



Research report September 2022

# **Future funding and current productivity in Northern Ireland's health and social care system**

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nuffieldtrust

## Acknowledgements

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# Contents

|          |                                     |           |
|----------|-------------------------------------|-----------|
|          | Executive summary                   | 2         |
|          | Introduction                        | 5         |
| <b>1</b> | <b>Historic funding</b>             | <b>8</b>  |
| <b>2</b> | <b>Spending projections</b>         | <b>18</b> |
| <b>3</b> | <b>Performance and productivity</b> | <b>36</b> |
| <b>4</b> | <b>Conclusions</b>                  | <b>65</b> |
|          | References                          | 67        |
|          | Appendix                            | 74        |

# Executive summary

## Historic public spending

- Since 2002/3, on average, per capita health spending in Northern Ireland has been around 7% higher than England and around 4% lower than Scotland – though with wide fluctuations from year to year.
- As in the rest of the UK, health spending in Northern Ireland has grown significantly over time: total spending has increased by nearly 67% in real terms since 2002/3. That's the second-largest increase among the UK nations after England. Per capita spending has increased by 63%, the highest across the four UK nations.
- Health spending also consumes a larger proportion of public spending than ever – increasing from around 16% in 2002/3 to 22% in 2019/20.
- Since 2016/17, public spending on social care across all age groups in Northern Ireland has been rising faster than the rest of the UK and per capita spending is now around a fifth higher than in Wales and Scotland, and 43% higher than in England.

## Spending projections

- Across the different ways in which spending might be projected out to 2070, health care funding is likely to continue to rise relentlessly.
- A model based on population projections suggests an increase in demand for health care and, hence, in spending (if that need is met) of around 0.6% per year in real terms. Any adjustment for technological change is likely to produce a considerably faster increase. Actual real spending increases over the past two decades have been at 3.3%.

- While projections are subject to great uncertainty, it is likely that Northern Ireland will continue to face difficult choices about how to make this sustainable.
- Our projections show health and care spending increasing considerably as a proportion of the economy under most scenarios: if spending continues to rise at recent rates, it will also use an ever-increasing share of the block grant which funds all departmental budgets.

## Performance and productivity

- A comparison of the costs of providing particular procedures in a hospital setting across the two countries suggests that Northern Ireland has considerably higher costs than England.
- Northern Ireland spends 25% more on elective inpatient care than it would if it provided the same mix of treatments at English costs, and 33% more on long-staying emergency patients.
- Around a third of higher costs are attributable to Northern Ireland's higher rate of 'excess' bed days, where patients who might normally stay between one and three nights are instead in hospital longer than is usual for the procedure in question.
- A lower proportion of patients in Northern Ireland are cared for as single-day or short overnight-only patients than in England, adding to higher relative costs. These reflect data showing generally somewhat longer lengths of hospital stay in Northern Ireland.
- Overall, estimates suggest that compared to an equivalent mix of patients, Northern Ireland's elective, non-elective and outpatient activity cost £410m more than England's in 2019/20.
- Since 2016 unit costs of hospital care have risen by around 28% in Northern Ireland, as opposed to 7-8% in England.

- Northern Ireland has 35% more registered nurses in total than England relative to the size of its population, and likely a lower rate of admissions per nurse. Precise estimates are impossible because of limited data collection.
- Hospital beds in Northern Ireland are run at a slightly lower rate of occupancy, though the level of crowding in England is undesirable.
- However, indicators of inefficiency do not only point in one direction. Northern Ireland prescribes a higher proportion of generic medicine, implying better use of pharmaceutical budgets, although its per capita spend is much higher. The crude output of admissions per hospital doctor is similar.

# Introduction

In order to inform the Northern Ireland Fiscal Council's (NIFC's) first review of the sustainability of public finances in Northern Ireland, the Council commissioned the Nuffield Trust to carry out a review of health and care funding, productivity, service performance and spending projections in Northern Ireland relative to other countries of the UK with a focus on comparisons with the English NHS.

## Terms of the Review

Areas of research to include:

### Historic funding

- To provide context, a description of historic funding trends for Northern Ireland over the last 15 years (2005/6 to 2019/20) in comparison with England (and its regions), Scotland and Wales.
- To describe spending in 2020/21, acknowledging that this was an exceptional year due to Covid-19.

### Spending trajectory and capacity

- To project future spending pressures in Northern Ireland, based on age-cost curves and population projections in relation to other UK countries, and English estimates for the non-population driven component of increasing costs.
- To examine this in relation to Northern Ireland's planned and projected uplift in block grant funding from Westminster, and examine whether health and social care would need to expand as a proportion of Northern Ireland spending more rapidly than in other UK countries to meet projected trends in demand.

- To consider whether Northern Ireland could feasibly manage better within its budget by considering whether current higher spending is driven by lower efficiency; higher levels of need; or higher standards of service. This will illustrate whether Northern Ireland may be able to meet future health needs within the bounds of fiscal feasibility.

