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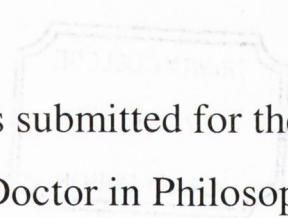
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Improving equity in resource allocation in the Irish health service

Rosalyn O'Loughlin

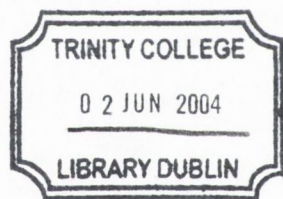


Thesis submitted for the degree
Doctor in Philosophy
at University of Dublin

Department of Public Health and Primary Care

March 2004

Supervisor: Dr. Alan Kelly



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DECLARATION

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SUMMARY

Background

Health systems worldwide are moving towards making their systems more transparent and more equitable, often due to pressure from consumers. Reforms to resource allocation systems are one attempt to do this. The nature of these reforms is varied but several are based on the concept of needs based weighted capitation models. The resource allocation system in Ireland's health service is non-transparent and is generally perceived as being inequitable. Due to the developments in other countries, Ireland can draw on their experiences to explore the options in relation to resource allocation reform. The aim of this study is to examine the desirability and feasibility of developing and introducing a more equitable alternative model for health care resource allocation in Ireland.

Methods

This research was carried out in four distinct strands. The first strand was a Policy Delphi study that examined the views and opinions of 52 senior health service policy makers, managers and planners in relation to equity in resource allocation and improvements that could be made to the system. This was done using a three round questionnaire study where responses were fed back to the panellists through an iterative process. This methodology allowed a diverse group of individuals to interact anonymously on a complex topic without the group actually having to meet.

The second strand used Benchmarks of Fairness, a tool developed in the US, to assess whether a theoretical needs based resource allocation model for Ireland, would actually improve equity. This tool was first modified for Ireland and then a team of four researchers scored each benchmark in relation to the equity of the proposed health care reform.

The third strand developed a five stage framework for a resource allocation model for Ireland, based on the experiences of other countries. One of the main decisions in the development of this framework was whether to use small area based data or individual level data. As data in Ireland are not fully available for either type and as the literature advocates the superiority of models based on individual level data, individual level data were used for the framework.

The fourth strand used empirical Irish data to test this framework for acute hospital inpatients. A master database of each individual in the country was created including demographic, socio-economic, health care utilisation, access to health services and vital status information. As no unique personal identifier exists in Ireland this database was created using a certain degree of estimation while keeping as close to reality as possible. Once the database was created, a logistic regression analysis was run to find the variables that best predicted whether someone had had an inpatient hospital event. Variables that were statistically significantly associated with an event were used to form a cost matrix for the country. A corresponding population matrix was created for each Health Board and the two matrices were multiplied and summed to get the overall allocations.

Results

The main finding from Policy Delphi study was that the panellists thought that the method of resource allocation was inequitable and they made several suggestions for improvement the main one being the development and introduction of a needs based resource allocation model. The Benchmarks of Fairness study found that introduction of such a model would increase equity in the health system (scored 0.93 out of a possible maximum of five and a minimum of minus five). This provided the justification for developing a framework for a need based resource allocation model. Testing of the framework was only possible for the acute hospital sector due to data limitations. The relative expected cost for each Health Board's acute hospital expenditure was calculated and this was compared with the actual allocations to each Health Board. This found that Health Board's estimated needs ranged from 1.8% less to 4.4% more than their actual allocations.

Conclusion

The extent to which a reform of the resource allocation process can take place will depend on the political will, the information sources available and choosing an acceptable method. The development and implementation of the proposed model requires investment in data systems including the introduction of a unique personal identifier to allow linking of databases. Limited data sources at present means that the results from testing the framework need to be interpreted with caution and further research is required, for example, in dealing with the problem of unmet need. The current system of resource allocation in Ireland is unacceptable and this proposed framework will improve its equity and transparency.

ACKNOWLEDGEMENTS

Firstly I would like to express my sincere gratitude to my supervisor Dr. Alan Kelly for his assistance, support and advice.

In addition I would like to thank the following:

All the panellists who took time from their very busy schedules to take part in the Policy Delphi study.

Ms. Frances O' Keeffe for her, assistance with the Policy Delphi study, for her words of wisdom and for reading drafts without complaint.

Dr. Fergus O'Ferrall, Dr. Darice Broomfield and Ms. Patricia White for their advice and support on the Policy Delphi study.

Dr. Joe Barry and Professor Tom O'Dowd for their general support and their assistance with both the Policy Delphi study and the Benchmarks of Fairness component of the study.

Conor Teljeur for his technical expertise and for providing the accessibility index and demographic information.

All the staff of the Department of Public Health and Primary care for their support and encouragement particularly Jean Long, Elaine Hand, Deirdre Handy and Ailbhe Mealy.

The Health Research Board for funding me through their Health Services Research Fellowship Scheme.

Finally, I would like to thank my family and friends (particularly Susi) for their support and encouragement.

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GLOSSARY

Terms in the glossary are in italics in the main text

Casemix	Casemix is a system used to classify patients by type of illness and resources used in treating them. It uses details of activity and cost for assessing comparative efficiency of hospitals and to influence in part the total allocation given to each hospital.
Community rating	A rating process that produces average premium rates for a defined community of insured people.
Confounding	The possibility that the observed association is due totally or in part to the effects of differences between study groups other than the exposure under study that could affect their risk of developing the outcome of interest.
General Medical Scheme	(GMS) A means tested system where those below a certain income limit are eligible for a medical card which entitles them to free primary and secondary health care.
Misclassification	Errors in the classification of either exposure or disease status.
Moral hazard effect	Hospital alters the level of treatment they provide in response to changes in payment incentives in an attempt to discourage the admission of unprofitable patients.
Progressive	A finance system is progressive if the proportion of income paid out for health care rises as the level of income rises.
Proportional	A finance system is proportional if the proportion of income paid out for health care is the same at all income levels
Regressive	A finance system is regressive if the proportion of income paid out falls as income rises.
Risk adjustment	An adjustment which seeks an unbiased estimate of the expected costs of a citizen to a health care plan relative to all other plan members, given the citizen's personal characteristics.
R² values	Assesses crudely how well the model fits the data.
Selection effect	Hospitals alter their admission policies in response to changes in payment incentives in an attempt to discourage the admission of unprofitable patients.

LIST OF ABBREVIATIONS

CSO	Central Statistics Office
DED	District Electoral Division
df	Degrees of freedom
DRG	Diagnostic Related Group
EHB	Eastern Health Board
ERHA	Eastern Regional Health Authority
EU	European Union
GMS	General Medical Scheme
GP	General Practitioner
HIA	Health Impact Assessment
HIPE	Hospital In-Patient Enquiry (scheme)
MHB	Midland Health Board
MWHB	Mid-Western Health Board
NEHB	North-Eastern Health Board
NWHB	North-Western Health Board
NCR	National Cancer Registry
NHS	National Health Service (UK)
OECD	Organisation for Economic Co-operation and Development
ROC	Receiving operating characteristic
SAHRU	Small Area Health Research Unit
SAPS	Small Area Population Statistics
SHB	Southern Health Board
SEHB	South-Eastern Health Board
SMR	Standardised Mortality Ratio
US	United States
VFM	Value for Money
WHB	Western Health Board
WHO	World Health Organisation

CHAPTER 1: INTRODUCTION

'No variation in the health of the states of Europe is the result of chance; it is the direct result of physical and political conditions in which nations live.'

William Farr 1866

1.1 Background to the research

In general, developed health systems have similar philosophies, which are that the poor and very sick should not be denied essential health care as a result of an inability to pay.¹ Health systems worldwide are moving towards making their systems more transparent and more equitable, often due to pressure from consumers.^{2 3} Reforms to *resource allocation* systems are one attempt to do this. The nature of these reforms is varied but several are based on the concept of weighted capitation models, in many cases adjusted for need.⁴ Evidence that needs based resource allocation models actually reduce inequities in health care is weak, but the underlying theory (i.e. that allocating resources according to need should improve health outcomes) is strong. The weakness in evidence is mainly due to difficulties in measuring the impact of the changes in resource allocation.^{4 5}

1.2 Research problem and hypotheses

The research problem addressed in this thesis is that the current method of resource allocation in Ireland has been reported as being non-transparent and is generally perceived to be inequitable.^{6 7} In order to solve this problem either an improvement will have to be made to the current system of resource allocation or a new system will have to be implemented. The research hypothesis is therefore that reform of the current method of resource allocation in the health service in Ireland will make the health system more transparent and in particular more equitable. It is not possible to prove this hypothesis irrefutably in this study as empirical data are not of a high enough quality to fully implement the framework for reform developed in this study. This reform needs to be implemented in real time and assessed and evaluated over a period of several years before this hypothesis can be proved. However the findings of the study suggest that, using the framework developed, reform of the current method of resource allocation in the health service in Ireland will make the system more transparent and equitable.

1.3 Justification for the research

Equity has become a central tenet in the main health policy documents in Ireland over the last number of years.^{8 9 10} The four principles of the current Health Strategy are equity, accountability, quality and people-centredness.¹⁰ Despite this, a number of reports have highlighted the inequities in resource allocation in Ireland.^{7 6} They have also pointed out the difficulty in determining accountability of the system as it is not transparent. The methods of resource allocation from central government to Health Boards have traditionally been based on historical precedents with increases for inflation and for some special programmes.^{7 10} In order to address this perceived inequity, health service managers are becoming more interested in developments in other countries such as the development of needs based weighted capitation models. These methods are not directly transferable to Ireland due to differences in our data sources and health system. In addition the models in use in other countries are not without fault and it is necessary to pick the model that will best meet our present and future needs. While the Department of Health and Children have committed to reviewing the resource allocation process, they have not stated in detail what approach they will adopt.¹⁰

1.4 Aims and Objectives

The aim of this study is to examine the desirability and feasibility of developing and introducing a more equitable alternative model for health care resource allocation in Ireland. The underlying theme of this research is the pursuit of equity

The objectives of this study are to:

- Elicit 'expert' opinion to determine desirable and feasible alternatives for improving equity in resource allocation using a Policy Delphi study.
- Assess the equity impact on the Irish health system of a theoretical implementation of a needs based weighted capitation model using Benchmarks of Fairness.
- Decide whether an area based or an individual level model is most appropriate for Ireland and, based on this develop, a framework for a needs based weighted capitation model for Ireland.
- Apply this framework using available empirical data.
- Examine the changes required in Irish health information systems in order to facilitate development and implementation of the proposed model.

1.5 Outline of the thesis

This thesis commences with detailed background information in Chapter 2. The research was carried out in four phases and these are presented in the following four chapters. The first phase used a policy Delphi study to elicit the views and opinions of an expert panel of health service planners and managers on the research question. (Chapter 3) The second phase used Benchmarks of Fairness to establish whether the implementation of a needs based resource allocation model, one of the suggestions for improving equity from the Delphi study, would actually improve equity of the Irish health service. (Chapter 4) The third phase centred around the development of a framework for a needs based resource allocation model for use in Ireland. (Chapter 5) The fourth phase applied the limited empirical data available in Ireland to this framework to test its appropriateness. (Chapter 6) Each of these Chapters contains a discussion on the issues and limitations pertaining to that particular topic and Chapter 7 is reserved for bringing the findings of these research phases together and looks at the overall implications of developing and introducing a needs based resource allocation model for Ireland. The final Chapter (8) presents the conclusion and recommendations of the study. The recommendations centre on the further research required and the improvements in data sources necessary, to allow a needs based model to be developed using individual level data.

1.6 Delimitations and key assumptions

Many countries that have social insurance funding mechanisms use capitation models for resource allocation. However, they are generally not needs based and therefore this thesis concentrates on those health systems with needs based capitation models and these generally tend to have tax-based funding systems. Health funding systems are only commented upon in the context of equity and resource allocation. The creation of resource allocation models in other countries is a long detailed process that is performed by a multidisciplinary team including, among others, econometricians, health policy analysts, statisticians, social scientists and public health practitioners. Lack of access to the expertise of such a team for this study and limited empirical data have resulted in the development of a framework for a model rather than an actual model. The main assumption underlying this research and mentioned many times is that, in order for the framework to work, an improvement will be needed in Irish data sources, specifically the introduction of a unique personal identifier and permission to link data sources using this identifier. The term resource allocation in this thesis refers to recurrent annual monetary funding only and not to funding for capital projects.

1.7 Other contributors to this research

The bulk of the work of this thesis was done by the author. However, assistance was received with the Benchmarks of Fairness study from three colleagues in the Department of Public Health and Primary Care, Dr. Alan Kelly (supervisor of this thesis), Dr. Joe Barry (Senior Lecturer in Public Health) and Professor Tom O'Dowd (Professor of General Practice and Head of Department). Along with the author, these made up the research team for this part of the study. The four-team members scored the benchmarks and assisted in writing a paper which is currently undergoing a peer review process for the Journal of Health Services Research and Policy. Chapter 4 of this thesis provided the framework for that paper. The same colleagues formed the Policy Delphi panel selection group described in Chapter 3.

1.8 Ethical considerations

Ethical approval was granted from the Trinity College Public Health Ethics Committee for this study. Permission was sought and granted from the Registrar General for use of mortality data. Permission was sought and granted from the Department of Health and Children for use of the Hospital Inpatient Enquiry (HIPE) data. Other data were obtained from publicly available sources that did not require ethical approval. No individuals were identifiable from the data. Access to the master database created was only available to the author and supervisor and was stored on a computer on in a locked office.

1.9 Conclusion

This Chapter has laid the foundations for the thesis. It introduced the research problem and hypotheses. The research was then justified and the aim and objectives stated. The outline of the study was presented followed by the main delimitations and key assumptions. This thesis now proceeds with a detailed description of the research. The main recommendation of this research is that there is reform of the resource allocation methodology in Ireland through the implementation of a needs based resource allocation model using individual level data. Ultimately, the extent to which such a reform can take place will depend on the political will, the information sources available and choosing an acceptable method.

CHAPTER 2: BACKGROUND

2.1 Introduction

2.1.1 *Layout*

The background is divided into three main sections. The first section contains a discussion of equity in health generally, which includes an international perspective. It also looks at various methods used to evaluate whether health care reforms or proposed reforms are equitable. The second section examines equity in the context of health care resource allocation. It starts by detailing the different methods of resource allocation and focuses on needs based capitation models. The third section discusses equity in the context of the Irish health care system, specifically examining its system of resource allocation and the current Health Service Reform Programme.¹¹ As stated in Chapter one, the aim of the study is to examine the desirability and feasibility of developing and introducing a more equitable alternative model for health care resource allocation in Ireland.

2.1.2 *Search strategy*

The literature quoted in this Chapter comes from a number of sources including peer reviewed journal articles and grey literature. The grey literature includes published and unpublished reports and working papers from universities, governments and other health agencies. The Medline database (from 1964 to present) was searched using the following key words; 'resource allocation', 'capitation models', 'capitation formula', 'needs based formulae', 'needs based capitation models', 'needs based resource allocation', 'Benchmarks of Fairness' and combinations of these words with 'equity'. Several articles and reports were sourced from the references of relevant articles. Searches were also made of individual authors who have made a major contribution to this body of work.

2.2 Equity in health

2.2.1 *Definitions of equity in health*

There are several definitions and interpretations of equity in health in the literature. One of the most comprehensive is from the International Society for Equity in Health:

Equity in health is the absence of systematic and potentially remediable differences in one or more aspects of health across populations or population groups defined socially, economically, demographically, or geographically.¹²

The term equity is often misunderstood and is often used interchangeably with equality. Inequalities in health describe the differences in health between groups without any assessment of the fairness of these differences. Inequities are more of a comparative principle and are a subset of inequalities that are judged to be unfair and unavoidable.¹³ Reference is made to the WHO recommendation (below) in relation to the equity principle in the Irish Health Strategy.¹⁰

Everyone should have a fair opportunity to attain full health potential and more pragmatically no one should be disadvantaged from achieving this potential, if it can be avoided. Inequity refers to differences in health, which are not only unnecessary and avoidable but, in addition, are considered unfair and unjust.¹⁴

The concept of fairness is closely related to that of equity in that inequities must be eliminated for the system to be fair.¹⁵ WHO define fairness as attaining the smallest feasible differences in health status among individuals and groups.¹⁶

2.2.2 Vertical and horizontal equity

Ultimately, it is up to governments to promote a definition of what should be regarded as health inequity, so that they can introduce fair, comprehensive and acceptable health policies that provide value for money.^{17 18} These health policies generally aim for health services that are received according to need and where payment is made according to ability to pay. This introduces the concepts of vertical and horizontal health equity. Horizontal equity is defined as equals being treated equally and vertical equity as unequals being treated unequally.^{1 19} These concepts are further discussed below.

2.2.2.1 Distribution of health care according to ability to pay

It is widely accepted internationally that people should not be denied essential health care purely on the basis that they cannot afford to pay.¹ There is a debate over how ability to pay should be assessed. Pre-tax income or pre-tax income including income from assets are two options, with the latter being the favoured option from an equity perspective. However due to

limited data, pre-tax income alone is generally used. According to the definition of vertical equity, people with unequal ability to pay should make appropriately dissimilar payments for health care. In a centralised public health care system this is generally through national taxation. Whether those with greater ability to pay should be paying more in *proportional* terms or absolute terms is a question that is rarely addressed in health policy statements.¹ In the first case the relationship between ability to pay and payments would be *progressive* and would be the best option. In the second case the relationship between ability to pay and payments would be proportional or even *regressive*, a less favoured option.¹

The issue of horizontal equity in the finance of health care has received little attention. To achieve horizontal equity, people with the same ability to pay should make the same contribution. These payments should be regardless of characteristics such as gender, marital status, trade union membership, and place of residence. In private insurance systems, where there is no *community rating*, high-risk groups, for example the elderly, can experience horizontal inequity by paying higher premiums than lower risk persons of the same ability to pay.¹

2.2.2.2 Distribution of health care according to need

The requirement that health care be distributed according to need can also be interpreted in terms of both vertical and horizontal equity. As individual health care needs differ it follows that the resources needed to meet these needs differ in different areas.

Need has been defined as '*the ability to benefit from health care*'.²⁰ Four concepts of need have been described. These are normative need defined as a 'desirable standard' set down by planners, managers and others, felt need which is what people want, expressed need, determined by what people actually or attempt to use and comparative need which is a comparison of demographic profile with services provided.²¹ Unmet need occurs when services are less for a specific population group for example travellers, ethnic minorities or rural groups, than for the population at large.²² If need is defined with no sensitivity to the special needs of disadvantaged populations it is likely that inequities will be exacerbated.²³

If a person has a greater need for health services than someone else but does not receive a greater amount of these services then vertical equity is not achieved.¹ ²⁰ If people with equal

need actually end up receiving equal treatment irrespective of personal characteristics that are irrelevant to need such as ability to pay, race gender and place of residence then horizontal equity has been achieved.^{1 20} Health status is assumed to predict health care needs. As health status varies across socio-economic groups then so too does need. Measurement of horizontal equity requires a comparison of the levels of health care utilisation with levels of need. Violations of horizontal equity may occur if the wealthier in society secure more than their fair share of health care.¹

2.2.3 Theories of equity in health care

There are several theories that underlie equity in health care. The egalitarian theory is that everyone is given an opportunity to have equal health status and that payments for health care should be related primarily to ability to pay rather than to the amount of medical care received.¹ Libertarians believe that people should, if they wish, be able to pay for more or better care than their fellow citizens provided the poor and sick are catered for by a set of minimum standards.²⁴ Utilitarianism is the belief that everyone should be brought up to the highest possible level of health by maximising the sum of individual well being.¹⁸ Policy makers in most countries generally appear to accept the egalitarian principle that access to health care should be available according to need irrespective of their willingness and ability to pay.¹ In practice, in most countries including Ireland, health care is financed and delivered by a mixture of systems and policies, within which are reflected various theories, with the emphasis often changing with changes of government.

2.2.4 Health equity internationally

Cross-country comparisons of health systems have traditionally concentrated on comparing efficiency measures, with concerns about equity and fairness often ignored.² Health care reforms worldwide in the 1990s were efficiency orientated. Evaluation of these reforms shows that choice of care and access to care improved for the well off and dis-improved for the less well off.²⁵ More recently, particularly due to extensive health care reforms of some industrialised countries, policy makers are considering the issue of equity in addition to economic and political issues.^{2 3} The presence of equity objectives in many Organisation for Economic Co-operation and Development (OECD) country's health care policies, including resource allocation policies, demonstrates the importance of equity in the ethical basis underpinning health care systems.^{1 19} A comparison of these policy statements has revealed that there is broad agreement over the meaning of equity.¹

Politicians have not traditionally welcomed research on inequalities in health. This was highlighted when the UK 'Black Report' on inequalities in health²⁶ was launched in 1980 with minimal publicity. The 'Black Report' presented evidence of marked differentials in health outcomes:

'...from birth to old age those at the bottom of the social scale have much poorer health and quality of life than those at the top...gender, area of residence and ethnic origin also have a deep impact'.²⁶

More recent research has found that these inequalities are continuing and in some cases widening, showing how sensitive health remains to socio-economic circumstances.^{27 28}

Recommendations from the 'Acheson report',²⁷ an independent inquiry into inequalities in health which highlighted the continuing inequalities in health by socio-economic status in the UK, have been criticised for being more related to health promotion than to reducing health inequalities. Lack of cost-effectiveness prioritisation of recommendations made it difficult for the government to choose between the various recommendations made.²⁹ Reports highlighting inequalities have been criticised for, *'...selective reporting of statistics to meet an agenda'*.¹⁷ Reporting of ratios only rather than ratios and absolute numbers can be misleading and risks the promotion of policies that do not benefit as many in society as other options may.¹⁷

The focus more recently in the measurement of health inequalities has been to examine the variations in the risks to individuals within groups across a society rather than the traditional method of just examining the variations between groups.³⁰ This individual approach has been used by the WHO in the 2000 World Health Report.¹⁶ The individual approach is an attempt to measure the distribution of health in the population, including assessing fairness. Findings have shown that while countries may have similar average values, for example mortality rates, there are large differences in inequalities and inequities between countries.¹⁶ This new approach has received much criticism from the international community. Criticisms focus on methodological weaknesses, failure to use a value free measure, and lack of a clear distinction between inequalities and inequities.³¹ This last point is reflected in the international health-inequality policy debate, where ethical considerations about the point at which an inequality becomes an inequity are lacking.¹⁷

2.2.5 Barriers to equity

Access to health care remains one of the main barriers to health care and includes financial, geographical, time (for example inconvenient opening times), social inconveniences, psychological and cultural barriers.^{32 33} The 1972 inverse care law states that "*The availability of good medical care tends to vary inversely with the need for it in the population served*".³⁴ A recent paper which revisited the inverse care law, pointed out that it is still true and that more resource are needed to treat and prevent disease in more deprived areas.³⁵

Accessibility to hospital has been defined as '*having the right and means to approach the hospital services with a view to utilising those services*'.³³ It therefore requires that health services are in place. Sometimes utilisation is mistakenly used as a measure of access. However utilisation is a measure of the met demand, which could reflect unnecessary use or hide the level of unmet need, rather than reflect access.³³ There are few studies evaluating policy interventions to reduce these inequalities in access to health care.

Distance is a convenient, though crude, measure of the relative differences in geographical accessibility to health care services.³² There is a move currently to rationalise and move health services to expert centres.³⁶ The primary aim of this in Ireland is to meet the European working time directive for medical staff. While rationalisation is likely to meet some resistance, one theory is that distance barriers would be overcome by the perceived benefits to be obtained from travelling to these large expert services. However this was found not to be the case in a systematic review which looked at how distance from a hospital affected its use internationally.³³ A distance decay function found that increasing distance resulted in reduced utilisation. It was concluded that the results were suggestive rather than conclusive as the quality of the studies in the review were found to be poor, mainly as they did not look at potential *confounding* factors. The GP, as gatekeeper, has an important role in controlling access to health care. If access to primary care is restricted this will have a direct effect on most elements of secondary care. A recent UK study, which controlled for supply confounders, and examined distances to GPs and hospitals, found that distance from these health care facilities did reduce hospital use.³² This study concluded that the UK National Health Service (NHS) was failing to achieve its objective of providing fair access to services as geographical inequities persist.

Most evidence based guidelines assume that an individual has a single complaint without considering what has been described as the concept of '*co-morbidity of socio-economic deprivation*' which measures the quantity of co-existing health and social problems within families.³⁵ It is clear that these problems can provide barriers to health and health care,^{13 23} as the links between poverty and ill health have been well documented.³⁷

2.2.6 *Tackling inequities and evaluating outcomes*

Equity in health outcomes is the most important dimension of health equity. Eliminating barriers to health care, while desirable, are useless unless health outcomes are equitable.¹³ An assumption is often wrongly made that all health inequalities are inequitable and that intervention should take place regardless of the opportunity costs involved.¹⁷ An international review carried out on the effectiveness of health service interventions to reduce variations in health identified a number of interventions which were in some cases shown to reduce variations in health.³⁸ The quality of the studies reviewed was found to be poor so they recommended that more good quality experimental studies on interventions be carried out and recommend that 'equity audits' of health services take place in order to monitor changes and identify gaps in equity. Impact assessment is a standard component of policy appraisal and includes Economic Appraisal, Environmental Impact Assessment, Social Impact Assessment and more recently Health Impact Assessment (HIA).³⁹ Countries are now adopting HIA, or in some case the more targeted Health Inequalities Impact Assessment, on any government policy influencing health.^{10 27} This is similar to health equity proofing and focuses on how fairly resources are distributed in relation to the health needs of different groups and may include services, facilities, and determinants of health such as employment and education.

A set of criteria was developed for judging policy recommendations as part of the Acheson enquiry.²⁷ These criteria included asking whether the policy was supported by systematic empirical evidence, the ease and cost of implementation, whether it fitted in with current policy, and the potential harm or benefit it could cause. The UK government has been criticised with regard to its policies to reduce health inequalities that were implemented on the grounds of the Acheson report findings, as there is no evidence that the policies are evidenced based, and therefore their evaluation may not show any improvement in health inequalities.²⁹

⁴⁰ In order to determine whether health care reforms have affected equity it is necessary to be able to measure equity adequately. Benchmarks for Fairness (described in Chapter four) are perhaps one such measure.²

2.3 Equity in health care resource allocation

2.3.1 Layout

This section explores the type of resource allocation systems used internationally and explains how capitation models have become more popular in recent years. It then describes what capitation is, its principles and the factors necessary to create a capitation formula, that is, the identification of needs factors and weighting of those factors. Limitations of capitation models are also discussed. This study proposes to develop a framework for a capitation model for the Irish health system. While this would have the dual advantages of containing costs and improving equity, it is equity that is of most concern in this study. Therefore, capitation systems designed to control costs only, usually those operating through competitive insurers, will not be discussed in detail. Countries where these systems are employed tend to follow insurance based funding systems. As Ireland has a taxed based funding system, most of the countries discussed in relation to capitation formulae will also have a tax based funding system. Sweden and the UK are the main examples discussed.

2.3.2 Methods of resource allocation

There are four main methods of health service resource allocation or budget setting used internationally. The first is fee for service. This is where there is no budget and a practitioner or institution will receive payment for all expenditure incurred. This method, while administratively simple, can make it difficult to contain costs as a perverse incentive is created to maximise health care delivery.⁴ The second method is allocation on a non-objective basis such as historical or political. The lack of objectivity in this method makes it non-transparent and therefore it is perceived to be inequitable.⁴ The third method allocates resources based on health outcomes or performance activity levels. While this gives an incentive to minimise cost on individual episodes of care, it provides no incentive to restrain the number of episodes,⁴ leading to negative consequences such as the *moral hazard effect* and the *selection effect*.⁴¹ The fourth method of health service resource allocation is prospective funding for expected activity. Ideally the plan will operate within a budget, which is not influenced by current activity, and therefore has an incentive to restrain both referrals and the costs of referrals. In reality however, current activity is often used in setting these budgets. The adverse consequences of this method may be to reduce the quality of health care offered, or to introduce rationing and waiting. The prospective budget may be based on

realistic forecasts of future expenditure, or it may be deliberately set lower than such forecasts, for example to encourage efficiency improvements.⁴

While most health care systems consist of combinations of these methods, systems are generally moving towards the prospective setting of budgets based on expected activity.⁴ A number of methods could be used to construct such budgets, for example, bilateral negotiations between funder and provider or extrapolation of historical expenditure levels. However such methods are generally heavily criticised because they appear arbitrary and may perpetuate existing inefficiencies and inequities. Increasing use has therefore been made of capitation methods, which are considered a more objective approach towards setting budgets.⁴

2.3.3 *Capitation models*

Capitation is defined as:

'...the amount of health service funds to be assigned to a person with certain characteristics for the service in question, for a specified time period and subject to any overall budget constraint'.⁴

Capitation models are now a commonly used policy instrument in developed health care systems for securing both equity and efficiency objectives.^{4 42} Development of capitation models has been described as both a political and a technical undertaking and in general they are not combined with any other budget setting mechanism.⁴³

Capitation models fall into two categories - non-weighted and weighted. Non-weighted capitation formulae derive a cost per head for every citizen without considering any individual factors that would influence that cost. An example is Spain where an equal amount of funding for each citizen is allocated regardless of personal circumstances.⁴⁴ Weighted capitation formulae are calculated by varying the capitations according to an individual's personal and social characteristics. This is done using 'needs adjustment' and the resulting formulae are often referred to as being 'needs based'. The equivalent terminology in relation to competitive insurance plans is *risk adjustment*.⁴³ The intention is that the weighted capitation models should represent an unbiased estimate of the expected costs of the citizen to the health system over a certain time. With this method, even where the overall budget is inadequate, the capitations should reflect the relative health care expenditure needs of citizens.⁴ There are successive degrees of refinement of weighted capitation models. Countries with social insurance health systems, for example Germany, Israel and Switzerland,⁴ only use basic

demographic data such as age and sex in their models. Other countries, for example the UK⁴⁵ and Sweden,⁴⁶ have much more sophisticated systems that include variables such as mortality, morbidity and socio-demographic factors.

2.3.4 Principles of needs based weighted capitation models

The purpose of a needs based weighted capitation model is:

'...to identify the national average response, in terms of health care expenditure, to a set of local socio-economic 'needs' indicators, after adjusting for supply factors' ⁴⁷

These models present an expected level of expenditure per head, but a large degree of variation is expected for any individual.⁴ As the capitations are generally estimates of historical expenditure for similar individuals they take no account of unmet need.¹⁹ Rather than measuring the absolute need for health care resources in a region, needs based funding models attempt to capture the variation in relative need for health care of regional populations.

There are a number of factors that should be considered when developing a capitation model. These include equity, practicality, transparency, objectivity, relevance, stability, responsiveness, evaluability,⁴⁸ validity, acceptability, resistance to manipulation, flexibility, avoidance of perverse incentives and feasibility.⁴³ While all are important, equity, objectivity and transparency are considered to be the most important.⁴⁸ These principles can easily be compromised, for example, by using inappropriate statistical methods⁴⁵ or by using readily available but inadequate needs adjusters in the model.⁴³

In a Canadian review of the policy considerations of capitation models it is stressed that there is no difference in the quality or innovation of programmes that have capitation models compared to those that do not. They recommend that the introduction of capitation based models should be gradual and that simple more manageable models should be chosen over more complex ones. A concern they raise is the number of diverse approaches to the development of capitation formulae and how each country *'...suit their own objectives'*. They consider this lack of a universal standard to be worrying.⁴³

2.3.5 *Equity of capitation models*

While specific methods vary, the underlying aim of needs-based capitation models is the pursuit of equity, specifically to attain equal access to health care for equal need and to contribute to equity of health outcomes.⁴ In reality little attempt has been made in capitation models to allow for equity of health outcomes. Some countries, for example New Zealand, have attempted to make adjustments for disadvantaged groups (i.e. Maori) who are known to suffer poorer health.⁴ There is an assumption that achieving the objective of securing equity of access to health care through equitable resource allocation will automatically result in equity of health outcomes. This is not necessarily the case. It can be difficult to determine whether a needs based resource allocation model is achieving equity particularly in a time of cutbacks.⁵

There is limited literature examining the success of capitation models in achieving equity. In a review of the UK Labour Government's performance,⁴⁹ it is stated that despite money being redistributed to areas with increased health care need over the last few decades the health gap widened. There is some dispute that there was ever any true redistribution of resources. An example is of extra resources for deprived areas going to recruit and retain GPs to work in these areas rather than into the area itself.³⁵

An evaluation of the resource allocation process over 19 years in Scotland examined the relationship between standardised mortality ratios (SMRs) and the rate of change of per capita health care expenditure.⁵⁰ It was assumed that a reduction in mortality would be found due to increasing and more equitable health spending. However it was found that while there has been a narrowing in the differences in the per capita funding of each Health Board there has been a worsening of the SMRs in some areas. The authors concluded that non-health public policy has a large impact on health and mortality and this cannot be controlled for by healthcare providers.⁵⁰ It has also been suggested that it may be more economical to leave the health care resource allocation system unchanged and make other public policy changes that would reduce inequalities in health.⁴⁷ Changes to the weighting of mortality in the English formula in 1988 led to a redistribution of resources from areas with high premature mortality to areas with low premature mortality, a redistribution which was not desirable.⁵¹

2.3.6 Predictive and explanatory power

Estimates have been made as to the proportion of variation in annual expenditure than can be explained using capitation models. In order to improve the predictions of Medicare in the US the percentage variation in expenditure explained using objective health measures and prior utilisation was examined. They found that if both factors were added to the model approximately 60% of variation was explained with decreasing percentages as the number of variables reduced.⁵² Many capitation systems do not have objective measures of health and prior utilisation that meet the data criteria outlined above and thus models have poor predictive power. This leads to the problem of large budget fluctuations particularly in small areas.⁴ Recent work on the English resource allocation models has produced well specified models with R^2 values of 0.72 for the acute hospital model, 0.74 for the acute and maternity hospital model and 0.71 for the acute, maternity and mental health services model.⁵³

2.3.7 Deriving capitation models

Three main factors are described in the derivation of capitation models. The first relates to the choice of variables to be incorporated into the model. These should capture the main reasons why health care needs vary,⁵⁴ and routinely include population size and the age / sex distribution of the population. In addition a varying number of needs factors maybe included. The second factor in deriving capitation models is the weights to be placed on these variables. The third factor is the adjustment that must be made to account for supply.⁴ Each of these factors are discussed below.

2.3.7.1 Variables

Population

A measure of the size of the population of each area is required. Because census data are only updated every five to ten years, numbers are generally projected to obtain year-on-year figures.

Age sex cost weights

It is widely acknowledged that costs vary according to age and sometimes according to sex so these variables are generally included in capitation models⁴ In particular health care costs have been found to rise in the period preceding death.

Need factors

Needs factors are used to measure the relative health care needs over and above the size, age and sex of the population in each area. They are defined as factors that represent '*...demonstrably material influences on the need to consume the services under consideration*'.⁴ The decision on whether to include a particular needs factor or not depends on whether it is a statistically significant explanatory factor for health care spending in the context of a chosen model. A normative approach (selecting needs factors based on evidence) or an empirical approach (selecting needs factors based on their proven association with health care spending) can be used to identify needs factors. The empirical approach tends to be the one adopted in capitation models.⁴

No direct measure of health care need has been identified by any of the resource allocation models examined. Therefore, several proxy measures of need are used. A number of problems, listed below, have been identified in the selection of needs factors to be included in health care capitation models.⁴

- Relevant data are limited
- Research evidence on appropriate needs factors is poor
- Difficulty in handling covariances between needs factors.
- Difficulty in disentangling legitimate needs factors from other influences on utilisation.
- Difficulty in identifying costs associated with needs factors.
- Creation of perverse incentives

Capitation models are becoming increasingly sophisticated in an attempt to try and tackle some of these problems. Specific needs factors are discussed below under the headings of mortality and non-mortality needs factors and includes a section on unmet need.

Mortality as a needs factor

Mortality data, in the form of SMRs, are the most common needs factor used as they were historically considered to be a good proxy measure of morbidity and therefore of health care need.⁵⁵ The theory behind using SMRs for assessing need are the correlations that have been found between age/sex standardised mortality rates and morbidity.⁵⁶ Advantages of using mortality data are that they are produced annually, they are relatively accurate, they are mandatory to report, and were thought to be independent of the existing unequal supply of health services resources. In addition, some authors have shown that SMRs adequately account

for health care need,²⁰ and that they are a good indicator of social deprivation factors, which are likely to be associated with additional health resource needs.⁵⁷ Despite this, the use of SMRs as a needs factor have received much criticism, mainly because it is thought to understate the additional needs of socially deprived areas.^{58 51} Morbidity is not the only factor that impacts on health, and, if the correlation between mortality and morbidity is disrupted by social deprivation factors, this would cause the validity of mortality as a needs factor to be questioned. Despite these concerns, there is no evidence to date, that using SMRs for resource allocation fails to reflect relative needs for health care and it is considered that SMRs are a reasonable proxy for needs associated with population morbidity.⁵⁸

Non-mortality needs factors

The two main non-mortality based indicators used are morbidity and socio-economic characteristics. Some countries include a morbidity measure such as self-reported health status in their census or in annual household surveys. Often however, no such morbidity measure exists and service utilisation maybe used as a proxy. The problem with the latter is that utilisation may be confounded by supply factors.

Many socio-economic needs indicators have been developed in the form of composite scores or indices. Examples of some of these indices are the Jarman index^{59 60} and the Townsend Index⁵⁷ in the UK, the Carstairs and Morris index⁶¹ in Scotland and the Small Area Health Research Unit (SAHRU) index ⁶² in Ireland. All these indices have weaknesses. The Jarman index was criticised as being based on GPs perceptions of their patient's needs in a small area of the country and therefore not generalisable.²⁰ There was also dispute as to whether this index measured need or demand.⁶³ The Townsend index was criticised for lack of a conceptual basis for the choice of population characteristics used.²⁰ The Carstairs and Morris index, while explaining variations in SMRs very well, was criticised for including SMRs whose inappropriateness was the very reason for developing non-mortality based indicators.²⁰ The SAHRU index, based on 1996 data, is now seven years out of date due to a delay in conducting the Irish national census.

Non-mortality needs factors focus on the broader determinants of health status and are often used in combination with mortality indicators.^{20 51} The use of social deprivation factors attempt to explain differences in service use in terms of differences in deprivation levels after

allowing for mortality differences. Criteria for non-mortality needs factors are that they are valid, reliable and responsive. However there is no clear evidence that when used to allocate resources they reflect relative need for health care any better than the mortality based indicators.²⁰ An argument against including a variable to measure deprivation in resource allocation models is that deprivation is an area that can not be tackled by the health service alone.⁵⁸

An additional non-mortality needs factor sometimes used is a remoteness or rurality measure. A distinction needs to be made between remoteness and rurality, both of which are important factors for consideration in a capitation model as they measure the unavoidable excess costs of delivering health care in these areas. Remoteness relates to isolated areas that need their own health services despite having small populations, for example, islands.⁶⁴ Rurality relates to areas where there is an increased cost in health services but services are accessible, albeit often at a distance. A higher cost per patient is often a feature in smaller rural hospitals compared to larger hospitals due to economies of scale.⁴⁸ These factors require modelling in different ways.

A final non-mortality needs factor is the market forces factor. The market forces factor relates to the unavoidable differences in input prices over and above the remoteness and rurality costs referred to above. These would be the extra costs incurred for example in recruitment or retention of staff in particular areas, costs relating to high staff turnovers and variations in costs of equipment or services in particular areas. An adjustment has been made in the English capitation model known as the 'London weighting'.⁴ Cost variation relating to differences in efficiency of different health institutions should not be adjusted for in capitation formulae as they do not necessarily reflect differences in need.^{4 43}

Unmet need

Two types of unmet need are described in the literature - general and specific.²² General unmet need is when services cannot meet the needs of the population at large. Specific unmet need occurs when services are less for a specific population group (for example travellers, ethnic minorities or rural groups) than for the population at large.

As data rarely exists on unmet need and capitation models often use existing spending patterns for modelling, unmet need is often ignored.⁴ This leads to an increase of any existing inequity where spending patterns are based on historical precedents rather than on needs. Finding a successful measure of unmet need may create perverse incentives for individuals to join a particular disadvantaged group that is being targeted.⁴ Difficulties also arise in defining who belongs to a disadvantaged group,⁴ and may lead to labelling of particular groups and an increase in social isolation.⁶⁵ In the pursuit of vertical equity, tackling unmet need would require more resources to be allocated to disadvantaged populations relative to the main population.

Even if unmet need were taken into account in the capitation model another difficulty arises. There is a risk that these resources would be absorbed into existing programmes rather than be spent on the intended vulnerable groups in order to address that unmet need.^{4 47} It has been recommended that additional mechanisms to ensure correct use of these additional resources be put in place if an adjustment is made for unmet need.⁵⁴

2.3.7.2 *Weighting*

After the needs factors have been identified they must be assigned a weight that will reflect their relative influence on health care expenditure. This can be done by identifying the national average expected health care expenditure for each person for certain characteristics for example age, sex, and ethnicity. In order to carry out age sex weighting a breakdown of the population in each area by age and sex are required. This requires the necessary individual level data to be available. Where only aggregate data are available the tendency has been to rely on the results of statistical methods such as regression analysis, often performed at the small area level, to identify weights. This analysis is reported as having been performed with varying levels of refinement and statistical rigour and is often influenced by data limitations.⁴

Most of the criticism, particularly statistical ones, in relation to weighted capitation models have been in relation to the health needs element of the formula.^{51 63 66 67} This is despite the fact that population projections and age-cost weights have the biggest effect on capitation funding levels. A study compared the relative increases in capitation funding from 1991 with the projected 1997 population, based on the three main factors in the model - population projections, age cost weights and mortality weights.⁶⁶ Variation at district level was -17% to

28% overall, -16% to 31% for the population projection, -20% to 30% for age cost weights and -9% to 14% for the mortality weighting. The age cost weights which produced the biggest variation were criticised for over compensating for the cost of the elderly and for using crude calculation methods.⁶⁶ It has been recommended that the age cost weight calculations be well founded to avoid large funding variations.

2.3.7.3 Adjustment for supply

Utilisation measures are often used to measure health care need. This seems logical as it relies on the fact that access to health services is usually gained through a health professional or gatekeeper, and should therefore be appropriate. However this theory is flawed as health care use may vary depending on supply factors and similar use of services does not necessarily indicate similar need.²⁰ The early resource allocation models tried to explain differences in utilisation of service by differences in deprivation levels having allowed for differences in mortality. The correlations between service utilisation and deprivation factors were thought to reflect relationships between deprivation and need for healthcare. This analysis was done at small area level with the assumption that differences in supply of service were being controlled for which was not always the case.^{63 68} The reasons that utilisation measures should not be used to measure need are that variations in supply affect service use and perverse incentives may be created for service providers to increase or reduce their activity regardless of need. Utilisation measures also fail to measure unmet need.^{45 47}

There has been much discussion of how need of, demand for and supply of services overlap. (Figure 2.1)⁶⁹ That supply should be available to meet all need would be desirable but would lead to over-provision and require unrestricted resources. As need is difficult to measure it may seem that on some occasions need is being met but this does not account for the so-called iceberg of unmet need. Demand for services does not always reflect need. This can work two ways. People may need a service but do not demand it as they do not realise that they need it or they may demand a service that they do not need. This demand can lead to an over or under-provision of services. All these factors interplay to affect health service utilisation.

An adjustment should be made to the capitation models to account for supply factors e.g. the level of health care providers and services in an area. Distribution of services is often inequitable for historical reasons. Therefore, without adjusting for supply factors, there is a

danger of exacerbating existing inequities.⁴ In the area-based models this is done by using a two stage least squares regression model rather than an ordinary least squares model.⁴⁵

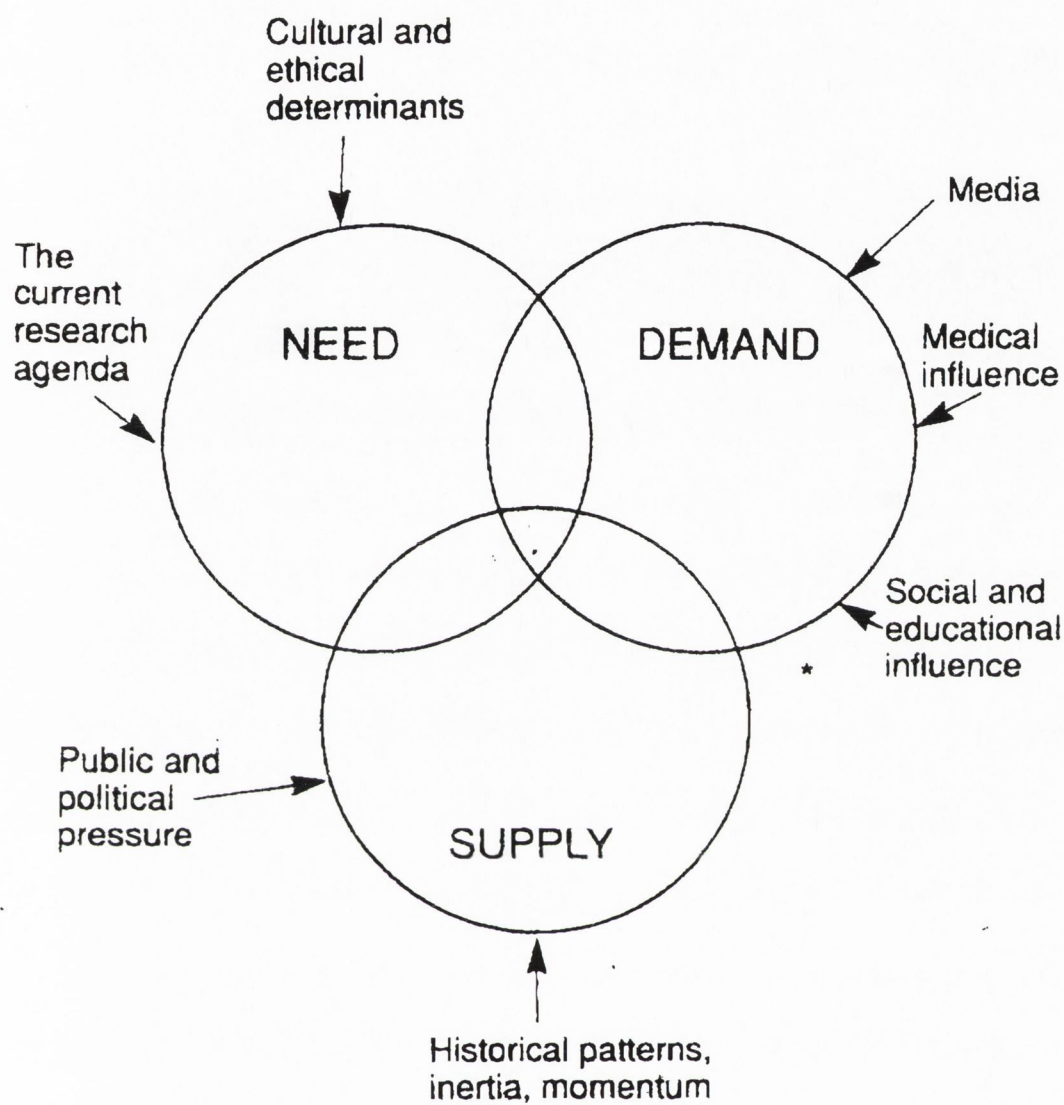


Figure 2.1: Need, demand and supply: influences and overlap⁶⁹

Need - what people benefit from, Demand - what people ask for, Supply - what is provided.

*The external field where a potential service is not needed, demanded or supplied.

2.4 Irish health system

2.4.1 Layout

This section gives some background to the Irish health system particularly in relation to resource allocation equity, the use of capitation models and the current Health Services Reform Programme.

2.4.2 Equity and equality in Ireland

Shaping a Healthier Future, the 1994 Health Strategy, laid down the principles of equity, quality and accountability for the development of the Irish health service.⁹ Attention was drawn in the document to inequalities in health in selected sub-groups of the Irish population. Subsequent research has highlighted inequalities in mortality (across the social gradient and across geographical regions)⁷⁰ and in hospital admissions (used as a proxy for morbidity).⁷¹ The National Health and Lifestyle Survey found that those in lower social classes were significantly more likely to report themselves as having poor health than those in higher social classes.⁷² In 2001, following a detailed consultation process, a new Health Strategy 'Quality and Fairness' was published. The strategy is structured under a vision, four principles, four goals, six frameworks and 121 actions as outlined in Figure 2.2.¹⁰ The principle of equity, the goals of fair access and better health for everyone and the framework for funding are highlighted as they are the main issues that pertain to equity in resource allocation. The wide range of factors which contribute to health inequalities such as social, environmental and economic factors are recognised, as is the importance of responding to peoples need and being perceived as being fair.¹⁰

Whilst equity has been a central issue of several Irish health strategies and policy documents⁸⁹ and is one of the four underlying principles of the current Health Strategy,¹⁰ the concept of equity has not yet been fully incorporated into the health system. This is particularly reflected in the continuing public private mix and resulting two tier system.

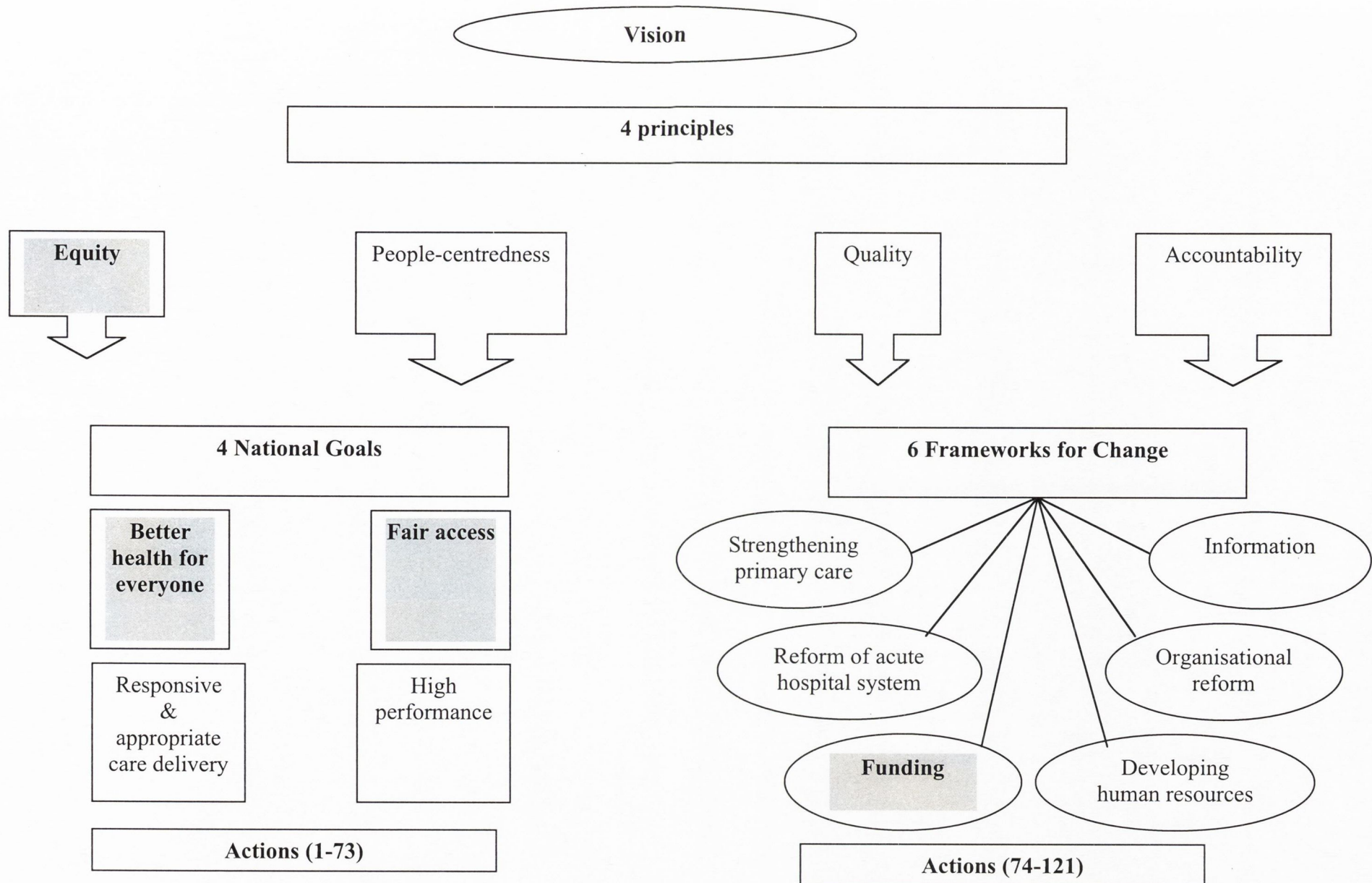


Figure 2.2: Structure of national Health Strategy⁸

2.4.3 Funding and resource allocation in Ireland

The Irish health system is largely a tax based publicly funded system. The health services received 75.8% of funds publicly, mainly through the tax-based system in 2000/2001. Between 11 and 12% of funding comes from the private sector and the remainder from out-of-pocket expenses, which mainly consists of private spending by households on drugs and GPs.^{7 73} Until 2001 Ireland has been consistently below the OECD national average per capita health expenditure.¹⁰ The favourable economic situation in Ireland in recent years has led to an increase in health spending bringing us closer to the OECD and EU average. Approximately 70% of monetary resources to the health service go on pay costs.¹⁰

Prior to the development of the new Health Strategy, a Value for Money (VFM) audit of the health services was commissioned by the government, one aspect of which was an examination of the resource allocation procedures. The Department of Health and Children currently allocates money annually to each of ten Health Boards who are then responsible for deciding how this money is allocated within the Board based on a previously agreed service plan. This allocation process has been based on historical costs with incremental increases, pay costs, service developments, funding for agreed specific items and *Casemix*.¹⁰ The VFM audit lists the problems inherent in the incremental system as not being conducive to medium or long term planning, reinforcing the status quo, unlikely to match the needs of the population nationally and reinforcing inequity in allocation of resources between competing Health Boards.⁷ The 2001 Health Strategy recognises the inequity and inefficiency in its incremental approach to funding. Actions in the strategy in relation to the funding framework include a review of the allocation process with the objectives of making the allocation system more transparent, more evidence based and taking into account the specific needs of the population.¹⁰ This goes some way towards meeting the recommendation of the VFM report,⁷ but fails to give any specifics. It is also difficult to see how a model based on need will fit in with the funding framework actions outlined in the strategy for example the proposed expansion of *Casemix*. The *Casemix* system focuses on system efficiencies rather than on equity, and there remains no objective needs-based element to the resource allocation system.

2.4.4 Public private mix

There are two eligibility categories in the Irish health care service. People in category one receive free medical care based on a means test that entitles them to free medical care (as

public patients) and they are said to be part of the *General Medical Scheme* (GMS). The remainder of the population are in category two and are entitled to public hospital care (subject to minimal charges) but are not entitled to free GP care or free prescription medicines (beyond a certain limit) as are the *GMS* patients.⁷⁴ Many category two patients take out private health insurance. The proportion of the Irish population with each type of health cover is outlined in Table 2.1.⁷⁴

Table 2.1: Proportion of population with each type of health cover in 2001.

Health cover	%	Level of private cover	%
Category 1	31	Private insurance	2
		No private insurance	29
Category 2	69	Private insurance	43
		No private insurance	26

(Adapted from Watson *et al* ⁷⁴)

The public private mix or 'two-tier system' that arises as a result of this mix of health cover raises several equity issues in the Irish context as there is a high degree of interdependence between the two sectors.⁷ There are approximately 12,300 beds in the acute hospital system of which approximately 2,500 are designated for use by private patients with an additional, approximately 2,500 beds in private hospitals.⁷⁴ Private patients have accounted for approximately 20% of bed days in public hospitals and it is reported that the actual economic cost of these beds has not been charged.⁷⁵ An almost non-existent phenomenon in the private sector, waiting lists are a very contentious issue for public sector patients. A major reason for taking out private health insurance was found to be ensuring quick treatment (85%). Avoiding large bills (88%) and ensuring good treatment (73%) were other important reasons.⁷⁴

The Health Strategy recognises the problem inherent in the public private mix particularly in the acute hospital sector; a problem it says must be addressed in the context of equity of access for public patients. It has proposed strategies such as developing closer strategic links with the private hospital sector, clarifying hospital entitlements for public patients and developing public private partnerships.¹⁰ The strategy has been criticised for not taking firmer steps to tackle the two-tier system,⁷⁶ such as a common waiting list, a proposal that was put forward as far back as 1989,⁸ and for which the Government has been criticised by the UN in

2002.⁷⁷ The Value for Money audit accepts that the public private mix is a system that would be very difficult to change.⁷

2.4.5 Capitation models in Ireland

Payment of GMS GPs, is the only example of a capitation system in the Irish health service. Allocations are weighted for age and sex and this system was found to provide good value for money by the VFM audit.⁷ However a more recent report found that the GMS scheme as a whole was not cost effective.⁶

Some preliminary work has been done on the development of needs based weighted capitation models for the allocation of funds from central government to acute hospitals in Ireland.^{78 48} A Health Board commissioned one of these reports, as they perceived that they were receiving less than their fair share of allocations relative to other Health Boards. This study was based on age and mortality of the population and included an adjustment for the movement of patients across county boundaries. This report found that this Health Board was in fact underfunded and that while it should be approximately 5-10% below the national average it was currently 15% below.⁴⁸ A problem with this report is that the modelling was done for the acute sector but the finance figures used referred to all health spending. In addition they used English age cost weights. The other report was primarily concerned with developing an accessibility index for Ireland, one application of which was in the creation of a capitation model.⁷⁸

There are several difficulties with the approaches used in these two studies. Firstly data were modelled at county level rather than at small area level. Secondly no consideration was taken of the private sector. Despite the relatively small amount it constitutes of overall health funding (11-12%) the VFM audit highlight the importance of taking into account the contribution of the private health care sector in any capitation system.⁷ Thirdly both studies used outdated data and used SMRs rather than the potentially more appropriate comparative mortality figure.⁷⁹ Neither study took account of unmet need. These failures all relate to data limitations.

