

**TOWARDS  
THE  
DEVELOPMENT  
OF A  
RESOURCE  
ALLOCATION MODEL  
FOR PRIMARY,  
CONTINUING AND  
COMMUNITY CARE  
IN THE HEALTH SERVICES**

**Volume 1**

Executive Summary

**2010**



# **Towards the Development of a Resource Allocation Model for Primary, Continuing and Community Care in the Health Services**

## **Volume 1**

### **Executive Summary**

**Report prepared for the HSE and HRB by a research team lead by Professor  
Anthony Staines, DCU**

**2010**

## **Note**

This report is in two volumes. Volume 1 is written for a more general audience and is an extended executive summary of the more detailed Technical Report (Volume 2.) While some references are provided in Volume 1, Volume 2 contains the full set of references and a more detailed technical discussion.

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Ireland

The views expressed in this report reflect the views of the authors and do not necessarily represent those of UCD, DCU, the Health Research Board or the Health Service Executive.

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# Summary

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## Statement of principle

This report proposes a resource allocation model for the Irish health services based on the principle that each Irish resident should be provided with access to health services funded from general taxation and in proportion to their need for those services. At the moment, such a system cannot be deployed as some necessary financial information is not available. The information could be made available, and should be done as quickly as possible. If this information were made available, the model proposed here, while very crude, would serve as a good starting point for resource allocation and should be initiated as soon as possible. Any reasonable system of resource allocation would be an improvement on the system that is currently in place.

## Resource allocation

The issue of resource allocation raises a number of fundamental questions, all of which need to be answered. One basic question is: **'How much of the States resources should be spent on health services?'** A crucial additional question is: **'Given the total national spend, how should these resources be allocated between different services?'**

This study does not address either question. Rather, the question posed by the study was: **'Given the national spend on the health services, and existing allocation between services, how should the budget for each service be divided between PCCC areas in order to support access to services in rough proportion to the need for these services in each area?'** The current system does not allocate resources in a way that addresses this question.

The model developed in this study proposes to allocate **money** – not staff, facilities or equipment – to specified areas (LHO's for the purposes of this study) in which the managerial responsibility for ensuring that services are provided to the resident population of that area actually resides. This does not imply that services would have to be physically located within a particular LHO catchment area; neither does it imply that services would have to be provided by agencies either directly or indirectly managed by the relevant LHO managers. Currently, while many services are provided to LHO populations, they are either delivered outside the LHO, or they are provided by the voluntary sector or other providers. If the proposed model were implemented, this system would continue unchanged.

## Resource allocation models

This study conducted a review of resource allocation models currently in use by health services in a selection of developed countries. The study identified three major types of resource allocation models i.e. those based on individual health utilisation and demographic data (e.g. the Swedish model); those based primarily on small-area data (e.g. the English and Scottish models), and those based on direct assessment of health needs (e.g. the Welsh model). From this review, it was concluded that the best option for the Irish health services would be a model based on the principles of the Welsh model.

There is no single correct way to allocate resources, and there is no perfect model. What is required is a model that is comprehensible to non-specialists; is acceptable to practitioners, politicians and the general public; is flexible and is robust in the sense that small changes in the model and in the data will lead to small changes in resource allocation. The model proposed in this report has the capacity to meet these requirements.

## Resource allocation for PCCC in the HSE

At present, it is difficult to ascertain exactly how resources are allocated between care groups at LHO level. Budgets do not reflect service provision to the population at LHO level and there is no truly systematic approach to resource allocation.

This study proposes a new model, which would operate at LHO level; a model in which resource allocation is driven by LHO populations and is weighted by age and gender-specific estimated need. Need was estimated using as proxy age and gender-specific estimates of national GP and PCCC utilisation. Several possible sets of weights were derived, but this made little difference to the overall distribution of resources. These allocations were then further refined using estimates of the relationship between LHO-level data on deprivation and healthcare utilisation.

It is not currently possible to estimate the additional costs of providing services to dispersed rural populations due to the lack of LHO-level cost data. As a result, the effect of living in a rural area was not considered when designing the model, but this should be built into the design at a future date. The model lends itself easily to further extension.

The severe limitations of existing health information systems mean that any Irish model developed at present will necessarily be very crude. This report makes a number of specific recommendations aimed at bringing Irish health information systems into line with the necessary international standards. According as this is done, it will be possible to refine and improve resource allocation.

## Sources of data

All of the financial data used in the study was extracted from the HSE's financial reporting system, using the outcome data (that is, actual expenditure at year end, as opposed to budgeted expenditure) for 2006 and 2007. This is the system used to prepare reports on a common basis from the eleven separate financial systems operated by the former Health Boards. Work is underway to improve the recording and reporting of HSE expenditure in these systems, and there are significant improvements each year, but they are not yet completely consistent in the classification of expenditure.

## Implementation

In the current economic environment, where budgets are shrinking, the implementation of a resource allocation model will be difficult. This report suggests adopting a phased approach to implementing the resource allocation strategy i.e. one where the development of the financial system is agreed as a priority action. Only when this has been done will it be possible to develop actual budgets at LHO level for the provision of services to individual LHO populations. These budgets can then be compared with the proposed allocation derived from the model proposed in this study, and a strategy for gradual implementation can be devised.

This report suggests that an early decision on implementation is necessary and that this course of action might fit well with other work on integrated service plans within the PCCC service and elsewhere within the HSE. This study emphasises that an overly rapid implementation of any resource allocation system would be likely to cause severe damage to the delivery of healthcare to the Irish population.

## Other recommendations

This study illustrates with great clarity the inadequacy of current Irish health information systems for the management of the HSE. Addressing this must be a priority. The report recommends that a single unit within the HSE should have direct operational responsibility for running all the major health information systems, including the Hospitals Inpatients Enquiry System (HIPE), the National Psychiatric Inpatient Reporting system (NPIRS), the Primary Care Reimbursement Service (PCRS), and the disability databases. This operational unit should also be given a remit to develop and refine primary care information systems in partnership with GPs.



# Abbreviations

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ACRA	Advisory Committee on Resource Allocation	PYLL	Potential Years of Life Lost
ALOS	Average Length of Stay	QNHS	Quarterly National Household Survey
ASMR	Age-specific Mortality Rates	RA(M)	Resource Allocation (Model)
CARAN	Combining Age-related and Additional Needs	RAWP	Resource Allocation Working Party
CRS	Central Records System	RDF	Resource Distribution Formula
CSO	Central Statistics Office	RHA	Regional Health Administration
DCU	Dublin City University	RMI	Relative Mortality Index
DFLE	Disability-free Life Expectancy	SAPS	Small Area Population Statistics
DHB	District Health Board	SAHRU	Small Area Health Research Unit
DOHC	Department of Health and Children	SEHD	Scottish Executive Health Department
DRG	Diagnosis-related Group	SHARE	Scottish Health Authorities Revenue Equalisation
EA	Enumeration Areas	SLÁN	Survey of Lifestyle, Attitudes and Nutrition
ED	Electoral Divisions	SMR	Standardised Mortality Ratio
EDOCC	Education and Occupation	SSWD	Standardised Spatial Wage Differentials
ESRI	Economic and Social Research Institute	UA	Unitary Authority
GIS	Geographical Information System	UCD	University College Dublin
GLM	General Labour Market	WHS	Welsh Health Surveys
GMS	General Medical Services		
HBSC	Health Behaviour in School-age Children		
HCHS	Hospital and Community Health Services		
HIPE	Hospital In-patient Enquiry		
HRB	Health Research Board		
HSE	Health Service Executive		
HSSBNI	Health and Social Services Boards, Northern Ireland		
HURA	Health Utilisation Research Alliance		
ICD	International Classification of Diseases		
LHO	Local Health Organisation		
MFF	Market Forces Factor		
NCRI	National Cancer Registry of Ireland		
NHO	National Hospitals Office		
NHS	National Health Service		
NPIRS	National Psychiatric In-patient Reporting System		
OLS	Ordinary Least Squares		
PAS	Patient Administration System		
PCA	Principal Components Analysis		
PCCC	Primary Community and Continuing Care		
PCRS	Primary Care Reimbursement Service		
PCT	Primary Care Trust		
PoC	Programme of Care		

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# Recommendations

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**RECOMMENDATION 1**      **The HSE should prioritise the collection of LHO-level budgetary data that reflect expenditure on a population basis.**

*Current status:*

An exercise quantifying patient flows across LHOs for PCCC services was undertaken in 2007 and is currently being updated and reassessed.

**RECOMMENDATION 2**      **The HSE should support the adoption of a single health identifier for use on all health records, and should require its use in all HSE-funded activities.**

*Current status:*

The HSE is working on the development of a national client index, which will be an essential building block in the process of uniquely identifying patients.

**RECOMMENDATION 3**      **The HSE should develop a single consistent set of nested hierarchical boundaries for all services. These are built from Electoral Divisions at the moment, and will be built from the new census output areas in the future.**

*Current status:*

The HSE will continue to link with the CSO and other relevant bodies in order to improve the consistency of boundaries for the purpose of data collection.

**RECOMMENDATION 4**      **The HSE should adopt a central geocoding system based on the Geodirectory, with a web interface to permit geocoding by administrative staff of all changes of address, and with a link between the unique health identifier and the geocode at any given time.**

*Current status:*

Part of this functionality is already available in the Health Atlas, but has not as yet been used at service level for geocoding.