### Efficiency comparisons

- Drawing on previous work and published data, to estimate a range of metrics to describe productivity in the Northern Ireland health service, with the key comparator being the English NHS.
- To compare health care resource group (HRG<sup>1</sup>) reference cost data for Northern Ireland and England in the categories of elective, non-elective and day case (and probably other sectors such as outpatients, depending on data availability). This should give a general indicator of overall relative costs.
- To estimate composite HRG cost indices for Northern Ireland relative to England based on English HRG costs and Northern Ireland's particular patient mix of activity (case mix) for elective, non-elective and outpatient activity (and combined for all/most secondary care activity).
- To examine crude labour productivity by comparing the total volume of inpatient, non-elective and outpatient activity in Northern Ireland and England relative to the number of doctors; nurses; and total staff.
- To look at input and purchasing efficiency by comparing cost of prescribed medications using patient-level or practice-level prescribing data, both across the board and by individual classes of drugs.
- To describe relative generic prescribing rates between Northern Ireland and England.

1 Healthcare resource groups define an intervention based on a patient's diagnosis on admission with resource use (cost) being similar across patients assigned the same HRG. With around 2,000 HRGs, this classification provides a very detailed unit of analysis.



- To compare the process indicators of length of stay for comparable groups of activity – with shorter lengths of hospital stay being a key driver of productivity in contemporary health care – and bed occupancy rates.

## Understanding differences

Subject to time and resourcing, to look further into drivers of any differences revealed. In particular, potential to look for indications as to:

- Whether spending is balanced similarly or differently across aggregate areas in Northern Ireland as opposed to England – for example across primary and secondary care, pay bill versus supplies.
- What factors, based on earlier reports by Appleby (2005, 2011), Bengoa (Department of Health (NI), 2016), Donaldson (Department of Health (NI), 2014), the OECD (2016) and others, have been associated with concerns regarding Northern Ireland’s productivity – recognising that some are also well attested in the literature on England.

## Structure of the report

The rest of this review firstly describes historic trends in health and care funding in Northern Ireland, drawing out comparisons with other parts of the UK. It then looks forward over the next 50 years with various projections of health and care spending in Northern Ireland, and explores different ways of thinking about the sustainability of these projections. Third, the review investigates various measures of performance and productivity of the health system, drawing comparisons with (in the main) the English NHS. Finally, we draw some conclusions from this review.

# 1 Historic funding

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## Summary

Historically, on average, per capita health spending in Northern Ireland has been around 7% higher than England and around 4% lower than Scotland – though with wide fluctuations from year to year.

As in the rest of the UK, health spending in Northern Ireland has grown significantly over time: total spending has increased by nearly 67% in real terms since 2002/3 (the second largest increase after England) and per capita spend by 63% (the highest across the UK).

Health spending also consumes a larger proportion of public spending than ever – increasing from around 16% in 2002/3 to 22% in 2019/20.

Since 2016/17, spending on social care across all age groups in Northern Ireland has been rising faster than the rest of the UK and per capita spending is now around a fifth higher than in Wales and Scotland, and 43% higher than in England.

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## Health and social care spending

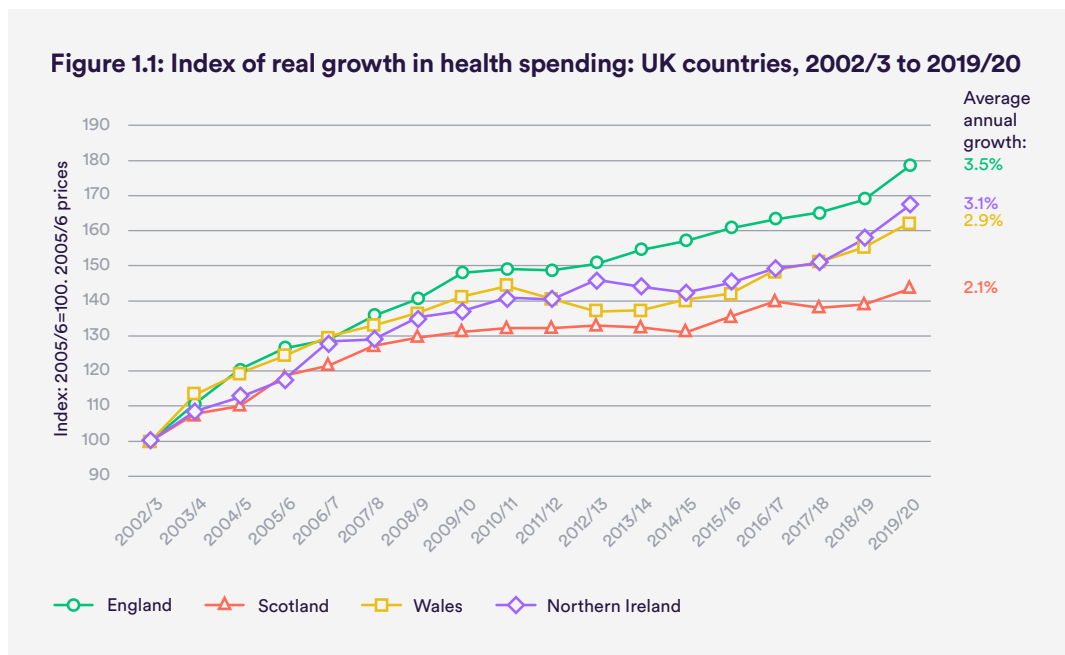
Public spending on health services represents a large and growing share of all public spending. Since 2002/3, and based on data reported in the HM Treasury's Public Expenditure Survey Analyses (HM Treasury, 2022), UK health spending has risen by 73% in real terms.