Another method of resource allocation that has been used in the Irish health service is the development of illness specific strategies and getting money dedicated to the implementation of these strategies. Examples are the national cardiovascular and cancer strategies.^{80 81} While

these strategies may be more efficient as they tackle the illnesses that are the greatest burden to the health service they do not tackle the health inequities that exist in the system.

2.4.6 Health Service Reform Programme

This year (2003) a Health Service Reform Programme was announced.¹¹ Following the findings of three commissioned reports^{6 82 36} it is proposed to rationalise acute hospitals and abolish the existing ten Health Boards and replace them with a Health Services Executive and four Regional Health Offices serviced by a network of Local Health Offices. The Health Services Executive will consist of a National Hospitals Office that will be responsible for all hospitals. The Regional Health Offices will be responsible for community care. One of the main criticisms of the Irish health service, made in one of these reports, is that at national level there is no one that takes ultimate responsibility for the health service and no one who systematically evaluates core service and funding.⁶ Health service spending in Ireland tends to focus on new developments rather than on baseline expenditure. It is the baseline expenditure which is needed to permit evidence-based decision making, provide true cost estimates and provide monitoring and evaluation of value for money. A key function of the Health Services Executive is proposed as being to *'provide the country's health service with quality management, analysis and evaluation of existing resource allocation mechanisms built around evidence based needs assessment'*.⁶

It is interesting to note that while the Health Service Reform Programme has been announced by the Department of Health the main drivers behind reform are the Department of Finance. The Department of Finance commissioned the report on the Financial Management and Control Systems in the Health Service.⁶ The membership of the interim board of the Health Services Executive represents stronger financial and business backgrounds than heretofore.⁸³

While there will be a time lag before these reforms are implemented they need to be taken into consideration at this stage as they may influence the choice of resource allocation model. The model that is constructed should therefore not be contingent on the current organisational structure of the health service and where possible this thesis incorporates the proposed reformed structure.

2.5 Conclusion of background

This background chapter has outlined the trend for health systems internationally to incorporate equity along with efficiency into their policy objectives. This has led to a number of health service reforms one of which is the introduction of needs based capitation models to distribute resources more equitably. The section on the Irish health system outlined the failure of its resource allocation mechanisms to achieve equity or transparency. While needs based capitation models have been criticised on many levels, they do seem to have potential to improve the Irish resource allocation system. It has been suggested that the question is '*...not as whether to set capitations but how to do so*'.⁴² This study looks at both these elements. Chapters three and four tackle the question of whether to set capitations and Chapter five and six examine how to do so.

CHAPTER 3: POLICY DELPHI

3.1 Introduction

The overall aim of this thesis is the development of a resource allocation model for use in the Irish health service. However there has been no research done to investigate whether this would be an acceptable health care reform in Ireland. It was therefore considered appropriate to examine the views on, and acceptance towards, such a model among health service managers and policy makers and to explore other, possibly better, alternatives. A Policy Delphi, which is a systematic method used to obtain the informed judgements and insights of experts about an issue⁸⁴ is used in this research to answer the following research question.

How desirable and how feasible is the development and introduction of a more equitable alternative model for health care resource allocation in Ireland?

In this Chapter section 3.2 gives the background to the uses, advantages and disadvantages of Policy Delphi and the rational for using this method. Section 3.3 details the Policy Delphi methodology as used in this study and section 3.4 gives the results. The main table from the results section has been put in Appendix 10 due to its size. Section 3.5 discusses the findings of the study and how they should contribute to decision making.

3.2 Background

3.2.1 Layout of background

This Chapter starts by describing what are Delphi studies and more specifically what are Policy Delphi studies. It then compares Policy Delphi to other idea generation strategies as part of the justification for using this methodology. It then examines the strengths and limitations of Policy Delphi and concludes with a rational for this study followed by the aims and objectives.

3.2.2 What are Delphi studies?

Several descriptions of Delphi exist. Most illustrate the systematic nature of the technique, the generation, collection and synthesis of new ideas and insights, and the use of a panel of experts to do this.^{85 86 87 88} Several authors include the search for a consensus in their description,^{86 88 89 90} and some mention the feedback element.⁸⁶ A reluctance has been reported

in developing a concrete definition of Delphi due to its 'versatile nature'⁹¹ but the following is a general description:

*'Delphi may be characterised as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem.'*⁹²

The Delphi method originated in the 1950s in the US. Initially used for technological forecasting in military applications, it subsequently was developed by additional sectors such as industry, education and since the 1960s it has been used in health care and social services.⁹¹ Its name derives from references to the Greek Oracle at Delphi. The Delphic Oracle was a shrine dedicated to the worship and consultation of the prophetic deity, Apollo.

Policy Delphi, one of the many types of Delphi, was first introduced in 1969.⁸⁹ The difference between conventional Delphi and Policy Delphi is that rather than seeking a consensus the Policy Delphi deliberately seeks to explore consensus and disagreement on the issues raised, an approach that is not possible through other methodologies.⁹³ It *'...seeks to generate the strongest possible opposing views on the potential resolutions of a major policy issue'*.⁸⁹ Policy Delphi, as its name implies, investigates policy issues, problem solving and informed decision-making rather than the more technical topics dealt with by the traditional Delphi.^{84 89}

⁹³ This method ensures that all major options and implications of a policy are raised and their acceptability can be assessed.^{85 89} Consensus has been described *'...as a measure of the degree to which all the parties concerned are prepared to sacrifice what they really believe and want in the name of professional or other social solidarity'*.⁹⁴ Essentially it is considered to be a form of compromise rather than true consensus. By not explicitly seeking a consensus Policy Delphi can avoid this conflict.

Turoff provided broad guidelines for a basic framework for a policy Delphi.⁸⁹ Lack of any specific guidelines has resulted in Policy Delphi being implemented in a wide variety of ways. Most of the Policy Delphi studies examined used different approaches. Subjects studies were as diverse as social policy (e.g. national drug-abuse policies),⁹⁵ public administration (e.g. alternative approaches to computerisation),⁹⁶ environmental management (e.g. water management),^{97 98 99 100} and public policy (responses to electricity bill debt),⁹³ There are few

Policy Delphi studies in the literature in the last two decades and of these very few are on health. This contrasts with the coverage of health topics by either conventional Delphi or modified conventional Delphi which include defining public health,¹⁰¹ identifying factors influencing length of hospital stay,¹⁰² evaluating professional practice,⁸⁷ and identifying priorities for continuing medical education.¹⁰³ In general Delphi is reported to be an underused methodology that should be more widely used in the health and social sciences.⁹³

Policy Delphi is one tool of policy analysis. Policy analysis is defined as '*...the application of scientific methods to the formulation of policy options and a description of the consequences or implications of each option*'.¹⁰⁴ Analysis can be done at the formulation, implementation or evaluation phase of policy making. Similarly Policy Delphi can be used at any of these stages.

3.2.3 Characteristics of Policy Delphi

Delphi studies generally consist of three or four rounds but two and five have also been reported.^{93 96} Rounds are repeated as is judged appropriate depending on priorities, the need to clarify issues, and the degree of examination of areas of agreement and disagreement.^{85 105} The first round usually involves the generation of ideas around the problem/question posed and the second and subsequent rounds requires panellists to reflect on and rate each of the issues raised in the first round. Third and subsequent rounds receive feedback of ratings from previous rounds.¹⁰⁶

A wide divergence of individual opinion is a common result of responses to the first and second rounds. Ideas from round one are condensed and edited using qualitative methods. There are risks of bias in doing this as the moderator must use their own interpretation of these ideas.¹⁰⁶ Subsequent rounds are analysed using more quantitative methodologies and there is a tendency in some studies for subjects to converge towards consensus.¹⁰⁵

3.2.4 Policy Delphi versus other methods

Delphi is part of the general category of 'idea generating strategies' which are divided into group studies (e.g. workshops, nominal group technique and Delphi), and non-group studies (e.g. surveys).⁹⁷ Group methods are reported to produce a greater number of ideas and a better quality of ideas than non-group methods,¹⁰⁷ and at least as good as any other group technique.⁸⁸ There is a shortage of publications that address the fundamental theoretical,

methodological and practical issues associated with Delphi, and of studies that compare Delphi with other techniques.⁸⁵ This makes it difficult to conclude that Delphi is the best methodological choice to answer a particular research question. However some of the advantages of Delphi, in particular Policy Delphi, over other group methods are outlined below.

Policy Delphi has been described as being similar to a committee process, which is the traditional approach for the exploration of policy issues.⁸⁹ As policy Delphi is a decision facilitation tool rather than a decision making tool, it is recommended that it acts as a precursor to a final decision making committee rather than as its replacement.⁸⁹ Each committee meeting is like a Delphi round, the difference being that the members of the committee do not meet face to face. This anonymity has advantages in that it eliminates domineering personalities, encourages free expression of opinion and there is less unwillingness to change opinion for fear of losing face and less fear of saying something stupid.^{85 89 92}

The Delphi process allows the participation of a greater number of 'experts' and facilitates the inclusion of more geographically dispersed individuals than a committee meeting, conference or workshop.^{85 89 92 93 96} In addition it is a more cost-effective alternative.^{87 93 95 108} As with a committee meeting, Delphi participants who miss one round can still make a contribution in subsequent rounds.¹⁰³ On the other hand, those who miss all committee meetings (or Delphi rounds) and turn up for the final meeting (or Delphi round) are not eligible to participate as they have not contributed to the process thus far.⁹³

Nominal Group Technique is similar to Delphi in that it involves a series of rounds with feedback and statistical analysis of the results. Nominal group technique is commonly used in health care to examine the appropriateness of clinical interventions but is designed to focus on a single goal rather than on obtaining policy opinions.⁸⁵ It usually involves the group meeting face-to-face which has several problems as discussed earlier and is a more costly option.^{85 97}

The theory behind Delphi is basically that 'two heads (or informed opinion from a diverse group) are better than one'. There is no proof underlying this theoretical assumption and some critics suggest that a single expert researching a topic would produce a result that is just as

good as Delphi.^{85 88} There is also a theory that the opinions of the group may dilute the opinion of the real expert within the group. Attempts to find out have involved letting experts rate their own expertise and comparing answers based on these ratings.¹⁰⁹ However, it was found that people rate their expertise differently thus making these results difficult to validate.

Qualitative methods, for example focus groups or in-depth interviews, were an alternative option to a Policy Delphi study as they are good methods of exploring new issues. Facilitation of focus groups would have required getting a number of diverse people together and this was not thought to be feasible in terms of the time available to these potential participants. Due to the diversity of the group it was considered that to reach saturation point through in-depth interviews would take excessive time and expense (due to travelling) and would result in a large number of interviews making analysis unwieldy. For these reasons Policy Delphi was chosen as the most feasible and cost effective method to allow the issue of equity in resource allocation to be explored.

3.2.5 Strengths and limitations

It is argued that the strengths of the policy Delphi outweigh its limitations.⁹⁷ Some of the main strengths and limitations are outlined below.

3.2.5.1 'Unscientific'

Several research questions, such as those relating to policy issues, lack empirical data and therefore cannot be answered using precise analytical techniques.⁹² In addition, as experts cannot become experimental laboratory subjects, it is unlikely that Delphi will ever have a sound theoretical basis, a fact that many critics of Delphi have emphasised.¹⁰⁸ However, Policy Delphi can be used to tackle these problems using collective subjective judgements. The process produces documentation as to how the final judgements were achieved.⁸⁵ While admitting the existence of some poorly conducted Delphi studies, advocates of Delphi warned against condemning the technique based on its poor application in some studies rather than on its merits as a technique.¹¹⁰

The anonymity associated with the Delphi method encourages frank responses and allows a collective sharing of responsibility of the opinions expressed.^{88 90 93} However some argue that this may lead to a lack of accountability for the views expressed¹⁰⁸ or that it may result in judgements made without much thought.¹¹¹

3.2.5.2 Flexibility

Policy Delphi is a very flexible methodology as it combines both quantitative and qualitative elements and can be adapted to suit different research objectives.⁹⁶ It ranges from establishing opinion, identifying areas of agreement and disagreement, and developing and refining policy options. There have been several modifications of Delphi made and there is a fear that adaptation of Delphi, without necessary rigour, could threaten the validity of the method.¹⁰⁵ Several commentators on Delphi have highlighted the need for further validation of its methodology to promote its reputation.⁹⁷

3.2.5.3 Wide range of opinion

The use of a group of 'experts' from diverse backgrounds elicits a wide range of opinion.⁹² However, due to the different status, assumptions, values, backgrounds and areas of expertise of participants, facilitating an in-depth discussion can be difficult. There is also a lack of opportunity for the kind of spontaneous discussion that can occur at face-to-face workshops.⁸⁵ ⁹⁷ This can lead to a problem of breadth versus depth. Policy Delphi responses generally consist of ratings and brief written comments. This method of communication means that panellists are likely to give more careful consideration to their replies than to the verbal responses of a workshop.⁹⁰ However the brevity of replies reduces the level of in-depth discussion possible.⁸⁵ ⁹⁷ Therefore there has to be a trade off between breadth and depth of responses. It is suggested that breadth and depth can be achieved only by using the policy Delphi in combination with other approaches such as a post-Delphi committee for final decision making.⁹⁷ In addition, assimilation of the large amount of data generated, particularly the varying quality of the written responses, has been reported as being difficult.⁹⁷

3.2.5.4 Panel size and selection

There are several criteria for the selection of panellists. Although referred to as 'experts' by several authors they need to be well informed about an issue rather than having a high degree of expertise.⁸⁸ ⁹¹ They are usually purposefully selected and should consist of those comfortable with abstract thought who understand the aims of the process, are motivated to contribute ideas and have given a commitment to participate in all rounds of the process.⁸⁵ ¹⁰⁶ It is also important that informed panellists are representative of the many sides of the issues under examination and come from a range of backgrounds and geographical areas.⁸⁵ ⁸⁹ ⁹⁰ ⁹¹

The size of the panel and method of selection often meet with criticism due to the unscientific process used. There is no clear sampling frame so sample size calculation cannot be statistical. Every effort should be made to ensure a representative sample as decision-makers using the results will assume that the sample is representative.⁹⁹ The effect of group size on the outcome of a Delphi exercise is unknown. Sample sizes reported in the literature vary. A panel size of 10 to 50 is recommended for a Policy Delphi as anything above this makes analysis very difficult.^{89 90 97} As the response rate varies it is recommended to have an initial list that is quite large to produce an average number of actual participants.⁹⁵ It is also recommended that people who are known to hold an alternative view are included to improve debate.¹⁰⁶ Due to its iterative nature there are inevitable long delays between Delphi rounds and it is thought that this may lead to an increase in attrition rates.^{85 97}

3.2.5.5 Analysis

The biggest challenge in analysing Delphi questionnaires is to capture the complexity of views. This involves editing comments, decisions as to what to include and what is relevant and the organisation of results. Although obtaining a wide range of opinion is the objective, it is necessary to edit and structure the questionnaire to facilitate analysis with the risk that the format will prohibit panellists from fully expressing their views. The task of the moderator is to achieve a balance between developing specific policy statements and facilitating open expression of ideas.⁹⁰

As with any qualitative or policy process, the analysis can be manipulated, and it is important that panellists have faith in the moderator.⁸⁹ As the moderator's interpretation of the ideas cannot be checked interactively with group members the moderator must rely on his or her own judgement with the resultant subjectivity.¹⁰⁶ Some authors worry about achieving artificial consensus. That could be the result of attrition by dissenters if they feel their views are not being fairly expressed,^{89 96} or by inappropriate adaptation of the methodology.⁹²

Various Likert type rating scales are used in Delphi studies with four to nine point scales mentioned in the literature.^{89 95} Criticisms of these scales relate to putting numerical values on what are essentially opinions. The statistical definition of a consensus varies throughout the literature and is usually either based on a mean and variance or a median and interquartile

range.¹⁰³ While suitable for conventional Delphi where the objective is to seek a consensus, they are not particularly suitable in Policy Delphi studies where the objective is also to explore disagreements. They are particularly insensitive to identifying polarity of opinion.⁹⁷

Another issue is the ordinal nature of Likert type scales. Ordinal scales provide no judgements about the distance between quantities on the scale.^{112 113} However for a policy Delphi it is important to establish not only which policies are considered to be the most important but how much a policy is preferred over another policy. This leads to an ordinal scale being treated as an interval scale. One study compared three methods which usually result in interval scales namely rating scale, simple ranking and pair comparisons. There was poor agreement between the intervals produced and the iterative nature of the Delphi process made comparisons particularly difficult.¹¹³ These problems can be overcome in an analysis that does not use medians and means which are more suitable for use with interval scales. An example is the process of defining a consensus developed by de Loë and outlined in section 3.3.^{97 100} de Loë's method also has the advantage that the consensus is defined in advance. Several studies define the consensus based on the data collected rather than in advance which leads to an arbitrary definition of consensus.¹¹⁴

3.2.5.6 Benefits to panellists

An area not well researched is the benefits to the panellists of the Delphi process. Although it is widely agreed that panellists are educated through their participation, it is unclear whether they are learning the same thing or having a shared understanding of the issues.⁸⁹ Whether the benefits of their increased knowledge make up for the time they invest into the process remains to be seen. It is clear however that where issues are relevant to the panellist, where they are well informed⁹³ and where the process is well organised⁸⁸ they will be more motivated to participate and the creativity in their decision-making will be improved.⁸⁵ The feedback provided allows panellists to feel that they have had some influence on the broader decision making process.¹⁰⁶ It is also recommended that panellists should be provided with the final research findings.⁹³

Policy Delphi often explore issues which are conceptually complex, to some extent hypothetical and perhaps not of central importance for group members. Panellists may find the rating process non-intuitive, and may find giving reasons for differences difficult as they

may not be able to easily draw on an interpretative context within which to make sense of the questions.¹⁰⁶

3.2.6 *Rationale*

The output from a Policy Delphi produces a substantial number of new ideas plus an evaluation of those ideas for use in the decision-making process.⁹⁷ Generally the product of a Policy Delphi survey can be used as the ground-work for a workshop with a smaller number of policy makers who can use the information to make the final decisions.⁹⁷ There has been no formal study examining the opinions of health service managers on the subject of resource allocation in Ireland, which is an issue that directly relates to their day to day work. From this review of the Policy Delphi methodology it is clear that this is the best method to use in order to examine this subject, particularly with limited time and resources.

3.2.7 *Aims and objectives of Policy Delphi study*

The aim of the study is to examine the desirability and feasibility of the development and implementation of a more equitable alternative model for health care resource allocation in Ireland?

The four main objectives of this Policy Delphi study are listed below:

- To identify the perceived factors influencing inequity in resource allocation
- To produce a range of options for a more equitable, resource allocation process.
- To determine the feasibility of these options.
- To determine if the Policy Delphi methodology is a useful tool for health planning and policy making in Ireland.

3.3 Policy Delphi Methodology

3.3.1 *Layout of section 3.3*

The first section of the Policy Delphi methodology presents details of the selection of panellists and describes the pilot study. Each of the three Delphi rounds are then described individually under the headings of objectives, formulation of questionnaire and analysis. The aim of the analysis from rounds one and two was to extract, from the data, sufficient information to form the subsequent questionnaire. Analysis involved using both qualitative and quantitative methodologies, both of which are explained below. A section on correspondence analysis is then included and this section ends by describing the techniques used to increase the response rate.

3.3.2 *Selection of panellists*

3.3.2.1 *Potential panellists*

A Policy Delphi panel selection group, comprising of the principal researcher and three senior colleagues (professor of general practice, senior lecture in biostatistics and senior lecturer in public health), was formed. This group collectively have a broad range of experience of the health services in Ireland, at Health Board, academic and government level. As there was no natural population which could act as a sampling frame for the Delphi study, this group identified 62 potential panellists based mainly on personal knowledge but also using other sources such as the medical directory¹¹⁵ and nominations from contacts. A few people known to hold a view on resource allocation methodologies or have worked in this area were specifically invited to participate.

Selection was guided by two fundamental principles which have been outlined by others.⁹⁹ Firstly, potential panellist had to represent Irelands regional and national experience of the health services and secondly, they had to exhibit recognised authority or sufficient expertise. This was ensured through knowledge of each individuals education, training, profession, occupation, and regional and national affiliations. This selection process resulted in a list of 62 potential panellists who were drawn from across Ireland and mostly with titles of chief executive, director or professor.

3.3.2.2 *Exclusions*

A number of groups were excluded from selection as panellists. The reasons for these decisions are given below.

Politicians As the study took place over the period of a national general election, politicians were less likely to have time to participate, may have changed their political status by the end of the study, and may have misused the study as a forum to highlight their own agenda.

Medical correspondents There was a risk that confidentiality and ownership of the data may have been jeopardised by the inclusion of medical correspondents, or that findings would be reported out of context.

Health service users No attempt was made to canvass the views of health service users, as they could not be expected to have the same level of knowledge as other panellists. It was decided therefore to select representatives of service users e.g. patients groups, trade unions etc. as has been done elsewhere.⁹⁶

Non-Republic of Ireland (RoI) health personnel The study was designed to examine equity in resource allocation in the Irish health service. Non-Irish experts, while having potentially very valuable contributions to make to the general theme, particularly regarding their own systems, may not have enough knowledge about the Irish system to participate. Two exceptions were made where non-RoI experts had particular knowledge of the Irish system. As there is a wealth of literature internationally on resource allocation this exclusion was not considered to have weakened the study.

3.3.2.3 *Number of panellists*

An invitation to participate was sent to the 62 potential panellists outlining the aims and objectives of the study and enclosing a Delphi information sheet and a reply slip (Appendix 1). Fifty-two people (84%) agreed to participate demonstrating an enthusiastic response to our general aim. (This number included a late reply from one person who was too late to participate in round one but was included as a panellist during round two). Three people (5%) did not agree to participate and 7 (11%) did not reply. Panellists were asked to indicate their choice of communication method. Seventeen (33%) chose the postal route, 34 (65%) chose the e-mail route and one person (2%) chose to use a dictaphone. A break down of the area of work of the 52 panellists are outlined in Table 3.1 and to preserve confidentiality these details are non-specific.

Table 3.1: % of panellists with each health background.

Institution	Panellists' area of work	%
Health Board	CEOs, senior planners and managers.	25%
Health Board	Directors and specialists in public health	16%
Department of Health	Senior officials	10%
Hospitals	CEOs / directors	10%
Other health agencies	Research institutes, medical bodies, private insurance companies and health advisors	17%
Academics	Senior academics in public health, health management and related fields	16%
Representatives of service users	Unions, patient groups, groups for marginalised people	6%

Round one was sent to 51 panellists in April 2002. Replies were received from 40 panellists (78 %). Round two was sent to 51 panellists in May 2002. (This included those who did not reply to round one and one late entrant. It did not include one person who withdrew from the study in round one). Replies were received from 35 panellists (69%). Those who did not respond to either of the first two rounds were not entitled to partake in round three as their opinion had not informed any of the process. As a result round three was sent only to those panellists who had responded to at least round one or round two (n=42). Round three was sent in July 2002 and replies were received from 36 panellists (86%).

3.3.3 Confidentiality

All replies were kept confidential. A number identified each panellist. Specific comments used in the final write up were not attributed to an individual panellist. Only the moderator (principal researcher) knew the identity of panellists and panellists were not known to each other.

3.3.4 Pilot testing

Pilot testing of each questionnaire was carried out prior to each round, resulting in some modifications to the questionnaire each time. Two people, with experience in service provision, health planning and policy making and academia, undertook the pilot test (three people were initially chosen but one subsequently withdrew). In addition several people read the questionnaire in order to ensure clarity.

3.3.5 Round 1

3.3.5.1 Objectives of round 1

The objectives of the first round were:

- To identify the perceived reasons why the current method of resource allocation in Ireland was deemed equitable or inequitable.
- To obtain suggestions for alternatives or improvements to the current method of resource allocation and to determine the feasibility of implementing these suggestions.

3.3.5.2 Formation of round 1 questionnaire

The questionnaire for round one (Appendix 2, including instructions) contained open-ended questions, posed in broad terms. This format was chosen as it is appropriate when the possible responses cannot be anticipated, and when it is necessary to use a written form of data collection. The lack of rigidity of these open questions encourages freedom of expression so that the results are more likely to be meaningful and valid.¹¹⁶ Some attempt was made to ensure that there was common understanding of the terminology used. (Appendix 2).

3.3.5.3 Analysis of round 1

The aim of the analysis of round one was to obtain and summarise the information to create a round two questionnaire. Round one was analysed qualitatively using a three-stage process, outlined below, resulting in a set of 111 statements (including one ranking question) that were used to form the second questionnaire. An audit trail of this process was maintained. The level of detail in responses varied from minimal detail to substantial detail.

Stage 1 The written replies were read carefully for each question. By searching for common threads these replies were sorted. Ideas that were duplicated were carefully edited resulting in a series of 110 non-repetitive statements and a number of factors for the ranking question. This process was difficult as, although an attempt was made to remove repetitions and ambiguities, interdependencies between ideas remained with a potential lack of transparency of some issues.

Great care was taken to ensure that all pertinent views from the first round were represented in the second round. This was done to avoid any bias such as forming an artificial consensus due to people not responding because they perceived that their views were not represented. This resulted in a long second questionnaire. Comments, which were not related to the general theme of resource allocation, were excluded in most cases.

Stage 2 The 110 statements from above were first divided into 4 sections based on their topics. The first section, A, reasons for inequity or equity in the current system of resource allocation, was related to question one in round one. The second section, B, consisted of suggestions for alternatives or improvements to the current system of resource allocation and related to question two in round one. Sections C, criteria for a resource allocation formula and section D, policy and planning statements relating to resource allocation, generally related to question three in round one. Study of these sections resulted in the emergence of 18 categories that were grouped into the four sections. Section A had seven categories, section B had nine categories and sections C and D one category each.

Stage 3 The categories that emerge from the statements were initially identified by the moderator. In order to add some rigour to this process three independent coders (two research fellows and one health services policy expert) assigned the statements to the categories for each section. Coding is defined as '*...the process of identifying persistent words phrases themes or concepts within the data so that the underlying patterns can be identified and analysed.*'¹¹⁶ Where two of the three coders assigned a statement to the same code the corresponding category was accepted for that statement. In the few cases where all three coders assigned different codes to a statement, the particular code was discussed with the coders and, in all instances, following clarification of the meaning of the statement or code, there was agreement between coders. Where a statement could be accommodated by two codes the coders were instructed to chose the one they felt was the most appropriate. The final four sections and related categories are outlined in Figure 3.1.

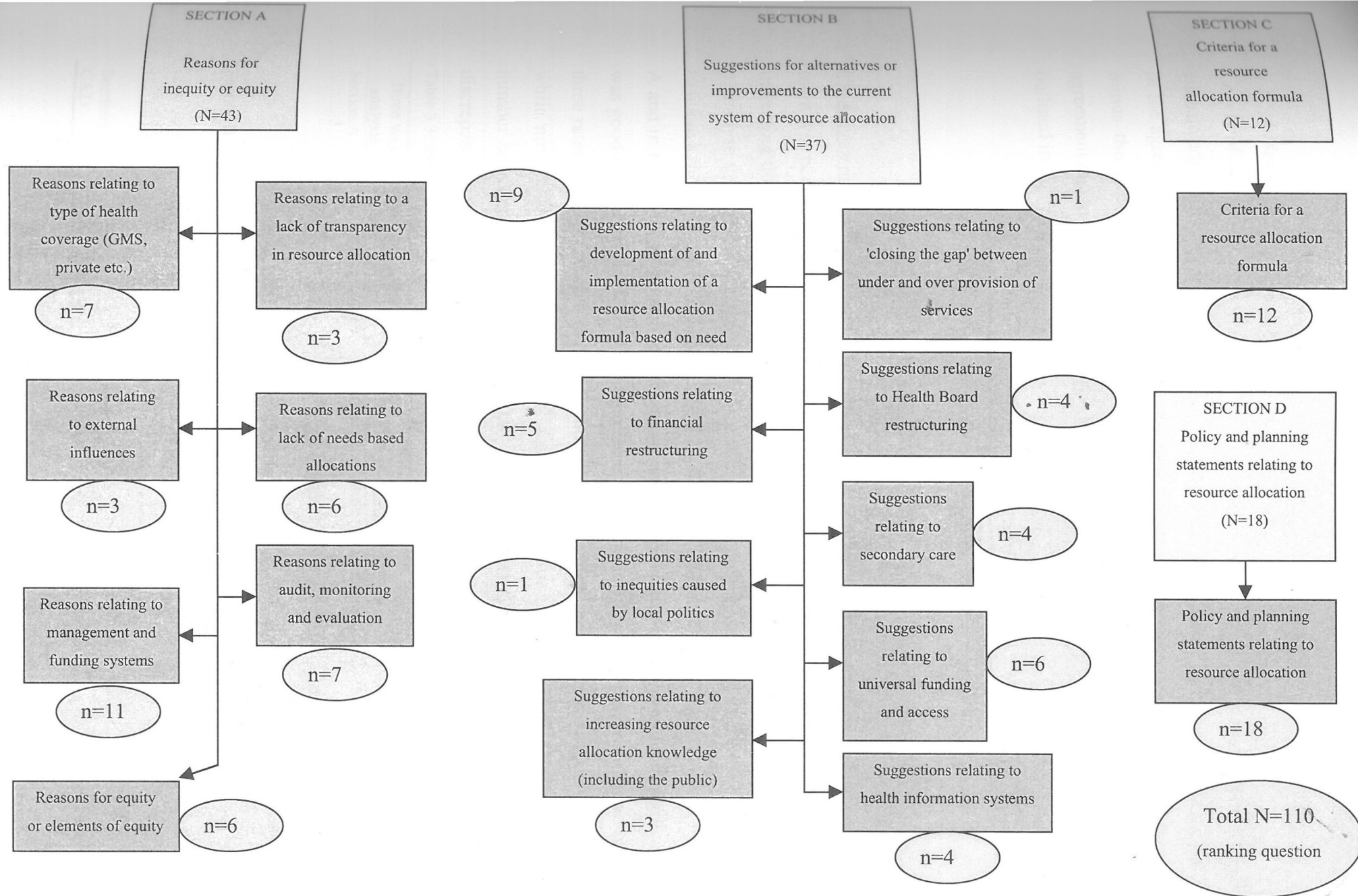


Figure 3.1: Number of statements (N) derived from round one in each section and category

3.3.5.4 Measures of coders agreement (round one)

Levels of agreement among coders were calculated using the Kappa statistic. The Kappa statistic adjusts for the amount of agreement that one expects purely by chance and is the ratio of the agreement actually observed minus the agreement expected by chance, divided by one minus the expected. The best possible agreement gives a Kappa statistic of one. and agreement due to chance gives a Kappa statistic of zero. Guidelines for interpreting values are outlined in Table 3.2.¹¹⁷

Table 3.2: Guidelines for interpreting the kappa statistic (κ)

Value of κ	Strength of agreement
<0.20	Poor
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Good
0.81-1.00	Very good

Three coders were used for sections A and B but only two were used for sections C and D as there was perfect agreement between these two coders ($\kappa=1.00$). All p values were significant indicating that the agreement was better than what would have occurred by chance. In order to analyse three raters together it was necessary to exclude those cases where the rater failed to make a rating (e.g. not understanding the question). This occurred in seven cases in section A and in two cases in section B. Therefore pair-wise analysis is also presented. Agreement was good for section A ($\kappa=0.69$) and moderate for section B ($\kappa=0.55$) but, as only two out of three raters needed to agree in order to accept the category, the results for section A and B, while not showing perfect agreement, were adequate for this study.(Table 3.3) The total number of statements coded was 104 but 111 statements are presented in round two. This discrepancy is due to revisions made to the statements following the round two pilot study.

Table 3.3: Measure of agreement of coders' ratings.

Three way analysis	No. of raters	Kappa	P value	Pair-wise analysis	Kappa	P value	% agreement
Section A	3	0.69 n=41	P<0.001	Rater 1&2 N=48	0.90	P<0.001	91.7
				Rater 2&3 N=48	0.61	P<0.001	66.7
				Rater 1&3 N=48	0.59	P<0.001	65.4
Section B	3	0.55 n=24	P<0.001	Rater 1&2 N=26	0.66	P<0.001	71.4
				Rater 2&3 N=26	0.51	P<0.001	58.5
				Rater 1&3 N=26	0.50	P<0.001	58.1
Sections C&D	2	1.00 n=30	P<0.001				

3.3.6 Round 2

3.3.6.1 Objectives of round 2

The objective of the second round was:

- To feedback the statements derived from round one in order to assess whether panellists rate them as important, desirable, feasible or whether they agree with the statement.

3.3.6.2 Formation of round 2 questionnaire

The content of questionnaire two is based solely on the results obtained from the first round. This questionnaire (Appendix 3, including instructions) contained 110 statements divided into sections and categories as outlined above and one ranking question.

Panellists were requested to rate each statement using a series of rating scales. The rating scale used depended on the content of each section. Section B consisted mainly of alternatives and improvements to the current method of resource allocation so these were evaluated using the desirability and feasibility rating scales. Section A dealt mainly with reasons for inequity and section C with suggested criteria for a resource allocation model, so it was most appropriate to use an importance scale for these sections. Section D consisted of a series of policy and planning statements, so an agreement scale was considered to be the most suitable.

All rating scales used were four-point scales where one was the best outcome (i.e. very important, very desirable, very feasible or strongly agree) and four was the worst outcome (i.e. unimportant, very undesirable, definitely unfeasible and disagree). A detailed description of the first three of these scales was distributed with the questionnaire (Appendix 4).⁸⁹ This was to ensure that there was a common understanding of the rating scales. The agreement scale was an adaptation of a likert scale and is self-explanatory. As per recommendations no more than two scales were used in rating any section.⁸⁹

Participants were allowed to give an option of no judgement (NJ) if they felt that they did not know enough about the particular statement or did not understand the statement. Participants were asked not to leave answers blank and a neutral option such as 'neither agree nor disagree' was not offered as this would add very little information and can cause an artificial consensus.⁸⁹ %

3.3.6.3 Analysis of round 2

Medians and interquartile ranges

Replies from round 2 were entered into the statistical package JMP (Ver. 4.1, SAS Corp, 2001). Medians and interquartile ranges were used to summarise the responses. These were chosen over means and standard deviations as they were considered a more appropriate summary measure to feed back to panellists. These formed part of the third questionnaire and can be viewed there in Appendix 5. While it is recognised that use of the median and interquartile range failed to adequately reflect statements where there was polarity in opinion (see section 2.5.5), it was considered sufficiently detailed to use as feedback and this method was not used in the final analysis.

Calculation of ranked scores

Nineteen factors were suggested in round one, for inclusion in a needs based resource allocation model. These factors formed the ranking question (question 53). Panellists were asked to rank the ten factors they felt were most important to include in a model where one was most important and ten was least important. Feedback from panellists in round two recommended that some of the categories e.g. disability and morbidity be combined and an additional factor QALYS (quality of life indicators) be included. The top ten ranked items were calculated (Appendix 6) and fed-back to panellists in round three.

3.3.7 Round 3

3.3.7.1 Objectives of round 3

The objective of the third round was:

- To feedback the responses from round two in order to consolidate any consensus or explain any disagreements.

3.3.7.2 Formation of round 3 questionnaire

Round three contained the exact same statements as in round two and panellists were asked to re-rate each statement. The difference between rounds two and three was that in round three panellists were supplied with the group median score and interquartile range. Panellists were asked to consider the group median score when re-rating each statement. In keeping with the Delphi technique, panellists were shown their original rating from round two when asked to re-rate their statements.⁸⁹

Where a panellist's round two rating was significantly different from the group median rating he was asked, if he did not change the rating, to give a reason for the rating. This required the individualisation of each questionnaire (i.e. the round three questionnaire for each panellist had to include their round two ratings highlighting those statements that were different from the group median). An example of a round three questionnaire, with instructions for completion, is given in Appendix 5. Being significantly different from the group median was loosely defined as 'being outside the interquartile range'. The actual definitions used are given in Appendix 7. All panellists were significantly different from the group on at least one occasion (range 1-38) and were therefore requested to give a reason for at least one rating. On average nine reasons were requested from each panellist (SD 7.5).

3.3.7.3 Analysis of round 3

There were five elements to the analysis of round three.

- Defining whether there was any consensus
- Determining the direction of that consensus where present.
- Analysis of reasons given for being significantly different from the group median.
- Analysis of the ranking question - question 53
- Calculation of the change in individual ratings between rounds two and three for each panellist

Defining consensus

In round two the median and interquartile range (IQR) were used to summarise the group response and the amount of spread around that response. This was not used in round three, as, while it provided an adequate description of round two, it was inappropriate for defining a consensus (see section 2.5.5). This is because it fails to describe results that are polarised or that are ambiguous.⁹⁷ Use of the mean and standard deviation were also rejected for use in defining consensus as they were not sensitive enough and not suitable for ordinal scales. Therefore a definition of consensus developed by de Loë was used and is described below.⁹⁷

Consensus is a measure of the extent to which the group agreed on the statement or agreed on the importance, desirability or feasibility of the statement. Where there is general agreement among the panel that a statement is important or desirable then it can tentatively be accepted and vice-versa. Where there is no agreement (e.g. polarised statements) then further

investigation is needed and the reasons given for ratings may help to clarify this polarisation.¹⁰⁰ The level of consensus was determined following calculation of what percentage of ratings were in each category of the four point rating scale. The cut-off percentages in Table 3.4, used to define consensus, are considered to be fairly conservative and varying these levels would strongly influence the results.¹⁰⁰ Therefore, the actual number of ratings in each category of the rating scales are presented in the results section, along with the definition of consensus, so that readers can make their own judgements. Non-responses or no judgement ratings were omitted from the calculation of percentages but are presented in the results.¹⁰⁰ Four levels of consensus were defined, high, moderate, low and none and are outlined with their cut off points in Table 3.4.

Table 3.4: Definitions of levels of consensus

Consensus	Definition
High	70% of ratings in one agreement category or 80% in two contiguous categories.*
Moderate	60% of ratings in one agreement category or 70% in two contiguous categories.*
Low	50% of ratings in one agreement category or 60% in two contiguous categories. *
None	Less than 50% of ratings in one agreement category or less than 60% of ratings in two contiguous categories. *

*Contiguous agreement categories are. 1 and 2 or 3 and 4

Determining the direction of consensus

The direction of consensus indicates where the consensus lay if one occurred i.e. in favour or not in favour of the statement. Assigning a direction to the consensus was described by de Loë but without detail. Formal rules for defining direction were developed and are described here and in Table 3.5. The direction means different things depending on the rating scale used e.g. in section B there could be a high consensus in favour of the desirability of a statement but in section C it would be a high consensus in favour of the importance of the statement.

In some cases a consensus could have been reached by either the percentage of ratings in one category or two categories. For example, if a statement had 60% of ratings in category one and 15% of ratings in category two the statement could have been classified as having a moderate consensus based on either the 60% in one category or the 75% in categories one and two combined. Where this occurred the direction of consensus was determined based on the ratings of one category. Where there was no consensus there was also no direction as this usually indicated polarity. Once the level of consensus and the direction of that consensus had been determined a matrix was drawn up of the desirability and feasibility ratings for section

Table 3.5: Determination of direction of consensus using four rating scales.

Direction	Consensus				Rating scale			
	Cat no.	High	Moderate	Low	Importance	Desirability	Feasibility	Agreement
In favour ✓	1	70% or more in category 1	60% or more in category 1	50% or more in category 1	Very important (VI)	Very desirable (VD)	Very feasible (VF)	Strongly agree (SA)
	1&2	80% or more in category 1 &2	70% or more in category 1 &2	60% or more in category 1 &2	Very important to important (VI-I)	Very desirable to desirable (VD-D)	Very feasible to possibly feasible (VF-PF)	Strongly agree to agree (SA-A)
	2	70% or more in category 2	60% or more in category 2	50% or more in category 2	Important (I)	Desirable (D)	Possibly feasible (PF)	Agree (A)
Not in favour ✗	3	70% or more in category 3	60% or more in category 3	50% or more in category 3	Slightly important (SI)	Undesirable (UD)	Possibly unfeasible (PUF)	Disagree (D)
	3&4	80% or more in category 3 &4	70% or more in category 3 &4	60% or more in category 3 &4	Slightly important to Unimportant (SI-UI)	Undesirable to very undesirable (UD-VUD)	Possibly unfeasible to definitely unfeasible (PUF-DUF)	Disagree to strongly disagree (D-SD)
	4	70% or more in category 4	60% or more in category 4	50% or more in category 4	Unimportant (UI)	Very undesirable (VUD)	Definitely unfeasible (DUF)	Strongly disagree (SD)

B. This was in order to clearly identify which suggestions received high or low desirability and feasibility ratings.

Analysis of reasons given for being significantly different from the group median

Two hundred and twenty eight reasons and comments were given by panellists as to why they differed from the average group rating. Some panellists did not give a reason when requested and others added general comments on some statements. There was at least one reason for 84% of statements with up to nine reasons for some statements. Reasons were summarised and repetitions or comments that did not clarify the issue were deleted leaving 175 individual reasons and comments. These are presented in the results section. Reasons and comments ranged from a few words to detailed arguments. These written arguments justifying and clarifying ratings add to the strength of evidence provided either in support of or against statements.

Ranking question

The top ten ranked factors for inclusion in a resource allocation model, produced from round two, were presented for ranking in round three. These were analysed in the same manner as explained above in section 3.6.3 and in Appendix 6.

Change in individual ratings between rounds two and three

The kappa statistic was used to measure the change in individual ratings between rounds two and three. This was possible as the statements in the two questionnaires were identical.

3.3.8 Correspondence analysis

Correspondence analysis is a suitable alternative to multivariate techniques such as factor analysis when using categorical or ordinal data such as that produced in this Delphi study. It produces a two-dimensional graphical display of the data which represents the relationship between the row and column categories, and in this way can help to explain the data and add depth to the analysis.¹¹⁸ An advantage of correspondence analysis is that it eliminates the need for using any particular model to represent the data. While the summarisation of data in this way results in some loss of information, this is made up for by increasing its interpretability.

A new column was added to the data that categorised each panellist that responded to round three (n=36) into their respective employment groupings as outlined in Table 3.6 below.

Table 3.6: Categorisation of round three respondents

Group	No.	Abbreviation
Planners and Managers (Health Board)	10	PM
Public Health (Health Board directors and specialists)	6	PH
Department of Health and Children officials	2	DH
Hospital CEOs and Directors	2	H
Academics (in public health, policy and management)	8	A
Other Health Agencies	5	HA
Representatives of service users	3	RU
Total	36	

Each statement from the round three questionnaire has an individual column in the data table with the ratings from each panellist forming the rows. The formation of the new column as described above resulted in a number of rows for each group of panellists. Cross-tabulation of these data allowed analysis of each statement according to how the different groups had voted. Where there was a high or medium consensus or a high level of disagreement for a particular statement the majority of panellists tended to vote the same way.

This was the case for statement 44 where panellists rated the desirability of developing and implementing a national resource allocation formula for the health services based on actual objective resource need. All rated this statement as either very desirable or desirable and the correspondence analysis of this statement is presented in Figure 3.2. 100% of inertia was accounted for in one dimension. For many other statements there were only one or two dissenters who were not representative of their whole group.

The production of cross-tabulation tables or performing correspondence analysis for 110 statements was therefore unnecessary and was also found to be cumbersome. No consensus was reached for nine statements. It was decided therefore to use correspondence analysis to explore whether particular groups of panellists continued to vote in the same direction where there was no consensus. This is presented in section 3.4.7.

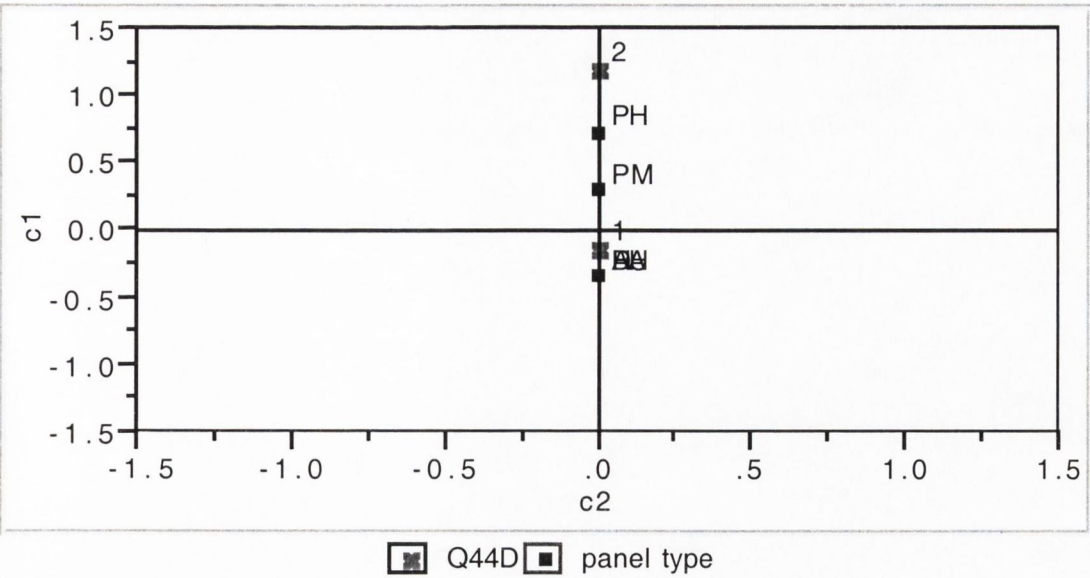


Figure 3.2: correspondence analysis plot of panellist group with statement 44D

3.3.9 Techniques used to increase response rate.

The following techniques, which were identified as statistically significant in a systematic review of methods to increase response rates to postal questionnaires, were used to maximise the response rate.¹¹⁹ Some of these methods are also applicable to e-mail:

- Contacting participants before sending questionnaires.
- Personalised letters and e-mails
- Follow up reminder letters enclosing another questionnaire.
- Short questionnaire (round one only).
- University headed note-paper.
- Questionnaires designed to be interesting for participants.

This systematic review also found that monetary incentives were very successful in getting good response rates.¹¹⁹ It was not however considered appropriate or necessary to offer monetary incentives in this Delphi study. Thanks were given after each reply was received and all panellists were furnished with a copy of the final report of the study.

Panellists were asked to make comments if they wished at the end of questionnaire two and three. This was so that anyone who felt that his or her views were not represented by the questionnaire could comment here. It was decided not to ask specifically if the panellist thought that their views were well represented as there was a possibility that there would be general acquiescence to this question. Comments were also requested with the aim of counteracting any biases in the moderator's interpretation of ideas.

3.4 Policy Delphi Results

3.4.1 Layout of section 3.4

The response rate is presented first. This is followed by an assessment of the inter-rater agreement between rounds two and three. The level of consensus and direction of consensus achieved for each statement with summary tables for each section are then presented. This includes the reasons that were given by people who deviated from the median reply. A desirability and feasibility matrix is then presented and this is followed by analysis of the ranking of factors considered necessary for inclusion in a needs-based resource allocation model. The results of the correspondence analysis are then presented. The experience of carrying out this Policy Delphi study is then used to develop a conceptual framework, which is presented at the end of the Chapter.

3.4.2 Response rate

Response rates of 78%, 69% and 86% were received for rounds one, two and three respectively (Figure 4.1). Panellists who responded to round one and or two were eligible to participate in round three. Seven panellists who did not participate in either rounds one or two and two panellists who withdrew were excluded from round three, thus resulting in a different denominator for rounds one and two (n=51) and round three (n=42).

3.4.3 Inter-rater agreement

Thirty-three panellists completed both round two and round three. Inter-rater agreement was measured using the Kappa statistic. This was possible as both rounds presented the same statements for ranking. This was done in order to determine the stability of each individual's ratings and the reliability of the questionnaire. Agreement between rounds two and three for each panellist ranged from 74% to 100% with a mean of 90.3% (SD 6.9%). The kappa statistic ranged from 0.56 to 1.00 with a mean of 0.85 (SD 0.11). Using the guidelines for deciding strength of agreement,¹¹⁷ the mean kappa score indicated a very good strength of agreement. Raw percentages and kappa scores are presented in Appendix 8.

3.4.4 Consensus and direction of consensus

The main product of this study was the group's assessment of each statement on the third-round questionnaire. A summary of the ratings achieved for each statement is presented in Table A5 in Appendix 10 (due to its large size). The number (and percentage) of times each

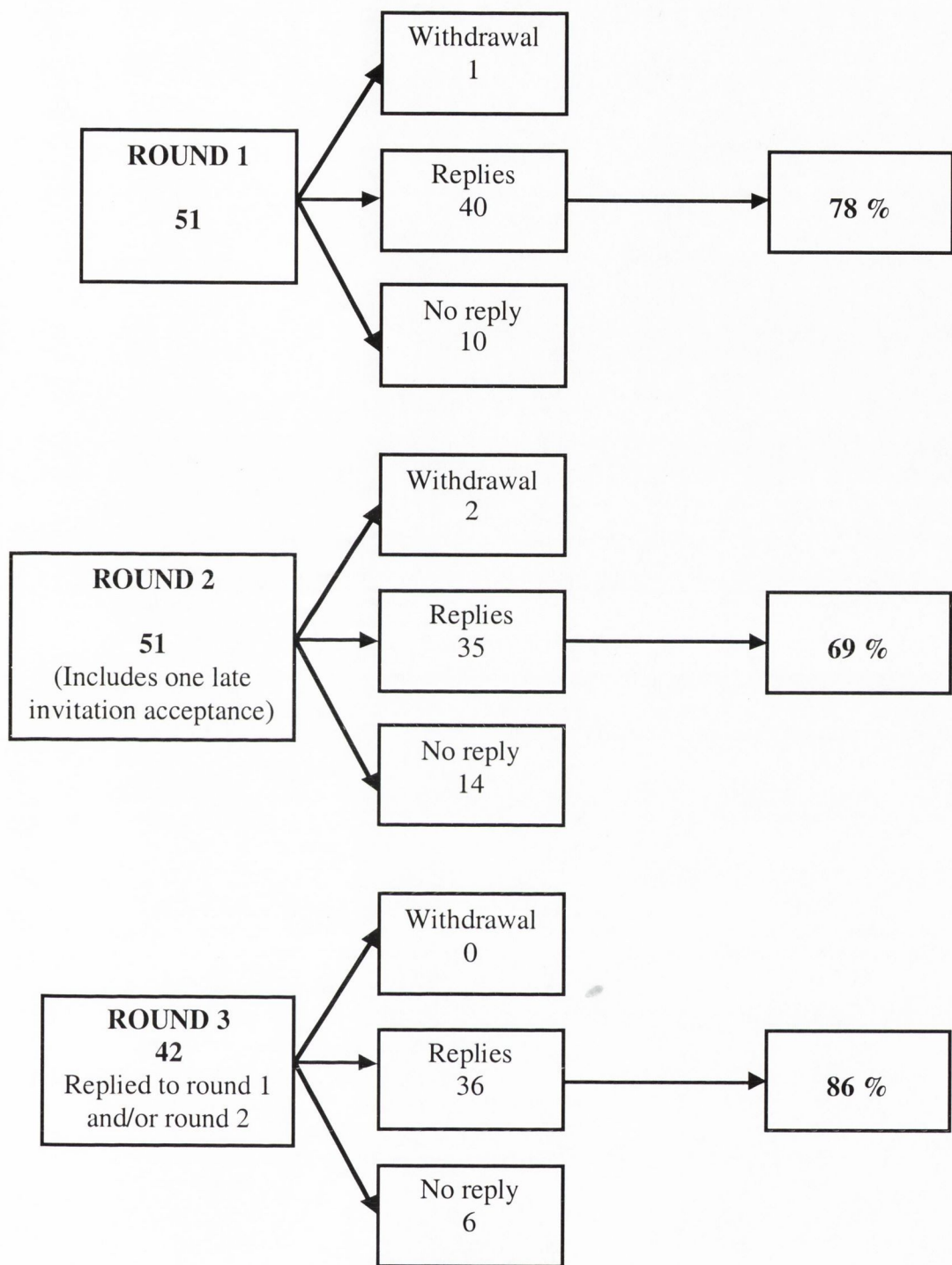


Figure 3.3: Diagrammatic representation of responses to the three Delphi rounds

option on the four-point scale received a rating is displayed for each statement. It also indicates when the statement was not rated or when it received a no judgement (NJ) rating, indicated by the following symbol '--'. Based on the proportions in each category the level of

consensus (high, moderate, low or none) and the direction of that consensus (i.e. in favour (✓), not in favour (✗) or none (↔)) were calculated.

In addition, Table A5 (Appendix 10) also contains the reasons or comments given by panellists for being significantly different from the group median. When read together with the rating summaries the ratings are clarified and any patterns or trends can be identified.

Abbreviations have been used to represent the different levels of consensus and whether or not the consensus was in favour of the statement (e.g. 'high consensus where the statement was rated as very important' is represented as 'High VI'). The abbreviations used are explained at the beginning of each section in Table A5 (Appendix 10). A summary of the proportion of statements that achieved the different levels of consensus for each section, A, B, C and D is given below in Tables 3.7 to 3.10.

Section A Section A was divided into part one and part two. There were 37 statements in part one where panellists were asked to indicate how important a reason for inequity in resource allocation they attached to each statement (Table 3.7a). There were six statements in part two where panellists were asked to indicate how important a reason for equity in resource allocation they attached to each statement (Table 3.7b). An importance rating scale was used for this section. There was a high consensus in favour of the statement (i.e. very important or very important to important) for 62% of statements in part one and for 33% in part two.

Table 3.7a: Number (%) of statements in each consensus and direction category for section A part one

Consensus	Direction	N(%) (n=37)
High	In favour	23 (62)
Moderate or low	In favour	10 (27)
Low	Not in favour	1(3)
None	None	3 (8)

Table 3.7b: Number (%) of statements in each consensus and direction category for section A part two

Consensus	Direction	N(%) (n=6)
High	In favour	2 (33)
High	Not in favour	1(17)
Moderate or low	Not in favour	2 (33)
None	None	1 (17)

Section B There were 37 statements presenting various options for alternatives or improvements to the resource allocation process. Panellists were asked to indicate how desirable and how feasible each of the statements were. There was a high consensus in favour of the desirability and feasibility of 70% and 49% of the statements respectively (i.e. very desirable, very desirable to desirable or very feasible, very feasible to possibly feasible). (Table 3.8) More information on section B is given in table 3.11 below.

Table 3.8: Number (%) of statements in each consensus and direction category for section B

Desirability (n=37)			Feasibility (n=37)		
Consensus	Direction	N(%)	Consensus	Direction	N(%)
High	In favour	26 (70)	High	In favour	18 (49)
Moderate or low	In favour	8 (22)	Moderate or low	In favour	15 (40)
Moderate or low	Not in favour	2 (5)	Moderate or low	Not in favour	1 (3)
None	None	1 (3)	None	None	3 (8)

Section C There were 12 statements presenting various criteria for any resource allocation process. Panellists were asked to indicate how important each of the statements were. All received a high consensus in favour of the statement (i.e. very important, very important to important). (Table 3.9)

Table 3.9: Number (%) of statements in each consensus and direction category for section C

Consensus	Direction	N(%) (n=12)
High	In favour	12 (100)

Section D There were 18 policy or planning type statements relating to the resource allocation process. Panellists were asked to indicate whether they agreed with each of the statements. Thirty three percent of statements received a high consensus in favour of the statement (i.e. strongly agree, strongly agree to agree). (Table 3.10)

Table 3.10: Number (%) of statements in each consensus and direction category for section D

Consensus	Direction	N(%) (n=18)
High	In favour	6 (33)
Moderate or low	In favour	4 (22)
High	Not in favour	3 (17)
Moderate or low	Not in favour	3 (17)
None	None	2 (11)

3.4.5 Desirability and Feasibility matrix

Table 3.11a and 3.11b (below) present a matrix of the desirability and feasibility ratings. The first presents the actual number of statements in each cell and the second presents the statement number from the questionnaire (see Appendix 5). These results are presented separately to highlight statements that achieve a high desirability and high feasibility rating.