**Recommendation 5**      **The HSE should rationalise and improve current systems for recording health service activity, and it should carry out more detailed health service utilisation surveys on a regular basis.**

*Current status:*

A joint HSE/Department of Health and Children (DoHC) Performance Information Group was established in 2008 with the aim of simplifying, consolidating and sharing high-value performance data between the HSE and the DoHC while actively developing and improving data collection in all areas, with particular focus on service activity and outcome.

**RECOMMENDATION 6**      **Healthstat should be reviewed according as it develops, in order to ascertain whether the information it collects can be used to improve resource allocation in the Irish health services.**

*Current status:*

Under active development.

**RECOMMENDATION 7**      **A national survey on health service utilisation and major illness in adults and children is required and could be established by either expanding the SLÁN survey or by establishing a separate national survey with an adequate sample size, which would help researchers to make inferences at LHO level.**

*Current status:*

Not being actively developed.

**RECOMMENDATION 8**      **The HSE should consider ways of integrating existing and newly collected data in order to provide more reliable, robust and updated measures of population health need.**

*Current status:*

Not being actively developed

**RECOMMENDATION 9**      **The HSE should collect Irish data on the relationship between deprivation and both GP and PCCC service utilisation.**

*Current status:*

This data is not currently being collected, and requires coordinated efforts between the HSE, the Central Statistics Office (CSO) and others.

**RECOMMENDATION 10**      **The HSE should consider the deployment of the model proposed in this study, in tandem with other work on its financial systems.**

*Current status:*

To be considered.

**RECOMMENDATION 11**      **The HSE should establish a small group of HSE staff, civil servants, CSO staff, academics and others, charged with responsibility for developing, improving and maintaining the resource allocation model.**

*Current status:*

A national expert group on resource allocation has recently been established. The HSE currently has a team reviewing all related work in this area.

# 1. Resource allocation

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Resource allocation (RA) is a procedure for distributing resources between competing claims in order to achieve certain pre-specified goals. RA is an essential function of any government that is providing public services; in particular, it has become a major focus of work in health service planning in many countries. Active RA is driven by the need to achieve efficiency and equity in healthcare provision, regardless of the mechanisms by which these services are provided. The goal is to develop a sustainable and defensible method of distributing resources between areas.

The two central questions to be posed when considering any resource allocation process are: what is to be allocated and what purpose is intended to be achieved as a result of the allocation?

## 1.1 What is to be allocated?

This study examined allocation procedures for the Primary, Community and Continuing Care (PCCC) budget. The original objective of this study was to examine all major HSE services including, and with a particular focus on hospital services, for which a large amount of utilisation data exist (in the HIPE system). However, the study Steering Group requested a change in focus to cover only PCCC services because of a parallel internal HSE project on hospital services that got underway at the same time as this study.

The primary objective of this study was, therefore, to develop a basis for a workable scheme for the allocation of PCCC funding at LHO level in the Republic of Ireland, taking into account the current state of the Irish health service and the complex mix of public and private mechanisms that are used to deliver healthcare to Irish residents.

There are a number of very important questions about health service resources that can be posed. For example:

1. What should be the balance between health expenditure and other forms of State or public expenditure?
2. What should be the total health service expenditure?
3. Within the total health service expenditure what should be the allocation between different services e.g. PCCC, general practice, general hospital services and psychiatric hospital services?

These questions lie outside the scope of this study, but their significance was noted.

As the study drew to a close, the Minister for Health and Children, Ms Mary Harney TD, announced the establishment of a new group led by Professor Frances Ruane, ESRI. This group will:

“examine how the existing system of resource allocation within the Irish public health service can be improved in order to better support the aims of the health reform programme”.

The aims of this group are described as “improved health status and outcomes for people; quality assurance and patient safety; speed and equity of access and sustainability within the resources that are provided by the Government and Oireachtas”. It is hoped that Prof. Ruane and her group will find this study helpful to their deliberations.

## 1.2 What is the objective of allocation?

The strategy document *Quality and Fairness; A Health System for You* was published by the Department of Health and Children in 2001. Despite radical changes in the administrative structure of the health system since 2005, the four national goals set out in the 2001 strategy continue to be the focus of Ireland’s health services strategy. These goals are:

1. Health for all
2. Fair access

3. Responsive and appropriate care delivery
4. High performance

Any proposed resource allocation system must work towards the achievement of these four goals. While all four goals are important, the 'Fair access' goal is the one that most directly guides the design and construction of RA systems. Indeed, *Quality and Fairness* sets out four principles which should guide the implementation of the health services strategy. These principles are:

1. Equity and fairness
2. A people-centred service
3. Quality of care
4. Clear accountability

In 2009, Samantha Smith published an important report on equity in the Irish health system, *Equity in healthcare: a view from the Irish healthcare system*. The first part of this report is an extended critique of the ways in which the word 'equity' has been used in the development of Irish healthcare policy. Smith identifies four different uses of equity in discussions about healthcare policy. As follows:

- Ensure equal access to healthcare for every member of the population
- Distribute healthcare according to need
- Ensure equal distribution of healthcare
- Distribute healthcare on the basis of willingness to pay

Smith then describes some of the conceptual and linguistic confusions arising from the use of different ideas about equity in Irish health policy development. She infers that many of the problems in the Irish system are sustained at least in part by the conceptual confusion between the libertarian idea of equity (i.e. roughly equal care for equal money), and the more socially responsible vision of equal care for equal need.

The definition of equity set out in *Quality and Fairness: A health system for you* (DoHC, 2001) is as follows:

"Everyone should have a fair opportunity to attain their 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."

As Smith (2009) notes: "It is interesting that in this overall definition, conflicting principles can be identified. The first statement indicates a concern with equal opportunity (i.e. to achieve full health potential). On the other hand, the second statement (distinguishing between avoidable and unfair differences in health) focuses on disparities in actual health achievements, suggesting a concern with equality in health status."

For the purposes of this study, 'equal access to healthcare for equal need' was selected as the objective that the model is intended to support. In this context, access is taken to be related to the provision of resources at LHO level.

### **1.3 Where should resources be allocated?**

One important practical question to be considered for any resource allocation system is: 'What is the unit of allocation?' There are several possibilities for Ireland. The maps in Figure 1 indicate some of these possibilities. (Note: some of the boundaries in Fig. 1 are under revision at the time of writing this report). Currently, the HSE administrative and service structure is divided into four regions and 32 local health offices. Given this plethora of choices regarding area, what criteria should be used to determine areas for resource allocation?

One basic choice is between having a single unit of allocation for all services, or having multiple units of allocation for all services. The majority of healthcare systems have multiple units of allocation, with some element of 'top-slicing' for national services, and, in big countries such as the UK, for regional services. Each such level of allocation gives rise to its own costs and its own set of opportunities and incentives. As a result, there is a strong argument for keeping the process as simple as possible. In Ireland, a country with a population of just over four million, it is hard to argue the merits of having a regional as well as a local level for resource allocation.

The top-slicing of resources is an important issue. In most systems of hospital resource allocation, some national hospital services e.g. neurosurgical services, transplant services and paediatric oncology services – which are both individually very costly and relatively rarely needed – are top-sliced and excluded from the general system of resource allocation. This prevents simple statistical variation in costly service needs from destabilising budgets at local level. PCCC services and certain high cost services e.g. those for at-risk children, might need to be top-sliced for similar reasons.

At a local level, the choice is between a single set of areas, which are to be used for allocating all resources, and many sets of areas, one set of areas for each separate set of resources. The latter could easily be mapped onto the existing system, where there are separate boundaries for PCCC, hospital services, mental health services, PCRS, and primary care networks. The major drawback of this is the potential for conflict between those managing the services in different areas. For example, in late 2008 there was extensive media coverage of the prolonged stay in an acute hospital by a patient who required home nursing care. The provision for home nursing care was allocated from a different budget to the hospital budget, and the two agencies responsible for these budgets were unable to agree on how to provide the service to the patient in their own home. The use of common boundaries would help to avoid future similar arguments between different PCCC services about financial responsibility for individual patients or services.

The size of the allocation unit or body managing the resources is also an issue. The use of small units of resource management presents a number of problems. For example:

- Cost – because the financial implications of creating, staffing and running a large number of units to manage relatively small resources are severe;
- Population size – because small units can have far more year-to-year variation in costs, due, simply, to statistical variation (Bachman *et al.* 1996);
- Expertise – because it can be very difficult to staff small units with sufficient skilled people to ensure that responsibilities are executed effectively.

Large units pose a different set of problems. For example:

- Unresponsiveness to public needs;
- Poor planning due to the distance between the decision-makers and the service providers;
- Empire building, with its concomitant inefficiencies.

The model proposed in this study is based on the assumption that resources will be allocated and managed at LHO level. Ireland has 32 LHOs (Table 1). Should it be decided to use a different level for resource allocation, the proposed model could easily accommodate this change.