Across the four UK countries, England has had the largest real rise (78%), followed by Northern Ireland (67%), Wales (62%) and Scotland (43%) (Figure 1.1). And across the English regions, the North East had the lowest increase (61%) and London the highest (100%). All countries experienced significant growth in spending between 2002/3 and 2009/10, and then

significant slowing of growth from 2010/11 to around 2014/15, followed by some pickup through to 2019/20.

Northern Ireland’s average annual real spending growth since 2002/3 has been 3.1% – compared to 3.5% for England, 2.9% for Wales and 2.1% for Scotland. While England has experienced the highest average growth since 2002/3, it is worth noting that this is from a lower per capita spend than the rest of the UK, and despite higher growth, per capita spending in England remains the lowest across all countries (see Figure 1.3).

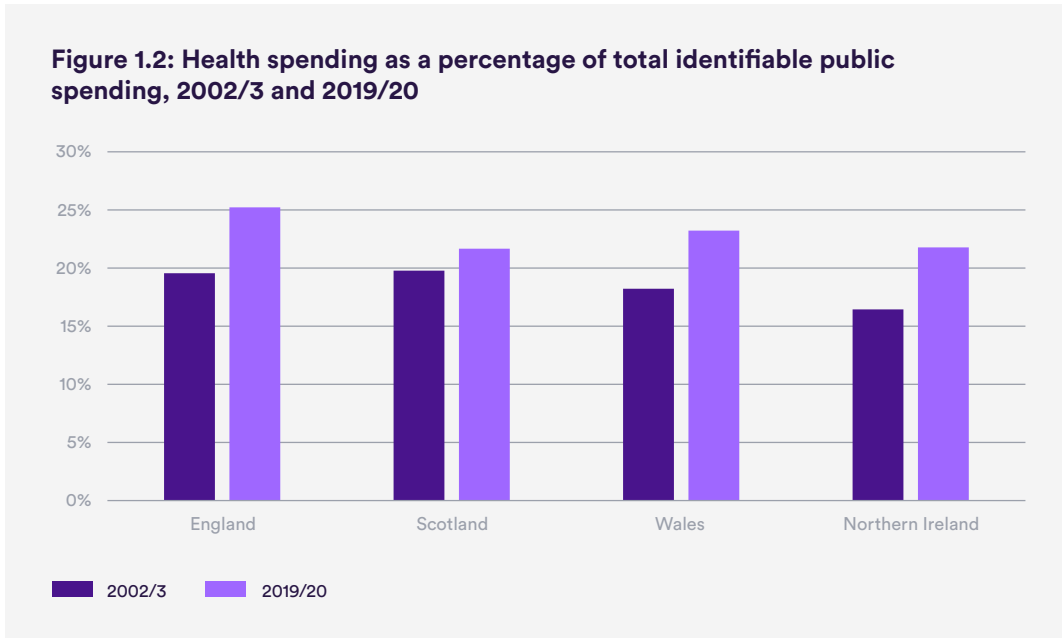
The reasons for growth in health spending are noted in more detail in the next section, which examines future spending trends. However, in broad terms, health care spending trends will be some varying combination of changes in population size and structure, supply-side factors such as changes in medical technology and productivity, as well as other factors such as changes in national income and relative inflation.



Source: HMT (2022), various Public Expenditure Survey Analyses

Not only has health spending increased in real terms, but it has done so faster than other areas of public spending. Across the UK, health spend as a proportion of all identifiable public spending has increased from around a fifth in 2002/3 to a quarter in 2019/20. For Northern Ireland, the proportion

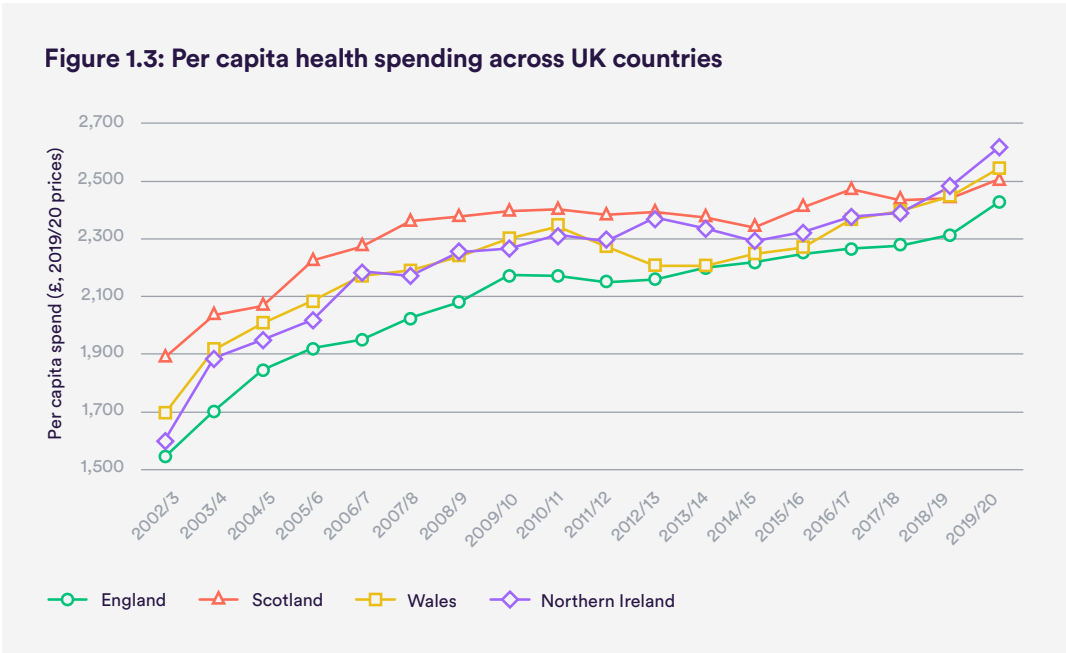
of public spending devoted to health rose from 16% (the lowest compared to other nations of the UK) in 2002/3 to 22%, similar to Scotland, but lower than Wales (23%) and England (25%) (Figure 1.2).