There was a high consensus achieved for 70% of statements based on their desirability and 49% based on their feasibility. In all cases the direction of this consensus was in favour of the statement. Forty one percent of statements achieved a high consensus in favour of the statement on both the desirability and feasibility ratings. The shaded areas in the Tables highlights the 73% of statements where desirability and feasibility were both in favour of the statement but with consensus varying from high to moderate to low. The unshaded area represents those where desirability or feasibility or both were not in favour of the statement or the direction of favour could not be established e.g. due to polarity (27%)

3.4.6 Ranking

Nineteen factors were ranked in round two. The top ten of these were included in round three for re-ranking. The results of this are presented in Table 3.12. Demographic characteristics, socio-economic deprivation and morbidity and disability data were ranked as the most important items to include in a model. The numbers associated with each ranking are presented in Appendix 6.

Table 3.12: Ranking of importance of each factor for inclusion in a needs based resource allocation formula (where 1 is the highest rank).

Rank	Factor
1	Demographic (e.g. population size age & sex)
2	Socio-economic deprivation
3	Morbidity and disability data (derived independently of health care utilisation data)
4	Mortality data
5	Health status (e.g. self reported health status)
6	Social exclusion
7	Rurality / geographical access
8	Best practice in provision of services
9	Quality of life indicators (e.g. QALYs)
10	Performance indicators and measurements of health gain

Table 3.11a: Desirability and feasibility matrix showing the number of statements (n=37) in each consensus and direction category

	Consensus Desirability	High	High	Moderate	Low	None	Moderate	Low
Consensus Feasibility	Direction	Very desirable	Very desirable to desirable			None	Undesirable to very undesirable	
High	Very feasible	1						
High	Very feasible to possibly feasible	11	3	2	1			
Moderate		1	2		2			1
Low		1	1	2				
Low	Possibly feasible	1	2		1	1		
None	None	2					1	
Low	Possibly unfeasible to definitely unfeasible		1					

Table 3.11b: Desirability and feasibility matrix showing the statement numbers (n=37) that fall into each consensus and direction category

	Consensus Desirability	High	High	Moderate	Low	None	Moderate	Low
Consensus Feasibility	Direction	Very desirable	Very desirable to desirable			None	Undesirable to very undesirable	
High	Very feasible	58						
High	Very feasible to possibly feasible	67, 69, 70, 73, 74, 75, 77, 78, 79, 80, 81	47, 62, 68	55, 57	63			
Moderate		59	49, 54		60, 61			48
Low		66	56	46, 50				
Low	Possibly feasible	44	51, 76		52	72		
None	None	64, 65					71	
Low	Possibly unfeasible to definitely unfeasible		45					

3.4.7 Results of Correspondence Analysis

Correspondence analysis for nine statements where no consensus was reached were performed. Table 3.13 presents the inertia values, which are a measure of the spread of the points, for each of these statements on three dimensions. In all cases two dimensions accounted for at least 85% of the inertia.

Table 3.13: Inertia (%) of statements where no consensus was reached.

	Dimension 1	Dimension 2	Dimension 3
Statement 24	0.23 (53)	0.16 (38)	0.04 (9)
Statement 28	0.44 (58)	0.22 (29)	0.10 (13)
Statement 41	0.40 (62)	0.17 (26)	0.08 (12)
Statement 64F	0.31 (55)	0.24 (42)	0.02 (3)
Statement 65F	0.54 (55)	0.30 (31)	0.14 (14)
Statement 71F	0.50 (82)	0.10 (16)	0.02 (2)
Statement 72D	0.43 (62)	0.23 (33)	0.03 (5)
Statement 99	0.38 (52)	0.29 (39)	0.07 (09)
Statement 105	0.23 (50)	0.17 (39)	0.05 (11)

From the correspondence analysis plots it was possible to see whether Delphi panellists from one group rated statements in a consistent manner. An example is given below of statement 24. The remainder of the statements are presented in similar detail in Appendix 9.

Statement 24: The lack of a clear distinction between funders and providers presents a potential conflict of interest.

The majority of panellists' groups were divided on the importance of this statement. Those in the Department of Health and Children rated it as slightly important or unimportant whereas those in the health agencies group rated it as very important or important. Figure 3.4 presents the two-dimensional correspondence analysis that explains 91% of the inertia.

Table 3.11a: Desirability and feasibility matrix showing the number of statements (n=37) in each consensus and direction category

	Consensus Desirability	High	High	Moderate	Low	None	Moderate	Low
Consensus Feasibility	Direction	Very desirable	Very desirable to desirable			None	Undesirable to very undesirable	
High	Very feasible	1						
High	Very feasible to possibly feasible	11	3	2	1			
Moderate		1	2		2			1
Low		1	1	2				
Low	Possibly feasible	1	2		1	1		
None	None	2					1	
Low	Possibly unfeasible to definitely unfeasible		1					

Table 3.11b: Desirability and feasibility matrix showing the statement numbers (n=37) that fall into each consensus and direction category

	Consensus Desirability	High	High	Moderate	Low	None	Moderate	Low
Consensus Feasibility	Direction	Very desirable	Very desirable to desirable			None	Undesirable to very undesirable	
High	Very feasible	58						
High	Very feasible to possibly feasible	67, 69, 70, 73, 74, 75, 77, 78, 79, 80, 81	47, 62, 68	55, 57	63			
Moderate		59	49, 54		60, 61			48
Low		66	56	46, 50				
Low	Possibly feasible	44	51, 76		52	72		
None	None	64, 65					71	
Low	Possibly unfeasible to definitely unfeasible		45					

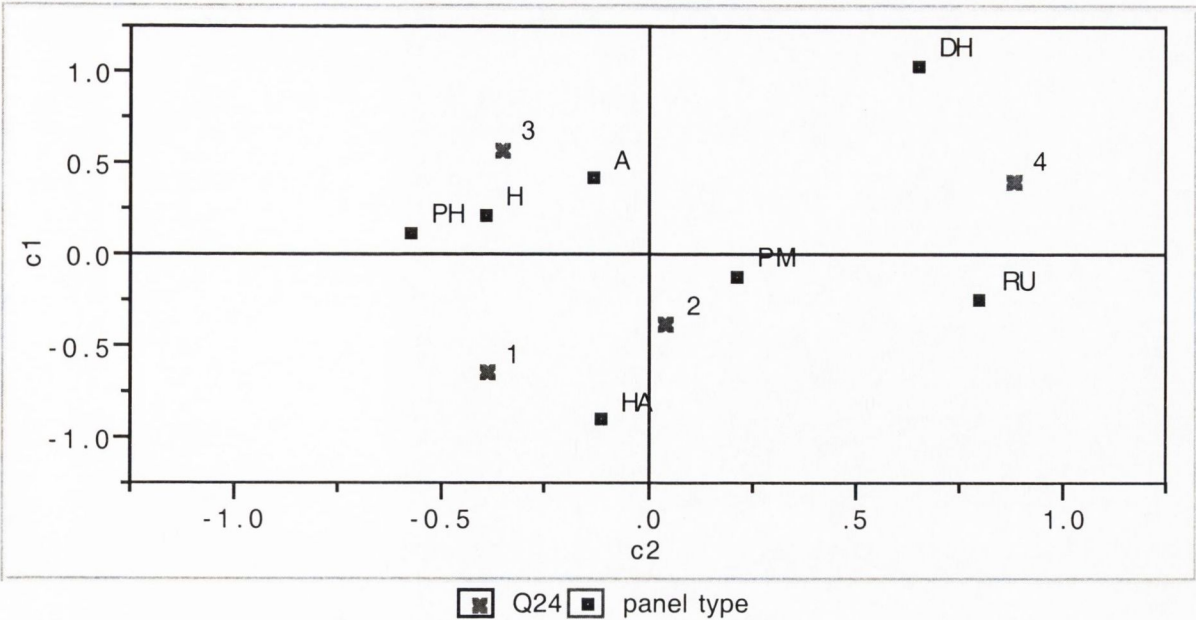


Figure 3.4: Correspondence analysis plot of panellist group with statement 24
 PM=planners and managers, PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.
 1=Very important, 2=Important, 3=Slightly important, 4=Unimportant

3.4.8 Conceptual framework

A conceptual framework is a 'theoretical model developed to show relationships between constructs' where a construct is 'a term comprising several concepts'.¹¹⁶ No clear description of a conceptual framework for a policy Delphi was found in the literature. As this is a decision analysis tool that is perhaps underused, particularly in health care,⁹³ it was considered appropriate to use the experience of carrying out a policy Delphi to attempt to develop a conceptual framework for the process used in this study. This may be suitable for others interested in using this tool. This was considered particularly important due to the varying ways in which policy Delphi has been reported in the literature. The framework was developed by adapting a conceptual framework for a group decision support methodology containing a Delphi component¹⁰⁶ with the descriptions of the phases of communication in a Policy Delphi.⁸⁹ The framework, described below and in Figure 3.5, shows how the processes are interrelated. Each box represents the process issues, and arrows the links between those processes. Reading from the bottom up the interactions between the moderator and the panellists is clearly central to the framework.

- *Formulation of issues:* An initial broad problem was identified by the moderator and the initial questions were formulated, aimed at eliciting ideas and solutions to this problem

from panellists. As devising questions is a difficult part of the process every effort was made to make the questions balanced in order to allow panellist freedom of expression.

- *Exposing options:* Panellists, who were selected based on their knowledge and understanding of the substantive content of the issues, read and considered the questions of this first round and generated ideas and gave opinions.
- *Analysis of ideas:* The moderator had to rely on personal judgement to edit the ideas from round one and this inevitably led to some level of subjectivity and arbitrary choices in editing. From this editing a second questionnaire was formed consisting of a series of policy statements.
- *Determining initial positions on issues:* In the second round panellists were asked to rate each of the statements using a number of rating scales in order to determine their initial positions on the issues raised.
- *Identifying and exploring areas of agreement and disagreement:* Analysis of these second round ratings highlighted areas of agreement and disagreement. Panellists who diverged significantly from the average group rating were asked in the third round to give an explanation why they adopted this position.
- *Re-evaluation of options in the light of the above:* In the third round all panellists were asked to re-rate the statements while considering feedback, presented as the group median and interquartile range. This added validity to the process as it was possible to analyse changes from one round to the next. By feeding back the group average, panellists were able to reflect on their responses in the context of the group response. This process can continue for as many rounds as deemed necessary i.e. re-rating and feeding back reasons why panellists disagreed.
- *Evaluating reasons:* The moderator was responsible for evaluating the reasons given and feeding back to the group each time. Again there was a level of subjectivity in these decisions.
- *Outcomes:* Final outcomes included well-defined areas of consensus and disagreement with clear arguments presented for the views articulated. The development of this problem structure has clarified the way forward and assists in the decision making process.^{90 106}
- *Better informed policy makers:* The richness and clarity of detail of the panellists' views on the issue should lead to more informed final policy formation.
- *Panellists' learning:* Panellists should have learned from the process and should feel that they have had some influence on the broader policy decision making process.

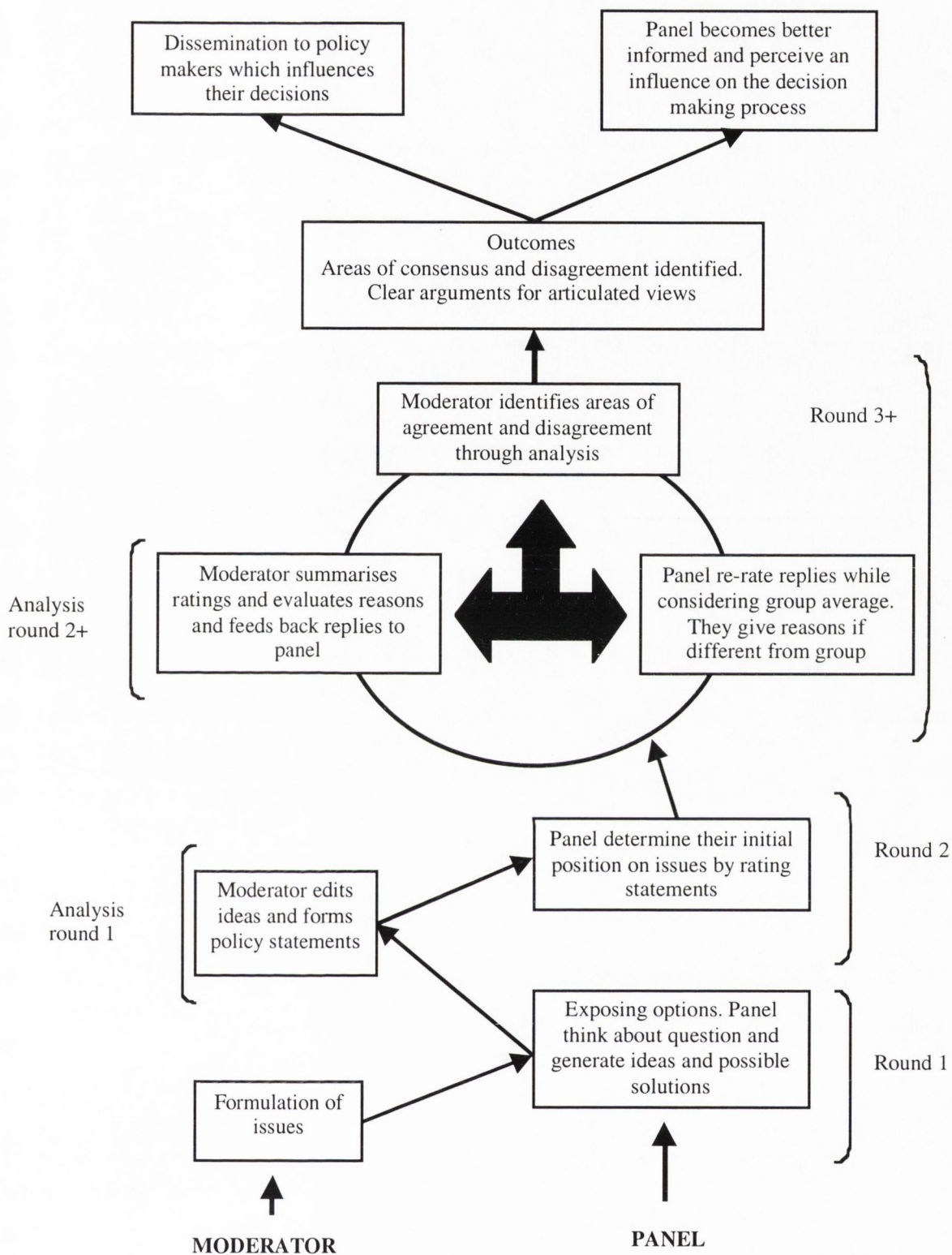


Figure 3.5: Policy Delphi Conceptual Framework (adapted from Morton *et al*¹⁰⁴ and Turoff⁸⁷)

3.5 Policy Delphi Discussion

3.5.1 Introduction

The majority of panellists agreed that there was inequity in resource allocation. This study resulted in a substantial number of ideas and suggestions from panellists to improve equity in resource allocation. The panel concurred that many of these suggestions were important but there was some disagreement over the importance of other suggestions. It was found that the Policy Delphi methodology was an appropriate method to use as it allowed the objectives of this study to be achieved.

3.5.2 Layout of section 3.5

The reasons for resource allocation inequity, as perceived by the panellists, are presented first. This is followed by the main suggestions for improving equity in resource allocation arising from the study, which are discussed under the four broad headings listed below:

- Needs based resource allocation
- Criteria for any resource allocation system
- Health Board and financial restructuring
- Public, private and general health funding

The policy Delphi methodology, including its strengths and weaknesses pertaining to this study are then discussed followed by an examination of the implications of the study. For clarity statement (S) numbers are used which refer to Table A5 in Appendix 10.

3.5.3 Study suggestions

3.5.3.1 Reasons for resource allocation inequity

Panellists identified several reasons, with a high consensus, as being very important reasons for inequity in resource allocation. These generally related to the two-tier health system, lack of transparency in the system, and information deficits. Other reasons that received a high consensus, but considered slightly less important, related to geographical inequities in access to and quality of services, GMS eligibility levels, lack of universal access to health services, insufficient data to assess need and poor prioritisation of services. Although these inequities have been previously identified,^{10 76} this study emphasises those reasons that specifically account for inequities in resource allocation in the health service. The remainder of this

section discusses the suggestions that arose from these perceived reasons for inequity in resource allocation, including in some cases the reasons given for holding a dissenting view.

3.5.3.2 Needs based resource allocation

The main suggestions arising from these perceived reasons for inequity, was the suggestion to develop and implement a model for resource allocation based on actual, objective, resource need. There was a high level of interest and support for the development of such a model, with a high consensus in favour of the desirability of this suggestion obtained. However, several obstacles were identified that may hinder the process of developing and implementing such a model, as only a low consensus in favour of its feasibility was obtained. Some of the issues contributing to this low feasibility are discussed here.

There was a high consensus against developing a formula for new rather than existing services with the consensus being that a model should be developed for both (S48). There was a high consensus in favour of the desirability of introducing a zero-based budget system. This would mean that all Health Boards start with nothing and would be funded purely on the basis of need with past allocations ignored. This was seen as unfeasible unless implemented on a phased basis (S45, S56).

The inadequacies of Irish national data sources were highlighted by many as a potential barrier to the development of a model. Suggestions for improving the Irish health information system, such as increased investment, introducing unique personal identifiers and improvements in data quality, all received a high consensus in favour of both the desirability and feasibility of these suggestions (S78-81). The pending National Health Information Strategy should go some way towards addressing the data deficiencies identified in this study. Various sources for obtaining data for use in a model were mentioned. Data from a population survey or from small area level data were rated as more desirable than using individual level data or simulated national data, but these options received varying feasibility ratings (S49-52). While Wales are considering using a population survey to obtain data for use in a model,¹²⁰ and Sweden use individual level data,⁵ data from small area level^{45 121} are most commonly used for needs-based models internationally.⁴ One of the panellists said that a disadvantage of using population survey data is that they tend to under sample those most in need, a fact pointed out by other authors.³⁵

There was concern as to whether or not adequate resources would be forthcoming to allow the development or implementation of a needs-based resource allocation model (S99). There was no consensus reached on this, although one panellist remarked that *'If health is given the political priority it deserves then additional resources will be forthcoming'*. If a suitable model is developed it is imperative that there is a commitment to funding its implementation. Another fear expressed by panellists was that a model might not be an option due to resistance from Health Boards who may lose out in funding allocations using this method. However there was a high consensus among panellists that disagreed with this view (S98).

It was agreed, with a high consensus, that although a needs based resource allocation model may not present all the answers to equitable resource allocation, it would provide a rationale for variation between Health Boards, and would assist in evaluation of expenditures (S106-107). There was no consensus on whether the focus of equity should be on health outcomes rather than on baseline needs (S105). One panellist who agreed that the emphasis should be on health outcomes pointed out that *'Some deprived communities need more to get the same level of outcome'* thus highlighting the importance of vertical equity.

Demographic factors, deprivation factors, morbidity and disability data, and mortality data were ranked as the top four items for inclusion in a needs-based resource allocation model. These concur with other models used internationally such as the York model in the NHS⁴⁵ and the Fair Shares model in Scotland¹²¹ that use these as their main data sources.

3.5.3.3 Criteria for any resource allocation system

Certain statements and suggestions were made which would apply as general criteria to any resource allocation system. This list of criteria received a high consensus in favour of each statement (S82-93). Examples include linking the allocation of resources to evidence based practice (S82), to service plans that meet defined equitable standards of service (S83), to programmes that achieve value for money (S88), and to programmes that are linked to formal agreements on service access (S90). All these criteria are mentioned in the Health Strategy document.¹⁰ One of the disadvantages of a needs based resource allocation model is that local equity may be increased, through the reduction of national equity. This is because the smaller the area the greater the budget risk. Many of the criteria for a resource allocation system

highlighted here by panellists, for example having appropriate performance management systems, helps to reduce this budget risk.¹²²

There was a high consensus in favour of linking allocations to programmes that maximise health benefits (S87). Some panellists were concerned that focusing on outcomes may actually exacerbate inequities. An example given was of a community with a high rate of smoking and a resultant high rate of lung cancer and heart disease. A failure in the reduction of these high levels of disease may result in transfer of money to another area, which may benefit more from these resources. The ethical dilemmas inherent in this scenario were reflected perhaps by the lack of consensus achieved when panellists were asked whether the focus of equity should be on health outcomes rather than on baseline needs (S105).

3.5.3.4 Health Board restructuring

Many suggestions were made in relation to both the organisational and financial restructuring of Health Boards and these are discussed below. These findings however have largely been superseded by the developments in relation to the health services reform programme mentioned in the last chapter. Subsequent to three reports, Health Boards^{122 36} are to be abolished and replaced by a Health Services Executive containing an acute pillar, a shared services pillar and a primary, community and continuing care pillar. Acute services are to be rationalised and the focus will be on accountability. The membership of the interim board of the Health Services Executive represents stronger financial and business backgrounds than heretofore.⁸³

Health Board organisational restructuring

There was a low consensus in favour of the suggestion that Health Boards be replaced or that the number of Health Boards be reduced (S60-61). As a large proportion of the panellists (41%) worked in Health Boards this is perhaps not surprising. These statements generated a lot of debate with panellists suggesting that improving management and improving inter-Health Board contact would be better than replacing or reducing the number of Health Boards. The only comparable alternative model, the Eastern Regional Health Authority, was not viewed positively by some panellists. Others pointed to the lack of evidence that the Health Board system was not working, and some referred to the fatigue experienced by colleagues in the UK who have experienced excessive organisational restructuring. The Value

for Money Audit has pointed out that competition between Health Boards for financial, human and material resources is negative and has reduced partnership between Health Boards.⁷

There was a suggestion that there should be no change in resource allocation methods until the review of the Health Board organisation and structure, which was in progress at the time of this study, was complete (S103). Surprisingly, panellists mainly disagreed with this statement. This may be because panellists were not aware of the Health Board review. One panellist commented that *'It is important to sort out the structure of the Health Boards based on this review before sorting out the funding, as otherwise one will confuse the other'*. Many panellists felt that any new resource allocation system should not be introduced until it is ensured that any new system is fairer and more transparent (S101). A low consensus in favour of this statement was achieved. Others felt that this was an excuse for doing nothing and pointed out that effective measures can be implemented immediately such as raising the income eligibility limits for medical cards.

There was a moderate consensus in favour of increasing involvement of the public in health service decision making and in advising Health Boards (S63). However, some panellists were concerned that the public may have vested interests and that they may fail to take a broad view. As methods of health funding evolve to incorporate health care rationing, public power is to some extent reduced as they are forced to take on the role of service user rather than consumer which was the case with unrestricted health funding. In recognition of this, the public are being involved more in priority setting and health policy making in some countries for example the Citizens Councils in the National Institute for Clinical Excellence.¹²³ One study that looked at the level of involvement the public wanted in health care decision-making found that they want consultation but without responsibility for decisions. In addition they wanted feedback about how the final decisions were made and the role that their consultation took in reaching the decision.¹²⁴ There is a need for public debate before rather than after any final resource allocation decisions are made where it is made explicit that the objective is that a more equitable resource allocation system would benefit the public, not only through provision of and access to services, but also theoretically by extension their health.

Inappropriate political influence in resource allocation was seen as a major cause of inequity (S17) and the panellists reached a high consensus in favour of the desirability of removing this inappropriate influence (S64). There was no consensus reached on the feasibility of this, mainly due to difficulties in defining appropriateness and how it has different interpretations at local and national level. The Value for Money Audit also recognised a strong element of local democracy in Health Boards and pointed out that this can militate against the delivery of best value for money due to political pressures.⁷ Some panellists felt that reducing political influence would be interfering with the democratic electoral process. It is interesting to note a move by the government recently towards abolition of the dual mandate (i.e. serving in the Dail and on local authorities and Health Boards) for serving elected government members. This is due to take effect from 2004 under the Local Government Bill 2003.¹²⁵

Health Board financial restructuring

There was a high consensus among panellists in favour of Health Boards paying for treatment of their residents, regardless of where that treatment took place. This suggestion was rated as feasible to implement (S62). There was a high consensus in favour of the desirability and feasibility of increasing the knowledge base of managers, health professionals and the community on issues surrounding equitable resource allocation (S77). This was a problem identified by the Value for Money Audit who maintain that, as health service personnel have worked for years within a culture of financial restraint, they are not suited to longer term strategic planning.⁷ Unfortunately the Health Strategy does not seem to have any plans to tackle this problem.

There was no consensus reached as to whether the lack of a clear distinction between funders and providers of health care presents a potential conflict of interest, and whether this was a reason for inequity in resource allocation. (S55) Some panellists felt that the separation was quite clear. Others felt that the clear distinction between funder and provider in the Eastern Regional Health Authority has not provided evidence that this division makes the health system any better. There was a high consensus in favour of the statement that multi-annual budgets are required to allow improved planning and empowerment of managers (S58). This is not surprising as this was also identified as an important reason for resource allocation inequity in this study (S23), by the National Economic and Social Forum,⁷⁶ and by the Value for Money Audit.⁷

Some panellists thought that another reason for inequity in resource allocation was the fact that corporate management does not have a culture of accountability (S20). While this achieved a low consensus in favour of the statement there were several panellists who denied this and referred to the Health Amendment Act which makes it impossible not to have a culture of accountability.¹²⁶ Whether this conflict of opinion reflects a lack of information on the part of some panellists or a perception that there is not a culture of accountability was unclear.

3.5.3.5 *Public, private and general health funding*

The two-tier system of public and private care in Ireland was rated as an important reason for inequity in resource allocation as it has been elsewhere (S1, 3, 6).^{76 74} The two-tier system is seen as a challenge by the Department of Health and Children in its pursuit of equity but it is not necessarily seen as an inequity in itself. Their position is that the private health sector makes a valid contribution to the public health sector and these links should be strengthened and retained.¹⁰

Public health system

General Medical Scheme (GMS)

There was a high consensus in favour of restructuring the GMS, for example there was a high consensus in favour of raising the income eligibility limit for medical cards (S73). One panellist, however, commented that this sort of '*...tinkering around the edges*' and making minor changes would be insignificant in relation to improving equity and that more fundamental change was needed. There was a high consensus that resources should be allocated based on needs and that this lack of transparency added to inequity in the system. However the panellists also agree that all children should receive medical cards (S74). Obviously giving free medical cards to children would not be a needs based system and this appears contradictory. However the reason for this may be due to the goal of free access to primary and secondary care which was also seen as important (S69-70). Free medical cards to children would be a step towards this goal. Reconciling these two issues - needs based system and free medical cards to children - needs further investigation. This is similar to the policy change which introduced free medical cards to people who had reached their seventieth birthday in 2000. There was a low consensus that the statement 'The inclusion of all people over seventy years in the GMS is unfair' was an important reason for inequity in the health

care system (S2). This is probably because it is considered to be small in the overall scale of things.

Acute hospitals and Casemix

Suggestions that related to the acute hospital sector all received a high consensus in their favour. These statements related to restructuring of consultants' contracts (S65), introducing common waiting lists (S66), and avoiding rewards for what are perceived as inefficiencies in the waiting list initiatives (S67). The issue of common waiting lists has been around since 1989 following a recommendation by the Commission on Health Funding.⁸ Their recommendation was not adopted despite the waiting list issue causing much political controversy over the years. Subsequently a waiting list initiative was established and several of the actions of the current Health Strategy are aimed at reducing waiting times.¹⁰ While common waiting lists would seem to be the obvious answer to reduce inequalities this is still not a policy objective and the Health Strategy has been criticised because of this.⁷⁶ Ireland has been criticised by the Committee on Economic, Social and Cultural rights on this issue and they have also recommended the introduction of a common waiting list for all patients treated in publicly funded hospitals.⁷⁷

The suggestions relating to Casemix had the highest number of non-responses (19.4%, n=7), perhaps indicating a lack of knowledge by some panellists of this area. Continuation of Casemix funding for acute hospitals, with increases in budget adjustments, was rated as desirable and feasible with a high consensus for both these suggestions (S68). This fits in with the policy objectives relating to Casemix in the Health Strategy.¹⁰ The statement that Casemix is a broadly equitable basis of allocation however received a low consensus in favour of this statement with many panellists pointing out the flaws in Casemix, particularly its lack of a quality component (S109).

Right to health care

Another interesting suggestion, which bears some relation to the issue of resource allocation, was that our health system should be based on the right to health care rather than on the current eligibility for health care (S108). There was a high consensus in favour of this statement. Some panellists pointed out that the cost implications of a rights based system, particularly the possibility of legal actions, could make this suggestion prohibitive. While the

Health Strategy has not addressed the issue of the right to health care, it has committed itself to move from an eligibility-based system to an entitlements based system.¹⁰

While the right to health is recognised in numerous international instruments, particularly article 25.1 of the Universal Declaration of Human Rights,¹²⁷ it is the International Covenant on Economic, Social and Cultural Rights that provides the most comprehensive article on the right to health. This states that state parties recognise "...the right of everyone to the enjoyment of the highest attainable standard of physical and mental health."¹²⁸

The Committee on Economic, Social and Cultural rights recently admonished Ireland for failing to incorporate a human rights framework in the recent Irish Health Strategy, in contravention of paragraph 54 in the Committee's General Comment No. 14 on the right to health.¹²⁸ They recommend that Ireland embrace a human rights framework within the strategy, incorporating the principles of non-discrimination and equal access to health facilities and services.⁷⁷ The right to health however is not enshrined in the Irish constitution so despite this recommendation there is no obligation on Ireland to comply.

Private health care

The issue of whether the tax rebate on private health insurance is an important reason for inequity received much debate, not resulting in any consensus (S7). Several panellists, while agreeing that it was inequitable, pointed out that its influence has a minimal effect overall. Others felt that its removal would make health insurance less affordable which would be a negative consequence.

General health funding

The main focus of this study was on equity in resource allocation. However the breadth and extent of comments raised in round one resulted in the widening of this focus to include areas such as health financing methods. While adhering only to comments on resource allocation would have simplified the process this may have alienated many of the panellists whose views would not have been reflected in the subsequent rounds. The decision to retain the majority of issues raised did complicate and add to the workload but it also gave breath to the study. There was no consensus as to whether funding of the health services should be insurance-based (S72) but there was a high consensus agreeing that the tax-based system of

health funding is equitable (S110). Pre strategy reports^{7 129} agree that there was insufficient benefit to be maintained by adopting an insurance-based system and that the tax-based system of health funding should be maintained - the position adopted in the Health Strategy.¹⁰ The tax based system has been found to be a progressive method of health funding.¹

3.5.4 Discussion on methodology

3.5.4.1 Response rate

A high response rate was achieved for the three rounds. This reflects a high level of interest in the issue of equity in resource allocation among the panel. Response rates in other studies have been reported as dropping to between a half and two thirds at each round⁹⁵ but the drops were significantly smaller in this study with a drop from 78% to 69% between rounds one and two and, using the round two denominator, the response rate for round three actually increased to 71%. When the round three denominator is used this increases to 86%. (See response rate - section 3.4).

3.5.4.2 Sample size and selection

The objective of this Policy Delphi was to establish a panel of people with a diverse range of experiences and knowledge of the health sector in Ireland. Sixty-two people were initially invited to participate in the hope of recruiting about half these to the study. In fact, 52 agreed to participate. This number was as large as is desirable in a Policy Delphi⁹⁷ and the range of experiences in the panel was considered to be sufficiently broad. Thus this gave confidence that the exercise actually captured a broad range of views, experiences and suggestions relating to resource allocation. This means that, while a representative sample was not sought statistically due to the lack of a sampling frame, the final panel does seem to comprise a representative sample. Some warn however that this does not necessarily guarantee a pool of sufficient expertise.⁹⁹ There were only three representatives of service users in the sample so they may have been under represented. However, it was clear from the analysis that many panellists who were health service providers, explicitly adopted a service users perspective by becoming advocates for equity, sometimes competing with the panellists who adopted the role as advocates for efficiency and effectiveness.

3.5.4.3 Strengths and limitations of study method

Consistency in replies

It was apparent that a few panellists rated statements according to how important, desirable or feasible they found them to be in relation to equity generally rather than in relation to improving equity in resource allocation. Despite this the results still provided a wide range of information and insight into views of panellists.

There was a high consensus in favour of the desirability of developing and implementing a national resource allocation formula for the health services based on actual objective resource need. This contrasts with the medium consensus in favour of putting the emphasis on developing a service planning culture where care is planned in a targeted manner according to need, rather than on developing an actual formula to allocate resources. This contradiction, between support for a model in the former and apparently less support in the latter, demonstrates one of the weaknesses in the questionnaire. This was that it was not very discerning in prioritising views in some areas. It needs to be pointed out however that this is likely to be a questionnaire flaw rather than any real contradiction in the panellists' thinking. Panellists were not asked to rank the various statements or to make explicit comparisons between them.

Frustration

General comments were invited from panellists at the end of rounds two and three. A small minority of panellists expressed frustration at being prevented from fully expressing their views due to the restrictive nature of the rating scales (i.e. they may have wanted to disagree with a statement but were asked to rate how important they thought it was). Other authors have expressed similar problems and it is recognised that Policy Delphi presents a challenge to find a balance between developing specific policy statements while maintaining a flexible agenda.⁹⁰ The wide range of issues raised probably also highlights the keen interest there is among senior health service staff and others in the workings of the health service and perhaps also reflects the lack of opportunity to express their views in a structured manner. Lack of clear definitions of some concepts was a cause of concern for a few panellists. An attempt was made to do this by defining the terms 'resource allocation' and 'equity' but this may not have gone far enough.

Principle versus practice

While agreement in principle may have been reached on some issues there are no guarantees that this will translate to agreement in practice. However, as with all change management processes, the aim is to get change agents on board and the common view is that the rest will follow.¹³⁰ From this study it is clear that there are many such change agents working in the health service willing and ready to lead and implement change. Participation in the planning and implementation of change is one of the key strategies for overcoming resistance to change.¹³¹ This Delphi study has laid the groundwork for acceptance of future changes to the resource allocation mechanism.

Number of rounds

There were three rounds in this Policy Delphi. A disadvantage of not having conducted a fourth round was that the reasons given by panellists as to why they gave a rating that was significantly different from the group median was not fed back to the other panellists. This would have facilitated counter arguments and a livelier debate. More rounds allow issues to be clarified, and a better understanding of the priorities to develop. This however has to be balanced against the increasing respondent fatigue, the fall off in participation and the diminishing quality of arguments supplied as rounds progress.^{90 95 132} In addition ratings are unlikely to change after two or three rounds. This is highlighted by the high consistency of individual ratings of panellists between round two and round three. Some change is to be expected, as otherwise there would be no benefit to giving feedback. This consistency improves confidence in the results.

Cost-effectiveness

Relative to workshops which involve bringing people together the Policy Delphi is inexpensive. This is particularly so as the majority of panellists chose e-mail as their preferred method of correspondence which reduced administration costs.

Time

Panellists have an opportunity to think about the issues raised on two occasions i.e. prior to the second and third rounds. For the third round they can rethink their ideas in the context of the median group score. They can also take as much time as they like to complete the questionnaire, unlike a workshop where there is time pressure to produce an answer.⁹⁷ By its

nature however, the questionnaire tends to be long and several panellists remarked that they greatly exceeded the guide time given on the questionnaire. The whole process using this multi round survey took approximately five months to complete due to panellists not meeting deadlines and the time taken for analysis and preparation of the next round. This delay can lead to reduced interest by panellists and other unforeseen commitments in the intervening period making them unable to continue. This problem seems to be generic to surveys involving respondents who donate their time.

Difficulty with assimilation of data

Similarly to other studies⁹⁷ due to the large amount of data produced throughout the three rounds there were some difficulties experienced in assimilating all the information. Making sense of some of the reasons and ideas presented was challenging and in some cases they had to be omitted, as the methodology does not facilitate clarification of responses. The reasons presented for holding a dissenting view were often very short and it was sometimes difficult to determine the substantive content of the argument. While the ratings for a particular statement were relatively easy to summarise, identifying trends and patterns was more difficult. This may have been partially attributable to the study design.

Moderator objectivity

A problem with Delphi studies is the potential for lack of objectivity of the moderator.^{89 106} Several methods were used to increase objectivity. The use of independent coders to assign the statements to categories increased objectivity. Comments were invited from panellists at the end of each questionnaire. These comments related to the questionnaire design, unclear definition of some words and difficulties with the rating scales. These comments were used to help clarify issues in subsequent rounds. Procedural openness in any exercise where expert opinion is sampled is essential.⁹⁹ This is because decision-makers will ultimately be influenced by these opinions and advice and will assume the sample is representative. Every effort was made in this policy Delphi to maintain openness in the methodology.

Breadth versus depth

With the benefit of hindsight it is clear that greater depth in the Policy Delphi could have been achieved with some adjustments to the questionnaire and study design. Nevertheless the survey product was acceptable because a broad range of ideas were generated and the level of

consensus or lack of consensus on these was established. As Policy Delphi is a decision facilitation tool rather than a decision making tool there will be other fora where depth can be explored further.

One way of increasing depth may have been to replicate the methodology used in a water management Policy Delphi. This study requested every panellist to give a reason for every rating, resulting in 216 ratings per person, which the author admitted was too many to analyse.⁹⁷ The rationale for requesting a reason for every rating was to avoid the study merely becoming a summary of rating on options rather than a range of arguments for and against each statement. Panellists who agree with a statement may be agreeing for several different, sometimes contradictory, reasons so in order to avoid this loss of information the panellists need to give reasons. If all panellists give reasons then the best pro and con arguments can be identified and also the more informed panellists can be identified and their responses given more weight.

It is believed that requesting a written reason for every rating in this study (this would have resulted in 148 reasons per person) would have led to reduced quality and quantity of responses. This is particularly true as the reasons that were received usually consisted of one or two brief sentences, which in some cases had insufficient depth to garner a full explanation for the rating. While it is recognised that those who agreed with a statement were not necessarily agreeing for the same reasons there was a considerable degree of overlap in the reasons and suggestions generated from round one. These were supported by the similarity of many statements to objectives in the Health Strategy – many of which came from an extensive pre-strategy consultation process. It was decided therefore only to ask reasons for dissenting views.

The current study however provided feedback to panellists in the form of the group median and interquartile range. This allowed panellists to consider their arguments in light of the others score and thereby added depth to the replies. The de Loë water management study,⁹⁷ while obtaining more reasons for ratings, lost out on some depth by only carrying out two rounds. The rating scales used in the current study were more sophisticated and gleaned more information than in the de Loë study.⁹⁷ de Loë used only an agreement rating scale while the current study used four different rating scales. It was also considered unrealistic for panellists

to be asked to give a reason for something that most people agreed with, but that it would not be unrealistic to ask people who diverged from the status quo to explain why and in most cases they did.

A possible way of increasing depth may have been to have a panel of moderators, rather than just one, who would analyse each round together and therefore get more from the data. However this does not seem to be a feature of Delphi studies in the literature and is incorporated into qualitative studies mainly through dual coding of data, an exercise that was done in this study. As mentioned in the de Loë study, all published Policy Delphis are done in different ways and no other studies were found that used the method described by de Loë.⁹⁷ Because of this variation in methodology a conceptual framework was developed for this study to allow others to follow this methodology more clearly.

Correspondence analysis

As some of the groups used in the correspondence analysis have only a small number of panellists these results must be interpreted with caution. The Department of Health officials and the Hospitals group members were most likely to be in agreement but as there were only two in each group this is a bit misleading. The main point from this section is that where no consensus was reached there was division in the voting patterns between groups and groups of panellists did not in general vote in the same direction. In addition panellists were asked to take part as individuals rather than as representatives of their respective employers.

3.5.4.4 Conclusion on methodology

On balance the strengths of this study outweigh the weaknesses. Policy Delphi is a powerful, flexible, efficient and inexpensive way of drawing on the knowledge of a widely dispersed group of people with varying backgrounds, who might not otherwise come together. Despite its shortcomings it is a useful tool for exploring a wide range of complex policy questions.

3.5.5 Policy Delphi Conclusions

Some of the findings and discussions raised in this study have been superseded by the commencement of the Health Services Reform Programme. It is possible that the panellists in this study, many of whom are in positions of authority, will not hold the same authority in the

new health structures. This may reduce their ability to influence change, in particular to drive a reform agenda for improving equity in resource allocation.

A description of the implications of this study is presented in Chapter 7 in the general discussion of the thesis. A report of this study was sent to the Department of Health and Children and to the panellists and a paper has been published in the journal 'Health Policy'.¹³³ This is an underused methodology with several strengths and this dissemination process is an attempt to promote its use. The main finding of this study was the strong support for the development and implementation of a needs based resource allocation model. The next chapter examines whether such a model would in fact improve equity in the health services and the subsequent chapters develop and test the framework for such a model.

CHAPTER 4: BENCHMARKS OF FAIRNESS

4.1 Layout

This Chapter describes the Benchmarks of Fairness that were briefly referred to in Chapter 2. Following an introduction (4.2) the values systems of Ireland and the US are compared (4.3). The process of modifying these Benchmarks for use in Ireland is then described (4.4) followed by the application of these Benchmarks to test the fairness of the proposed reform, that is, introducing a needs based resource allocation model for the Irish health services. In the results section the score for each benchmark is discussed (4.6). Section 4.7 discusses the methodology used.

4.2 Introduction

In order to determine whether health care reforms have affected equity it is necessary to have a measurable construct of equity.¹³⁴ Benchmarks for fairness are perhaps one such measure.² Ten benchmarks of fairness were developed in the US. They have three possible uses: they can be applied to compare the fairness of different health systems, assess the fairness of existing systems or assess the fairness of an actual or proposed health care reform. They are a flexible tool that can be adapted for use in different countries to incorporate their particular values, for example, developing countries.¹³⁵

The Benchmarks were first developed to assess the fairness of proposed medical insurance reforms and to address concerns that US health policy makers were concentrating on efficiency rather than on fairness in their decision making.² The Benchmarks of Fairness complement other measures of equity and health system performance.¹³⁵ The US health care system has a large private sector which constitutes 34.8% of total health funding with 44% of funds coming from the public sector (2001 Figures reported).⁷³ The remainder is mainly made up of out-of-pocket expenditure which makes this system predominately privately funded, a fact that is reflected in the construction of the Benchmarks. This study examines whether the benchmarks could be modified to assess reforms in the predominately publicly funded Irish health system.

Fairness as measured by the Benchmarks of Fairness is a broader concept than equity and embraces health outcomes, accessibility to health services, health financing, efficiency,

accountability and patient and provider autonomy.^{2 136} Health care reforms are considered to be fair if they seek to reduce the differences in health and health care between groups.²

While a lot of work has been done on needs based resource allocation models, and models are becoming increasingly sophisticated, the question of whether they actually contribute towards equity in health systems remains unanswered. Our main interest was in finding out how the concept of introducing a needs based resource allocation model would impact on fairness and equity in the Irish health system. The HIA tools discussed in Chapter 2 are not entirely suitable for the assessment of the fairness of a reform such as the implementation of a needs-based resource allocation model, particularly as the reform is only at a conceptual rather than at a structural phase. Fairness needs to be measured using other tools and the benchmarks of fairness were considered to be a suitable tool. However there are several parallels to be drawn between HIA and benchmarks including making judgements and getting the informed opinion of those knowledgeable in the area.³⁹

4.3 Values system

It may appear strange that a set of benchmarks devised in the US, a country whose value framework based on current practice would seem to differ vastly from that of Ireland, are being used to assess the fairness of a proposed Irish reform. The perception is that the US have a Libertarian approach to equity but that often people slip through the net and are left without any health cover. However, an examination of the Benchmarks of Fairness and the values that underpins them reveals that the aspirational values of the US health care system are very similar to those in Ireland even though their practice differs. The values of the Irish health system as outlined in the Health Strategy are presented in Table 4.1.¹⁰

Table 4.1: Irish health values ¹⁰

Irish health values
• Population health focus • Better health for everyone • Fairness • Equality • Equity • People-centredness • Quality • Accountability • Fair access • Responsive and appropriate care delivery • Promotion of consumer control • Promotion of consumer responsibility for health • Professional accountability and transparency • Role of social, environmental and economic factors in health

The values underlying the US benchmarks entail a right to health care, a desire to maintain the values of a just society and of equity.² They are based on a values framework for health system reform in the US which draws on Western European health care values.¹³⁷ The modification of the benchmarks therefore concentrated on system and terminology differences rather than value differences. The creators of the original benchmarks have stated that their benchmarks are not necessarily directly transferable to other health care systems without modification due to possible value and structural differences.² This was found to be true in the Irish case and led to the modification of the Benchmarks outlined below.

4.4 Modification of benchmarks for Ireland

Originally there were ten Benchmarks of Fairness, developed in the US, which were divided into 30 detailed criteria.² In their original format the benchmarks were considered unsuitable for use in Ireland without some modification. This was mainly because they were developed for a health system that is primarily funded privately,² (Ireland is a primarily publicly funded health system) and also because some of the terminology used was unfamiliar in the Irish health sector. The adapted benchmarks for developing countries were also unsuitable for use in Ireland as they were developed for health systems that have a large informal health sector.¹³⁵ In order to develop benchmarks for Ireland the US benchmarks were suitably modified. Each criterion and benchmark were examined separately. If it was considered that a criterion or benchmark was irrelevant for describing some aspect of the Irish health sector, the benchmarks for developing countries were examined to see if they had produced a suitable alternative, before dropping that criterion. If a suitable alternative existed this was amalgamated into the Irish benchmarks in place of the original criterion. Where a US criterion or benchmark could adequately describe some aspect of the Irish health care system this was retained, (in some cases with a slight change in wording to enhance understanding).

The values framework underlying the original benchmarks was constantly referred to during this process¹³⁷ as were the values outlined in the Irish Health Strategy summarised in Table 4.1 above.¹⁰ As the scoring system is sensitive to the number of criteria per benchmark, restructuring of the layout was kept to a minimum.

The final set of benchmarks developed for Ireland consist of nine benchmarks with 23 criteria. The first five benchmarks focus on universal access and equitable means of raising

health service funding. The last four benchmarks focus on financial efficiency, accountability and choice. (Table 4.2)

Table 4.2: Irish Benchmarks of Fairness with criteria

	Benchmark Criteria
1	Intersectoral public health - Degree to which reform would lead to the development of information infrastructure for monitoring health status inequalities - Degree to which reform would actively engage intersectoral efforts to improve social determinants of health
2	Financial barriers to equitable access to health care Degree to which reform would increases the percentage of the population receiving universal access to basic health care
3	Non-financial barriers to equitable access to health care - Degree to which reform would lead to reduction in inequitable geographical distributions of health services and resources - Degree to which reform would minimise educational, information and cultural barriers
4	Comprehensiveness of benefits and tiering - Degree to which reform would result in all effective and needed services being deemed affordable - Degree to which reform would reduce tiering (i.e. 2 tier system)
5	Equitable financing Degree to which reform would result in all direct, indirect & out-of-pocket payments being scaled to household budget & ability to pay
6	Efficacy, efficiency and quality of health care - Degree to which reform would emphasise primary care - Degree to which reform would introduce measures to improve quality - Degree to which reform would lead to the implementation of evidence based practice
7	Administrative efficiency - Degree to which reform would minimise administrative overheads - Degree to which reform would lead to contractual bargaining - Degree to which reform would minimises cost-shifting - Degree to which reform would minimise abuse, fraud and perverse incentives
8	Public accountability and transparency - Degree to which reform would lead to explicit, public and detailed procedures for evaluating services with full public reports - Degree to which reform would lead to explicit, democratic procedures for resource allocation decisions - Degree to which reform would lead to fair grievances procedures - Degree to which reform would protect privacy - Degree to which reform would allow the health care budget to be compared with other programs - Degree to which reform would strengthen civil society
9	Patient and provider autonomy - Degree to which reform would increase consumer choice - Degree to which reform would increase practitioner autonomy

4.5 Using the Benchmarks to test the fairness of a proposed reform

From Chapter 2 it was seen that many countries are adopting needs based resource allocation models in an attempt to improve equity in their health services. Evaluation of whether this has been achieved is difficult to measure. Before developing such a model for Ireland it was

considered wise to try and prospectively assess how such a reform would affect equity. The Benchmarks of Fairness are therefore used to assess the fairness of the proposed health care reform which is the development and introduction of a needs based resource allocation model for resource allocation in the Irish health service. As benchmarks of fairness have not to date been used in Ireland this is, in essence, a pilot study where the benchmarks, modified for Ireland, are considered to be in draft format and are used to assess this proposed health care reform.

A team of assessors (including this author and supervisor and two senior colleagues) who have extensive collective experience in Irish and international health systems, independently scored every criterion, projecting what the impact of the reform on each criterion would be over a five-year time frame. Each team member gave a rationale for his or her scores. Discussions between team members clarified individual rationale and the authors were allowed to revise their scores in light of the scores of other members of the team. This was an important step as the scores are meaningless unless they encourage debate on the specific, interacting effects of the reforms being compared. Consensus was not explicitly sought among the group members although following discussion there was convergence towards a consensus on some criteria but polarity remained on others.

4.5.1 Benchmark scoring system

Quantitative estimates were made of the potential impact of the proposed reform. It is recommended that these estimates are based on empirical evidence ² but due to the difficulties in directly measuring fairness and the level of uncertainty in predicting the impact of a proposed conceptual reform rather than an actual reform this was not possible. Fairness was therefore measured using numerical scales defined in qualitative terms. Each criterion was scored on a scale from -5 to +5 with intervals of 0.5.² (Figure 4.1) If the proposed reform was judged to make the current health care system fairer it received a positive score and if it was judged to make it less fair it received a negative score. A score of zero provided the baseline and was received if the proposed health care reform was judged as being neutral. Of themselves the scores are meaningless but they attain a clear meaning when compared with the scores of the other criteria and benchmarks. The mean of the team member's individual scores provided the criterion score, the mean of the criterion scores provided the benchmark score and the mean of the benchmark scores provided the overall score. The benchmark scoring system is designed to help stakeholders, including policymakers and the public,

determine whether a specific health care reform would make the existing health care system more or less fair relative to the system at present.²

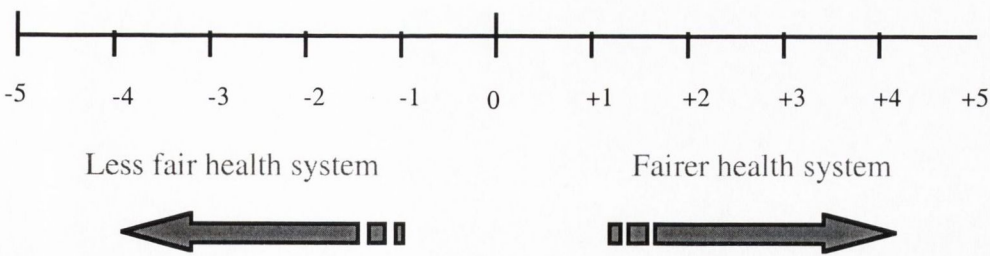


Figure 4.1: Diagram representing the Benchmarks of Fairness scoring system.

4.6 Benchmarks results

The score of each criterion, each benchmark and the overall benchmark score are presented in Table 4.3 overleaf. The overall benchmark of fairness score was 0.93 out of a maximum of five, indicating that the proposed reform, introducing a needs-based resource allocation model for resource allocation, would result in a health system that is marginally fairer than the status quo. (Figure 4.2) Put in terms of percentages, if a 100% increase in fairness from what exists currently were possible then this reform would contribute 18.6% to that increase. A brief rationale for each benchmark score and their respective criterion scores is given below.

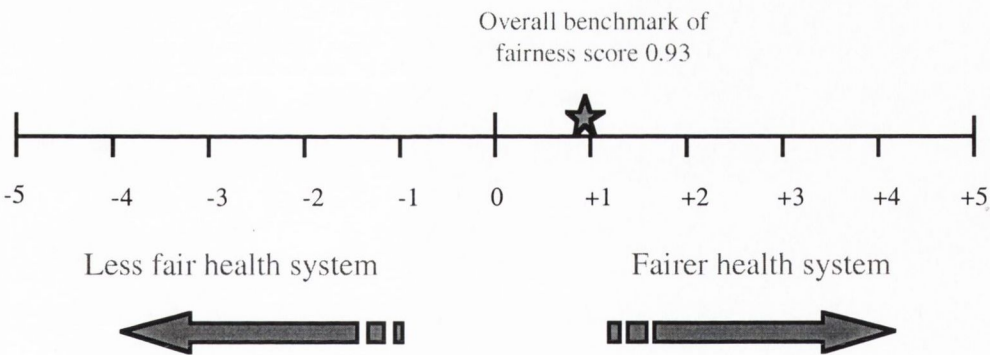


Figure 4.2: Diagram indicating the potential improvement in fairness due to the implementation of a needs based resource allocation model.

Table 4.3: Irish Benchmarks of Fairness with criteria benchmark and overall benchmark scores

	Benchmark • Criteria	Criteria score	Benchmark score
1	Intersectoral public health		1.32
	• Degree to which reform would lead to the development of information infrastructure for monitoring health status inequalities	2.38	
	• Degree to which reform would actively engage intersectoral efforts to improve social determinants of health	0.25	
2	Financial barriers to equitable access to health care		0.25
	• Degree to which reform would increase the percentage of the population receiving universal access to basic health care	0.25	
3	Non-financial barriers to equitable access to health care		2.30
	• Degree to which reform would lead to reduction in inequitable geographical distributions of health services and resources	2.75	
	• Degree to which reform would minimise educational, information and cultural barriers	1.9	
4	Comprehensiveness of benefits and tiering		1.00
	• Degree to which reform would result in all effective and needed services being deemed affordable	0.00	
	• Degree to which reform would reduce tiering (i.e. 2 tier system)	2.00	
5	Equitable financing		0.00
	• Degree to which reform would result in all direct, indirect & out-of-pocket payments being scaled to household budget & ability to pay	0.00	
6	Efficacy, efficiency and quality of health care		1.88
	• Degree to which reform would emphasise primary care	1.38	
	• Degree to which reform would introduce measures to improve quality	2.25	
	• Degree to which reform would lead to the implementation of evidence based practice	2	
7	Administrative efficiency		0.78
	• Degree to which reform would minimise administrative overheads	-1.25	
	• Degree to which reform would lead to contractual bargaining	1.63	
	• Degree to which reform would minimise cost-shifting	1.50	
	• Degree to which reform would minimise abuse, fraud and perverse incentives	1.25	
8	Public accountability and transparency		1.17
	• Degree to which reform would lead to explicit, public and detailed procedures for evaluating services with full public reports	2.25	
	• Degree to which reform would lead to explicit, democratic procedures for resource allocation decisions	3.50	
	• Degree to which reform would lead to fair grievances procedures	0.00	
	• Degree to which reform would protect privacy	-0.75	
	• Degree to which reform would allow the health care budget to be compared with other programs	0.00	
	• Degree to which reform would strengthen civil society	2.00	
9	Patient and provider autonomy		-0.38
	• Degree to which reform would increase consumer choice	-0.75	
	• Degree to which reform would increase practitioner autonomy	0.00	
	OVERALL BENCHMARK SCORE		0.93

4.6.1 Benchmark 1

The first benchmark is concerned with factors other than health care, which influence health status. The majority of health-producing actions do not result from health services but from

intersectoral activities such as education, water and sanitation and housing.¹³⁸ Therefore, the benefits resulting from health care reform can only be minimal. The proposed reform, a needs-based resource allocation model, will undoubtedly contribute to the first criterion by developing better and more timely information sources, thus providing tools for better policy making to reduce inequalities. The expense involved in improving information collection along with some potential data protection issues may limit the effect of this criterion, particularly within a five-year time frame. It was not considered that the proposed reform would actively engage intersectoral efforts to improve social determinants of health over and above what is currently the situation. Therefore, the second criterion received a score of zero.

4.6.2 Benchmark 2

A fair system requires the reduction of financial barriers to needed health services. While possible in theory it was considered that in practice the effect of the proposed reform on increasing universal access to basic health care (criterion one of benchmark two) would be very limited, thus achieving a low score.

4.6.3 Benchmark 3

The proposed reform was perceived to have an impact on the two criteria of benchmark three (reduction of non-financial barriers to needed health services). There is a growing body of grey literature documenting inequitable access to health services in Ireland^{70 71 76 139} and therefore this reform has the potential to distribute resources more fairly as the distribution would be based on need. However, the scope to do this is limited by the fact that many services are historically distributed, with political and local resistance to service rationalisation regardless of national need. Some reductions in educational, informational and cultural barriers to equitable access to health care (second criterion) were envisaged through the proposed reform. Having an appropriate information campaign with the launch of such a reform would reduce educational and informational barriers. Cultural barriers include a perception of poor public sector care, which exists to some extent in Ireland.⁷⁴ By increasing transparency in resource allocation practice the credibility of the system would be improved. The capitation model could be weighting for certain groups (e.g. non-English speakers and those with high levels of illiteracy) who require additional resources (e.g. interpretators and alternative communication methods) to minimise these barriers. To completely eliminate these barriers to health care several actions, not affected by this reform

(e.g. changing lifestyle choices and reducing discrimination towards certain groups in society) would be required, limiting the score given to this criterion.