**Table 1: LHO level expenditure, total and per capita, for PCCC - 2007 outcome expenditure data**

LHO	Total population (2006 Census)	2007 expenditure	2007 expenditure per capita
Carlow/Kilkenny	120,631	€136,860,581	€1,135
Cavan/Monaghan	118,791	€115,354,045	€971
Clare	110,950	€106,282,411	€958
Donegal	147,264	€201,749,302	€1,370
Dublin North	222,049	€214,556,464	€966
Dublin North Central	126,572	€328,805,348	€2,598
Dublin North West	185,900	€197,863,406	€1,064
Dublin South	126,382	€131,398,630	€1,040
Dublin South City	134,344	€109,407,745	€814
Dublin South East	110,487	€189,575,595	€1,716
Dublin South West	147,422	€331,236,865	€2,247
Dublin West	134,020	€72,025,392	€537
Galway	231,670	€239,120,886	€1,032
Kerry	139,835	€156,915,225	€1,122
Kildare/West Wicklow	203,327	€121,767,735	€599
Laois/Offaly	137,927	€181,086,677	€1,313
Limerick	151,290	€154,013,155	€1,018
Longford/Westmeath	113,737	€168,390,263	€1,481
Louth	111,267	€102,088,888	€918
Mayo	123,839	€145,713,978	€1,177
Meath	162,831	€93,230,189	€573
North Cork	80,769	€103,186,584	€1,278
North Lee – Cork	167,701	€142,288,163	€848
North Tipperary/East Limerick	98,788	€85,647,976	€867
Roscommon	58,768	€70,088,398	€1,193
Sligo/Leitrim/West Cavan	91,053	€189,731,513	€2,084
South Lee – Cork	179,260	€157,115,096	€876
South Tipperary	88,441	€101,021,591	€1,142
Waterford	120,017	€120,634,326	€1,005
West Cork	53,565	€241,839,711	€4,515
Wexford	131,749	€109,834,306	€834
Wicklow	109,202	€112,998,820	€1,035
<b>Total</b>	<b>4,239,848</b>	<b>€4,931,829,262</b>	<b>€1,163</b>

The first important caveat, in looking at PCCC expenditure, is that the expenditures presented in Table 1 are actual LHO-level expenditures. Total PCCC expenditure was a little over €7.6 billion in 2007, of which only €4.93 billion was routed directly through LHOs. Of the remaining €2.5 billion, most was spent directly on providing services to PCCC patients, and was allocated through other agencies. To take one example: in 2007 just under half of the national budget for disability services was spent through voluntary sector agencies. During 2008, a greater proportion of the budget was allocated at LHO level.

The second important caveat in examining LHO data is that many LHOs hold the budgets for a range of services for neighbouring LHOs. The effect of this is to greatly increase the apparent differences in per capita expenditure at LHO level; this is illustrated in Table 1 where there are apparently

substantial differences between LHOs in their expenditures on services for their populations; for example the apparently high expenditure in West Cork reflects the purchasing of services for large areas of the former Southern Health Board thought that LHO, rather than any real service provision in West Cork. The real differences in LHO expenditure are almost certainly much less than the apparent differences suggested by Table 1.

Currently, the HSE records LHO budgets based on where specific services are provided, rather than on where LHO clients actually live. While it is possible, in principle, to obtain these re-allocated budgets, in practice, the necessary resources to do this within the HSE finance units cannot be made available at the moment.

### **RECOMMENDATION 1**

**The HSE should prioritise the collection of LHO-level budgetary data that reflect expenditure on a population basis.**

**Current status:**

**An exercise quantifying patient flows for PCCC services across LHOs was undertaken in 2007 and is currently being updated and reassessed.**

## 2. Review of resource allocation models used in other countries

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The different models used in other countries aim to distribute resources based on the relative needs of those countries' populations. The major differences between the models lie in how needs are defined and the data used to describe those needs, and also whether resources are allocated on an individual or small-area basis. More detail on each of these models, and references for further reading, are provided in *Towards the Development of a Resource Allocation Model for Primary, Continuing and Community Care in the Health Services: Volume 2, Technical Report*.

### 2.1 England

Since 1977, the English NHS has used a weighted capitation formula to determine target shares of available revenue resources between NHS areas. With this formula, the budget for an area is based on its share of the English population and this is then weighted in order to take account of that population's needs for healthcare services, relative to other areas of England. The weightings adjust for age distribution, additional need over and above that relating to age and unavoidable cost in the provision of services. GP registers are used to define the populations within each small area, as well as other residents for whom national data is available. Measures of indirect need are employed, including utilisation of health services, socio-economic characteristics, health status and measures of the existing supply of health services. A separate formula is used to address health inequalities; this is based on disability-free life expectancy.

### 2.2 Scotland

Scotland also uses a capitation system where the main determinant of resource allocation is population size, and where the intention is to minimise the impact of the extreme differences in population size between urban and rural health boards. The main objective of the Scottish model is to ensure that health funding is distributed on the basis of geographical pattern of health need. The data for populations within each health area are adjusted to take account of age and gender, morbidity and life circumstances, and unavoidable costs due to the remoteness of their home location. Postal-coded patient data from Censuses were used in the model to describe the population. A restricted number of important indirect need indicators was used, and were combined to create a composite, because the use of a large number of proxy need indicators had resulted in instability in subsequent outcomes.

### 2.3 Wales

Resource allocation in Wales was reviewed in 2001. This resulted in the introduction of a model that was based on measures of direct need, and was designed to improve overall health and reduce health inequalities. This novel approach involved an initial budget allocation to the various areas of service provision, followed by distribution within each small health area according to objectively measured levels of need. Estimates of direct health needs were based on a series of health condition indicators, which were developed from epidemiological and service-level data.

### 2.4 Northern Ireland

In Northern Ireland, a capitation formula is used to allocate resources according to population size, age and gender, estimates of additional needs of the population, and a special cost factor reflecting the impact of providing services to rural populations. Population and needs estimates are based on small area level and are defined by electoral boundaries. Each area budget is then divided into several care groups which are weighted according to age, gender and population need.

## **2.5 Sweden**

Healthcare in Sweden is funded and managed at local, regional and county level. There are several different systems in operation across Sweden's 26 counties. In the early 1990s, market-style reforms were introduced by many Swedish councils. The Stockholm model is one example where individual-level data is applied using a unique personal identification number. This system provides actual costs of healthcare expenditure for each individual in the catchment population. Therefore, utilisation data can be linked to several socio-economic indicators, and this results in funds being allocated to those populations that are considered to be most in need.

## **2.6 Portugal**

The Portuguese healthcare system is similar to the Irish one in that it is characterised by a public/private mix of healthcare finance and provision. In 2003, a capitation model was developed; this was adapted from the English model, and used census data to calculate population estimates. The Portuguese model includes population data at a district level. Needs estimates are based on diagnosis-related groups, adjusted for age and gender. Additional need is based on age-specific SMRs, potential years of life lost, and the Relative Mortality Index.

## **2.7 New South Wales**

New South Wales is currently the only state in Australia that uses an explicit resource allocation system called the Resource Distribution Formula. Using a capitation model, the annual budget is first distributed among nine healthcare programmes, and is then distributed among the 17 area health services. The population of each area is weighted by age and gender, and adjustments are also made for people of Aboriginal origin, for people who are homeless, for private hospital care and also for rurality. Needs are estimated using a generic needs indicator which is derived from a formula that includes SMR, an index of educational occupational status and a rurality index.

## **2.8 New Zealand**

New Zealand uses a population-based funding formula that determines the share of funding to be allocated to different districts nationwide, and is based on the number of people living in each district. The projected population of each District Health Board is adjusted according to the national average cost of the health and disability support services used by different demographic groups. Service-based costs are weighted by age, gender, ethnicity and a deprivation index. An additional weighting is included for unmet needs; this aims to reduce disparities between population groups. Adjustments are also made for rurality and for overseas visitors.

## **2.9 Lessons from abroad**

There is no single correct way to allocate resources, and there is no perfect model. What is required is a model that is comprehensible to non-specialists, and is acceptable to practitioners, politicians and the general public. It must also be flexible and robust in the sense that small changes in the model, and also in the data, will lead to small changes in resource allocation. In every system examined certain resources are excluded from allocation – usually resources for which the unit cost is very high.

## 3. Data issues

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The preparation of this report relied extensively on the use of Irish health system data. As a result, some clear recommendations emerged on urgent changes that would need to be made in HSE information systems before any attempt is made to deploy a resource allocation model in Ireland. Briefly, before any model can be deployed, LHO-level expenditures must be known with certainty. The current health information systems will only support a relatively crude model. While even a crude model would be a substantial improvement on the current situation, better information systems would result in the development of a far superior model and this in turn would be likely to result in better resource allocation. Discussion of data issues in this chapter is divided into six sections - personal identifiers, borders, locations, health service utilisation data, health service operational data, and personal health data.

### 3.1 Personal identifiers

Currently, unique personal identifiers are not used extensively across the Irish health services. Instead, different areas of the health service use their own identifiers for each client, a system that is very costly to maintain, as every identifier must be located, checked and recorded for each client visit.

A common occurrence that arises directly as a result of this system is that people may have more than one identifier – each with a corresponding set of records that are retained by a given service provider. The system can give rise to serious errors in patient care, where essential information known to the service is not acted upon. It can also lead to substantial unnecessary costs, where medical investigations are replicated without good reason.

From a resource allocation perspective, the main impact that results from such fragmentation of records is that routine utilisation data becomes difficult to use. It is unnecessarily difficult to ascertain which services are being provided to whom. For example, with the HIPE system there is no simple way of matching data on a patient who is transferred from one hospital to another. As a result, calculating costs for episodes of care that cross institutional boundaries is very difficult. In countries that operate a properly functioning system of unique identifiers, the process of identifying resource utilisation across health service organisational boundaries is comparatively simple. The same problems arise in PCCC. In Irish general practice, where quite sophisticated computerised record systems are the norm, there is no expectation that these systems will link into hospital systems, or that PCCC systems will support the transfer of information. It is, of course, true that the introduction of unique personal identifiers would not be enough to facilitate effective transfer of information between services and areas, but they would certainly contribute significantly to achieving this goal.

