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AN ANALYSIS OF POPULATION-BASED RESOURCE ALLOCATION FOR HEALTH AND SOCIAL CARE IN IRELAND

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AN INSTITIÚID UM THAIGHDE EACNAMAÍOCHTA AGUS SÓISIALTA
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ABBREVIATIONS

ABF	Activity-based funding
ACRA	Advisory Committee on Resource Allocation
CCG	Clinical Commissioning Group
CHN	Community Health Network
CHO	Community healthcare organisation
CIPC	Counselling in Primary Care
COPD	Chronic obstructive pulmonary disease
CSO	Central Statistics Office
DEIS	Delivering Equality of Opportunity in Schools
DHB	District Health Board
DRG	Diagnosis-related group
ESRI	Economic and Social Research Institute
EU	European Union
GP	General practitioner
HIPE	Hospital In-Patient Enquiry
HIS	Healthy Ireland Survey
HNI	Health Need Index
HR	Health Region
HRB	Health Research Board
HSE	Health Service Executive
ICB	Integrated care boards
IHA	Integrated health areas
KPI	Key performance indicator
LHO	Local health office
LOS	Length of stay
LTRC	Long-term residential care
MFF	Market forces factor
MLC	Morbidity and life circumstances
NHS	National Health Service (UK)
NHSS	Nursing Home Support Scheme
NRAC	National Resource Allocation Committee
NSW	New South Wales
NTPF	National Treatment Purchase Fund
ONS	Office for National Statistics

OOP	Out-of-pocket
PBR	Payment by Results
PBRA	Population-based resource allocation
PCRS	Primary Care Reimbursement Scheme
PHI	Private health insurance
PN	Practice nurse
PPSN	Personal Public Service Number
RICO	Regional Integrated Care Organisation
SAPS	Small Area Population Statistics
SIMD	Scottish Index of Multiple Deprivation
TILDA	The Irish Longitudinal Study on Ageing
UK	United Kingdom
WHO	World Health Organization
WTE	Whole time equivalent

EXECUTIVE SUMMARY

INTRODUCTION

The effectiveness of a healthcare system depends on its ability to distribute resources equitably and efficiently, aiming to improve the health and well-being of the population. This report, funded through a Department of Health research programme, examines the critical issue of healthcare resource allocation in Ireland. Its findings underscore the need for a resource allocation mechanism that can effectively address the varying healthcare demands across the country. The focus is on evaluating the current resource allocation mechanisms and exploring the potential of implementing population-based resource allocation (PBRA) mechanisms within proposed HSE Health Regions (HRs).

PBRA mechanisms are employed successfully in other countries, and offer a structured approach to allocate healthcare resources based on population needs. These models consider various factors such as age, health status and socioeconomic conditions, ensuring a more equitable distribution of healthcare services. In Ireland, we have lacked a system-wide PBRA-type mechanism for making systematic health and social care resource allocation decisions. Within the Irish healthcare system, where challenges arise from demographic change and ongoing capacity constraints, PBRA mechanisms present an opportunity to enhance the efficiency and fairness of resource allocation. This proposed shift towards PBRA would also help to further the main goals of Sláintecare, by ensuring affordable universal healthcare for all, transferring more care into primary and community care settings, and developing a resource allocation mechanism to distribute funding, workforce and capacity to improve overall population health.

The report aims to provide evidence to inform the establishment of PBRA in Ireland. It examines PBRA mechanisms within international systems and resource allocation and funding mechanisms in the Irish healthcare system. Lessons from this exercise are used to evaluate the Health Service Executive (HSE) HR restructuring and the PBRA formulae proposed by the Department of Health.

METHODS

This report initially examines PBRA systems internationally, as well as the literature evaluating these systems. The report highlights the main parameters included within PBRA mechanisms in comparator countries, including Australia, Canada, England, Scotland and Sweden. It also outlines other important considerations for policymakers when introducing or expanding PBRA within a healthcare system, including the health and social care services to be included, the transition adjustments that may be required, and the governance structures needed for PBRA mechanisms to succeed.

Four important case studies are highlighted, which provide examples of resource allocations and funding mechanisms in Ireland, offering lessons for the regional restructuring and PBRA formulae proposed.

Finally, the report examines the HSE HR restructuring and proposed Department of Health PBRA formulae for healthcare in Ireland. We outline the key parameters included in the formulae, and develop a range of discussion points and recommendations based on the international and national analyses conducted.

FINDINGS

The proposed PBRA formulae for HSE HRs, developed by the Department of Health, represent a significant step forward for Irish healthcare in terms of resource allocation and decision-making. The formulae are based on population size, age and sex profiles, deprivation profiles and rurality profiles of the six HSE HRs, adjusted sequentially. They are proposed to cover key health and social care services, including HSE-funded acute public hospital care, community care and some services for older people. The formulae are simple and clear, and their parameters largely match those in countries with more established PBRA mechanisms. We suggest that some modifications may be required to enhance their effectiveness.

Overall, the methodology used to determine the PBRA parameters, and the parameters included, closely follow those used in other countries and will likely lead to a more equitable allocation of funding. The parameters, and the level of data available to inform them, also increase the potential for developing medium-term health and social care budgets. However, based on the arbitrary weights applied to both deprivation and rurality, an evaluation of appropriate weighting schemes is recommended, possibly drawing lessons from other public policy allocation mechanisms, such as the DEIS (Delivering Equality of Opportunity in Schools) education programme.

The report found no evidence of additional health differences across HSE HRs that need to be accounted for in the formulae, though we note data availability may curtail this analysis. However, we identified a clear impact of medical card coverage on healthcare demand, even after controlling for age, sex and deprivation. Parameters like medical card status, not typically featured in other countries' PBRA formulae, were excluded from the proposed Irish PBRA. However, given the unique nature of the Irish healthcare system and the evidence that medical cards are associated with higher healthcare demand, policymakers should consider including medical card coverage in resource allocation decisions.

Nearly half of all HSE expenditure is currently excluded from the proposed PBRA mechanism, with decision-making to remain at central level (the HSE Centre) for many important health and social care services. Expenditures on the Primary Care Reimbursement Scheme (PCRS) for general practitioner (GP) and dental care, and the Nursing Home Support Scheme (NHSS – 'Fair Deal'), are notable exclusions from the PBRA formulae. Without these components, the PBRA mechanism may not reflect a full understanding of the actual resource needs of HRs, potentially exacerbating inequalities in the distribution of resources across regions and population groups. The non-inclusion of these services is likely to hinder PBRA and HRs from effectively implementing key integrated care pathways for significant population groups. Despite data challenges, we identify existing data that could allow for the inclusion of these sectors in the PBRA.

The implementation of PBRA will change how funding allocations occur within the HSE, and Irish health and social care more generally. A convergence or transition process, akin to that used in the National Health Service (NHS) England, should be employed to gradually move from initial funding levels to target allocations, ensuring that sudden financial impacts are mitigated. Governance and oversight of the PBRA and the transition to HRs are vital for their success. An advisory group, as proposed by the Department of Health, is essential for PBRA implementation. Such a group could also facilitate routine evaluation of the formulae and guide future iterations of the PBRA mechanism.

DISCUSSION

Devolving decision-making to HSE HRs, and implementing PBRA across the Irish healthcare system, has the potential to significantly improve the efficient and equitable allocation of health and social care resources. This process will also help embed key proposals from Sláintecare, and represents a pivotal step towards further developing a universal healthcare system and new models of innovative and integrated care.

The initial PBRA formulae proposed are commendable and align closely with those implemented by international peer countries. However, PBRA should be viewed as a process that evolves over time. This report suggests that two factors should be prioritised by policymakers: expanding the range of services included, particularly for publicly funded GP care (via the PCRS) and older peoples' care, and evaluating the necessity of adjustments for medical cardholders. Additionally, the effectiveness of PBRA is currently hindered by deficits in health information systems and data. Investment in improved data systems is essential, as such systems will enhance the effectiveness of PBRA.

Recent decades have witnessed several organisational structure changes and proposals within the Irish healthcare system. All these changes have been constrained by the absence of a coherent resource allocation mechanism and

decision-making structure. Implementing PBRA, and expanding its scope, is crucial to improving the health and social care system. However, substantial investment and political commitment are required to ensure the necessary changes are fully realised.

CHAPTER 1
Introduction

1.1 RESOURCE ALLOCATION IN HEALTHCARE

The effectiveness of a healthcare system depends on its ability to distribute resources equitably and efficiently, with the aim of improving the health and well-being of the population. This fundamental aim is often impacted by policymakers and planners being constrained by healthcare budgets, or by scarce workforce, physical capacity or equipment to meet patient needs. To help increase the effectiveness of available resources, resource allocation mechanisms are commonly integrated within healthcare systems to systematically assign resources for various uses. These mechanisms can be designed to focus on attributes that planners desire, such as equity, efficiency/productivity, profit maximisation and transparency in resource usage. In healthcare these mechanisms are generally used to equitably divide resources across regions or population groups. Even with increases in healthcare budgets, such as those that have occurred in Ireland in recent years, both at a system-wide and sectoral level, the lack of a systematic system to aid in resource allocation within a healthcare system reduces the efficiency and equity of the system, and potentially impedes better healthcare outcomes.

There are myriad ways in which health and social care are funded and organised worldwide (Mossialos et al., 2002). In general, healthcare systems can be categorised by the extent to which their funding models rely on public or private funding. The National Health Service (NHS) in the United Kingdom (UK) is a government run and funded health service that provides universal care. In many European countries (e.g., Germany, the Netherlands and Switzerland), statutory health insurance is a key feature of system financing. Meanwhile, in the United States (US), healthcare is financed through private health insurance and large public programmes such as Medicaid and Medicare. Each of these systems also differs in how different healthcare services are funded, and the extent to which services and funding are integrated across the system. The healthcare system in Ireland shares common features with many of these systems.

In addition to differences in funding, healthcare systems vary according to the level at which funding, and resource allocation, decisions are made. The combination of these decisions and the level at which they are made is the ‘fundamental challenge’ policymakers face in developing a plan to deliver health and social care services to meet the population’s needs (Rice et al., 2002). Historically, centralised national/regional planners and policymakers made decisions on allocations across the system (Rice et al., 2002). However, as healthcare systems have matured, different funding mechanisms have been incorporated for various sectors. Responsibility for planning and delivering care has been devolved to regional

planning in many systems. Rice et al. (2002) termed this devolution of budgeting 'strategic resource allocation'. This process can generally take the form of:

- retrospective reimbursement for expenditure incurred;
- activity-based funding (ABF) based upon a schedule of fixed fees for providing an episode of care (e.g., an inpatient hospital stay); and
- fixed budgeting, with funding provided based on expected expenditure in the short to medium term.

In their recent processes of devolving decision-making to regional or more localised levels, countries such as England, Denmark and New Zealand have tended to shift to fixed budgeting over a short- or medium-term horizon. As highlighted by Rice et al. (2002), and more recently by Howdon et al. (2022), resource allocation decisions that move from Method 1 towards Method 3 also shift risk from a centralised state funder towards local decision-makers or providers of care. It is this shift to fixed regional budgets based upon population needs that often equates to resource allocation proposals made by health researchers in Ireland, including within the Sláintecare report (Houses of the Oireachtas Committee on the Future of Healthcare, 2017; Burke et al., 2018).

This report is set within a number of important contexts. First it builds upon the Sláintecare report and the Government's goal to increase devolution of decision-making to local decision-makers. Second it is set within the context of the need to implement population-based resource allocation (PBRA) and to develop a more integrated system of care.

1.2 HEALTHCARE RESOURCE ALLOCATION IN IRELAND

Ireland currently lacks a systematic health and social care resource allocation system that allows resources to be matched to sectors and populations with the greatest need. The absence of such a system and the resulting issues have been documented in several analyses in recent years. Two extensive reports, commissioned by health authorities and published in 2010, outlined the necessity of such a mechanism and the potential forms these mechanisms could take (Brick et al., 2010; Vega et al., 2010). Subsequent to these reports, the CEO of the HSE stated:

> *The HSE will be flagging a move to allocating resources on a population basis in the Service Plan 2011.* (HSE, 2010).

However, despite these recommendations and subsequent statements, a resource allocation system was not introduced into the Irish healthcare system.

In more recent years some improvements in resource allocation have been made in certain areas. For example, in 2016, ABF was adopted as the main method

through which funding for inpatient and day patient care in large acute public hospitals was allocated (Keegan et al., 2020). This shift towards ABF, away from block funding, in Irish acute public hospitals, can be seen as an important shift in how healthcare services are funded in Ireland (HSE, 2015). As we discuss in Chapter 3, the adoption of ABF has represented a substantial change and offers policymakers guidance for future research allocation and funding mechanism options. However, the expansion of similar methods to other sectors, and the integration of funding decisions across sectors, has not yet occurred.

A systematic resource allocation system assists local and national healthcare planners in efficiently allocating budgets and services to meet population needs. The lack of a resource allocation system designed to account for the population's healthcare needs considerably hinders healthcare planners. The absence of a resource allocation system, similar to systems that exist across many contemporaneous countries, also contributes to other constraints that pose substantial challenges and directly affect the quality of healthcare delivery within the Irish healthcare system. Previous research has highlighted that key constraints – such as the lack of healthcare workers (Keegan et al., 2022), physical facilities and infrastructure (Walsh et al., 2023), coordinated care pathways and health information systems (Walsh et al., 2021) – all impede the efficiency of the Irish healthcare system. While several factors underpin these issues, these studies have highlighted that the lack of a resource allocation system designed to account for the population's healthcare needs is partly to blame.

Many issues arise as a result of the current lack of a systematic resource allocation mechanism in Ireland. Notably, as healthcare funding in Ireland is often determined by historical spending, any previous inequitable allocation or unmet need (due to waiting lists, reduced access to care or cost barriers) will be reinforced (Vega et al., 2010). This can result in funding not being directed to meet the health needs of the population, or it not being used to maximise health outcomes given the available resources (Vega et al., 2010). Rather, the current system reinforces and exacerbates any structural inequalities that may exist. Moreover, as illustrated in Section 3.2.2 on urgent and emergency care, the development of different funding structures across regions and by deprivation levels is fragmented and inconsistent, with no identifiable funding allocation method.

The lack of a resource allocation system has resulted in inefficient distribution of resources and staffing across regions in Ireland. Previous research by the Economic and Social Research Institute (ESRI) examined the supply of primary, community and long-term healthcare services in Ireland in 2014 (Smith et al., 2019). The key findings, illustrated in Figure A.1 in Appendix A, show notable inequalities in the distribution of health and social care services across counties. A recurrent trend of undersupply in care was seen across numerous counties. The greater Dublin commuter belt (Kildare, Meath, Wicklow) and the southeastern counties

consistently exhibited a lower supply of primary and community care services compared to the national average. Kildare and Meath, in particular, showed a significantly lower supply, falling at least 10 per cent below the national average for all non-acute community and primary care services examined. Additionally, Wexford and Wicklow displayed an undersupply that was at least 10 per cent lower than the national average for 7 out of the 8 non-acute community and primary care services evaluated. The authors also adjusted the supply to account for need-related factors, such as age, mortality rates, rates of disability, medical card usage and chronic illness rates. Even after these adjustments, the findings repeatedly demonstrated that adjusting for needs did not eliminate the observed disparities in supply.

In general, apart from some key exceptions (such as ABF in public hospitals), the HSE still allocates health and social care resources based on historic patterns of demand for services (Johnston et al., 2021). This approach raises several issues, as current service use patterns may not accurately reflect either current or future population needs, due to the omission of unmet need, thereby reinforcing structural inequities (Johnston et al., 2021). Additionally, given the rapidly growing and ageing population in Ireland, and the clear importance of demographics on healthcare demand and expenditure requirements (Keegan et al., 2020; Casey et al., 2021; Walsh et al., 2021), relying on historic patterns may embed systematic underestimations of healthcare resource needs when determining the annual HSE budget. To account for this, in the absence of a resource allocation system in the short term, consideration should be given to cost barriers and long waits to access care, as well as changes to the structure of the population when determining the healthcare system's requirements.

The absence of a resource allocation mechanism was also outlined in the Sláintecare report as impeding many of the changes required to expand universal healthcare in Ireland (Houses of the Oireachtas Committee on the Future of Healthcare, 2017; Burke et al., 2018). Since the publication of the Sláintecare report, and subsequent Sláintecare implementation plans, there has been increased preparation for PBRA and regional devolution of health and social care planning and governance. The Department of Health have outlined the appropriateness of a PBRA approach based upon the regionalisation of health and social care (McCarthy et al., 2022; O'Malley et al., 2023). These reports outlined the appropriateness of a PBRA approach based upon the regionalisation of health and social care. The approach follows that taken in Australia, England, the Netherlands, New Zealand and Scotland, all of which have developed PBRA systems to help distribute healthcare resources efficiently to meet the demands of their population.

This report, funded through a research programme by the Department of Health, provides an overview of PBRA, detailing important factors included in

contemporaneous systems within peer countries. Building upon this review, the report offers insights from other healthcare systems about the appropriate evolutions PBRA in Ireland should take in the coming years. Expanding upon the analyses undertaken previously (McCarthy et al., 2022; O'Malley et al., 2023), this report identifies obstacles to the successful integration of PBRA in Ireland and suggests how the system can be improved moving forward, by modifying elements of the current proposed PBRA formula and adopting approaches implemented across international PBRA systems.

1.3 RESOURCE ALLOCATION PROPOSALS

1.3.1 HSE Health Regions

In 2020 the Minister for Health outlined plans to develop six HSE Health Regions (HRs – previously referred to as Regional Integrated Care Organisations and Regional Health Areas at various stages of the proposal process). These HRs would incorporate community healthcare organisations (CHOs) and Hospital Group structures in a coterminous geographical structure (i.e., having the same geographic boundaries). However, the emergence of the COVID-19 pandemic stalled the establishment of regional bodies, with much of the response to the pandemic undertaken at a centralised level.

The proposed restructuring of the healthcare system is the latest in a long list of transformations in its structural and regional configurations in recent decades (Tussing et al., 2006; Burke et al., 2016; Wren et al., 2017; Braun et al., 2023). Following the Health Act 1970, a system of regional health boards was developed, which provided a more localised governance of healthcare services. In 2003, the report of the Commission on Financial Management and Control Systems in the Health Service (also known as the Brennan report) recommended the ending of the health board structure, and the establishment of a national body responsible for delivering and managing care (Department of Health and Children, 2003). This resulted in the establishment of the HSE in 2005. Since then, a number of organisational changes have been made (and proposed). The short-lived integrated service areas (ISAs) aimed to streamline services and improve patient care continuity. Further reorganisation led to the creation of CHOs, which are responsible for delivering community-based health and social care services. Concurrently, Hospital Groups were formed, clustering hospitals to work together as a single entity to deliver acute care, ensuring higher standards and more efficient use of resources. CHOs and Hospital Groups were both operational by 2015.

In 2017, the Sláintecare report proposed major changes to the structure of Ireland's health and social care services (Houses of the Oireachtas Committee on the Future of Healthcare, 2017). The primary goals of Sláintecare include ensuring affordable universal healthcare for all, transferring more care into primary and

community care settings, and developing a mechanism to distribute funding, workforce and capacity to improve overall population health. A key aspect of this approach was the development of regional decision-making bodies that would include governance structures to connect acute hospital, primary and community health and social care services. The report also recommended that staff recruitment (including that of hospital consultants) should be undertaken at the regional level. Subsequent to the report, the development of HRs was central to the first Sláintecare Implementation Strategy (Government of Ireland, 2018). The report outlined:

> … *the value of geographical alignment for population-based resource allocation (PBRA) and governance to enable integrated care.*
>
> (Houses of the Oireachtas Committee on the Future of Healthcare, 2017, p. 20)

In April 2023, it was announced that the implementation of HRs would commence in 2024 (HSE, 2023).

1.3.2 Population-based resource allocation

In 2022 and 2023, the Department of Health published two pivotal reports presenting options for a new PBRA mechanism for Ireland (McCarthy et al., 2022; O'Malley et al., 2023). These reports outlined a potential model for allocating HSE resources. The proposed PBRA formula was based on models from other countries, including those discussed in the next chapter.

Using evidence from other countries, and analysis within previous reports (Johnston et al., 2021), the Department of Health published a proposed formula for the initial PBRA in Ireland (O'Malley et al., 2023). The proposed PBRA formula is:

$$AdjPop_{HR} = ProjPop_{HR}\ x\ Age\_SexIndex_{HR}\ x\ DepIndex_{HR}\ x\ RurIndex_{HR}$$

where the adjusted population of each HR ($AdjPop_{HR}$) accounts for the (projected) population of each HR ($ProjPop_{HR}$), the age and sex composition of each HR ($Age\_SexIndex_{HR}$), the level of deprivation in each HR ($DepIndex_{HR}$), and the rurality or remoteness of each HR ($RurIndex_{HR}$).

The Department of Health reports recommended that only HSE acute and community expenditure, and some services for older people, be subject to the PBRA over the short to medium term. This would exclude over 50 per cent of 2019 HSE operational expenditure, amounting to €8.14bn. It is recommended that the Nursing Home Support Scheme (NHSS or 'Fair Deal'), the Primary Care Reimbursement Scheme (PCRS – e.g., GP and pharmacy expenditure) and disability

services not be included in the initial application of the PBRA. It is in the context of the formula above that this report is undertaken.

1.4 OBJECTIVES OF REPORT

The main objectives of this report are to provide policymakers with evidence to inform the establishment of PBRA in Ireland and to examine the proposed formula developed by the Department of Health.

The research in the report examines the impact of regional, socioeconomic and other pertinent factors on the development of PBRA in Ireland. To do this, the report also provides an overview of PBRA, as well as important factors included in contemporaneous healthcare systems within peer countries. Building upon this review, the report provides insights from Ireland and other healthcare systems about the appropriate evolutions PBRA in Ireland should take in the coming years. It also identifies obstacles to the successful integration of PBRA in Ireland. The report explicitly examines the most recent restructuring and PBRA plans outlined by the Department of Health and the HSE, and provides recommendations on changes and considerations that could occur to improve the proposals, drawing on evidence from other countries, and case studies on previous resource allocation and funding mechanisms from Ireland.

1.5 STRUCTURE OF THE REPORT

The report is structured as follows. Chapter 2 details resource allocation systems internationally and the key review studies of PBRA. Chapter 3 first provides case studies from resource allocation and funding mechanisms in Ireland. It then introduces the HSE HR restructuring and proposed PBRA formulae, before providing discussion points and recommendations on how PBRA can be improved, using evidence from international PBRA mechanisms and the Irish case studies. Chapter 4 concludes and outlines barriers to PBRA and improvements to PBRA that may be needed.

CHAPTER 2

Population-based resource allocation options in Ireland

2.1 INTRODUCTION

This chapter discusses the key characteristics of population-based resource allocation (PBRA) mechanisms used within international healthcare systems. The chapter outlines the different PBRA formulae used in peer countries and, using these national level reviews, points to the common characteristics found in PBRA formulae. A number of other considerations for PBRA in Ireland are also identified, and finally we discuss specific resource allocation and payment mechanisms that are used in Ireland.

2.2 INTERNATIONAL RESOURCE ALLOCATION MECHANISMS

PBRA frameworks aim to facilitate strategic health and social care service planning. This is achieved by shifting towards models that incorporate a more holistic assessment of needs, rather than focusing solely on specific diseases, settings, or service utilisation patterns (Johnston et al., 2021). The PBRA method allocates funding according to variations in need, as well as the additional costs required to provide services. PBRA mechanisms can also incorporate unmet need and geographical factors such as rurality, and they may apportion a higher level of care to certain demographic groups. Furthermore, PBRA formulae often apply differing weights to certain formula inputs, based on the judgements of decision-makers in determining their importance to their population's healthcare needs.

This section reviews literature on the development and application of PBRA mechanisms. Relevant literature was identified through appropriate databases and reference searching. Our selection criteria included papers published in English and studies from countries with healthcare systems akin to that envisioned for Ireland. The selected countries are Australia (New South Wales), Canada (Alberta, Ontario), New Zealand, Sweden and the United Kingdom (UK – England and Scotland). These countries were included due to the integration of PBRA frameworks within their health systems, the fact that each health system shares some important similarities with the Irish health system, and the identification of literature that details the key components within each PBRA framework. The use of such criteria also means that most of these countries have been included in previous analyses commissioned by the Department of Health (Johnston et al., 2021; O'Malley et al., 2023) to inform the potential future PBRA formula for Ireland.