4.6.4 Benchmark 4

Benchmark four is concerned with the comprehensiveness of health care benefits and tiering. As noted in Chapter two approximately 31% of the population in Ireland are entitled to free medical care while the remainder are subject to varying levels of charges.⁷⁴ The comprehensiveness of the proposed reform is assessed through the first criterion, which asks to what degree would the reform result in all effective and needed services being deemed affordable. It was agreed that the proposed reform was unlikely to affect whether *effective* services are deemed affordable but that it may affect the perceived affordability of *needed* services. It was also thought to depend on whether the affordability is assessed from the point of view of the public or the exchequer. If services are needs-based and are meeting all needs then the public may perceive the services as being more affordable due to the efficiencies in the system. However this would be countered by the additional costs to the exchequer to meet all need. On balance therefore, this criterion received a score of zero. Approximately 45% of the population have private medical insurance.⁷⁴ The Irish health system is described as a 'two tier' public / private system and, while this has some advantages, is largely perceived as being inequitable due to the hospital waiting lists that exist in the public but not the private sector.⁷⁴ A system that is fair will have no tiering and there was much debate within the team as to whether the reform would reduce tiering (second criterion benchmark four). On one level the proposed reform should almost eliminate tiering. If the health system were to be purely based on needs, where people are treated the same regardless of ability to pay, then the private sector would be unnecessary. Allocations would be made purely on the basis of need regardless of who had private health insurance. This interpretation of the reform is unlikely to be achieved in the short to medium term. What is more likely is that, as needs based resource allocation models are primarily about allocation of public finances, account would be taken of who has private insurance in allocating resources. This would result in the private sector and tiering being maintained but with a gradual modification of the status quo.

4.6.5 Benchmark 5

A fair health system is one that is equitably financed. Tax-based funding systems, as in Ireland, are generally considered to be progressive.¹ Out-of-pocket expenditure and private sector funding is a regressive funding mechanisms and makes up approximately a quarter of

all health spending. The proposed reform was judged to be unlikely to have any impact on the criterion for this benchmark, which asks what is the degree to which the reform would result in payments being scaled to ability to pay.

4.6.6 Benchmark 6

A health system is fair if it provides good value for money and good quality service. The first criterion in this benchmark is whether the reform would emphasise primary care. A shift in funding from secondary and tertiary care to primary care was considered to be desirable and cost effective in the long run as most people's health needs are dealt with at primary care level.¹⁴⁰ A needs-based resource allocation model could theoretically be weighted to increase the funding and emphasis on primary care e.g. through choice of needs factors. However it could only go some way towards doing this as other policy changes would be necessary and essentially it would be a political decision. The second criterion is concerned with improvements in health care quality and this was considered to be implicit in the proposed reform. Financial incentives have been used as a means of improving quality.¹⁴¹ However failure to achieve quality does not have to result in financial repercussions and in fact resource allocation models generally tend not to be linked to any other funding method.⁴³ Alternatives include positive steps such as additional training and investigations into causes of poor performance. The third criterion in benchmark six asks how the proposed reform would lead to the implementation of evidence-based practice. Like the quality improvements above this is considered to be inherently rational in the reform. Information infrastructure improvements will contribute to provide evidence-based research.

4.6.7 Benchmark 7

Administrative efficiency must be of a high standard for the health system to be fair. The first criterion of benchmark seven is concerned with reducing administrative overheads. As these would increase, particularly in the short term, due to necessary improvements in databases, formation of a team to design and implement a model and training of those involved, this criterion received a negative score. In the long term these costs may be balanced by reductions in administrative overheads resulting from rationalisation of services, reduced duplication of structures and more efficient use of personnel. The second criterion asks to what extent the reform would lead to contractual bargaining. It was judged that this would increase due to the transition from a provider driven system to a needs driven system. Professionals and provider institutions are more likely to become cost aware through

performance-based reimbursement health care models than the more traditional retrospective reimbursement models, thus increasing efficiency.¹⁴² A needs driven system will emphasis quality of care, evidence based medicine and value for money. This will lead to more bargaining with pharmaceutical companies and consultants and will perhaps see the adoption of guidelines such as those produced by the National Institute for Clinical Excellence in the UK. A system than minimises cost shifting (e.g. shifting costs between one part of the public system to another) is fairer than one that does not (third criterion). The dangers of cost shifting include increasing the level of unmet need in an area from where resources have been shifted or passing on additional costs to consumers. A needs-based model would allocate a specified amount to each area based on need making it difficult to justify the transfer of money from an area where there is an identified need. Cost-shifting could be minimised through regulation. The final criterion in benchmark seven relates to abuse, fraud and perverse incentives. The current system is open to abuse as it is non-transparent. The proposed reform is likely to shift power away from the provider and reduce his control and thereby increase transparency reducing abuse, fraud and perverse incentives. The effect this will have is limited as a capitation model is not without its own perverse incentives for example cream-skimming by fundholders,⁵¹ or conflicts between local and central governments.¹⁴³ One of the criteria for a capitation model is that the data used be free from perverse incentives.⁴

4.6.8 Benchmark 8

The eighth benchmark, public accountability and transparency, has six criteria. The first criterion relates to evaluation of services. A needs-based capitation model would lead to pressure for improved evaluations and this ties into earlier criteria, which would result in improved quality and evidence based practice. The resource allocation system itself would be very explicit and would be available for evaluation. The second criterion received the highest score of all criteria (3.5 out of a possible 5) as there is no doubt that a needs-based weighted capitation model would lead to explicit democratic procedures for resource allocation decisions. This increased transparency would also provide protection for health managers. It failed to achieve the maximum score of five, as this may be too much to expect in a five-year time frame. The third criterion related to grievances but it was judged that the proposed reform would not have an effect on grievance procedures. The degree to which the reform would protect privacy, the fourth criterion, received a negative value. This is because a capitation model would require more detailed individual or area level data than that which

exists currently. This would require collection of more data and implementation of some form of data linkage such as unique personal identifiers or geocoding. While data protection legislation is in place to protect individual records and preserve confidentiality there would likely be a perception that privacy is more at risk. Other forms of privacy such as that between a patient and physician would not be affected. The fifth criterion related to whether the proposed reform would allow the health care budget to be more easily compared with other program budgets e.g. education and welfare. In theory a system that allows budgets to be compared easily is fair as health care needs and funding requirements could be weighted against competing social needs. In this case it was judged that the proposed reform would not improve the ease with which the health budget is compared to other budgets. The final criterion in this benchmark was the degree to which the proposed reform would strengthen civil society. It is likely that society would view the new method of resource allocation as being fairer. This would be a positive development and would have a strong symbolic effect.

4.6.9 Benchmark 9

The final benchmark concerns patient and provider autonomy and may conflict with several of the previous benchmarks. It was argued that a fair system would increase consumer choice. However it was also argued that a fair system would reduce consumer choice as emphasis would be placed on need and need gets higher priority in the hierarchy of values than choice. Overall the proposed reform is likely to reduce consumer choice as service priorities would be based on need and not on providing choice thus giving this criterion a negative score. Planners concerned with value for money and efficiency could perceive increasing provider autonomy (second criterion) as being unfair but practitioners generally see increased autonomy as a positive and fair development.¹³⁵ Introduction of a needs-based resource allocation model could lead to practitioners having a better idea of the resources available to them which enables them to adjust what services they offer based on needs, e.g. general practitioner fundholding in the UK.¹⁴⁴ However, fundholding has also been reported to decrease autonomy.¹⁴⁵ Due to the positive and negative effects of increasing provider autonomy this criterion received a score of zero.

4.7 Discussion on Benchmark methodology

Empirical evidence was not available for our scoring of these benchmarks, giving a subjective element to the results. This subjectivity was reduced somewhat through a team of four assessors independently scoring each criterion. Subsequent discussion meant that each

criterion could be examined from a number of angles to ensure that all possible advantages and disadvantages were considered. It is acknowledged that a different group of people may obtain a different score, particularly if they further modified the benchmarks, but we are confident that the overall benchmark score would retain a positive value, that is, it would be judged to make the health system fairer. This view is strengthened by the wide agreement that existed among the developing countries (Thailand, Pakistan, Mexico and Colombia) on their joint benchmarks, despite vast historical and cultural differences between the countries.¹³⁵

Each benchmark gets an equal weighting in the final calculation, regardless of the number of criteria it contains. Therefore, alternative arrangements of the criteria or benchmarks could result in different benchmarks scores. However, we feel that the modified benchmarks used here fairly encompass all aspects of the Irish health care system. When scoring, the panel considered the potential of a conceptual resource allocation model, without giving too much consideration to data and design limitations, which will inevitably occur in the development of such a model.

An advantage of the scoring system is that it was easy to identify the proposed reform's strengths and weaknesses. Weaknesses included the increases that may result in administrative overheads, the increased risk of privacy violations and the potential reduction in consumer choice. Strengths included improvements in the information infrastructure, more appropriate distribution of resources, improving quality of care, improving evidence based practice and improving transparency in resource allocation.

With empirical data, the number of persons assessing a reform using the benchmarks is largely irrelevant. The literature at present provides no guidance on the number of assessors required. In this study a team of four assessors scored the benchmarks and despite their experience there may be some questions raised as to the representativeness of this team. As this was a pilot analysis we were more concerned with modifying the benchmarks and developing the methodology rather than on ensuring representativeness of the findings.

Assessment of reforms in Ireland tends to be in the form of retrospective audits but with baseline data often lacking this is not always very comprehensive. It is also of no use in deciding whether to implement a reform. The benchmarks of fairness were found to be a

useful method in determining the impact of a proposed reform on the equity of a health system. The introducing of this assessment tool as a planning aid would represent a relatively new departure in our health system. Other methods such as health impact assessment tend to look at the impact of a reform on population health but not on the wider health system. The consensus of a panel of experts, similar to the Policy Delphi described in the last chapter, may also be a good way to determine the impact of a proposed reform on health system equity.

This study has demonstrated that reforming the resource allocation system in Ireland, through the introduction of a needs-based capitation model, would marginally improve equity in the Irish health system (scored 0.93 out of a maximum of five). It was never envisaged that a maximum score of five would be achieved. This is because the proposed reform concentrates primarily on resource allocation, and reform of several other areas of the health system would be required to achieve a score of five. By putting these benchmarks into the public domain they should generate debate around fairness in the health system generally and particularly in resource allocation and should help to ensure that health care reforms are not solely centred on efficiency considerations. The finding that this reform would improve equity in the health system gives weight to the remainder of this thesis which seeks to develop an appropriate needs based resource allocation model for Ireland.

CHAPTER 5: FRAMEWORK FOR A CAPITATION MODEL

5.1 Layout

This chapter presents the background to and the development of a framework for a capitation model for Ireland. It describes in section 5.2 the four different types of data available for the development of a capitation model. In section 5.3 it uses this information, coupled with an examination of the data available in Ireland, to decide which type of data, and therefore which type of model, could be used in the development of a capitation model in Ireland. This process leads to a decision to use individual level data. The remainder of this chapter (section 5.4) describes the framework for developing an individual level capitation model using a five-step process and concludes by discussing some of the limitations of this framework.

5.2 Data for capitation models

Data and information sources used in a capitation model should meet the following criteria:⁴

- Universally recorded
- Consistent
- Verifiable
- Free from perverse incentives
- Not vulnerable to manipulation
- Consistent with confidentiality requirements

Poor data availability limits the choice of variables for capitation models, as many data do not meet all of these criteria. Four main sources of data are available for resource allocation models: area level data, individual level data, data from a population survey and data obtained from simulation of the other data sources. The resource allocation models developed from these data include area based models and individual level models. (Table 5.1) Another potential model would be a simulation model but there is no current example of this. These data sources and modelling strategies are discussed below along with the advantages and disadvantages of each method.

Table 5.1: Types of data associated with each model type

Data	Models currently in use
Area level data	Area based model
Individual level data	Individual level model
Population survey data	Area based or individual based model
Data obtained from simulation	Area based or individual based model

5.2.1 *Area based data and models*

Small area based capitation models are the most common needs based resource allocation models in use.⁴ This is mainly due to the fact that individual level data in many countries are confined to age and sex with other data available at small area level only. Area based models generally use data from small areas (e.g. electoral wards) to determine need for service. This process is usually facilitated by the presence of a postcode system. A weakness of this method is that the small areas were generally formed for administrative convenience or cost rather than specifically for use in a capitation model.¹⁴⁶

A capitation model was first introduced in the UK in 1977/78 with the objective of securing '*...equal opportunity of access to health care for people at equal risk*'.¹⁴⁷ This model was created using data at regional level. There have been several reviews and adjustments to the initial model over the years resulting now in the presence of a small area based model.^{53 55 148}

¹⁴⁹ Each new model has had its fair share of criticisms, due to methodological issues.^{45 51 63 67 68}

Each constituent part of the UK (England, Wales, Scotland, and Northern Ireland) now have their own individual capitation models. There are some differences between these models but all are based on small area level analysis that model utilisation and supply factors to determine population characteristics of need. Need cannot be measured directly and therefore requires proxy variables such as health status and socio-economic circumstances to measure its relationship with utilisation. These proxies are not ideal however, as they may directly or indirectly affect demand for health care. Model construction is also complicated by supply of services. The statistical approach used, two stage least squares regression, was developed in York and adjusts the supply variables to take into account any influence on them by needs variables.

A study looking at migration patterns in Northern Ireland pointed out another problem with area based analysis as it found that population migration was selective with the more well off leaving more deprived areas leading to depopulation, polarisation of ill-health and an inaccurate interpretation of widening inequalities between areas.¹⁵⁰

A main advantage of area-based models is that they can include additional local data which is not always captured by the sum of individual variation, for example local data on mortality, morbidity and environmental factors such as the location of dumps.⁵ They also allow a needs-

based model to be created with limited data. There are several disadvantages of area based models, the main one being the ecological fallacy. *'The ecological fallacy arises when the results of an analysis based on area-level aggregate statistics are incorrectly assumed to apply at the individual level.'*¹⁵¹ Area level and individual level statistics are well documented as being different due to the aggregation effects of the area level data.^{45 146 151 152} This aggregation arises as individuals who live close to one another tend to have similar characteristics and are not random groupings. This is known as *'within area homogeneity'*.¹⁵¹ Techniques are being developed to overcome the ecological fallacy such as a technique which allows for the within area homogeneity by including a set of grouping variables to identify the main dimensions of aggregation in the census variables.¹⁵¹ In the UK a 2% sample of anonymised individual census records has allowed the development of the latter technique. Some work has been done on making inferences about individuals from aggregate data but this work tends to rely on having strong knowledge about the multivariate distribution of a set of variables that are highly correlated with area effects.¹⁴⁶ Although these data are not always available there are recommendations for continuing this work.¹⁵³

Research into the size of the area used in area based capitation models has shown that there is little difference in the models obtained when using smaller areas and larger areas.¹⁵⁴ On a theoretical basis however, the larger the area the greater the organisational pressures created which are independent of need and which affect expenditure. For this reason smaller areas, with a recommended population of around 7,000, are preferred as areas smaller than this were considered to have too few events for stable estimates to be made. Wards were the geographical unit used for small area based allocations in the English resource allocation model. The average ward population size was 5,000. Wards which had a population of below 5,000 were amalgamated with their nearest neighbour in the same county into 4,985 synthetic small areas with an average population size of 9,643 each.¹⁵⁵ it should be noted however that subsequent to these recommendations Northern Ireland has produced successful models for a smaller population using areas with populations as small as 2000.¹⁵⁶

Resource allocation models have traditionally used past utilisation and costs in order to predict future utilisation and cost. This was a criticism of the early area-based models as utilisation is influenced by supply factors.^{63 149} This criticism led to the introduction of two-stage least squared regression to control for the supply effects. Some commentators however

maintain that such action is not warranted and that all needs variables are 'legitimate' but highly correlated and ordinary least squares regression would be adequate.¹⁵⁷ There are also concerns that the inclusion of previous utilisation in resource allocation models may create a perverse incentive to provide unnecessary care or additional admissions in order to gain more resources.⁴⁵

5.2.2 *Individual level data and models*

Individual level models use data on individuals rather than data at small area level. Individual level models are considered to be superior often because they reduce the problems of *confounding* and *misclassification*.^{158 159} The ideal data set for a needs based resource allocation model is an individual level data set which contains demographic and socio-economic data, morbidity data, data on health service utilisation and information on the supply of services in the area in which the individual lives.^{5 45 53} Many countries use an individual level model for setting capitations, but they tend to have insurance based systems and the capitations are limited to age and sex adjustments and are not needs-based.⁴ Many commentators favour an individual based model as they overcome problems such as the ecological fallacy,⁴⁵ and the problem of unstable models due to small numbers and random variation in regions.⁵ Limitations in data availability means this is not possible in many countries.

Sweden, in particular Stockholm County, has the most developed model based on individual level data, made possible by the presence of a unique personal identifier and the advanced data linkage that this allows.⁴⁶ This model was obtained from joining healthcare records, health care costs, census variables, and other socio-economic databases. Using multiple variable Poisson regression the variables that had the greatest effect on hospital use were identified. These variables were then used in the construction of a matrix where each cell represented a unique combination of the variables (i.e. covariate patterns). It was then possible to calculate the average cost per person in each cell. A similar matrix with the number of population in each cell was constructed for each health authority allowing the allocation for each area to be calculated.⁵ The creators of this model are self critical of the number of arbitrary steps taken in their approach but justify them by the robustness of the final model.⁴⁶ They also maintain that using individual level data was their only option as small area level analysis would have resulted in small numbers that would have made the

models statistically unstable.⁵ Their population was 1.7 million so similar problems of small numbers could be encountered in Ireland with a population of 3.9 million.

A recent review of the English model has recommended that the development of an individual level model be explored, possibly using a representative sample of individuals over time and requesting permission from participants of the Health Survey for England to allow linking of their responses to Hospital episode statistics.⁵³ They also consider that a survey of health care costs for individuals will be needed which would allow the creation of expenditure weights for different population groups.⁴⁵

5.2.3 Population survey data

Obtaining all or some data for a resource allocation model from population surveys is an area that has been explored recently, particularly in Wales. The Welsh model departs from the other approaches in the UK by using health measures obtained from a national survey directly in the model. This was done partly because utilisation data were not available and partly to avoid missing potential unmet need.^{53 160}

Many countries carry out annually repeated national household or health surveys. The problem with these studies is that sample sizes generally allow inferences to be made at regional rather than at small area level so the potential for an ecological fallacy is high. Local surveys can overcome this problem but they are expensive, often carried out on a once off basis and not always comparable to other surveys as they are specific to a particular geographical region. In addition a large sample size is required to adequately represent each small area.¹⁶¹ Another disadvantage of using population survey data is that surveys tend to under-represent those most in need.³⁵ New techniques are being developed using multilevel models and synthetic estimation procedures on national survey data to obtain data for local areas. Synthetic estimation has been defined as '*...a family of techniques that derives the correlates of a particular behaviour or phenomenon from a large-scale survey or pre-existing study and applies those correlates to local data*'.¹⁶¹ There is an assumption that the relationship between the behaviour and the factor is similar at national and local level. As this is not the case the multilevel component of the model seeks to '*control for the hierarchy of factors impacting on behaviour*'. Studies using multi-level analysis also allow estimation of both population and individual level effects, thus avoiding the ecological fallacy.¹⁶² A comparison of the local survey and national survey approaches showed some benefit to the

multilevel model approach, particularly its cost-effectiveness, although the study did not come out in favour of any particular methodology.¹⁶¹ No evidence of the practical application of this methodology was found in the resource allocation literature.

5.2.4 *Data obtained from simulation and simulation models*

It is possible to obtain data by creating a simulated database based on empirical evidence for use in an area based or individual level model. An alternative modelling strategy could theoretically be obtained from using these simulated data. While this may be an option where data are not available it is not likely to be well accepted and its accuracy may be questioned. No examples of countries using this method were found in the literature.

5.3 Decision on type of data for Irish model

5.3.1 *Irish data*

The data listed in Table 5.2 are the Irish equivalents of data in use, available or being sought for resource allocation models in other countries. Some combination of these data would be required for the development of either an area based or an individual level model in Ireland. The table also presents whether these data are currently available, or whether they exist but are not available, and in what format.

Although a large amount of data currently exists in Ireland, its format is such that it is difficult to link data sources either by DEDs, as would be required for an area based model, or by unique personal identifiers, as would be required for individual level models. Major improvements in all databases would be required to facilitate either type of model. The government is aware of these issues and their potential benefits. The introduction of a unique personal identifier leading to electronic health records and extension of the use of the Personal Public Services Number are all part of the pending National Health Information Strategy. This could potentially allow access to additional data sources such as revenue and social welfare data. The government are also planning legislative changes to support the objectives of this strategy ¹⁰ This strategy, due for publication in late 2001¹⁰ has still not been published but its publication should be sometime in 2004 (Personal communication Mr. Tim McCarthy, Department of Health and Children).

Table 5.2: Data required and available in Ireland for an individual level or area level resource allocation model

Data required	Data availability / existence	Updated
Age	Available for individuals and at DED level from CSO	5 yearly
Sex	Available for individuals and at DED level from CSO	5 yearly
Area of residence	Available for individuals at DED level from CSO	5 yearly
Socio-economic variables • Social class • Socio-economic group • Income	SEG and social class available for individuals and at DED level from CSO (only possible to link with age groups). Income and welfare data exist at individual level from government departments (but not at DED level). The SAHRU deprivation index is available at DED level.	5 yearly
Education level	Available for individuals at DED level from CSO (only possible to link with age and sex groups and not possible to link with other census variables)	5 yearly
Marital status	Available for individuals at DED level from CSO (only possible to link with age and sex groups and not possible to link with other census variables)	5 yearly
Housing condition	Available for individuals at DED level from CSO (only possible to link with age and sex groups and not possible to link with other census variables)	5 yearly
Mortality	Available at individual level from CSO. 1994-1998 data available at (poor quality) DED level but geocoding is not routine	Annually
Hospital utilisation • Inpatient • Daycase • Outpatient • Long stay hospitals	Data are available for all acute hospitals and some psychiatric hospitals for inpatient and daycases as HIPE events - not individuals - with limited information on readmissions allowing some conversion of events to person events. They are not available at DED level. No routine data is collected on out-patients, A&E or from long stay hospitals / private nursing homes.	Annually
Community services utilisation • GP • Drugs • Health professionals • Immunisation	Data exists for the number of GP visits and drug usage for GMS cardholders from the GMS payments board. Data also exist for drug usage of non-GMS cardholders who exceed a certain drugs cost limit per month. Data on the number of home visits or clinic attendance for allied health professionals are not routinely collated. Immunisation data are available for individual children.	Annually (GMS and drugs)
Diagnostic information	For patients whose details are recorded on the HIPE system diagnostic information is available. Some work has been done on GMS drug payments lists to determine diagnosis	Annually (HIPE) Occasional

	based on drug consumption. Diagnostic information on community care and GP visits are recorded but are not routinely available. The long-term illness scheme has details of the illnesses of people in receipt of this benefit. The social welfare system has information of people receiving disability allowances. Other smaller databases exist such as the drug misuse database in the health research board and the disabilities database. A question on disability was included in the 2002 census	(GMS) 5 yearly (CSO)
Health care cost	Data are available as a relative cost for inpatients and daycases for 30 acute hospitals. No actual individual costs are available. The GMS payments board have information on the amounts paid for drugs and to GPs with GMS lists.	Annually
Health care coverage i.e. public / private	GMS status for the population is available at county level only with some limited data available at DED level although this is not routinely collected. HIPE data records whether someone is public or private or whether he or she has a GMS card. Data exists in the health insurance agencies but legislation may be required to obtain these data.	Annually (HIPE)
Country of birth / ethnicity	A question on nationality was included in the 2002 census.	5 yearly
Proxy for supply e.g. distance to service	Accessibility score available for each DED based on distance to ambulance service, hospital or GP. Number of bed-days, occupancy rates etc available from SAHRU.	Occasional

There is a consultation process going on at the moment in relation to the introduction of postcodes in Ireland. This is seen as very important by some (e.g. Health Boards) particularly as An Post, (Irish postal body) estimate that 40% of addresses in Ireland are non-unique. However, An Post itself is reported as being opposed to this development as they see their current system as being efficient.¹⁶³ At present, the absence of such a system makes geocoding inaccurate, incomplete and expensive. In order to develop a high quality capitation model it would also be necessary to have individual cost data rather than just the relative costs that are currently provided based on the 30 Casemix hospitals. Individual cost data is one of the recommendations from a report of the Commission on Financial Management and Control Systems in the Health Service.⁶

The smallest unit of administration in Ireland is the district electoral division (DED) of which there are 3421. The average population in each DED in 1996 was 1,056 (SD 1,606) and this

ranged from 39 to 25,762 (median 496). Using the NHS recommendation that wards with populations of less than 5,000 require amalgamation,¹⁵⁵ then 3322 DEDs (97% of all DEDs) in Ireland would have to be merged to form synthetic DEDs. This could result in synthetic DEDs failing to adhere to county or Health Board boundaries thus making the development of a model more difficult.

There has traditionally been an over-reliance on census-based data in capitation models. While census data have advantages such as being universally recorded and reliable, disadvantages include lack of timeliness, inappropriateness and an absence of direct needs measures.⁵⁸ Proxy measures of need such as car ownership can be problematic as young professionals living in city centres, while affluent, may not have a car, as they do not need one. Some countries (for example Sweden,⁴⁶ Scotland⁶⁴ and Northern Ireland¹⁶⁴) are moving towards the elimination of census based variables from their models, for example, through the use of annually updated registers in Sweden.⁴⁶ As the trend is to move away from dependence on census based variables, population survey data may become a more popular option. Sources of data in Ireland that contain information similar to that in the census are very limited. Other countries have used information from frequent national health surveys but these are not carried out in Ireland and are unlikely to start due to resource constraints. Other non-census variables include those from the Public Health Information System. This contains data such as low birth weight but these are only available aggregated at county level. Under-reporting, leading to missing information, is another problem with census data. The Swedes have estimated that 13.3% of their population was unaccounted for due to migration, new births and non-responders.⁴⁶ Similar problems have been reported in the UK and it has been estimated that population estimates vary from -6% to +25% of the actual count in some UK health authorities for some population groups.⁵⁴

Recently work has been done in the UK to increase the number of non-census based needs indicators available through the development of indices.¹⁶⁵ These indices are summary measures that describe multiple deprivation across various geographical scales based on multiple administrative data sources. They are said to be 'domain specific' where each domain reflects a particular aspect of deprivation as directly as possible. They are updateable, statistically robust and available at small area level. Problems often relate to the absence of a denominator, which is overcome by using population estimates during inter-censal years. A

recent review of the capitation model in England has examined the feasibility of using these indices and found them to be suitable.⁵³ In addition use of annually updated registers has been recommended.⁵⁴ Some work is beginning in Ireland on the creation of domains (Personal communication, Mr. Conor Teljeur, TCD).

5.3.2 Decision

Generally countries have developed their resource allocation models using whatever routine data were available and constructing the model to fit the available data.⁵ In the US some data collection programs were initiated or expanded specifically to provide data needed for resource allocation models.¹⁶⁶ It is recommended that an approach similar to the US be adopted in Ireland and this would be possible as major improvements will be required to Irish data sets regardless of whether an area based or individual level model is proposed.

There are a greater number of criticisms of area-based models than individual level models, and while this may be due to the more widespread use of area based models, the superiority of the individual level models is frequently cited, particularly as they resolve the problem of the ecological fallacy.^{45 53} Were a small area based model to be developed it is likely to take the form of the York model in the UK which its developers have said has been brought almost as far as it can go.⁴⁵ As strong criticisms of this model remain it is illogical therefore to take this approach when a newer, individual level model, which is considered to be superior, is possible. This is the main argument in favour of the development of a framework for Ireland using individual level data. The development of this framework assumes that in the future a unique personal identifier will be introduced. In fact, the creation of this framework provides another argument for the introduction of a unique personal identifier.

5.4 Framework

This section describes the construction of a framework for a model of resource allocation for the Irish health service using an individual level model. This framework is described in five main steps below and is presented in diagrammatic format in Figure 5.1. The steps are loosely based on the Stockholm County model^{5 46} where each step is a separate component organised in a manner that makes them easy to communicate. This framework is applied to empirical data in Chapter 6.

5.4.1 Step one: *Construction of a master database*

The first step in the framework is the creation of a master database of individual level data. A major assumption is that such a database could be constructed and that a unique personal identifier would be introduced to facilitate this. This database would contain linked information on the demographic, socio-economic, mortality, diagnostic history, access to and utilisation of health services of each individual in the population. Chapter 6 creates a master database by joining existing databases in Ireland, using a series of artificial matches, in order to demonstrate the potential of a master database were such a unique identifier available.

5.4.2 Step two: *Analysis of master database*

The second step involves analysis of the master database. A sample of the database would be used in a regression analysis to determine which variables influence health care utilisation. A number of factors require consideration in this section: type of regression used, adjustment for supply, inclusion of mortality and morbidity indicators, adjustment for cross boundary flows, and entitlement, eligibility and private care levels. These are discussed individually below.

5.4.2.1 *Type of regression used.*

A multiple variable Poisson regression model was used by Stockholm County in their analysis⁵ but it is proposed for this Irish framework that a logistic regression model may be equally effective. The Poisson regression model takes into consideration not just whether someone uses a health care service but how often they use that service. Its aim is to try and explain who will need health care and to what extent.⁴⁶ While this information would be useful for planning and management of services, it is not essential to know the frequency of individual service utilisation for implementing a resource allocation model. If patients with multiple health service usage are assigned the associated cumulative cost of their

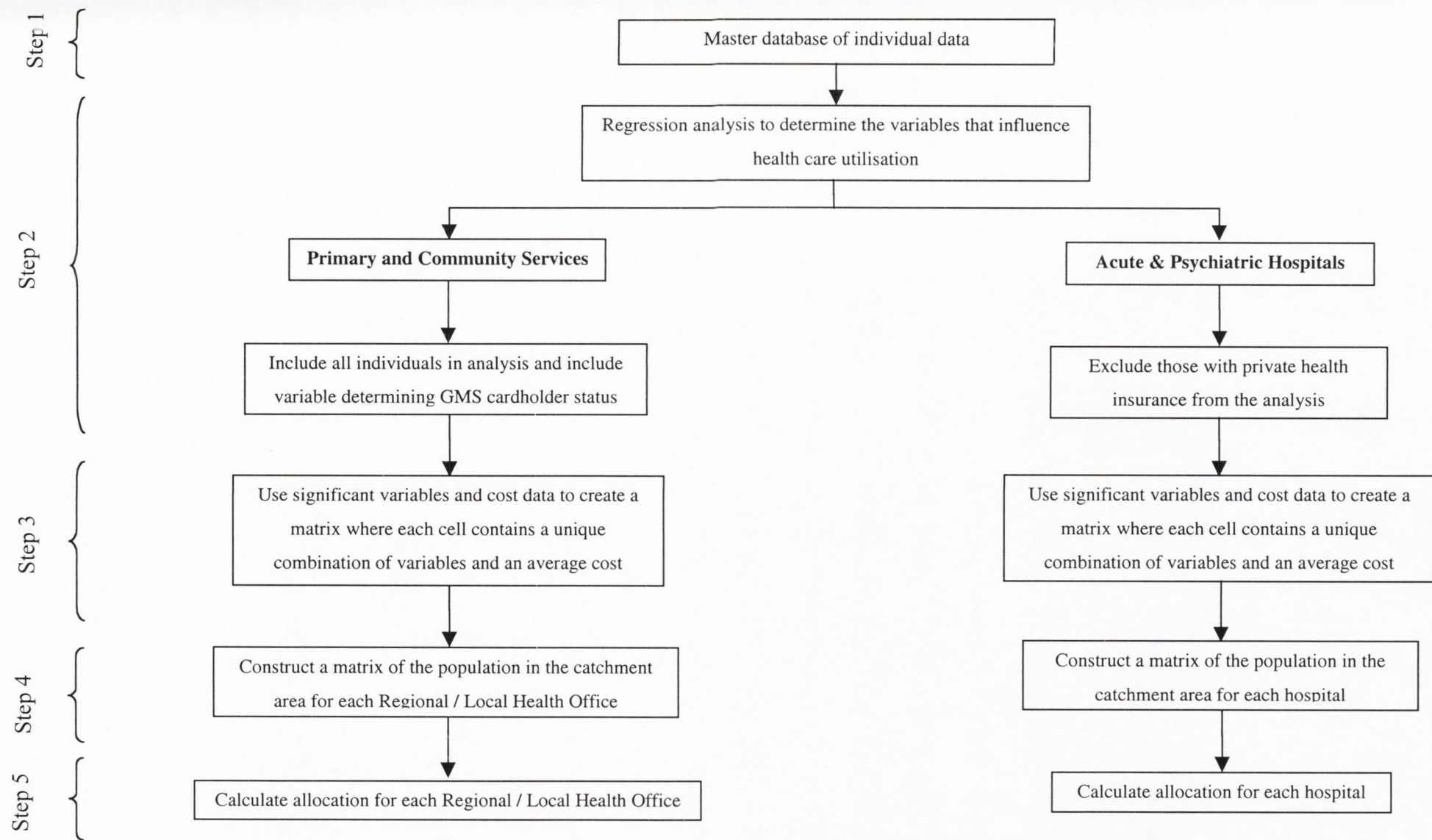


Figure 5.1: Framework for resource allocation using individual level data.

care, then examining past health service utilisation in the form of a binary outcome variable (i.e. attended service, did not attend service) in a logistic regression model may be sufficient. The aim of the current framework is to develop a model that allocates an average cost to each member of the population. The main reason for exploring the usefulness of a logistic regression model in preference to a Poisson model was that empirical data in Ireland does not currently allow frequency of inpatient use to be accurately determined. A unique personal identifier will allow discrete unique visits to be distinguished and will also allow both types of regression analysis to be compared. There is also an argument that logistic models are more widely appreciated in the health sciences and would therefore be more transparent for policy makers.

5.4.2.2 Adjustment for supply

The cumulative cost of patients who used a service in a particular year are used to determine the allocations for future years. An alternative to this is to predict the cost and use of services in a future year and then determine the allocations from that. However, prediction of services can only be done through current use of services so the interaction between supply and demand remains a problem. The Stockholm County model, while admitting that confounding by supply is a potential problem, does not adjust for supply. This Irish framework proposes the inclusion of an accessibility index which, by measuring the distance from the centroid of a DED to a health facility, will, to some extent, take account of supply. An accessibility index is not included in the Swedish model although their latest model does include an urbanisation index.⁴⁶ They are concerned that this urbanisation index may be somewhat controversial, as it reduces the area independence of the model. While the same criticism may apply to the accessibility index in Ireland, its exclusion may lead to criticism for not taking into account supply.

It is assumed that the different needs for health care of the various sections of the population are matched by their differential use of services. In practice the use of services is influenced not only by legitimate need but also by supply and many other socio-economic factors so the match is not perfect. Using an individual level model does not eliminate the necessity of having proxies for need. These are normally in the form of social and material deprivation variables which are taken to imply an increased need for health care resources.⁵

5.4.2.3 Mortality and morbidity indicators

This Irish framework proposes the inclusion of mortality and, where possible, morbidity indicators as these have been shown to be closely associated with health care need.^{20 57} It has been found in fact that health status is the most important determinant of hospital utilisation.^{159 57} The Stockholm model has, until recently, avoided the use of mortality and morbidity indicators and although their reasons are unclear this is possibly due to worries about creating perverse incentives. The use of diagnostic information in the Stockholm model has recently been explored and, while it improved the predictive power of the model, it increased its complexity. This was seen as a negative consequence and therefore they do not yet use diagnostic information for allocations.⁴⁶

5.4.2.4 Cross boundary flows

In Ireland, as in Sweden, the majority of the population are largely free to choose their service provider or their 'gatekeeper' (mainly their GP) and he or she is free to refer their patient to any hospital. Variations in these referral practices can compromise the principles of equity.¹⁶⁷ This causes a problem in terms of resource allocation as, if a service is provided outside the area of residence of a particular inhabitant, there is currently no specific recognition of this cross boundary flow and no arrangements are in place for Health Boards to pay for services for their residents that take place in other Boards. This can lead to inequity in the allocations to the various Boards. It is estimated that up to 20% of patients treated in the Eastern Regional Health Authority are resident in other Health Board areas.¹⁶⁸ In order for a resource allocation model to be equitable provision will need to be made so that Health Boards are billed for the cost of care for their patients regardless of where they are treated (i.e. the money follows the patient). In addition referral protocols need to be established whereby referrals to other Boards are made on the basis of need and lack of a service in a particular area rather than on the particular preferences of referring GPs.⁷

5.4.2.5 Entitlements, eligibility and private care

The development of a resource allocation model is further complicated by the different entitlement and eligibility levels of the population in the Irish health care system and the existence of a large private sector. Public sector health funding pays GPs for visits from GMS patients. Non-GMS patients must pay for themselves. GMS patients are also entitled to all prescription medication free. Non-GMS patients must pay for prescription medications

themselves, although, if that expenditure exceeds a certain monthly threshold for the individual or family, they are entitled to a refund of the difference. Other community services, for example from public health nurses and social workers, are provided free of charge to all patients whereas services from occupational therapists, physiotherapists and other allied health professionals are only provided free of charge to GMS patients. Some services provided free of charge to the whole population are health promotion and public health services, childhood immunisations and ante-natal and post-natal care administered through GPs for women in the shared maternity care scheme.¹⁶⁹ In some cases there is confusion over these eligibility arrangements and action 37 of the Health Strategy aims to clarify these arrangements.¹⁰ Private health insurance does not generally cover community-based services.

Hospital care is provided free of charge to GMS cardholders and is provided to the rest of the population with nominal charges for accident and emergency, outpatient and inpatient usage. However, anecdotally, the majority of those with private health insurance do not use the public health system (with the exception of accident and emergency). (Evidence for this will be available in more recent HIPE data due to the inclusion of a public private coverage identifier). They are either treated in private beds in public hospitals or in private hospitals. There is a relatively large private sector in Ireland (approximately 45% of the population have private health insurance).⁷⁴ Although expenditure on private hospital care in Sweden is only approximately 8% of their health care budget they do admit that not considering this variable in their model is a weakness.⁴⁶ In Ireland all private care in public hospitals is recorded on the HIPE system as are some data for private hospitals.¹⁶⁸

It is recommended that a model be constructed for the population in two strands. The first strand would deal with community services and would include all patients in the analysis but would differentiate between those with and without a GMS card. Having a GMS card will result in higher costs as these patients will cost more per episode of care than non-GMS patients who are generally paying for their own care. Data on community services activity and costs are currently poor so good information systems would need to be established in order to carry out this analysis.

The second strand would deal with hospital services and would include only those patients without private health insurance. This recommendation may be slightly controversial, as

theoretically, those with private health insurance are eligible for public hospital care but realistically rarely use it. In fact, if all private patients were to suddenly use the public system the system is likely to collapse under the strain. Some countries (for example the UK¹⁵⁵) split the allocations for acute and mental health hospitals possibly due to different needs variables being associated with admission. However, many acute hospitals in Ireland now have psychiatric units so it seems reasonable to develop a resource allocation model for acute and psychiatric hospitals that excludes those with private health insurance.

5.4.3 Step three: *Creating a cost matrix*

The variables that are significantly associated with health care utilisation for the two strands of the model (primary community services and hospital services) are determined from the Logistic regression model. These variables are used to create individual cost matrices for each strand. Each cell of the matrices represents a unique combination of variables and the number in each cell denotes the average cost of the cell. This is calculated based on the total population in each cell. For clarity, a hypothetical example is provided.

The first cell in the matrix for primary and community services may represent live males aged 0-4 years who are a member of social class one, who live in an owner occupied home, with a car, a household income of >€50,000 per annum, private health insurance and who live less than five miles from a GP. The number of people with these characteristics in the Irish population was 50. Of these, ten visited a GP in the last year with an average cost €25. Fifteen received free vaccinations, developmental checks and visits from the public health nurse at a cost of €100, €70 and €60 respectively per child. The total cost for the cell is therefore $(10 \times €25) + (15 \times €100) + (15 \times €70) + (15 \times €60) = €3700$ and the average cost per head in this cell is therefore $€3700/50 = €74$.

5.4.4 Step four: *Creating an area matrix*

Matrices, similar to that described above, are created for each strand where again cells represent a unique combination of variables. Instead of costs however each cell contains the number of the population in a particular area to which the allocation is to be made. For the primary and community services strand it is proposed that allocations are first made to the four Regional Health Offices that are proposed in the Health Services Reform Programme and then further allocations are made to Local Health Offices where the funds will be administered. The Prospectus report recommends that Local Health Offices, developed along

the lines of the current community care area structure, are set up as sub units of Regional Health Offices.⁸² These Local Health Offices would serve populations of between 120,000 and 150,000 people. They would also be responsible for funding, supporting and overseeing the proposed primary care teams and primary care networks that have been proposed in the Primary Care Strategy.¹⁶⁹ It is envisaged that there would be six to ten Local Health Offices under each of the four Regional Health Offices. There were a number of other options for allocation of community care resources such as directly to GPs or to the primary care teams or networks. However, these were disregarded mainly because the populations they serve are small, thus introducing a large element of risk.¹⁶⁷ Following on from the hypothetical example above, if a Local Health Office had five residents with the characteristics described in the first cell of the primary and community care matrix then their allocation for those children would be $5 * \text{€}74 = \text{€}370$.

For the second strand it is proposed that the National Hospitals Office, as proposed in the Health Service Reform Programme,¹¹ be used to define catchment areas for hospitals. Funds can then be allocated to each hospital directly. Previously hospitals were funded through local Health Boards. This, combined with reforms that would solve the problem of cross boundary flows, should enable hospitals to have sufficient resources using the needs based formula.

5.4.5 Step five *Calculating allocations*

Multiplication of the totals in each cell of the matrices from step three and step four gives the total allocation per cell for the particular area and for a particular strand. When these totals are summed overall, the allocation for each area is obtained. This is done in Chapter 6 using the current Health Board structure.

The variation in costs between individuals in a particular cell matrix is likely to be considerable due to the random nature of ill health and the random component will account for a substantial portion of the variance of the expenditure on any one individual.⁵² Thus it is only in this step of the framework, when aggregation of individual capitations is performed, that budgets become meaningful.¹⁶⁷

5.4.6 *Limitations of framework*

This section examines the general limitations of the proposed framework. In Chapter 6 some of the more technical difficulties are explored.

5.4.6.1 Unmet need

Like area based models, individual level models are still poor at tackling the problem of unmet need. This problem cannot be dealt with using empirical methods as these are based on previous utilisation, so, if someone is under using a service the utilisation levels will not reflect this. It may become necessary therefore to make an appropriate explicit adjustment to empirical formulae for minority groups as has been done in Sweden (for non-Nordic immigrants)⁵ and New Zealand (for the Maori).¹⁷⁰ Similar adjustments could be made in Ireland for the traveller population, as information is available from the CSO on this group. It has also been suggested that only through co-ordinated action across all government departments will the issue of unmet need be properly tackled and that a single sector based approach may be insufficient.¹⁷¹ Capitation models are generally based on the national average response to population characteristics. This is not necessarily the best option as this national average response will include services that may be inefficient or of poor quality. An alternative is that a central funder would use the average response of services that were performing well on which to base capitations.⁴ This is the approach taken in Scotland where, in the pursuit of vertical equity, an attempt was made to identify areas with unmet need eliminated to use as a baseline.²² While some of the decisions made in this study were criticised by the authors as they were arbitrary it is an interesting attempt to tackle this problem. Other work being done to tackle unmet need includes a recent review of the English capitation model.⁵³ This model calculated a measure of the responsiveness of health care utilisation to differences in population need in each health authority using Health Survey for England data and area level models. They devised a method whereby areas with poorer patterns of utilisation based on need would receive additional resources. Most work however is being done on area based models. Unmet need is not tackled adequately in this framework as the criteria for deciding to include a needs factor in the model is whether or not it (statistically) significantly explains health costs. Adjusting for unmet need is difficult and this has been noted by other countries.²²

5.4.6.2 Model fragmentation

While it is recommended that the best approach to developing a resource allocation model is to have one model for all allocations^{53 172} models generally tend to be fragmented. Examples are New Zealand where three population based funding formulae have been developed

(personal health, public health and disability support services),¹⁷⁰ and England where a five strand model has been developed (acute care, mental health services, maternity, prescribing and community health services).⁵³ Separate models, that are determined in isolation from each other, may give rise to biases particularly if there is a subsequent transfer of funding between alternative services.⁴⁵ While it is acknowledged that an aggregate model is best, it was considered necessary to develop at least two strands in this Irish framework to accommodate the different entitlement, eligibility and private insurance arrangements. This can lead to an exacerbation of inequities as no one has overall responsibility and may cause barriers to assessing whether resources have been distributed according to need. Advantages of aggregate models are that they reduce the complexity of the resource allocation model and can improve statistical performance.⁵³ In addition they allow freedom to reallocate funds among programmes, thus improving efficiency.⁴³ In a review of the English capitation model such unified formulae have been created along with the sector-based formulae.⁵³ Alberta in Canada has a similar unified formula and there is a recommendation that all areas in Canada move to such a system.⁴³ Fragmented models do however have some advantages such as a more transparent relationship between the adjusters included in the formula and the need for services offered by the program. They can also be used as a policy tool to ensure that adequate resources are available for particular disadvantaged populations.⁴³

There is currently a review underway of eligibility and entitlement to funding for long stay hospitals and nursing homes in Ireland.^{173 174} For this reason long-stay hospitals were not considered in this framework but it is likely that eventually a separate strand would be required for resource allocation for long-stay services. Unlike New Zealand where there is a separate resource allocation strand for disability support services, such a strand was not created in this framework mainly due to lack of data. However, theoretically it could be constructed in a manner similar to that for community services.¹⁷⁰

5.4.6.3 Model complexity

The Stockholm modellers employed increasingly more complex models i.e. including diagnostic information and prospective modelling to try and improve on their current model. However they ended up implementing the current model as they found that while there was some added accuracy from the more complex models there was no justification in

implementing them.⁴⁶ Therefore the proposed framework for Ireland and its subsequent application in Chapter 6 attempts to keep this model as parsimonious as possible.

5.4.6.4 Integration of framework with other funding systems

This framework would supersede the role of the Casemix system in allocations to acute hospitals. The government have however stated that they wish to expand and enhance the Casemix system.¹⁰ They do not clarify how they will reconcile a needs based resource allocation system and a Casemix system. As most capitation based resource allocation models are not run in conjunction with other allocation systems it is difficult to see how such a reconciliation could take place.⁴³ Further research will be required in this area, specifically to determine what the optimum proportion of the allocation should be based on casemix and on a needs based model. This research should include an examination of any perverse incentives created and an examination of physician behaviour based on different payment systems. A dual system of payment would allow payment to be fairly and transparently delivered through the needs based allocation and would reward efficiency and promote movement of patients through the system through the casemix allocation. However, some sort of quality measure would need to be included.

CHAPTER 6: CALCULATION OF ALLOCATIONS FROM IRISH EMPIRICAL DATA USING THE FRAMEWORK

6.1 Introduction

This Chapter attempts to apply the framework, as described in the last chapter, to a master database of empirical Irish data. It is not possible to implement the framework in full due to present data constraints, particularly the lack of a unique personal identifier to facilitate joining databases. As a result, the master database created in this chapter is somewhat artificial but the main objective of this chapter is to illustrate how the framework could be implemented if appropriate data existed. In addition lack of data on community health services meant that this chapter only calculates allocations for the acute hospital strand of the framework. The extent to which each step was implemented is outlined under each heading below.

6.1.1 Layout

This chapter is divided into four main sections. The first section (6.2) describes the methodology used in the construction of a master database of individual level data using available empirical data in Ireland. The characteristics of this master database are described in section 6.3. Section 6.4 calculates the allocations for each Health Board using the master database and following the framework described in Chapter 5. The final section (6.5) discusses the main limitations of this process.

6.2 Construction of individual level master database

6.2.1 Introduction

Data from five sources were combined to form a master database of all individuals in Ireland. The aim of creating this database was to obtain as much information as possible on each individual in relation to their demographic and socio-economic characteristics, their access to and utilisation of health services and their vital status, using the available data. These variables provide proxies for the information required for a resource allocation model, which are health care need, supply of health care and utilisation of health care. The five sources of data used are as follows:

- 1996 census data
- 1996 deprivation index

- 2001 Accessibility scores
- 1998/1999 HIPE data
- 1996 mortality data

No unique identifiers exist that allowed these data sources to be merged. The process of developing the master database and joining the data involved a number of assumptions and estimates, which affected the accuracy of the final master database obtained. However, this process demonstrates that the master database created is as close to reality as possible within the present limitations of the data. It also demonstrates that, were it possible to create such a database accurately (that is, with the presence of unique personal identifiers), then an advanced analysis would be possible. Each of the data sources is described below including any preparation done to allow them to be joined. The rationale for using each one has largely been explained in Chapter 5 but a few additional comments are added here. This section ends with a description of the process of joining the data.

6.2.2 *Census data*

The last census took place in Ireland in April 2002. Unfortunately, data at a small area level from this census were not available in time for this study. Therefore, data from the previous census in 1996 have been used. Despite these data being somewhat out of date there are some advantages to using 1996 census data. For example, DED coded mortality data were available for 1996 but are not available after 1998 as yet and the area level deprivation index and the accessibility scores used in this study were created based on data from the 1996 census.

The smallest administrative unit in Ireland is a District Electoral Division (DED). Small area population statistics (SAPS) are DED level census data which contain data on a number of variables including sex, age, social class, socio-economic group, employment status, education status, marital status, type of accommodation and family structure. Socio-economic variables were required for the resource allocation model to use as proxies for health care need. Due to confidentiality restrictions enforced by the CSO, data were only available for each variable at age, sex and DED level and not at the level of other variables. Therefore while it was possible to know the age, sex, DED and education level of an individual it was not possible to determine the education level of an individual in a particular social class. The combination of age (in five groups), sex (in two groups), DED and social class (in seven groups) was used in this study as it was considered to be the most suitable. The rationale for choosing this combination is outlined in Appendix 11. These data were manipulated to obtain

a foundation for the master database with an entry for each member of the population containing their age, sex, DED of residence and social class for 1996 (N=3,626,087).

6.2.3 Deprivation scores

A deprivation score was available for each DED using the SAHRU material deprivation index.⁶² These scores range from one (least deprived area) to five (most deprived area). Five census variables (unemployment, low social class, no car, rented accommodation and overcrowding) were used in the calculation of material deprivation using data from the 1991 census. This index was updated in 1996 using only two of these variables (unemployment and low social class), as every second census records less information.⁶² The index was derived using a composite concept and although the scores are closely related to poverty, an individual can experience deprivation but not live in poverty. Table 6.1 presents the number and percentage of DEDs and the number and percent of the population residing in each deprivation level. The majority of DEDs and of the population are in areas with a deprivation score of one or two.

Table 6.1: No. (%) of DEDs and population residing in each deprivation level, 1996.

Deprivation score	No. (%) of DEDs	No. (%) of population
1 (least deprived)	791(23.1)	988719 (27.3)
2	1460 (42.7)	1227427 (33.8)
3	606 (17.7)	515151 (14.2)
4	429 (12.5)	672774 (18.6)
5 (most deprived)	135 (14.0)	222016 (6.1)
Total	3421	3626087

A cross tabulation was performed to examine the association between this deprivation index and the social class variable from the census data. As expected there was a statistically significant association between these two variables. A higher proportion of those belonging to social classes five, six and seven lived in more deprived DEDs (deprivation level four and five) and a higher proportion of those belonging to social classes one, two and three lived in less deprived DEDs (deprivation level one and two) (χ^2 276400, df 24, $p<0.0001$). This Table is presented in Appendix 12.

6.2.4 Accessibility scores

An accessibility index has been developed for Ireland, by researchers in SAHRU, as one measure of health care supply.⁷⁸ The accessibility scores are based on travel times using distances by road from the centroid of a DED to the nearest health facility. The accessibility model took into consideration different grades of roads and the different travel times based on speed limits in urban areas. It also considered the population size in each area and the size of the various health facilities. Different models have been created for distances to GMS GPs, ambulance controls and acute public hospitals. The index for acute public hospitals is used in this study and all residents of a DED were given the same accessibility score. Dublin DEDs generally had low accessibility scores meaning that residents have good access to hospitals whereas Co. Carlow DEDs had high accessibility scores, indicating poor access to hospitals.

Other potential supply variables were the numbers of beds available and staffing levels within acute hospitals. These variables, which are only available at institutional level, were not suitable for a model using an individual level database. Waiting times for health care were another supply variable that could potentially have been available at individual level. However no comprehensive data set of waiting times exists.

6.2.5 Hospital In-Patient Enquiry (HIPE) data and Casemix

HIPE data were used to obtain information on health care utilisation in the form of acute hospital activity. HIPE is a minimum data set on hospital discharges, including in-patients and daycases but excluding out-patients. It is a computer based health information system which was first developed in Ireland in 1971. It is the principal source of national data on both administrative and clinical information on acute hospital discharges, including deaths. HIPE data are currently available for 62 hospitals including all major regional hospitals and all district hospitals (apart from one). In recent years it has included maternity hospitals and some private hospitals.¹⁶⁸

Casemix is a system used to classify patients by type of illness and resources used in treating them. It was first implemented in 1993 in Ireland and uses details of activity from the HIPE system, and cost for assessing comparative efficiency of hospitals and to influence, in part, the total allocation given to each hospital.¹⁰ The Casemix system currently covers 32 hospitals. For the purposes of this study the relative values derived for the Diagnostic Related Groups (DRGs) for those 32 hospitals were applied to the 62 HIPE hospitals used in this

study. Each DRG has an associated cost weight, or national relative value. These relative values are calculated nationally as part of the Casemix system and are an expression of the resource use of a particular DRG relative to the average use of all participating hospitals.¹⁷⁵ The relative values are calculated by dividing the average cost for all DRGs in Casemix hospitals by the number of cases nationally. This gives the relative value which is equal to one. The average equivalent cost was in 2000 €2455.13.¹⁷⁵ If a case costs twice this, €5910.26, then it would be considered to have a relative value of two. Each year the overall mean is reset to one.

HIPE data were available for daycases and inpatients but the relative values were only available for inpatients for this study. Therefore, only data on inpatients were used. HIPE data were available for 1998 (n=471280) and 1999 (n=510922). In order to reduce random variation a random selection of HIPE events, equivalent to the average number of events in 1998 and 1999 (n=491101), were selected. This was done by giving each HIPE event a unique identification number and randomly selecting 491101 of these.

There were three main limitations that had to be overcome before the HIPE database was suitable for joining to the master database. These are as follows and the actions taken for each one are described below:

- Data were recorded as HIPE events rather than as HIPE person events
- Some events had missing county of residence data
- GMS status was the only socio-economic type variable recorded. As this could not be easily joined to the census data a method of joining had to be found.

6.2.5.1 Conversion of HIPE events to HIPE person events

The HIPE database records HIPE events in the form of the number of discharges (or deaths) per year. Lack of a unique personal identifier did not allow individuals who had more than one HIPE event to be distinguished. A HIPE person event refers to an individual on the HIPE system regardless of how many admissions they have had. For the creation of an individual level database it was necessary to know the number of people who had a HIPE person event so it is therefore necessary to convert HIPE events to HIPE person events. To do this it was necessary to identify individuals that had more than one hospital discharge in the year, that is, they were readmitted. The only identifiable readmissions from the HIPE database are

planned repeat admissions, transfers from other acute hospitals and emergency readmissions following a previous spell of treatment. These categories are highlighted in the shaded areas of Table 6.2. Patients readmitted to a different hospital or with a new illness are not recorded as a readmission.

Table 6.2: HIPE admission codes (with identifiable readmissions shaded)

No.	Source of admission code
0	Admission deferred at patients wish or by medical constraints
1	Normal admission from waiting list
2	Planned repeat admission
3	Transfer from other acute hospital
4	Emergency - deliberate self-inflicted injury or poisoning
5	Emergency - road traffic accident
6	Emergency - home accident
7	Emergency - other injury
8	Emergency - other than injury
9	Emergency - readmission following previous spell of treatment

The three identifiable sources of readmission (N=42,790) were removed from the data resulting in a best estimate of the number of HIPE person events of 448,311. These readmissions were joined with the person events by matching county of residence, sex and five-year age group. If a HIPE person event was recorded as having died then it was not assigned a readmission. This was ensured by removing the HIPE person events recorded as dying and joining the readmissions to the remaining data. The HIPE person events recorded as having died were then rejoined. Where a HIPE person event had been assigned a readmission they received a DRG cost weight for both admissions and these were added to get the total relative cost of that patient. Figure 6.1 outlines this process.

There were several potential matches for each county / age / sex group but only one match was allowed. A random number was used to avoid any sequencing of the data. This method assumed that each HIPE person event had a maximum of one readmission. Clearly an individual could have had more than one readmission but this detail was not known.

Using this method 42,790 HIPE person events were now recorded as having had a readmission. This is equivalent to a readmission rate of 9.5%.