The adoption of unique personal identifiers will require legislation in order to provide a sound basis for ensuring the security and confidentiality of clients' personal health data and health service utilisation data. The adoption of such identifiers is recommended in both *A Vision for Change* (Department of Health and Children, 2006) and in the national health information strategy *Health Information – a National Strategy* (Department of Health and Children, 2004). A number of European countries, notably Finland and Denmark, operate well-established systems on a statutory basis, and these systems might serve to provide useful templates for Ireland. In the case of the European countries' systems, the use of an identifier is strictly regulated by legislation and rigorous procedures, which protect privacy but permit data linkage for research purposes, are provided. A new Health Information Bill is being developed in Ireland, which will, hopefully, provide a clearer legal basis for the deployment of unique personal identifiers across the Irish health services.

## RECOMMENDATION 2

**The HSE should support the adoption of a single health identifier for use on all health records, and should require the use of such identifiers for all HSE-funded activities.**

**Current status:**

**The HSE is working on the development of a national client index which will be an essential building block in the process of uniquely identifying patients.**

### 3.2 Borders

The HSE uses quite a number of different internal boundaries in allocating resources. These are of great practical importance in the context of this study because, presumably, at least one of them will serve as the basis for allocating resources in the future – either to the 32 LHOs, to the four regions, or to some other boundary (Figure 1). At the moment, these boundaries present a number of challenges.

In order to understand these challenges, it is necessary to describe briefly the basis on which the current administrative boundaries in Ireland were established. Originally, Irish boundaries were derived from townlands, which were built up into civil parishes, baronies and counties. District Electoral Divisions, now known more correctly as Electoral Divisions (EDs), were established as subdivisions of the Poor Law Unions, and their boundaries were largely defined by the time the 1888 Local Government Act became law. EDs have great practical importance, as they are the primary reporting areas used in Irish censuses.

The vast majority of administrative boundaries in the Republic of Ireland are derived from aggregates of EDs. Unfortunately, however, this is not the case for the HSE, and a significant number of HSE boundaries cross ED boundaries. This has led to many anomalies e.g. the need to support two sets of boundaries for LHOs. The first of these boundaries is an approximation based on EDs for which census data are available; these are referred to as 'statistical LHO boundaries'. The second is based on actual LHO boundaries. EDs are not a satisfactory long-term solution as they were originally drafted in the 1870s to secure areas of approximately equal rateable value and correspond to nothing in particular on the ground. In urban areas in particular, EDs are far too large to be of practical value for health service planning purposes.

The Ordinance Survey of Ireland (OSI) and the Central Statistics Office (CSO) have worked with Martin Charlton, National Centre for Geocomputation, National University of Ireland Maynooth to develop a new set of output areas. It is hoped that Small Area Population Statistics (SAPS) from the 2011 Census will be published for these areas, in addition to the customary EDs nationwide and Enumeration Areas (EAs) in cities. On average, the new output areas are much smaller and more consistent in population size than EDs

The output areas generally correspond with townland boundaries in rural areas, but are especially designed within urban areas to be as socially homogeneous as possible. Natural physical boundaries such as arterial roads, railways and canals are used where possible as boundaries for the output areas. Minor roads (e.g. streets within a housing estate) are used as foci rather than as boundaries. (In other words, the houses on both sides of a street will generally be deemed to be in the same output area).

Each output area is designed to contain a minimum of 65 households. More typically, however, output areas contain about 120 households. It is envisaged that the boundaries will remain fixed into the future, in order to facilitate temporal comparisons. However, some areas may need to be sub-

divided to take account of population growth, and a few adjoining areas may need to be merged on a once-off basis if the population of one particular area falls below the threshold. (This is similar to the practice that is adopted for EDs currently.) These output areas would be a far superior basis for defining areas for HSE purposes in the future, and this report recommends that whatever unit is ultimately used for resource allocation be derived from these areas.

HSE boundaries would also benefit from some rationalisation. Having to support resource allocation models based on several different boundaries would be extremely challenging. It would almost certainly be beneficial if the unit for resource allocation (whatever that might prove to be ultimately) were to have responsibility for all service provision for a specified population.

Another fundamental problem arises in relation to the different geographies used by the various routine data systems being operated in Ireland. Most of these systems use county boundaries; for example, this is the case for the registration of births and deaths and for much of HIPE. HIPE uses postal areas in Dublin to determine boundaries – an approach to defining boundaries that is not used in other State information. NPIRS uses HSE mental health catchment areas, which are close to, but not identical to, LHO boundaries. The PCRS uses the old Health Board areas. Budgetary reports, although generated within the former Health Board structures, use LHO boundaries, as does much of the internal activity reporting system e.g. Healthstat. Even using county borders as boundaries poses problems, as some data sources report Dublin as one county; some report it as two boundary areas (e.g. city and county); some report it as four boundary areas (e.g. Fingal, Dublin City, Dun Laoghaire/Rathdown and South). Some data sources provide separate information for the five main cities (Dublin, Cork, Galway, Limerick and Waterford) as well as for their county boroughs, and some do not. The existing LHO boundaries in Dublin do not relate to the four county boundaries within the Dublin area.

Each of the sets of boundaries described above is costly to maintain, and the different boundaries are not mutually compatible. In particular, there is no simple way for data recorded at county level to be converted to LHO-level data. It is important to emphasise that these costs affect every single user of health data in Ireland, including the HSE, Department of Health and Children, researchers, local authorities and the private sector - each of which has to invest resources in managing these various boundaries.

### **RECOMMENDATION 3**

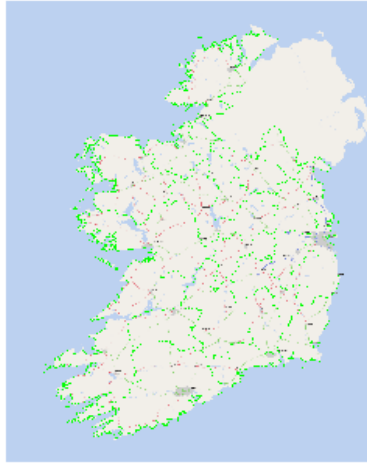
**The HSE should develop a single consistent set of nested hierarchical boundaries for all services. These are derived from EDs at the moment, but will be derived from the new Census output areas in the future.**

**Current status:**

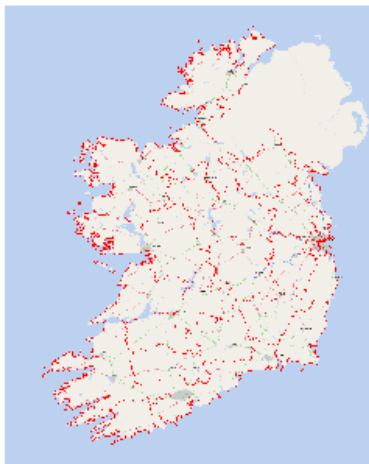
**The HSE will continue to work with the CSO and other relevant bodies in order to improve the consistency of boundaries for data collection.**



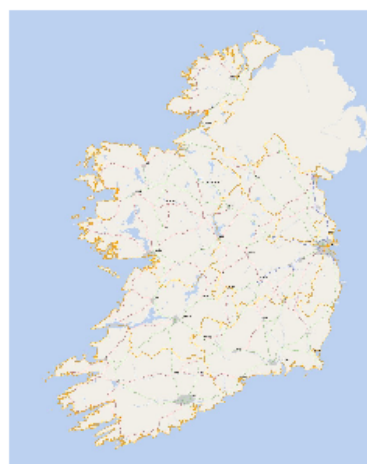
HSE Regions



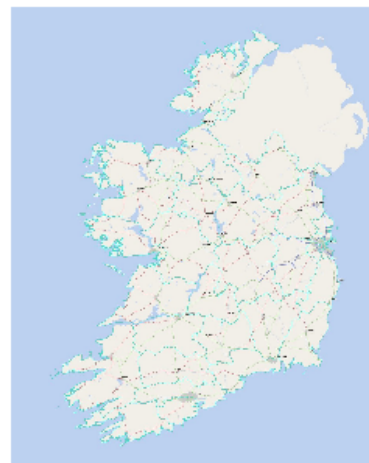
Counties



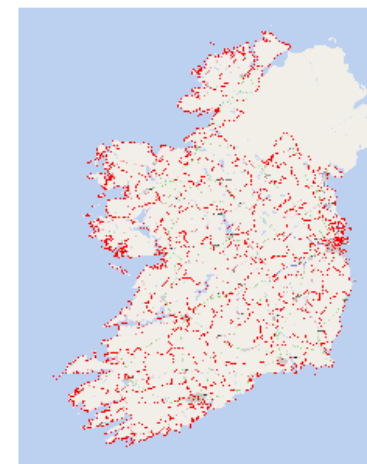
Local Health Offices



Hospital Networks



Mental health areas



Primary Care Networks

**Figure 1: Selected HSE boundaries**



### 3.3 Locations

Location is an issue for the implementation of any resource allocation model at two levels.. The first relates to the correct assignment of population and health events to the areas where resources are to be allocated. The second relates to the correct assignment of resources to those areas. As described above, HSE boundaries contain a number of anomalies. While rectifying these poses significant challenges for the HSE, in practice, the scale of the problem is such that these anomalies have been ignored in developing a model. This study has therefore used statistical LHO boundaries in developing a RA model.