2.2.1 United Kingdom

The National Health Service (NHS) operates across the constituent countries of the UK. While the key pillars of universal healthcare, free at the point of use, are

consistent, the functions of the NHS have been devolved to each country. There are also variations between the UK countries regarding the formulae used to distribute resources. In England, NHS England oversees healthcare provision, whereas local authorities are responsible for managing social care. The resource allocation mechanisms in Scotland and Wales allocate funding to health boards for different care programmes, and are formulated in a similar manner. In this study we focus on the Scottish model. In contrast, Northern Ireland, similar to Ireland, adopts a joint approach to health and social care services, with both falling under the jurisdiction of the Department of Health and Health and Social Care in Northern Ireland. However, we do not examine the structures for PBRA used in Northern Ireland as they are much less developed than those used in England and Scotland.

England

The NHS in England was one of the first healthcare systems to establish strategic resource allocation based on population needs in the 1970s (Buck et al., 2013). Resources were mainly allocated based upon population size, and age and sex differences across regions. A more detailed formula that incorporated other factors such as deprivation was proposed by Carr-Hill et al. (1994). The 'Carr-Hill formula' has been in operation since the 1990s and has been adapted for general practitioner (GP) and other care services (Fisher et al., 2022). The formula, which was initially developed for allocating resources to GP services, has since undergone a series of refinements and adaptations, expanding its use to all key healthcare services.

In 2023, NHS England underwent a significant organisational change with the transition from clinical commissioning groups (CCGs) to integrated care boards (ICBs). This shift led to the creation of a smaller number of larger regional bodies for decision-making and marked a move towards a more integrated healthcare system, emphasising collaboration and coordination among various healthcare providers. Compared to the CCG structure, the ICB framework envisages greater integration of healthcare providers and local authorities, who provide social care services such as long-term care.

As a result of this transition from CCGs to ICBs, the resource allocation formula underwent adaptations to align with the new structure. These changes, outlined in a technical note by NHS England (2023), aimed to ensure that the distribution of resources continued to reflect the varying needs and costs associated with providing healthcare across different regions, maintaining the principle of 'weighted capitation' that has existed for decades. The updates took into account demographic, morbidity and economic factors specific to the areas overseen by the new ICBs, ensuring that the allocation of funding remained equitable, efficient and responsive to the unique characteristics and requirements of each area. This supports the overarching goal of the ICBs to deliver more patient-centric and integrated care.

The NHS England model aims for resource allocation to be based on healthcare needs, operating on the principle of weighted capitation. This method is used to calculate target funding allocations for each ICB for core responsibilities, specialised services and primary medical care. Separate formulae are estimated for different healthcare service models (e.g., acute hospital care, disability care), though the parameters are very similar across the formulae. The formulae are among the broadest and most data-intensive internationally. However, the key parameters are similar to those used in other countries and those proposed by O'Malley et al. (2023). The weighted capitation formula includes:

- *Population size:* Censuses in England occur only every ten years. Due to previous difficulties in population estimates, the size of the population for each ICB is based on the number of registered patients at GP practices located within the ICB's boundary area.
- *Age and sex:* Adjustments are made for age and sex within each ICB, recognising that healthcare needs vary significantly across different age and sex groups.
- *Additional healthcare needs:* The ICB formula accounts for additional healthcare needs that cannot be explained by age and sex differences alone. These include factors that increase healthcare needs, such as the incidence rates of morbidities in the population.
- *Unmet need and health inequalities:* Adjustments are made to address health inequalities and unmet healthcare needs within populations. This is crucial for ensuring that areas with historically underserved or disadvantaged populations receive adequate funding. These parameters have been key to NHS resource allocation formulae in the past. Previous authorities have rejected new resource allocation formulae that were perceived as failing to reduce health inequalities (Iacobucci, 2012).

- *Market forces factors (MFF, or 'cost factors'):* The formulae also include adjustments for the higher costs of delivering healthcare in some areas. For example, there are generally higher input costs in cities or densely populated areas, such as London. Additionally, adjustments are made for specific circumstances like the higher costs of running small hospitals in rural areas or emergency ambulance services in remote regions.

Combining each of these factors, statistical modelling is used to select the 'best fit' drivers of relative costs at the person level and the relative weights for each driver. There are a number of more nuanced aspects of the formula:

Weighting: Specific factors are also weighted differently across healthcare models. For example, in the general and acute care formula, to account for the higher hospital needs of the older population, individuals aged 65–69 years are assigned a weight of 4 compared to those aged 20–24 years, while

individuals aged 85+ are assigned a weight of 10 (NHS England, 2023). Furthermore, weights are applied to other parameters, such as unmet need. Regions that are historically underserved or disadvantaged are targeted with a higher share of funding, using a fixed percentage to reweight the contribution they receive.

Transitions: The formulae account for key transitions, particularly the shift from CCGs to ICBs, by implementing strategies to ensure financial stability and equitable resource distribution during this structural change period. A convergence process is created whereby ICBs are gradually moved from their initial funding levels (based upon the previous CCGs) to target allocations determined by the updated formula. This transition, which is managed to avoid sudden financial impacts, helps to ensure continuity of healthcare services. In a small number of cases, adjustments are also made to reflect new geographic boundaries and population bases of ICBs, as well as more general population updates (NHS England, 2023).

Rurality: The new ICB formulae for community care services include a new travel time adjustment. This adjustment recognises that additional travel times are often necessary to deliver community care services (e.g., community nursing visits) to patients living in remote areas.

Integrated care: The decision to create ICBs and transition resource allocation to the ICB level was largely motivated by policymakers' goal of creating better integrated care pathways for population groups. It reflects a strategic shift towards more coordinated and patient-centred healthcare services. First, as with other modern PBRA mechanisms, the NHS England formulae take into account a wide range of factors, like population demographics, healthcare needs and local cost variations, when determining resources. In this sense, the formulae ensure that funding is not only allocated based on the number of individuals in an area but also on their specific health requirements and the complexities of delivering services in diverse settings. This approach is conducive to integrated care as it enables ICBs in this instance to have the resources necessary to address the holistic health needs of their respective populations, considering both primary and specialised care services. Second, ICB structures foster greater coordination between NHS and healthcare providers and the local authorities responsible for commissioning social care (Wenzel et al., 2019). The shift also offers an opportunity for commissioners of health and social care to embed and rationalise the process of integrated care provision (Gongora-Salazar et al., 2022).

Transparency and information: An important aspect of the NHS England resource allocation formula is the extensive level of data and information available to inform the decision-making process. Related to this, the Advisory Committee on Resource Allocation (ACRA) was established to provide

guidance on the formula and to ensure transparency in the process. In this context, all guides and data spreadsheets used to estimate the formulae are available to the public.[1] However, for integrated care especially, some have argued for the further strengthening of broader data collection and the adoption of an evidence-based priority framework (Gongora-Salazar et al., 2022).

Scotland

The Scottish PBRA formula, known as the Scottish National Resource Allocation Committee (NRAC) formula, allocates funding for 6 care programmes to 14 NHS health boards. To begin, the population is weighted by age and sex profiles (NHS Scotland, 2020). Subsequently, the model is weighted by a morbidity and life circumstances (MLC) index that considers various indicators that affect health, over and beyond what can be explained by age and sex. This index includes deprivation rates from the Scottish Index of Multiple Deprivation (SIMD) and standardised mortality ratio included at the regional level (NHS Scotland, 2020). Finally, the PBRA formula accounts for the additional costs of providing care in rural areas (NHS Scotland, 2020).

The NRAC formula is not too dissimilar to the approach adopted in England, and there are many commonalities between the English and Scottish PBRA formulae. However, the NRAC places a heavier emphasis on adjustments for rurality and remoteness, which is likely to be due to the geographic distribution of the population in Scotland compared to that in England.

One other distinction between England and Scotland relates to integration of care. In Scotland, Integrated Joint Boards (IJBs) were established to better integrate health and social care services. IJB memberships include members from NHS health boards, local authorities and other stakeholders (e.g., voluntary providers). However, in Scotland, these IJBs function as separate legal entities, with the autonomy to make decisions about the functions and responsibilities of health and social care commissioners (Collins et al., 2023). Therefore, the IJBs are not embedded within the NRAC formula, though they likely do help with the more equitable distribution of resource for integrated care.

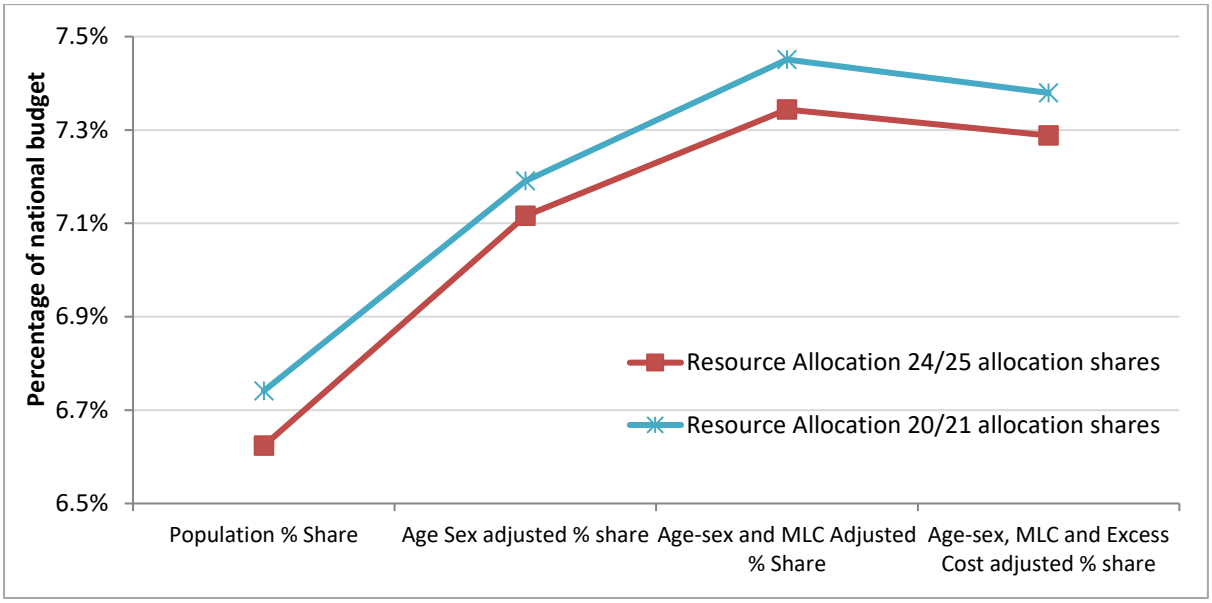
Figure 2.1 presents the percentage share of the funding provided to the Ayrshire & Arran NHS Health Board in 2020/2021 and 2024/2025. The figure illustrates that while population is the key component of the NRAC formula, the other adjustments (especially the age–sex index) do impact the percentage of funding provided to each NHS board. Furthermore, there is a great deal of consistency in allocation across years. This figure conveys that transparency on how resource

[1] A technical guide and all technical annexes and data spreadsheets used to estimate the resource allocations can be found here: https://www.england.nhs.uk/publication/supporting-spreadsheets-for-allocations-2023-24-to-2024-25/.

allocation decisions are made are also central to Scotland's resource allocation model.

Figure 2.1 shows that the percentage of the healthcare budget to be provided to a region may increase over time, if for example, in this case, a region is projected to have higher population increases relative to other regions in the future. Such an approach therefore can allow for more equitable and efficient medium-term resource planning.

FIGURE 2.1 FUNDINGS FROM RESOURCE ALLOCATION FORMULA IN SCOTLAND



Source: Public Health Scotland; see https://publichealthscotland.scot/publications/resource-allocation-formula-nrac/resource-allocation-formula-nrac-for-nhsscotland-results-for-financial-year-2024-to-2025/.

Notes: These data are from the area of NHS Board Ayrshire & Arran.
MLC: Morbidity and life circumstances; additional needs index that considers factors that predict the need for healthcare in addition to needs due to age and sex, such as higher underlying morbidity.
Excess costs: The rurality index takes account of the cost of supplying health services in remote and rural areas relative to more urban areas.

The resource allocation mechanism in Wales is similar to that in Scotland, as it allocates funding to its seven health boards for different care groups and also adjusts population need across health boards for factors like age, health status and rurality.[2] Wales uses specific allocations for discretionary funding, ring-fenced services and directed expenditures, an approach similar to how Scotland targets its health funding. As may be expected, due to the nature and dominance of the NHS across UK countries, none of the PBRA formulae used include private healthcare or private health insurance.

The English and Scottish PBRA formulae provide several evidence-based and straightforward templates that could be highly valuable for a proposed Irish formula. The key parameters for formulating weighted capitation included in these

2 See https://www.gov.wales/health-board-allocations-2021-2022-html.

formulae, as highlighted in O'Malley et al. (2023), are aligned with the specific healthcare needs of diverse populations. The emphasis on integrated care, particularly evident in the recent NHS England formulae, resonates well with the objectives of Sláintecare. Additionally, pragmatic approaches such as transition strategies for implementing a new formula, a focus on medium-term projections and the use of independent oversight, all offer significant insights for Irish policymakers. However, as discussed in Chapter 3, the advanced health information and data systems utilised for key refinements to formulae in the NHS formulae may not be immediately viable for Ireland in the coming years due to differing infrastructural and data capabilities.

2.2.2 Australia

New South Wales

In Australia, regional-level policymakers have a significant level of autonomy. One state, New South Wales (NSW), uses a 'resource distribution formula' to allocate resources to eight area health services across the state, with the aim of providing and projecting target shares for each area health service (Gibbs et al., 2002, New South Wales Health 2005). To begin, the population of each area health service is weighted to account for its age and sex structure. Subsequently, the weighted population figure is multiplied by the Health Need Index (HNI) to arrive at a 'need adjusted' population; whereby the HNI is based on factors influencing healthcare beyond age and sex. The three factors included in the HNI are: premature mortality, socioeconomic status (index of occupation–education) and a rurality/remoteness index (Gibbs et al., 2002). Supplementary private health insurance, and private hospitals, are an important component of the Australian healthcare system. Therefore, within the allocation system, adjustments are also made for private hospital utilisation.

Certain essential speciality services coordinated at a state level, such as the NSW ambulance service and the Children's Hospital Network, remain outside of the PBRA mechanism (Johnston et al., 2021). Unique to other healthcare systems, the NSW deprivation indicator includes homelessness and education (Radinmanesh et al., 2021).

2.2.3 Canada

Canada's healthcare system is primarily publicly funded, with funding and delivery of care largely devolved to provinces and territories. It is a mixture of publicly financed services (provided with no out-of-pocket payments required) and other services that require some form of co-payment. Key services such as primary care and hospital visits are covered via province/territory-level public healthcare insurance plans.

Alberta

Alberta uses a PBRA mechanism to distribute funding for key healthcare services, including hospital care, mental healthcare and long-term care, to nine regional health authorities (Alberta Health and Wellness, 2007). Primary care is not included within the province-level PBRA and falls under the Canadian Ministry of Health. The PBRA formula weights the population by age, sex, aboriginal status and socioeconomic status for each health authority (Alberta Health and Wellness, 2007). This provides capitation rates for 136 population groups: 40 full premium paying groups (20 age ranges for 2 genders); 40 Aboriginal status groups (20 age groups for 2 gender groups), 28 welfare status groups (14 age groups for 2 gender groups) and 28 low-income groups receiving health care insurance premium subsidies (14 age ranges for 2 genders) (Alberta Health and Wellness, 2007).

Ontario

Ontario utilises its health-based allocation model to calculate funding allocations for each healthcare sector. The model was established in 2007. It estimates the annual use of health services for each patient, adjusting for age, sex, ethnicity, income and clinical conditions (Rachlis et al., 2008). The model incorporates personal electronic records for each resident to develop unique 'person profiles' based on utilisation patterns from the past 3 years, placing individuals into 1 of 21 clinical groups based on their highest severity of illness (Rachlis et al., 2008; Penno et al., 2013). Additionally, the model applies adjustments for the additional costs of providing care in remote areas (Health System Information Management and Investment Division, 2011). Standardised mortality rates have also been used as health-based indicators of resource allocation (Radinmanesh et al., 2021).

This model is part of a wider set of policies that incorporates several local health integration networks and cancer care services, among other services, with a view to improving vertical integration of healthcare.

2.2.4 New Zealand

In 2003, New Zealand introduced a new resource allocation system whereby funding provided to regions was primarily determined by the differences across 20 district health board (DHB) populations (Shin et al., 2017). To begin, each DHB population is weighted by age, sex and ethnicity. Subsequently, the relative health need for each sector is calculated using previous use, in conjunction with the average cost associated with services. The average cost is broken down by demographics and socioeconomic status/deprivation measures, which are then grouped into respective cost weights (Ministry of Health, 2016). Finally, the data are aggregated into five service groups (Ministry of Health, 2016).

A feature of the PBRA mechanism in New Zealand relates to weighting assigned to ethnicity differences across regions, in particular the Māori population. The PBRA

method aims to address the healthcare needs of the Māori population and Pacific peoples, who have historically faced inequalities in health outcomes compared to non-Māori groups, within an unmet needs adjustment in the formulae (Shin et al., 2017). This unmet needs adjustment also provides more funding for individuals in more deprived groups. Expansions to the weighted capitation mechanism have occurred in recent years, and Flexible Funding Pool payments, which include funding to help improve healthcare access and health promotion, were included with higher weights assigned for ethnicity and deprivation (Senior et al., 2022).

Uniquely, the New Zealand formula also includes an overseas adjuster. This covers visitors to New Zealand who may be citizens residing overseas but who are temporarily visiting the country, or visiting citizens of countries that have reciprocal agreements with New Zealand (Shin et al., 2017).

2.2.5 Sweden

In Sweden, the PBRA mechanism distributes healthcare to nine health authorities (Diderichsen et al., 1997). The model is designed to allocate resources for primary and acute care. The formula begins with age and sex weightings. Subsequently, the formula incorporates need-based matrix models, varying by health authority to reflect differing healthcare needs. Finally, individuals are classified into 1 of 93 adjusted clinical groups by a mixture of sex, age and morbidity burden based on International Classification of Disease classes (Andersson et al., 2011).

In recent years, market elements such as patient choice have become important elements of resource allocation in Sweden, especially since the primary care choice reform (*vårdvalsreformen*) in 2010 (Fredriksson et al., 2013; Kullberg et al., 2018). This model differs considerably from the resource allocation models in other healthcare systems discussed in this section. Rather than primary care budgets being allocated to regions based upon their size and demographic characteristics, patients' choices and the location of providers determine where funding is allocated. This market-oriented reform sought to increase the decentralisation of healthcare decision-making to local levels, make healthcare more responsive to local needs and preferences, and entice competition from different providers based on cost and quality.

It is arguable that the primary care choice reforms undertaken in Sweden would be difficult to replicate in another jurisdiction that does not have similarly good data and health information systems.

2.3 POPULATION-BASED RESOURCE ALLOCATION FORMULA CHARACTERISTICS

This section reviews common characteristics within PBRA mechanisms, based on the international PBRA formulae discussed above.

2.3.1 Population size

The size of a population is a key factor in PBRA and all PBRA mechanisms discussed above begin with population size. Larger populations generally require more resources due to the number of individuals who need services.

2.3.2 Age and sex

All PBRA mechanisms subsequently use age and sex in their formulae. The impact of age on healthcare use is well documented, with research identifying higher healthcare use at the oldest and youngest ages, and during maternity years for women (European Commission, 2015; Dumitrache et al., 2017); this serves as a justification for its inclusion. The level of aggregation of age varies across models. Five-year age bands are the most consistent level of aggregation across the models. More granularity in age improves the precision. Sex is included in PBRA formulae on a more discretionary basis; however, most countries (Austalia, Canada, England and Scotland) combine age and sex profiles when determining allocations.

Age and sex, which are indirect measures of need, are poor predictors of expenditure alone. Thus, their use is not an appropriate proxy for health need as there is no acknowledgement of unmet or additional need. In the absence of other measures, PBRA mechanisms based solely on demographics may reinforce structural inequalities.

2.3.3 Socioeconomic status/deprivation

Due to the long-evidenced relationship between socioeconomic status and health (Glymour et al., 2014; Cutler et al., 2011), some form of socioeconomic status measure is frequently included in PBRA mechanisms. However, the socioeconomic measures included vary significantly across models, due to a combination of data availability and country-specific significance of socioeconomic measures. In a wide review of indicators used within PBRA, Radinmanesh et al. (2021) identified various socioeconomic indicators, such as income and assets (Netherlands), unemployment (Belgium and Sweden), welfare status (Alberta, the Netherlands, New Zealand, Northern Ireland and the US), and even marital status and family structures (Norway and Sweden).

The most commonly used socioeconomic measures across the examined models include source of income, mean house price and area-based deprivation (score or quintile). The PBRA formulae in England cover an extensive list of socioeconomic measures, varying by healthcare sector (e.g., maternity care, acute and general care). These include income deprivation and welfare claimants, mean house price, ethnicity, and the percentage population aged 60+ that are single pension credit claimants (Department of Health, 2011). Not only does the English model vary the indicators, variations are also made to the weightings applied to those indicators,

to reflect those most related to healthcare need at different age groups (Penno et al., 2013).

To create a morbidity and life circumstances adjustment index, Scotland utilises a deprivation index (SIMD).[3] This includes the unemployment rate (based on benefit claimants), the proportion of older people on income support, and the mortality rate among people under 65 years into a single index – the Arbuthnott Index, which is used to predict the relative need for healthcare resources in different areas (NHS Scotland, 2020). Similarly, New Zealand employs an index of socioeconomic deprivation, incorporating income, educational qualifications and welfare supports. This index is transformed into quintiles, indicating least to most deprived, and is included to calculate costs at the individual level for hospital and community services, primary care and mental health services (not disability services) (Department of Health, 2011).

2.3.4 Health

When it comes to incorporating both clinical and epidemiological health factors into PBRA formulae, this usually involves considering variables such as disease prevalence, incidence rates, morbidity and mortality within the population.

In Ontario, the availability of individual electronic data means that the model can develop a personal data point based on an individual's diagnostic and procedural episodes. Subsequently, individuals are ranked by case mix severity, based on the last three years of these episodes, and aggregated to 1 of 21 major clinical groups (Health System Information Management and Investment Division, 2011; Penno et al., 2013). Similarly, in the Netherlands, individual level health data, in conjunction with cost data, are utilised to classify people into 20 pharmacy cost groups and 13 diagnosis cost groups (Penno et al., 2013). Sweden uses individual level health data to assign individuals to adjusted clinical groups, of which there are 93; these groupings are determined by a combination of factors, which classifies patients by a mixture of age, sex and morbidity burden/health situation (Johnston et al., 2021).

In healthcare systems where data are available at a regional level, epidemiological information is utilised to inform allocations. Scotland uses an MLC index, whereby each programme of care uses different measures of morbidity and life circumstance dependent on the factors that will influence the specific programme. These epidemiological factors range from standardised mortality ratios and limiting illness indicators to hospital admissions due to substance abuse (NHS Scotland, 2020). England and Northern Ireland also vary their epidemiological

[3] SIMD looks at the extent to which an area is deprived across seven domains: income, employment, education, health, access to services, crime and housing (Fraser, E. (2020)).

measures by healthcare sector to account for varying impacts of morbidity, health status and utilisation.

2.3.5 Regional factors

Regional-level indicators that capture remoteness or rurality account for the unavoidable cost of providing care in rural areas. Such indicators include travel costs and additional costs associated with staff retention (Penno et al., 2013; Johnston et al., 2021), and are included across most PBRA mechanisms examined. England adjusts for costs associated with providing emergency services in sparsely populated areas and diseconomies of scale associated with unavoidably small hospitals (NHS England, 2023). In Northern Ireland, the formula compensates for additional travel carried out by staff to provide selected community services in each area (staff time and the travel cost) and for differential costs faced by areas in meeting a given level of demand (economies of scale) (Department of Health, 2014).

Cost adjustments are not solely applied to rural areas but also to high-cost areas. To illustrate, England compensates for unavoidable geographical cost differences through their use of a MFF adjuster. The MFF incorporates data on staff wages, in conjunction with building and land prices, to reflect higher input costs in densely populated areas (London and Southeast England) (Barr et al., 2014; NHS England 2023). The adjuster also accounts for higher costs associated with attracting and retaining workforce supply in rural areas. The MFF focuses on supply-side factors that will influence utilisation and, consequently, need (NHS England, 2023). An emergency service cost adjustment was introduced to reflect the unavoidable cost variations of delivering services in rural areas.