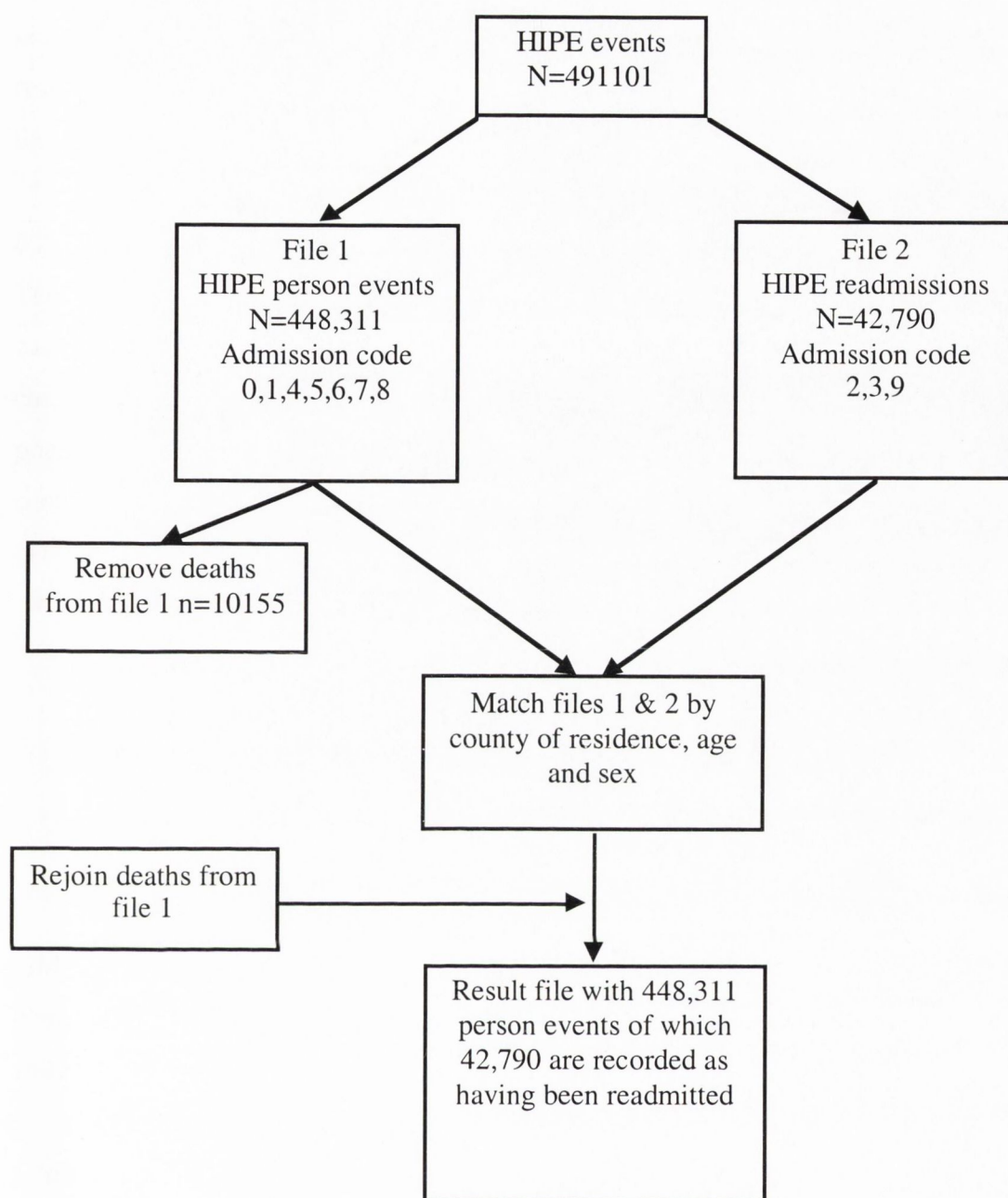


Figure 6.1: Process of converting HIPE events to HIPE person events

6.2.5.2 Missing county data

There are 26 counties in the Republic of Ireland. County Tipperary has traditionally been split into Tipperary North Riding and Tipperary South Riding for administrative purposes. Most data collection instruments, including HIPE, uses this format of 27 areas. Area of residence of those who had a HIPE person event is recorded at county level and not at DED level. This causes a problem for joining HIPE data with individual level data where a DED code is available. In addition county of residence was missing for approximately 1% of cases. These missing data fell into two categories. The first was where county of residence was

unknown or unrecorded (0.07% n=319) and the second was where the patient was a non-resident of Ireland (0.86% n= 3832), for example tourists. A county was allocated to each of these categories using two different methods which are described in Appendix 13a and 13b.

6.2.5.3 *Socio-economic variable in HIPE*

The only socio-economic type variable recorded by HIPE is GMS status. To receive a GMS card a person's income would have been means tested and therefore GMS status was considered a suitable proxy socio-economic variable. Just less than one third of the general population have GMS cards, ¹⁷⁶ but slightly over half of the HIPE population have a GMS card, indicating that those of lower socio-economic group have a higher hospitalisation rate. (Table 6.3)

Table 6.3: No. (%) of GMS cardholders in HIPE data, 1998/1999

GMS status	No. (%)
GMS card	227502 (50.7)
NO GMS card	201173 (44.9)
Unknown	19636 (4.4)
Total	448311 (100)

GMS status was unknown for 4.4% (n=19,636) of HIPE person events. As the only socio-economic type variable it was considered important to assign all HIPE person events a GMS status. This process is described in Appendix 13c.

GMS data are not recorded by the census creating a difficulty in using this variable to join HIPE data to the master database. In order to utilise the GMS data to assist in joining HIPE person events with the individual level census data, HIPE person events were allocated a deprivation score based on their GMS status. This was possible as data were available for the Eastern Regional Health Authority (ERHA) on the number of primary GMS cardholders by DED. The deprivation level for each DED was known so this allowed the proportion of the population with a GMS card in each deprivation level to be calculated. A regression analysis of these data for each of the three ERHA counties (Dublin, Kildare and Wicklow) was performed. These data were used as a proxy for the whole country. As some counties only have four deprivation levels the regression analysis was rerun for deprivation levels one to four. The regression coefficients are presented in Table 6.4 along with the proportion of GMS

cardholders in each deprivation level. The models were a good fit with R^2 adjusted values of 86% and 89% for the five level and four level deprivation models respectively.

Table 6.4: Regression β coefficients and percent of GMS cardholders by deprivation level for ERHA

Model with five deprivation levels ($R^2 = 86\%$)			Model with four deprivation levels ($R^2 = 89\%$)		
Deprivation level	β coefficients	% of GMS cardholders	Deprivation level	β coefficients	% of GMS cardholders
1	0.09	6.9	1	0.11	13.8
2	0.17	13.5	2	0.17	21.3
3	0.25	20.0	3	0.22	28.7
4	0.33	26.5	4	0.28	36.2
5	0.41	33.1	--	--	--

The procedure for allocating the HIPE person events a deprivation score was done in two stages. Firstly each HIPE person event that had a GMS card was assigned a deprivation score using the percentages in Table 6.4 obtained from the regression equation. Secondly the remaining HIPE (non-GMS) person events were assigned a deprivation score in the same proportion as the distribution of deprivation scores in each county. For example 13.8% (from Table 6.4) of HIPE person events with a GMS card in Co. Carlow were assigned to deprivation level one. Fifteen percent of people in Co. Carlow reside in DEDs with deprivation level one. Therefore 15% of the non-GMS HIPE person events were randomly assigned to deprivation level one.

Following this distribution, a check was made to ensure that the HIPE person events assigned to each deprivation score for each age-sex group in each county did not exceed the population of the same age-sex group residing in that DED according to the 1996 census figures. In the small number of cases where this occurred, the excess cases were redistributed throughout the remaining deprivation levels. This happened most commonly for counties where there was a small number of DEDs of deprivation level five. A table showing the difference between the actual distribution of the population in each deprivation level in each county and the HIPE person events assigned to each deprivation level is presented in Appendix 14.

6.2.6 Mortality data

Mortality data are used as a proxy for health care need. DED coded mortality data from 1996 (N=30344) were obtained and used for this study as the year matched the census data. As

with the HIPE data, lack of a unique personal identifier had to be overcome by maximising the number of variables which could be joined to the master database. There were two problems that prevented this. Firstly, mortality data were in some cases incorrectly assigned a DED code and secondly, a socio-economic variable rather than a social class variable existed in mortality data. These problems and the actions taken to resolve them are discussed below.

6.2.6.1 DED codes incorrectly assigned mortality data

Approximately 6.2% of mortality data were incorrectly assigned a DED code. (Personal Communication, Dr. Harry Comber, National Cancer Registry) These data were reallocated a DED code as this was necessary for joining mortality data to the master database. The process used is described in Appendix 15.

6.2.6.2 Conversion of socio-economic group to social class

A socio-economic group variable with 11 categories was part of the mortality data. This could not be matched with the master database as the master database contained a social class variable (with seven categories) rather than a socio-economic variable. In order to use the socio-economic group variable, each socio-economic group was converted to a social class as shown in Table 6.5 below. This was done artificially by combining similar descriptive terms for the groups (for example higher and lower professional socio-economic groups were assigned to the professional workers social class).

Table 6.5: Conversion of socio-economic groups to social class

No.	Mortality Socio-economic group	No.	Corresponding social class
0	Farmers, farmers' relatives and farm managers	2	Managerial and technical
1	Other agricultural occupations and fishermen	5	Semi-skilled
2	Higher Professionals	1	Professional workers
3	Lower Professionals	1	Professional workers
4	Self employed (with employees) and managers	2	Managerial and technical
5	Salaried employees	4	Skilled manual
6	Intermediate non-manual workers	3	Non-manual
7	Other non-manual workers	3	Non-manual
8	Skilled manual workers	4	Skilled manual
9	Semi-skilled manual workers	5	Semi-skilled
X	Unskilled manual workers	6	Unskilled
Y	Unknown	7	All other gainfully occupied and unknown

In order to examine whether this newly created mortality social class was similar to the distribution of social class in the master database the distributions were compared. From Table 6.6 it can be seen that the distributions are relative similar. There is a higher proportion of the general population in social classes four and five and there is a higher proportion of deaths in social class seven. The remainder of the social classes have differences of less than 5%. An exact match was not expected and this table shows that this conversion, while artificial, is acceptable.

Table 6.6: comparison of proportion of the general population and deaths in each social class

Social class	Population	%	Deaths	%	Difference
1	194139	5.4	1896	6.2	-0.89
2	796511	22.0	6855	22.6	-0.63
3	668738	18.4	4687	15.4	3.00
4	741697	20.5	2940	9.7	10.77
5	464589	12.8	2126	7.0	5.81
6	309418	8.5	2414	8.0	0.58
7	450995	12.4	9426	31.1	-18.63
Total	3626087	100.0	30344	100.0	

6.2.7 Joining sources of data for master database

Deprivation scores, accessibility scores, HIPE data and mortality data were joined to the master database (consisting at this stage of only census data). The process of joining is explained below.

The deprivation scores were joined through a straightforward matching of DEDs. This resulted in each resident of a DED being given the same deprivation score. Joining accessibility scores was also a straightforward process, again by matching DEDs, and each resident of a DED received the same accessibility score. The HIPE data were joined to the master database by matching sex, age (in five groups) and deprivation level. As there was more than one possible match for many of these joins, a unique code was created so that only one match was possible. In addition a random number was used in both files to avoid any inadvertent sequencing of remaining data.

Mortality data were joined to the master database in two stages. Firstly individuals with a HIPE event (now joined to the master database) recorded as having died were assigned a death from the mortality file. This was done by extracting individuals from the master

database that had a HIPE event and were recorded as dying in hospital. Deaths were assigned to these individuals using the following sequence.

Sequence 1	Match by sex, age, DED & social class
Sequence 2	Match by sex, age & DED
Sequence 3	Match by sex & age
Sequence 4	Match by sex

Again a unique code was created so that only one match was made and a random number was used to ensure that there was no inadvertent sequencing of the remaining variables during this process. These sequences were necessary as not all deaths were matched using sequence one. This was due to a number of factors including the artificially created social class in the mortality data, the reallocation of some DEDs, the artificially assigned deprivation levels in the HIPE data, the different years of some of the data and possibly some other unknown data errors.

Once the individuals with a HIPE event who died had been assigned a death the remaining population in the master database were joined with the remaining deaths using the same sequence as above. When all the deaths had been assigned the individuals with a HIPE event who died were rejoined to the file. This process is clarified in Figure 6.2 below. The majority of deaths were joined using sequence one or two and the exact proportions are detailed in Appendix 16.

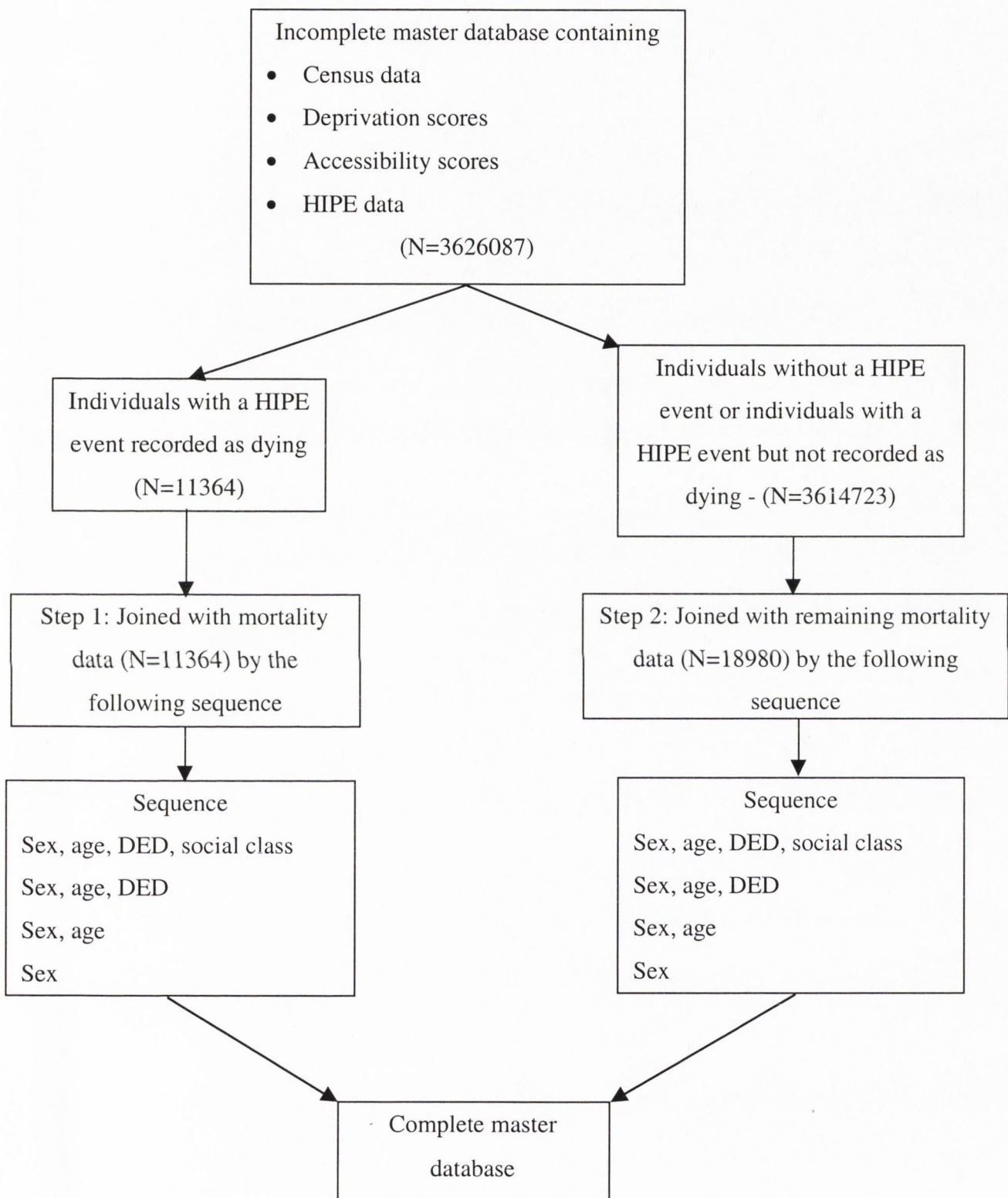


Figure 6.2: Process of joining mortality data to master database

6.2.8 Summary of creation of master database

A summary of the construction of the final master database, which contains an individual record for each member of the population (n=3,626,087) is outlined in Table 6.7.

Table 6.7: Summary of data preparation and joining procedures for master database

Data Source	Preparation	Joining to master database	Master database
Census data	Summary age, sex, DED and social class data expanded to form individuals	Basis of master database	Contains the following variables: • Age (in 5 bands) • Sex • DED • Social class • Deprivation score • Access score • Died Y/N • HIPE person event Y/N (and relative value for those with an event)
Deprivation scores	None required	Joined using DED codes	
Accessibility scores	None required	Joined using DED codes	
HIPE data	HIPE events converted to HIPE person events Reallocation of missing data Deprivation score assigned using GMS data	Joined using age, sex and deprivation scores	
Mortality data	DED codes corrected Socio-economic group converted to social class	Joined using age, sex, DED and social class sequence. Done first for individuals with a HIPE event who died and then for remaining data	

6.3 Descriptive analysis of master database

6.3.1 Introduction

Due to the large size of the master database a 20% sample of data (N=724,432) was randomly selected for analysis. The bulk of this analysis was carried out using JMP (Ver. 4.1, SAS Corp, 2001). The conventional probability level of <0.05 was considered to be indicative of statistical significance. Pearson χ^2 tests were used to compare proportions in independent groups of categorical data.

6.3.2 Descriptive analysis of variables

Descriptive statistics of this 20% subset are presented below followed by bivariate analysis of each variable with the dependant variable - HIPE event. Table 6.8 shows whether each variable is continuous or categorical.

Table 6.8: Name and type of variable used in master database

Data name	Data type
HIPE event	Binary categorical
Age	Categorical (5 categories)
Social class	Categorical (7 categories)
Deprivation score	Categorical (5 categories)
County of residence	Categorical (27 categories)
Sex	Binary categorical
Vital status (alive or dead)	Binary categorical
Access (to acute hospital)	Continuous but also treated as categorical (10 deciles)

6.3.2.1 HIPE variable

The majority of the population (87.7%) did not have a HIPE event - that is they were not discharged from an acute hospital during 1998/1999. (Table 6.9)

Table 6.9: Number (%) of population with and without a HIPE person event.

	N (%)
No HIPE event	635166 (87.7)
HIPE event	89266 (12.3)
Total	724432 (100)

6.3.2.2 Age group

As can be seen from Table 6.10, the largest proportion of the population (28%) was in the 25-44 year age group, and only 11.4% were in the oldest age group. There was a statistically significant relationship between age group and whether an individual had a HIPE event ($\chi^2 = 26957.5$, $df=4$, $p<0.001$). Those with a HIPE event were more likely to be older than those without a HIPE event.

Table 6.10: Distribution of age group by HIPE person event

Age group	No HIPE event (%)	HIPE event (%)	Total (%)
<15	156993 (91.4)	14807 (8.6)	171800 (23.7)
15-24	115256 (91.3)	11036 (8.7)	126292 (17.4)
25-44	180585 (89.0)	22379 (11.0)	202964 (28.0)
45-64	124003 (88.3)	16510 (11.7)	140513 (19.4)
65+	58329 (70.4)	24534 (29.6)	82863 (11.4)
Total	635166	89266	724432 (100)

6.3.2.3 Social class

The majority of the population belonged to social class two, three or four. Only 5.4% of the population belonged to social class one. (Table 6.11) There was a statistically significant association between social class and whether an individual had a HIPE event ($\chi^2 = 2243.4$, $df=6$, $p<0.001$). As social class number increased so too did the proportion of people with a HIPE event.

Table 6.11: Distribution of social class by HIPE person event

Social class	No HIPE event (%)	HIPE event (%)	Total (%)
1	34811 (89.7)	4004 (10.3)	38815 (5.4)
2	141957 (89.2)	17180 (10.8)	159137 (22.0)
3	118137 (88.6)	15201 (11.4)	133338 (18.4)
4	130776 (88.4)	17178 (11.6)	147954 (20.4)
5	81390 (87.1)	12044 (12.9)	93434 (12.9)
6	52609 (85.2)	9174 (14.8)	61783 (8.5)
7	75486 (83.9)	14485 (16.1)	89971 (12.4)
Total	635166	89266	724432 (100)

6.3.2.4 Deprivation score

The majority of the population resided in the least deprived areas - areas with a deprivation score of one or two, and only 6.1% of the population resided in the most deprived area -

deprivation score of five. (Table 6.12) There was a statistically significant association between deprivation score and whether an individual had a HIPE event ($\chi^2 = 12198.1$, $df=6$, $p<0.001$). Those living in the most deprived areas were more likely to have a HIPE event than those living in the least deprived areas.

Table 6.12: Distribution of deprivation score by HIPE person event.

Deprivation score	No HIPE event (%)	HIPE event (%)	Total (%)
1	180623 (91.4)	17074 (8.6)	197697 (27.3)
2	221869 (90.4)	23623 (9.6)	245492 (33.9)
3	85797 (83.4)	17143 (16.7)	102940 (14.2)
4	112850 (84.2)	21209 (15.8)	134059 (18.5)
5	34027 (76.9)	10217 (23.1)	44244 (6.1)
Total	635166	89266	724432 (100)

6.3.2.5 County of Residence

Table 6.13 presents the percentage of the population resident in each county. The largest percentage, almost 30%, reside in Dublin. There was a statistically significant association between county of residence and whether an individual had a HIPE event ($\chi^2 = 3521.9$, $df=26$, $p<0.001$) although there is no major pattern discernible. The percentage of the population with a HIPE person event ranged from 9.9% in County Dublin to 17.7% in County Mayo.

6.3.2.6 Sex

There were slightly more females than males in the population (50.4% versus 49.6%). There was a statistically significant association between sex and whether an individual had a HIPE events ($\chi^2 = 1144.8$, $df=1$, $p<0.001$). Females were more likely than males to have a HIPE event (13.6% versus 11%) (Table 6.14).

6.3.2.7 Vital status

Less than 1% of this sample died in 1996 ($n=6056$). There was a statistically significant association between vital status and whether an individual had a HIPE event ($\chi^2 = 8539.0$, $df=1$, $p<0.001$). Over half of the deaths had a HIPE person event compared with only 12% of those who did not die. (Table 6.15)

Table 6.13: Distribution of county by HIPE person event

County	No HIPE event (%)	HIPE event (%)	Total (%)
Carlow	6964 (84.7)	1257 (15.3)	8221 (1.1)
Cavan	8962 (85.0)	1585 (15.0)	10547 (1.5)
Clare	16476 (88.9)	2060 (11.1)	18536 (2.6)
Cork	74702 (88.6)	9615 (11.4)	84317 (11.6)
Donegal	22320 (86.4)	3511 (13.6)	25831 (3.6)
Dublin	190346 (90.1)	20971 (9.9)	211317 (29.2)
Galway	32561 (86.1)	5248 (13.9)	37809 (5.2)
Kerry	22336 (88.6)	2889 (11.5)	25225 (3.5)
Kildare	24178 (89.4)	2871 (10.6)	27049 (3.7)
Kilkenny	13049 (86.4)	2063 (13.7)	15112 (2.1)
Laois	9190 (87.5)	1317 (12.5)	10507 (1.5)
Leitrim	4391 (86.0)	714 (14.0)	5105 (0.7)
Limerick	28946 (88.3)	3841 (11.7)	32787 (4.5)
Longford	5122 (83.8)	989 (16.2)	6111 (0.8)
Louth	15626 (84.5)	2855 (15.5)	18481 (2.6)
Mayo	18326 (82.3)	3952 (17.7)	22278 (3.1)
Meath	19408 (88.3)	2561 (11.7)	21969 (3.0)
Monaghan	8912 (85.8)	1470 (14.2)	10382 (1.4)
Offaly	10113 (85.3)	1737 (14.7)	11850 (1.6)
Roscommon	8750 (85.0)	1542 (15.0)	10292 (1.4)
Sligo	9330 (84.1)	1757 (15.9)	11087 (1.5)
Tipperary NR	10021 (86.0)	1624 (14.0)	11645 (1.6)
Tipperary SR	12973 (86.2)	2073 (13.8)	15046 (2.1)
Waterford	15860 (83.7)	3084 (16.3)	18944 (2.6)
Westmeath	10599 (83.5)	2091 (16.5)	12690 (1.8)
Wexford	17513 (84.4)	3229 (15.6)	20742 (2.9)
Wicklow	18192 (88.5)	2360 (11.5)	20552 (2.8)

Table 6.14: Distribution of sex by HIPE person event

Sex	No HIPE event (%)	HIPE event (%)	Total (%)
Females	315165 (86.4)	49691 (13.6)	364856 (50.4)
Males	320001 (89.0)	39575 (11.0)	359576 (49.6)
Total	635166	89266	724432 (100)

Table 6.15: Distribution of vital status by HIPE person event

Sex	No HIPE event (%)	HIPE event (%)	Total (%)
Alive	632210 (88.0)	86166 (12.0)	718376 (99.2)
Dead	2956 (48.8)	3100 (52.2)	6056 (0.8)
Total	635166	89266	724432 (100)

6.3.2.8 Accessibility score

The histogram and box plot for the accessibility scores are presented below in Figure 6.3. As can be seen the distribution is positively skewed. The mean score of the distribution was 37.7 and the standard deviation was 26.0. The median was 26.6 and the range of the data was from 10.5 to 179.5. These scores have a relative meaning rather than any sort of metric meaning but a large score indicates that an individual lives far from a hospital and a low score indicates that an individual lives close to a hospital. A log transformation of these data resulted in a bi-modal distribution. Other transformations such as reciprocal, squaring, or taking the square root failed to improve the distribution of this variable.

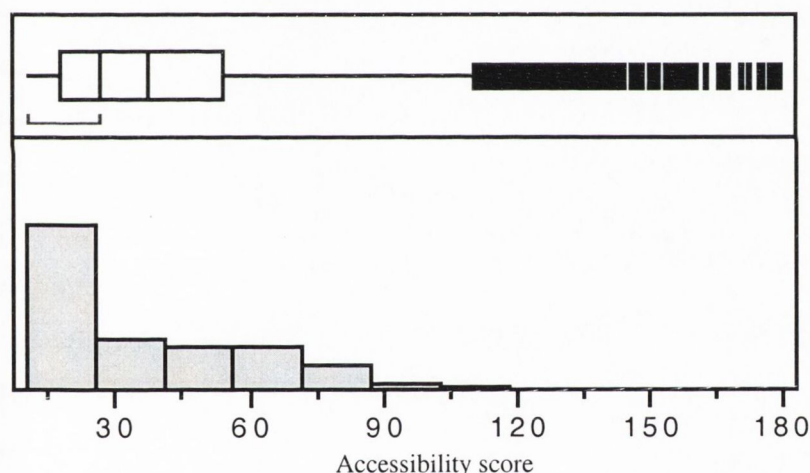


Figure 6.3: Histogram of accessibility data.

Those with a HIPE event had a mean access score that was significantly higher (i.e. they lived further away) than those without a HIPE event. There was a statistically significant difference between the mean of those without a HIPE event (37.3) and the mean of those with a HIPE event (40.7), (Wilcoxon=-19.1, $p<0.0001$). As these data are skewed a non-parametric test was used.

6.4 Using the master database in the resource allocation framework

6.4.1 Introduction

This section applies the framework developed in Chapter 5 to the master database. Step one of the framework was covered in section 6.2 (creation of the master database) so this section starts at step two of the framework. In some places this analysis deviates from the framework due to data limitations. The analysis is done mainly using the statistical package Stata (Version 7, Stata Corp, 2001).

6.4.2 Framework step two

6.4.2.1 Logistic regression model

A multiple logistic regression model was used to determine which variables best predicted whether an individual in the master database had a HIPE event. This analysis was carried out using the 20% random sample of data, from the master database, that was described in the last section. The model was first constructed using all seven variables (sex, age, vital status, social class, deprivation level, county and access) as all had a statistically significant association with the dependant variables (HIPE event) in bivariate analysis (section 6.3). All variables remained statistically significant in the model. Normally, variables that are not statistically significant are excluded from the model but in this case, due to the large size of the database (N=724,432), all variables were significant. Therefore, the contribution of each variable to the model was assessed using two methods.

Firstly, the scale of effect was examined by standardising the coefficients (coefficient divided by its standard error). These standardised coefficients are presented in ranked format in Table 6.16. As a rough rule of thumb, large values contribute more to the model than smaller values, so age and deprivation status contribute a significant amount to the model whereas sex and social class do not. The access variable is highlighted in the table as it is presented in two formats. The left-hand side of the table includes access as a continuous variable. However, in order to use this variable in a matrix (step three of framework) it needs to be categorical so the right-hand side of the table includes access as a categorical variable. Only two of the ten access categories had a standardised coefficient above three and did not contribute much to the model.

Table 6.16: Standardised coefficients from Logistic regression model for all variables (with access as both continuous and categorical).

Variable (access as continuous)	Standardised coefficient	Variable (access as categorical)	Standardised coefficient
Age 65+	119.3	Age 65+	119.0
Deprivation level 5	88.3	Deprivation score 5	85.9
Deprivation level 4	54.8	Deprivation score 4	53.3
Deprivation level 3	46.3	Deprivation score 3	45.7
Dead	43.7	Dead	43.8
Age 45-64	30.4	Age 45-64	30.3
Age 25-44	27.4	Age 25-44	27.2
Westmeath	7.7	Westmeath	7.8
Access	6.1	Cavan	5.6
Roscommon	5.7	Roscommon	5.5
Cavan	5.6	Access score 2	4.8
Sligo	5.0	Sligo	4.6
Monaghan	4.4	Access score 10	4.5
Mayo	4.1	Monaghan	4.2
Longford	4.1	Mayo	4.2
Waterford	3.9	Longford	3.8
Age 15-24	2.8	Waterford	3.4
Kilkenny	2.7	Access score 5	2.9
Wexford	2.6	Kilkenny 10	2.9
Tipperary NR	1.1	Age 15-24	2.6
Galway	1.0	Wexford	2.5
Leitrim	1.0	Access score 6	2.0
Meath	0.9	Access score 9	1.8
Louth	-0.2	Access score 8	1.3
Offaly	-0.3	Tipperary NR	1.0
Laois	-0.4	Meath	1.0
Tipperary SR	-1.0	Galway	0.9
Social class 6	-1.4	Leitrim	0.9
Social class 3	-1.7	Louth	0.3
Social class 2	-1.8	Laois	-0.2
Social class 5	-2.3	Offaly	-0.3
Kildare	-3.0	Tipperary SR	-0.6
Deprivation level 2	-3.2	Access score 3	-1.0
Wicklow	-4.0	Access score 7	-1.1
Social class 4	-4.0	Social class 6	-1.5
Cork	-4.7	Social class 3	-1.7

Table 6.16: Continued

Variable (with access as continuous)	Standardised coefficient	Variable (with access as categorical)	Standardised coefficient
Clare	-4.8	Social class 2	-1.8
Social class 7	-4.9	Social class 5	-2.4
Limerick	-6.0	Deprivation score 2	-2.8
Kerry	-7.3	Kildare	-3.0
Donegal	-11.8	Social class 4	-4.0
Dublin	-12.2	Wicklow	-4.1
Sex	-28.2	Clare	-4.6
Constant	-63.2	Access score 4	-4.7
		Galway	-5.0
		Cork	-5.2
		Limerick	-6.6
		Kerry	-7.1
		Donegal	-11.7
		Dublin	-12.2
		Sex	-28.1
		Constant	-60.5

The second method used to assess the contribution of each variable to the model was by constructing several models with one variable excluded in turn each time. (Table 6.17) The R² value (range 0-1) produced in regression analysis normally measures the contribution of the variables to explaining the model. In Logistic regression however the R² value is not available and a pseudo R² value is computed automatically as a rough indicator of the goodness of fit of the model. While not an ideal measure it is useful here to compare the different models.

Table 6.17: Ranked pseudo R² values for each models.

Model	Variables	Pseudo R ² %	Difference from Model 1
Model 1	All variables	7.39	--
Model 2	Social class excluded	7.38	0.01
Model 3	Access score excluded	7.38	0.04
Model 4	Sex excluded	7.24	0.15
Model 5	Vital status excluded	7.05	0.34
Model 6	County excluded	6.81	0.58
Model 7	Deprivation score excluded	5.18	2.21
Model 8	Age-group excluded	4.17	3.22

Age-group and deprivation score contributed most to the overall pseudo R^2 value. Social class, access score and sex contribute very little. Social class and sex also had very small standardised coefficients and access score had a moderately low standardised coefficient. (Table 6.16) In order to have a model as parsimonious as possible these three variables were therefore excluded from the Logistic regression model resulting in a model with the variables age, deprivation level, county of residence and vital status. Other models, for example, the Swedish model also excluded sex as it did not contribute significantly to the final model. The interpretation of county in the model could be as either a supply variable or as a needs variable. Supply may vary depending on whether or not a hospital is located in a particular county although putting county in the model as a cluster variable later in this chapter did not show a significant effect. A case could be made that health board would be a better supply variable as policies made at health board level will equally affect all counties in that health board. County may also be perceived as a needs variable due to the different distances from some counties to health facilities and differing environmental and demographic profiles. The inclusion of mortality (vital status) in the final model may also be questioned. It is not included in the Swedish model as they are attempting to build a prospective model so therefore retrospective mortality data is of little use. It is also known that mortality alone is a poor predictor of morbidity without more robust socio-economic indicators. However, it is retained in this model due to lack of any morbidity indicator and until improved data sources are available that allow a prospective model to be constructed mortality is likely to remain as part of an initial Irish resource allocation model.

The pseudo R^2 value of the final model containing age, deprivation level, county of residence and vital status was 7.23% compared to 7.39% for the model with all variables. This Logistic regression model, which was used in the remainder of the analysis, is presented in Table 6.18 and includes the coefficients with their standard errors. The alternative and more appropriate goodness of fit measure the 'Hosmer-Lemeshow' χ^2 statistic for this model was $\chi^2=14206$, $p<0.001$.¹⁷⁷ Although the small p-value was not unexpected due to the very large sample size, this p-value indicates a poor fit but it was considered the best model obtainable from the available data.

The odds ratios with their 95% confidence intervals in Table 6.18 mainly followed an expected pattern. Those who died were over three times more likely to have had a HIPE

event. As age increased the likelihood of having a HIPE event also increased. As deprivation score increased, with the exception of deprivation score two, the likelihood of having a HIPE event increased. Individuals living in an area with the highest level of deprivation were almost four times more likely to have a HIPE event than those living in the least deprived area. Many counties were significantly more likely or less likely to have a HIPE event when compared to the base county of Carlow but there was no apparent trend. Counties that were not significantly different from Carlow (which is a rural county), with the exception of Galway, were predominantly rural.

Table 6.18: Logistic regression analysis with coefficients and odds ratios* (continued on next page)

	Odds Ratio	95% Confidence Interval		P value<	Coefficient	Std. Err.
Constant				0.001	-2.56	0.03
Vital status						
Alive	1.00					
Dead	3.32	3.15	3.51	0.001	1.2	.03
Age						
Age <15	1.00					
Age 15-24	1.03	1.01	1.06	0.01	0.03	0.01
Age 25-44	1.37	1.34	1.40	0.001	0.31	0.01
Age 45-64	1.45	1.41	1.48	0.001	0.37	0.01
Age 65+	4.29	4.20	4.40	0.001	1.46	0.01
Deprivation score						
Deprivation score 1	1.00					
Deprivation score 2	0.96	0.94	0.99	0.001	-0.03	0.01
Deprivation score 3	1.81	1.77	1.86	0.001	0.59	0.01
Deprivation score 4	1.92	1.88	1.97	0.001	0.65	0.01
Deprivation score 5	3.76	3.66	3.87	0.001	1.32	0.01
County						
Carlow	1.00					
Cavan	1.24	1.14	1.34	0.001	0.21	0.04
Clare	0.82	0.76	0.88	0.001	-0.20	0.04
Cork	0.83	0.77	0.88	0.001	-0.19	0.03
Donegal	0.65	0.60	0.70	0.001	-0.44	0.04
Dublin	0.64	0.60	0.68	0.001	-0.45	0.03
Galway	1.01	0.94	1.08	0.77	0.01	0.04
Kerry	0.75	0.70	0.81	0.001	-0.28	0.04
Kildare	0.87	0.81	0.94	0.001	-0.14	0.04
Kilkenny	1.08	1.00	1.17	0.06	0.08	0.04
Laois	0.96	0.88	1.05	0.35	-0.04	0.04

Table 6.18 continued

	Odds Ratio	95% Confidence Interval		P value	Coefficient	Std. Err.
Leitrim	1.05	0.95	1.16	0.35	0.05	0.05
Limerick	0.78	0.72	0.84	0.001	-0.25	0.04
Longford	1.22	1.11	1.34	0.001	0.19	0.05
Louth	0.95	0.88	1.03	0.20	-0.05	0.04
Mayo	1.16	1.08	1.25	0.001	0.15	0.04
Meath	1.00	0.93	1.08	0.94	0.00	0.04
Monaghan	1.18	1.08	1.28	0.001	0.16	0.04
Offaly	0.96	0.89	1.04	0.35	-0.04	0.04
Roscommon	1.26	1.16	1.37	0.001	0.23	0.04
Sligo	1.19	1.10	1.29	0.001	0.18	0.04
Tipperary NR	1.04	0.95	1.12	0.41	0.03	0.04
Tipperary SR	0.94	0.87	1.02	0.13	-0.06	0.04
Waterford	1.12	1.04	1.21	0.001	0.11	0.04
Westmeath	1.34	1.23	1.45	0.001	0.29	0.04
Wexford	1.08	1.00	1.16	0.04	0.08	0.04
Wicklow	0.84	0.78	0.91	0.001	-0.17	0.04

*Original model also contained sex, social class and access scores.

Further analysis was performed in order to try and improve the fit of the model. These included testing for an interaction between deprivation score and county. There was some evidence of an interaction and the pseudo R^2 value for this model did improve slightly to 8.7% but, as the estimates were very unstable, it was not used. The model was also run using county as a cluster variable to test if there was interdependence between variables in the model and county. This reduced the pseudo R^2 statistic to 6.9% indicating that there was little interdependence.

Cross validation of the logistic regression model was performed using a second 20% random sample of data from the master database. The predicted probabilities of this sample are presented in Table 6.19. The cross validation was done using the Hosmer and Lemeshow goodness of fit methodology which involved dividing the data into deciles of risk for each outcome (HIPE event or no HIPE event) and calculating the observed and estimated (predicted) frequencies.¹⁷⁷ Table 6.19 shows that the model is poor at prediction as it estimated that there would be 213,253 HIPE person events when there were actually only 89,748 person events. This was a difference of 123,505 which was an increase of 137%. The Hosmer-Lemeshow χ^2 statistic for this cross-validation was $\chi^2=1,640,821$, $p<0.001$ indicating

that the model does not fit well on the validation sample (although, as noted above the large sample size will inevitably result in a significant p-value).

Table 6.19: Cross validation of Logistic regression model using a second 20% random sample of data

Group	Probability	Number observed with HIPE event	Number predicted to have a HIPE event	Number observed with no HIPE event	Number predicted not to have a HIPE event	Total
1	0.17	5078	11234	71127	64971	76205
2	0.18	5218	12838	66480	58860	71698
3	0.21	5022	13636	64901	56288	69923
4	0.23	6670	16031	65707	56346	72377
5	0.26	6507	17697	66421	55231	72928
6	0.30	7918	20163	64979	52734	72897
7	0.33	7899	22529	64448	49818	72347
8	0.39	10485	27242	63999	47242	74484
9	0.47	12083	30531	59133	40685	71216
10	0.84	22868	41352	48492	30008	71360
Total		89748	213254	635687	512181	725435

The receiving operating characteristic (ROC) curve is used to plot sensitivity against one minus specificity. The area under the ROC curve for the original 20% sample (Figure 6.4) and the cross-validated sample (Figure 6.5) are presented below. The area under the curve for the original 20% sample from which the model was constructed was 67% whereas for the cross-validated sample it was only 34%. As predictive power increases, the bow of the curve increases to a maximum value of one and for a model with no predictive power all points lie on the diagonal (45°) line and the area under the curve is 50%. The predictive performance from this cross-validated sample at 34% is therefore quite poor.

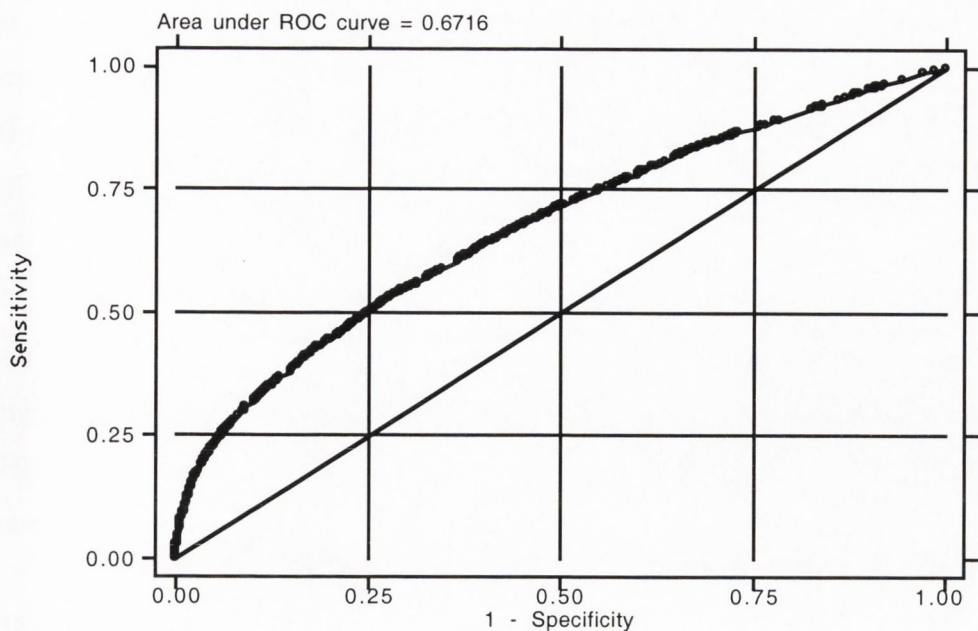


Figure 6.4: ROC curve for logistic regression model based on a 20% sample of data.

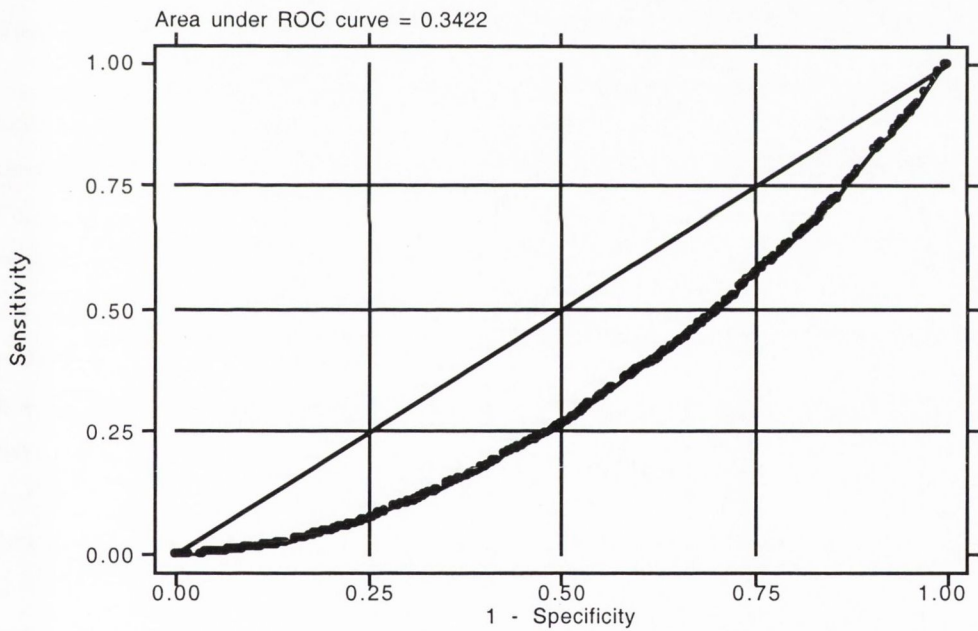


Figure 6.5: ROC curve for sample of data used for cross-validation.

The poor predictive power of the model may be due to the default probability cut-off of 0.5 used in the analysis. This is investigated further by producing a sensitivity and specificity table (Table 6.20) and graph (Figure 6.6).

Sensitivity and specificity measure the validity of the regression model. Sensitivity is defined as the probability of predicting a HIPE event if a HIPE event really occurred. Specificity is

defined as the probability of predicting that an individual did not have a HIPE event if a HIPE event really did not occur.¹⁷⁸ From Figure 6.6 it can be seen that, at the probability cut-off of 0.5, the specificity is very high but the sensitivity is very low and this is also apparent from Table 6.20. The sensitivity of this model was 3.36%. This means that, of those who had a HIPE event, just over 3% were predicted as having had a HIPE event. As the sensitivity increases the number of individuals with a HIPE event who are missed by being incorrectly classified as false negatives will decrease. The specificity in this study was 99.75%. This means that virtually all those who did not have a HIPE event were predicted as not having a HIPE event. As the specificity increases the number of individuals without a HIPE event who are incorrectly classified as false positives will decrease.

Table 6.20: Results of model prediction with probability cut-off of 0.5.

	HIPE event	No HIPE event	Total
HIPE event predicted	3002 (a)	1593 (b)	4595
HIPE event not predicted	86264 (c)	633573 (d)	719837
Total	89266	635166	724432
	Formula	Percent	
Sensitivity	a/a+c	3.4%	
Specificity	d/b+d	99.8%	
Positive predictive value	a/a+b	65.3%	
Negative predictive value	d/c+d	88.0%	

- a = The number of individuals for whom the model predicted a HIPE event and the individuals did actually have a HIPE event (true positive)
- b = The number of individuals for whom the model predicted a HIPE event but the individuals did not actually have a HIPE event (false positive)
- c = The number of individuals for whom the model did not predicted a HIPE event and where the individual did actually have a HIPE event (false negative)
- d = The number of individuals for whom the model did not predict a HIPE event and where the individual did not actually have a HIPE event (true negative)

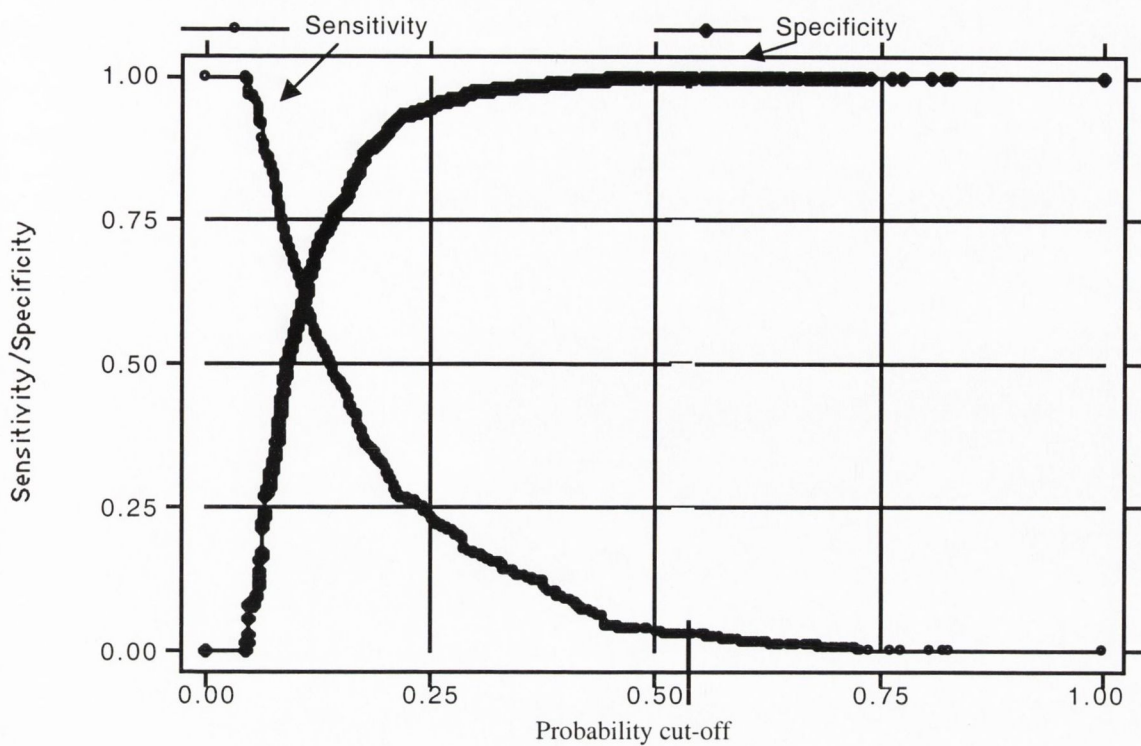


Figure 6.6: Sensitivity and Specificity plot for the Logistic regression model

It is desirable that a model has both a high sensitivity and high specificity. Sensitivity should be increased at the expense of specificity when the penalty associated with missing an individual with a HIPE event is high. In this case low sensitivity would result in a lower funding allocation and therefore an attempt was made to increase sensitivity. From Figure 6.6 it is clear that by reducing the probability cut-off point sensitivity will increase and this will be at the expense of specificity. Therefore the first probability cut-off chosen was 0.25 as this would increase sensitivity without reducing specificity too much. From Table 6.21 it can be seen that the sensitivity increased to 23.6% and the specificity only decreased slightly to 94.7%.

The positive and negative predictive values were also examined. The positive predictive value (PPV) is the probability that an individual actually had a HIPE event given that the model predicts that he or she did have an event.¹⁷⁸ For the first model with a cut-off of 0.5 (Table 6.20) the PPV was 65.3% that is, if the model predicts a HIPE event, then there is a 65.3% chance that that person actually had the HIPE event. This indicates that for every three individuals who were predicted as having a HIPE event only two actually had a HIPE event. Reducing the probability cut-off to 0.25 reduced the PPV to 38.7% (Table 6.21) which means

that for every (almost) three individuals who were predicted as having a HIPE event only one actually had a HIPE event. Using this measure the probability cut-off of 0.5 ensures a more relevant model.

The negative predictive value (NPV) is the probability that an individual actually did not have a HIPE event given that the model predicted that they did not.¹⁷⁸ For the model described in table 6.20 the NPV is 88%, that is, if the model predicted that an individual did not have a HIPE event then there is an 88% chance that this is true. This high NPV was expected as the incidence of HIPE events overall was rare so therefore most individuals will not have a HIPE event. This value remained high for both probability cut-off levels (Tables 6.20 and 6.21).

Table 6.21:Results of model prediction with probability cut-off of 0.25.

	HIPE event	No HIPE event	Total
HIPE event predicted	21065 (a)	33412 (b)	54477
HIPE event not predicted	68201 (c)	601754 (d)	669955
Total	89266	635166	724432
	Formula	Percent	
Sensitivity	a/a+c	23.6%	
Specificity	d/b+d	94.7%	
Positive predictive value	a/a+b	38.7%	
Negative predictive value	d/c+d	89.8%	

The probability cut-off value was reduced further to 0.1 as from Figure 6.6 this is approximately the point where the sensitivity and specificity meet. This action however, while increasing the sensitivity further, significantly reduced the specificity and PPV and therefore would not improve the model. (Table 6.22)

Table 6.22: Results of model prediction with probability cut-off of 0.1.

	HIPE event	No HIPE event	Total
HIPE event predicted	59892 (a)	279663 (b)	339555
HIPE event not predicted	29374 (c)	355503 (d)	384877
Total	89266	635166	724432
	Formula	Percent	
Sensitivity	a/a+c	67.1%	
Specificity	d/b+d	56.0%	
Positive predictive value	a/a+b	17.6%	
Negative predictive value	d/c+d	92.4%	

This section has examined whether any improvements in goodness of fit can be made to the logistic regression model presented in table 6.18. Changing the probability cut off points did not lead to any improvements so the original model is retained despite its poor goodness of fit. As the master database has been constructed using some artificial processes it was not expected that the goodness of fit would be high. It is probably likely that additional explanatory variables, not available from current data sources, are required in order to obtain a satisfactory goodness of fit. The next section explores whether an alternative to a logistic regression model would provide a better fit.

6.4.2.2 Non-logistic regression models investigated.

As the logistic regression model was not a good fit another models was investigated to see if it resulted in a better fit. One of these was a recursive-partitioning model also known as a decision tree model.¹⁷⁹ This technique is good for exploring relationships when the model choice and structure is uncertain. It handles large problems easily and its output is easy to understand. The sample is divided into a series of partitions by splitting the data into categories, for categorical data, or by determining a cutting value for continuous data. The most significant split is performed for each step in the construction of the model and this is decided by determining the largest likelihood-ratio chi-square statistic.¹⁷⁹ This analysis was performed using JMP (Ver. 5.0.1, SAS Corp, 2002).

As with logistic regression, the goal of this analysis was to investigate which factors influence whether or not someone had a HIPE person event using a 20% random sample of the data. The dependant variable was whether or not someone had a HIPE event. All the explanatory variables were used (i.e. age group, social class, deprivation level, sex and vital status as categorical variables and accessibility as a continuous variable). This statistical package is not yet refined enough to effectively analyse categorical variables that have a large number of categories so therefore, county (with 27 categories) was excluded. The analysis works by systematically splitting the variables. The analysis is interactive with no stopping rules imposed. Initially the analysis was run to include every possible split. This resulted in over a thousand splits which gave an R^2 value of just over 10%. The first four splits divided the five age groups into single groups and this accounted for 4% of the R^2 value. An additional 11 splits (mainly of deprivation level and one sex split) increased the R^2 value to 7% and a total

of 43 splits increased the R^2 value to 8%. In order to create a parsimonious model, the model with an R^2 value of 7% was used in the analysis. This model is presented in Figure 6.7 below.

The prediction formulae obtained from this model were applied to a separate 20% random sample of the data in order to cross-validate the model. As expected due to the low R^2 value the predictive power was low and predicted that there would be 4381 (0.6%) HIPE person events compared with the 89,748 (12.4%) actual HIPE person events in this sample. Because of this poor prediction and because the performance was no better than the Logistic regression model the recursive-partitioning model was not used in the allocation of resources.

Other models are available that may have better suited the data in the master database but these were considered to be beyond the scope of this thesis. Generalised Additive Models, using S-Plus, was one such option.¹⁸⁰ Generalised Additive Models are a more flexible version of logistic regression that involve fitting splines and that allows for the possibility of non-linearity in the dependence between variables. Fractional polynomials, which allow a more flexible treatment of co-variances and also allow for non-linearity, were another option.¹⁸¹ As most of the master database variables are categorical, the outcome and benefits of these approaches may be limited as they are generally more suited to the analysis of continuous data. Neural networks are another possible option of exploring the data and are suitable for continuous or categorical data.¹⁸²

A Poisson regression model was used in the Stockholm County model as they had data on the number of hospital visits for each individual.⁵ The master database used here could not determine number of events per individual due to limited readmission data in the HIPE system. Using a truncated Poisson model was also explored. This model is useful where readmission data is incomplete but a scale of admissions could be established e.g. zero, one or two or greater. However, as the maximum number of re-admissions allowed in the creation of the master database was one, this model was not practicable so the Logistic regression model seemed to be a suitable alternative given present data availability.