There is just one national set of health data available that has a high proportion of correct geo-coded events and that is the National Cancer Registry (NCRI). It uses a time-consuming manual process, built on the Geo-Directory system, to link newly diagnosed cases of cancer with EDs. The address of the person newly diagnosed is matched against the system, and remaining queries are resolved manually. While most addresses in urban areas can be matched quite easily, for rural addresses (which make up almost one in three of all Irish addresses) matching is far more difficult and less reliable.

Despite the time-consuming processing required, the high rate of geo-coding contributes significant added value to the NCRI. In particular, work on the aetiology of cancer and the delivery of cancer care benefit greatly from access to geo-coded data. Without these data it would be significantly more difficult for the NCRI to achieve its objectives.

For the HSE as a whole, the value of reliable geo-coded health event data would be considerable. At the moment, the choice of boundaries is constrained by the ability of the reporting systems to monitor activity and/or outcomes in those boundaries. In practice, the existing systems are rarely used to monitor service provision; however, since the advent of the Health Atlas they have increasingly been used to develop service plans. Flexible reporting systems – using high quality geo-coding – would make it much easier to develop boundaries for service provision that made sense, and which reflected the current realities of resource location.

The most efficient way to manage geo-coding is to use personal identifiers, and to link these with an address, a grid reference, and a time period. This means supporting once-off geo-coding when the address or change of address is registered, and is made accessible to the GP, to other primary care providers, and to hospital IT systems. This could readily be done by using a single web-based system. The alternative is to embed geo-coding capabilities into every single Patient Administration System (PAS) in the HSE. The recent announcement by the Government of its intention to introduce postal codes nationwide over the next few years will make geo-coding easier and more reliable.

#### **RECOMMENDATION 4**

**The HSE should adopt a central geo-coding system based on the Geodirectory, with a web interface to permit geo-coding by administrative staff of all changes of address, with a link between the unique health identifier and the geo-code at any given time.**

**Current status:**

**Part of this functionality is already available in the Health Atlas, but it has not yet been used at service level for geo-coding.**

### 3.4 Health service utilisation

The Irish health services collect a great deal of health service utilisation information. There are two large systems: HIPE, which records hospital discharges and is run by the Economic and Social Research Institute (ESRI) on behalf of the HSE, and the NPIRS, which records in-patient stays and is run by the Health Research Board (HRB). These systems are run separately and do not collect comparable information, although there is now a substantial overlap between the organisations from which data is collected, since many acute hospitals now provide psychiatric in-patient care.

Much less systematic collection of information takes place on community-based care and out-patient care although a project aimed at extending the NPIRS to cover community mental health activity has recently commenced. The HSE case mix team work closely with the hospital sector to identify costs and at the moment they are expanding their work to include an examination of out-patient costs. While there is little centrally collected information on other primary care activities, the HSE's Healthstat team are beginning to collect some PCCC information. Although the PCRS (formerly known as the GMS Payments Board) collects information on GP activity for medical card holders only, in reality most of this is prescription data only. Data are also collected from the Drugs Payment Scheme, the Long-Term Illness Scheme, the High-tech Prescriptions Scheme, and a number of other related schemes. Data on privately-funded GP care is not collected anywhere, although the virtual ubiquity of computerisation in Irish general practice suggests that this would not be too difficult to achieve through, for example, a sentinel practice network.

The most extensive population-based study of health service utilisation in Ireland is the Insight '07 study. This was a national survey of health service satisfaction, with fieldwork carried out in early 2007; it involved asking a large sample of the adult population about their use of a wide range of health services during the previous year. This survey was one of the starting points used in this study for estimating utilisation of GP and PCCC services in the model described below.

#### RECOMMENDATION 5

**The HSE should rationalise and improve current systems for recording health service activity, and it should carry out more detailed health service utilisation surveys on a regular basis.**

**Current status:**

**A joint HSE/DoHC performance information group was established in 2008 with the aim of simplifying, consolidating and sharing high-value performance data between the HSE and the DoHC while actively developing and improving data collection in all areas, and maintaining a particular focus on service activity and outcomes.**

### 3.5 Health service operational data

Healthstat is a new system developed by the HSE during 2008/2009. Healthstat is designed to monitor the operation of the health service by making the performance monitoring reports (which themselves gather data from many different parts of the HSE) widely available within the HSE. While the Healthstat process is well developed for the hospital sector, at the time of writing reporting processes for PCCC activity remain in development. Healthstat<sup>1</sup> divides indicators into three groups: access, integration and resources:-

<sup>1</sup> Source Healthstat (<http://www.hse.ie/eng/Healthstat/metrics/>)

- 'Access' measures the waiting times that people experience for different services. Are patients able to access consultant-led out-patient clinics, diagnostic services, treatments, procedures and emergency services within acceptable timescales?
- 'Integration' checks that the services received are patient-centred. Are people receiving out-patient or daycare when they should be receiving them? Where services are suitable, are people being admitted on the day on which their procedure will take place? Is the length of stay for in-patients in line with what should be expected? Are patients and their families informed about their treatment and included in the discharge planning process?
- 'Resources' assesses whether a hospital is making the best use of its human and financial resources. Is a hospital serving acceptable numbers of patients? Are budget spend and staff numbers in line with what have been planned? What is the absenteeism rate?

The specific indicators used for the hospital sector are shown in Table 2.

**Table 2: Healthstat categories for hospital sector activity**

Access	Integration	Resources
Waiting times for:	Day case rates	Staffing and absenteeism
• Planned procedures	Average lengths of stay	Management of:
• Emergency department admissions	Day-of-procedure admission rates	• Social work • Physiotherapy • Occupational Therapy
• Diagnostics	Delayed discharges	• Radiology
• Therapies	Use of in-patient beds	• Consultant clinics
Average lengths of stay		Budget/spend
Out-patient clinics		Meeting activity targets

While Healthstat is of great practical importance for monitoring HSE activity, it currently provides very limited information about health service utilisation. This may change over time.

## RECOMMENDATION 6

**Healthstat should be reviewed according as it develops, to see if the information it collects can be used to improve resource allocation in the Irish health services.**

**Current status:**

**Under active development**

### 3.6 Health status

There are limited data available on the health status of the Irish population. The main sources of information are the SLÁN surveys, a series of health surveys conducted on a national sample of the adult population in 1998, 2002 and 2006. These surveys provide good information on health status, with some specific questions on ill health and disease; some general health status questions as well as very detailed information on lifestyle, but very little information on health service utilisation. The most recent survey has collected very detailed data on mental health. These studies were intended, as the name SLÁN suggests, to provide good data on the lifestyle of the Irish population and how these lifestyles might influence the status of people's health. The achieved sample sizes of the three surveys were 6,539 (62% response rate), 5,992 (53% response rate) and 10,634 (62% response rate).

A useful supplementary source of information is the Quarterly National Household Survey, which incorporated a health module in 2007 (Central Statistics Office 2008). While the main focus of this survey is labour market participation, it also includes periodic surveys on special topics. The survey is limited to those aged 18 years and over. Data were collected on health status, health service utilisation, limiting long-term illness, and doctor-diagnosed chronic illness.

For data on the health status of children, the main sources are the Health Behaviour in School-aged Children (HBSC) studies. These are a series of studies co-ordinated by an international steering committee, in which Ireland has participated since 1989. In the most recent study, carried out in 2006, 10,334 children and adolescents undertook a self-completion questionnaire administered in their schools. Information was collected on self-reported health as well as on a wide range of lifestyle issues such as smoking, use of alcohol, and diet.

The SLÁN and HBSC studies are excellent, are carried out to a very high standard, and provide much valuable information on health-related behaviour in the Irish population. The major drawback of these studies, for the purposes of resource allocation, is the relatively limited data collected on the population's actual health status. The Quarterly National Household Study special module on health is also useful, but it does not provide sufficient detail on the actual services used to directly support resource allocation. The Welsh Health Survey (Fuller and Heeks 2008), which collected detailed data on recent health service utilisation as well as detailed data on major medical conditions, might serve as a model for future development of these surveys, or might suggest the need for a specific survey with a stronger focus on health service activity.

#### **RECOMMENDATION 7**

**A national survey on health service utilisation and major illness in adults and children is required and could be established by either the expanding SLÁN survey, or by establishing a separate national survey with adequate sample size so that it would be possible to make inferences at LHO level.**

**Current status:**

**Not being actively developed**

## 4. Measuring need for healthcare services

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The idea of 'need' for healthcare services is elusive. Resource allocation models, no matter how diverse, all have one common feature: they are intended to align health service expenditure and health service needs – 'equal access for equal need'.

Bradshaw (1972) famously divided 'needs' into four categories:

- 'normative need', as defined by an expert;
- 'felt need', defined by those who express the need;
- 'expressed need', where felt need leads to action;
- 'comparative need', where the characteristics of a population who receive a service are ascertained, and where people similar to those who do receive a service (but who themselves do not) are judged to be in need.

It is 'comparative need' that drives much health service resource allocation.

In some countries, comparative need is measured directly by health service utilisation; this is the case in England and Scotland (Carr-Hill *et al.* 1994; Smith *et al.* 2001; Health and Community Care Committee 1999). In other countries, it is measured by socio-economic proxies such as 'deprivation' – as, for example, in Sweden – (Diderichsen *et al.* 1997; 2004). Gordon *et al.* (2001) have developed direct measures of healthcare need primarily based on disease prevalence data in one form or another. Oliver and Mossialos (2004) describe the problems of turning the body of work in this area into policy prescriptions for health service resource allocation (RA). The direction in which they propose that one should look for a solution is a combination of the ideas of morbidity and capacity to benefit.