2.3.6 Unmet needs

There are two main approaches for measuring unmet need in PBRA mechanisms. The first approach is to use previous evidence on health outcomes for defined population groups. NSW applies additional weightings for Aboriginal and homeless populations to represent greater health disparities faced by these groups (New South Wales Health, 2005). New Zealand distributes a percentage of their budget to health according to the proportion of Māori, Pacific and deprived populations in each DHB (Ministry of Health, 2004). Similarly, Sweden provides an additional weighting for those who fall into the Care Needs Index within their more market orientated allocation formula. The index is inclusive of material deprivation, family structures, social instability and ethnicity (Sundquist et al., 2003).

The second approach has been to use epidemiological markers of unmet need. In Scotland, allocations are adjusted for differential rates of circulatory disease (NHS Scotland, 2020). In England, prior to 2014/2015 the PBRA employed ‘disability free life expectancy’ as an indicator for health inequity and unmet healthcare needs

while distributing resources to primary care trusts. However, more recently the standardised mortality ratio for individuals under 75 years old (SMR<75) was chosen as a more suitable choice to capture unmet need. This was due to its relative stability at the CCG level over consecutive periods and its ease of comprehension.[4]

2.4 CONCLUSION

The PBRA or weighted capitation mechanisms established in comparator countries analysed in this chapter are often remarkably similar to each other. The basic adjustments are determined according to population size and the age and sex profiles of regional populations. While each country assigns considerable autonomy in decision-making to regional or local health authorities, each country also invariably includes an adjustment for socioeconomic status (most likely deprivation), rurality and other unmet needs. Other country- or system-specific parameters are also included. For example, in New Zealand, the size of the Māori and Pacific peoples' population within a region is accounted for. The NHS models may incorporate quite granular deprivation information and also account for additional healthcare needs (e.g., morbidity levels) within their formulae.

This analysis, alongside similar analyses (Johnston et al., 2021; McCarthy et al., 2022), highlights that Ireland can learn considerably from international PBRA systems. However, the uniqueness of the Irish healthcare system suggests that system-specific parameters may also be appropriate for inclusion within the PBRA mechanism for Ireland.

[4] See https://www.england.nhs.uk/wp-content/uploads/2022/04/report-on-acra-review-of-the-health-inequalities-and-unmet-need-adjustment-22-23.pdf.

CHAPTER 3

Proposed HSE Health Regions and population-based resource allocation formula

3.1 INTRODUCTION

This chapter introduces the most recent proposals for healthcare system structure reorganisation in Ireland; Health Service Executive (HSE) Health Regions (HRs), and the proposed population-based resource allocation (PBRA) formula developed by the Department of Health. As a way of providing context, the chapter first provides information on resource allocation, funding mechanisms and integrated care structures that currently exist in Ireland, as well as lessons that can be garnered from them when informing PBRA. It then introduces the proposed HRs and PBRA formula, highlighting the key components of these proposed changes and recommending some changes to improve the proposals. Discussions of potential changes draws on evidence from other countries, as outlined in Chapter 2, analysis within previous reports (Johnston et al., 2021) and case studies.

3.2 RESOURCE ALLOCATION AND FUNDING MECHANISMS IN IRELAND

While Ireland lacks a system-wide resource allocation mechanism, recent years have seen changes in the use of payment and funding mechanisms utilised within various publicly funded health and social care services. Section 3.3 and Section 3.4 outline options for regional level resource allocation, based on systems developed in other countries. First, we outline examples of resource allocation and strategic funding mechanisms that are currently being used in Ireland and may remain within a future, wider healthcare resource allocation mechanism. They also show that funding decisions designed to ensure greater efficiency and equity have already been implemented by healthcare policymakers in Ireland, and a number of barriers to their effective use have been identified.

This section identifies four examples, referred to here as case studies, that provide evidence of resource allocation mechanisms being used within the healthcare system. We highlight:

- the implementation of activity-based funding (ABF) within acute public hospitals;
- resource allocation in urgent and emergency care, as examined by Thomas et al. (2019);
- implications of the separate financing of acute hospital care and social care, using evidence from Walsh et al. (2020); and
- the potential need for other parameters, in particular mental health and mental illness, to be accounted for within PBRA mechanisms more generally.

Key practical lessons from each mechanism have been identified. These lessons can also help to inform the embedding process of the proposed PBRA mechanism.

3.2.1 Case Study 1: Activity-based funding in acute public hospitals

ABF is a method of funding healthcare that allocates funds to healthcare providers (e.g., hospitals) based on the actual amount and type of care and services they provide. ABF allows for funding to reflect care delivered, rather than it being based on pre-set budget allocations or historical spending patterns.

Since 2016, ABF has been the method through which the HSE has funded inpatient and day patient episodes of care within the main large acute public hospitals (categorised as Model 3 and Model 4 hospitals with 24/7 emergency departments) (Keegan et al., 2020; Valentelyte et al., 2021; Valentelyte et al., 2023). While ABF is not yet used to fund emergency departments and outpatient care in acute public hospitals, this shift towards ABF, and away from block funding in acute public hospitals for inpatient care, represents an important shift in how healthcare services are funded in Ireland. The implementation of ABF has made Ireland comparable in this regard to other countries that employ activity-based or Payment by Results (PBR) models for allocating health budgets. The move towards ABF also showed that the healthcare system in Ireland was capable of implementing largescale strategic resource allocation and funding mechanisms. ABF has been favoured as a mechanism by health economists and planners. The key attributes of ABF are as follows.

- ABF puts more responsibility onto the hospitals (and Hospital Groups) to provide accurate information on care provided to patients.
- ABF provides a mechanism for more equitable distribution of resources across hospitals based upon the patients who receive the care. In this context, ABF is more patient-centred than block funding.
- ABF explicitly includes an efficiency element. Under ABF, hospitals are reimbursed for the type and complexity of care provided to patients. This means that ABF incentivises earlier discharge from hospital, as hospitals will be provided with the same level of funding for patients with the same diagnosis-related group (DRG), regardless of their length of stay (LOS).
- The use of DRGs provides hospitals with a simple classification system that allows for funding to be more easily and efficiently allocated.

The implementation and evolution of ABF in acute public hospitals offers valuable insights for policymakers, particularly in shaping the PBRA system and the establishment of HSE HRs. We demonstrate below how the implementation of ABF in these hospitals has enabled healthcare providers and planners to address numerous organisational challenges that are also likely to arise with the introduction of PBRA.

Regional decision-making

The policy establishing ABF identified key priorities and levels of decision-making for resource allocation at the Hospital Group level. According to the first ABF implementation plan:

> *'Hospital Groups will form the contracting entity for Activity-Based Funding'* and Hospital Groups were to be *'given the autonomy to harness the benefits of independence and greater control at local level'.* (HSE, 2015)

These groups were granted autonomy to optimise the benefits of independent decision-making at a local level. This autonomy included adjustments in the cost base and staff deployment to meet local demands. Importantly, this autonomy was also intended to support hospitals facing geographical or structural challenges, which is the approach also taken in England and Sweden. As Rice et al. (2002) discussed, this approach is a critical aspect of budget devolution within a broader 'strategic resource allocation' system. These insights are also valuable for the transition towards PBRA and the establishment of HSE HRs.

The most recent ABF implementation plan (2021–2023) outlines that Hospital Groups are responsible for the governance and management of hospitals within their groups, and for providing good quality, timely data for national ABF (HSE, 2021). Hospital Groups remain 'the contracting entities for ABF, with funding flowing from the HSE to the Groups, rather than individual hospitals'; they 'therefore determine how funding is distributed among hospitals'. It is outlined that responsibilities of Hospital Groups will be subsumed by the newly established regional bodies, e.g., HSE HRs.

Currently, it appears that responsibility for ABF will remain predominantly at the hospital and regional level, as Ireland transitions to HSE HRs. Therefore, a review of the role Hospital Groups actually played within ABF and wider resource allocation decision-making as it occurred in reality could be valuable in terms of our understanding of how improvements can be made.

Community and long-term care resource allocation

As we explore in more detail in subsection 3.2.3, the effectiveness of ABF is somewhat reduced due to the lack of integration between acute and non-acute care. First, the misalignment of regional boundaries between Hospital Groups and community healthcare organisation (CHOs) (and local health offices (LHOs)) likely hinders the integration of these sectors. Second, ABF is also impacted by the poorer level of information on costing and availability of non-acute services. In light of this, the latest ABF Implementation Plan (HSE, 2021) identified several key areas for focus during the 2021–2023 period. One such area is the commencement of the process of cost assessments for community and home support services, with

the eventual goal of transferring pricing responsibility for these services to the Healthcare Pricing Office (HPO). This would be another significant change in funding mechanisms for Irish health and social care. Given that integrating acute and non-acute care is a critical aspect of the proposed HR restructuring, future plans for shifting pricing responsibilities for community services to the HPO warrant close examination.

Transition adjustments

The issue of transitioning or de-coupling from historic budgets was acknowledged by the HSE since the inception of ABF (HSE, 2021). Transition adjustments remain a continuing feature of ABF within acute public hospitals. The shift from fixed block budgets to activity-based budgets necessitated gradual changes, as will PBRA.

Governance

A key goal of ABF is to encourage the delivery of care in less complex settings and to reduce the LOS in hospitals, as payments are no longer linked to longer hospital stays.

ABF, and extensions to ABF, aimed to increase the rates of same-day surgeries for certain procedures. Notably, from 1 January 2018, hospitals were incentivised to perform laparoscopic cholecystectomy (gallbladder removal) as a day case rather than as an inpatient procedure. Essentially, hospitals would receive the same funding for conducting a laparoscopic cholecystectomy as a day case as they would for an inpatient procedure (Valentelyte et al., 2023; Brick et al., 2025). However, a recent analysis of this ABF incentive, using a difference-in-difference statistical approach that compares the use of day case surgery before and after the funding change, revealed no significant effect on the rates of day case procedures (Valentelyte et al., 2023). The study concluded that 'the implementation of the funding policies did not improve hospital efficiency' (Valentelyte et al., 2023). The authors discuss that their results conform with international evidence that shows at best modest impacts of ABF-type mechanisms on increasing the use of more efficient hospital care. But they also discuss that Irish hospitals may have a lower capacity to respond to ABF due to underlying capacity constraints, high bed occupancy rates, and long waiting lists for day case and elective inpatient care.

It is possible that ABF requires time to become embedded and fully integrated into hospitals, and results will not be evident shortly after its introduction (e.g., for laparoscopic cholecystectomy). International evidence suggests that the benefits of ABF may take several years to materialise (Gaughan et al., 2019). This research also revealed significant variations in how hospitals respond to ABF in their decision-making processes. Such variations were observed with both small and large incentives, and across different clinical settings. These patterns might indicate issues in the governance of ABF, and the capacity of a sophisticated

funding mechanism to become embedded in practice by clinicians, clinical decisionmakers and hospital management. Furthermore, recent research published by the Department of Health has shown substantial disparities in hospital key performance indicators (KPIs) associated with ABF in acute public hospitals (Clancy et al., 2023). Collectively, these findings underscore the importance of robust governance in resource allocation mechanisms, and within the proposed PBRA. Effective governance ensures not only that the systems function as intended but also that providers failing to meet requirements receive adequate incentives and support structures for compliance.

3.2.2 Case study 2: Variation in resource allocation in urgent and emergency care systems in Ireland

This case study highlights that in Ireland, within a relatively small and homogenous sector of the healthcare system – urgent and emergency care – large differences currently exist in how financing and resource allocation decisions are made. Unlike inpatient and day patient care, ABF has not yet been incorporated within emergency department or outpatient care. The objective of a research study undertaken by Thomas et al. (2019) at Trinity College Dublin was to examine the funding mechanisms within the urgent and emergency care sector in Ireland, focusing on the dynamics of healthcare funding used and the regional disparities that exist. As discussed by the authors, international research consistently finds a higher risk of poor health outcomes from emergency conditions in rural areas compared to urban areas. This is due to rural areas consisting of older and more socioeconomically disadvantaged populations, longer travel times to hospitals and care clinics, and lower survival rates (Smith et al., 2008; Alanazy et al., 2019).

In their key analyses, Thomas et al. (2019) examined total funding per capita within the three areas of urgent and emergency care (ambulance services, emergency departments and general practitioner (GP) care) across counties in Ireland. They found the lowest funding in Wicklow (€47) and highest in Louth (€208). The analyses also showed that for ambulance services, many rural counties, including Donegal, Clare, Kerry, Roscommon and Leitrim, have well-sourced ambulance services. However, the pattern is inconsistent, with some rural counties like Sligo not being well served (Thomas et al., 2019). This inconsistency is also apparent in GP care, where some rural counties are relatively well-financed (Donegal and Mayo) while others are not (Cavan and Monaghan). Interestingly, in rural counties where public emergency department funding is low, GP funding is relatively high and vice versa. This latter finding may point to differences in how healthcare systems diverge in their operation as well.

Thomas et al. (2019) also found that private emergency care services are concentrated in Dublin and the south of the country (namely Cork) while public emergency care services are concentrated in Dublin north-east, the midlands, and the south-east of the country. The authors found no link between pre-hospital (GP,

practice nurse and ambulance services) funding and deprivation (Thomas et al., 2019). This is in direct contrast to numerous international studies which found significantly poorer outcomes in more deprived areas (Rigby et al., 2017; McCann et al., 2018), indicating inadequate pre-hospital funding for deprived areas.

In conclusion, the authors found that across rurality and deprivation, which are key parameters within the proposed PBRA formula, urgent and emergency healthcare funding is fragmented and inconsistent. This lack of uniformity in the urgent and emergency care system in Ireland may be due to the system currently being based predominantly on historic patterns of expenditure, with limited adjustment for case mix. Little to no acknowledgment of current inefficiencies, in terms of funding across counties and regions, will only serve to advance inequalities, notably in rural areas. The findings from this study also point to the need for PBRA to make systematic decisions of funding based upon population needs. They also suggest that regional inequalities exist, which may take time to dissipate under PBRA.

3.2.3 Case study 3: Social care supply and hospital length of stay

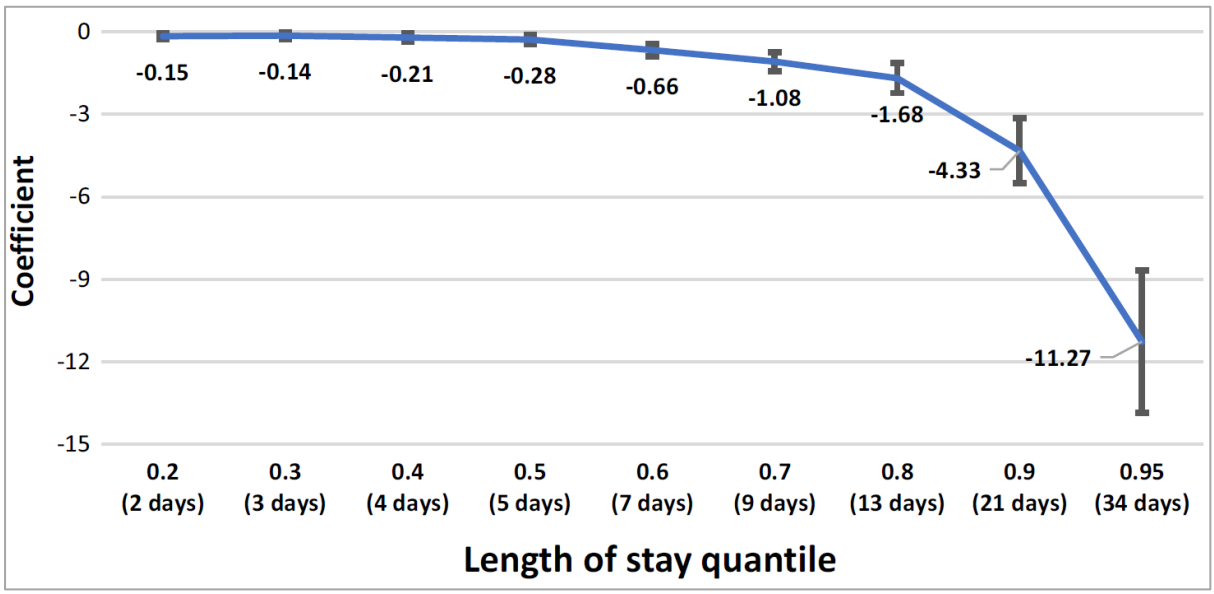
An important aspect of the healthcare system changes recommended in Sláintecare is the need to transfer care out of hospital into more appropriate settings. The restructuring envisaged under HRs and PBRA partly aims to help this recommendation be realised. Research from the Economic and Social Research Institute (ESRI) found that improving non-acute care supply can help reduce use of less appropriate hospital care, using the example of the impact of access to public home support on the use of hospital services among older people (65+). This study was one of the first to identify how health and social care services can often act as a substitute for each other in Ireland (Walsh et al., 2020). In the context of Sláintecare, and the goal of placing care in the least complex setting and as close to home as possible, findings from this study highlight that diverting resources from hospitals into other parts of the system has benefits for the efficient and equitable allocation of healthcare resources.

This study used information on over 300,000 inpatient hospitalisations between 2012 and 2015 among those aged 65+ from the Hospital In-Patient Enquiry (HIPE) dataset. Using this information on patients' home address (county and postcode in Dublin), the authors were able to match home support (or home care) supply in patients' local area, at a point in time, to their hospitalisation data.

As highlighted in Section 1.2, there exists large variation in health and social care supply across Ireland, including home support. An updated analysis by Walsh et al. (2020) found similar for home support; they showed that some individuals will have lower access to home support, *ceteris paribus*, than others, based solely upon their county address. This is in part a result of no mechanism being in place to match home support supply with need. The authors exploited this variation in home support supply across counties, over time, to examine the impact of an

increase in home support supply on the inpatient LOS of older patients (aged 65+). Furthermore, as the Model 3 and Model 4 hospitals included in the analyses have catchment areas that draw patients from numerous counties, the authors were able to compare patients within the same hospital at the same point in time, who had similar profiles except that they came from different counties, and for that reason had different home support supply available to them. The results show home support supply has little effect on average LOS. However, using a novel unconditional quantile regression technique that subdivides LOS into short and long categories, Figure 3.1 shows that inpatients from areas with a higher per capita availability of home support services tended to have shorter hospital stays on average. Concentrating on longer LOS patients who are likely delayed transfers of care, the paper finds a 10 per cent increase in home support availability correlates with a 1.2 to 2.1 per cent decrease in hospital stay duration. Larger effects were found among stroke and hip fracture patients, who may potentially utilise home support services more than the average patient. Larger effects were also found in one region that invested heavily in home support during the period studied (2012–2015).

FIGURE 3.1 THE IMPACT OF HOME SUPPORT SUPPLY ON INPATIENT LENGTH OF STAY



Source: Walsh et al. (2020).

The results of Walsh et al. (2020) demonstrate the significant impact that non-acute care supply can have on the usage of acute care services. It also highlights how inequalities in access to care can lead individuals to use less appropriate services, such as hospital or long-term residential care (LTRC). The study points out a key inefficiency: hospitals are penalised for longer LOS, despite not being responsible for decisions on home support supply. This disconnection in resource allocation decisions within the healthcare system undermines the potential efficiency gains of measures like ABF within hospitals. A crucial policy takeaway

from this research is the potential benefits of joint planning and management of health and social care activities within a region, as proposed by PBRA. Such integration may enable more efficient hospital discharge timing while ensuring patients receive the most appropriate care. Additionally, results may point to the lack of benefits from ABF observed by Valentelyte et al. (2023) being influenced by factors outside a hospital's control. This study underscores the importance of ensuring that the proposed PBRA mechanism effectively integrates acute and non-acute care.

3.2.4 Case study 4: Mental illness and healthcare utilisation

Incidence of mental illness is increasing in Ireland as well as many other countries, leading to an increase in both general healthcare utilisation and use of more specialist mental healthcare services (Figueroa, et al., 2020). Furthermore, while utilisation and expenditure by those with mental illness may be high (Figueroa et al., 2020), access to, and use of, healthcare services can also differ across sociodemographic groups and healthcare coverage (Frank et al., 2014). Health coverage and broader structural barriers often lead to lower uptake of mental healthcare. Barriers such as distance to services and lack of transportation can deter those in rural areas. Moreover, waiting lists and the financial cost of treatment, particularly for those in lower socioeconomic groups, can lead to lower mental healthcare utilisation.

While often overlooked in PBRA mechanisms, mental illness and poorer mental health outcomes lead to significant healthcare utilisation (Himelhoch et al., 2004; Saloner et al., 2014; Saloner et al., 2017; González-Suñer et al., 2021). However, no PBRA formula examined in Chapter 2 explicitly includes mental health as a characteristic to help determine resource allocation decisions more generally. Separate mental health budgets, though, are now common in PBRA formulae, including in England (NHS England, 2023).

The 2024 HSE budget allocated almost €1.3 billion to mental healthcare services,[5] with the majority of this budget spent on specialised inpatient and community-based mental healthcare services. O'Malley (2023) outlined that this expenditure on mental healthcare services will be included in the proposed PBRA formula. This is in line with PBRA systems across the National Health Service (NHS) and other comparator countries. However, treatment of mental health issues will invariably include expenditure on general acute public hospital care and primary care. Therefore, as the prevalence of mental ill health continues to increase, future iterations of PBRA formulae may begin examining the appropriateness of including mental health rates explicitly when trying to account for the additional healthcare

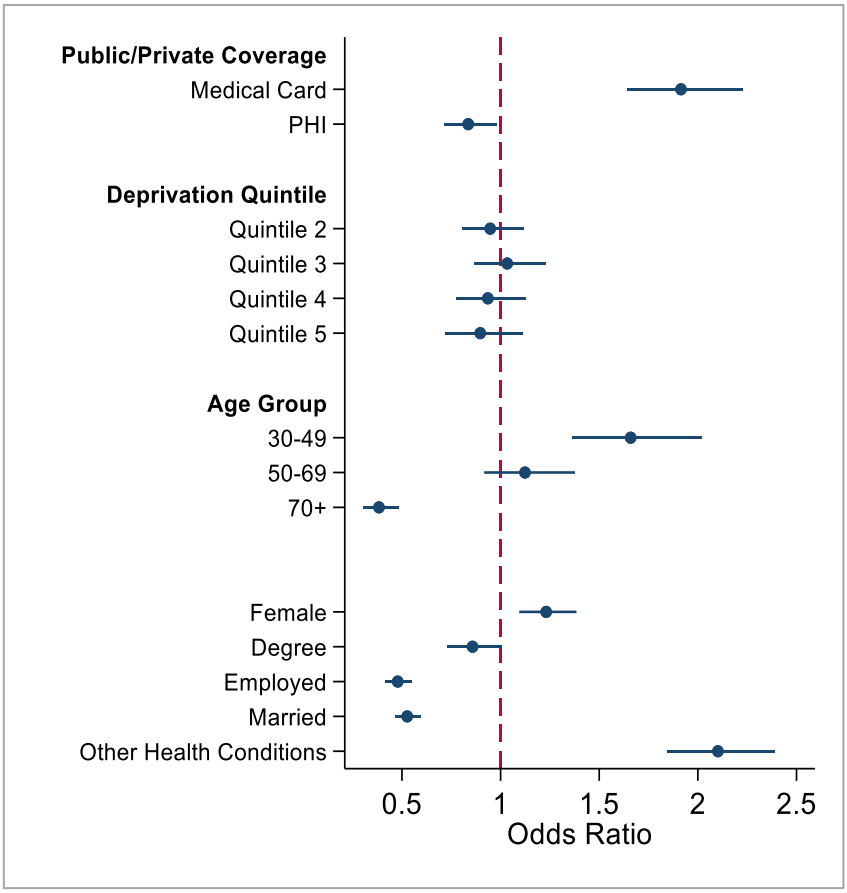
5 See https://www.gov.ie/en/press-release/ae213-minister-for-mental-health-and-older-people-launches-hse-digital-my-mental-health-plan/.

needs of populations, specifically care that is not captured within the current expenditure on more specialist mental healthcare services.