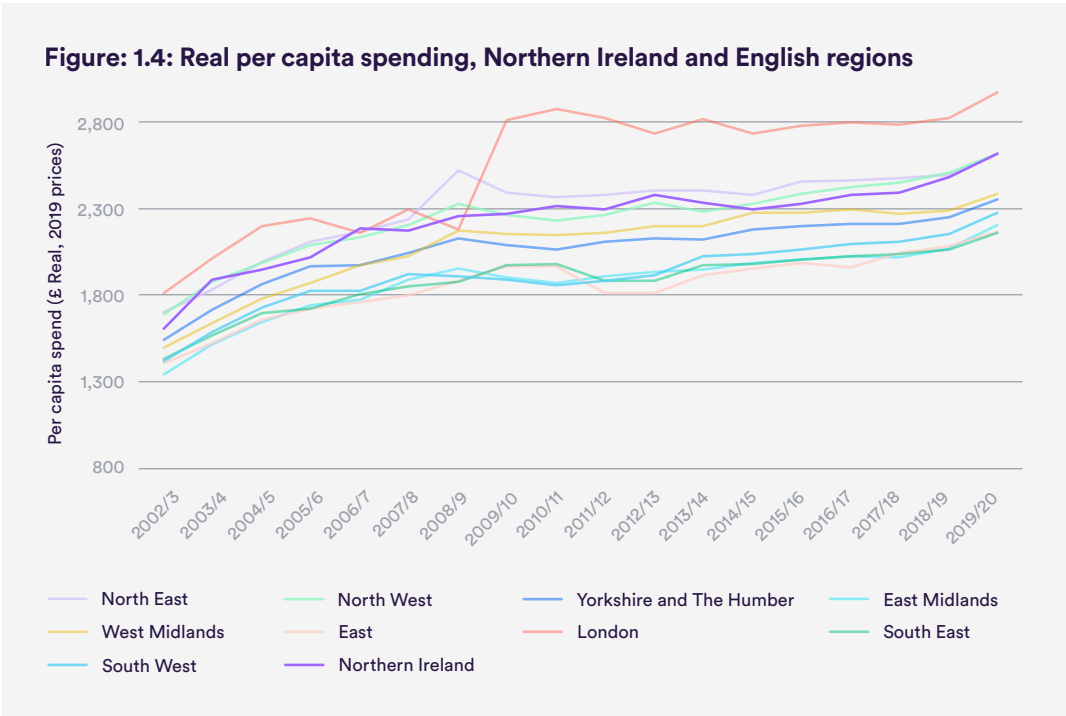
Source: HMT (2022), various Public Expenditure Survey Analyses

Spending on health has also grown faster than the growth in population. As Figure 1.3 shows, over the last 17 years, real per capita health spending has increased by around 54% across the whole of the UK, and by 63% in Northern Ireland (compared to 33% in Scotland, 50% in Wales and 57% in England). Figure 1.4 shows real per capita trends in spending across English regions and Northern Ireland. Northern Ireland spending has broadly tracked the trend in the North East and North West of England.

Across all four nations, spending grew fastest in the period 2002/3 to 2009/10, with slower growth from 2010/11 onwards. The uptick in spending in 2019/20 will likely reflect the start of large spending increases due to Covid-19. As Figure 1.5 shows, spending per head in Northern Ireland is now nearly 8% (£189) higher than in England, and, since 2018/19, has overtaken Scotland in this comparison. The trends in per capita spending relative to England look quite volatile but are the product of changes in English and other countries' spending.