Another critical point raised in Oliver and Mossialos' work is the role of both supply and demand factors in driving utilisation. On the supply side, the ability to overcome inefficient patterns of both over-supply and under-supply due to historic resource allocation may be very limited (Oliver and Mossialos 2004; Asthana *et al.* 2004; Oliveira and Bevan 2003). On the demand side, the ability of more deprived people to access services, even where these are made available to them, may be severely limited. This is an issue of great relevance in Ireland where the evidence suggests that primary care fees suppress a great deal of healthcare demand from people who are just above the medical card limit (O'Reilly *et al.* 2007).

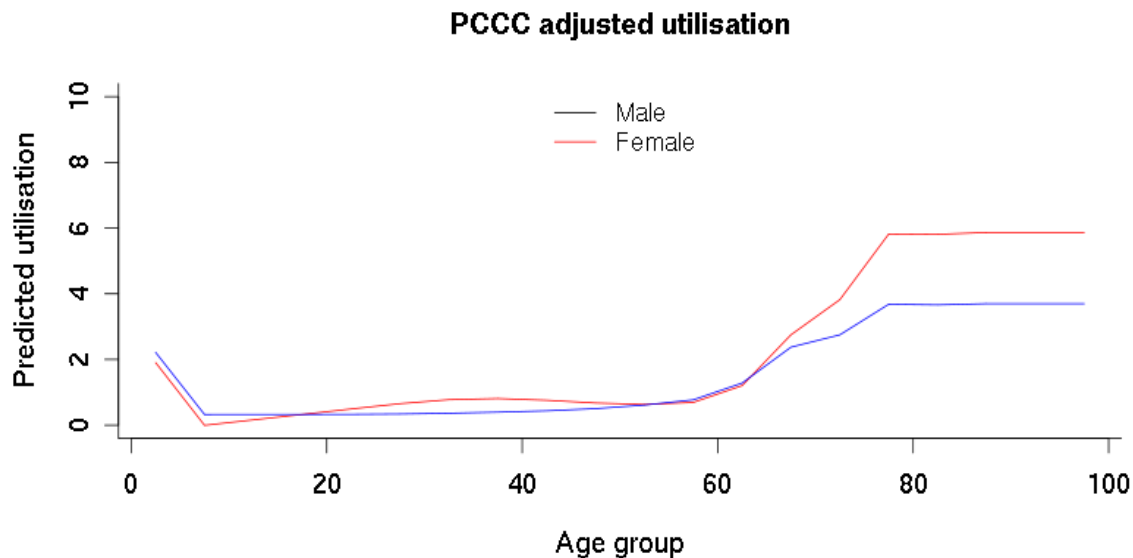
For this study the original intention was to use existing routine data sources to estimate need, or proxies for need, at LHO level. This is essentially the strategy used by Gordon *et al.* (2001) in developing their RA model for Wales.

This proved impossible for several reasons. These included limitations in the data collected; the decision to work only on PCCC services; the issues of differences between data collection boundaries and health service boundaries; and difficulties with access to the necessary detail in one major health service dataset (i.e. the NPIRS). After some reflection, and following discussions with researchers as well as the HSE/HRB Steering Committee, the use of estimated utilisation as a proxy for need was agreed.

### 4.1 Utilisation as a proxy for need

The assessment of utilisation by age and gender involved a great deal of work with the literature on GP utilisation, and with data from Insight '07, all of which is described in more detail in the Technical Report (Volume 2). The result of this work is a recommendation for the use of age- and gender-specific estimated utilisation, shown in Figure 2, for the purpose of resource allocation in PCCC. Five

other sets of weights were developed, which are provided in the associated spreadsheet, and are discussed more fully in the Technical Report (Volume 2). While these have some impact on the resources allocated to any given LHO, in practice, the effect is relatively modest (see Table 3).



**Figure 2: Plot of estimated PCCC utilisation by age and gender, based on GP utilisation data from Nolan and Nolan (2007), and the ratio of GP utilisation to PCCC utilisation reported in the Insight '07 study**

Figure 2 shows the estimated utilisation of all PCCC services, expressed as (approximately) service uses per year, per person, by age, for men and women separately. It should be noted that the apparent plateau for utilisation at ages 80 years and above is based on very little data, and may not reflect the actual situation. It would be expected that utilisation of services would increase more or less linearly with age over 85 years, although it is possible that the pattern of services used would be quite different.

### **RECOMMENDATION 8**

**The HSE should consider ways of integrating existing and newly-collected data in order to provide more reliable, robust and updated measures of population health need.**

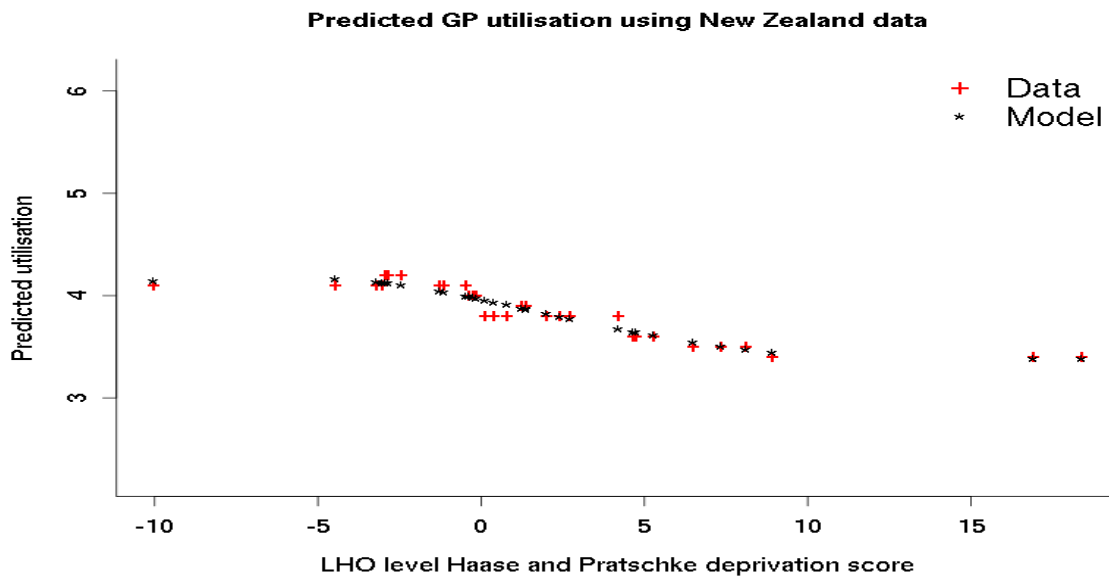
**Current status:**

**Not being actively developed**

These estimated utilisations play a key role in the development of an RA model. The main driver for the allocation of resources to any area is the total population of that area. However, it is well-established that different people have very different patterns of health services use. The logical basis for using utilisation as a proxy for need is that people do not use health services unless they feel a need to do so. This need might or might not be well-founded from the perspective of a health professional, but it does provide a starting point.

Much more detail on this model, on the data used to support it, and on the processes used when developing it are provided in the Technical Report (Volume 2).

Taking the data in Figure 2, it seems broadly appropriate that an LHO which has a greater proportion of older people and children will be assessed as having a higher need for PCCC services than an LHO which has a greater proportion of young adults.



**Figure 3: Relationship between the Haase and Pratschke deprivation score at LHO level and estimated GP utilisation. 'Data' are the observed data for the 32 LHOs and 'Model' is the values predicted by a regression model fitted to these data.**

## 4.2 Other model elements

The second issue to be addressed in developing an RA model is that of deprivation. In this study, the allowances that can be made, in the absence of LHO-level budgetary data, was deduced by making the assumption that a similar relationship exists between deprivation, as measured at LHO level by the Haase and Pratschke (2008) deprivation score, and GP utilisation, as was observed in a recent study from New Zealand (HURA, 2006). The results of this analysis are shown in Figure 3. The graph is not based on any Irish data; that said, it would be better to use this data, however crude it may be, rather than neglect the impacts of deprivation on healthcare needs.

### RECOMMENDATION 9

**The HSE should collect Irish data on the relationship between deprivation and both GP and PCCC service utilisation.**

**Current status:**

**This data is not currently being collected and requires coordinated work between the HSE, CSO and others.**

## 5. Deciding on a model for resource allocation

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Using the available Irish data, and also taking into account experience with RA in other countries as well as the particular needs and requirements of the Irish health services, the task of this study was to select a model for RA in Ireland. As is described in more detail in the Technical Report (Volume 2), a number of possible models were considered.

### 5.1 Options for an Irish model

There are two main ways to use health data to build an RA model: direct and indirect. The direct approach uses morbidity data to measure health service needs. The indirect approach is a two-stage process whereby health service utilisation data is used to measure needs – firstly, by examining the effects of age and gender, and, secondly, by accounting for additional needs due to influences (e.g. deprivation) over and above the age/gender effects.