This case study uses data from Waves 1–5 of the Healthy Ireland Survey (HIS) to examine diagnosis of mental illness, general healthcare utilisation and mental healthcare utilisation. Within the HIS, participants are asked about their health conditions diagnosed by a healthcare professional, one of which pertains to 'emotional, nervous, or psychiatric problems, such as depression or anxiety'. Responses to this question allowed us to construct a binary variable indicating the presence or absence of a mental illness diagnosis. The HIS also incorporates questions concerning the use of three primary healthcare services: GP visits in the preceding four weeks; emergency department attendances; and overnight inpatient stays in the past 12 months. From these data, we derived annual count variables for each of these services.

Linear regression analyses were undertaken to examine the determinants of mental illness in Ireland. Figure 3.2 illustrates that medical cardholders, individuals aged 30-49, females and the unemployed are more likely to receive a mental illness diagnosis. While medical cards can serve as proxies for deprivation/socioeconomic status as provision is means tested, they may also serve as proxies for access as cardholders do not face fees for GP visits and, in the context of constrained supply, medical cards may be used as an instrument to assign scarce healthcare. Conversely, private health insurance (PHI) holders were less likely to be diagnosed.

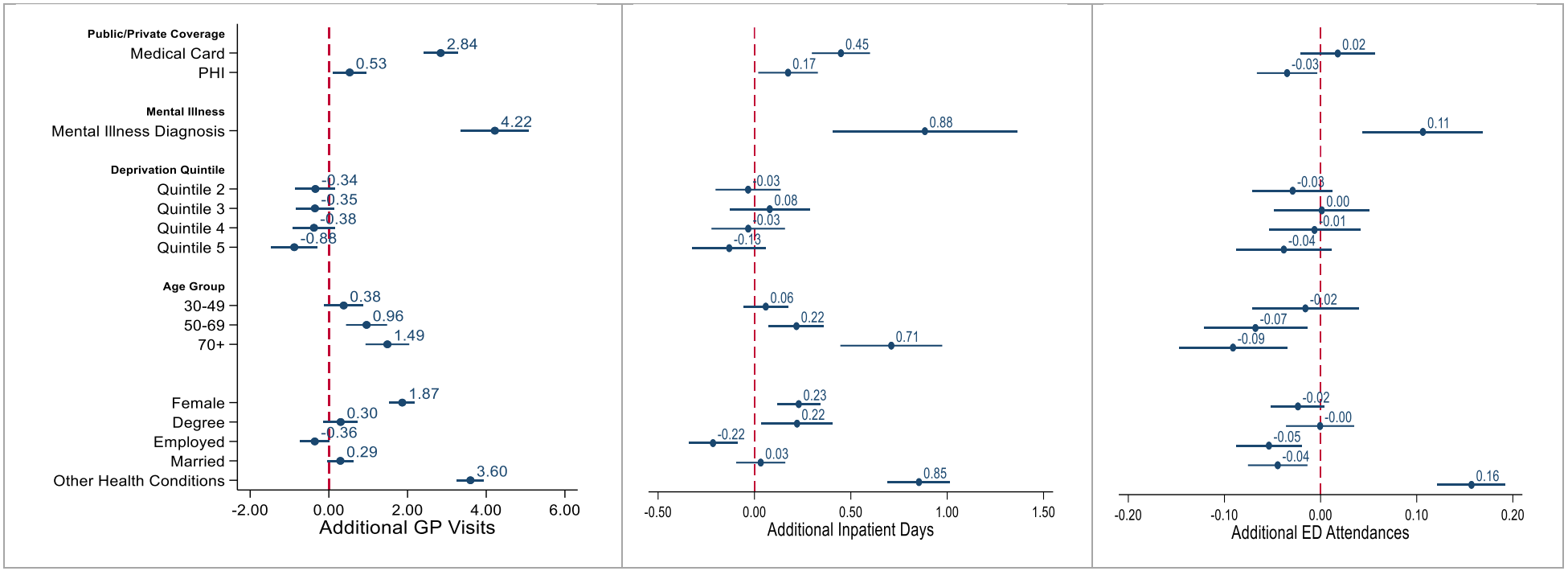
FIGURE 3.2 DETERMINANTS OF MENTAL ILLNESS DIAGNOSIS AMONG ADULTS IN IRELAND



Source: Authors' calculations of Healthy Ireland Survey, Waves 1–5.
Note: Results presented as odds ratios with 95% confidence intervals.

Figure 3.3 shows that mental illness diagnosis was associated with large increases in healthcare utilisation. Individuals with a mental illness diagnosis reported 4.22 additional GP visits, 0.88 additional inpatient days and 0.11 additional emergency department attendances per annum. Overall, individuals with a mental illness diagnosis used twice as much healthcare as individuals without a mental illness diagnosis.

FIGURE 3.3 DETERMINANTS OF HEALTHCARE UTILISATION AMONG ADULTS IN IRELAND



Source: Authors' calculations of Healthy Ireland Survey, Waves 1–5.
Note: Results presented as additional utilisation (average marginal effects) with 95% confidence intervals.
ED: emergency department.

Access to quality and affordable care in a timely manner is crucial for treating mental illness and enhancing the overall mental health of societies (WHO, 2019). However, in countries without universal healthcare coverage, where complex processes of access and provision exist, the ability of individuals with mental illness to receive adequate treatment is often limited. This study indicates that in Ireland, where universal healthcare is not in place, the impact of mental illness on the healthcare system is substantial, and that there may be inequalities in the diagnosis and use of healthcare for mental illness.

The results of this study highlight that mental illness in Ireland places a large burden on all parts of the healthcare system. Access to, and utilisation of, healthcare for those with mental illness is closely linked with medical card coverage. The *Vision for Change* and *Sharing the Vision* (Department of Health, 2020) policies provided key recommendations to refocus mental healthcare from residential to primary and community settings. While progress has been made, these results suggest that more effort is needed to ensure that barriers such as lack of a medical card or long waiting lists do not hinder the diagnosis and treatment of mental illness. The expansion of universal healthcare through Sláintecare, or policies ensuring that all individuals in need of public healthcare can access it regardless of their medical card status (Rafferty et al., 2019), could significantly reduce inequalities in accessing care. As the issue of mental illness increases, future iterations of the PBRA may examine the appropriateness of incorporating mental illness profiles within PBRA formulae, in particular the formula for mental health services.

3.3 HSE HEALTH REGIONS

The Sláintecare report emphasised the need to implement greater devolution of health and social care decision-making to local/regional structures. It recommended that:

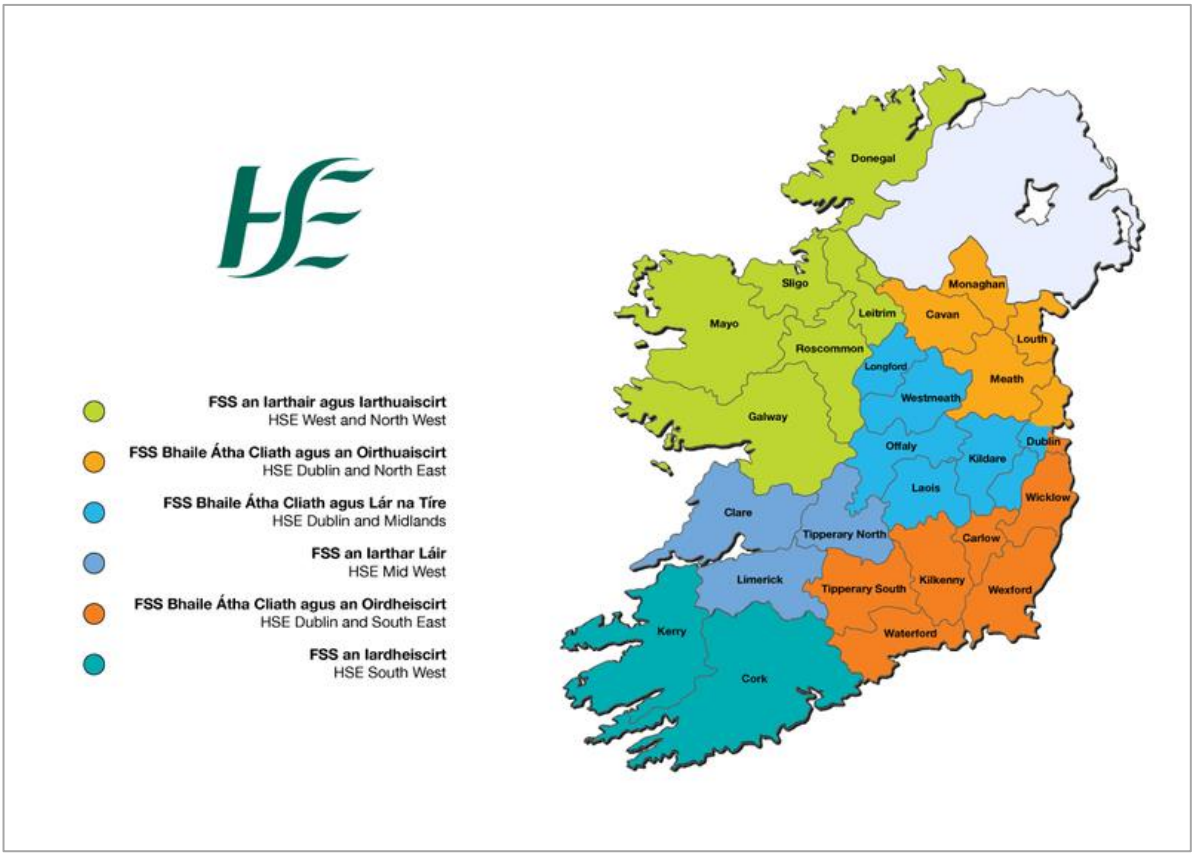
> *the HSE in future will act as a more strategic 'national centre' carrying out national level functions, with regional bodies designed on the basis of optimum organisation and regional health resource allocation.* (Houses of the Oireachtas Committee on the Future of Healthcare 2017)

These regional bodies would include governance structures to connect acute and non-acute care.

Figure 3.4 illustrates the HR structure that has been agreed upon (HSE, 2023). There will be six HRs distributed on a geographical basis across the country. The responsibility for organising and delivering acute and non-acute service previously undertaken by CHOs and Hospital Groups will be subsumed into the HRs. In general, the HRs follow a similar structure to the CHOs, while the smaller LHOs

remain nested within the new HRs.[6] The LHOs within each HR are listed in Table A.1. Larger changes have been made to Hospital Group structures. Many organisational structures from CHOs and Hospital Groups will remain; for instance, each HR will have at least one Model 4 acute public hospital.[7] It is also expected that there will be minimal frontline staffing or infrastructure initially impacted by this organisational change.

FIGURE 3.4 HSE HEALTH REGIONS



Source: Health Service Executive.

In general, the move towards HRs is welcome, and one of the most substantial elements of the Sláintecare report to be established. The HRs firstly will be used to:

> *align hospital and community-based services in each region so that they can work together better and deliver joined-up, co-ordinated care closer to home.* (HSE, 2023)

This alignment is expected to enhance the coordination of care across acute, community and long-term care sectors. At their core, HR structures are designed to foster improved integration and planning of healthcare services. Before the HR structures were announced, a public consultation was conducted to gather

6 HR C includes CHO5 and CHO6; HR D equates to CHO4; HR E equals CHO3.
7 There are nine Model 4 adult public hospitals in Ireland.

opinions on the integration of CHOs and Hospital Groups (Department of Health, 2019). Of the 230 stakeholders who submitted responses, the majority strongly supported the integration of acute and non-acute services. They also advocated for aligning new structures geographically. Thus, HRs lay the groundwork for more effective integration of healthcare services.

This integration is likely to result in more efficient utilisation of strained healthcare services. As highlighted in Section 3.2.3, regions with a better supply of home support services experienced lower LOS for hospitalised patients. Currently, hospitals face penalties in two ways from the lack of integration: their inability to discharge patients promptly; and the implications within the ABF framework (i.e., they receive the same reimbursements despite longer LOS), due to the limited supply of non-acute care, which is beyond their control. The establishment of HRs, while not eliminating all these challenges, may lead to better alignment of incentives for both hospital and non-hospital providers.

The shift towards integrated care will necessitate HRs to coordinate and communicate across different service areas. The exact nature of this coordination is yet to be finalised; in reality, it will be dependent upon data available and the health information systems in place. However, it is anticipated that each HR will require a sub-structure for care delivery. The July 2023 HR implementation plan proposes that these sub-structures, named Integrated Health Areas (IHAs), will each cover a population of about 300,000 people (Government of Ireland et al., 2023). Below the IHAs, the 96 existing Community Healthcare Networks (CHNs) are expected to continue operating. Additionally, IHAs are proposed to coordinate with other local social services and public bodies involved in the broader determinants of health (Government of Ireland et al., 2023).

Finally, introducing a PBRA and the devolution of some decision-making to HRs and within-HR substructures means that more decisions will need to be made at local levels. Local service planners will need to be granted the requisite authority to take responsibility for the decision-making process regarding how best to use resources, how to take advantage of the local conditions (e.g., infrastructure) and how to meet the staffing requirements of HRs or IHAs. The Sláintecare report has recommended that staff recruitment, including that of acute public hospital consultants, should be undertaken at the regional level.

The establishment of the HRs will change the structure of the HSE. However, it is envisaged that the HSE Centre will remain to focus on strategic actions and that it will support HRs by formulating national frameworks and models of care (Government of Ireland et al., 2023).

3.4 PROPOSED POPULATION-BASED RESOURCE ALLOCATION FORMULA

The previous section outlined the HR structure through which the PBRA in Ireland will occur. In this section, we outline the key parameters within the proposed formula and offer some discussion and recommendations on how future iterations of the formula could be improved upon.

The proposed PBRA formula is:

$$AdjPop_{HR} = ProjPop_{HR}\ x\ Age\_SexIndex_{HR}\ x\ DepIndex_{HR}\ x\ RurIndex_{HR}$$

where the adjusted population of each HR ($AdjPop_{HR}$) accounts for the (projected) population of each HR ($ProjPop_{HR}$), the age and sex composition of each HR ($Age\_SexIndex_{HR}$), the level of deprivation in each HR ($DepIndex_{HR}$), and the rurality or remoteness of each HR ($RurIndex_{HR}$).

In the analyses that follows, we list HRs by letter: HR A = Dublin & North East; HR B = Dublin & Midlands; HR C = Dublin and South East; HR D = South West; HR E = Mid West; and HR F = West & North West. The proposed PBRA formula, detailed by the Department of Health in O'Malley et al. (2023), draws on a range of evidence from prior academic studies (Johnston et al., 2021) and a report by the Department of Health (McCarthy et al., 2022). Generally, the parameters incorporated into the PBRA mechanism closely align with parameters included in PBRA formulae in Australia, England, New Zealand and Scotland. We examine these parameters in greater detail below, particularly how they are sequentially integrated into the formula. We also examine the impact of the proposed PBRA formula on HSE budgets, following the methodology of O'Malley et al. (2023). Their approach involves comparing the 2021 budgets allocated across HRs with the hypothetical budgets that would result under the proposed PBRA. In their analyses, O'Malley et al. (2023) examine the impact the PBRA formula would have on acute public hospitals, primary care, social inclusion, palliative care, mental health and older peoples' services. For the sake of brevity, our examples will primarily focus on acute public hospital care.

3.4.1 Population

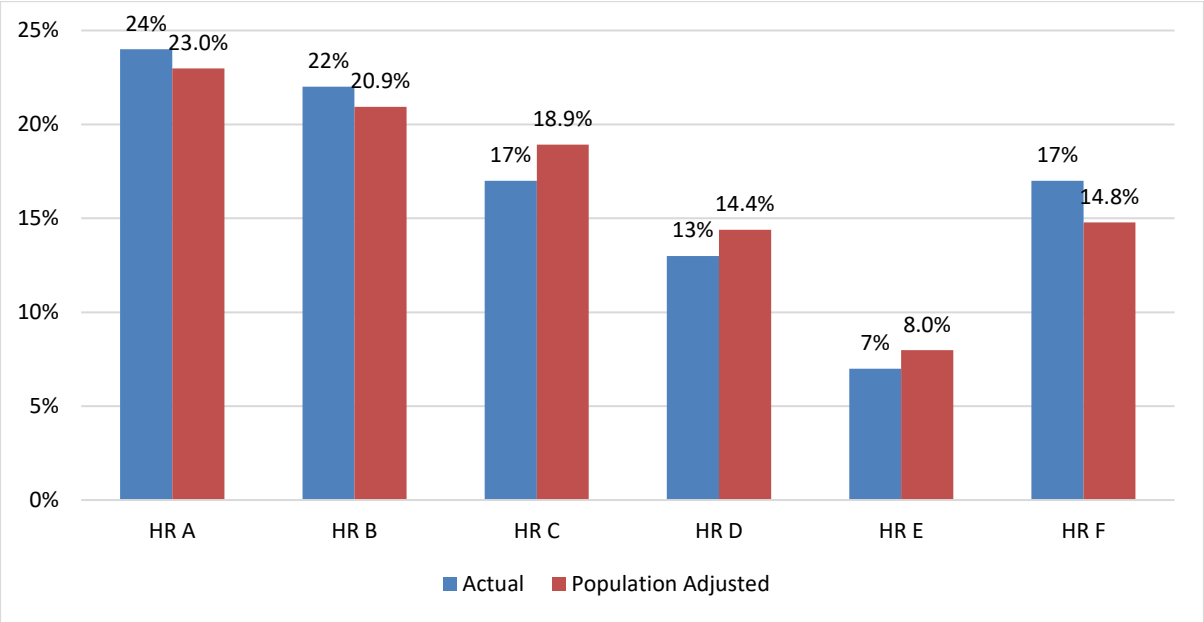
In line with PBRA formulae used internationally, the population of each HR ($ProjPop_{HR}$) is the starting point in the resource allocation decision within the Irish proposed PBRA formula. Population will have the largest impact on the distribution of resources using this formula, as Figure 3.5 shows large variation in population across each HR. Overall, HR A (Dublin & North East) has the largest population, with HR E (Mid West) having the smallest population.

FIGURE 3.5 PERCENTAGE OF POPULATION BY HSE HEALTH REGION

Source: O'Malley et al. (2023).

Figure 3.6 illustrates the acute public hospital funding allocation once HR population is adjusted for. In general, as would be expected, the inclusion of population does result in changes in funding allocations across HRs. However, the changes seen for acute care are relatively small (two percentage points or less).

FIGURE 3.6 ACUTE PUBLIC HOSPITAL FUNDING ALLOCATION, POPULATION ADJUSTED



Source: O'Malley et al. (2023)

No weighting is used in the adjustment for the population structure of HRs for acute care or other services examined in O'Malley et al. (2023). For older peoples' services, the population aged 65+ within each HR is used in lieu of the wider population, as these services are targeted to this age group.

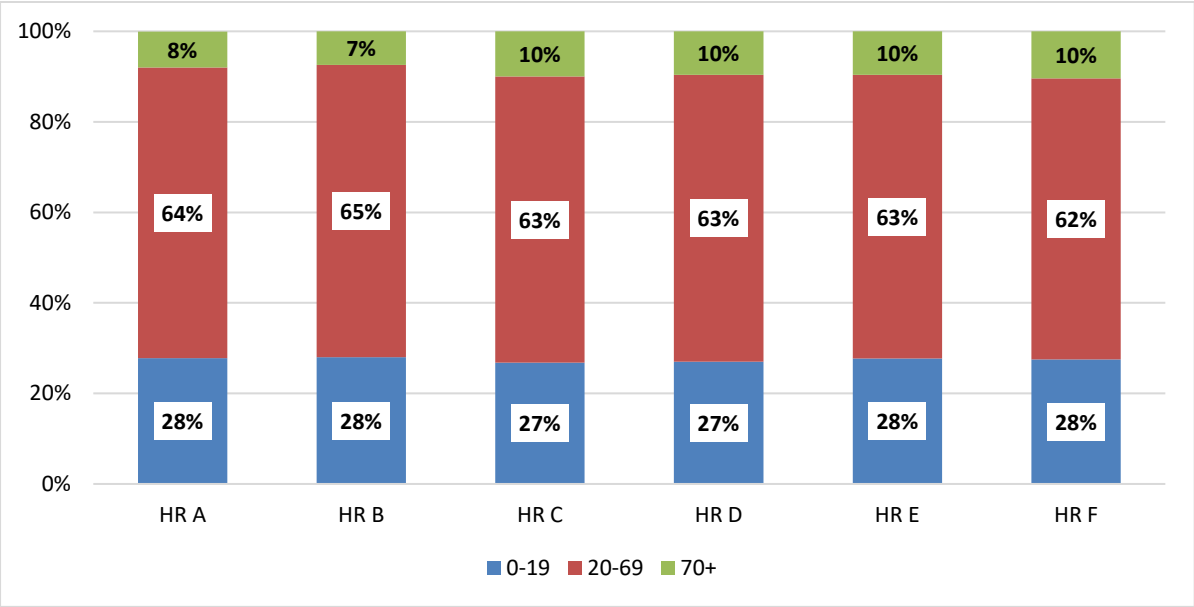
The adjustment based on HR population size is reliant on readily available data provided by the CSO from the national census. Over a shorter-term horizon (two to five years), it would be expected that the shares of population within each HR would not change to a large extent. However, the size of the Irish population has been increasing in recent years, largely due to increases in net migration among the working age population and improvements in life expectancy at older ages (Walsh et al., 2021). Therefore, relying on population projections provided by the Central Statistics Office (CSO), or using the COSMO model (which models fertility, migration and life expectancy) located at the ESRI (Walsh et al., 2021; Bergin et al., 2024), will provide accurate medium-term population projections. This will allow healthcare policymakers to exploit a key benefit of PBRA mechanisms: multi-year budgets. This would be of considerable importance, and follows calls by the Irish Fiscal Advisory Council (Casey et al., 2021) and others to define short- to medium-term budgets to remove some of the underbudgeting and overspends that are common within the health budget.

3.4.2 Age and sex index

The second parameter, $Age\_SexIndex_{HR}$, included in the formula is the age and sex profiles of each HR. This reflects the impact age and sex have on healthcare utilisation and costs. The PBRA formula uses healthcare costs per capita for each age group (five-year age bands) and for both males and females. These age–sex healthcare cost profiles are based in part on previous ESRI research using the Hippocrates model (Keegan et al., 2020; Walsh et al., 2021) and research on palliative care (May et al., 2019). These per capita cost profiles are subsequently compared to the national average per capita cost, to estimate relative age–sex profiles.

Figure 3.7, using the age groups examined in O'Malley et al. (2023), shows little variation in the age composition of the six HR populations. HRs A and B have the smallest percentage of people aged 70+, which may reduce the level of resources for care of older people required in these HRs compared to other regions.

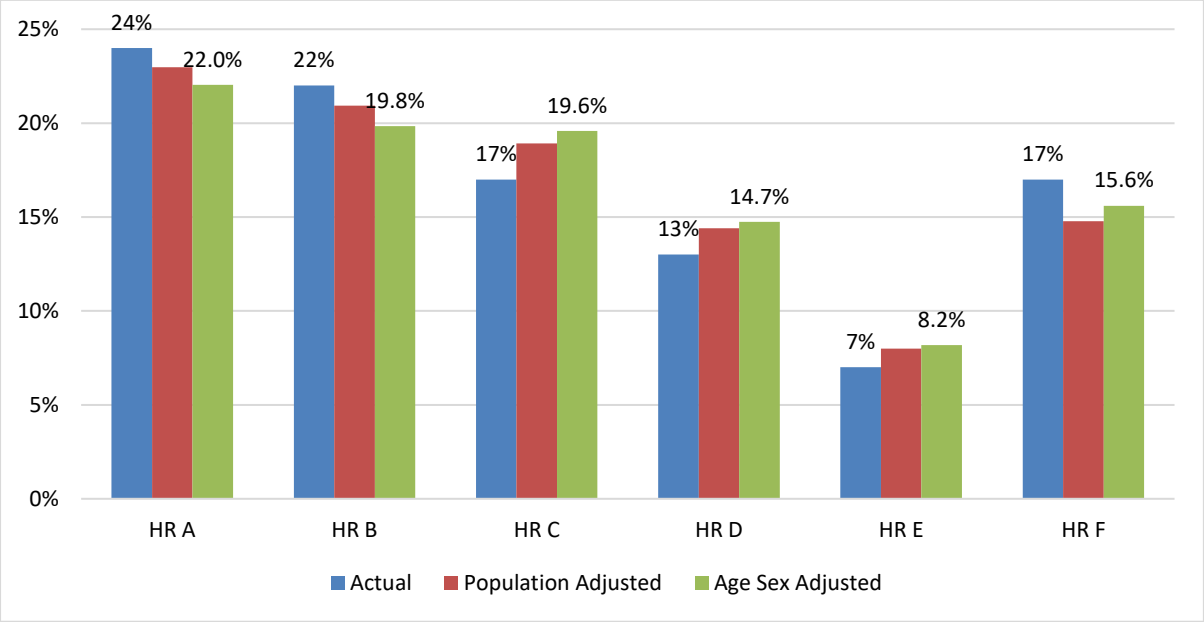
FIGURE 3.7 PERCENTAGE OF POPULATION IN EACH AGE GROUP BY HSE HEALTH REGION



Source: Authors' calculations.