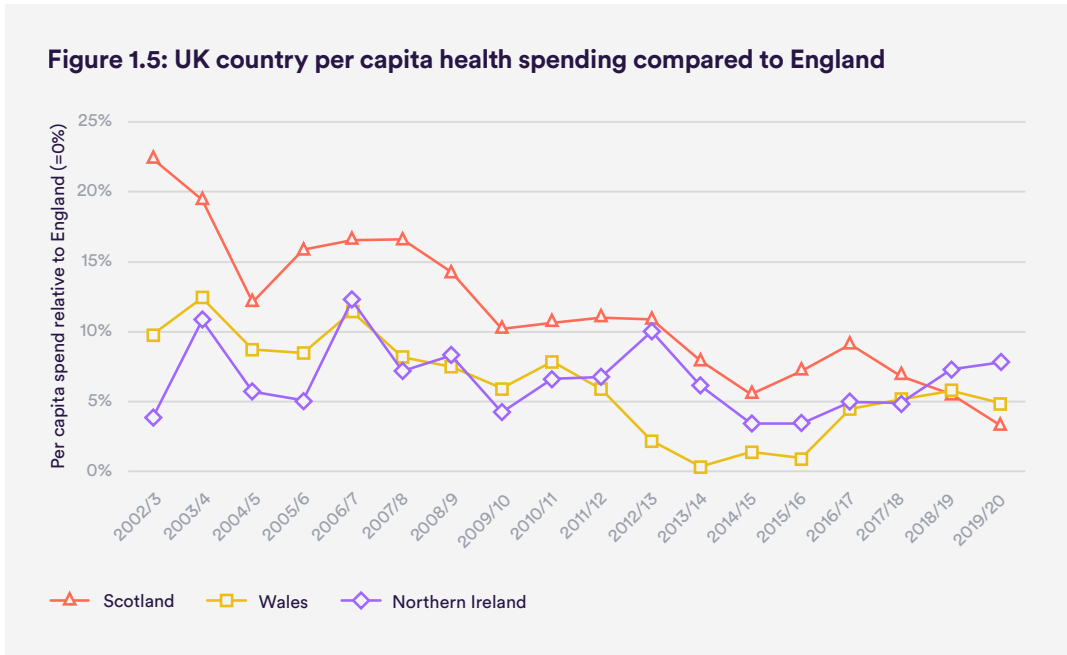


Source: HMT (2022), various Public Expenditure Survey Analyses



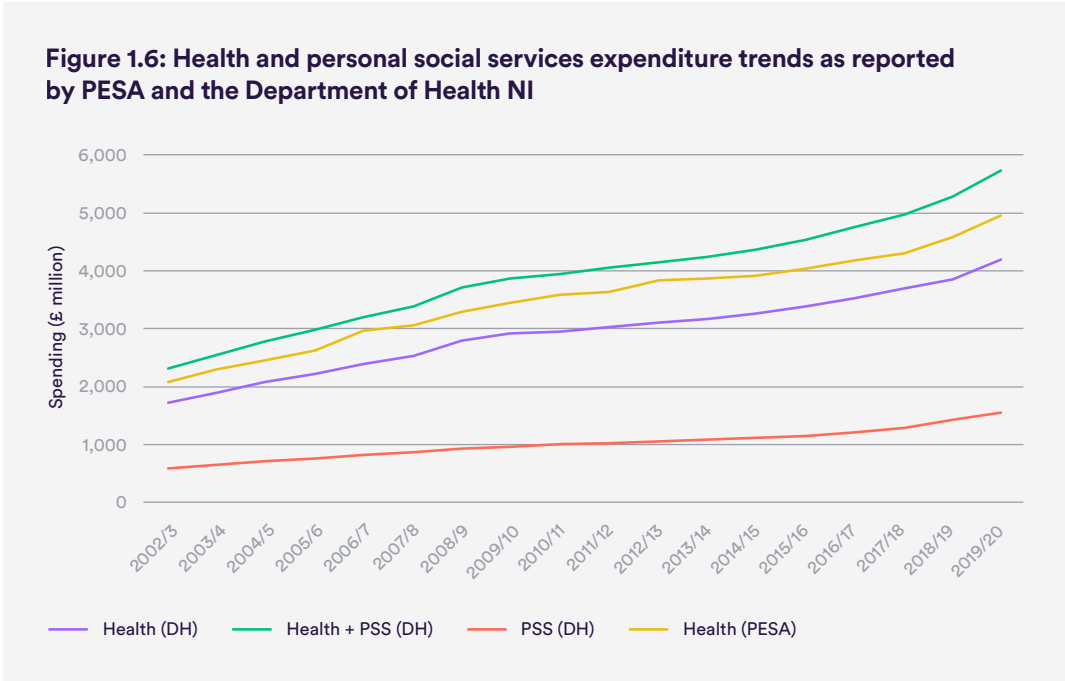
Source: Data: HMT (2022), various Public Expenditure Survey Analyses

NB: The step change in spending in 2009/10 for the London region was the result of methodological changes which increased the weight given to health spending in London



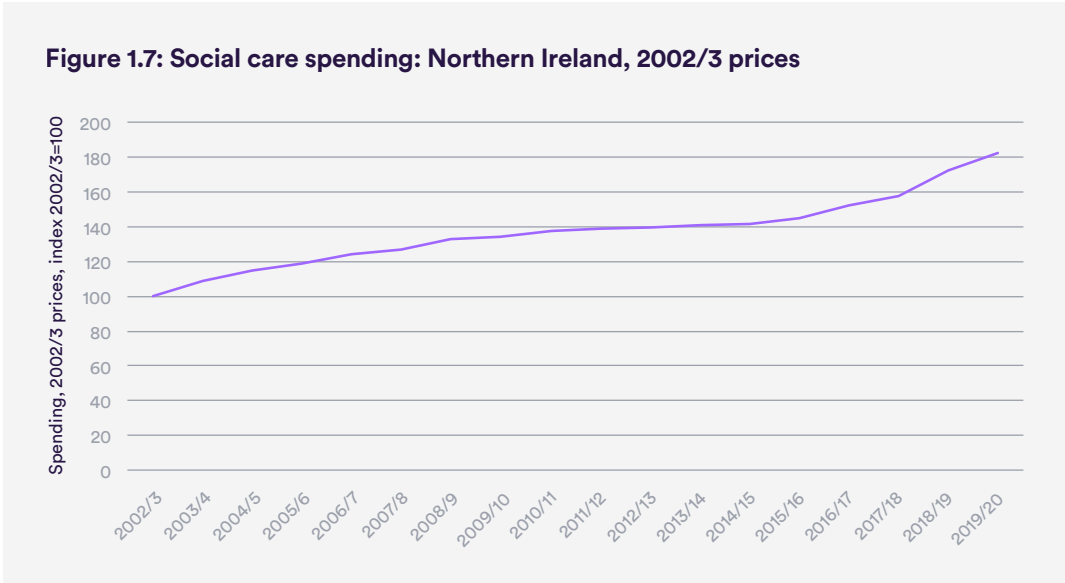
Source: Data: HMT (2022), various Public Expenditure Survey Analyses