The main limitations identified when considering the construction of an RA formula using an indirect approach were:

- Data-demanding process that require the use of complex statistical analyses.
- Patient-level data is needed to carry out the required statistical analyses. When this is not available, access to small area-level data is essential.
- The existence of healthcare budgets based on historical costs makes the application of an indirect approach highly unstable by emphasising patterns of utilisation and supply that have not been responsive to population needs.
- The need for the continuous generation of healthcare data as inputs to the statistical analysis of additional needs indicators.
- Lack of transparency and comprehensibility of the statistical analysis needed to derive the additional needs indicators required by the resource allocation formula. (These tend to be too complex for non-specialists to understand).
- Persistent difficulties in separating the effects of true need on utilisation of healthcare from the effects of the existing pattern of supply and demand. There is a fundamental problem of endogeneity in service supply, which needs to be dealt with in the statistical analysis, in order to avoid biased weights.

The use of a direct approach, as proposed by Gordon *et al.* (2001) in the development of the Wales NHS resource allocation formula, is suggested by the research team. The justification for this is summarised as follows:

- The direct approach is less data-demanding and relies on data sources that are already available in Ireland i.e. the 2006 Irish Census of Population as a source for vital statistics, long-term illness and impairment, Irish Cancer Registry, SLÁN (for primary care), the Quarterly National Household Survey (CSO), HIPE, etc.
- The differences in the geographical distribution of sickness and death, as shown for the UK, confirm that mortality rates, widely used in resource allocation formulae that adopt the indirect approach, are not the best indicator of health need. It seems preferable to allocate resources for the treatment of mental illness, for example, on the basis of reliable measurements of morbidity, rather than on the age, gender and social class distribution of the population, weighted by death rates.



- Empirical evidence from countries/regions currently using the indirect approach in their resource allocation formulas (England, Northern Ireland and Scotland in particular) suggesting the introduction of more direct measures of need in their models.

It should be emphasised that the main factor influencing the allocation of resources to any area for almost all services will be the population to be served by that service.

It was concluded that, firstly, standard indirect models for Ireland were impossible to apply due to the absence of small-area health data or individual-level health data. Direct models were very challenging, due to the lack of morbidity data at the level of allocation that this study proposed to use, i.e. the LHO. A final option, which is proposed as a starting point for the process of formal resource allocation within the HSE, is a model that uses estimates at national level of service utilisation by age and gender (e.g. as set out in Figure 2), and estimates of GP utilisation by area-level deprivation (see Figure 3), in order to drive resource allocation at LHO level.

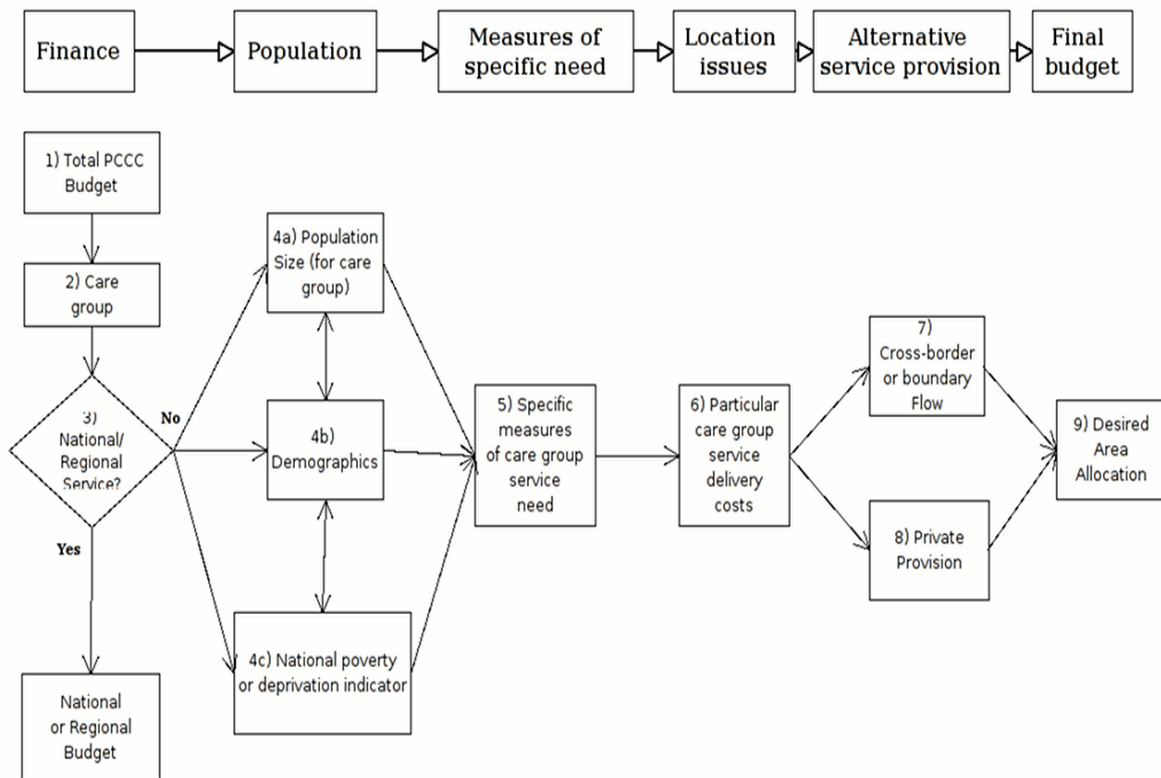
## 5.2 Recommendations for allocation

The basis for the final system of allocations is shown in Figure 4.

The elements of the proposed model are as follows:

1. Total PCCC budget: this is determined as part of the HSE budgetary process. It totalled €7.63 billion for 2007.
2. Care group: the total budget is divided into 14 elements, covering a range of care groups and types of service provision – some at LHO level, some at regional level, and some at national level.
3. National/Regional service: the budgets are further divided into those elements spent at LHO level and those spent at regional or national level.
4. The LHO-level budget is then apportioned to each LHO, taking into account three elements.
  - a. The population to whom the budget is being provided (e.g. elderly people, young people, or the whole population)
  - b. The age and gender breakdown of that population at LHO level, derived from the 2006 Population Census.
  - c. National poverty or deprivation indicator: this study used an LHO-level measure of deprivation (Haase and Pratschke 2008).
5. Specific measures of care group need. As discussed above, this did not prove feasible. Instead, it is proposed to use estimated GP and PCCC utilisation by age and gender.
6. Particular care group service delivery costs: it is the authors view that the costs of service delivery are likely to be notably higher in serving dispersed rural populations than in serving more compact urban or village populations. Currently, there is no HSE data available that would permit any quantification of this effect.
7. Cross-boundary patient flow: it had been widely supposed that there is a substantial utilisation of services in Northern Ireland by people normally resident in the Republic of Ireland. While absolute certainty is not possible, in the view of the Northern Ireland resource allocation unit, this is not a major component of healthcare provision (Capitation Formula Review Group, 2004).
8. Private provision of services: the private sector is not well-developed in most of the areas of service considered here. The HSE is the dominant funding agency.
9. Desired area allocation: this is calculated by taking the population of each LHO, broken down by age and gender, and multiplying that population by the relevant age- and

gender-specific estimated utilisations. These weights are then adjusted for LHO-level deprivation, and the total LHO budget for that service is distributed in direct proportion to the adjusted weights.



**Figure 4: Structure of proposed resource allocation model**

### 5.3 Impact of choice of weights on LHO budgets

In the proposed model, the resources provided to a given LHO for any particular service depend on the size of the population in that LHO, the age and gender distribution of that population, and the particular set of age and gender weights selected. As discussed in more detail in the Technical Report (Volume 2), there are many possible choices of weights. Six sets of weights were created, all based on reasonable assumptions. One critical question that might be asked is: 'How much difference does it make to choose one set of weights rather than another?'

A simple measure of the impact of these alternative weights on LHO-level allocations is illustrated in Table 3. This presents the range of the budget allocations, and was arrived at by using each of the sets of estimated utilisations (i.e. the biggest per capita budget minus the smallest per capita budget). As the per capita LHO-level budgets vary greatly in size between services, these ranges are divided by the median budget for that service and for that LHO from amongst those budgets produced by using each of the sets of estimated utilisations. The final result is the average percentage change in the budget for each service in each LHO based on the use of each of the different weights. Much more detail on these is provided in the spreadsheet included with the Technical Report (Volume 2).

These impacts are presented separately for services directed at young people, at older people, and at the whole population. As Table 3 shows, while there is significant variation, it lies within reasonable limits, with the highest change in a single LHO being 10.2%.