Figure 3.8 illustrates the acute public hospital funding allocation once the age and sex cost profiles of acute public hospital care in Ireland are adjusted for. In the case of acute public hospital funding, these adjustments have a similar effect on funding allocations as the population adjustment.

FIGURE 3.8 ACUTE PUBLIC HOSPITAL FUNDING ALLOCATION, AGE AND SEX ADJUSTED



Source: Authors' calculations.

No additional weighting is applied to the age–sex profiles within the proposed formula.

Similar to population data, there exists granular information on HR populations by age and sex, and changes to the demographic profile can be modelled within CSO and ESRI population projections. This feature once more points to the ability of healthcare policymakers to formulate multiannual budgets using this PBRA approach.

3.4.3 Deprivation

Area-level deprivation is a key factor in the proposed formula, and the third parameter included in the formula. The determination of what deprivation measure to include when calculating the PBRA mechanism for Ireland is, in part, based upon available data. O'Malley et al. (2023) use the Pobal HP (Hasse and Pratschke) Deprivation Index, based upon the Small Area Population Statistics (SAPS) from Census 2016 and 2022. The Pobal HP Deprivation Index uses data from the national censuses to assess various socioeconomic indicators at a regional level, and it one of the most commonly used deprivation indices in public policy research in Ireland (Whelan et al., 2023).

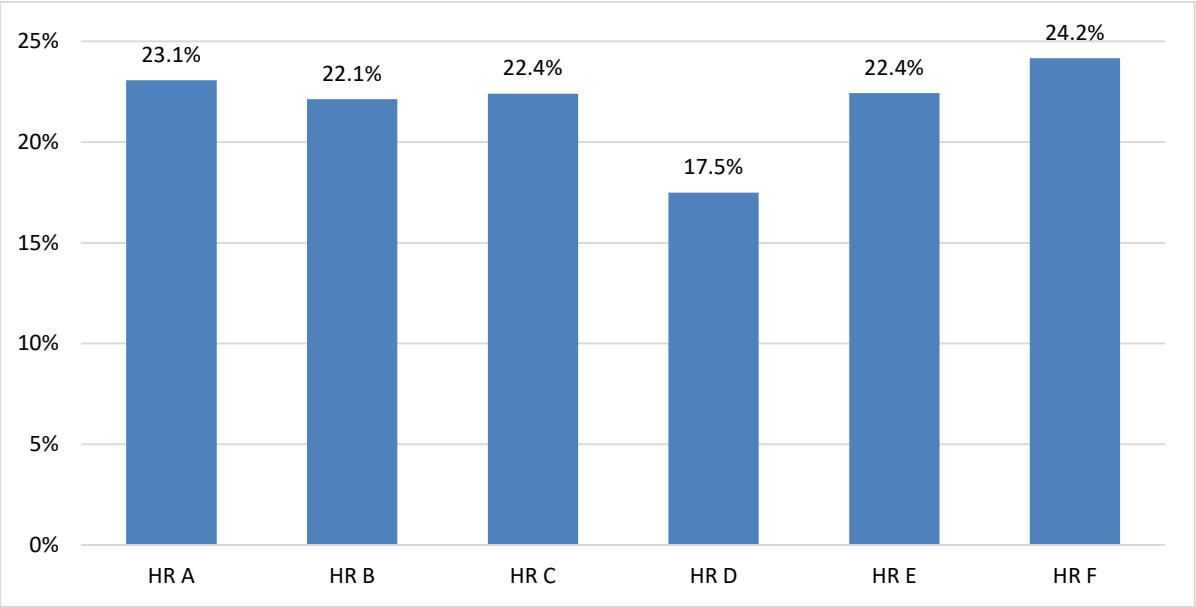
The Pobal HP Deprivation Index has three dimensions of advantage:

- demographic profile of each small area population (e.g., percentage of households with children aged under 15 years and headed by a single parent);
- social class profile (the percentage of the population with a third level education); and
- labour market participation (e.g., unemployment rate).

Often, the HP Index score is partitioned into decile or quintile variables that apportion SAPS and their populations to specific quintiles (deciles), based upon where they are ranked on the deprivation index. This allows for particular focus on the most deprived populations – those seen as being very or extremely disadvantaged.

The HP Deprivation Index is also included in many surveys including the HIS and has been used previously to examine health across groups (Walsh et al., 2020; Walsh et al., 2022). Using Waves 1–5 of the HIS, Figure 3.9 identifies the percentage of adults in each HR living in the most deprived quintile (most deprived 20% of the national population). We find that HRs A and F are the most deprived HRs, with 23.1 per cent and 24.2 per cent respectively living in the most deprived quintile. HR D is the least deprived HR. These differences in deprivation show the importance of accounting for deprivation or socioeconomic inequalities within the PBRA.

FIGURE 3.9 DEPRIVATION BY HSE HEALTH REGION



Source: Authors' calculations of Healthy Ireland Survey Waves 1–5.

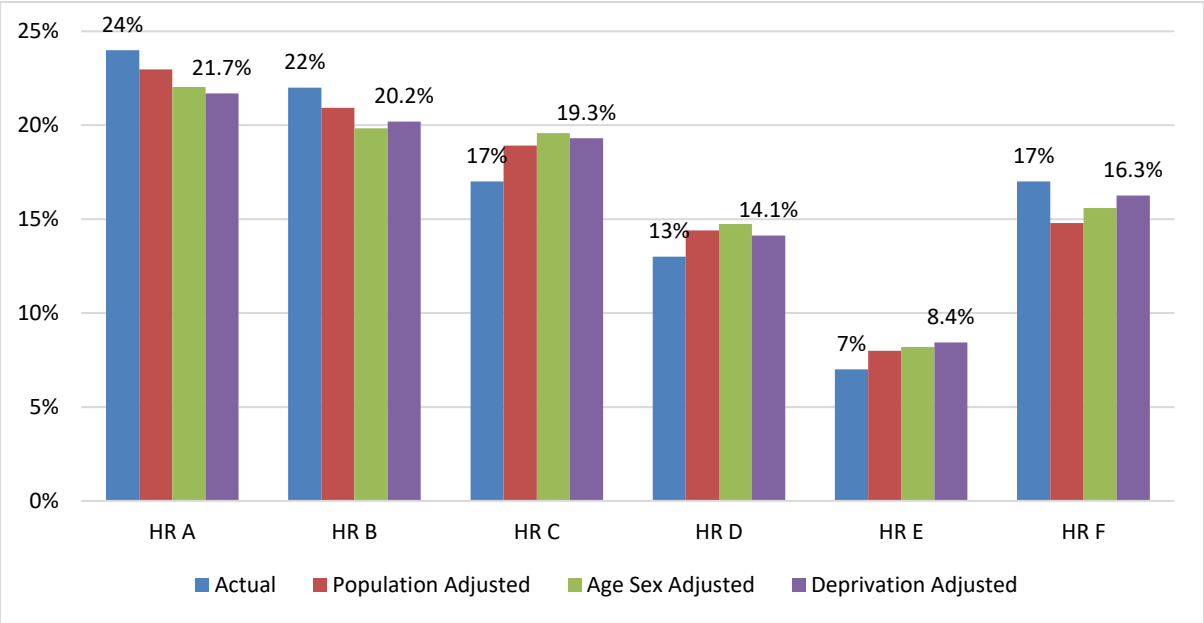
Within the proposed PBRA formula, a deprivation relative score is estimated, in which SAPS is divided into eight categories, from extremely affluent to extremely disadvantaged. This measure is also included in HIS to estimate deprivation of each respondent. The proposed formula used defined deprivation weights.

- A weighting of 1 is applied to individuals who are categorised as not being disadvantaged.
- A weighting of 2 is applied to individuals who are categorised as disadvantaged.
- A weighting of 3 is applied to individuals who are categorised as very disadvantaged.
- A weighting factor of 4 is applied to individuals who are categorised as extremely disadvantaged.

The deprivation index included is then compared to the national average and normalised as appropriate.

Figure 3.10 illustrates the acute public hospital funding allocation once the deprivation weighting outlined above is adjusted for. In the case of acute public hospital funding, these adjustments have a similar effect on funding allocations as the population adjustment.

FIGURE 3.10 ACUTE PUBLIC HOSPITAL FUNDING ALLOCATION, DEPRIVATION ADJUSTED



Source: Authors' calculations.

However, as discussed by Penno et al. (2013), a number of different deprivation and socioeconomic measures, and weightings, are used across PBRA mechanisms internationally.

In the past in Ireland, different deprivation indices and weightings were used for resource allocation decisions and recommendations in health. In 2006, the HSE introduced a simple resource allocation formula to try to allocate resources more efficiently and equitably for adult community mental health teams (Vega et al., 2010). This approach estimated deprivation at the local (electoral division level) and used the Small Area Health Research Unit Deprivation Index developed by Dr Alan Kelly at Trinity College Dublin in the 1990s.[8] It applied higher weights to the most deprived areas. Similarly, deprivation was used by the HSE in their formula to determine the location of new Primary Care Centres, which also placed importance on the deprivation of local areas.[9]

Outside of healthcare, one of the most important uses of deprivation relates to education and the DEIS (Delivering Equality of Opportunity in Schools) scheme (Department of Education, 2022). The Department of Education specifically targets resources to DEIS schools, which cater to students in areas of high deprivation, aiming to mitigate the educational challenges and disadvantages associated with

8 See https://www.tcd.ie/media/tcd/medicine/public-health-primary-care/pdfs/sahru-report-1997.pdf.

9 The HSE stated that where locations had equal scores, their rankings were then based on the deprivation index score. See https://www.audit.gov.ie/en/find-report/publications/2019/2018-annual-report-chapter-15-development-of-primary-care-centres.pdf.

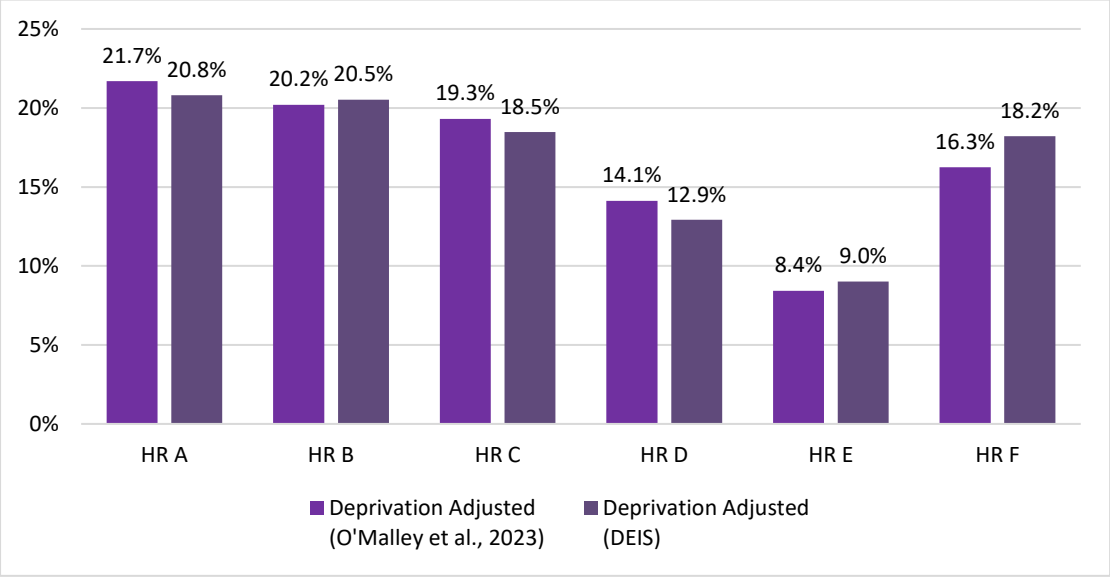
socioeconomic background. The DEIS formula also uses the HP Deprivation Index but applies different weights to those chosen in O'Malley et al. (2023).

The DEIS formula uses defined deprivation weights applied to individuals based upon their location of residence.

- A weighting of 0 is applied to individuals living in locations that are categorised as not being disadvantaged (extremely affluent, very affluent, affluent and marginally above average).
- A weighting of 0.5 is applied to individuals living in locations that are categorised as being marginally below average.
- A weighting of 1 is applied to individuals living in locations that are categorised as disadvantaged.
- A weighting of 2 is applied to individuals living in locations that are categorised as very disadvantaged and extremely disadvantaged.

Figure 3.11 illustrates the acute public hospital funding allocation using the weighting applied in O'Malley et al. (2023), and applying the DEIS weighting to the acute public hospital funding across HRs.

FIGURE 3.11 ACUTE PUBLIC HOSPITAL FUNDING ALLOCATION, DEPRIVATION ADJUSTED USING DEIS FORMULA



Source: Authors' calculations.

In presenting this exercise in Figure 3.11, the intention is not to put forward the DEIS weighting as more appropriate than others. But it does show that further examination of appropriate weighting is required as the changes in funding differ across weightings. The DEIS approach to inclusion of deprivation has been used now for a number of years, and one of the important elements of the DEIS

programme is that evaluation was built into the programme from its inception (Smyth et al., 2015).

There is relative stability in deprivation within an area over time. All CSO censuses now capture deprivation at regular (five-year) intervals. Once more, the data on deprivations point to the ability of healthcare policymakers to formulate multiannual budgets using this PBRA approach.

3.4.4 Rurality index

Finally, a rurality index is applied to the formula. The model includes variables based upon the percentage of the population within each HR that lives in a highly rural/remote area, using information from Census 2016. This measure is given a weighting of two.[10] Once more, the rurality index is compared to the national average and normalised as appropriate. The degree of rurality of an area will remain relatively constant over time, therefore not impeding medium-term budgeting; however rurality definitions may change over the longer term.

3.4.5 Impact of population-based resource allocation formula on acute and primary care budgets

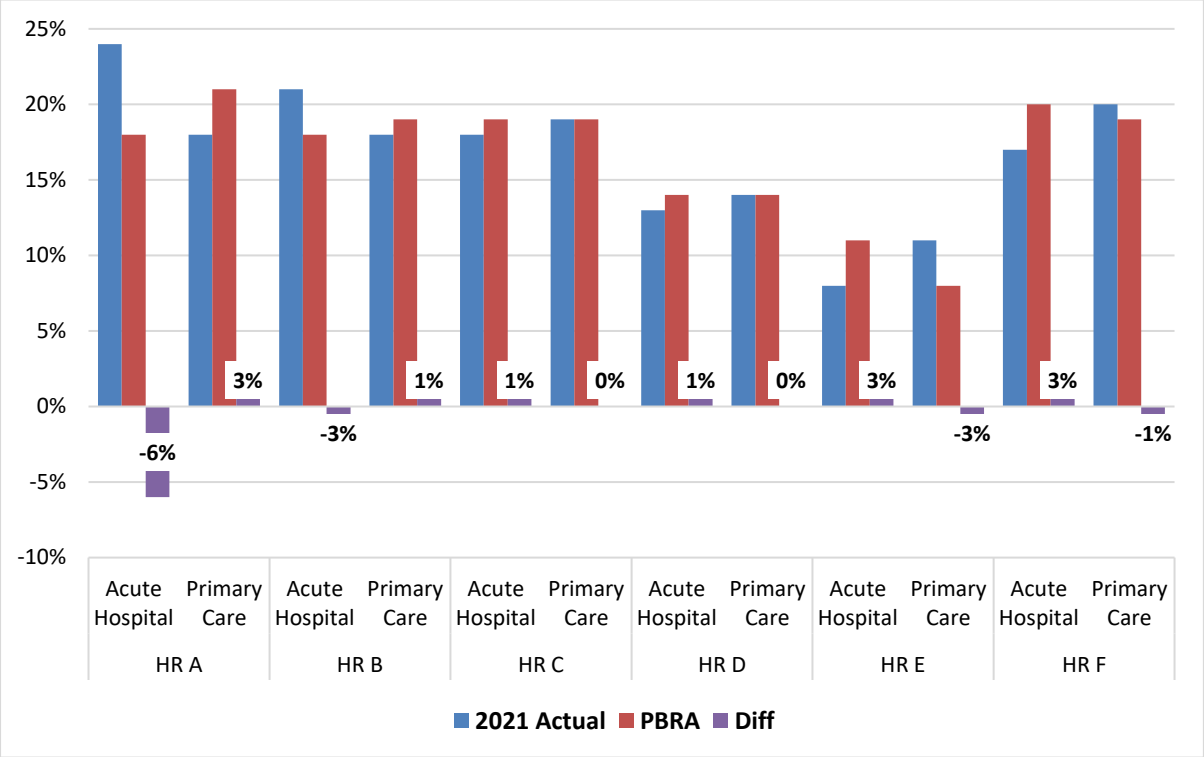
Combining all of the parameters above, O'Malley et al. (2023) compare 2021 budgets allocated across HRs to the counterfactual budget that would occur under the proposed PBRA. The authors compare budget allocations for a number of different sectors, including acute hospitals and primary care. We show the impact the adjustments have on both the acute and primary funding allocations in Figure 3.12. Overall, for both acute hospitals and primary care, the actual budgets provided in 2021 differ little from the counterfactual budget that would occur under the proposed PBRA. Some notable exceptions to this are seen. In HR A, the budget for acute hospitals would be six percentage points lower under the proposed PBRA scenario, while a reduction of three percentage points would occur in HR B. In contrast, a three percentage points increase would occur in HRs E and F.

Interestingly, in those HRs where PBRA would reduce (increase) acute healthcare budgets, the proposed formula would also increase (reduce) the HR's primary care budget. Therefore, it is possible that some of the differences between the actual and PBRA budgets for acute care reflect the relative importance of acute hospitals in some HRs. This may be further underpinned by the fact that the relative

[10] As also shown in O'Malley et al. (2023), applying a rurality index has only a small effect on resource allocation for acute public hospital and primary care. Therefore, we do not provide graphical representation of its redistributive effect in this section. However, based upon evidence from other countries, accounting for remoteness is important when allocating resources for community-based care and long-term care, where healthcare workers such as home carers and community nurses may be required to spend significant time travelling to patients.

importance of the acute budgets is largest in HRs A and B, which are located in part in Dublin and the Dublin commuter belt.

FIGURE 3.12 PERCENTAGE OF ACUTE HOSPITAL AND PRIMARY CARE HEALTHCARE EXPENDITURE BY ACTUAL AND PBRA SCENARIOS ACROSS HSE HEALTH REGIONS, 2021



Source: O'Malley et al. (2023).

3.5 OTHER POPULATION-BASED RESOURCE ALLOCATION FORMULA CONSIDERATIONS

It is clear that the PBRA formula outlined in the previous section represents a significant step forward for Irish healthcare and will have a considerable impact on healthcare funding, and health and social care provision in Ireland. Furthermore, the PBRA formula template is well considered and many of the parameters adopted within the formula match those in countries with more sophisticated and embedded PBRA. However, some changes may be required prior to the introduction of PBRA or, more realistically, in future iterations of the formula, to improve its effectiveness. Below we identify other formula parameters or features that policymakers in Ireland may need to consider. Where appropriate, we provide options and lessons from other countries, as examined in Chapter 2.

3.5.1 Health

The health and well-being of a population, and the demand for health and social care, are closely related to demographic factors such as age, sex and deprivation, already accounted for within the PBRA formula. For example, the age and sex cost

profiles estimated by the ESRI (Keegan et al., 2020; Walsh et al., 2021) are used to inform the age and sex adjustments within the O'Malley et al. (2023) PBRA formula. However, it is possible that additional health and healthcare demand differences exist across HRs (or across CHNs within HRs). Other healthcare system PBRA formulae account for these additional differences. Within the new NHS England formula, a further adjustment to the weighted capitation is made for 'additional healthcare needs' that cannot be explained by age and sex differences alone. Some regions in England were found to have higher incidence rates of morbidities even after controlling for age and sex (NHS England, 2023).

While the excellent health information and data systems within NHS England allow for granular information on health and morbidities to be included, it is not possible to undertake a similar exercise in Ireland. Instead, we attempt to examine whether or not there exists any evidence for differences in health and healthcare demand across HRs using data from the main health and healthcare survey, the HIS. Using data from Waves 1–5 of the HIS, we examine three key measures of health; these are correlated, but capture both subjective and objective health status, which can both impact individuals' demand for healthcare. In the analyses, we present health and healthcare utilisation for each HR after adjusting for age and sex of respondents. Our three health outcome variables are: self-reported health, chronic illness and multimorbidity.

Self-reported health: In all waves of the HIS, respondents are asked, 'How is your health in general?' Response options are: 'very good, good, fair, bad, and very bad'. We use this question to assess self-reported health and create a binary variable equal to one for those who respond very good or good, and zero otherwise. This is used as a measure of individuals' subjective health.

Chronic illness and multimorbidity: Building upon research that shows the number of chronic conditions is correlated with healthcare demand and expenditure (Larkin et al., 2022), we created chronic illness and multimorbidity variables. Across all waves of the HIS, respondents are also asked about the diagnosis of common health conditions by a medical professional. The list of health conditions differs across HIS waves. In Waves 1–2, 16 health conditions were listed to respondents, while in Waves 3–5, 25 health conditions were listed. From Wave 7 onwards, there was a change in survey format (from face-to-face to telephone) and a slight change in wording; therefore, it was deemed inappropriate to use Waves 7 and 8 in this analysis.

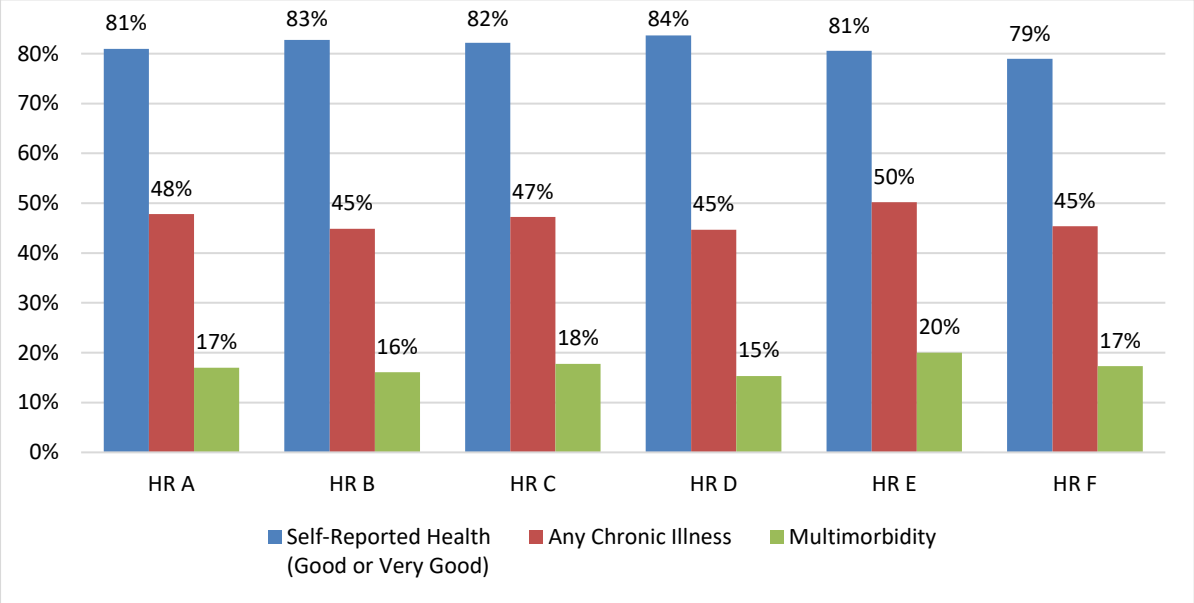
Many of these conditions were considered not to be limiting health conditions and were therefore excluded (e.g., asthma). Several similar conditions were listed separately, and in this analysis were combined as one.[11] A full list of the conditions

[11] For example, Alzheimer's disease, dementia and serious memory impairment were listed as separate options. We grouped these conditions together into one cognitive impairment variable.

included, and conditions grouped together, can be found in Table A.2. In the analyses we examine the prevalence of any chronic condition by creating a binary variable equal to one if the respondent stated they have any of the limiting health conditions listed, and zero otherwise. These conditions also correspond closely to a similar analyses undertaken in Ireland (Walsh et al., 2022; Humes et al., 2023) and one in the UK (Blundell et al., 2020). Multimorbidity was assessed as having two or more chronic illnesses.