All the foregoing health spending comparisons are based on PESA data produced annually by HM Treasury. However, there are differences in figures reported by PESA and those we obtained from the Department of Health NI. A key difference is the integrated nature of health and social care services in Northern Ireland. The Department’s spending figures include personal social care service spending. While PESA reports on health spending only, as Figure 1.5 shows, while trends are similar across the two sources of information, there remain differences between these figures and those supplied by the Department of Health for this review. Figures reported by PESA for health spending only are around 20% higher than those supplied by the Department of Health for this review. Part of this difference may be accounted for by the inclusion in PESA figures of various central and administrative functions. It is worth noting that trends in the growth of spending for both data series are almost identical.



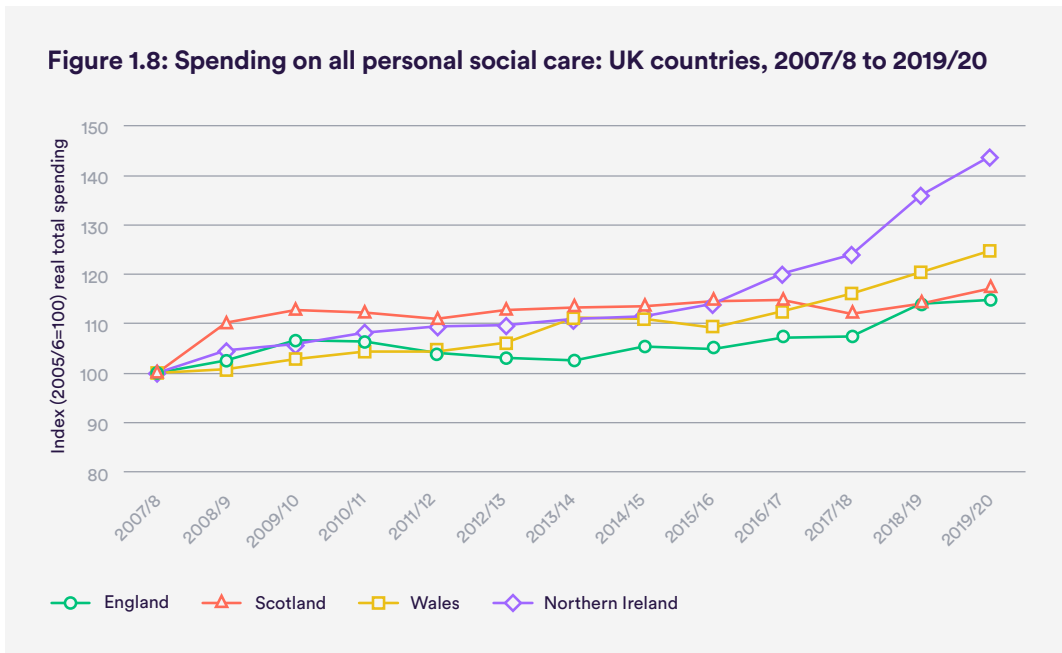
Source: HMT (2022), various Public Expenditure Survey Analyses. Personal communication, Department of Health Northern Ireland

Taking the Department’s figures on social care spending, between 2002/3 and 2019/20, spending on social care (adults and children) in Northern Ireland rose by around 82% in real terms – with half of that increase occurring since 2013/14 (Figure 1.7).



Source: Data: Personal communication, Department of Health, Northern Ireland

Comparisons with other UK countries are made more complicated given the integrated nature of Northern Ireland’s health and care system which does not (as other UK countries do) separately identify adult and children’s social care spending. Therefore social care spending comparisons are on the basis of total net spending across all age groups. As Figure 1.8 shows, real total spending increased at a slow rate across all countries between 2007/8 to 2014/15. Average annual increases across the whole period were between 1.3% (England) and 2.0% (Wales), with Northern Ireland averaging 3.4% – mostly due to large increases since 2015/16. These trends and differences are reflected in spending per head (Figure 1.9). In 2019/20, total social care spending per head in Northern Ireland was around 42% higher than in England, 22% higher than in Scotland and 21% higher than in Wales.