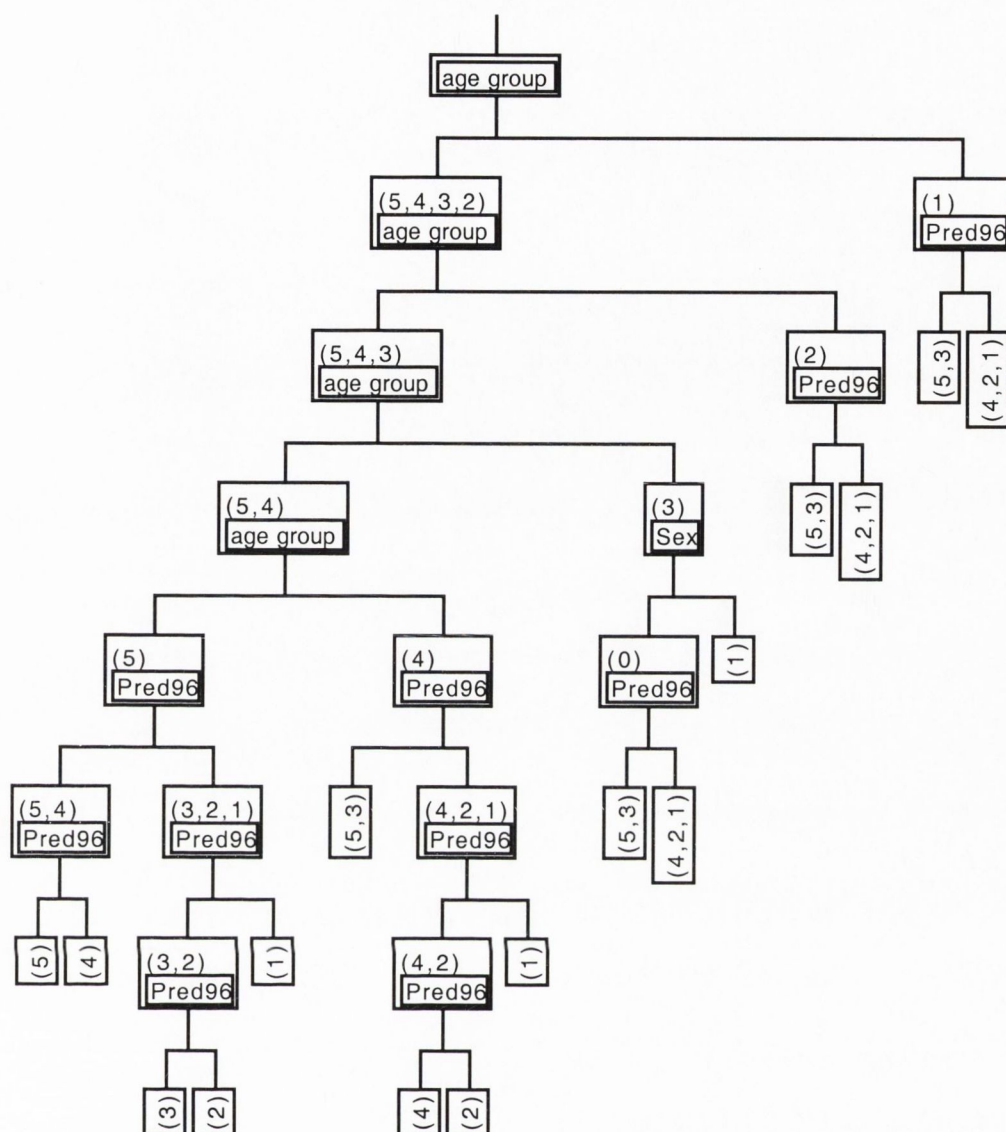


Figure 6.7: Recursive partitioning tree diagram $R^2 = 7\%$. (Pred96 is the deprivation level)

6.4.3 Step 3

The variables identified as being statistically significant and contributing significantly to the Logistic regression model were used to construct a cost matrix for the country using data from the master database. Each cell represented a unique combination of these variables i.e. age, deprivation level and vital status. A matrix was initially created for each county and then combined for the country. The relative costs were obtained by summing the relative costs for the individuals in the cell who had a HIPE event and dividing by the total population of that cell. The country matrix, consisting of 50 cells, is presented in Table 6.23.

Table 6.23: Cost matrix for the country (Step 3)

Age group	Deprivation level 1, dead	Deprivation level 1, alive	Deprivation level 2, dead	Deprivation level 2, alive	Deprivation level 3, dead	Deprivation level 3, alive	Deprivation level 4, dead	Deprivation level 4, alive	Deprivation level 5, dead	Deprivation level 5, alive
<15	32.9	19.7	45.5	19.8	51.5	19.8	43.0	19.4	17.7	9.5
15-24	24.8	20.8	81.9	21.1	31.8	21.8	55.5	21.3	10.9	9.4
25-44	45.4	22.9	50.3	22.6	47.2	23.3	45.8	23.1	16.4	11.1
45-64	54.9	35.1	59.4	34.8	61.7	35.1	65.4	35.0	31.2	14.5
65+	52.1	38.4	49.1	37.9	49.7	37.2	49.9	37.5	21.4	14.1

Table 6.24: Population matrix for the North Western Health Board (Step 4)

Age group	Deprivation level 1, dead	Deprivation level 1, alive	Deprivation level 2, dead	Deprivation level 2, alive	Deprivation level 3, dead	Deprivation level 3, alive	Deprivation level 4, dead	Deprivation level 4, alive	Deprivation level 5, dead	Deprivation level 5, alive
<15	2	4578	7	13539	11	11206	12	17449	4	5146
15-24	0	2607	3	9534	5	7629	8	11348	0	3441
25-44	3	4665	14	15145	11	11696	16	16931	6	4772
45-64	17	3794	63	11199	43	9039	74	13336	22	4102
65+	92	1842	525	7653	408	6387	549	8814	209	2916

Table 6.25: Total population cost matrix for North Western Health Board (Step 5)

[illegible]

6.4.4 Step 4

A matrix, using the same variables as above, was created for each Health Board using the master database, but instead of containing the mean relative cost per cell it contained the actual number of the population in each cell. The population matrix for the North Western Health Board (NWHB) is presented as an example in Table 6.24.

6.4.5 Step 5

The product of the values in the cells of each matrix (Tables 6.23 and 6.24) were calculated. This gave the total relative cost for each cell. These were summed for each Health Board to get the total expected relative cost per Health Board. This calculation is performed in Table 6.25 for the NWHB and the totals for each Health Board are presented in Table 6.26. In this table the estimated relative cost per Health Board is compared with the actual relative cost per Health Board. The actual relative cost was obtained using the HIPE data from the master database. The sum of the actual HIPE relative values and the sum of the matrix relative values are not directly comparable. What is interesting is to compare the difference between the percentage of the totals. From this it appears that three Health Boards are over funded and five are underfunded using this needs based resource allocation framework. The Eastern Health Board (EHB) (known as the ERHA since March 2002) is over-funded by 4.4% and the Western Health Board is underfunded by 1.8% for inpatient services. While these percentages seem small they translate into a substantial amount of money.

Table 6.26: Comparison between actual cost and expected cost for full matrix

Health Board*	Sum of actual HIPE relative values	% of total	Sum of matrix relative values	% of total	% difference between matrix & actual
EHB	140280	30.1	31464329	34.5	4.4
SHB	68893	14.8	14024260	15.4	0.6
MWHB	39449	8.5	8041222	8.8	0.4
MHB	30144	6.5	5348983	5.9	-0.6
NWHB	31062	6.7	5266924	5.8	-0.9
NEHB	45402	9.7	7937044	8.7	-1.0
SEHB	57020	12.2	10121985	11.1	-1.1
WHB	54461	11.7	8977578	9.8	-1.8
Total	466711	100	91182327	100	100

*E - Eastern, M - Midland, MW - Mid-Western, NE - North Eastern, NW - North Western, SE - South Eastern, S - Southern, W- Western

6.5 Discussion

6.5.1 Formation of master database

6.5.1.1 Health information system limitations

A number of the limitations discussed below in relation to the formation of a master database relate to present health information system limitations. The joining of individual level data from HIPE and mortality data to census data attempts to reflect reality. There is no way of checking this as real data are not available. Data were joined based on matching a limited number of characteristics, some of them artificially, so errors are likely. Data limitations in Ireland have been highlighted by other reports such as the Value for Money Audit which highlighted '*...the highly fragmented nature of data collections and the systems used*'.⁷ They go on to say that highly fragmented data have led to highly fragmented evaluation systems. The empirical data used in this study do not generally conform to the data quality guidelines of reliability, being up to date and being annually available.⁵ However, this study was concerned only with investigating the feasibility of developing a resource allocation model. It is acknowledged that, while the master database would not be used in actual implementation of the model, it was useful in examining the framework process.

6.5.1.2 Census Data

There were a number of limitations with the SAPS census data. The main one was that it was not possible to get multiple combinations of data for confidentiality and data protection reasons. Another limitation was that social class for women, particularly housewives or retired women, are generally according to their husbands social class which can give some misleading results. A report on inequalities in mortality in Ireland noted that data needed to be strengthened and that particular focus should be placed on females, those outside the working ages and unemployed people because of this difficulty with social class.⁷⁰ A third limitation was the lack of an ethnicity variable which would have allowed better analysis of the additional (often unmet) health needs of certain ethnic minorities. The most recent census (2002) included a question on ethnicity so these data should become available in future.

6.5.1.3 Out of date data

Data used in the creation of the master database were mostly from 1996 with HIPE data coming from a combination of 1998 and 1999 data. The main reason for not using more updated data was that the CSO SAPS from the 2002 census have not yet been released. In

addition mortality data coded to DED level were only available from 1994 to 1998. As the master database was primarily used for illustrative purposes the use of up to date data were not considered to be a priority.

6.5.1.4 Cost data insufficiently detailed

The Casemix system covers 32 hospitals in Ireland. The relative values used in this study were derived based on the cost associated with these 32 hospitals but the HIPE data used data on 62 hospitals. There was no published documentation on the costs of these additional 30 hospitals. Therefore the relative values derived for the DRGs for those 32 hospitals were applied to the 62 HIPE hospitals used in this study. As the Casemix hospitals tend to be larger, economies of scale may mean that their costs were slightly lower than the remaining 30 hospitals. On the other hand, the Casemix hospitals are likely to have been dealing with more complex and expensive case loads and with patients who perhaps have more co-morbidities which may have increased costs. It was considered therefore, that using cost data from 32 Casemix hospitals for all HIPE hospitals would not unduly distort the results.

Another issue in relation to costs was that average costs were used that do not necessarily reflect differences in cost of treatment throughout the country. There were no individual costs available and this is a weakness of the health system that has recently been highlighted by the Commission on Financial Management and Control Systems in the Health Service. They point out that individual patient cost data '*...is essential to any review of the system of allocating funds or in deciding where the most cost effective treatment can be obtained for various conditions.*'⁶

6.5.1.5 Readmission data

International literature suggest that between 5% and 29% of patients may be readmitted within a month of a medical or surgical admission,¹⁸³ and up to 30% readmitted within one year.¹⁸⁴ Readmissions are defined in the literature in a number of ways. This study was interested in readmissions using the broadest definition, which was anyone who was recorded more than once on the HIPE system. Planned repeat admissions and emergency readmission following a previous spell of treatment were recorded on the HIPE system only if they were back to the same hospital. The readmission rate based on these data was 9.5%. Clearly patients could have been readmitted to a different hospital or could have been hospitalised

with a completely different disorder in which case they would not be recorded as a readmission. Other patients could have had multiple readmissions and it was not possible to determine this from the HIPE data in its current format. Because of these difficulties it is known that the number of readmissions calculated in the construction of the master database was an underestimate and therefore the number of HIPE person events used was an over estimate.

The introduction of a unique personal identifier would solve this problem of identification of readmissions. Not alone would comprehensive readmission data be beneficial for the creation of a resource allocation model but they would also be useful in terms of being an outcome indicator for hospitals.

6.5.1.6 Missing data

It is acknowledged that people whose data are unrecorded tend to be from lower socio-economic groups.⁷¹ However, as only a small number of individuals had unrecorded data in the data sources used in the construction of the master database, it was considered appropriate to assign data to these cases using a system of proportional representation.

6.5.1.7 Distribution of GMS cards by deprivation level

DED coded GMS data were available for the ERHA and this was used to calculate percentages for the distribution of GMS cards to DEDs of different deprivation levels throughout the country. The ERHA is largely an urban area and the distribution of medical cards may be different to rural areas. The percentage of the population covered by medical cards in the ERHA was 26.1% in 1997 - the lowest of all Health Board areas.¹⁷⁶ This compares with the North-Western Health Board who had the highest percentage of the population covered by medical cards at 48.8% and the average for all counties in 1996 was 33.6%. ERHA data were used as they were the only proxy data available but it is acknowledged that its distribution across deprivation levels may not be the same as for the whole country.

6.5.1.8 Conversion of socio-economic group to social class for mortality data

The conversion of the socio-economic group variable in mortality data was artificially converted to social class in order to allow this data to be joined to census data by this variable.

This conversion was done purely based on similar nomenclature and a knowledge of the different groups and classes. It is acknowledged therefore that this conversion is likely to have had inaccuracies. However, it did assist in making the joining of mortality data to census data more likely to reflect the actual situation.

6.5.1.9 Joining deprivation scores to census data.

Each individual was allocated a deprivation score according to the DED in which they resided. Obviously not all residents of a particular DED have the same deprivation level and this action may have resulted in an ecological fallacy. For example if a DED has a deprivation score of five (an area of high deprivation) this method would infer that all residents of that DED are highly deprived which is not necessarily the case. Despite this, the deprivation scores were found to be a very useful variable in assisting in joining the HIPE data to the census data. If a unique personal identifier were available a combination of individual level socio-economic variables could be used in place of an area based deprivation score.

6.5.2 Descriptive analysis

Despite parts of the master database being artificially created, bivariate analysis looking at the association between each variable and whether or not an individual had a HIPE event all show expected results. Rates of hospitalisation were found to be higher among the older age group, those in lower social classes, among those from deprived areas, among females, among those who died and among those living further from hospital. These findings are consistent with other research that has shown higher rates of illness and hospitalisation among deprived groups and lower social classes.⁷¹ The higher rate of female admissions may reflect the female use of maternity services and their longer life expectancy.

6.5.3 Application of framework

6.5.3.1 Model fit

The goodness of fit of the Logistic regression model used in the analysis of the master database remained poor despite using techniques to try and improve its fit. For most individuals, their health care utilisation in a given year is determined principally by unpredictable random incidents. Some individuals have a predictably higher predisposition to illness than others but due to the unpredictable nature of health status there is a general consensus that only a fraction of individual variability in health care costs can be predicted.⁴⁵

¹⁶⁷ Because of this variability it has been stated that resource allocation models can only

achieve '*rough justice*'.¹⁸⁵ The Logistic regression model attempted to do this by predicting health care utilisation and translating that to cost. While a very good fit was not expected there are a number of possible reasons why the fit was not slightly better.

Firstly, parts of the master database were artificially created. Were a unique personal identifier available, that allowed the accurate linking of databases used in this study, then undoubtedly the goodness of fit would improve.

Secondly, variables that explain much of the variation in the model may not have been included.¹⁶⁷ This is likely to be true as the master database contained very few variables and only four of these, age, deprivation level, county of residence and vital status were used in the final model. Additional data on morbidity, demographic and socio-economic status are likely to have improved the fit. Another variable that may have affected the model fit is variations in clinical practice. The reason for this is that despite adjusting for supply factors in the model, variations in supply of services are often not due to difference in needs of populations but to differences in medical discretion and adjustment for this is difficult. A unique personal identifier would facilitate the inclusion of extra data sources that would increase the number of variables available but measuring of variations in clinical practice would remain a problem.

Thirdly, the use of a different model may have given a better fit. The options for alternative models were limited however, again mainly due to the nature of the data available. For example, most variables were categorical whereas some of the alternative model options better suit continuous data. In addition, lack of adequate hospital readmission data precluded the use of a Poisson regression model similar to that used in the Stockholm model.

6.5.3.2 *Model coefficients*

A problem with the Stockholm County model was that, despite creating a regression model with coefficients for each variable, the model was only used to identify which variables were significant in the model so that they would be used in the construction of the matrix. No account was taken in their analysis of the different contributions that each of the variables made to the model. From the Logistic regression model used in the current study it was apparent that not all variables contributed equally to the model. An attempt was made therefore to use this information. It is normally the case that variables that are statistically

significant in the model remain in the model but this study investigated further the contribution of each variable and as a result did not retain three variables, sex, social class and access score, as they did not contribute significantly to the model. The other action was to examine the sensitivity and specificity of the model, to determine whether the default probability cut-off of 0.5, used by the statistical package to determine if an individual had a HIPE person event, was appropriate. In this case, while sensitivity was poor, the positive predictive value was maximal so the probability cut-off of 0.5 was not changed. However, the most appropriate cut-off point would need to be calculated for each new model created. These actions resulted in consideration being taken of the different contributions of the variables to the logistic regression model.

6.5.3.3 Bigger matrix

The introduction of a unique personal identifier and the subsequent increase in the number of variables used in the model would undoubtedly increase the size of the matrix. The matrix in this study consisted of only 50 cells but it is easy to envisage the matrix growing to a size of several hundred or even several thousand cells. This is likely to result in many cells in the matrix having no values or very small values because no individual has the particular characteristics of a cell. This can cause statistical complications due to the lack of a random component. It is also likely that the number of cells with no entries would vary from year to year. Calculation of the estimated values should therefore be from probabilities rather than be determined by the actual values for that year. Alternatively a number of years of data could be analysed but this would make the predictions too outdated. Measures are being investigated to tackle this problem by reduce the dimensionality of the matrices through formal statistical tests using a clustering and compressing matrix.⁴⁶

6.5.3.4 Interpretation

The final results compare the actual resources allocated to and the expected resources based on need for each Health Board's acute inpatient hospital programme and found that some Health Boards would require additional funding and some would require less. These results, which were produced mainly for illustrative purposes, need to be interpreted with caution for several reasons. Firstly many elements of the master database have been artificially created. Secondly, the analysis was based on a model with a poor goodness of fit and thirdly, HIPE data were from 1998 and 1999 whilst all other data were from 1996.

6.5.3.5 Lack of data on private patients

The framework proposed using only data on those without private health insurance in the acute hospital strand of the model. However private health insurance status was not known for the population in this study and therefore this analysis was done for all patients. A recent development in HIPE is the recording of whether a patient has public or private status,¹⁶⁸ which, in combination with the GMS status variable, will contribute to the formation of socio-economic proxies. In 2000, a change in legislation meant that all people over 70 years of age were eligible to a GMS card regardless of means. This change distorts the use of this variable as a proxy for a socio-economic status, at least for the over seventies. This study used HIPE data prior to 2000 so this was not problematic for this study.

6.5.4 Conclusion

This analysis did not follow completely that described in the framework in Chapter 5. Firstly it was only done for the acute hospital sector. Secondly, information on whether an individual with a HIPE event had private insurance was not available so all patients were included in the analysis rather than only those without private insurance as recommended in the framework.

The results from this chapter are mainly for illustrative purposes due to the artificiality of the master database. Both the process of developing the master database and creating a cost matrix demonstrates the potential of the framework in providing a needs based method of resource allocation so, despite the problems encountered in this chapter, the individual level resource allocation model remains the model of choice for resource allocation in Ireland.

Neither the pseudo R^2 or the Hosmer and Lemeshow goodness of fit tests are really designed for a situation with large numbers such as the data set used in this chapter. The ability of these tests to detect small but not necessarily important departures from the model is very strong. Hence, almost all variables are identified as being significant. There is no recognised alternative to this problem and, while some of the other possible approaches mentioned such as generalised additive models and data mining techniques may improve the goodness of fit somewhat, they will not fully rectify this problem. Because of this problem the analysis did not rely solely on goodness of fit tests and examined the sensitivity, specificity and positive predictive value of the models.

CHAPTER 7: DISCUSSION

7.1 Layout

Chapters three, four, five and six all have sections that discuss their respective methodologies. In Chapter five, each element of the framework is discussed as it is being constructed. It was considered appropriate to discuss these methodologies and their limitations as they arose and to concentrate in this chapter on the overall implications of the study and the role of a resource allocation model in a reformed Irish health system. Following an introduction this chapter discusses the implications of the findings of each part of the study (Policy Delphi, Benchmarks of Fairness, development and application of framework). It then discusses issues related to information systems and then makes an overall assessment of the policy implications of the study.

7.2 Introduction

It has been said that every health system is a reflection of the broader society in which it is found.⁵¹ The Irish health system is complex in terms of structures, organisations and people. It has been shaped by a range of historical, cultural, socio-economic, industrial relations, governmental and media factors.⁵¹ These same factors have shaped the resource allocation system. Current Irish health system reform proposals are aimed at reducing the complexity of the health system, ensuring value for money, accountability, transparency and improving management structures.¹¹ Although equity was highlighted by the Health Strategy¹⁰ the Health Service Reform Programme does not explicitly mention equity. Both the reform documents^{6 11}⁸² and the Health Strategy¹⁰ recommend reforming the resource allocation methodology, in all cases to take account of need. While quality information, not yet available, is necessary to do this, this thesis presents one framework for a more equitable and possibly more cost-effective method of allocating resources.

The limited research to date on capitation models in Ireland has focused on area based data and has had poor success mainly due to data limitations. The development of a model using individual level data is not unique, as such an approach has been taken in Stockholm County where there are advanced data systems. The framework created in this thesis questions some of the approaches used in the Stockholm model and develops a framework for an Irish model

taking into consideration the structure of the Irish health system and its information technology structure.

7.3 Implications and dissemination of Policy Delphi Study

The cumulative knowledge of the Policy Delphi panel has highlighted the inequities in resource allocation in Ireland. The Government has, in the Health Strategy, acknowledged the weaknesses in the current system of resource allocation. This study has endorsed the Health Strategy objective of reviewing the allocation process in order for it to take account of the specific needs of the local population.¹⁰ It goes further however by suggesting specific ways of doing this. One suggestion was the development and introduction of a needs based resource allocation model.

The study highlighted some discontent among the panellists in relation to the way in which the health services are structured both organisationally and financially with several suggestions for change. Some of these suggestions were seen as unfeasible, but the high levels of consensus for some of the quite radical changes proposed, for example to abolish all Health Boards, perhaps reflect the extent of this discontent. Many of the suggestions however, mirror the objectives and actions in the Health Strategy.¹⁰ The implementation of these objectives and actions, in a timely manner, will contribute to the improvement of some of the inequities in resource allocation. This study was carried out prior to the publication of the Health Service Reform Programme¹¹ and associated reports.^{6 36 82} It is interesting to note that some of the suggestions and views of the panellists are reflected in these reports, for example the abolition of health boards, needs based resource allocation, increased accountability, investment in information systems and restructuring of consultant contracts.

Policy Delphi is a decision analysis tool rather than a decision making tool where the results are used to inform the decisions made by a small group of policy makers.⁸⁹ In this case the policy makers are the resource allocation review team in the Department of Health and Children and ultimately the Minister for Health and Children. While the results of this study were sent to the resource allocation review team, a potential weakness of this study was that it was not carried out in conjunction with these policy makers. Many policy Delphi studies are in fact commissioned by, or carried out by the policy makers.^{93 97} Doing this may have given more weight to the findings although, conversely, the independence of this study may have encouraged more freedom of expression. These results have highlighted the positive attitude

among senior health personnel towards the development of a needs-based resource allocation model. One of the objectives of the Policy Delphi study was to determine if the Policy Delphi methodology is a useful tool for health planning and policy making. This question cannot be fully answered yet as it will depend on whether or not these results are actually used to inform policy. Policy makers will need to further explore the measures where there was a high consensus and then examine which combined measures would make a more equitable resource allocation system.

Assuming a model is introduced in the future, it is likely to be very acceptable to the panellists, who have endorsed this concept in principle in the course of this Delphi survey. Due to the representativeness of the panel, this acceptance could be cautiously extended to the wider health community. If a model is not introduced, the Department of Health and Children will have to give an account as to why the resource allocation methodology is not achieving transparency and why it is not evidence based or needs based, the aims that are expounded in the Strategy.¹⁰ The debate on the process of resource allocation that has been generated through this Delphi study, and the issues of inequity highlighted, will give impetus to this demand for accountability. The potential feasibility problems of a resource allocation model highlighted in this study, from the perspective of those working within the system, will allow policy makers to take account of these potential pitfalls and to avoid them in the development of a model.

To reiterate, the Policy Delphi is a decision facilitation and not a decision making tool. The expert opinion obtained in this study is just one input in the policy formulation process. By considering this with other viewpoints and information then a balance may be assured and final policy can be decided.

No Policy Delphi studies undertaken in Ireland were found in a literature search and few Policy Delphi studies relating to health issues were found internationally. It was considered important to disseminate both the findings from this study and the methodology. A short report of the findings of this Policy Delphi study was sent to all the panellists and some of the findings of this report were also disseminated at public health scientific meetings. In addition a paper has been published by the journal 'Health Policy'.¹³³

7.4 Implications of Benchmarks of Fairness study

A WHO study found that health care reforms are more successful in achieving equity-related objectives, when they are aimed at reforming the supply side of health care, including reforming the resource allocation system.¹⁸⁶ Our study has shown that reforming the resource allocation system in Ireland, through the introduction of a needs-based capitation model, would marginally improve equity in the Irish health system (scored 0.93 out of a maximum of five and a minimum of minus five). It was never envisaged that a maximum score of five would be achieved. This is because the proposed reform concentrates primarily on resource allocation and reform of several other areas of the health system would be required to achieve a score of five. There are several criteria where the proposed reform has little or no effect (Table 4.3, Chapter 4). A criticism that has been levelled at health care reforms is that the majority of health-producing actions do not result from health care specific actions but from intersectoral activities such as education, water and sanitation and housing.¹³⁸ Therefore the benefits resulting from health care reform can only be minimal. Outcomes using the benchmarks were not measured in terms of health producing actions but in terms of an increase in fairness of the overall health system. By putting these benchmarks into the public domain they should generate debate around fairness in the health system generally and particularly in resource allocation and should help to ensure that health care reforms are not solely centred on efficiency considerations.

The Benchmarks of Fairness are a relatively new methodology and this is the first time they have been modified for use in Ireland and actually applied. They remain to be validated through a larger scale application in a more rigorous manner, but they were found to be a useful tool in assessing the potential impact of a proposed health system reform in a predominately publicly funded system. It is recommended that they are used to assess the impact of other proposed or recent reforms, including a reformed resource allocation model, if implemented. They could also be suitable for equity proofing health policies.

The Benchmarks of Fairness study was carried out prior to the development of a framework for a resource allocation model. This meant that the team had to assess the fairness of a conceptual, largely undefined, resource allocation model. The reason for this was to strengthen the case for proceeding to the development of a framework by showing how a resource allocation model could increase health system equity. It is acknowledged however,

that it may have been more beneficial to apply the Benchmarks of Fairness to the hypothetical implementation of the framework described as it may be more readily understood.

7.5 Framework for resource allocation and analysis of master database

Developers of a Canadian resource allocation model recommend that simple more manageable capitation based models should be chosen over more complex ones.⁴³ The framework developed here, which has proposed an individual level data model over an area based model has allowed the development of a manageable model. There is concern about the number of diverse approaches and lack of a universal standard in the development of capitation models. In particular there is concern about how each country '*...suit their own objectives*'.⁴³ The development of a framework for Ireland has produced yet another approach. While this approach was guided to some extent by an existing model (Stockholm County) significant differences, due to different health systems, data sources and questions about their use of regression have made the Irish framework another '*diverse approach*'. The lack of a universal standard is a problem that persists and until more research is done on the actual improvements in equity, and the advantages and disadvantages of any particular model, the number of '*diverse approaches*' will continue. The Irish framework developed in this thesis does attempt to combine the best parts of existing models, for example, choosing to use individual level data rather than area level and including an accessibility index.

The experience in Stockholm has shown that it is very difficult to measure the effects of a resource allocation model often due to the interrelated effects of cutbacks.⁵ In a review of the policy considerations of capitation models, the Canadians stress that there is no difference in the quality or innovation of programmes that have capitation models compared to those that do not.⁴³ Why then are capitation models important? The reason is because equity, openness and transparency and not quality and innovation are the prime objectives, and these will improve with a capitation model. This highlights the need for an effective monitoring and evaluation programme. The Health Information and Quality Authority (proposed in the Health Strategy¹⁰ and Health Service Reform Programme¹¹) will have a role to play here.⁸²

Much of Chapter 6 focused on the creation of a somewhat hypothetical master database. This had several advantages in that it allows the process of analysis of such a database to be explored. Its accuracy or otherwise was not the main focus of this thesis. Others have stated that there are '*...far more important questions to tackle in the field of resource allocation than*

worrying about spurious precision in any formula'.⁶³ These questions relate to how the allocated resources can be best employed to improve and maintain public health. There needs to be a balance between the theoretical rigour of a model and the original aims and objectives of the model as it is very easy to get caught up in the modifications of a model (for example Smith *et al*¹⁷¹) The constant revising and refining of empirically produced formulae has been referred to as '*formula fever*' and it is thought that this is detracting from an examination of how the money is spent.¹⁸⁷ The impact of a resource allocation model should not be justifiable on its formula alone and doing this raises the debate between the normative and empirical approaches to inclusion of data.⁵¹ As approximately 70% of health service funding goes on salaries, a model will be limited in the affect it can have in redistributing those resources unless there is major organisational restructuring. As this is beginning to happen, the impact of a model may become stronger.

Another problem with capitation models is that their introduction may lead to the development of a '*formula industry*' which involves different groups putting forward different approaches, particularly those which favour their own interests. One of the objectives of the development of capitation models was to reduce lobbying of different groups, so if a '*formula industry*' develops then this objective has not been met.⁵⁴

As referred to in Chapter 6, the interpretation of the results should not concentrate on whether some Health Boards are being drastically over or underfunded due to limitations in the data that make these results somewhat unreliable. All Health Boards are likely to argue that they are under funded but it is the relative differences between Health Boards that will be of interest. The results demonstrate, using empirical data, how the framework would work in reality. With this method - even where the overall budget is inadequate - the allocations should reflect the relative health care expenditure needs of citizens.⁴ A potential problem with this approach however, is that health boards can gain only at the expense of others.⁵¹ The main message from the results is that they were produced using a needs based open and transparent methodology. These results have translated the principle of distributing resources in proportion to the relative needs of local populations into practice.

The proposed Logistic regression model performed quite poorly in predicting historic health care costs. The demand for health care is always to some extent unpredictable and the

resulting variability may cause a conflict between efficiency and equity. Risks would be particularly high for smaller hospitals and the proposed Local Health Offices. Negative consequences of this conflict could include offices or hospitals creating large contingency reserves at the expense of services, 'cream skimming' so that they get the healthiest (and therefore cheapest) patients and taking more patients with private insurance.¹⁶⁷ Strategies to counter the risk posed by this unexplained variation include pooling of budgets with other agents, contributing to financial reserves, rationing or delaying the delivery of services, varying user charges, varying local taxes and retrospective renegotiations of the budget, increasing the size of the patient group for which budgets are set, setting budgets for a period of more than one year, and a close examination of the reasons for variations from budgets.¹⁶⁷ Implementation of any of these strategies may threaten equity of access to services and therefore none are ideal in terms of the objective of increasing health system equity.

There are a number of factors that should be considered when developing a capitation model. These include equity, practicality, transparency, objectivity, relevance, stability, responsiveness, evaluability,⁴⁸ validity, acceptability, resistance to manipulation, flexibility, avoidance of perverse incentives and feasibility.⁴³ The framework has not been demonstrated to have all these qualities due to existing and acknowledged data limitations. From this thesis it does however seem to be a more equitable, transparent, objective and relevant method when compared to the status quo. Its acceptability has, in principal, been demonstrated in the Policy Delphi study. The framework was designed to avoid potential perverse incentives but in doing so has also created some. The practicality and feasibility of a capitation model could be questioned, as the current method, based mainly on historical methods, is simple and relatively easy to implement. Stability of the model could also be questioned particularly as the data used in this study produced a model with a poor fit. However, with improved data and further statistical analysis a model is likely to become more stable.

7.6 Information systems

A major assumption in this thesis is that a unique personal identifier will be introduced which will enable a needs based capitation model to be created using individual level data. This assumption is made with the knowledge that the introduction of a unique personal identifier could meet with much resistance in Irish society. A study looking at public awareness of privacy issues in Ireland¹⁸⁸ found that Irish people place a high value on their privacy. Seventy seven percent, 72% and 60% of people rated the privacy of their financial history,

medical records and Personal Public Service numbers respectively as very important. The study also found that there was poor trust of government agencies who hold personal records and an increasing insecurity about data transmitted on the internet. The data protection act currently legislates for personal data which is defined as:¹⁸⁹

'...data relating to a living individual who is or can be identified either from the data or from the data in conjunction with other information that is in, or is likely to come into, the possession of the data controller'.

None of the data used in this study allowed any individual to be identified. However the use of unique personal identifiers would potentially allow individuals to be identified. Data users are required to inform each individual that their data are being used and that an individual has the right to refuse. While there are some exemptions in the data protection act for statistical and research purposes¹⁸⁹ these may need to be strengthened in order to allow the linking of data bases and subsequent analysis of this information for resource allocation.

The announcement of the Health Service Reform Programme in June 2003 is timely as it would be appropriate to include reform of the resource allocation system in the programme. This needs to start with investment in the information systems. The National Health Information Strategy, due to be published later this year, proposes the introduction of unique personal identifiers.¹⁰ Interestingly, there is no mention of this document in the Health Service Reform Programme documents recently released despite the recommendations in these documents for upgrading of data sources.^{6 82} The government also propose to make the legislative changes necessary for the implementation of the National Health Information Strategy.¹⁰

The process of developing and upgrading data sources will require a considerable amount of investment. However, if it results in the implementation of an equitable resource allocation system these costs may seem quite modest and well worthwhile in terms of the increases in efficiency and equity that they would yield.

One of the main problems identified by the Commission on Financial Management and Control Systems in the Health Service was that the capacity of the existing systems to provide relevant, timely and reliable information for linking resources to outputs/outcomes is severely

limited.⁶ Individual cost information is not available but is essential to any review of the system of allocating funds or in deciding where the most cost effective treatment can be obtained for various conditions.⁶ High quality data are vital to facilitate informed decision-making.^{6 11 82} Resources and skills in change management will be needed to obtain maximal value from investment in information systems.⁶

Apart from the recommendation for unique personal identifiers in the pending Health Information Strategy, another positive development in relation to information systems in Ireland is the recent publication of productivity action plans associated with the payment of the benchmarking pay awards to Irish Civil Servants.¹⁹⁰ While some media reports were quite cynical about these action plans others saw their merits, in particular those that pertain to improving the use of information.¹⁹¹ One of the actions of the CSO action plan is to *"...prepare a report on the statistical potential of administrative records for key policy purposes of departmental data holdings of six departments"*.¹⁹⁰ This will lead to an increase in the efficiency of producing official statistic which can be used for policy analysis and policy evaluation. Sharing information across departments will lead to a more integrated cross-departmental approach to the development of policies. As a result these will be more effective in terms of both costs and outcomes. These developments show that the proposal in this thesis to use individual level tax and social welfare data in a resource allocation model could become a reality. The action plan of the Department of Health and Children restates its commitment to publishing the National Health Information Strategy this year and to develop a legislative framework to underpin this.¹⁹⁰

It is worth commenting on a possible scenario where the Health Information Strategy is not published. It has now been delayed for over two years with resourcing issues apparently the main impediment. Without a unique personal identifier the formation of a resource allocation model using individual level data will not be possible. However, as noted earlier, our data sources are not comprehensive enough to allow the development of a small area based resource allocation model. It could be possible for funding to be made available specifically to geocode data (e.g. HIPE and mortality data) to allow the development of a modified version of the York small area model but this fragmented approach to data development is exactly what a health information strategy is designed to avoid. It is therefore recommended

that publication of the Health Information Strategy take place as soon as possible and that appropriate resourcing is made available for its implementation.

7.7 Policy and implementation issues

It is recommended, based on equity and fairness considerations and on the results of this study, that a needs-based resource allocation model be introduced in Ireland as it will make the health care system and, in particular, the resource allocation system more equitable. This would be an important contribution to the pursuit of equity outlined in the national Health Strategy.¹⁰ This recommendation is made with the realisation that any health care reform involves complex policy choices,¹⁹² and that pursuit of equity will not be the only concern of policy makers.

Despite the presence of several policy documents and strategies that put equity to the forefront of Irish health policy there seems to be difficulties in moving from policy to action. Resource constraints, poor information systems, lack of research and difficulties in medium to long term planning and budgeting are impediments to this. Assuming that a robust resource allocation model is developed it is then a government policy decision whether to implement it in full, implement a modified version or to continue with the current system. The latter decision would ignore the several recommendations to government and statements in strategy documents to implement some form of needs based resource allocation. There may be worries however about allocating all resources according to models which have a large amount of unexplained variation and some commentators have suggested that a certain proportion (e.g. 70%) be allocated according to the model and the remainder be allocated based on informed judgement and negotiation.¹⁵³ Others, however, argue that there is no evidence that using informed judgement and negotiation is any better than the model and that these methods are not as transparent as a model.⁴⁵ In the Irish setting it is recommended that any new allocation model be introduced gradually as part of a phased transition process.

Some funding reforms have taken place in the health sector in recent years such as the 1996 Health Amendment Act¹²⁶ which formalised the linking of Health Board service plans to a fixed budget, and the improvements and plans to develop the acute hospital casemix funding programme.¹⁰ While these changes are welcome, they focused on system efficiencies rather than on equity and meanwhile there is no objective needs based element to the resource allocation system. If a resource allocation model is introduced a means will have to be created

whereby the current method of resource allocation, such as Casemix and service plans, are integrated and facilitated. In addition, the composition of the new interim Health Services Executive represents stronger financial and business expertise than heretofore.

The development of capitation models has been described as both a '*...political and a technical undertaking*'.⁴³ This study has attempted to develop a model looking at both the technical end, through the development of a framework, and the political end, through an exploration of the policy implications and conduction of a Policy Delphi study. As with the Policy Delphi study, a potential weakness is that this study was undertaken without explicit political involvement. There are no explicit institutional mechanisms by which the framework recommended in this thesis can be translated into action. This is a generic problem of reports developed outside an explicit policy initiative.¹⁹³

Resource allocation mechanisms will always be contentious.⁵¹ The funding mechanisms used to date in Ireland which is centred around incremental funding to an historic base featuring some bidding for funds and political representations has led to political pressures and precedents which are difficult to diffuse. From a political point of view, resource allocation models may not be popular. Politicians may perceive that they will lose status and votes if they are unable to influence allocations. In order for the national agenda to take precedence over local issues change will have to be accepted.⁷ Having an equitable resource allocation model which leads to geographical equity,⁴⁵ is more transparent for the public and therefore change is more likely to be accepted from a public point of view. Citizens are more likely to accept the taxation burden associated with health care if they can be assured that the funds are distributed equitably. The same is likely to be true of health care practitioners.¹⁶⁷

An interesting concept raised in the literature is that it is cheaper for governments to fund health services than to tackle the underlying causes of deprivation (that ultimately lead to poor health).⁵ Other reforms, in addition to reform of the resource allocation system will be required to make the health system equitable. Once introduced, an appropriate resource allocation model must be monitored and evaluated as it is essential to determine if there are improvements in the effectiveness and appropriateness of health service interventions⁵¹ paying particular attention to health service equity and to health outcomes. The government must take responsibility for ensuring that these resources once distributed are used efficiently

and equitably.⁵⁴ In addition they must comply with their responsibilities to tackle and prevent poor health through the development of other sectors and through the development of a cross-sectoral action plan to improve the health of those who are disadvantaged, similar to the one recently launched in the UK.¹⁹⁴ Attention should increasingly be focused on how resources are used and on examining the effectiveness of resource allocation models.

As capitation models are unrelated to the quantity of services provided there might be a perverse incentive created to underserve a particular population. It is recommended that more research be done on the behavioural responses to combinations of payment systems. In addition actions need to be taken so that care providers cannot benefit financially from this perverse incentive.⁴³

There is a strong feeling in the government that resources should be linked to performance.¹⁰ Whether resource allocation in the health service should be conditional on performance is more questionable. If it is, then areas that perform poorly will be penalised and therefore will be less able to provide services, and thus this area will become more inequitable. However if there are no checks on performance there may be no incentive to improve services. A possible solution would be to adopt a system similar to that in the NHS plan where a 'performance fund' has been established. The money from this fund is allocated according the resource allocation model but its use is restricted if performance is not satisfactory. This principle is termed '*earned autonomy*'.¹⁹⁵

Some health service managers may fear that the introduction of a resource allocation model will lead to instability in receipt of resources as the allocations may change from year to year and following reviews. As one UK local authority manager said '*Though fairness is said to be the most important thing, stability is what makes life bearable*'.¹⁹⁶ Provided that the model is introduced on a phased basis, preferably with multi annual budgeting built in, stability and fairness should be achievable.

The Health Service Reform Programme, announced in 2003 is now underway with the establishment of a Health Services Executive and a National Steering Committee to oversee the reforms.⁸³ It is planned that the Health Boards will be abolished at the end of 2004 although boundaries for the new regions have yet to be decided. Acute hospital services are

due to be rationalised in line with the recommendations of a report looking at ways to meet the EU working time directive for medical staff that will be introduced in August 2004.³⁶ Two pilot areas have been chosen and while implementation has not yet taken place there have been public demonstrations against any degree of downscaling. This may delay the pace of reforms. It is planned to disseminate the findings of this research to the Health Service Executive to inform their decisions into resource allocation methodologies.

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

This research provided background information on capitation models, found strong support in principle for the development and implementation of a needs based capitation model and found that such a model would marginally improve equity in the health service but would greatly improve equity in resource allocation. In addition, it created a framework for a needs based capitation model for resource allocation in Ireland which can be used as a base on which to build further research. This has started the process of developing a pathway to consensus among health service policy makers, planners and funders as to the acceptability of introducing a more equitable system of resource allocation in Ireland. It is important to advance this proposed policy beyond the aspirational to a more goal oriented approach if it is to become a reality. Public policy makers will ultimately decide whether to pursue the development of a model, but in order to adhere to their own commitments the government must implement some reform. If it is decided that a needs based model for resource allocation is the option to be taken, it is imperative that there is commitment to funding the development and implementation of such a model. It must also be remembered that the implementation of a needs based resource allocation model does not absolve the government from ensuring that these resources are used appropriately.

This thesis is primarily intended to encourage debate on the importance of a needs based weighted capitation model for resource allocation and to overcome the likely initial doubts as to the feasibility of such an approach in Ireland. It has produced a possible template for resource allocation as distinct from offering a prescription and has begun to set the parameters within which the model needs to be defined. It is recognised that more work would be required in order to translate the proposed framework into a robust working model for resource allocation. This would include constructing an accurate master database, constructing models and testing whether a combined or fragmented model would be best and then validating the models. However, it is believed that such an exercise is both desirable and timely both due to the pending National Health Information Strategy and the Health Service Reform Programme. To date, little debate has taken place in relation to making the system of resource allocation more equitable, mainly due to the realisation that our data systems were inappropriate for such a development. However, this thesis can open the debate and has

shown how, with some investment in information systems, the development of a more equitable method for resource allocation in the form of a needs based weighted capitation formula is possible.

The research hypothesis, as stated in the introduction, was that reform of the current method of resource allocation in the health service in Ireland will make the health system more transparent and in particular more equitable. This thesis has shown that a reform, in the form of the introduction of an individual level resource allocation model, will undoubtedly make the health system more transparent. This was shown through the step by step process of the model where the effect of each variable could be clearly seen and where the calculation of the resources finally allocated to each health board was unambiguous. Determining whether this model would make the health system more equitable was more difficult. The participants of the Delphi study, with a high consensus, thought that it would and the Benchmarks of Fairness component of the study also showed that a resource allocation model would make the health system fairer. However this could not be proved irrefutably as the empirical data were not of a high enough quality to fully implement the model and, until this happens in real time, and is assessed and evaluated over a period of several years, it will not be possible to determine whether the health system is more equitable.

The aim of this study was to examine the desirability and feasibility of developing and introducing a more equitable model for health care resource allocation in Ireland. The policy Delphi and the Benchmarks of Fairness study examined the desirability of this aim and found it desirable that a needs based resource allocation model be introduced. The remainder of this thesis examined the feasibility of a needs based model and found that in principle it would be feasible to develop and implement but this could not be tested fully due to data limitations. The recommendations below therefore recommend the introduction of a needs based resource allocation model but also recommend further research to test the model fully.

The approach described in this thesis centred on an individual level resource allocation model. Even if a unique personal identifier were introduced today a realistic expectation of when a working individual level model could be ready to implement would be five or six years due to the time taken to prospectively collect data and test models. It needs to be

considered therefore whether some sort of modified model should be implemented in the interim. It is recommended below that a modified individual level model be introduced.

8.2 Recommendations

The main recommendations are presented first. In order to implement these recommendations a number of steps need to be taken. These are outlined below followed by some other recommendations resulting from this research.

Main recommendation

- An individual level needs based capitation model should be introduced in Ireland as a more equitable method of health system resource allocation. It is recommended that this model is based on the framework developed in this thesis and that it should be introduced on a gradual phased basis to provide stability in year-on-year allocations.
- A realistic time frame for the implementation of an individual level model, given that a unique personal identifier has to be introduced, data have to be collected and accurate costings have to be performed, would be 5 to 10 years. It is therefore recommended that in the interim a model adjusted for age, sex and social class, available at the individual level, should be developed and introduced. This should be refined as more data becomes available.

Development of a model

- As the framework developed in this thesis was only partially tested and was only tested for inpatient allocations it will require further testing for both the acute hospital and community care sectors. Further research may result in changes to the framework.
- Some adjustments for unmet need will need to be incorporated into the model.
- Frameworks and subsequently models need to be developed for the long-stay care population and for the disability sector.
- The framework needs to be disseminated in order to get feedback as to its acceptability. This will be done through publications and presentations at relevant scientific meetings and as a discussion document to the Health Services Executive Board

Further research

- Further research is required to clarify the variations in need for and utilisation of health services. The objective of this will be to identify how resources can be used more

equitably and efficiently. Monitoring and evaluation of the impact of the needs based capitation model on equity and efficiency in the health system will also be required.

- Health equity audits (that focus on how fairly resources are distributed in relation to the health needs of different groups) should be mainstreamed into planning, delivery and performance monitoring of all government systems.
- Further research is required on the behavioural responses of the health service and health service managers to combinations of payment systems. This could be done in a prospective manner and would aim to avoid the creation of perverse incentives.
- The implications of excluding those with private insurance in the construction of the model needs to be examined further. Alternative strategies for handling the public private mix will need to be devised for the community care sector.

Data

- Publication of the Health Information Strategy should be a government priority and sufficient resources should be made available for its implementation.
- A unique personal identifier, to be used for each person on all government and health services data, including census data, is required. This will require appropriate legislation.
- Improvements are required in patient costing data so that an exact cost per patient can be calculated. This will improve the depth of individual level analysis possible.
- Data collection and recording should be standardised nationally. The Health Information and Quality Authority will have a role to play here.
- Research is required into data sources that will decrease reliance on census based data.
- Geocoding of data should become more widespread, particularly for data where individual level data will not be available e.g. some census variables.
- The disability data collected for the first time in the 2002 census needs to be examined to see if it would provide a good proxy variable for morbidity.

Policy Delphi

- The use of Policy Delphi methodology should be promoted as it is an effective but underused tool.
- Where possible, policy makers should be included in the design and commissioning of Policy Delphi studies, provided that independence is maintained.

Benchmarks of Fairness

- Validation of the Benchmarks of Fairness is recommended so that their use can be expanded to assess the impact of all health care reforms in publicly funded systems.
- Once a needs based resource allocation model is implemented the Benchmarks of Fairness should be used to assess the fairness of the actual reform and compare the two findings. This will also help to validate the tool.

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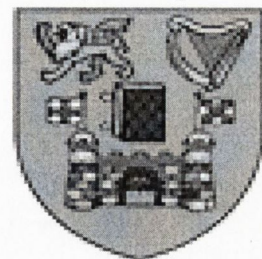
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Appendix 1 Delphi invitation letter, information sheet and reply slip sent to 62 potential panellists.

Appendix 1a: Delphi invitation letter

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Date

Dear (potential panellist's name);

I am writing on behalf of one of my colleagues, Ros O'Loughlin, who is a Health Research Board funded health services research fellow in our department. She is investigating ways of improving equity in resource allocation in the Irish health service. I suggested you as a potential member of an expert panel she is compiling in order to examine the current method of resource allocation and perhaps to suggest modifications or changes to the method. This panel will consist of senior Irish health service funders, providers, advisors and representatives of service users. Consequently I feel that your experience and insights will make a valuable contribution to this novel study.

The method to be used, which you may be aware of or have used previously, is called Delphi. It is a method for structuring a communication process, which allows a group of individuals to deal with a complex problem, through provision of feedback, without the group having to meet. It involves a series of three questionnaire rounds. We estimate that the first round will take half an hour to complete and the subsequent rounds, which will be roughly a month apart, will take 15 minutes to complete. An information sheet explaining the Delphi methodology is attached.

Your identity will remain confidential and your name will only be known to the principal researcher who is Ros O'Loughlin. All the information collected will be treated in the strictest confidence. We will provide you with a report on completion of the study.

I do realise that this is an imposition on your very scarce time and that it will require a certain commitment. Nonetheless it is a novel and hopefully important piece of research and I would be very grateful if you could afford the time to participate in this study. Enclosed is a reply slip where you can indicate your interest in the study. Please return this in the pre-paid envelope provided and do not hesitate to contact me if you require additional information.

With best wishes

Yours Sincerely

(Name of the member of the Delphi research committee best know to this person)

(This letter was adapted for invitations sent by R O'Loughlin)

Background to Delphi

Delphi was originally developed as a forecasting tool in the 1950's particularly for military and technological programmes. Its use in health and social services has been recorded from the 1960's. One of its common uses is in consensus development. In the context of this study however exploration of the issues rather than forming consensus is the aim.

Selection of panellists

Unlike other studies this method does not involve forming a sampling frame or drawing a random sample. The panellists are chosen and invited to participate based on their known level of knowledge, interest in, and experience of the issue - in this case resource allocation and inequity.

Process

The process involves a series of iterative questionnaire rounds with feedback to participants between rounds. It is regarded as both a qualitative and quantitative methodology. It is often likened to a series of committee meetings but without the members having to meet face to face. The first questionnaire has open questions where the panel are requested to express their views on more equitable alternatives to the current resource allocation process. Statements will emerge from the analysis of this questionnaire and panellists will be asked to state their level of agreement with each statement. The third round will feedback the average group response and ask panellists to confirm or modify their individual responses in view of the average response. As appropriate, particularly where views may deviate widely from the general view, participants may be asked to give an explanation or justification for their responses.

Confidentiality

All answers will be confidential. Only the principal researcher will have access to your responses. This is necessary in order that your response can be fed back to you in subsequent rounds. You will not know what views individual members of the panel have contributed. It is hoped that this will encourage participants to express views that are perhaps different to the main view and also prevents any sort of group dominance that may exist in a face-to-face meeting.

This study

The aim of the Delphi method in this study is to explore and assess the numerous issues involved in pursuing a common policy for improving equity in the resource allocation process in the Irish health service. Resource allocation in this context refers to recurrent or non-capital expenditure. This is part of a larger study the aim of which is to:

Examine the desirability and feasibility of developing and introducing a more equitable alternative model for health care resource allocation in Ireland.

Your replies will be used to inform the next stage of the study that will involve designing an alternative or modified method of resource allocation in Ireland.

Ref. no.	REPLY SLIP
Name _____	
I agree to participate ☐	
I would prefer to use the following method of communication:	
- Postal questionnaire ☐ - Electronic questionnaire ☐ please provide your e-mail address _____ - Dictaphone ☐ (tapes will be provided)	
I am unable to participate but would like to propose someone in my place ☐	
Name and contact details of alternative person _____	

I am unable to participate ☐	

Appendix 2 Round one questionnaire with instructions for completing.

Instructions

Please read through all three questions before beginning. Although you may find the questions are very broad this is part of the initial, ideas generation process of the Delphi Method. You may write as little or as much as you like for each question, either on screen under each question or, if printing, using additional paper.

Clarification of terminology

Resource allocation

In this context resource allocation in the health services refers to recurrent or non-capital expenditure i.e. the yearly allocations to health boards and hospitals for all costs.

Equity

There are several possible definitions of equity. In order that questions are somewhat standardised I would ask you to consider this definition of equity used in the context of resource allocation in the health services:

"Equality of expenditure for equal need"

If you agree with this working definition please proceed to Question One. If you disagree please give your reason and an alternative definition if any below and then proceed to Question One using your own definition.

Round one questionnaire

Question 1

Do you believe that the current methods of resource allocation in the Irish health service are equitable? Please give reasons for your answer.

Question 2

If you consider that there are inequities in the resource allocation process in Ireland, please suggest any alternatives, or improvements, to the resource allocation process that you feel would better address these inequities.

Question 3

In relation to your answer to question 2 above please discuss, for each alternative or improvement suggested, how feasible their implementation would be.

THANK-YOU

Appendix 3 Round two questionnaire with instructions for completing.

Definition

Several panellists made comments on the definition of equity - '*equality of expenditure for equal need*' proposed in round one. While most were happy with the definition several quite rightly pointed out that this definition is limited, as it does not include the following issues:

- Equal access for equal need
- Equal utilisation for equal need
- Moral / value judgements
- The fact that expenditure is not an absolute comparator
- Differences between real need, felt need and expressed demand
- No focus on whether care is appropriate, timely, of good quality or achieves positive health outcomes
- Lack of inclusion of capital expenditure
- The difficulty in measuring need making this definition an aspiration

A separate Delphi study would be required to achieve any sort of consensus on a definition of equity. Therefore this questionnaire will concentrate on the sections outlined below.

Instructions and layout

The questionnaire is divided into four sections (A-D). While most questions involve using the importance, desirability and feasibility rating scales (see previous page), question 51 (section B) involves a ranking exercise and section D uses an agreement scale. The questionnaire layout is outlined in the table below. Throughout the questionnaire you are required to place a number in the box opposite each statement indicating where you place that statement on the particular scale.

For those of you who feel that it is not possible to say whether the system of resource allocation is equitable, I invite you to complete the questionnaire from your perspective. There is space at the end for any comments or clarifications that you may wish to make on either round one or round two.

Questionnaire layout

Section	Title	Questions	Rating scale
Section A	Stated reasons for inequity or equity	1 - 43	Importance
	1.1 Six sub headings		
	1.2 One sub heading		
Section B	Suggestions for alternatives or improvements to the current system of resource allocation	44 - 81	Desirability & Feasibility
	• Nine sub-heading		
	• Ranking exercise	53	Ranking
Section C	Criteria for a resource allocation system	82 - 93	Importance
Section D	Policy and planning statements relating to resource allocation	94 - 111	Agreement

Round two questionnaire

Section A Stated reasons for inequity or equity (Feedback from Q 1 Round 1)

Section A is divided into two parts
1.1 Reasons given why the current system of resource allocation is believed to be **inequitable** (6 headings).
1.2 Reasons given why the current system of resource allocation is believed to be **equitable** or have some elements of equity.

1.1 Reasons for inequity.
*Please indicate how **important a reason for inequity in resource allocation** you attach to each statement using the guide below.*

Importance (I) 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or NJ = No judgement

Reason 1. Relating to type of health coverage (GMS, private etc.)

		I
1	GMS cardholders generally spend longer on waiting lists and have poorer access to health services than those with private insurance.	
2	The inclusion of all people over 70 years in the GMS is unfair.	
3	Those just above the GMS income eligibility limit have to pay for their GP and medicines and have problems in accessing associated social support services.	
4	Universal access is not available at primary health care level.	
5	Universal access is not available, in practice, to secondary health care.	
6	Those with private health insurance have better access to health services.	
7	The tax rebate on private health insurance contributions exacerbates inequities.	

Reason 2. Relating to lack of needs based allocations

		I
8	There are insufficient data on which to analyse health and health care needs.	
9	There is no evidence of any comparative analysis at national level to assess relative needs of individual regions based on objective criteria.	
10	Resources are targeted towards high profile services (e.g. waiting lists and cancer services) at the expense of community and mental health services.	
11	There are geographical inequities with regard to the provision of higher quality services.	
12	There are geographical inequities with regard to access to services.	
13	Casemix is not linked to need or outcomes	

Reason 3. Relating to a lack of transparency in resource allocation

		I
14	Resource allocation is largely based on varying incremental adjustments to a historical base.	
15	The procedures for allocation of resources are not transparent (e.g. no published methodology or explicit formula).	
16	Casemix is open to manipulation.	

Reason 4. Relating to external influences

17	Resource allocations are often based on political decisions / interests.	I
18	Resource allocations are sometimes based on lobbying from pressure groups.	
19	Exclusion of the socially, educationally and economically disadvantaged individuals and communities from involvement in decision making in Ireland has an adverse effect on their health and their ability to access health services.	

Reason 5. Relating to management and funding systems

20	Corporate management does not have a culture of accountability.	I
21	There is over provision of services in some areas.	
22	There is no agreed minimum level of service that should be available in each health board.	
23	Multi-annual planning and budgeting does not exist so the system cannot be responsive to those in need and cannot encourage strategic planning for change.	
24	The lack of a clear distinction between funders and providers presents a potential conflict of interest.	
25	There is no compensation for the flow of patients between health boards with higher costs experienced in some geographical areas.	
26	The health care system is driven by the need to stay within budget.	
27	Those who overspend are frequently 'bailed out' at the expense of those who have kept budget.	
28	The public sector is slower to respond to changes in technology than the private sector.	
29	The current method of resource allocation rewards those who already have a lot of resources.	
30	The current system, which funds GPs individually, does not allow for the development of a comprehensive primary care infrastructure, particularly in disadvantaged communities.	

Reason 6. Relating to audit, monitoring and evaluation

31	Allocations are not linked to key performance indicators or health gain.	I
32	Allocations are not linked to the volume of work done.	
33	Allocations are not linked to health impact assessment.	
34	Allocations are not linked to evidence based health care.	
35	The system does not take account of supply and demand changes.	
36	There is no examination as to the equity or otherwise of the base level of funding/ resources in each area.	
37	There is a lack of hard information to determine whether the system is equitable and what the benefits are arising from resources invested.	

1.2 Reasons for equity or elements of equity

Please indicate how important a reason for equity you attach to each statement using the importance scale shown below.

Importance (I) 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or NJ = No judgement

		I
38	Many GPs have both public and private patients on their lists who are generally seen on the basis of clinical need.	
39	It could be that resources are allocated equitably by chance.	
40	A standard costing formula (i.e. adjusted for population) is used in the allocation of development funds for services for people with a disability.	
41	The government's 'No Policy Change' (NPC) process provides, over a 3-year period, the roll-over costs of new developments and can be regarded as meeting some of the needs of a multi-annual planning process at national level.	
42	Each health board represents one funder who is also a provider of local services (Eastern Region excepted). This leads to stability and best practice on service integration.	
43	The current system has low administration costs and is easier to implement than any alternative system.	