Figure 3.13 shows display-adjusted health outcomes across HRs. HR D has the highest percentage of individuals reporting good or very good health. HR E has the highest rates of chronic illness and multimorbidity. However, in general, using HIS, we find little variation in health outcomes across HRs once age and sex are adjusted for.

FIGURE 3.13 SELF-REPORTED HEALTH STATUS, CHRONIC ILLNESS AND MULTIMORBIDITY BY HSE HEALTH REGIONS



Source: Authors' calculations of Healthy Ireland Survey Waves 1–5.

Mental illness: One of the chronic illnesses included in the HIS relates to mental illness. In the HIS, respondents are asked to state if they have 'any emotional, nervous or psychiatric problems, such as depression or anxiety'. We use responses to this question to create a binary variable capturing mental illness diagnosis. Figure A.3 in the appendix shows some small variation across HRs, though administrative datasets may be more informative for the purposes of examining differences at the HR level. However, the burden of mental health remains higher than in other European countries (European Observatory on Health Systems and Policies et al., 2023), and further evaluation of the potential of incorporating mental health in the PBRA should be considered.

Using the HIS we find limited evidence that after adjusting for self-reported health or chronic illness rates, the allocation of resources across the HSE HRs would change. Future iterations of the PBRA formula should examine other datasets for 'additional healthcare needs' using more granular and administrative data as they become available. However, currently, there is limited evidence that accounting for additional healthcare needs is required.

3.5.2 Healthcare demand and healthcare coverage

It is also possible that healthcare demand may differ across regions in Ireland due to, for example, supply and access differences, cultural differences, or healthcare coverage and eligibility. This latter factor is potentially more of a concern in Ireland compared to many countries examined in Chapter 2. Public healthcare eligibility and coverage often determine access to public healthcare services, with the different coverage groups facing different sets of prices for (and sometime access to) public healthcare. Unlike most European countries, Ireland does not operate under a universal healthcare system (Connolly et al., 2019). Rather, there exists a mixture of public and private funding and provision of health and social care services. Although having mixed public and private provision, and funding, is not uncommon in an international context, the degree of overlap between the public and private parts of the system found in Ireland is unique (Geary et al., 2018). The nature of the Irish healthcare system may also impact the form and scope of resource allocation mechanism options available to policymakers.

Medical cards are the predominant form of public healthcare coverage in Ireland. Those with a medical card receive GP and practice nurse services, specific dental, optical and aural services, maternity and infant care services, community care, and public acute hospital care free from out-of-pocket payments (Wren et al., 2017). In addition, medical cardholders receive reduced-cost prescribed medicines.[12] Entitlement to a medical card is predominantly based on a family- or household-level means test. The income thresholds differ according to age, with households with the lowest incomes and those predominantly dependent on social welfare benefits typically qualifying for a medical card (Keane et al., 2021). For most households, the means test allows for deductions of outgoings such as rent and mortgage payments, and childcare costs. However, households with an individual aged 70+ undergo an income means test based on gross income (Keane et al., 2021). A smaller group of individuals qualify for a discretionary medical card. These cards are mainly provided to individuals diagnosed with a chronic health condition

[12] A co-payment of €1.50 is required for each drug that is dispensed to medical cardholders, up to a maximum of €15 per month per person or family. For individuals aged over 70, the prescription charge is €1 per item, up to a maximum of €10 per month per person or family.

or when their medical expenses are considered to be excessive (Keane et al., 2021). In December 2023, 30.5 per cent of the population held a medical card.[13]

In 2005, GP visit cards were introduced. These cards grant free GP and practice nurse visits. GP visit card eligibility mainly relies on a means test, with thresholds higher than those for a medical card. GP visit card eligibility is determined individually, not on a family/household basis. In recent years, the Government has expanded eligibility for GP visit cards. As of November 2023, all those aged under 8 years and all adults aged 70+ are automatically eligible for a GP visit card. In addition, all individuals considered to be under the median income are eligible. In December 2023, 11.5 per cent of the population held a GP visit card.[14]

For non-publicly funded private healthcare, individuals must pay out-of-pocket (which may be partially or fully funded if they have PHI). It is common for private care to be delivered in a public healthcare setting, yet separate waiting lists are often maintained for public and private patients, resulting in variations in waiting times that reflect ability to pay rather than clinical need (Mueller et al., 2020). In the context of out-of-pocket costs and long waiting lists for care in the public system, a majority of the population without a medical card purchase PHI (Health Insurance Authority 2020; Walsh et al., 2021). PHI offers three roles: complementary cover, which enables cost sharing left after basic coverage; supplemental coverage, which enables access to services not included in the public benefit basket; and duplicating coverage, which provides faster access to services, larger choice of providers and superior accommodation (Geary et al., 2018; Mueller et al., 2020). In Ireland, PHI plays a predominantly 'duplicate' role, with some complementary cover (Mueller et al., 2020). In 2022, 47 per cent of the population were covered by PHI (The Health Insurance Authority, 2022).

In this subsection, we examine whether or not there exists any differences in healthcare demand across HRs, using data from HIS Waves 1–5, after adjusting for age and sex of respondents. We concentrate on two key healthcare services: GP visits and inpatient (overnight) days in the previous 12 months. We examine the counts of each healthcare service over a 12-month period.

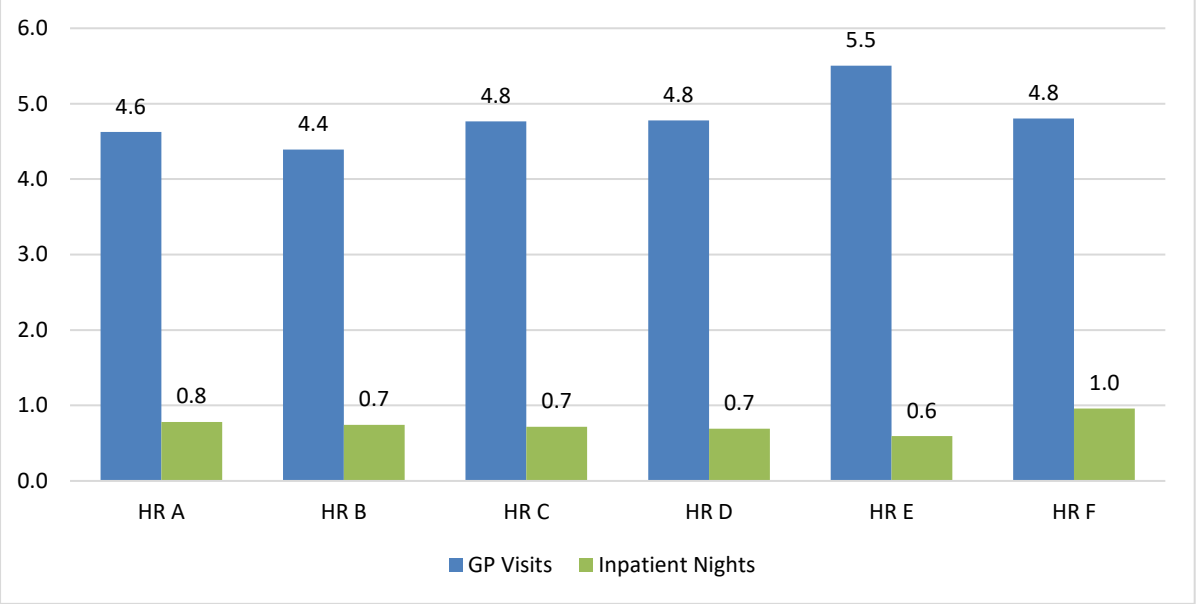
Figure 3.14 illustrates average annual GP visits and inpatient stays per annum across HRs. We find that there are differences in healthcare demand across different HRs. We find that HR E has the highest number of GP visits per annum at 5.5 visits per adult per annum. HRs A, C, D and F all report between 4.4 and 4.8 visits per annum. In terms of inpatient care, the average number of inpatient

13 Based upon 1.61m medical cards, see https://www.sspcrs.ie/portal/annual-reporting/report/eligibility; in a population of 5.28m people, see https://www.cso.ie/en/releasesandpublications/ep/p-pme/populationandmigrationestimatesapril2023/keyfindings/).

14 Based upon 0.61m medical cards, see https://www.sspcrs.ie/portal/annual-reporting/report/eligibility; in a population of 5.28m people, see https://www.cso.ie/en/releasesandpublications/ep/p-pme/populationandmigrationestimatesapril2023/keyfindings/.

overnight stays per annum is 0.7. HR F has the highest level of inpatient utilisation, followed by HR A at 0.8. HRs B, C and D all report 0.7 inpatient visits per annum. HR E reports the lowest level of inpatient utilisation, at 0.6 inpatient days per annum.

FIGURE 3.14 HEALTHCARE UTILISATION PER ANNUM BY HSE HEALTH REGION

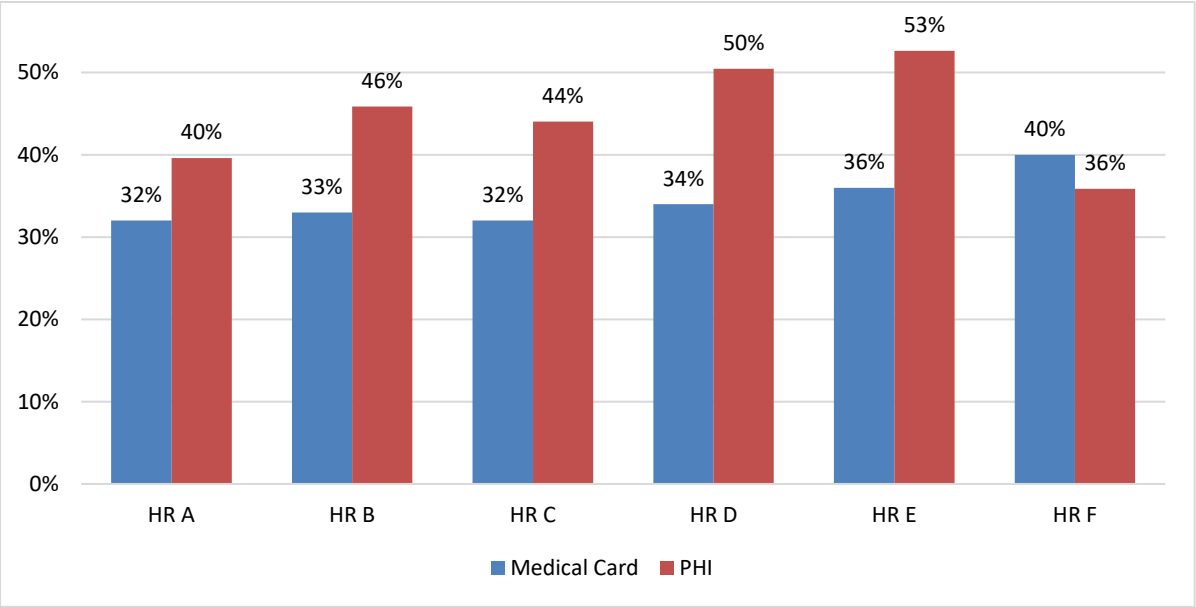


Source: Authors' calculations of Healthy Ireland Survey, Waves 1–5.

In Figure 3.14 above we find that there does appear to be variation in healthcare demand across HRs, even after controlling for age and sex differences. One of the key factors that may explain this concerns the levels of public healthcare coverage and PHI. The HIS asks respondents about their medical card and PHI status at the time of the survey. This allows us to examine medical card and PHI rates across HRs, while also examining the relationship between medical cards, PHI and healthcare demand.

First, we illustrate medical card and PHI rates across HRs in Figure 3.15. We find significant variation in medical card and PHI rates across HRs. Medical card rates are highest in HR F, with 40 per cent of respondents holding a medical card. The lowest rates are found in HRs A and C, where only 32 per cent hold a card. We find that PHI rates vary considerably across HRs. HR E has the highest rates of PHI, with an estimated 53 per cent of adults holding PHI. The lowest PHI rates are found in HR F, with only 36 per cent holding PHI.

FIGURE 3.15 MEDICAL CARD AND PHI RATES BY HSE HEALTH REGION

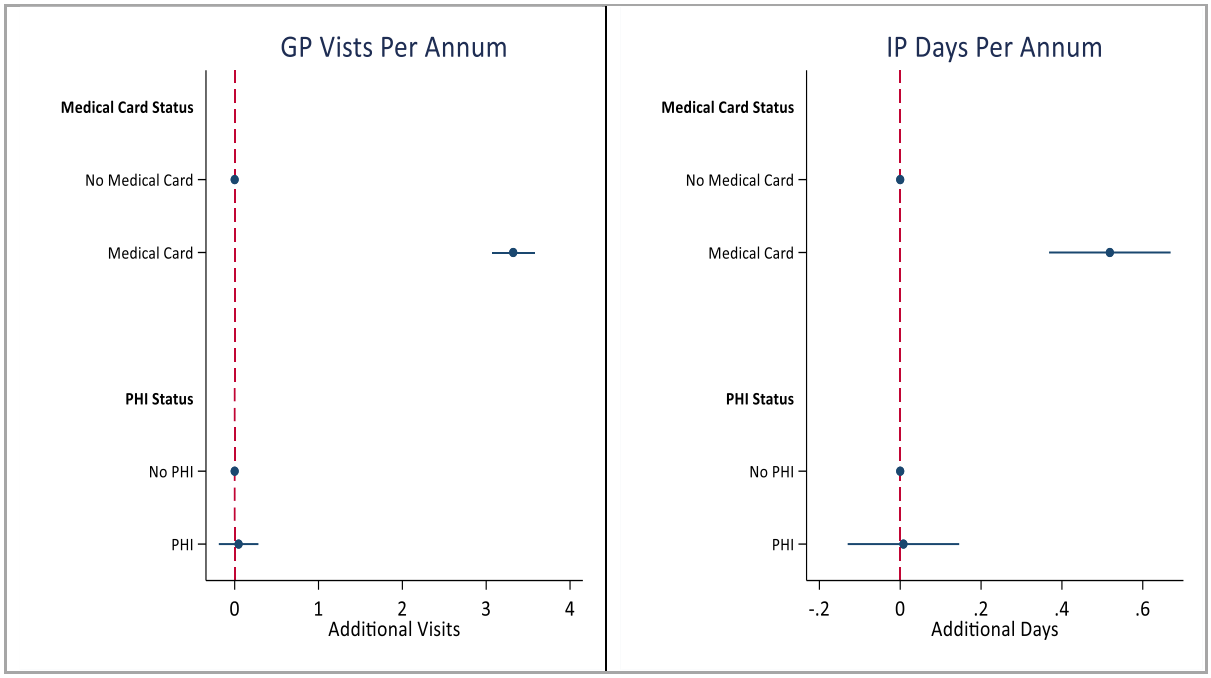


Source: Authors' calculations of PCRA medical card data, and calculations of Healthy Ireland Survey, Waves 1–5.
Notes: As shown in Table A.3 in the appendix, some variation in medical card rates is observed across the HIS and PCRS data. This figure also shows that there appears to be a negative correlation between medical card rates and PHI rates. To examine this in more detail we estimate average medical card and PHI rates for each LHO across Waves 1–5 of HIS. Overall, there clearly is a negative correlation between medical card rates and PHI.

It is possible that the deprivation adjustment within the PBRA formula will account for some of the variation in medical card rates and PHI rates across HRs. To examine this in more detail we estimate and examine the association between medical card status, PHI status and healthcare demand using HIS data. We estimate linear regression analyses, adjusting for age, sex and deprivation of HIS respondents, and results are shown in Figure 3.16.

Results show that, even controlling for age, sex and deprivation, medical card status is significantly associated with higher demand for GP care and acute public hospital inpatient care. In general, medical cardholders have over three additional GP visits per annum, compared to those without a medical card. Medical cardholders had 0.5 additional inpatient days per annum, compared to non-medical cardholders. Importantly, PHI is not found to be associated with higher GP or acute public hospital inpatient demand (once age, sex, deprivation and medical card status are taken into account).

FIGURE 3.16 MEDICAL CARD COVERGE, PHI STATUS AND GP AND INPATIENT CARE DEMAND



Source: Healthy Ireland Survey, Waves 1–5.
Notes: N: GP visits=25,669; inpatient days=22,055. Results presented as additional demand (average marginal effects) from a linear regression. Regressions control for age, age squared, sex and deprivation quintile.

Parameters such as the medical card are not features of the PBRA formula found in other countries, which may be a reason why they have not been included within the proposed PBRA formula. However, the uniqueness of the Irish healthcare system, and the clear evidence that medical cards are associated with higher demand for healthcare, suggests that policymakers should examine the inclusion of medical card coverage when determining resource allocations. As discussed in subsection 3.5.4, in order for some expenditure to be included within the PBRA, accounting for medical cards within HRs may also be required. It is recommended that, as part of evaluations of PBRA, further evaluations of the potential of accounting for medical card holders within future iterations of the PBRA formula are made.

3.5.3 Weighting factors

Weighting factors are commonly used in PBRA formulae to account for additional funds required to meet healthcare objectives. They are often country-specific and selected based on empirical evidence (Diderichsen 2004). The most common weighting factor is cost, which can be incorporated as a rurality, socioeconomic status/deprivation, unmet need, or demographic weighting. The most common cost weights are weights based upon age and sex indices, which take account of the differing healthcare needs across different age groups, and between males and females, often varying by sector and informed by empirical evidence. Generally, as older age groups have a greater need for healthcare, models give greater weight to areas with older populations (NHS Scotland, 2020; Sundquist et al., 2003).

Similarly, rurality cost weighting is included across all countries studied (with the exception of Sweden) to account for additional costs associated with providing care in rural areas. In Scotland, a rurality cost weight accounts for unavoidable costs associated with delivering care in rural areas. It is based on separate remoteness adjustments for community and hospital services, and determined by a simulation model of additional travel requirements (NHS Scotland, 2020). In New Zealand, the rurality cost weighting is determined by: the rurality premium and diseconomies of scale payments for small hospitals in remote or rural locations; payments made to practices in rural areas to assist in GP recruitment and retention; and price premia paid to rural maternity providers where the volume of births is below the threshold level (Ministry of Health, 2004). In England, the model accounts for higher costs in urban and densely populated areas through their market forces factor (MFF). The MFF costs in England are based on staff, building and land costs, and higher London pay costs. The staff MFF is calculated by an analysis of the actual costs borne by NHS organisations and examination of regional variations in pay rates in the private sector.

All models include a weighting to recognise the different challenges in reducing disparities between population groups through unmet need and/or socioeconomic status/deprivation. In New Zealand, the model includes additional cost weighting for ethnicity. These cost weightings are calculated by assessing expected against actual expenditure, and an adjustment factor is applied based on the difference (Penno et al., 2013). In Australia, the models incorporate additional weighting for the Aboriginal and Torres Strait Islander populations, with a weight of 2.5 applied per indigenous person to reflect poorer health outcomes within this group (New South Wales Health 2005).

In Sweden, unmet need is weighted using their Care Needs Index (CNI), with CNI weights calculated for each decile of the population (Sundquist et al., 2003). The CNI uses a range of indicators (discussed in subsection 3.6.5), which are subsequently weighted by a survey of Swedish GPs' workload associated with each factor (Malmström et al., 1998). Similarly, in Scotland, the morbidity and life circumstances (MLC) index gives more weight to areas with higher premature death rates and greater socioeconomic deprivation, to account for the additional healthcare resources required to combat such inequalities (NHS Scotland, 2020).

It is recommended that, when evaluating the proposed PBRA formula for Ireland, further evaluations of weights applied to age and sex remain based upon health and social care cost profiles. Furthermore, as discussed in subsection 3.4.3, a re-examination of weights applied to deprivation is recommended, with a specific examination of weights used to inform the DEIS programme for education.

3.5.4 Top slicing – Services excluded

It will not be possible, or appropriate, to include all health and social care services within PBRA formulae. Commonly used in resource allocation models (McCarthy et al., 2022), top slicing refers to the practice of setting aside a proportion of the overall budget for specific purposes before allocating the rest according to the standard allocation formula. In general, top slicing occurs in programmes that may require specialised concentrated responses, often at a national level. In Scotland, the government sets aside, or 'top slices', revenue funding for specified national service such as the Scottish ambulance service before distributing the remaining allocations to NHS boards.[15] In addition, capital expenditure does not tend to be included within PBRA formulae across those countries examined in Chapter 2.

However, excessive top slicing can cause substantial issues of concern. In the case of HRs and PBRA in Ireland, a key factor underpinning these changes relates to integrating services and pathways of care. But exclusion of key health and social care services can impede the ability of these structures to create integrated care pathways. Case study 3 (subsection 3.2.3) for example highlighted the impact the lack of integration between social care and acute care can have on the use of acute public hospital care, and how this can reduce the effectiveness of funding mechanisms such as ABF. Were excessive top slicing to occur, this may indirectly result in inequitable allocations for included services.

In their report, O'Malley et al. (2023) recommended that over the short to medium term, only acute public hospital and community expenditure should be subject to the proposed PBRA formula. A key issue with this recommendation is that a substantial percentage of public health and social care expenditure lies outside of the proposed PBRA mechanism. Table 3.1 outlines the key areas, as detailed in O'Malley et al. (2023), that are initially proposed to be included in PBRA. Overall, under the proposed formula, almost half of all public health and social care expenditure will remain outside the PBRA. Large sectors such as the acute public hospital sector (€5.11bn), mental health (€0.97bn) and older peoples' services (€0.90bn) will be included in the formula. Most notably, the Nursing Home Support Scheme (NHSS, €0.99bn), disability services (€1.99bn) and PCRS (€2.80bn) expenditure are also not be included in the proposed PBRA mechanism.

15 See https://www.nss.nhs.scot/media/1063/nsd602-00101.pdf.

TABLE 3.1 PUBLIC HEALTHCARE EXPENDITURE INCLUDED AND NOT INCLUDED IN PROPOSED PBRA MECHANISM

Included in PBRA (€000s)		Not Included in PBRA (€000s)	
Hospital Group expenditure	5,110,908	**Children's Health Ireland**	347,771
Primary care	886,051	**Acute regional and national services**	8,136
Social inclusion	161,149	**National Ambulance Service**	171,204
Palliative care	87,577	**Nursing Home Support Scheme**	986,202
Mental health division	986,833	**Disability services**	1,992,614
Older peoples' services	889,246	**Primary Care Reimbursement Scheme**	2,798,048
Other community services	20,621	**Other**	1,802,082
Total	8,142,385	Total	8,106,057

Source: O'Malley et al. (2023).

The top slicing of services such as Children's Health Ireland (CHI) and the National Ambulance Service is based upon the specialisation of these services, and the fact that they often cover national populations. Similar top slicing of these services also occurs in other countries. However, as PBRA mechanisms mature within countries, many such services often get absorbed into PBRA. Ambulance services for instance have been included in the NHS England PBRA formulae in more recent years (NHS England, 2023).

Earlier, we discussed how the restructuring of the HSE will revolve around the establishment of HSE HRs, with a centralised HSE body remaining. The most recent HSE HR implementation plan provides details on the responsibilities of this central HSE body in the context of PBRA, proposing that the HSE Centre:

> *… will plan, resource, and deliver a small cross-section of services, namely, national services (e.g. National Ambulance Service, National Screening Services, National Environmental Health Service, and the National Office for Suicide Prevention) and national shared services (e.g. PCRS, Statutory Home Support Scheme), which would not be efficient for a single Health Region to deliver.*
>
> (Government of Ireland et al., 2023)

Therefore, the services top sliced from the PBRA will effectively be commissioned and delivered by the HSE Centre. More detail is needed on how the HSE Centre and the HRs will coordinate to allow for devolved decision-making for integrated care to occur in practice.