**Table 3: The range of budgets, using only weights adjusted for LHO-level deprivation, as a percentage of the median budget per capita for service groups, supplied to young people, the whole population, and people aged over 65 years**

LHO	Children, adolescents and families	All other services	Older persons
Carlow/Kilkenny	0.6%	0.4%	0.2%
Cavan/Monaghan	2.1%	4.0%	1.0%
Clare	0.8%	1.3%	0.3%
Donegal	1.5%	4.0%	0.5%
Dublin North	1.4%	5.4%	3.8%
Dublin North Central	2.7%	5.2%	2.4%
Dublin North West	6.1%	6.3%	1.0%
Dublin South	5.8%	7.9%	1.3%
Dublin South City	1.2%	5.5%	2.9%
Dublin South East	1.2%	5.7%	2.9%
Dublin South West	0.4%	3.9%	1.5%
Dublin West	3.8%	9.6%	0.6%
Galway	0.4%	0.2%	0.1%
Kerry	2.9%	5.4%	0.2%
Kildare/West Wicklow	3.1%	10.2%	1.5%
Laois/Offaly	0.7%	2.2%	0.7%
Limerick	1.9%	1.1%	0.2%
Longford/Westmeath	0.5%	1.5%	0.7%
Louth	1.2%	1.9%	0.6%
Mayo	3.0%	7.9%	1.0%
Meath	3.8%	7.5%	0.9%
North Cork	0.3%	4.9%	1.3%
North Lee – Cork	1.2%	3.4%	1.1%
North Tipperary/East Limerick	1.7%	1.2%	0.1%
Roscommon	2.1%	9.1%	1.1%
Sligo/Leitrim/West Cavan	2.7%	6.5%	1.0%
South Lee – Cork	1.4%	0.5%	0.2%
South Tipperary	2.2%	4.1%	0.1%
Waterford	0.1%	1.9%	0.8%
West Cork	3.7%	9.5%	0.4%
Wexford	0.6%	1.1%	2.0%
Wicklow	0.7%	3.1%	0.8%
<b>MEDIAN</b>	<b>1.5%</b>	<b>4.0%</b>	<b>0.8%</b>

The final results of this study are illustrated in Table 4. This shows the recommended per capita budget (in euro) for each area of LHO-level PCCC expenditure. By comparing this with Table 1, it can be seen that the distribution of resources between LHOs is much more even. The study also developed a spreadsheet that documents the model calculations in more detail, and provides ready access to the mechanics of the proposed model for interested parties, which may be found accompanying the Technical Report (Volume 2).

**Table 4: LHO level budgets for all service groups, based on 2007 outcome expenditure data for PCCC only, with weights derived from the estimated PCCC utilization based on the Nolan and Nolan (2007) GP utilization data, and the corrected GP:PCCC utilization ratios from Insight '07, adjusted for LHO level deprivation**

LHO	Children, adolescents and families	Disability services	Mental health	Older persons	Multi-care group services	Palliative care	PCCC corporate	Population health	Primary Care	Social Inclusion
Carlow/Kilkenny	€469	€197	€177	€2,210	€141	€10	€2	€6	€247	€26
Cavan/Monaghan	€497	€216	€194	€2,392	€155	€11	€2	€7	€271	€28
Clare	€448	€191	€171	€2,097	€137	€9	€2	€6	€239	€25
Donegal	€500	€219	€197	€2,360	€157	€11	€2	€7	€275	€29
Dublin North	€448	€175	€157	€1,979	€126	€9	€2	€6	€220	€23
Dublin North Central	€480	€210	€188	€2,383	€151	€10	€2	€7	€263	€27
Dublin North West	€503	€185	€166	€2,287	€133	€9	€2	€6	€232	€24
Dublin South	€394	€188	€169	€1,964	€135	€9	€2	€6	€236	€25
Dublin South City	€417	€166	€149	€2,059	€119	€8	€2	€5	€208	€22
Dublin South East	€408	€178	€160	€2,010	€128	€9	€2	€6	€224	€23
Dublin South West	€505	€205	€183	€2,330	€147	€10	€2	€6	€257	€27
Dublin West	€516	€186	€167	€2,337	€133	€9	€2	€6	€233	€24
Galway	€458	€190	€170	€2,157	€136	€9	€2	€6	€238	€25
Kerry	€475	€218	€195	€2,272	€156	€11	€2	€7	€273	€28
Kildare/West Wicklow	€439	€158	€142	€1,964	€114	€8	€2	€5	€198	€21
Laois/Offaly	€489	€200	€179	€2,261	€143	€10	€2	€6	€250	€26
Limerick	€484	€206	€185	€2,300	€148	€10	€2	€7	€259	€27
Longford/Westmeath	€484	€203	€182	€2,292	€146	€10	€2	€6	€255	€27
Louth	€509	€206	€185	€2,374	€148	€10	€2	€7	€259	€27
Mayo	€492	€231	€207	€2,395	€166	€11	€2	€7	€290	€30

LHO	Children, adolescents and families	Disability services	Mental health	Older persons	Multi-care group services	Palliative care	PCCC corporate	Population health	Primary Care	Social Inclusion
Meath	€446	€165	€148	€2,002	€119	€8	€2	€5	€207	€22
North Cork	€466	€205	€184	€2,224	€147	€10	€2	€7	€257	€27
North Lee – Cork	€476	€189	€170	€2,180	€136	€9	€2	€6	€238	€25
North Tipperary/East Limerick	€438	€185	€166	€2,083	€133	€9	€2	€6	€232	€24
Roscommon	€464	€218	€195	€2,246	€156	€11	€2	€7	€273	€28
Sligo/Leitrim/West Cavan	€467	€215	€193	€2,267	€154	€11	€2	€7	€270	€28
South Lee – Cork	€414	€172	€154	€1,971	€123	€9	€2	€5	€216	€22
South Tipperary	€478	€212	€190	€2,286	€152	€11	€2	€7	€266	€28
Waterford	€480	€204	€183	€2,226	€146	€10	€2	€6	€256	€27
West Cork	€452	€216	€193	€2,177	€155	€11	€2	€7	€271	€28
Wexford	€502	€211	€189	€2,286	€151	€10	€2	€7	€264	€27
Wicklow	€442	€179	€160	€2,042	€128	€9	€2	€6	€224	€23

## 6. Implementation

Implementing a Resource Allocation model is much more difficult than designing that model. A number of elements are likely to be necessary in order to successfully achieve implementation. This report emphasises that the model presented is not perfect and is not complete. It would be quite easy for the HSE to spend a decade developing a more perfect model, but it is proposed that the model should be improved and refined at the same time as it is being implemented. Real RA models are never perfect, and work on improving them is never finished. The alternative to some form of RA model, no matter how crude and preliminary, is the current unsatisfactory system, not a perfect system. The Technical Report (Volume 2) contains a much more detailed discussion of implementation issues.

### 6.1 Financial issues

Currently, the model described in this report cannot be implemented. This is not due to any fundamental defect in the model itself; rather it is because the basic facilities required for the safe implementation of any resource allocation process are not yet available. The HSE is still working with a number of legacy financial systems that are not fully integrated. Until further work on these systems is completed, any attempt to allocate resources using the approach outlined here (or indeed, any other approach) is likely to fail because it will not be feasible to estimate the impact of the resource allocation process on LHO budgets. This report emphasises that the model does not require the deployment of a fully integrated financial system, however desirable this might be.

#### **RECOMMENDATION 10**

**The HSE should consider the deployment of the model proposed in this report, in tandem with other work on its financial systems.**

**Current status:**

**To be considered**

### 6.2 Ownership and maintenance of the model

If the model is to be implemented by the HSE, it must also be owned by the HSE. For successful implementation, support will be needed at several different levels. In the first place, support within the HSE, both at board level and, crucially, at LHO level, will be essential. The first step in obtaining support will involve meeting with the managers affected by the proposed model – in this case the LHO managers. This step could not be taken as part of the study because the Steering Group stated a preference for postponing these discussions until the model was further developed.

It is probable that any attempt to produce a resource allocation model that is not accepted and supported by these key managers will fail. It would be unreasonable to expect every manager to welcome every aspect of the new process, but the general model must be familiar to them and acceptable to them. Political support and the support of the Department of Health and Children will also be important. It is suggested that whoever undertakes responsibility for maintaining the model should arrange to brief Department of Health and Children officials and the Oireachtas Committee on Health and Children as a matter of urgency.

A specific group within the HSE will be required to take responsibility for further developing, implementing and maintaining the model. This group will have to work closely with personnel from the HSE Health Intelligence Unit and HSE Finance Department, and with the LHO managers. This group should be established immediately.

### 6.3 Speed of introduction

The report recommends a gradual process of introducing these new budgets, based on the Irish experience with introducing case mix-based payments in the acute hospital sector, and on international experience, especially that in Wales and England. However, a gradual process does not mean that the HSE should wait for a long time to begin implementation. The integrated service programme, which is due to start in 2010, would provide an excellent opportunity to begin allocating resources using more formal methods.

In order to do this, the existing LHO budgets need to be compared with those proposed in the model developed through this study. There will, in all likelihood, be substantial differences between the two budgets. It is suggested that implementing a process to remedy this should run over a maximum of five to eight years, should have agreed and detailed timings, and should secure clear agreement in advance on how the changes would be managed. Ideally, the process would operate by allocating growth money to LHOs that are in deficit relative to the model; growth money would not be allocated to those LHOs that have a budget surplus relative to the model. However, given the current national economic situation, this approach is not likely to be possible in the short term.

This report emphasises the critical importance of updating the model at least annually during the development phase. As new data become available, it should be possible to greatly refine this very crude model. To take two examples: Healthstat data for services for the elderly and for people with disabilities should facilitate a much more refined estimate of need than that presented here. Secondly, improved data on the geography of disability, elicited from the 2009 CSO study, will support much more refined resource allocation for these services. It is particularly important for the approach taken by the proposed model (where the major driver of resources is demography) that the underlying population estimates are updated regularly.

### 6.4 Development of HSE PCCC services and resource allocation

Many developments are currently under consideration by the HSE. By design, the model proposed by this report could adapt to these developments. Any system that assigns a manager responsibility for providing specific services to a known population can be managed using a variant of the proposed model. Refinements of care groups would be simple, provided that the relevant population and utilisation data can be obtained.

#### **RECOMMENDATION 11**

**The HSE should establish a small group of HSE staff, civil servants, CSO staff, academics and others, charged with responsibility for developing, improving and maintaining the resource allocation model.**

**Current status:**

**A national expert group on resource allocation has recently been established. The HSE currently has a team in place to review all related work in this area.**

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