Section B Suggestions for alternatives or improvements to the current system of resource allocation
(Feedback from Q 2 & 3 in round 1)

Suggestions made by the panellists for changing or refining the system of resource allocation, grouped under 9 headings, are listed below. Please indicate how desirable and how feasible you consider each suggestion to be, in relation to improving equity in resource allocation, using the guide below.

Desirability (D) 1=Very Desirable, 2=Desirable, 3=Undesirable, 4=Very Undesirable or NJ = No judgement

Feasibility (F) 1=Very Feasible, 2= Possibly Feasible, 3=Possibly Unfeasible,
4=Very Unfeasible or NJ = No judgement

Suggestion 1. Relating to development of and implementation of a resource allocation formula based on need

		D	F
44	Develop and implement a national resource allocation formula for the health services based on actual objective resource need.		
45	Any Resource allocation formula should start with a zero-base budget (i.e. all areas start with nothing and are funded on the basis of need with past allocations ignored).		
46	Any needs based resource allocation formula should take a sectoral approach (i.e. separate formulae for different groups e.g. acute, elderly, children), decided at central level.		
47	Needs based resource allocations should be from central (Dept. of Health) to local level (health boards) and redistributed of these resources should then be decided at local level.		
48	Needs based resource allocation should be used for new developments rather than existing services.		
49	A needs based resource allocation formula should be developed from data derived from a population survey.		
50	A needs based resource allocation formula should be developed from, individual level, nationally available data sources.		
51	A needs based resource allocation formula should be developed from small area level data.		

52	A needs based resource allocation formula should be developed from the simulation of needs data as a substitute for missing/incomplete data.		
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Suggestion 1 continued

Q53. The panel provided the following list of variables to be included in the development of any **needs based resource allocation formula**. Assuming that data on all these variables are available, please rank from 1 to 10 the factors that you consider should be included in such a formula. Give 1 to the factor that you consider to be most important and please do not give the same rank to more than one variable.

Rank	
	Demography (e.g. population size, age and sex)
	Socio-economic deprivation
	Social exclusion
	Rurality / geographical access
	Population density
	Mortality data
	Morbidity data (derived independently of health care utilisation data)
	Disability data
	Health status (e.g. self reported health states)
	Level of complexity of work done
	Flow of work across boundaries (e.g. health board boundaries)
	Differences in purchasing power in different areas
	Differences in system capacity (e.g. infrastructure, staffing levels, size of organisation & management structure)
	Differences in costs between facilities (e.g. teaching vs. non-teaching hospital)
	Best practice in provision of services
	Performance indicators and measurements of health gain
	Differences in the level of service provision across areas/ regions with regard to an established norm.
	Levels of private care
	The proportion of privately insured persons

Section B continued

Please proceed with suggestions using the desirability and feasibility rating:

Desirability (D)	1=Very Desirable, 2=Desirable, 3=Undesirable, 4=Very Undesirable or NJ = No judgement
Feasibility (F)	1=Very Feasible, 2= Possibly Feasible, 3=Possibly Unfeasible, 4=Very Unfeasible or NJ = No judgement

Suggestion 2. Relating to 'closing the gap' between under and over provision of services

		D	F
54	Analyse the existing levels service provision and use this information to positively discriminate funding allocations to redress the balance of under provision in base allocations within the reality of finite resources.		

Suggestion 3. Relating to financial restructuring

		D	F
55	There needs to be clear lines of separation between funder and provider roles with a single payer (purchaser).		
56	Any resource allocation system needs to move to a zero-based budgeting system on a phased basis.		
57	A specific percentage of GDP / GNP needs to be committed to health spending.		
58	Multi-annual budgets are required to allow improved planning and empowerment of managers.		

59	Costing systems and independent efficiency reviews should be implemented and monitored to ensure that funding (particularly core funding) is adequate and achieves both equitable service and value for money.		
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Suggestion 4. Relating to Health Board restructuring

		D	F
60	Health board structures should be replaced.		
61	The number of health boards should be reduced in the interest of efficiency and rational decision making.		
62	Each health board should be made responsible for treatment of all patients resident in that board regardless of where their treatment takes place (i.e. money follows the patient but the patient maintains choice).		
63	Panels of health experts and the lay public should be formed in each Health Board area to advise Health Boards.		

Suggestion 5. Relating to inequities caused by local politics

		D	F
64	Inappropriate local political influence should be removed from health resourcing decisions.		

Suggestion 6. Relating to secondary care

		D	F
65	Consultants' contracts should be restructured so that they are salaried with the objective of reducing incentives to concentrate on private practice at the expense of their public patients.		
66	There should be common waiting lists for secondary care.		
67	Resources should be allocated according to completed episodes of care, rather than the number of patients on a waiting list, to avoid rewarding inefficiencies.		
68	Casemix funding of acute hospitals should be continued with an increase in the proportion of the budget adjusted according to casemix.		

Suggestion 7. Relating to universal funding & access

		D	F
69	There should be universal access to well structured and well funded primary care services		
70	There should be universal access to well structured and well funded primary and secondary care services		
71	Universal entitlement should be removed from those who can afford to pay and universal access only given to those who are eligible based on ability to pay.		
72	Funding of health services should be insurance based.		
73	The income eligibility limit should be raised for medical cards.		
74	All children should be eligible for medical cards		

Suggestion 8. Relating to increasing resource allocation knowledge (including the public)

		D	F
75	A wide debate is required to increase the knowledge base of the public on resourcing issues particularly looking at the gap between public expectations and a finite health budget.		
76	Greater involvement of the general public in prioritisation of services would weaken the power of the politician and help to stem the ad hoc development of services.		

77	The skills and knowledge base of managers, health professionals and the community on the issues surrounding equitable resource allocation need to be increased.		
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Suggestion 9. Relating to health information systems

		D	F
78	Major investment is needed in health information systems.		
79	Information deficits need to be addressed in a systematic manner.		
80	Unique personal identifiers are required to facilitate a universal patient registration system and thereby access to better individual level data.		
81	More good quality data on current resource use, using a common data set from both public and private sectors, is required.		

Section C Criteria suggested for any resource allocation system

The statements below from the panel are the suggested criteria under which resources should be allocated. Please indicate how important you think each of the criteria are in relation to improving equity in resource allocation, where:

Importance (I) 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or NJ = No judgement

		I
82	Allocation of resources should be linked to services that are evidence based.	
83	Allocation of resources should be linked to services that have clear aims and meet a defined equitable standard of service (measured using service plans, performance indicators, specific equity targets and/or benchmarking).	
84	Allocation of resources should be linked to services that have a nationally agreed prioritisation process.	
85	Allocation of resources should be linked to services that are part of a national policy framework and meet the objectives of the national health strategy.	
86	Allocation of resources should be linked to services where there is integration of care delivery between services.	
87	Allocation of resources should be linked to outcomes, particularly those that maximise health benefits.	
88	Allocation of resources should be based on achieving value for money.	
89	Any resource allocation system should be transparent (even if this is at the expense of using a better but more complicated methodology).	
90	Allocation of resources should be linked to formal agreements on service access.	
91	Allocation of resources should be linked to health impact assessment.	
92	Any new resource allocation formula needs to strike a balance between curative services and broader public health and health promotion initiatives.	
93	Resource allocation planning should be inclusive of all stakeholders (including local communities and marginalised groups) and based on partnership.	

Section D Policy and planning statements relating to resource allocation

Panel members made the following statements that generally relate to policy and planning. They do not fit into any other category but are considered important to include in this feedback. Please indicate your level of agreement with each statement where:

Agreement (A) 1=Strongly agree, 2=agree, 3= Disagree, 4=Strongly Disagree, or NJ = No judgement

		A
94	The method of resource allocation is unimportant in the equity debate - what is needed is increased capacity in beds and manpower.	
95	Emphasis needs to be put on developing a service planning culture, where care is planned in a targeted manner according to need, rather than on developing an actual formula used to allocate resources.	
96	It is unlikely that any radical change to the funding system or method of resource allocation will take place due to the high cost and the huge structural and organisational difficulties that would be experienced.	
97	Achieving equity in resource allocation is meaningless unless accompanied by equity of service delivery.	
98	Resistance to a needs based resource allocation formula from potential losers means that this method is not an option	
99	The additional resources required to take account of the concept of equal access for equal need will not be forthcoming.	
100	The public want a quick fix solution to improve equity in health care and will not be prepared to wait for the benefits of a long-term strategy.	
101	The system should not be changed until it is ensured that any new system is fairer and more transparent.	
102	The current method of resource allocation should be continued as there is a lack of accurate data on which to base change.	
103	Any change to the system should be delayed until there is a review of health board organisation and structure.	
104	It will be impossible from a political perspective to close or downscale any services even if they are considered to be over-provided.	
105	The focus of equity should be on the health outcomes rather than on the baseline needs	
106	The use of a more refined resource allocation process would assist in the subsequent evaluation of health expenditures.	
107	A needs based, more refined, resource allocation process will not necessarily lead to a scientific answer but will provide better informed judgements on allocations to health boards and a rational for variation between boards.	
108	Our health system should be based on the right to health care rather than on the current eligibility for health care.	
109	Casemix is a broadly equitable basis of allocation.	
110	The tax-based system is equitable as a method of collecting funding.	
111	The GMS needs to be reformed and restructured as a component of a comprehensive community based primary health care service.	

FINALLY

If you would like to make any comments please do so here. **THANK YOU**

Appendix 4 Scaling instructions (Rounds 2 & 3) ⁶

IMPORTANCE (Priority or Relevance)

Very Important 1	A most relevant point First-order priority Has direct bearing on major issues Must be resolved, dealt with, or treated
Important 2	Is relevant to the issue Second-order priority Significant impact but not until other items are treated Does not have to be fully resolved
Slightly important 3	Insignificantly relevant Third-order priority Has little importance Not a determining factor to major issue
Unimportant 4	No priority No relevance No measurable effect Should be dropped as an item to consider

DESIRABILITY (Effectiveness of Benefits)

Very Desirable 1	Will have a positive effect and little or no negative effect Extremely beneficial Justifiable on its own merit
Desirable 2	Will have a positive effect and little or no negative effect Beneficial Justifiable as a by-product or in conjunction with other items
Undesirable 3	Will have a negative effect Harmful May be justified only as a by-product of a very desirable item, not justified as a by-product of a desirable item
Very Undesirable 4	Will have a major negative effect Extremely harmful Not justifiable

FEASIBILITY (Practicality)

Very Feasible 1	No hindrance to implementation No research and development required No political roadblocks Acceptable to the public
Possibly Feasible 2	Some indication this is implementable Some research and development still required Further consideration or preparation to be given to political or public reaction
Possibly Unfeasible 3	Some indication this is unworkable Significant unanswered questions
Definitely Unfeasible 4	All indications are negative Unworkable Cannot be implemented

No judgement (NJ) can be used if you feel you do not have the necessary knowledge to reply

Appendix 5 Round three questionnaire with instructions for completing.

You are requested to complete this questionnaire in the same way as for round two but taking account of the group median score and the inter-quartile range (G) and your own score (Y) from round two. You are asked to consider your score in light of the group median and then re-rate each statement. An example is given below.

Example

Please rate the level of importance of this statement in relation to inequity in resource allocation using the importance rating scale

		G	Y	I
Q7	The tax rebate on private health insurance contributions exacerbates inequities.	2 1-3	1	

The median is the value that comes halfway when the data are ranked in order. In this example it is 2 (box G)
The Inter-quartile range (IQR) is the range within which 50% of the responses lie. In this example it is 1 to 3 (box G). This means that when all the possible responses (i.e.1 to 4) were ranked the mid point was 2 and at least 50% of the responses were between one and three. In this example the panellist gave a score of 1 in round two (box Y). The blank box is for the round 3 score (box I). You are requested to complete box I for each question.

In this example **if your original rating was 2** then you are the same as the group median. You can either give a rating of 2 again or change your answer if you wish.

In this example **if your original rating was 1 or 3** you are within the inter-quartile range and similar to the main body of the group. You can give the same rating or change your answer if you wish.

In this example **if your original rating was 4** (see box Y below) you are different from the main group of panellists. You may change your answer or you can give the same answer. If you give the same answer you **may** be asked to give a reason why you are different from the main group. This will be indicated in the questionnaire by a star * (see below).

		G	Y	I
Q7	The tax rebate on private health insurance contributions exacerbates inequities. *If you rate this answer 4 today please indicate why on page 13	2 1-3	4	*

NB
You do not have to make any changes if you are happy with your original scores. Some people may be different from the main group of panellists for several statements. While I would welcome as many reasons you can give why your score is different, if you are constrained for time **it is much more important that you complete the ratings for round 3** and return the questionnaire without any reasons.

Layout

The questionnaire is again divided into four sections (A-D) with the same rating scales; importance, desirability, feasibility and agreement. Question 53 (section B) asks you to rank the top 10 items that were identified from round two.

Questionnaire limitations

A few panellists mentioned that they found some of the statements difficult to rate because they weren't in context, had no time-scale, were too open to different interpretations and because they found the particular rating scale inappropriate. I accept all the limitations that were pointed out, part of which are due to the difficulties in condensing the breath of information provided in round one. Unfortunately, in order for rounds two and three to be comparable, it was not possible to change the format of the questionnaire. I would ask you to rate as many statements as you can within the limitations of the questionnaire. The option of 'No Judgement' is still available to you. There is space at the end for any comments or clarifications that you may wish to make.

Thank you again for taking the time to complete this questionnaire. A final report will be sent to you.

Appendix 5 continued. Round three questionnaire

Section A Stated reasons for inequity or equity (Feedback from Q 1 Round 1)

Section A is divided into two parts

1.1 Reasons given why the current system of resource allocation is believed to be **inequitable** (6 headings).

1.2 Reasons given why the current system of resource allocation is believed to be **equitable** or have some elements of equity.

1.1 Reasons for inequity.

Please indicate how **important a reason for inequity in resource allocation** you attach to each statement using the guide below and taking into consideration the group median and inter-quartile range (**G**) and your own score from round 2 (**Y**).

Importance (**I**) 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or NJ = No judgement

Reason 1. Relating to type of health coverage (GMS, private etc.)

		G	Y	I
1	GMS cardholders generally spend longer on waiting lists and have poorer access to health services than those with private insurance.	1 1-1	1	
2	The inclusion of all people over 70 years in the GMS is unfair.	3 2-4	1	
3	Those just above the GMS income eligibility limit have to pay for their GP and medicines and have problems in accessing associated social support services.	2 1-2	1	
4	Universal access is not available at primary health care level.	2 1-3	3	
5	Universal access is not available, in practice, to secondary health care.	2 1-2	2	
6	Those with private health insurance have better access to health services.	1 1-2	2	
7	The tax rebate on private health insurance contributions exacerbates inequities. <i>*If you rate this answer 4 today please indicate why on page 11</i>	2 2-3	4	*

Reason 2. Relating to lack of needs based allocations

		G	Y	I
8	There are insufficient data on which to analyse health and health care needs.	1 1-2	1	
9	There is no evidence of any comparative analysis at national level to assess relative needs of individual regions based on objective criteria. <i>*If you rate this answer 4 today please indicate why on page 11</i>	2 1-2	4	*
10	Resources are targeted towards high profile services (e.g. waiting lists and cancer services) at the expense of community and mental health services.	1 1-2	1	
11	There are geographical inequities with regard to the provision of higher quality services.	2 1-2	2	
12	There are geographical inequities with regard to access to services.	2 1-2	2	
13	Casemix is not linked to need or outcomes	2 1-3	2	

Reason 3. Relating to a lack of transparency in resource allocation

		G	Y	I
14	Resource allocation is largely based on varying incremental adjustments to a historical base.	1 1-1	1	

15	The procedures for allocation of resources are not transparent (e.g. no published methodology or explicit formula).	1 1-2	1	
16	Casemix is open to manipulation.	2 1-3	1	

Reason 4. Relating to external influences

		G	Y	I
17	Resource allocations are often based on political decisions / interests.	1 1-2	1	
18	Resource allocations are sometimes based on lobbying from pressure groups.	2 1-2	1	
19	Exclusion of the socially, educationally and economically disadvantaged individuals and communities from involvement in decision making in Ireland has an adverse effect on their health and their ability to access health services.	2 1-3	3	

Reason 5. Relating to management and funding systems

		G	Y	I
20	Corporate management does not have a culture of accountability. <i>*If you rate this answer 4 today please indicate why on page 11</i>	2 2-3	4	*
21	There is over provision of services in some areas.	2 1-3	3	
22	There is no agreed minimum level of service that should be available in each health board.	2 1-2	3	
23	Multi-annual planning and budgeting does not exist so the system cannot be responsive to those in need and cannot encourage strategic planning for change.	1 1-2	2	
24	The lack of a clear distinction between funders and providers presents a potential conflict of interest.	2 2-3	3	
25	There is no compensation for the flow of patients between health boards with higher costs experienced in some geographical areas.	2 2-3	1	
26	The health care system is driven by the need to stay within budget.	2 1-3	1	
27	Those who overspend are frequently 'bailed out' at the expense of those who have kept budget.	2 2-3	3	
28	The public sector is slower to respond to changes in technology than the private sector.	2 2-3	3	
29	The current method of resource allocation rewards those who already have a lot of resources.	2 1-3	3	
30	The current system, which funds GPs individually, does not allow for the development of a comprehensive primary care infrastructure, particularly in disadvantaged communities.	1 1-2	2	

Reason 6. Relating to audit, monitoring and evaluation

		G	Y	I
31	Allocations are not linked to key performance indicators or health gain.	2 1-1	1	
32	Allocations are not linked to the volume of work done.	2 2-3	3	
33	Allocations are not linked to health impact assessment. <i>*If you rate this answer 4 today please indicate why on page 11</i>	2 1-2	4	*
34	Allocations are not linked to evidence based health care.	2 1-2	2	

35	The system does not take account of supply and demand changes.	2 1-2	3	
36	There is no examination as to the equity or otherwise of the base level of funding/ resources in each area.	1 1-2	2	
37	There is a lack of hard information to determine whether the system is equitable and what the benefits are arising from resources invested.	1 1-2	3	

1.2 Reasons for equity or elements of equity

Please indicate how **important a reason for equity in resource allocation** you attach to each statement using the importance scale shown below and taking into consideration the group median and inter-quartile range (**G**) and your own score from round 2 (**Y**).

Importance (**I**) 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or NJ = No judgement

		G	Y	I
38	Many GPs have both public and private patients on their lists who are generally seen on the basis of clinical need.	1 1-3	1	
39	It could be that resources are allocated equitably by chance.	3 3-4	3	
40	A standard costing formula (i.e. adjusted for population) is used in the allocation of development funds for services for people with a disability.	2 2-2	NJ	
41	The government's 'No Policy Change' (NPC) process provides, over a 3-year period, the roll-over costs of new developments and can be regarded as meeting some of the needs of a multi-annual planning process at national level.	2 2-3	2	
42	Each health board represents one funder who is also a provider of local services (Eastern Region excepted). This leads to stability and best practice on service integration.	3 2-3	4	
43	The current system has low administration costs and is easier to implement than any alternative system.	3 2-4	2	

Section B Suggestions for alternatives or improvements to the current system of resource allocation
(Feedback from Q 2 & 3 in round 1)

*Suggestions made by the panellists for changing or refining the system of resource allocation, grouped under 9 headings, are listed below. Please indicate how desirable and how feasible you consider each suggestion to be, in relation to improving equity in resource allocation and taking into consideration the group median and inter-quartile range (**G**) and your own score from round 2 (**Y**).*

Desirability (**D**) 1=Very Desirable, 2=Desirable, 3=Undesirable, 4=Very Undesirable or NJ = No judgement

Feasibility (**F**) 1=Very Feasible, 2= Possibly Feasible, 3=Possibly Unfeasible, 4=Very Unfeasible or NJ = No judgement

Suggestion 1. Relating to development of and implementation of a resource allocation formula based on need

		Desirability			Feasibility		
		G	Y	D	G	Y	F
44	Develop and implement a national resource allocation formula for the health services based on actual objective resource need. <i>*If you rate this answer 4 today please indicate why on page 11</i>	1 1-1	2		2 2-3	4	*
45	Any Resource allocation formula should start with a zero-base budget (i.e. all areas start with nothing and are funded on the basis of need with past allocations ignored).	1 1-2	1		3 2-4	3	

46	Any needs based resource allocation formula should take a sectoral approach (i.e. separate formulae for different groups e.g. acute, elderly, children), decided at central level.	2 1-3	1		2 1-3	2	
47	Needs based resource allocations should be from central (Dept. of Health) to local level (health boards) and redistributed of these resources should then be decided at local level.	1 1-2	1		2 1-2	1	
48	Needs based resource allocation should be used for new developments rather than existing services.	3 2-4	4		2 1-3	4	
49	A needs based resource allocation formula should be developed from data derived from a population survey.	2 1-3	3		2 1-3	3	
50	A needs based resource allocation formula should be developed from individual level, nationally available data sources.	2 1-3	3		2 2-3	3	
51	A needs based resource allocation formula should be developed from small area level data.	2 1-2	2		2 2-3	2	
52	A needs based resource allocation formula should be developed from the simulation of needs data as a substitute for missing/incomplete data.	2 2-3	2		2 2-3	3	

Suggestion 1 continued

*Q53. The variables below were identified in round 2 as the most important factors to be included in the development of any **needs based resource allocation formula**. They are not ranked in any order. Based on suggestions from the panellists some of the categories have been combined and an additional category was added. Please rank these factors from 1 to 10 giving 1 to the factor that you consider the most important for inclusion in a formula. Please do not give the same rank to more than one variable.*

Rank	
	Demography (e.g. population size, age and sex)
	Socio-economic deprivation
	Social exclusion
	Rurality / geographical access
	Mortality data
	Morbidity and disability data (derived independently of health care utilisation data)
	Health status (e.g. self reported health states)
	Performance indicators and measurements of health gain
	Best practice in provision of services
	Quality of life indicators (e.g. Qualys)

Section B continued

Please proceed with suggestions using the desirability and feasibility rating and taking into consideration the group median and inter-quartile range (G) and your own score from round 2 (Y).

- Desirability (D)
1=Very Desirable, 2=Desirable, 3=Undesirable, 4=Very Undesirable or NJ = No judgement
- Feasibility (F)
1=Very Feasible, 2= Possibly Feasible, 3=Possibly Unfeasible, 4=Very Unfeasible or NJ = No judgement

Suggestion 2. Relating to 'closing the gap' between under and over provision of services

		Desirability			Feasibility		
		G	Y	D	G	Y	F
54	Analyse the existing levels service provision and use this information to positively discriminate funding allocations to redress the balance of under provision in base allocations within the reality of finite resources.	1 1-2	1		2 2-3	1	

Suggestion 3. Relating to financial restructuring

55	There needs to be clear lines of separation between funder and provider roles with a single payer (purchaser).
56	Any resource allocation system needs to move to a zero-based budgeting system on a phased basis. <i>*If you rate this answer 4 today please indicate why on page 11</i>
57	A specific percentage of GDP / GNP needs to be committed to health spending.
58	Multi-annual budgets are required to allow improved planning and empowerment of managers.
59	Costing systems and independent efficiency reviews should be implemented and monitored to ensure that funding (particularly core funding) is adequate and achieves both equitable service and value for money.

Desirability			Feasibility		
G	Y	D	G	Y	F
2 1-3	1		2 1-2	1	
2 1-2	2		2 2-3	4	*
2 1-3	1		1 1-2	1	
1 1-2	1		1 1-2	1	
1 1-2	2		1 1-2	2	

Suggestion 4. Relating to Health Board restructuring

60	Health board structures should be replaced. <i>*If you rate this answer 4 today please indicate why on page 11</i>
61	The number of health boards should be reduced in the interest of efficiency and rational decision making.
62	Each health board should be made responsible for treatment of all patients resident in that board regardless of where their treatment takes place (i.e. money follows the patient but the patient maintains choice).
63	Panels of health experts and the lay public should be formed in each Health Board area to advise Health Boards.

Desirability			Feasibility		
G	Y	D	G	Y	F
2 1-3	4	*	2 2-3	4	*
2 1-3	3		2 1-3	3	
1 1-2	1		2 1-2	1	
2 1-3	1		2 1-2	1	

Suggestion 5. Relating to inequities caused by local politics

64	Inappropriate local political influence should be removed from health resourcing decisions. <i>*If you rate this answer 1 today please indicate why on page 11</i>
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Desirability			Feasibility		
G	Y	D	G	Y	F
1 1-1	1		3 2-3	1	*

Suggestion 6. Relating to secondary care

65	Consultants' contracts should be restructured so that they are salaried with the objective of reducing incentives to concentrate on private practice at the expense of their public patients.
66	There should be common waiting lists for secondary care.
67	Resources should be allocated according to completed episodes of care, rather than the number of patients on a waiting list, to avoid rewarding inefficiencies.

Desirability			Feasibility		
G	Y	D	G	Y	F
1 1-1	1		2 2-3	3	
1 1-2	1		2 2-3	3	
1 1-2	1		2 1-2	2	

68	Casemix funding of acute hospitals should be continued with an increase in the proportion of the budget adjusted according to casemix.
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2 1-2	1		1 1-2	2	
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Suggestion 7. Relating to universal funding & access

Desirability			Feasibility		
G	Y	D	G	Y	F
1 1-1	1		2 1-2	2	
1 1-1	1		2 1-2	2	
3 2-3	1		2 2-3	2	
3 2-3	4		2 2-3	4	
1 1-2	1		1 1-2	1	
1 1-2	2		2 1-2	2	

69	There should be universal access to well structured and well funded primary care services
70	There should be universal access to well structured and well funded primary and secondary care services
71	Universal entitlement should be removed from those who can afford to pay and universal access only given to those who are eligible based on ability to pay.
72	Funding of health services should be insurance based.
73	The income eligibility limit should be raised for medical cards.
74	All children should be eligible for medical cards

Suggestion 8. Relating to increasing resource allocation knowledge (including the public)

Desirability			Feasibility		
G	Y	D	G	Y	F
1 1- 1	1		2 1- 2	2	
2 1- 2	1		2 2- 3	2	
1 1- 2	2		2 1- 2	2	

75	A wide debate is required to increase the knowledge base of the public on resourcing issues particularly looking at the gap between public expectations and a finite health budget.
76	Greater involvement of the general public in prioritisation of services would weaken the power of the politician and help to stem the ad hoc development of services.
77	The skills and knowledge base of managers, health professionals and the community on the issues surrounding equitable resource allocation need to be increased.

Suggestion 9. Relating to health information systems

Desirability			Feasibility		
G	Y	D	G	Y	F
1 1-1	1		1 1-2	1	
1 1-1	1		1 1-2	1	
1 1-1	1		1 1-2	1	
1 1-1	1		2 1-2	1	

78	Major investment is needed in health information systems.
79	Information deficits need to be addressed in a systematic manner.
80	Unique personal identifiers are required to facilitate a universal patient registration system and thereby access to better individual level data.
81	More good quality data on current resource use, using a common data set from both public and private sectors, is required.

Section C Criteria suggested for any resource allocation system

The statements below from the panel are the suggested criteria under which resources should be allocated. Please indicate how important you think each of the criteria are in relation to improving equity in resource allocation, taking into consideration the group median and inter-quartile range (G) and your own score from round 2 (Y).

Importance (I) 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or NJ = No judgement

		G	Y	I
82	Allocation of resources should be linked to services that are evidence based.	1 1-2	2	
83	Allocation of resources should be linked to services that have clear aims and meet a defined equitable standard of service (measured using service plans, performance indicators, specific equity targets and/or benchmarking).	1 1-2	1	
84	Allocation of resources should be linked to services that have a nationally agreed prioritisation process.	2 1-2	2	
85	Allocation of resources should be linked to services that are part of a national policy framework and meet the objectives of the national health strategy.	1 1-2	2	
86	Allocation of resources should be linked to services where there is integration of care delivery between services. <i>*If you rate this answer 3 or 4 today please indicate why on page 11</i>	1 1-2	3	*
87	Allocation of resources should be linked to outcomes, particularly those that maximise health benefits.	1 1-2	2	
88	Allocation of resources should be based on achieving value for money.	2 1-2	2	
89	Any resource allocation system should be transparent (even if this is at the expense of using a better but more complicated methodology).	2 1-2	2	
90	Allocation of resources should be linked to formal agreements on service access.	2 1-2	1	
91	Allocation of resources should be linked to health impact assessment.	2 1-2	NJ	
92	Any new resource allocation formula needs to strike a balance between curative services and broader public health and health promotion initiatives.	1 1-2	2	
93	Resource allocation planning should be inclusive of all stakeholders (including local communities and marginalised groups) and based on partnership.	1 1-2	2	

Section D Policy and planning statements relating to resource allocation

Panel members made the following statements that generally relate to policy and planning. Please indicate your level of agreement with each statement taking into consideration the group median and inter-quartile range (G) and your own score from round 2 (Y).

Agreement (A) 1=Strongly agree, 2=agree, 3= Disagree, 4=Strongly Disagree, or NJ = No judgement

		G	Y	A
94	The method of resource allocation is unimportant in the equity debate - what is needed is increased capacity in beds and manpower.	3 3-4	4	
95	Emphasis needs to be put on developing a service planning culture, where care is planned in a targeted manner according to need, rather than on developing an actual formula used to allocate resources.	2 2-3	2	

96	It is unlikely that any radical change to the funding system or method of resource allocation will take place due to the high cost and the huge structural and organisational difficulties that would be experienced.	2 2-3	2	
97	Achieving equity in resource allocation is meaningless unless accompanied by equity of service delivery.	2 1-2	2	
98	Resistance to a needs based resource allocation formula from potential losers means that this method is not an option	3 3-4	4	
99	The additional resources required to take account of the concept of equal access for equal need will not be forthcoming.	2 2-3	NJ	
100	The public want a quick fix solution to improve equity in health care and will not be prepared to wait for the benefits of a long-term strategy.	3 2-3	NJ	
101	The system should not be changed until it is ensured that any new system is fairer and more transparent.	2 2-3	3	
102	The current method of resource allocation should be continued as there is a lack of accurate data on which to base change.	3 3-4	NJ	
103	Any change to the system should be delayed until there is a review of health board organisation and structure.	3 2-3	4	
104	It will be impossible from a political perspective to close or downscale any services even if they are considered to be over-provided.	3 2-3	3	
105	The focus of equity should be on the health outcomes rather than on the baseline needs	3 2-3	4	
106	The use of a more refined resource allocation process would assist in the subsequent evaluation of health expenditures.	2 1-2	NJ	
107	A needs based, more refined, resource allocation process will not necessarily lead to a scientific answer but will provide better informed judgements on allocations to health boards and a rational for variation between boards.	2 1-2	2	
108	Our health system should be based on the right to health care rather than on the current eligibility for health care.	1 1-2	1	
109	Casemix is a broadly equitable basis of allocation.	2 2-3	4	
110	The tax-based system is equitable as a method of collecting funding.	2 1-2	1	
111	The GMS needs to be reformed and restructured as a component of a comprehensive community based primary health care service.	1 1-2	4	

Reasons

Depending on your ratings today you **may** need to give short reasons for your answers to the following questions: 7,9,20,33,44,56,60,64,86. If so, please do so below and continue overleaf if necessary.

FINALLY

If you would like to make any final comments please do so here.

THANK YOU

Appendix 6: Ranking question (no. 53)

Round two ranking

In round one panellists suggested a number of factors for inclusion in a needs based resource allocation formula. Panellists were asked to rank these factor in importance from 1 (most important) to 10 (least important) in round two. The group rank was calculated by reversing the ranked scores (i.e. 10 most important and 1 least important) and any unranked item was given a score of zero. The cumulative score for each factor was then calculated and the top ten scores selected as the top ten ranked items from the group. Rankings for round two are presented below.

Table A1: Cumulative score and group rank from question 53 round two

Factor	Cumulative score	Group rank
Demography (e.g. population size, age and sex)	260	1
Morbidity data (derived independently of health care utilisation data)	244	2
Socio-economic deprivation	219	3
Mortality data	214	4
Health status (e.g. self reported health states)	133	5
Rurality / geographical access	106	6
Performance indicators and measurements of health gain	101	7
Best practice in provision of services	99	8
Social exclusion	82	9
Disability data	81	10
Flow of work across boundaries (e.g. health board boundaries)	66	11
Differences in system capacity (e.g. infrastructure, staffing levels, size of organisation & management structure)	60	12
Level of complexity of work done	44	13
Differences in the level of service provision across areas/ regions with regard to an established norm.	44	14
Population density	37	15
Differences in costs between facilities (e.g. teaching vs. non-teaching hospital)	27	16
The proportion of privately insured persons	20	17
Differences in purchasing power in different areas	18	18
Levels of private care	15	19

Round three rankings

The overall top ten factors from the group ranking in round two, with some minor changes, were presented for final ranking in round three. These rankings were calculated as for round two and are presented in table A2.

Table A2: Cumulative score and group rank from question 53 round three

Factor	Cumulative score	Group rank
Demographic (e.g. population size age & sex)	277	1
Socio-economic deprivation	246	2
Morbidity and disability data (derived independently of health care utilisation data)	241	3
Mortality data	236	4
Health status (e.g. self reported health status)	177	5
social exclusion	157	6
Rurality/ geographical access	132	7
Best practice in provision of services	123	8
Quality of life indicators (e.g. QALYs)	116	9
Performance indicators and measurements of health gain	108	10

Appendix 7: Criteria for requesting a reasons from panellists for their ratings

Where a panellists round two rating for any statement was 'significantly different' from the group median they were asked to give a reason why this was so in round three. What is meant by 'significantly different' is outlined in table A3 below and varies for each section of the questionnaire. If the panellists rated a statement as one of the ratings given in this table for the corresponding median and interquartile range (IQR) then they were asked to give a reason. If they changed their round two to a rating not on this table then it was not necessary to give a reason.

Table A3: Round three rating by section with ratings where panellists were requested to give a reason for their score with corresponding median and interquartile range.

Round 2 Median	Round 2 IQR	Section A Importance rating scale	Section B Desirability and feasibility rating scale	Section C Importance rating scale	Section D Agreement rating scale
1	1-1	4	3 or 4	4	3 or 4
1	1-2	4	3 or 4	4	3 or 4
1	1-3	4	4	4	4
1	1-4	No	No	No	No
2	1-2	4	3 or 4	4	3 or 4
2	2-2	4	3 or 4	4	3 or 4
2	2-3	4	4	4	4
2	1-3	4	4	4	4
2	2-4	No	No	No	No
2	1-4	No	No	No	No
3	1-3	No	No	No	No
3	2-3	No	1	No	1
3	3-3	No	1 or 2	No	1 or 2
3	2-4	No	1	No	1
3	3-4	No	1 or 2	No	1 or 2
3	1-4	No	No	No	No
4	4-4	1 or 2	1 or 2	1 or 2	1 or 2
4	3-4	1 or 2	1 or 2	1 or 2	1 or 2
4	2-4	1	1 or 2	1	1 or 2
4	1-4	No	No	No	No

Appendix 8 Inter rater kappa and agreement scores between rounds two and three

Table A4: Inter-rater Kappa agreement between rounds two and three

Panellist No.	Agreement %	Kappa Statistic
1	85.9	0.81
2	89.0	0.83
3	95.9	0.94
4	88.4	0.78
6	81.6	0.73
11	93.5	0.85
14	100.0	1.00
15	96.6	0.95
17	93.9	0.90
18	84.9	0.78
21	87.9	0.79
22	74.0	0.56
25	96.4	0.94
27	95.7	0.93
29	87.8	0.81
33	74.8	0.60
34	96.4	0.94
35	81.3	0.72
37	91.7	0.88
40	77.6	0.67
41	98.5	0.98
42	90.3	0.87
43	96.1	0.95
44	98.6	0.98
45	90.1	0.84
48	92.9	0.89
49	87.4	0.80
50	82.9	0.72
53	94.4	0.91
55	91.0	0.85
59	95.2	0.92
60	97.9	0.97
61	91.0	0.87

Appendix 9 Results from correspondence analysis of Policy Delphi statements where no consensus was reached

Statement 28: The public sector is slower to respond to changes in technology than the private sector.

The majority of panellists groups were divided on the importance of this statement. Only one Department of Health official rated this statement and it was rated slightly important. Figure A1 presents the two-dimensional correspondence analysis that explains 87% of the inertia.

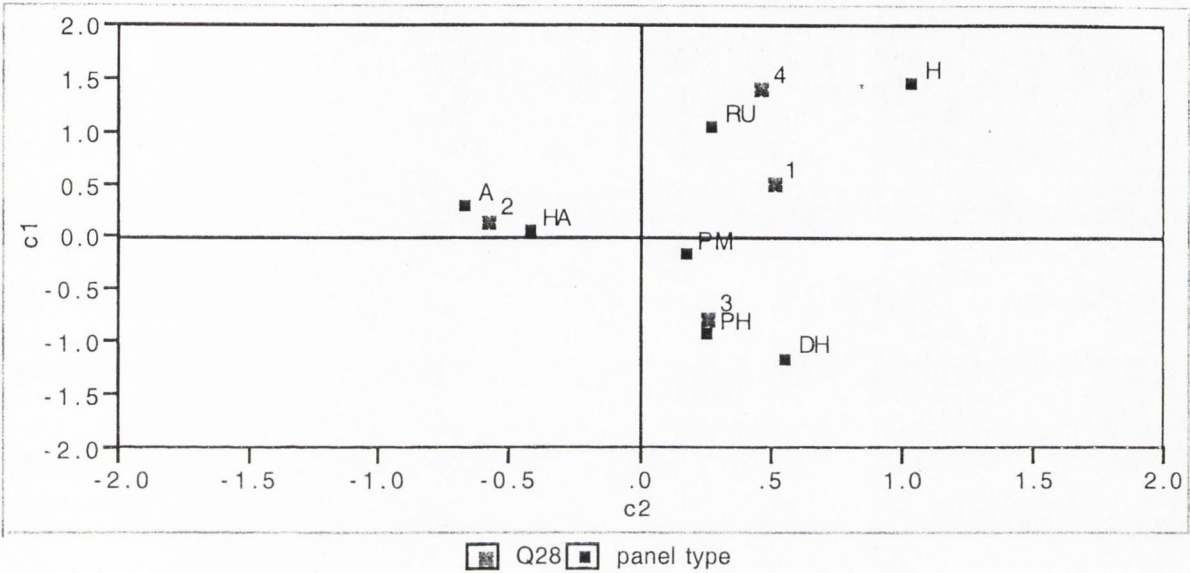


Figure A1: correspondence analysis plot of panellist group with statement 28

PM=planners and managers,PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.
1=Very important, 2=Important, 3=Slightly important, 4=Unimportant

Statement 41: The government's No Policy Change (NPC) process provides, over a 3-year period, the roll-over costs of new developments and can be regarded as meeting some of the needs of a multi-annual planning process at national level.

Again there was little consistency in the rating pattern of members of different groups with many groups rating this statement as both important (2) or slightly or unimportant (3). Only one person from the hospitals group replied and they rated this statement as very important. The two Department of Health and Children officials were also in favour of this statement. Figure A2 presents the two-dimensional correspondence analysis that explains 88% of the inertia.

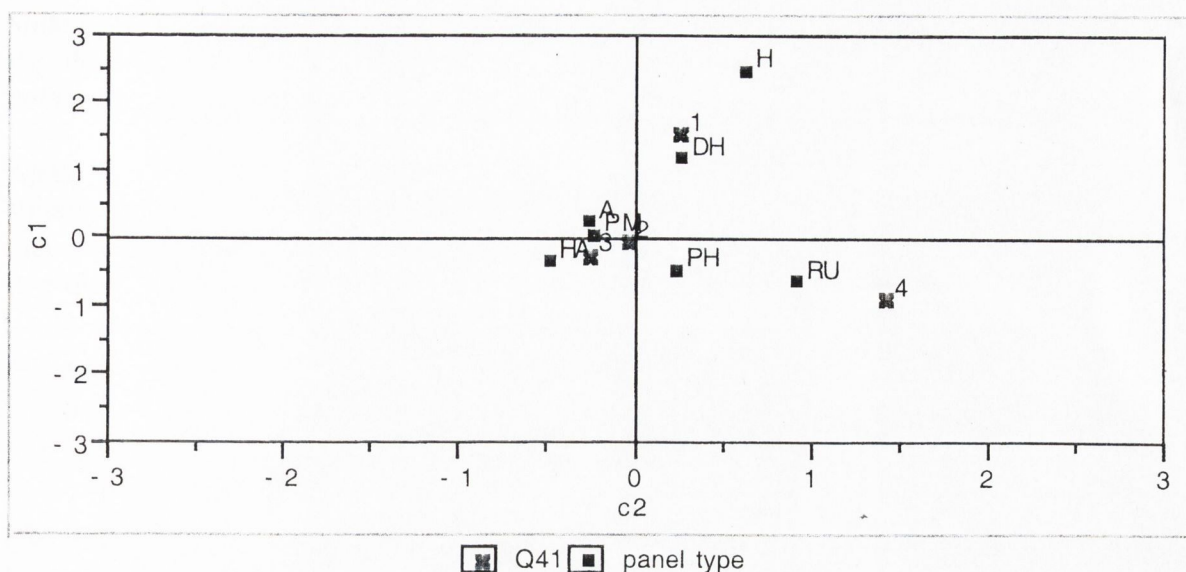


Figure A2: correspondence analysis plot of panellist group with statement 41

PM=planners and managers, PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.

1=Very important, 2=Important, 3=Slightly important, 4=Unimportant

Statement 64F: Inappropriate local political influence should be removed from health resourcing decisions. (Panellists voted this statement on the feasibility rating scale)

The majority of panellists groups were divided as to the desirability of this statement. The members of the hospital group both rated it as undesirable. Figure A3 presents the two-dimensional correspondence analysis that explains 97% of the inertia.

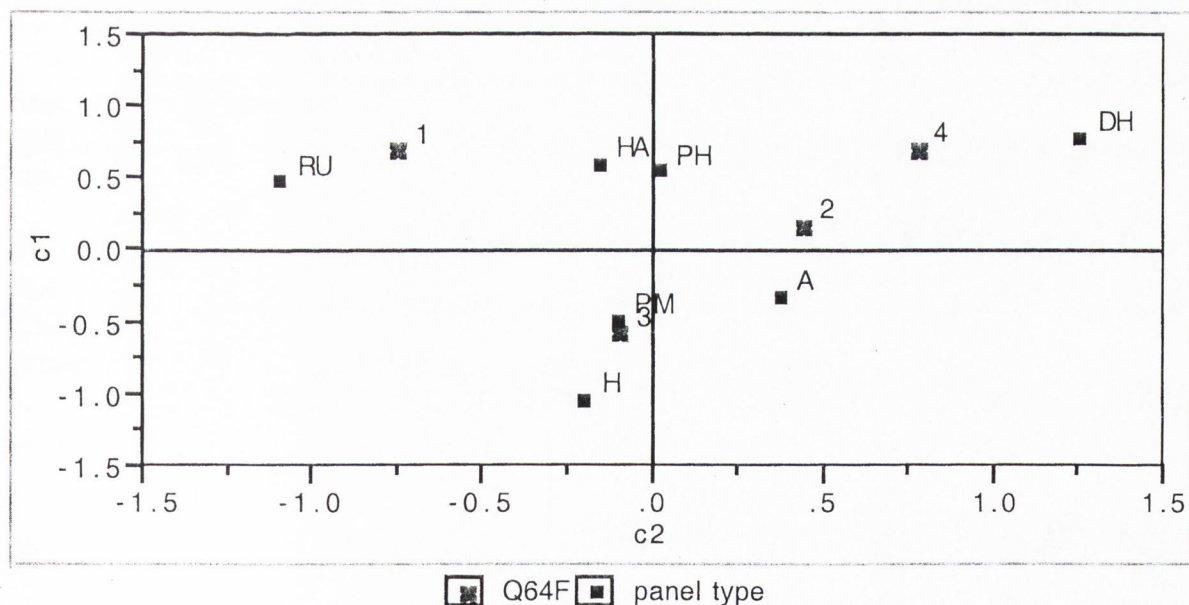


Figure A3: correspondence analysis plot of panellist group with statement 64F

PM=planners and managers, PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.

1=Very feasible, 2=Possibly feasible, 3=Possibly unfeasible, 4=Very unfeasible

Statement 65F: Consultants' contracts should be restructured so that they are salaried with the objective of reducing incentives to concentrate on private practice at the expense of their public patients. (Panellists voted this statement on the feasibility rating scale)

Again panellists in the majority of panellists groups were divided as to the feasibility of this statement. Both members of the hospital group rated it as possibly feasible (3) and all members of the public health group rated it as possibly unfeasible (2). Figure A4 presents the two-dimensional correspondence analysis that explains 86% of the inertia.

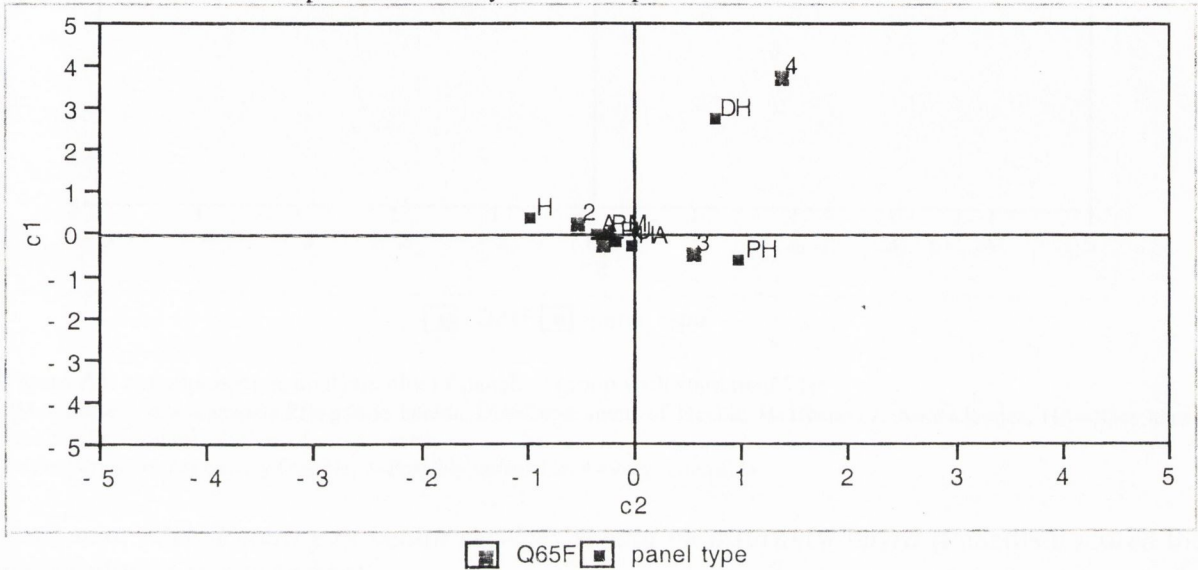


Figure A4: correspondence analysis plot of panellist group with statement 65F

PM=planners and managers, PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.
1=Very feasible, 2=Possibly feasible, 3=Possibly unfeasible, 4=Very unfeasible

Statement 71F: Universal entitlement should be removed from those who can afford to pay and universal access only given to those who are eligible based on ability to pay. (Panellists rated the feasibility of this statement).

This figure is particularly difficult to interpret as for most groups almost equal numbers rated this statement as feasible or unfeasible. The exception was the Department of Health and Children where both officials rated it as either very feasible or possibly feasible. Figure A5 presents the two-dimensional correspondence analysis that explains 98% of the inertia.

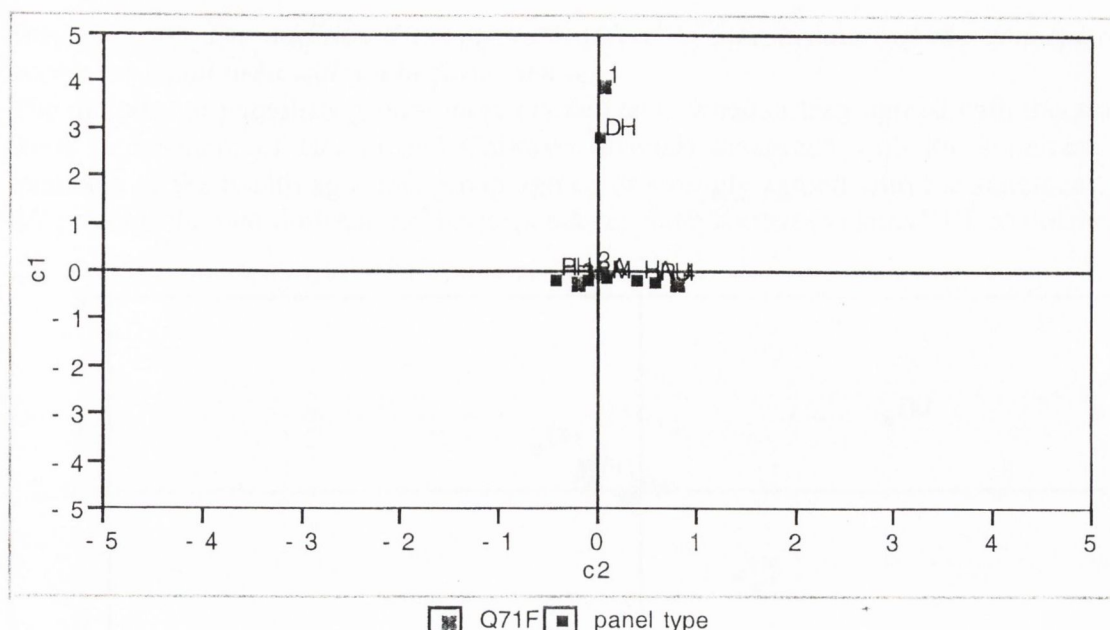


Figure A5: correspondence analysis plot of panellist group with statement 71F
 PM=planners and managers, PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.
 1=Very feasible, 2=Possibly feasible, 3=Possibly unfeasible, 4=Very unfeasible

Statement 72D: Funding of health services should be insurance-based (Panellists scored the desirability of this statement)

Although there was no consensus reached on this statement the groups were more consistent in their voting. Both panellists in the hospital group and in the representatives of services users group (H is covered by RU on graph) rated this statement as desirable. All members of the Health agencies group rated this statement as undesirable. Figure A6 presents the two-dimensional correspondence analysis that explains 95% of the inertia.

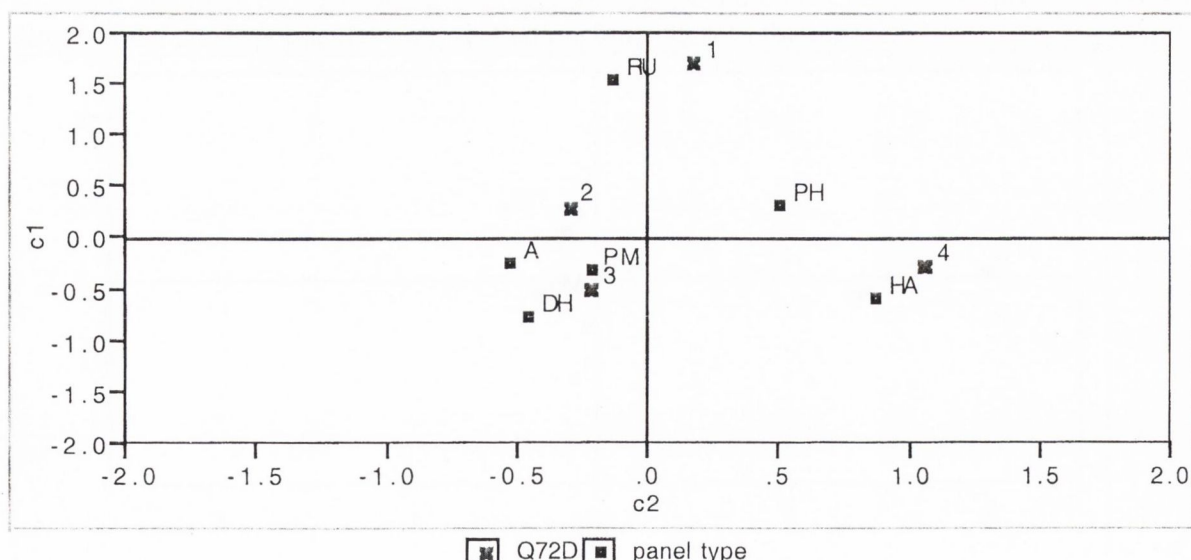


Figure A6: correspondence analysis plot of panellist group with statement 72D
 PM=planners and managers, PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.
 1=Very desirable, 2=Desirable, 3=Undesirable, 4=Very undesirable

Statement 99: The additional resources required to take account of the concept of equal access for equal need will not be forthcoming.

The majority of panellists groups were divided as to whether they agreed with this statement. Both Department of Health and Children officials disagreed with the statement but all members of the health agencies group agreed or strongly agreed with the statement. Figure A7 presents the two-dimensional correspondence analysis that explains 91% of the inertia.

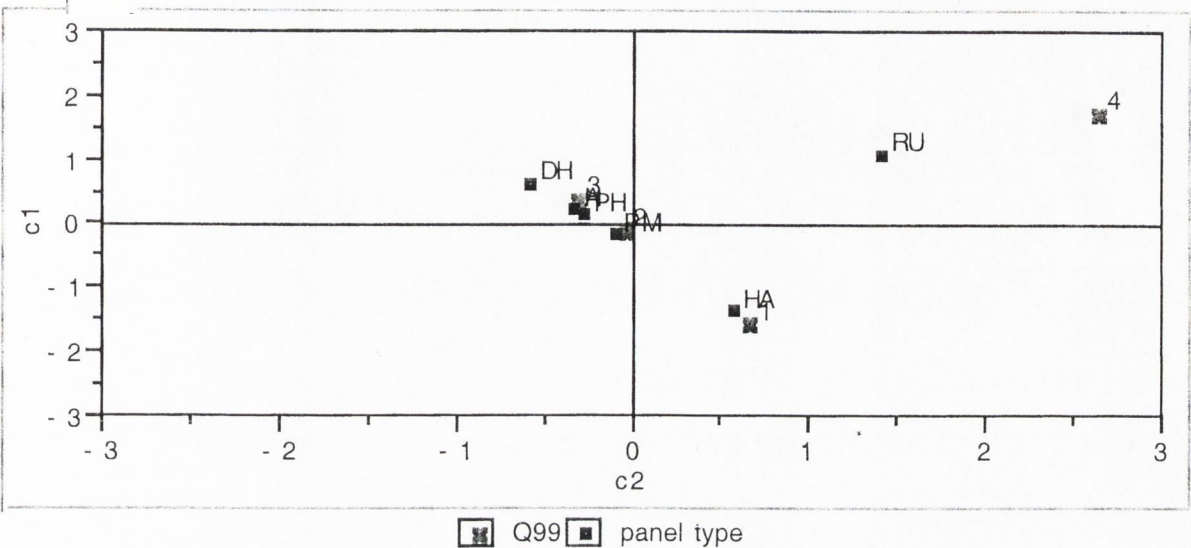


Figure A7: correspondence analysis plot of panellist group with statement 99
PM=planners and managers,PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.
1=Strongly agree, 2= Agree, 3=Disagree, 4=Strongly disagree

Statement 105: The focus of equity should be on the health outcomes rather than on the baseline needs

Again the majority of panellists groups were divided as to whether they agreed with this statement. Both Department of Health and Children officials disagreed with this statement and both members of the health group agreed with the statement. Figure A8 presents the two-dimensional correspondence analysis that explains 89% of the inertia.

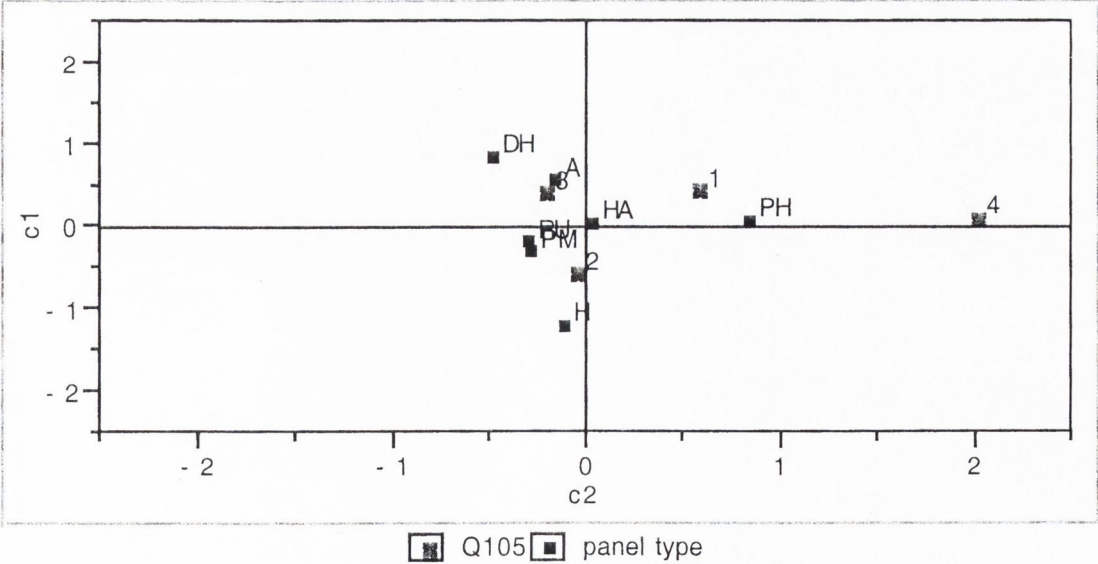


Figure A8: correspondence analysis plot of panellist group with statement 105
PM=planners and managers,PH=public health, DH=Department of Health, H=Hospitals, A=academics, HA=other health agencies, RU=representatives of service users.
1=Strongly agree, 2= Agree, 3=Disagree, 4=Strongly disagree

Appendix 10: Summary of ratings for 111 statements

Table A5: Summary of ratings for 111 statements including reasons given for being different to the median and other comments.