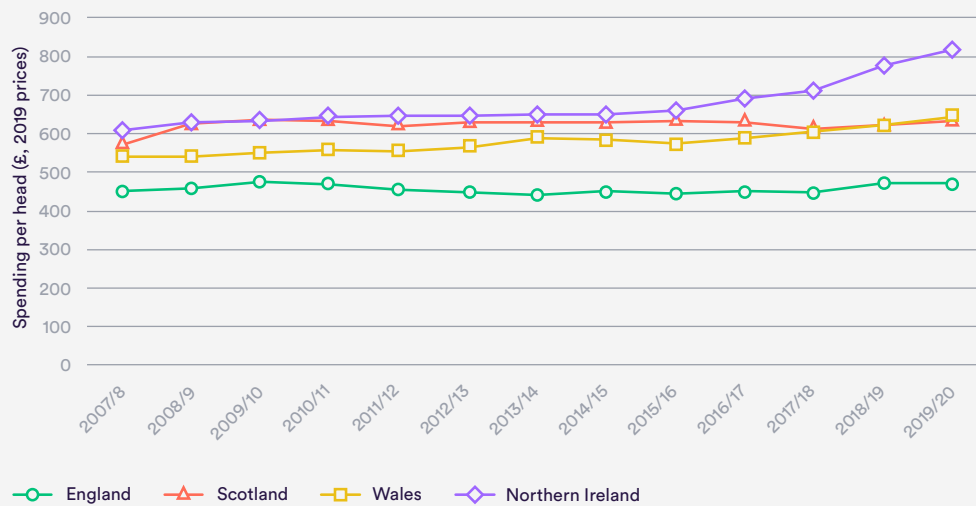


Sources: England: NHS Digital (2022a). Northern Ireland: Personal Communication. Wales: Stats Wales (2022a). Scotland: Scottish Government (2022)

NB: Comparisons of adult-only social care spending has not been possible given the nature of the aggregated Northern Ireland Data of social care expenditure



**Figure 1.9: Spending per head on all personal social care: UK countries, 2007/8 to 2019/20**



Sources: England: NHS Digital (2022a). Northern Ireland: Personal Communication. Wales: Stats Wales (2022a). Scotland: Scottish Government (2022)

## Public spending and Covid-19

The Covid-19 pandemic has had a major impact on public spending across the UK. Estimates by the National Audit Office suggest that extra spending related to the pandemic has amounted to around £260 billion between March 2020 and September 2021 (National Audit Office, 2022). Much of this has been in the form of support for businesses and employees. However, the second-largest area of spending (around £55 billion) has been on support for health care and other health-related measures.

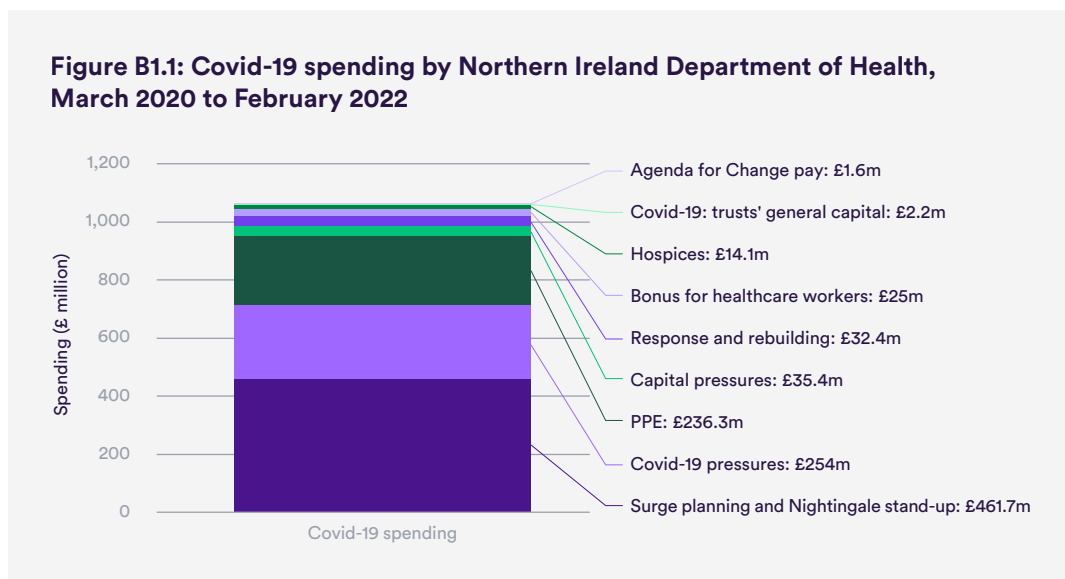
As Box 1.1 shows, Northern Ireland’s share of this extra Covid-19 spending totals around £3.3 billion as of February 2022, with the Department of Health receiving around £1.1 billion in 2020/21 – equivalent to an uplift on the 2019/20 spend of around 20% (Keyes, 2022). While spending in this year will be distorted by the impact of Covid-19, part of the Department’s allocation will have continued to be used in 2021/22, with possible extra spending in subsequent years as part of the recovery programme for health and care services, in particular, tackling waiting lists that have increased over the last two years.

**Box 1.1: Covid-19 spending in 2020–22**

Additional public spending to tackle the health and economic consequences of the pandemic between March 2020 and September 2021 amounted to £260 billion across the UK, with potential costs over the full lifetime of the measures amounting to £368 billion.

The devolved nations’ share of this spending was allocated as additions to the Barnett block grant, with Northern Ireland receiving around £3.3 billion by February 2022.