Two of the key sectors not included in the proposed formula are the PCRS and the NHSS:

> *It is recommended that the Nursing Home Support Scheme (NHSS or 'Fair Deal'), the Primary Care Reimbursement Scheme (PCRS), and Disability Services not be included in the initial application of the PBRA.* (O'Malley et al., 2023)

It appears that a key reason why the NHSS and PCRS have been excluded from the first PBRA formula relates to data issues. The report is explicit that:

> *With regard to CHO expenditure, NHSS is excluded from the PBRA model in this proposal as expenditure data does not appear to be available at the regional level and the majority of nursing homes in the scheme are private, with prices negotiated with the National Treatment Purchase Fund (NTPF). PCRS is excluded for similar reasons.* (O'Malley et al., 2023)

The PCRS and NHSS together account for over 23 per cent of total HSE expenditure (Table 3.1). Exclusion of these services results in an incomplete funding picture for resource allocation in Ireland. PBRA aims to allocate resources based on population needs, including socioeconomic factors. Without these sectors, any PBRA mechanism will be less informed by the actual resource needs of HRs, which may exacerbate health inequalities. The lack of inclusion of these services may reduce the ability of PBRA and HRs more generally to implement key integrated care pathways for important population groups.

Primary Care Reimbursement Scheme

The PCRS expenditure covers payments made to GPs under the General Medical Services (GMS) Scheme to provide care for medical card and GP visit card holders. In addition, the PCRS includes expenditure to pharmacists under the Drugs Payment Scheme (DPS), the Long-Term Illness (LTI) Scheme, the High Tech Drug Scheme, for medical cardholders, and some publicly funded dental and aural care.

Pharmaceuticals: The largest percentage of PCRS expenditure is spent on pharmaceutical medications. There is a clear centralised component to this expenditure. In particular, many of the decisions on negotiations for drug prices are made centrally. It may be appropriate for pharmaceutical expenditure to remain outside the PBRA initially.

General practice: The exclusion of the PCRS from PBRA would effectively result in GP care remaining outside of the resource allocation mechanism in Ireland. This would be unique in an international context. For example, within the NHS England PBRA formulae, GPs are central actors and the population and age and sex profiles of ICBs is based upon GP lists within an ICB, and GPs are treated as key providers of care within the system.

There are a number of limitations to excluding GP care from the PBRA. GPs often act as a principal agent in a patient's care pathway, and as gatekeepers to other forms of care; exclusion of GPs would therefore greatly reduce the PBRA's effectiveness in terms of improving the efficient and equitable allocation of healthcare resources in Ireland. In addition, new programmes such as the Chronic Disease Management Programme and the Asthma Cycle of Care for under 8s were designed in part to reduce demand for acute public hospital care and improve the care pathways of chronic disease patients. Including GP expenditure within the PBRA mechanism is important in order for the benefits of these programmes to be more effectively incorporated within PBRA.

It is recommended that efforts to include PCRS expenditure on GP care and public dental care within the PBRA formula are made from the outset of the restructuring process, using the information that is available. In order to include PCRS within the PBRA, we first acknowledge that there are data limitations on expenditures at the regional level. Poor data and health information systems have consistently impeded efficient allocation of healthcare in Ireland (Walsh et al., 2021). However, it is the authors' understanding that sufficient information is currently collected or collated by the PCRS, which can be used to develop expenditure data at the HR level. Currently, the PCRS captures quite comprehensive data on payments to GPs. It should be possible to use these data to group activity and expenditure to the HR using information on the address of GPs, as well as information on GMS patients' addresses. As highlighted in their online system,[16] the PCRS collects and provides high-level data on the number of contracts with GPs, and the number of medical card and GP visit card holders by age and sex within each LHO (which are nested within HRs). While not as detailed as the ABF information available in hospitals, these data are significantly more detailed than information available on most community care and mental health services (Brick et al., 2020; Walsh et al., 2021).

As acknowledged by the Department of Health (O'Malley et al., 2023) and the HSE (HSE, 2021), financing for GPs already incorporates weighted capitation when determining fees and allowances for GPs (age and sex are accounted for); this should reduce some frictions when incorporating the PCRS GP expenditure at the HR level. While including more detailed information (especially on non-capitation payments) may be a large undertaking, coordination with the PCRS, the CSO and other stakeholders should be undertaken to evaluate how much information can be garnered from the PCRS.

Dental care: The case made for including GP care can also be applied to dental care. While not as integral to integrated care pathways as GP care, dental care is an important healthcare service. Examination of the information available on dental

16 See https://www.sspcrs.ie/portal/annual-reporting/.

practice and GMS patients should be undertaken to assess the viability of using this information.

Nursing Home Support Scheme

Including services for older people (e.g., home support, day centres, etc.) within the proposed PBRA, while excluding the NHSS, is likely to impact the effectiveness of integrating these services, particularly in the context of any new Statutory Home Support Scheme. We acknowledge once more that data limitations may exist, which could inhibit the inclusion of NHSS expenditure in the PBRA formula. However, we recommend a thorough examination of the data available on the NHSS to estimate HR-level expenditure on the NHSS. The data are collected by the HSE, and particularly by the National Treatment Purchase Fund (NTPF), which plays a central role in the NHSS. Identification of such data may help with the potential inclusion of the NHSS into the PBRA mechanism.

The NTPF plays a key role in determining expenditure on the NHSS. While they do not negotiate NHSS bed payments for public long-term residential care (LTRC) homes, as these are determined by the HSE, they do negotiate NHSS bed payments for private (voluntary and for-profit) LTRC homes. In their 2021 review of the NHSS pricing system, the NTPF outlined that they negotiate payments made to private LTRC homes based on four criteria:

- costs incurred by the LTRC home and evidence of value for money;
- prices previously charged by the LTRC home;
- the local market price of NHSS payments; and
- '[b]udgetary constraints and the obligation on the State to use available resources in the most beneficial, effective and efficient manner to improve, promote and protect the health and welfare of the public' (NTPF, 2021).

Within the NHSS pricing mechanism, the NTPF uses a county-specific benchmark, known as the 'local market price', as one of its four primary criteria for setting payments to LTRC homes. This method typically leads to minimal variation in payments within a county for private LTRC homes. However, there is noticeable variation across different counties. This benchmarking approach is also employed in determining payment rates for new LTRC homes entering into NHSS agreements (NTPF 2021).

The authors believe that there are sufficient data currently available – collected by the NTPF (and the HSE for public LTRC homes) – to enable the inclusion of the NHSS within the PBRA. Data are currently available on the age and sex breakdown of NHSS residents across LHOs, as is the NHSS price paid for care delivered within LTRC homes. Inevitable, there will be data limitations, such as those arising from some LTRC homes having resident catchment areas outside of their HR, and the fact that negotiations between the NTPF and LTRC home providers may lead to

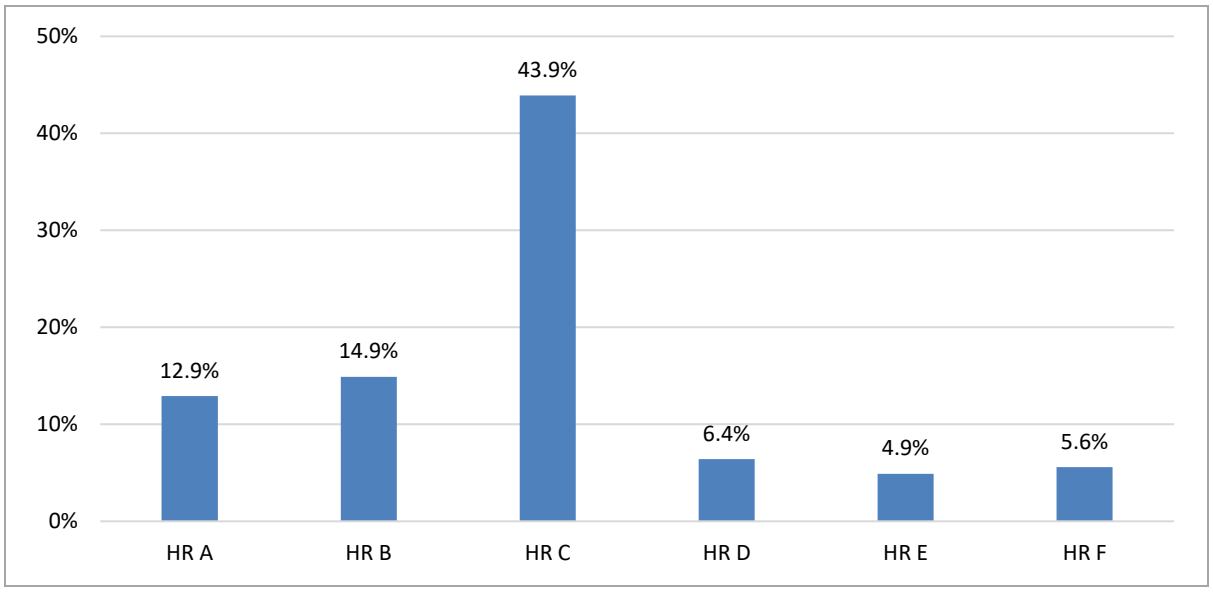
fluctuations in the amount paid to private LTRC homes over time. However, a thorough examination of these data should provide a reliable foundation for integrating NHSS expenditure into the PBRA mechanism.

3.5.5 Cross-boundary flows

The HRs are defined geographic regions; nonetheless, it is possible that some patients (or LTRC residents) living within one HR may use services provided within another HR, especially acute public hospitals. This affects the accuracy of population, age, and sex adjustments used in the PBRA formula. These 'cross-boundary flows' of patients, however, are common in all countries examined in Chapter 2. Some PBRA formulae explicitly address cross-boundary flows in their PBRA formulae. For example, NHS England accounts for individuals registered with a GP practice in one ICB area but residing in another (NHS England, 2023). This method acknowledges patient movement across ICB boundaries, thus ensuring that resource allocation reflects actual healthcare service use, not just the registered location of patients. This approach is crucial for accurately distributing resources and planning healthcare services, as it accounts for the dynamic nature of patient flows across regions.

Figure 3.17, based on O'Malley et al. (2023), shows that a significant percentage of acute public hospitalisations occur for patients with home addresses outside of their HR, a factor that may affect the PBRA. Notably, the highest percentage of cross-border flows is seen in HRs that include parts of Dublin.

FIGURE 3.17 PERCENTAGE OF HOSPITAL DISCHARGES FROM PATIENTS OUTSIDE A HSE HEALTH REGION



Source: O'Malley et al., (2023).

The issue of cross-boundary flows is likely to impact the PBRA until sufficient health information systems are incorporated into the healthcare system. Developing

integrated health information systems that facilitate data sharing between HRs, and with specialised service providers (e.g., Children's Health Ireland), would enable more accurate tracking of patient flows and resource utilisation. However, over the longer term, better data and health information systems will be required to reduce the impact of cross-boundary flows, and similar approaches have been taken by NHS England.

3.5.6 Transitions

As highlighted in Figure 3.12, implementing PBRA would result in some HRs receiving more or less funding, for different services, than is currently the case. Implementing PBRA quickly would lead to sharp shocks for HRs and services that would thereby receive funding cuts. For this reason, transitioning from the current funding structures to PBRA needs to take time. There are international examples on how best to incorporate transitions. In moving from CCG to ICB structures in NHS England, for example, a convergence process was created whereby ICBs are to be gradually moved from their initial funding levels to target allocations determined by the updated formula. This ensures that sudden financial impacts can be avoided and continuity of healthcare services for patients and populations is achieved (NHS England, 2023). It is clear from the above that a transition period, and appropriate transition adjustments, would be needed to allow for PBRA to become accepted. Transition adjustments remain a part of ABF within acute public hospitals. Reviewing how these transition adjustments work in practice would be valuable.

3.5.7 Governance and oversight

Governance and oversight – of the PBRA and the transition to HRs – will be vital to the success of each. This is especially so considering it is likely that a number of iterations of the PBRA formulae will be required prior to it being embedded within the healthcare system, and for the true benefits to accrue. The Department of Health recommends a permanent advisory group be established (O'Malley et al., 2023). This follows standard practice in other countries. An important element of the NHS England formulae is the level of oversight involved. In general, the resource allocation process is overseen by the Advisory Committee on Resource Allocation (ACRA). A similar structure in used in Scotland. The ACRA reviews the formula and decisions, using evidence from academic literature and information on the latest data and healthcare trends. ACRA comprises independent experts, including from academia, and advises the secretary of state for health and social care and the chief executive of NHS England. Many of the discussions and recommendations in this report also point to the importance of transparency in relation to how decisions are made. Input from a broad advisory group would be beneficial.

The PBRA could also learn from other allocation mechanisms in Ireland. For instance, within education, the DEIS programme has programme evaluation built

into it from its inception (Smyth et al., 2015). A number of evaluation studies of DEIS have been conducted by the Educational Research Centre, the Inspectorate of the Department of Education and Skills and the ESRI (Smyth et al., 2015). These evaluations have highlighted changes in both the structure and procedures of schools involved in the DEIS programme, as well as in student outcomes (Smyth et al., 2015; Kavanagh et al., 2017). Specifically, in terms of school processes, DEIS schools have improved their planning for teaching and learning and have set clearer academic achievement objectives.

CHAPTER 4
Conclusions

4.1 IMPORTANCE OF POPULATION-BASED RESOURCE ALLOCATION

The introduction of population-based resource allocation (PBRA) within Ireland's healthcare system would represent a pivotal advancement for policymakers and healthcare users. This report, along with previous Irish academic research (Johnston et al., 2021) and policy analysis (McCarthy et al., 2022; O'Malley et al., 2023), has outlined the benefits of PBRA, and the clear necessity for Ireland to establish a system-wide PBRA system based upon the design fundamentals of PBRA systems used in healthcare systems internationally. The benefits of PBRA are clear when we consider its application in other countries; it has real potential to reform the allocation of healthcare resources in Ireland. Broad PBRA mechanisms based upon regional decision-making offer an excellent instrument through to realise many of the key recommendations of Sláintecare to be realised, such as integrated care and moving more care into the community.

PBRA systems, and the decision-making structures underpinning PBRA, can modify and mature over time. However, when establishing a PBRA system for the first time there is a unique opportunity to ensure that it can be informed by successful existing models, drawing from relevant national projects as well as examples from other jurisdictions. In this way, the new system can quickly incorporate and benefit from best practice. For this reason, it is critical to establish a methodology and parameters for developing the PBRA that draw on existing knowledge and learning in this field.

The adoption of PBRA is not merely a policy change; it is a fundamental shift towards a more equitable, efficient and needs-based distribution of healthcare resources. The success of PBRA in Ireland would, therefore, mark a significant milestone, not only in terms of policy implementation but also in improving healthcare outcomes and addressing disparities across regions. Ireland is currently experiencing substantial challenges in relation to waiting lists for health and social care. In many instances, these waiting lists are a consequence of workforce shortages (Walsh et al., 2021) or potentially lack of capacity (Brick et al., 2020; Brick et al., 2021). While these shortages, at both national and regional level, are caused by many factors, implementing PBRA may improve the ability of policymakers to better plan the resource requirements in the medium term, as well as reduce inequities in workforce and capacity across different health and social care sectors, and across regions.

The development of Health Service Executive (HSE) Health Regions (HRs), as outlined in the most recent implementation plan (Government of Ireland et al., 2023), and the PBRA formula proposed in O'Malley et al. (2023), provide initial

steps in the restructuring of how health and social care resource allocation decisions are made. But it is important that they are considered as initial steps within a longer-term reform process. The proposed PBRA formula in particular, as stated in O'Malley et al. (2023), lays the foundation for future iterations of PBRA. It already incorporates fundamental elements from international PBRA mechanisms, focusing on population size, age–sex composition, deprivation and rurality, parameters consistently used when determining healthcare demand and expenditure requirements (Penno et al., 2013). However, as the first such model to be potentially implemented within the Irish healthcare system, this process demands ongoing evaluation and refinement. In addition, its practical application in the unique Irish healthcare context will require careful monitoring and adjustments, in order to ensure it meets the specific needs and challenges of the Irish healthcare system as they arise.

4.2 CONSIDERATIONS FOR FUTURE POPULATION-BASED RESOURCE ALLOCATION

It is the authors' view that the parameters currently being proposed by the Department of Health, and the sequential manner in which these parameters are adjusted for in the formula, follow closely the approach taken in successful PBRA formulae in other jurisdictions. The proposed PBRA model is also characterised by its simplicity and the parsimony of the parameters included (Penno et al., 2013). The five parameters of population size, age and sex profile, deprivation and rurality are clearly required and represent valuable additions. In Chapter 3, we highlighted that there is a possibility that the proposed PBRA formulae already have the ability to guide medium-term health and social budgeting and resource allocation, such as is done in Scotland. These have not been outlined explicitly by the Department of Health or the HSE, and data limitations exist; nonetheless, we believe that there are sufficient data on key PBRA parameters to make long-term budget and allocation decisions. If correct, this is of huge significance to policymakers and could curtail some of the underbudgeting and overspends that have occurred in recent years (Casey et al., 2021).

Building on the analysis presented in Chapters 2 and 3, several recommendations emerge for refining the PBRA formula and directing the focus of policymakers. First, the rationale for some weighting values is not immediately apparent; in the case of deprivation and rurality, O'Malley et al. (2023) does states that weighting values included are arbitrary. In the case of deprivation, we identify that modifying the weights, using those included in the DEIS (Delivering Equality of Opportunity in Schools) education resource allocation formula (Department of Education 2022), can have implications for the percentage of resources provided to each HR. Similarly, the weighting mechanism for rurality may be of significance to community and primary care in particular. Further evaluation of the most appropriate weights to apply to deprivation and rurality, and transparency over this decision, is recommended.

Attention should be paid to the potential value of incorporating medical card weighting, and broadening the number of services and sectors included at the HSE HR level and within the PBRA formula. The unique nature of the Irish healthcare systems of public and private coverage and financing means that, in other countries evaluated – both in this and previous analyses (Johnston et al., 2021; McCarthy et al., 2022) – factors such as medical card status and private health insurance (PHI) were less important to policymakers. In countries like Australia, where supplementary PHI and private healthcare are common, consideration of private hospitals is made in some PBRA formulae (Penno et al., 2013). We find little evidence that PHI should be included as an indicator of healthcare need in Ireland. However, we show that even after controlling for age, sex and deprivation, medical card status remains a key indicator of general practitioner (GP) and acute public hospital care demand. We understand these were simple adjusted regression analyses, but there is considerable evidence now that medical cards (and GP visit cards) are associated with higher healthcare utilisation (Nolan et al., 2016; O'Callaghan et al., 2018; Ma et al., 2020; Humes et al., 2023), including mental healthcare (Figure A.2). Medical cards often determine preferential access to community care services and more bespoke services such as the Counselling in Primary Care Service.[17] Not accounting for medical cards may underestimate demand for healthcare in regions with high levels of medical card coverage. Therefore, within a PBRA mechanism designed to allocate public healthcare resources, the importance of medical card status suggests that consideration should be given to the impact of accounting for medical cards on resource allocation, and whether its inclusion specifically in PBRA is appropriate.

Arguably the largest obstacle to the effective allocation of resources by the PBRA, and to the HSE HRs' implementation of integrated pathways of care, is the large percentage of health and social care expenditure that will remain outside the initial PBRA formulae. Similar to other countries, specialised services such as the National Ambulance Service and Children's Health Ireland are top sliced from the PBRA formulae. However, the current PBRA proposals would result in almost half of all HSE expenditure remaining outside of the regional resource allocation mechanism. While difficult to accurately estimate the level of top slicing in other countries with PBRA, the levels proposed for Ireland are significantly higher than those in countries examined in Chapter 2.

One additional obstacle to PBRA being used to aid integrated pathways of care is the potential incentive misalignment that exits between the activity-based funding (ABF) model for acute public hospitals with the wider PBRA approach. Such misalignment between HR regional executive officers and hospital managers could feasibly emerge; hospitals could see reductions in funding for hospitals as patient throughput is reduced, if and when community-based care is prioritised within the reallocation of resources. Such difficulties in embedding activity-based funding

17 See https://www.hse.ie/eng/services/list/4/mental-health-services/counsellingpc/.

(ABF) within PBRA due to this misalignment may also be greater in those parts of the country, such as HRs in the east of Ireland, where O'Malley et al. (2023) point to the existence of a more hospital-centric model of care. On the other hand, better integration of hospital and non-hospital care through the HR structures that allows for earlier discharge of in-patients could be beneficial to hospitals, as ABF rewards lower length of stay (LOS) and more efficient discharge planning. In this instance, PBRA could help free up valuable inpatient beds and improve patient throughput and flow. This potential benefit of PBRA to the hospital system has been alluded to in an analysis of home support access and earlier hospital discharge for older people (Walsh et al., 2020). While there are both positive and negative effects of trying to embed ABF within PBRA, it is clear that effective integration of ABF within the wider PBRA framework will require a balancing of resources between the acute hospital and community care and social care sectors, so as to ensure that hospitals do not dominate resource allocation at the expense of broader population health needs. In practical terms, this will require a transitional phase to allow for resources to transition towards PBRA while maintaining ABF. Such a phase will need clear guidelines and governance structures to manage the interplay between ABF and PBRA.

The level of top slicing within the proposed model considerably reduces the effectiveness of the PBRA, especially in terms of integration of care. We acknowledge O'Malley et al.'s assessment that, for PCRS and the Nursing Home Support Scheme (NHSS), the lack of regional expenditure data, and the fact that the majority of LTRC homes are privately operated, creates complexities (O'Malley et al., 2023). However, we have discussed that the required data may be available to examine the opportunity of including NHSS and PCRS into the PBRA formula. Every effort to coordinate data provision from the PCRS, and the National Treatment Purchase Fund (NTPF) especially, should be made.

From an integrated care perspective, one of the key reasons for devolving decision-making around budgets to the HR level is to afford local decision-makers greater autonomy in caring for local populations. In many instances, this would require coordination of care across primary, community, hospital and social care services. As has been highlighted by the original authors of the Sláintecare report to the Joint Oireachtas Committee on Health, there is a:

> *need for strong structures at the regional level to bring together providers. Integrated care relies on providers being able to work with each other and not work against these different structures or silos. The regionalisation, if put forward as envisaged in the original report, would remove some of those artificial barriers and allow true integration and flexibility to respond to the population there rather than it being dictated from the centre control where everybody does more of the same but with the money being allocated*

> *slightly differently. This is about a real shift, so the two come together. Without them, the intention of either is weakened*.
> (Joint Committee on Health debate, 1 March 2023)

Similar points have been made by stakeholders involved in providing consultation guidance on the new HRs (Department of Health, 2019). It is difficult to envisage such integration required in Ireland based on the level of top slicing of the budgets within the proposed formula, especially for services used by older people. For example, while home support will become part of the PBRA – though in the most recent HSE HR implementation plan it appears that home support will remain under the directive of the HSE Centre (Government of Ireland et al., 2023) – the NHSS will not. There has been considerable discussion surrounding the need to move care from residential care settings towards home (Walsh et al., 2020; Frazer et al., 2021; Walsh et al., 2021). The inclusion of home support services, and other older peoples' services within PBRA, while keeping NHSS outside of the PBRA process, may negate the ability of local decision-makers to divert resources towards home support and older peoples' care if they see such diversion as necessary.

The proposed exclusion of publicly funded GP care in the PCRS is worrying. In particular, keeping GP care outside of the PBRA formula is unique in an international context. GPs are a key provider of healthcare, but they also play a central role as gatekeepers to community and hospital care, and in helping to coordinate pathways of care for patients. At the core of the move towards HRs lies the goal to move care out of hospitals into the community, as set out in Sláintecare. Excluding GP funding from this approach under PBRA would undermine this goal. Reform of the General Medical Services (GMS) Scheme and PCRS systems will likely be required to ensure GPs and pharmacists' inclusion in PBRA, and this may prove difficult, but it is required. The effectiveness of PBRA in ensuring efficient and equitable allocation of resources will be diminished without GP funding being included. Failure to include GPs may also create difficulty regarding the wider political or public acceptability of PBRA.

Transparency is central to the success of PBRA. There will be a number of practical challenges and barriers to the proposed PBRA formula, and to the introduction of HSE HRs more generally. The Department of Health has outlined many of the key challenges to PBRA, including the potential disruptive transition to the new allocation mechanism, its political acceptability, and lack of public support (O'Malley et al., 2023). In this report, we have outlined some key considerations for policymakers, using evidence from international systems as well as case studies from Ireland. For example, key stakeholders from one HR, including patients and local politicians, are likely to want to know why their region is receiving less funding than another one (Buck et al., 2013). In Scotland, annual reports now outline how healthcare budgets are distributed across NHS boards, and how the PBRA formula

components impact these budgets.[18] All information used to derive the PBRA in NHS England is also available online to the public. A similar approach would be useful in Ireland.