Section 1.1

For section 1.1, statements 1-37, panellists were asked to indicate how important a reason for **inequity** in resource allocation they attached to each statement using the importance rating scale below.

Importance 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or **NJ** = No judgement (Non responses or NJ are indicated by the symbol '--' in the tables below)

The direction of the consensus is indicated by the abbreviations outlined below.

Direction ✓ In favour **VI** = Very Important, **VI-I** = Very Important to Important, **I**= Important,
 ←→ Ambiguous **None** = no consensus,
 ✕ Not in favour **SI**= Slightly Important, **SI-UI**= Slightly Important to Unimportant, **UI** = Unimportant

Reason 1. Relating to type of health coverage (GMS, private etc.)

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
	General comments on reasons 1: • For statement one, two, four, five and six two panellists who rated these statements as unimportant said that this was because the statements described inequities that exist rather than reasons for inequity in allocation.							
1	GMS cardholders generally spend longer on waiting lists and have poorer access to health services than those with private insurance.	High	VI ✓	30 86	3 8	0 0	2 6	1
2	The inclusion of all people over 70 years in the GMS is unfair.	Low	SI-UI ✕	6 17	7 21	16 47	5 15	2
3	Those just above the GMS income eligibility limit have to pay for their GP and medicines and have problems in accessing associated social support services. • One panellist who rated this statement as important did so because she believed that all the Irish literature suggests this group neglected. • A panellist who rated it as unimportant stated that no matter how much the eligibility limit is raised there will always be people just above.	High	VI-I ✓	17 49	15 43	2 6	1 3	1
4	Universal access is not available at primary health care level.	High	VI-I ✓	14 40	15 43	4 11	2 6	1
5	Universal access is not available, in practice, to secondary health care.	High	VI-I ✓	13 37	19 54	1 3	2 6	1
6	Those with private health insurance have better access to health services.	High	VI-I ✓	21 60	12 34	0 0	2 6	1

7	The tax rebate on private health insurance contributions exacerbates inequities.	None	None ↔	7 20	13 37	8 23	7 20	1
There was no consensus on statement seven. All the reasons below related to why this was an unimportant cause of inequity in resource allocation. - As many people are marginally above the GMS eligibility limit they may have no option but to join the VHI despite the expense. Getting a tax rebate is therefore an incentive to join and eases the financial burden. - People with private health insurance also pay local taxes so in a sense are paying double for insurance. It is only fair therefore that they should receive a tax rebate. - Those rating this statement as an important cause of inequity were making the inherent assumption that the tax rebate encourages people to buy private health insurance. However there is no evidence for this. - The tax rebate is actually quite small so has little effect on overall inequity. - High earners get both tax relief on their insurance contributions and can claim tax back (Med. 1 form) for other health expenditures. These costs are not included in calculations of the true cost of health care, which is a problem. - Private health insurance in general contributes to inequity but the influence of a tax rebate has minimal effect. - Removal of the tax rebate would 'have no positive impact on the health service.' It would probably make health insurance less affordable and therefore increase the numbers of patients in the public service. The people hardest hit would be people earning gross average industrial earnings or less who tend to be that sector of our population who are paying huge mortgages. - Another category who would suffer if the tax rebate were removed are retired men and women who have made health insurance contributions all their lives and would now be forced to cease these payments just at a time in their lives when they are going to need the health service if they never needed it before. - Removal of tax relief on health insurance contributions would have no negative impact on the people who could always afford to buy private medicine, even before health insurance became available, and they will continue to by pass waiting lists.								

Reason 2. Relating to lack of needs based allocations

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
8	There are insufficient data on which to analyse health and health care needs.	High	VI-I ✓	24 67	7 19	4 11	1 3	0
	One panellist disagreed and said that there are plenty of data							
9	There is no evidence of any comparative analysis at national level to assess relative needs of individual regions based on objective criteria.	High	VI-I ✓	20 55	12 33	2 6	2 6	0
	- One panellist remarked that analysis could be done - Another said that work on performance indicators, service planning and use of Public Health Information System belies this statement.							
10	Resources are targeted towards high profile services (e.g. waiting lists and cancer services) at the expense of community and mental health services.	High	VI-I ✓	21 60	12 34	1 3	1 3	1

11	There are geographical inequities with regard to the provision of higher quality services.	High	VI-I ✓	15 43	18 51	2 6	0 0	1
12	There are geographical inequities with regard to access to services.	High	VI-I ✓	14 39	19 53	2 5	1 3	0
13	Casemix is not linked to need or outcomes	Medium	VI-I ✓	11 32	14 41	8 24	1 3	2
	One panellist stated that it would be impractical if not impossible to link Casemix to need. It would be desirable to record outcomes, provided a standardised way of doing so were devised.							

Reason 3. Relating to a lack of transparency in resource allocation

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
14	Resource allocation is largely based on varying incremental adjustments to a historical base.	High	VI ✓	31 86	4 11	0 0	1 3	0
	One panellist disagreed and said that as the majority of new money going into the system is to meet wage costs, inflation and growth in existing services then the historical base is not really a problem.							
15	The procedures for allocation of resources are not transparent (e.g. no published methodology or explicit formula).	High	VI-I ✓	19 53	16 44	0 0	1 3	0
	One panellist remarked that making the system more transparent may add bureaucracy to the system but this disadvantage is not as important as achieving the equity objective.							
16	Casemix is open to manipulation.	Low	VI-I ✓	9 27	12 37	11 33	1 3	3
	One panellist suggested the need for a strong audit component within the Casemix programme.							

Reason 4. Relating to external influences

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
17	Resource allocations are often based on political decisions / interests.	High	VI-I ✓	22 63	13 37	0 0	0 0	1
18	Resource allocations are sometimes based on lobbying from pressure groups.	High	VI-I ✓	13 36	20 56	3 8	0 0	0

19	Exclusion of the socially, educationally and economically disadvantaged individuals and communities from involvement in decision making in Ireland has an adverse effect on their health and their ability to access health services.	High	VI-I ✓	11 30	19 53	4 11	2 6	0
	One panellist who disagreed with this thought that involving poor people is not essential to achieve equity and could add to a confusing debate.							

Reason 5. Relating to management and funding systems

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
20	Corporate management does not have a culture of accountability.	Low	I ✓	5 15	17 50	8 23	4 12	2
	- Several panellists said that health board management is bound by the 1996 accountability legislation. Corporate management is accountable to the citizens it serves, to the Health Board, to the DOHC through the service planning process, to the Oireachtas through the Public Accounts Committee and ultimately through the courts in discharging it's legal responsibilities. They are well aware of this and act accordingly. - One panellist commented that there is probably more accountability in the corporate management system than among doctors.							
21	There is over provision of services in some areas.	Low	VI-I ✓	7 21	13 39	10 31	3 9	3
	- One panellist remarked that reports have always been of gross under-capacity rather than over capacity. - Another panellist was confused about the definition of over-provision. Does it mean over provision in relation to need or over-provision in relation to other areas? One example of over-provision is where some affluent areas are over-provided with GP practices compared to deprived areas.							
22	There is no agreed minimum level of service that should be available in each health board.	High	VI-I ✓	17 47	17 47	2 6	0 0	0
	One panellist stated that while theoretically it would be a good idea to have an agreed minimum service level, in practice it would be very difficult.							
23	Multi-annual planning and budgeting does not exist so the system cannot be responsive to those in need and cannot encourage strategic planning for change.	High	VI-I ✓	23 66	11 31	1 3	0 0	1
24	The lack of a clear distinction between funders and providers presents a potential conflict of interest.	None	None ↔	3 8	17 47	11 31	5 14	0

	Panellists made the following comments: - Providers have a vested interest in growth and maintenance of their services and an inadequate focus on monitoring and evaluation - There is a clear separation between funders and providers in the private sector in Ireland. - The distinction between funders and providers is relatively clear. The funders are the PAYE taxpayers through Government and the providers are Health boards and hospitals. The health boards do not themselves raise the funds that they avail of to provide the service. - A conflict of interests is possible in areas where the funder and provider roles are unclear but this is unlikely to have any major effect on inequity in resource allocation. - The inequity arises from capacity deficiencies and setting of different priorities in different care groups by different health boards. - Evidence in favour of the purchaser provider split is not that clear. To date what has happened in the Eastern Region would not encourage one to establish separate health authorities in other health board areas.							
25	There is no compensation for the flow of patients between health boards with higher costs experienced in some geographical areas.	Low	I ✓	5 15	17 50	10 29	2 6	2
	Panellists made the following comments: - There is no evidence to support this statement. - Historically the ERHA has been better funded to cater for regional inflows. - The ERHA is absorbing growing costs in high cost areas such as oncology as other regions do not have these services locally							
26	The health care system is driven by the need to stay within budget.	Medium	VI-I ✓	11 31	14 39	7 19	4 11	0
	Panellists made the following comments: - Staying within budget (or carrying forward any deficit) is part of the Health Act 1996). - It is how, and on what basis, the money is spent that such a judgement can only be made. - Staying within budget is a feature of many health care systems.							
27	Those who overspend are frequently 'bailed out' at the expense of those who have kept budget.	Medium	VI-I ✓	8 23	19 54	3 9	5 14	1

	Panellists made the following comments: • There is no evidence that this exists • The process of 'bailing out' can carry a disincentive to manage within budget. • The accountability legislation specifically rules this out. In the case of the WHB this autumn they were forced by the DoHC to make health cuts in order to come in within budget indicating that 'bailing out' is a thing of the past. • The historical basis of funding of the health system comes into play here. Health boards who overspent over many years 'cultured' the system to overspending and often their baseline budgets were revised in the context of overspends rather than service pressures. Indeed service pressures were often measured against activity rather than service plan contracts. • 'Bailing out' rewards aggressive short-term strategies. • There can be many very legitimate reasons why a Health Board or Hospital overspends and if this is addressed it should not be viewed as a bailing out exercise. The reason for the overspend may be that there were insufficient funds to begin with.							
28	The public sector is slower to respond to changes in technology than the private sector.	None	None ↔	6 18	13 38	12 35	3 9	2
	Panellists made the following comments: • There is a high level of responsiveness to medical technology but a low level of responsiveness to general technology particularly the significant resistance to the implementation of automation in the public sector. • The fact that it is slower than the private sector is irrelevant. It would be important if it read 'the public sector is slow to respond.' • This is particularly so in the case of hospitals and universities who have taken on and developed new technologies.							
29	The current method of resource allocation rewards those who already have a lot of resources.	Medium	VI-I ✓	10 29	17 50	5 15	2 6	2
	• One panellist pointed out that the lack of transparency in the system means it is not clear that this applies. • One panellist said that the provision of adequate resources to some Health boards / hospitals is not a reward. Large hospitals have more resources because they need more resources. Many elements of resource growth are based on an existing pay and non-pay base							
30	The current system, which funds GPs individually, does not allow for the development of a comprehensive primary care infrastructure, particularly in disadvantaged communities.	High	VI ✓	26 76	7 21	0 0	1 3	2
	• One panellist said that this was because the practice, as a personal asset of the GP, cannot be adequately linked to create clusters large enough to allow significant public investment. • Another said it was because of the public private mix.							

Reason 6. Relating to audit, monitoring and evaluation

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
31	Allocations are not linked to key performance indicators or health gain.	High	VI-I ✓	18 51	15 43	1 3	1 3	1
	One panellist agreed that key performance indicators should be linked to allocations but that health gain should not be a factor in the allocation of resources. The demographic, ethnic and economic profile of an area would affect a 'health gain' indicator. Health gain should not be treated as an accountancy book-balancing factor.							
32	Allocations are not linked to the volume of work done.	Medium	I ✓	3 9.1	20 60.6	9 27.3	1 3.0	3
33	Allocations are not linked to health impact assessment.	High	VI-I ✓	17 50	14 41	1 3	2 6	2
	One panellist said that hospital services get priority over mental health and other services							
34	Allocations are not linked to evidence based health care.	High	VI-I ✓	14 41	16 47	2 6	2 6	2
	One panellist said that it is not possible to indicate that the output represents most effective use of resource in the context of outcomes							
35	The system does not take account of supply and demand changes.	Medium	VI-I ✓	9 26	18 53	7 21	0 0	2
36	There is no examination as to the equity or otherwise of the base level of funding/ resources in each area.	High	VI ✓	25 73	8 24	0 0	1 3	2
37	There is a lack of hard information to determine whether the system is equitable and what the benefits are arising from resources invested.	High	VI ✓	25 71	8 23	1 3	1 3	1
	One panellist said that there is a lack of clear information on use of services such as imaging, laboratory, ICU, etc to determine equity							

Section 1.2 Reasons for equity or elements of equity

For the following six statements 38-43, panellists were asked to indicate how important a reason for **equity** in resource allocation they attached to each statement using the importance rating scale below.

Importance 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or **NJ** = No judgement (Non responses or NJ are indicated by the symbol '--' in the tables below)

The direction of the consensus is indicated by the abbreviations outlined below:

Direction  In favour **VI** = Very Important, **VI-I** = Very Important to Important, **I**= Important,
 Ambiguous **None** = no consensus,
 Not in favour **SI**= Slightly Important, **SI-UI**= Slightly Important to Unimportant, **UI** = Unimportant

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
38	Many GPs have both public and private patients on their lists who are generally seen on the basis of clinical need.	High	VI-I 	19 53	10 28	6 16	1 3	0
	One panellist said that this is a reason for equity in service delivery not in resource allocation.							
39	It could be that resources are allocated equitably by chance.	High	SI-UI 	0 0	2 7	16 53	12 40	6
	- One panellist said that this is not important unless we know this is happening. - Another agreed that this might be possible due to rational distribution based on 'supply and demand' pressures.							
40	A standard costing formula (i.e. adjusted for population) is used in the allocation of development funds for services for people with a disability.	High	VI-I 	5 16	21 68	5 16	0 0	5
41	The government's 'No Policy Change' (NPC) process provides, over a 3-year period, the roll-over costs of new developments and can be regarded as meeting some of the needs of a multi-annual planning process at national level.	None	None 	4 13	11 36	14 45	2 6	5

	Panellists made the following comments: • Can one rely on the 'no policy change' for the coming year when planning? • This could be used as a barrier / delay to implementing a complete financial planning model for all aspects of our health care systems that can extend beyond the traditional 12 month segment. • Why is it 3 years why not 2 or 5 what is the basis behind the cycle? The new Primary Care strategy implementation is keen to roll out 8-10 projects in 2002 yet it did not use the NPC to save the funds in 2002 until there was a detailed and agreed plan by all the partners for ideal models. This may make the roll out nationally difficult as precedents will be set, and precedents in the public sector are hard to change! • We need a change of culture in the planning process, however this will mean that the Dept Of Finance will have to have the trust of the Health Sector not to claw back unused funds that have not been used because the systems they have been earmarked them for are not up and running. The recent cuts/ readjustments/ repatriation of funds or whatever you like to call them concerning the Treatment Purchase Scheme is another case where €15million has been cut and it is not clear that the funds will be added to the allocations already forecast for 2003.							
42	Each health board represents one funder who is also a provider of local services (Eastern Region excepted). This leads to stability and best practice on service integration.	Low	SI-UI ✘	4 11	10 29	17 49	4 11	1
	• One panellist commented that there is a clear separation between funders and providers in the private sector • Another commented that there is no evidence of a conflict in the public sector where funders and providers are synonymous.							
43	The current system has low administration costs and is easier to implement than any alternative system.	Medium	SI-UI ✘	1 3	8 24	15 46	9 27	3

For section B, statements 44-81 (excluding number 53), panellists were asked to indicate how *desirable* and how *feasible* they considered each suggestion to be, in relation to *improving equity in resource allocation* desirability and feasibility rating scales below:

Desirability **1** = Very Desirable, **2**= Desirable, **3**= Undesirable, **4** = Very Undesirable or **NJ** = No judgement (Non responses or NJ are indicated by the symbol '--' in the tables below)

Feasibility 1 = Very Feasible, 2= Possibly Feasible, 3= Possibly Unfeasible, 4 = Definitely Unfeasible or **NJ** = No judgement (Non responses or NJ are indicated by the symbol '--' in the tables below)

The direction of the consensus on desirability is indicated by the abbreviations outlined below:

Direction	✓	In favour	VD = Very Desirable, VD-D = Very Desirable to Desirable, D = Desirable,
	↔	Ambiguous	None = no consensus,
	✗	Not in favour	UD = Undesirable, UD-VUD = Undesirable to Very Undesirable, VUD = Very Undesirable

The direction of the consensus on feasibility is indicated by the abbreviations outlined below:

Direction ✓ In favour **VF** = Very Feasible, **VF-PF** = Very Feasible to Possibly Feasible, **PF**= Possibly Feasible,
 ↔ Ambiguous **None** = no consensus,
 ✗ Not in favour **PUF**= Possibly Unfeasible, **PUF-DUF**= Possibly Unfeasible to Definitely Unfeasible, **DUF** = Definitely Unfeasible

Suggestion 1. Relating to development of and implementation of a resource allocation formula based on need

[illegible]

Panellists made the following comments: • This is technically and politically unfeasible. • Some realistic appraising system of previous performance and past allocations needs also to be considered. • Zero budgetary should be applied to additional funding only. These changes should be made slowly over time as for Casemix where blend rates are used and progressive increased over time thus gradually levelling the playing field.															
46	Any needs based resource allocation formula should take a sectoral approach (i.e. separate formulae for different groups e.g. acute, elderly, children), decided at central level.	Medium	VD-D ✓	14 39	12 33	7 20	3 8	0	Low	VF-PF ✓	8 22	17 47	9 25	2 6	0
Panellists made the following comments: • A certain service level should be available regardless of the clients' condition or care group. • Taking a purely sectoral approach mitigates against individuals and communities needs. For example, a child with a disability may need a range of primary, acute and community based health and social support services. To view any of these 'sectorally' works against the concept of working with the whole person and reinforces sectors to work in isolation of each other often to the detriment of the patient. • There are insufficient data to do this. • There is a history of failure of central planning level in Ireland															
47	Needs based resource allocations should be from central (Dept. of Health) to local level (health boards) and redistributed of these resources should then be decided at local level.	High	VD-D ✓	20 55	10 28	5 14	1 3	0	High	VF-PF ✓	14 39	17 47	5 14	0 0	0
• One panellist disagreed because there is a history of failure of central planning level in Ireland • Another stated that our small population (at 3.9 million) means that it is necessary that we allow health boards to develop different approaches (added to a 'core' package)															
48	Needs based resource allocation should be used for new developments rather than existing services.	Low	UD-VUD ✗	4 12	7 20	12 34	12 34	1	Medium	VF-PF ✓	11 30	14 39	5 14	6 17	0
• One panellist commented that both new and existing services should be needs based and regularly reviewed. • Another said that the practicalities of developing a formula for both makes it unfeasible															
49	A needs based resource allocation formula should be developed from data derived from a population survey.	High	VD-D ✓	9 26	19 56	4 12	2 6	2	Medium	VF-PF ✓	10 29	14 41	6 18	4 12	2

Panellists made the following comments: - Needs assessment should not be restricted to a particular method, all resources should be available to be drawn upon and what is most appropriate used. - A problem with population surveys is those most at need e.g. seriously ill or the socially excluded would be unlikely to be surveyed. Population surveys are very expensive relative to using other data sources such as current average utilisation data, adjusted for supply.															
50	A needs based resource allocation formula should be developed from individual level, nationally available data sources.	Medium	VD-D ✓	12 37	13 39	6 18	2 6	3	Low	VF-PF ✓	5 15	15 46	10 30	3 9	3
One panellist said that our individual level, nationally available data sources are not sufficiently comprehensive or accurate to enable this to work.															
51	A needs based resource allocation formula should be developed from small area level data.	High	VD-D ✓	14 40	17 48	3 9	1 3	1	Low	PF ✓	6 17	18 52	7 20	4 11	1
- One panellist said the small population size of Ireland would make this unfeasible. - Another said that small area level data doesn't exist and won't for a long time at a level that could be useful to such a formula.															
52	A needs based resource allocation formula should be developed from the simulation of needs data as a substitute for missing/incomplete data.	Low	VD-D ✓	6 18	16 49	10 30	1 3	3	Low	PF ✓	4 12	18 55	9 27	2 6	3
One panellist thought that simulating data might lead to more inequity than we currently have particularly given that what is currently available is of poor quality.															

Suggestion 2. Relating to 'closing the gap' between under and over provision of services

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
54	Analyse the existing levels of service provision and use this information to positively discriminate funding allocations to redress the balance of under provision in base allocations within the reality of finite resources.	High	VD-D ✓	23 68	11 32	0 0	0 0	2	Medium	VF-PF ✓	5 15	19 56	8 23	2 6	2

Suggestion 3. Relating to financial restructuring

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
55	There needs to be clear lines of separation between funder and provider roles with a single payer (purchaser).	Medium	VD-D ✓	16 49	10 30	5 15	2 6	3	High	VF-PF ✓	10 29	19 56	3 9	2 6	2
		Panellists made the following comments: - The payer provider split in the ERHA has not to date proven that redistribution in this way has improved equity. - The lines of separation are clear with the funders being the PAYE taxpayers through Government and the providers are Health boards and hospitals. The health boards do not themselves raise the funds that they avail of to provide the service.													
56	Any resource allocation system needs to move to a zero-based budgeting system on a phased basis.	High	VD-D ✓	13 41	16 50	2 6	1 3	4	Low	VF-PF ✓	7 21	16 49	7 21	3 9	3
		One panellist remarked that phasing could result in a very slow pace thus losing the benefits.													
57	A specific percentage of GDP / GNP needs to be committed to health spending.	Medium	VD-D ✓	17 48	9 26	8 23	1 3	1	High	VF-PF ✓	19 54 9	11 31 9	3 9	2 6	1
		Panellists made the following comments: - It is a well used international indicator - It is not an effectiveness measure. - It is not a good measure of provision and should not be used. - Health spending should be based on need and that GNP is not a measure of need. - Ireland can or should try to emulate the % GNP on health spent by other countries with similar GNP per capita.													
58	Multi-annual budgets are required to allow improved planning and empowerment of managers.	High	VD ✓	28 80	6 17	1 3	0 0	1	High	VF ✓	27 77	8 23	0 0	0 0	1
59	Costing systems and independent efficiency reviews should be implemented and monitored to ensure that funding (particularly core funding) is adequate and achieves both equitable service and value for money.	High	VD ✓	28 80	7 20	0 0	0 0	1	High	VF-PF ✓	19 54	15 43	1 3	0 0	1

Suggestion 4. Relating to Health Board restructuring

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
60	Health board structures should be replaced.	Low	VD-D ✓	9 28	11 34	9 29	3 9	4	Medium	VF-PF ✓	7 20	18 53	6 18	3 9	2
Panellists made the following comments:															
- Colleagues experienced fatigue in the UK due to multiple changes. Restructuring, with improved management competence rather than replacement, is needed. - This represent a knee jerk “solutions” with no evidence as to how it would impact on delivery of health care particularly as no alternative is proposed. - Regional planning and delivery system is needed. - There is no evidence that this system is not working. - Boards should be restructured, as they are too unwieldy for good decision making. - The system needs to be reviewed before any such decisions are made.															
61	The number of health boards should be reduced in the interest of efficiency and rational decision making.	Low	VD-D ✓	13 38	10 29	6 18	5 15	2	Medium	VF-PF ✓	9 25	16 46	8 23	2 6	1
Panellists made the following comments:															
- This is a knee jerk reaction without any evidence to support it - evidence from other countries shows no benefit from reducing the number of health authorities - either in costs or outcomes. - It would be more sensible for all health boards to work together on various issues e.g. purchasing, paying suppliers, IT systems, better sharing of good practice etc. - Many of the more obvious inefficiencies and irrational decisions in our health service occurred at levels other than health boards. - The extent to which rational decision making occurs at regional level may be more a function of the composition of the board than the number of boards. - The constitutional and governance issues need to be addressed. The number of regions is not the issue. - Has the ERHA made a difference as an alternative? - Politicians want a say in how local services are structured and managed. - No evidence that this system is not working. - Reducing the number of health boards will not necessarily change things very much.															
62	Each health board should be made responsible for treatment of all patients resident in that board regardless of where their treatment takes place (i.e. money follows the patient but the patient maintains choice).	High	VD-D ✓	18 55	12 36	2 6	1 3	3	High	VF-PF ✓	9 26	22 65	2 6	1 3	2

Panellists made the following comments: • Contracts should be increased in areas where patients have to travel. • There needs to be a stable population catchement to plan services. • There should not be any rewards to central empire building.															
63	Panels of health experts and the lay public should be formed in each Health Board area to advise Health Boards.	Low	VD-D ✓	10 29	12 35	9 27	3 9	2	High	VF-PF ✓	14 41	14 41	3 9	3 9	2
Panellists made the following comments: • The public may have vested interests. • How would they be selected? • Would such an advisory body be given any status? • It would add to the administration burden of the health boards. Focus groups and or public consultation processes might be more productive. • A national panel would probably generate less confusion than a panel in each health board.															

Suggestion 5. Relating to inequities caused by local politics

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
64	Inappropriate local political influence should be removed from health resourcing decisions.	High	VD ✓	27 79	2 6	4 12	1 3	2	None	None ↔	7 21	8 23	15 44	4 12	2
Panellists made the following comments: • Health and health care are political and in reality should be more closely linked to the political system locally and nationally. This comment is a paternalistic comment from the professionals / managers. I am not aware of a better alternative to the democratic electoral process! • This can be done by restructuring or replacing HBs but it may be politically very unacceptable and therefore not feasible. • What is appropriate? Freedom of Information and transparency in decision-making should achieve this if the local community actually want it to be achieved. • What is considered inappropriate local political influence at a national level is often seen as the complete opposite at local level. • There needs to be a balance between national plans and what is determined locally. Local autonomy is very important but should have the needs of its people not local political issues as its focus of concern. • This is feasible with political will.															

Suggestion 6. Relating to secondary care

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
65	Consultants' contracts should be restructured so that they are salaried with the objective of reducing incentives to concentrate on private practice at the expense of their public patients.	High	VD ✓	27 82	3 9	3 9	0 0	3	None	None ↔	5 15	14 41	14 41	1 3	2
Panellists made the following comments:															
• Providing a salary with the right to private practice will only increase the incentive to engage in private practice. • If the right to private practice should be withdrawn, then salary is not the only option. It could be argued that fee per item would be a greater incentive to promote equity and high quality. • The government policy on this issue, as enunciated in the health strategy is one of continued commitment to the public/private mix. The current contracts are based on a commitment to the public patient of a fixed amount of hours plus variable on-call. What consultants do with the rest of their time in their own business. If the government wants to “buy out” this time and give it to public practice it can try but at what astronomical cost? The real issue here is to have sufficient consultants available to provide a high quality service and to manage that resource in a cost effective and accountable way • There is an inherent assumption in this statement that consultants presently neglect their public patients whereas it is at least as arguable that they provide significant unremunerated care that might disappear in a re-structured system. • This proposal would encounter major vested opposition in the short-term.															
66	There should be common waiting lists for secondary care.	High	VD ✓	23 72	6 19	3 9	0 0	4	Low	VF-PF ✓	7 21	15 46	10 30	1 3	3
Panellists made the following comments:															
• Given a strong political will this is of course feasible • Unrealistic as long as private insurance is seen as making a major contribution to health funding (even though only 11% of spend)!															
67	Resources should be allocated according to completed episodes of care, rather than the number of patients on a waiting list, to avoid rewarding inefficiencies.	High	VD ✓	26 76	6 18	2 6	0 0	2	High	VF-PF ✓	14 41	17 50	3 9	0 0	2
Panellists made the following comments:															
• Waiting lists are the political criteria for judging need so this is unlikely to change • This would increase the incentive to prioritise less complex procedures with the result that waiting lists might be smaller but comprised of complex procedures															

68	Casemix funding of acute hospitals should be continued with an increase in the proportion of the budget adjusted according to casemix.	High	VD-D ✓	15 50	12 40	2 7	1 3	6	High	VF-PF ✓	16 53	12 41	1 3	1 3	6
One panellist said that Casemix is very open to manipulation and is average based irrespective of absolute values.															

Suggestion 7. Relating to universal funding & access

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
The following are some general comments made by panellists about suggestion 7: - One panellist did not answer any of this section stating that it reflected a pre-determined ideological mindset. - Another panellist did not answer due to the lack of clarity of the term 'universal access' stating that it could mean 'free at the point of delivery' or 'equity of access' or 'access to all irrespective of equity.'															
69	There should be universal access to well structured and well funded primary care services.	High	VD ✓	30 91	2 6	1 3	0 0	3	High	VF-PF ✓	14 42	17 52	2 6	0 0	3
One panellist said that this will cost a lot of money and from a political perspective there will be no extra patients seen in hospitals and thus no reduction in waiting lists.															
70	There should be universal access to well structured and well funded primary and secondary care services.	High	VD ✓	27 82	5 15	1 3	0 0	3	High	VF-PF ✓	13 39	16 49	4 12	0 0	3
One panellist said that in the current economic climate it is difficult to see funding becoming available for universal access to well-funded primary and secondary care services. The level of investment needed is not available.															
71	Universal entitlement should be removed from those who can afford to pay and universal access only given to those who are eligible based on ability to pay.	Medium	UD-VUD ✗	1 3	9 27	16 49	7 21	3	None	None ↔	1 3	16 49	12 36	4 12	3
72	Funding of health services should be insurance based.	None	None ↔	3 10	10 32	13 42	5 16	5	Low	PF ✓	2 7	17 57	8 26	3 10	6
- One panellist thought an insurance-based system would be more efficient. - Another remarked that how the health service is equitably funded and how that funding is delivered is linked.															

73	The income eligibility limit should be raised for medical cards.	High	VD ✓	25 76	5 15	2 6	1 3	3	High	VF-PF ✓	21 64	11 33	1 3	0 0	3
	One panellist said that as long as there is the option of tinkering around the edges and making minor changes, the fundamental changes that are needed are less likely to happen. Therefore raising the eligibility level, while moving the system towards greater fairness, is insignificant in relation to the overall changes that are needed to achieve equity.														
74	All children should be eligible for medical cards	High	VD ✓	23 70	5 15	2 6	3 9	3	High	VF-PF ✓	15 46	17 51	0 0	1 3	3
	One panellist said that GMS cards should be on the basis of need (income) not age. This would not improve equity.														

Suggestion 8. Relating to increasing resource allocation knowledge (including the public)

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
75	A wide debate is required to increase the knowledge base of the public on resourcing issues particularly looking at the gap between public expectations and a finite health budget.	High	VD ✓	30 86	4 11	1 3	0 0	1	High	VF-PF ✓	14 40	18 51	3 9	0 0	1
	Panellists made the following comments: - This would add to the administration burdens of the health boards. - The public will never take the broad view so politicians need to lead on this.														
76	Greater involvement of the general public in prioritisation of services would weaken the power of the politician and help to stem the ad hoc development of services.	High	VD-D ✓	16 50	11 34	3 10	2 6	4	Low	PF ✓	2 6	17 51	12 37	2 6	3
	Panellists made the following comments: - There would be resistance to the loss of political power. - The misleading assumption being made here is that politicians do not reflect local opinion. - This statement assumes that the attitudes of the general public would favour those of experienced health professionals, for which there is actually converse research evidence. - It would be difficult for the public to differentiate between need and demand. - If members of the public are involved in prioritisation of services how would they be held accountable for their decisions? - How would local priorities fit into national priorities?														

77	The skills and knowledge base of managers, health professionals and the community on the issues surrounding equitable resource allocation need to be increased.	High	VD ✓	26 74	8 23	1 3	0 0	1	High	VF-PF ✗	18 51	16 46	0 0	1 3	1
One panellist said that the knowledge base of health professionals is not deficient. There is a need to build the knowledge base of the community so that there is mature debate of the issues and complex issues are not left to the service itself to adjudicate.															

Suggestion 9. Relating to health information systems

		Desirability							Feasibility						
		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N	Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
78	Major investment is needed in health information systems.	High	VD ✓	35 100	0 0	0 0	0 0	1	High	VF-PF ✓	21 60	13 37	1 3	0 0	1
79	Information deficits need to be addressed in a systematic manner.	High	VD ✓	34 97	1 3	0 0	0 0	1	High	VF-PF ✓	24 69	11 31	0 0	0 0	1
80	Unique personal identifiers are required to facilitate a universal patient registration system and thereby access to better individual level data.	High	VD ✓	28 80	7 20	0 0	0 0	1	High	VF-PF ✓	20 57	10 29	3 8	2 6	1
Panellists made the following comments: - We have tried to progress this for past 8 years. Several obstacles have been experienced e.g. from data controller and fear from the public of 'big brother'. A major civil liberties' debate would be encountered and would be opposed by a spectrum of interests. - There is possibly a lack of political will to introduce personal identifiers for all people.															
81	More good quality data on current resource use, using a common data set from both public and private sectors, is required.	High	VD ✓	30 86	5 14	0 0	0 0	1	High	VF-PF ✓	16 46	15 43	3 8	1 3	1
Panellists made the following comments: - The private sector (including insurance agencies) is slow to provide data. - There is major uphill work to get our information systems to the standard required.															

Section C Criteria suggested for any resource allocation system

In section C, statements 82-93, panellists were asked to indicate how important they thought each of the criteria are in relation to improving equity in resource allocation using the importance rating scale below.

Importance 1 = Very Important, 2= Important, 3= Slightly Important, 4 = Unimportant or **NJ** = No judgement (Non responses or NJ are indicated by the symbol '--' in the tables below)

The direction of the consensus is indicated by the abbreviations outlined below.

Direction
 ✓ In favour VI = Very Important, VI-I = Very Important to Important, I= Important,
 ↔ Ambiguous None = no consensus,
 ✗ Not in favour SI= Slightly Important, SI-UI= Slightly Important to Unimportant, UI = Unimportant

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
82	Allocation of resources should be linked to services that are evidence based.	High	VI-I ✓	24 69	11 31	0 0	0 0	1
83	Allocation of resources should be linked to services that have clear aims and meet a defined equitable standard of service (measured using service plans, performance indicators, specific equity targets and/or benchmarking).	High	VI ✓	25 71	10 29	0 0	0 0	1
84	Allocation of resources should be linked to services that have a nationally agreed prioritisation process.	High	VI-I ✓	16 47.1	15 44.1	3 8.8	0 0	2
85	Allocation of resources should be linked to services that are part of a national policy framework and meet the objectives of the national health strategy.	High	VI-I ✓	20 59	12 35	2 6	0 0	2
86	Allocation of resources should be linked to services where there is integration of care delivery between services.	High	VI-I ✓	20 57	9 26	6 17	0 0	1
87	Allocation of resources should be linked to outcomes, particularly those that maximise health benefits.	High	VI-I ✓	22 63	9 26	3 8	1 3	1
	One panellist remarked that resources should not be linked to outcomes such as health gain. While outcomes are vital they should not determine resource allocation. For example in a disadvantaged community with an extremely high level of heavy smokers, should the resources to that area be reduced if the incidence of lung cancer and heart disease does not reduce?							
88	Allocation of resources should be based on achieving value for money.	High	VI-I ✓	14 40	17 49	4 11	0 0	1

89	Any resource allocation system should be transparent (even if this is at the expense of using a better but more complicated methodology).	High	VI-I ✓	15 44	16 47	2 6	1 3	2
	One panellist pointed out that transparency is not necessarily the same as accountability and, if it produces opportunity cost, resources division should be examined carefully.							
90	Allocation of resources should be linked to formal agreements on service access.	High	VI-I ✓	17 50	15 44	2 6	0 0	2
91	Allocation of resources should be linked to health impact assessment.	High	VI-I ✓	16 47	16 47	2 3	0 0	2
92	Any new resource allocation formula needs to strike a balance between curative services and broader public health and health promotion initiatives.	High	VI ✓	26 74	8 23	1 3	0 0	1
93	Resource allocation planning should be inclusive of all stakeholders (including local communities and marginalised groups) and based on partnership.	High	VI-I ✓	21 60	12 34	2 6	0 0	1
- One panellist said that executive decisions have to be made and that achieving public consensus on health resource allocation would be almost impossible.								

Section D Policy and planning statements relating to resource allocation

In section D, statements 94-111, panellists were asked to indicate their *level of agreement with each statement* using the agreement rating scale below:

Agreement 1 = Strongly Agree, 2= Agree, 3= Disagree, 4 = Strongly Disagree or **NJ** = No judgement (Non responses or NJ are indicated by the symbol '-' in the tables below)

The direction of the consensus is indicated by the abbreviations outlined below.

Direction
 ✓ In favour SA = Strongly Agree, SA-A = Strongly Agree to Agree, A= Agree,
 ↔ Ambiguous None = no consensus,
 ✗ Not in favour D= Disagree, D-SD= Disagree to Strongly Disagree, SD = Strongly Disagree

		Consensus	Direction	1 N %	2 N %	3 N %	4 N %	-- N
94	The method of resource allocation is unimportant in the equity debate - what is needed is increased capacity in beds and manpower.	High	D-SD ✗	2 6	1 3	18 51	14 40	1
	One panellist said that increased capacity is vital but is not related to the equity debate. They are separate issues. The method of resource allocation will not deliver the bed capacity or the manpower that will require better pay and conditions for health workers in order to attract and retain them.							
95	Emphasis needs to be put on developing a service planning culture, where care is planned in a targeted manner according to need, rather than on developing an actual formula used to allocate resources.	Medium	SA-A ✓	6 18	19 58	7 21	1 3	3
	One panellist said that in the interest of equity it is critical that an objective resource allocation formula is developed. This will also be an incentive for better resource management.							
96	It is unlikely that any radical change to the funding system or method of resource allocation will take place due to the high cost and the huge structural and organisational difficulties that would be experienced.	Medium	SA-A ✓	4 12	19 56	10 29	1 3	2
	Panellists made the following comments: - The public will force the political system to improve the health services and will not be satisfied with platitudes. - Depends on the timeframe. Change is unlikely in the short or medium term but is likely in the long term.							

97	Achieving equity in resource allocation is meaningless unless accompanied by equity of service delivery.	High	SA-A ✓	15 43	14 40	6 17	0 0	1
	Panellists made the following comments: Equity of resources is the first step. More dispersed services are more expensive to develop. Equity of resource allocation will drive equity of delivery through comparisons.							
98	Resistance to a needs based resource allocation formula from potential losers means that this method is not an option	High	D-SD ✗	0 0	3 9	22 63	10 29	1
	One panellist said that the fact that an organisation is judged to have fared better than other similar organisations, relatively speaking doesn't mean that the total resource is not being well deployed or that removing some of that resource will not have unacceptable implications. I believe that the better way to achieve equity is through positive discrimination in favour of those who are disadvantaged, in the allocation of new resources.							
99	The additional resources required to take account of the concept of equal access for equal need will not be forthcoming.	None	None ↔	3 9	16 49	13 39	1 3	3
	One panellist said that if health were given the political priority it deserves the additional resources would be forthcoming.							
100	The public want a quick fix solution to improve equity in health care and will not be prepared to wait for the benefits of a long-term strategy.	Low	D ✗	1 3	15 46	17 51	0 0	3
	One panellist said that the public have been promised an end to waiting lists, during the recent election campaign, and have been led to believe that everything is possible if only the existing resources were better managed. They expect early results, not unreasonably.							
101	The system should not be changed until it is ensured that any new system is fairer and more transparent.	Low	A ✓	3 9	19 56	9 26	3 9	2
	Panellists made the following comments: - It is very clear that some measures <u>will</u> work and can be implemented immediately e.g. raise eligibility for medical cards. - This is a recipe for delay and an excuse for doing nothing. Of course any changes should be tested \ proofed for equity and transparency but not at the expense of delays.							
102	The current method of resource allocation should be continued as there is a lack of accurate data on which to base change.	High	D-SD ✗	0 0	2 6	20 59	12 35	2
103	Any change to the system should be delayed until there is a review of health board organisation and structure.	Low	D-SD ✗	3 9	10 28	14 40	8 23	1

	Panellists made the following comments: - It would be defeatist to hold up proposed changes pending the review and reorganisation of the existing Health Board structures in this country. - A review of Health Board structures is key to the longer-term sustainable solution to the question of “equity” within healthcare provision and promotion in a cost effective and measurable way. - There are significant organisational and structural deficits in the Irish health system, which significantly inhibit value for money (VFM report). However there is a review in progress at present due to be completed by the end of this year. It is important that this review points the way to the future organisation/structure of the system, which is central to any reform of the system generally. Need to sort out the structure before sorting out the funding, otherwise the former will confuse the latter.							
104	It will be impossible from a political perspective to close or downscale any services even if they are considered to be over-provided.	Low	D ✗	2 6	11 31	18 51	4 12	1
	One panellist said that service provision is still highly political both from a general and medical political perspective.							
105	The focus of equity should be on the health outcomes rather than on the baseline needs	None	None ↔	3 9	13 39	16 49	1 3	3
	One panellist said that there is increasing evidence of this in the literature. It is important to ensure equity of outcome above even equity of access, as some deprived communities need more to get the same level of outcome.							
106	The use of a more refined resource allocation process would assist in the subsequent evaluation of health expenditures.	High	SA-A ✓	11 32	21 62	2 6	0 0	2
	One panellist said that more could be done now if there was both will and capacity.							
107	A needs based, more refined, resource allocation process will not necessarily lead to a scientific answer but will provide better informed judgements on allocations to health boards and a rational for variation between boards.	High	SA-A ✓	14 40	21 60	0 0	0 0	1
108	Our health system should be based on the right to health care rather than on the current eligibility for health care.	High	SA-A ✓	19 56	12 35	3 9	0 0	2
	Panellists made the following comments: - It is too simplistic to sign up to a rights based approach without considering what is meant by term and the potential cost implications of that approach. - Implicit rationing is a feature of all health care systems. - A right to health care could lead to a spate of legal actions for enforcement.							
109	Casemix is a broadly equitable basis of allocation.	Low	A ✓	2 6	17 59	6 21	4 14	7

	Panelists made the following comments: • There are many flaws in Casemix (e.g. there is a lot of evidence for DRG creep, the manipulation of OPD work as day cases). • Casemix is a 'game' and people play it to gain extra resources. • There is no element of Casemix, which could be claimed to be equitable. • When properly utilised it is a reasonably sophisticated methodology of allocating resources but it does need a quality component.							
110	The tax-based system is equitable as a method of collecting funding.	High	SA-A ✓	8 24	19 58	6 18	0 0	3
111	The GMS needs to be reformed and restructured as a component of a comprehensive community based primary health care service.	High	SA-A ✓	23 70	9 27	1 3	0 0	3

Appendix 11 Rational for selection of census variables for master database

The combination of age (in five groups), sex (in two groups), DED, and social class (in seven groups) was used in this study in the creation of the master database. There were alternatives that could have been chosen as shown in Table A6. Information on sex and DED was available for each combination but age was presented in varying levels of detail depending on the socio-demographic variable available and in some cases did not include children. These combinations were disregarded as the master database needed to include every individual. Combinations that had the most detailed information were those containing social class, socioeconomic group and employment status. Employment status included four categories: at work, looking for first job, unemployed and not in the labour force. This variable was not considered useful as it was not discerning enough in terms of the socio-economic status of the individual. The combination including socio-economic group only contained two age categories and was therefore not considered detailed enough. Therefore, social class (shaded row in Table A6) was chosen as the best option. Age and sex alone could have been chosen and with 18 age groups would have provided a larger number of age / sex groups. However this would have meant that the socio-economic information was lost.

Table A6: Combinations of data available from the 1996 census.

No.	DED	Sex	Age	Socio-demographic 1	Socio-demographic 2
1	DED	Sex	Age (18 groups)	--	--
2	DED	Sex	Age (18 groups)	Marital status	--
3	DED	Sex	Age (8 groups) No children	Living alone	--
4	DED	Sex	Age (11 groups) No children	Martial status	Head of household
5	DED	Sex	Age (1 group) No children	Martial status	Employment status
6	DED	Sex	Age (6 groups) No children	Employment status	--
7	DED	Sex	Age (1 group) No children	Occupation	--
8	DED	Sex	Age (2 groups)	Socio-economic group (11 groups)	--
9	DED	Sex	Age (5 groups)	Social class (7 groups)	--
10	DED	Sex	Over 15s only No children	Employment status	Level of education (12 groups)

Appendix 12
Association between social class and deprivation level

Table A7: Association between social class and deprivation level.

No.	Social class	Social class	Social class	Social class	Social class	Social class	Social class
(%)	1	2	3	4	5	6	7
Deprivation	95238	311561	212494	154888	75732	37904	100902
level 1	(49.1)	(39.1)	(31.8)	(20.9)	(16.3)	(12.3)	(22.4)
Deprivation	57847	271271	236058	268500	154758	99388	139605
level 2	(29.8)	(34.1)	(35.3)	(36.2)	(33.3)	(32.1)	(31.0)
Deprivation	19168	95381	85619	114258	78499	55590	66636
level 3	(9.9)	(12.0)	(12.8)	(15.4)	(16.9)	(18.0)	(14.8)
Deprivation	19159	100686	108444	157094	111954	81513	93924
level 4	(9.9)	(12.6)	(16.2)	(21.2)	(24.1)	(26.3)	(20.8)
Deprivation	2727	17612	26123	46957	43646	35023	49928
level 5	(1.4)	(2.2)	(3.9)	(6.3)	(9.4)	(11.3)	(11.1)
Total	194139	796511	668738	741697	464589	309418	450995
	(100)	(100)	(100)	(100)	(100)	(100)	(100)

χ^2 276400, df=24, p<0.0001

Appendix 13 Assigning counties and GMS status to missing HIPE data.

County of residence was missing for approximately 1% of HIPE person events. These missing data fell into two categories. The first was where county of residence was unknown or unrecorded (0.07%, n=319) and the second was where the patient was a non-resident (0.86%, n= 3832) e.g. tourists. A county was allocated to each of these categories using two different methods. These allocations were performed after adjusting the data set for re-admissions as it was considered likely that non-residents who made up the larger portion of those without a county were less likely to be readmitted than someone resident in Ireland.

Appendix 13a First method

It was assumed that the distribution of those patients whose county of residence was unknown or unrecorded would be distributed throughout the country in the same proportion as other HIPE person events. Therefore those with county unknown were allocated to the 27 counties in the same proportion as the other HIPE person events. For example 1.4% of HIPE person events were recorded as being resident in Co. Carlow. Therefore, 1.4% of those with county unknown were randomly allocated to Co. Carlow.

Appendix 13b Second method

It was considered important to allocate non-residents to a county as the inpatient health care costs incurred in each area is of interest. In some cases the non-resident may pay for their own care (e.g. through insurance) but in many cases there is a reciprocal agreement between the patient's country of residence and Ireland where Ireland pays the costs of care. Therefore it makes sense to allocate the person to the county of the hospital of treatment rather than to any random county. Information was available on the county of the hospital where treatment took place so non-residents were allocated to these 22 counties.

Appendix 13c GMS status to missing HIPE data

GMS status was unknown for 4.4% (n=19,636) of HIPE person events. These people were allocating a GMS card in the same proportion as GMS cards were distributed among HIPE person events in each county. For example, from analysis of the HIPE data it was known that the proportion of people who had a HIPE event and who also had a GMS card, resident in Carlow, was 52%. Therefore 52% of the Carlow HIPE person events, recorded as GMS card unknown, were assigned a GMS card and 48% were assigned a code indicating they did not have a GMS card. This was done at random.

Appendix 14 Distribution of the population and assigned HIPE person events by deprivation level and area

Table A8: The percentage of the population and assigned HIPE person events in each deprivation levels in each county (difference in the shaded column).

County	Deprivation level 1			Deprivation level 2			Deprivation level 3			Deprivation level 4			Deprivation level 5		
	Population	HIPE	Diff	Population	HIPE	Diff	Population	HIPE	Diff	Population	HIPE	Diff	Population	HIPE	Diff
Carlow	7.45	11.06	-3.61	26.93	23.64	3.29	41.95	35.52	6.43	23.68	29.79	-6.11	0.00	0.00	0.00
Cavan	12.74	12.91	-0.17	65.02	43.70	21.31	11.58	20.44	-8.86	10.66	22.94	-12.28	0.00	0.00	0.00
Clare	36.75	26.25	10.50	29.61	25.23	4.39	20.57	24.37	-3.80	13.06	24.16	-11.09	0.00	0.00	0.00
Cork	28.47	20.76	7.71	41.02	30.61	10.41	15.79	17.24	-1.44	9.78	16.09	-6.31	4.94	15.32	-10.37
Donegal	1.81	5.73	-3.92	14.76	13.58	1.18	23.25	20.79	2.46	44.44	31.36	13.08	15.75	28.54	-12.79
Dublin	42.49	28.65	13.84	21.07	18.05	3.01	3.63	10.08	-6.45	20.39	22.90	-2.51	12.43	20.31	-7.89
Galway	30.78	17.41	13.36	37.79	23.54	14.25	15.50	17.88	-2.38	9.54	19.50	-9.96	6.40	21.67	-15.27
Kerry	9.02	10.86	-1.84	42.79	36.46	6.33	36.25	33.30	2.95	11.94	19.38	-7.43	0.00	0.00	0.00
Kildare	52.54	38.11	14.43	18.03	19.92	-1.89	10.14	17.13	-6.99	19.29	24.84	-5.55	0.00	0.00	0.00
Kilkenny	21.79	18.10	3.69	49.81	35.90	13.91	9.63	18.48	-8.85	18.78	27.52	-8.75	0.00	0.00	0.00
Laois	13.96	13.88	0.08	54.08	36.78	17.30	21.84	25.83	-4.00	10.13	23.51	-13.39	0.00	0.00	0.00
Leitrim	15.42	10.47	4.96	59.76	30.14	29.62	13.91	15.95	-2.04	10.55	21.71	-11.16	0.35	21.74	-21.39
Limerick	27.68	18.19	9.49	35.25	25.00	10.25	13.71	16.63	-2.93	12.97	19.36	-6.39	10.40	20.83	-10.43
Longford	11.39	9.10	2.29	52.06	30.68	21.38	16.07	18.39	-2.32	19.25	23.76	-4.52	1.24	18.07	-16.83
Louth	5.68	9.90	-4.21	18.88	20.27	-1.39	14.74	21.98	-7.24	60.69	47.86	12.84	0.00	0.00	0.00
Mayo	6.66	7.03	-0.37	47.55	25.09	22.46	20.94	20.27	0.67	16.49	23.17	-6.68	8.37	24.45	-16.08
Meath	23.54	19.26	4.28	55.96	40.27	15.69	13.30	20.25	-6.95	7.21	20.23	-13.02	0.00	0.00	0.00
Monaghan	13.16	13.81	-0.65	63.43	40.45	22.98	18.66	23.82	-5.16	4.74	21.92	-17.17	0.00	0.00	0.00
Offaly	8.98	11.05	-2.07	27.15	23.75	3.40	27.36	29.54	-2.18	36.51	35.66	0.84	0.00	0.00	0.00
Roscommon	34.85	17.23	17.62	52.05	27.78	24.27	8.90	16.42	-7.53	4.07	17.88	-13.80	0.13	20.69	-20.56
Sligo	20.40	11.53	8.87	42.14	22.68	19.45	22.81	20.59	2.22	14.55	22.79	-8.24	0.10	22.41	-22.30
Tipp_NR	25.60	19.78	5.82	36.20	28.82	7.38	34.42	31.63	2.79	3.79	19.77	-15.98	0.00	0.00	0.00
Tipp_SR	7.52	7.68	-0.17	44.45	27.92	16.53	13.16	16.60	-3.44	33.90	30.53	3.37	0.97	17.27	-16.30
Waterford	15.78	11.93	3.85	37.01	27.38	9.63	20.89	20.55	0.34	19.10	21.52	-2.42	7.23	18.62	-11.39
Westmeath	25.29	20.47	4.82	40.38	30.89	9.49	20.97	24.80	-3.84	13.37	23.84	-10.47	0.00	0.00	0.00
Wexford	2.23	7.99	-5.76	42.67	32.33	10.34	22.75	25.51	-2.75	32.35	34.18	-1.83	0.00	0.00	0.00
Wicklow	21.04	14.79	6.25	42.80	29.14	13.66	16.90	18.81	-1.91	16.81	21.64	-4.82	2.45	15.63	-13.18
Mean			4.04			12.17			-2.71			-6.29			-7.21

Appendix 15 Assigning DED codes to mortality data

Approximately 6.2% of mortality data were incorrectly assigned a DED code. (Personal Communication, Dr. Harry Comber, National Cancer Registry) It was necessary to reallocate DEDs to these data as they would be used for joining mortality data to the master database. Table A9 presents the percentage of mortality data for each 'hit code' and the action taken, if any. The hit code denotes the accuracy of the assignment of the mortality case to a DED. All hit codes starting with the number '1' had only one possible DED so these were not changed. Those with codes 200 and 400 could potentially have an alternative DED but the DED allocated was retained as it was considered to be the best estimate and in the majority of cases would be correct. The remaining deaths (i.e. those with hit codes 80xxx and 90xxx) were reallocated as they were very likely to have an incorrect DED. These codes only occurred in five counties. Deaths with these codes were allocated to a DED in the same county as the code in the same proportion as the population were resident in that DED in the county. For example 3% of Co. Dublin's population lived in DED 2127. Therefore 3% of the Dublin deaths who received a hit code of 80xxx or 90xxx were assigned to this DED. Where the number of DEDs exceeded the number of cases to be allocated the deaths were allocated in order of the most populous DED until all were allocated.

Table A9: % of 1996 mortality data for each hit code and action taken

Hit code	Explanation	%	Action
100	Coded to building	0.3	Unchanged
110	coded to street	38.4	Unchanged
120	coded to town	28.8	Unchanged
130	coded to town land	26.3	Unchanged
200	forced to street	0.5	Unchanged
400	Town valid street invalid	3.3	Unchanged
80xxx	Not coded but assigned to an urban area	2.2	Reallocated
90xxx	Coded to the centre of an urban area	0.2	Reallocated

Source NCR

Appendix 16: Joining mortality data to master database

Table A10: % of deaths assigned to HIPE person events recorded as dying and the master database for each sequence

% Deaths assigned to HIPE person events recorded as dying in the master database						% Deaths assigned to remaining master database		
New county	Sequence	Sequence	Sequence	Sequence	Total	Sequence	Sequence	Total
	1	2	3	4	No.	1	2	No.
Carlow	37.6	33.9	28.4	0.0	109	98.6	1.4	290
Cavan	31.0	37.6	29.9	1.5	197	89.8	10.2	313
Clare	35.8	35.4	28.8	0.0	229	93.7	6.3	621
Cork	43.0	35.0	22.0	0.0	979	97.1	2.9	2757
Donegal	35.6	37.1	26.3	1.0	399	95.7	4.3	832
Dublin	47.5	32.5	20.0	0.0	3351	98.3	1.7	4362
Galway	32.1	31.5	36.4	0.0	685	96.2	3.8	914
Kerry	35.2	36.2	28.1	0.5	398	95.8	4.2	886
Kildare	45.6	31.4	23.0	0.0	287	97.6	2.4	592
Kilkenny	40.8	33.2	26.1	0.0	238	94.4	5.6	394
Laois	29.6	34.7	35.7	0.0	196	95.7	4.3	254
Leitrim	13.5	44.9	41.6	0.0	89	90.3	9.7	238
Limerick	30.5	40.2	29.3	0.0	522	94.3	5.7	786
Longford	26.9	35.2	33.3	4.6	108	94.2	5.8	190
Louth	52.1	27.5	19.7	0.7	305	100.0	0.0	274
Mayo	33.9	30.6	35.3	0.2	490	99.3	0.7	835
Meath	36.3	37.0	26.1	0.7	284	98.2	1.8	502
Monaghan	29.9	43.3	25.4	1.5	201	90.6	9.4	278
Offaly	37.7	37.2	25.1	0.0	247	96.6	3.4	267
Roscommon	28.7	37.7	33.2	0.4	268	94.3	5.7	336
Sligo	27.5	28.0	44.5	0.0	182	94.0	6.0	364
Tipp NR	31.0	40.7	28.2	0.0	216	96.3	3.7	382
Tipp SR	37.0	38.0	24.1	0.9	216	96.9	3.1	543
Waterford	31.3	36.3	32.2	0.3	320	93.7	6.3	397
Westmeath	30.0	32.4	37.2	0.5	207	96.0	4.0	374
Wexford	39.3	38.7	20.4	1.5	328	95.2	4.8	522
Wicklow	40.3	29.4	23.6	6.7	313	98.7	1.3	477
Total					11364			18980