While none of these issues relates to the usefulness or effectiveness of PBRA, these are practical challenges that will need to be overcome. Strong leadership, guided by an advisory group, will help to alleviate some of these challenges; this will be needed when justifying the introduction of a PBRA mechanism in the first place, ensuring transparency throughout the process, and in aiding the improvement and validation of the mechanism in the future. These groups can also consider factors that henceforth may not have required consideration, such as the health effects of climate change (Duffy et al., 2024). PBRA formulae may be required to consider such factors (Grigoroudis et al., 2023). In addition to transparency, it is also important to educate health and social care workers, and the general public, on the benefits of using PBRA to allocate resources, as well as the scope of capabilities of PBRA (e.g., it will not solve all problems within the system).

It is imperative to enhance the formula to reflect variations in regional health needs more accurately, incorporating more detailed and robust data. Addressing existing data limitations will strengthen the foundation upon which PBRA decisions are made. The poor health information system and data structures in Ireland (Walsh et al., 2021) will likely impede the effectiveness of the PBRA in the short term. However, collaborations between the Department of Health, the Central Statistics Office (CSO) and other stakeholders have led to an extensive improvement in the level of information available to inform the PBRA, but also regarding the decisions to be made within HRs in terms of allocation of resources across community healthcare networks (CHNs). Granular information within HRs will be vital for healthcare providers and planners in making evidence-based decisions regarding healthcare utilisation, as well as allocation of resources, especially in the community. The ACB Programme Implementation Plan 2021–2023, which discusses the potential of the Healthcare Pricing Office (HPO) to begin incorporating community care, acknowledges that:

> *As with hospital care, increasing the availability of high-quality activity and cost data in the community sector will provide a basis for more informed system planning and opportunities to increase efficiency in the system with providers in a position to manage costs more effectively and adopt a more efficient approach to resource allocation. This will also provide increased accountability for the resources invested, and enable monitoring, analysing and managing of trends over time.* (HSE, 2021)

[18] See https://publichealthscotland.scot/publications/scottish-health-service-costs/scottish-health-service-costs-high-level-costs-summary-2021-to-2022/#:~:text=In%20real%20terms%20total%20expenditure,billion%20in%202021%20to%202022.&text=In%20the%20financial%20year%202021%2F22%3A,billion%20spent%20in%202020%2F21.

The development of a unique patient identifier, based upon personal public service numbers and the Health Information Bill, will comprise key developments for determining accurate population and age information for the PBRA. These type of data are used to good effect in other countries. In Scotland, for example, population shares across NHS boards are based on the Community Health Index (CHI) registered populations, which are incorporated into population projections.[19]

4.3 CONCLUSION

The introduction of a PBRA model in Ireland has the ability to greatly improve the efficient and equitable allocation of health and social care resources. PBRA and devolved decision-making are also key aspects of Sláintecare. In combination with the establishment of HSE HRs, PBRA can become a fulcrum towards the further development of a universal healthcare system and new models of innovative and integrative care. The first PBRA formula proposed is to be welcomed and follows closely formulae implemented by international peers.

However, improvements to PBRA will be required and PBRA itself will be an iterative process that may require time to become embedded within decision-making (McCarthy et al., 2022; O'Malley et al., 2023). This is in recognition of the rudimentary allocation system that currently exists, and the health information systems and data challenges faced. However, investment to improve data systems is being undertaken, and as Ireland moves towards the inclusion of unique patient identifiers and care summary records as proposed in the Health Information Bill, PBRA will in time have the capabilities to integrate more granular information in the allocation process.

In this report, in addition to the information challenges highlighted, we identify that the level of top slicing proposed in O'Malley et al. (2023) may hinder the PBRA effectiveness, especially in terms of integration of care. Exclusion of expenditure on the NHSS and publicly funded GPs care in particular will reduce the ability of PBRA to perform to the level of systems in other countries. The integration of key programmes including the PCRS, disability services and the NHSS should be prioritised by policymakers. Without broadening programme inclusion, local decision-makers will struggle to implement integrated care approaches and implement the goals of Sláintecare of providing care in the least complex setting, as close to home as possible.

In countries with longer established resource allocation mechanisms, the approach has moved from equality of resource allocation to outcome-based focus and accountability (Buck et al., 2013). Future iterations of PBRA may also incorporate different approaches as the focus of commissioning and resource allocation shifts

[19] See https://publichealthscotland.scot/publications/resource-allocation-formula-nrac/resource-allocation-formula-nrac-for-nhsscotland-results-for-financial-year-2024-to-2025/.

to outcomes, while decision-making and accountability are increasingly devolved to local areas. This process again will be heavily dependent upon more sophisticated health information systems. This report, alongside previous research (Johnston et al., 2021; McCarthy et al., 2022), has identified important PBRA approaches in other countries, which can be used as guides to the future improvement of PBRA in Ireland.

In conclusion, over recent decades the healthcare system in Ireland can be characterised by the constant changes to organisational structures made or proposed. Many of these changes were incremental in nature, and often adequate time was not provided to ensure structural changes became embedded within the system. However, all of these changes failed to implement a systematic resource allocation mechanism. The inclusion of PBRA within the current proposed restructuring process, therefore, is welcome. While developing PBRA formulae is clearly important, the most difficult factor is securing stakeholder agreements and embedding PBRA mechanisms across the healthcare system. It is vital that the introduction of PBRA is not treated simply as an important key performance indicator (KPI), but rather that PBRA and HSE HRs represent the first stage in a multi-year process of integration, coordination and transparency, and devolution of important decisions to local decision-makers.

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APPENDIX A

Additional tables and figures

TABLE A.1 LOCAL HEALTH OFFICES WITHIN HSE HEALTH REGIONS

Health Region	HR	List of LHOs in each HR
HSE Dublin and North East	A	Cavan/Monaghan, Dublin North, Dublin North Central, Dublin Northwest, Louth, Meath
HSE Dublin and Midlands	B	Dublin South City, Dublin Southwest, Dublin West, Kildare/West Wicklow, Laois/Offaly, Longford/Westmeath
HSE Dublin and South East	C	Carlow/Kilkenny, Dublin Southeast, Dun Laoghaire, Tipperary South, Waterford, Wexford, Wicklow
HSE South West	D	Cork North, Cork North Lee, Cork South Lee, Cork West, Kerry
HSE Mid West	E	Clare, Limerick, Tipperary North/East Limerick
HSE West and North West	F	Donegal, Galway, Mayo, Roscommon, Sligo/Leitrim

Source: Department of Health.

TABLE A.2 LIST OF HEALTH CONDITIONS IN HEALTHY IRELAND SURVEY

Waves 1–2	Waves 3–5

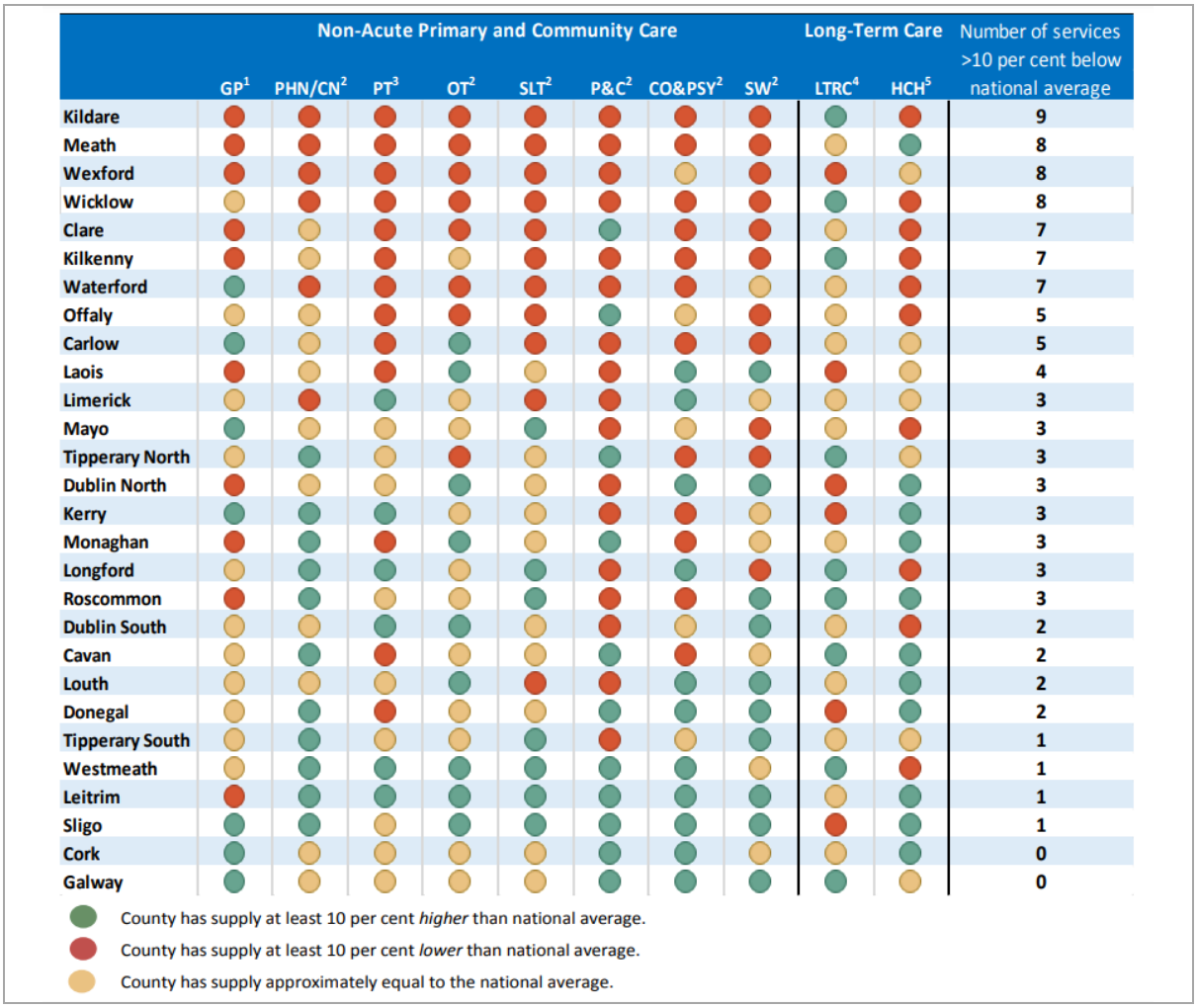
– Asthma
– Chronic lung disease
  o Chronic bronchitis
  o Chronic obstructive pulmonary disease (COPD)
  o Emphysema
– Heart issues
  o Heart attack
– High blood pressure
– Stroke
  o Cerebral vascular disease
  o Ministroke or transient ischaemic attack (TIA)
– Arthrosis
– Arthritis
– Chronic back defects
– Chronic neck defects
– Diabetes
– Allergy
  o Rhinitis
  o Hay fever
  o Dermatitis
  o Food
  o Eye
– Cirrhosis
– Urinary incompetence
– Kidney problems
– Any emotional, nervous, or psychiatric problems
  o Anxiety
  o Depression
	– Asthma
	– Chronic lung disease
	  o Chronic bronchitis
	  o COPD
	  o Emphysema
	– Heart issues
	  o Heart attack
	  o Congestive heart failure
	  o High cholesterol
	  o Heart murmur
	  o Anormal heart rhythm
	  o Angina
	– High blood pressure
	– Stroke
	  o Cerebral vascular disease
	  o Ministroke or TIA
	– Arthritis
	– Osteoporosis
	– Diabetes
	– Cirrhosis
	– Ulcer
	  o Stomach
	  o Varicose
	– Any emotional, nervous, or psychiatric problems
	  o Anxiety
	  o Depression
	– Substance abuse
	– Dementia
	  o Alzheimer's disease
	  o Memory impairment
	– Parkinson's disease
	– Cancer

TABLE A.3 MEDICAL CARD RATES WITHIN HSE HEALTH REGIONS

HR	PCRS and Census 2022	Healthy Ireland Survey
A	32%	33%
B	33%	32%
C	32%	39%
D	34%	35%
E	36%	38%
F	40%	47%

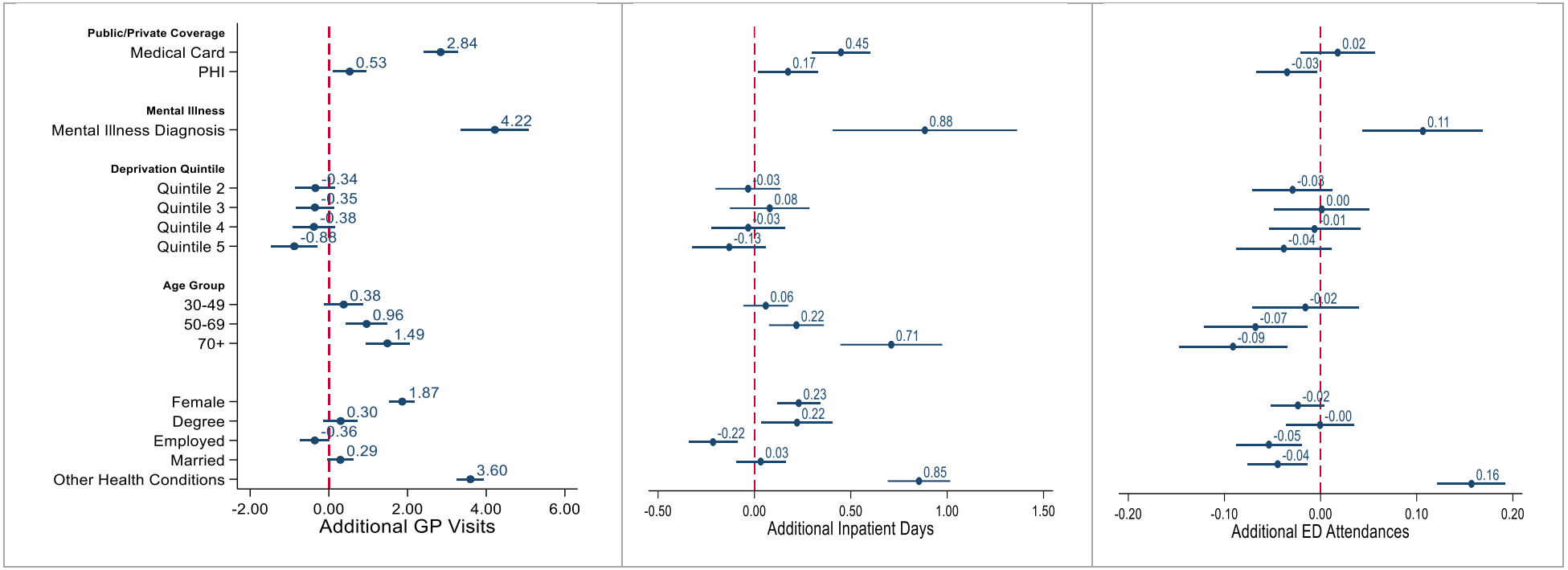
Source: Authors' calculations of Healthy Ireland Survey, Waves 1–5, and PCRS data.
Note: HIS respondents aged 15+.

FIGURE A.1 SUPPLY OF PRIMARY, COMMUNITY AND LONG-TERM CARE SERVICES IN IRELAND, 2014



Source: Smith et al. (2019).
Note: 1. The number of GPs is converted to estimated WTEs based on survey evidence on full- and part-time working practices of GPs in Ireland. 2. Publicly employed WTEs. 3. Publicly employed and privately employed WTE PTs. 4. LTRC beds in public and private LTRC centres (supply of beds per 1,000 population aged 65+). 5. Publicly funded home care hours from the Home Help and Home Care Package schemes (supply of hours per population aged 65+). See Chapter 3 of Smith et al. (2019) for more details.

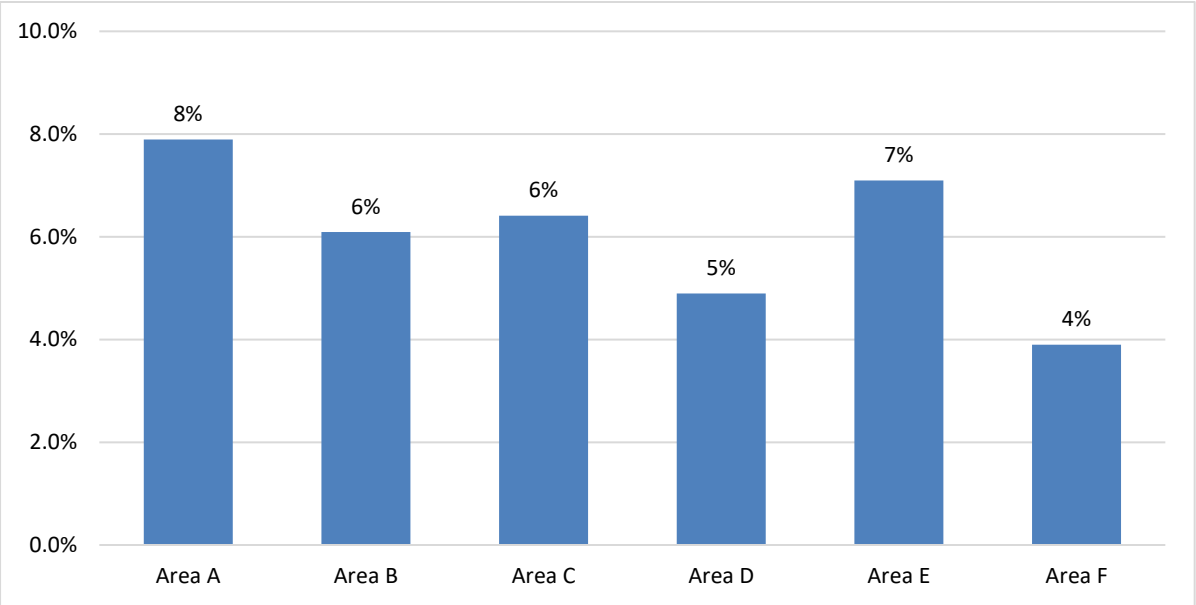
FIGURE A.2 THE IMPACT OF MENTAL ILLNESS DIAGNOSIS ON HEALTHCARE UTILISATION AMONG ADULTS



Source: Healthy Ireland Survey, Waves 1–5.

Notes: N: GP Visits=25,669; Inpatient days=22,055; Emergency department attendances=7,243. Results presented are additional visits/attendances/days (average marginal effects) compared to reference category with 95% confidence intervals. Survey weights included. PHI: Private health insurance. Reference categories for binary variables are the absence of said variable. Deprivation quintile 1 (most deprived) and ages 18–29 are the respective reference groups for deprivation and age group.

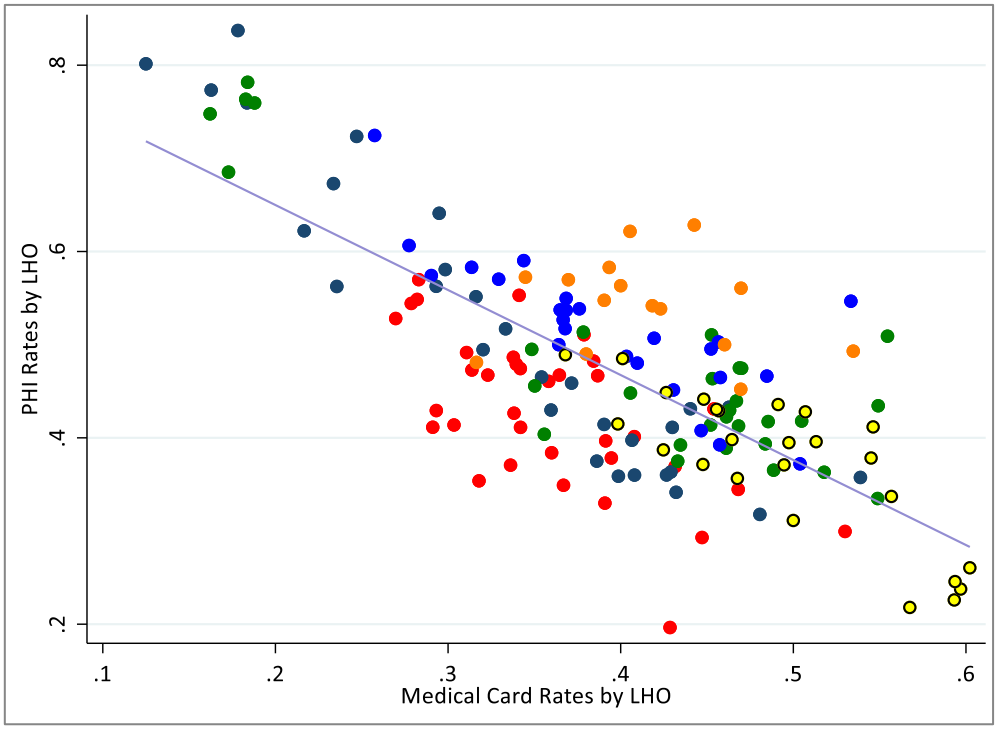
FIGURE A.3 MENTAL ILLNESS RATES BY HSE HEALTH REGION



Source: Authors' calculations of Healthy Ireland Survey, Waves 1–5.

The figure above also shows that there appears to be a negative correlation between medical card rates and PHI rates. To examine this in more detail we estimate average medical card and PHI rates for each LHO across Waves 1–5 of HIS. Overall, there clearly is a negative correlation between medical card rates and PHI.

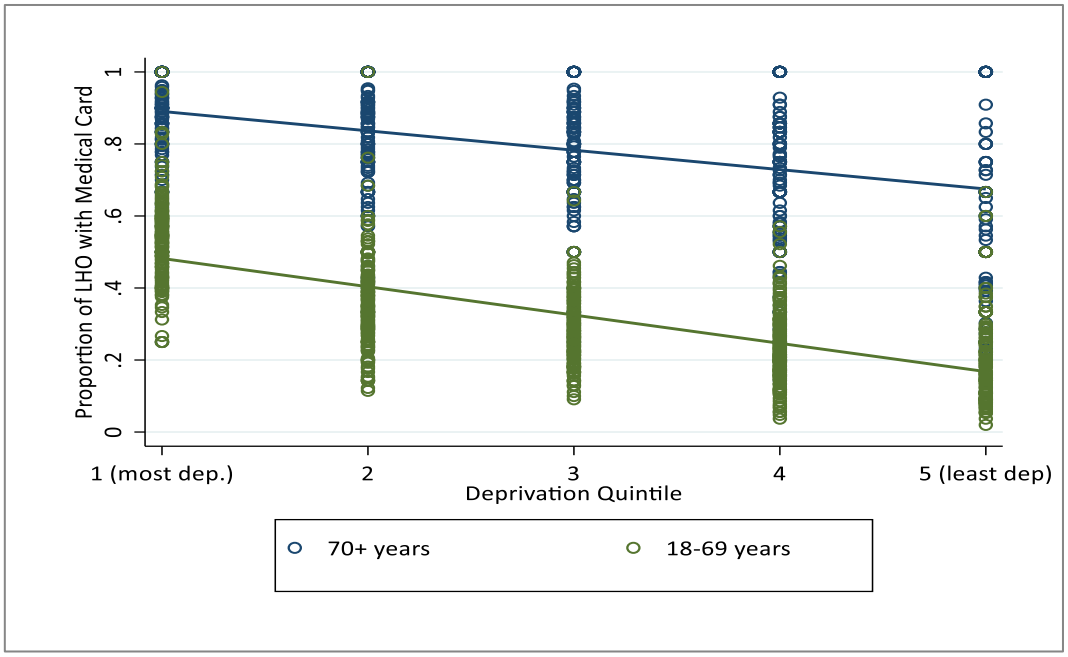
FIGURE A.4 MEDICAL CARD AND PHI RATES BY LOCAL HEALTH OFFICE AND HSE HEALTH REGION



Source: Authors' calculations of Healthy Ireland Survey, Waves 1–5.
Notes: Colours denote different HRs.

It is possible that the deprivation adjustment within the PBRA will account for some of the variation in medical card rates across HRs. Figure A.5 illustrates the relationship between medical card rates and deprivation by LHO. Results are displayed for the 18–69 years and 70+ populations separately, as the criteria and income threshold differ across these ages. Overall, we find a that medical card rates are higher in more deprived regions for both age groups. However, there is large variation across LHOs, especially in the younger age group.

FIGURE A.5 MEDICAL CARD RATES ACROSS DEPRIVATION QUINTILES BY LOCAL HEALTH OFFICE



Source: Authors' calculations of Healthy Ireland Survey, Waves 1–5.

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