The NI Department of Health’s bids for Covid-19 spending measures amounted to £1,350 million, of which £1,100 billion was allocated to cover extra spending on surge capacity, personal protective equipment (PPE), capital investment, etc (Figure B1.1).



Source: Data: Keyes (2022)

## Conclusions

Over most of the last two decades, on average, per capita health spending in Northern Ireland has been around 7% higher than England and around 4% lower than Scotland – though with wide fluctuations from year to year. As in the rest of the UK, health spending in Northern Ireland has grown significantly over time: total spending has increased by nearly 67% in real terms since 2002/3 (the second largest increase after England) and per capita spend by 63% (the highest across the UK). Health spending also consumes a larger proportion of public spending than ever – increasing from around 16% in 2002/3 to 22% in 2019/20.

While all health services could usefully spend more money, and while there are differences in health and care needs that will justify differences in spending, there is little *prima facie* evidence from the headline comparative spending figures that Northern Ireland has or does suffer from any significant shortfall in spending.

## 2 Spending projections

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### Summary

Across the different ways in which spending might be projected out to 2070, it is clear that health care funding is likely to be pushed relentlessly upwards.

A model based on population projections suggests an increase of around 0.6% per year in real terms. Any adjustment for technological change produces a considerably faster increase, and actual spending increases over the past two decades have been at 3.3%.

While projections are subject to great uncertainty, it is likely that Northern Ireland will continue to face difficult choices about how to make this sustainable.

Our projections show health increasing considerably as a proportion of the economy under most scenarios: if spending continues to rise at recent rates, it will also use an ever-increasing share of the block grant which funds all departmental budgets.

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### Introduction

The actual amounts of publicly financed health and social care spending are of course determined as part of the political process. This will involve choices, trade-offs and assumptions, and will be part of a larger macroeconomic policy context. However, analyses of the drivers of changes in historical health and care spending underlying and (at least in part) informing such choices have identified three categories of pressures on health and care spending (Smith and others, 2000; Appleby, 2013; Licchetta and Stelmach 2016).

The first pressure is changes in the **population** and its **demography** (its age and sex structure). As populations grow and the proportion of older, higher and more costly users increase, so too would pressures to spend more on health and care.

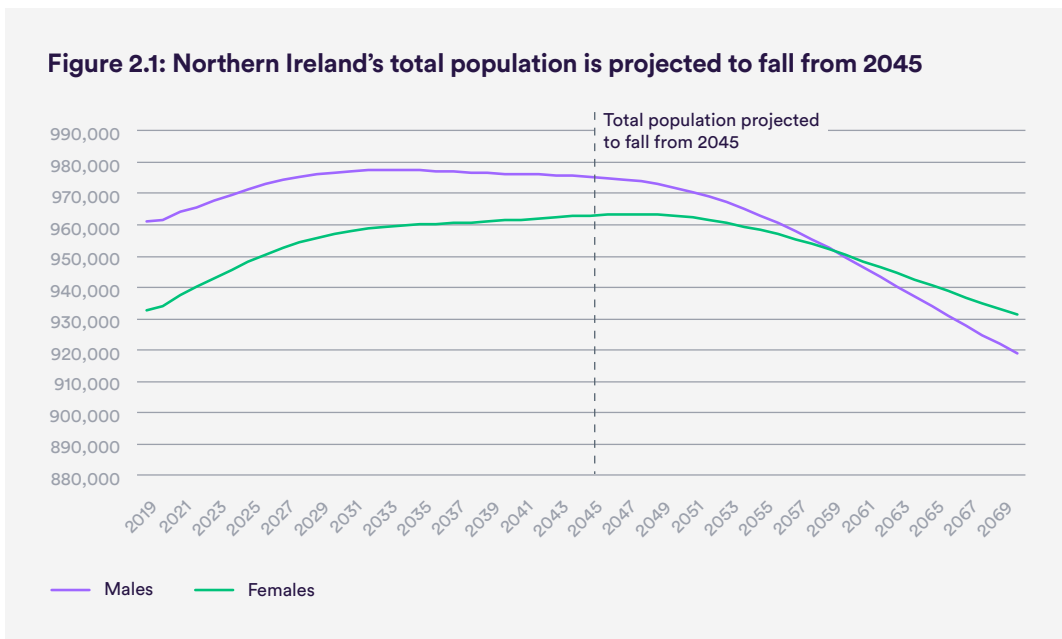
The second pressure many studies identify is a positive relationship between **income** and spending. As income increases, so too does the pressure to spend more. Whether spending pressures increase at a faster rate than income (that is, increasing spending as a proportion of income) is somewhat moot. Studies of the income elasticity of health spending at a national level have suggested an income elasticity slightly greater than 1 – with health spending growing faster than income. Other studies estimating elasticities at an individual level, however, suggest an elasticity at or just under 1.

The third set of spending pressures include a number of factors, most notably the Baumol cost effect whereby there is a tendency for labour intensive industries, especially in the service sectors, to experience **higher labour cost inflation** relative to other sectors of the economy as they need to pay competitive wages to attract staff even though they may find it harder to improve productivity to justify wage increases. Other factors include **epidemiological changes** in the population (for example, changes in the number of co-morbidities as the population ages), changes in **health-care seeking behaviour** by the public/patients and, importantly, a **supply-side technological effect**. This would include advances in medicine and changes in clinical approaches to treatment which have had a tendency to increase pressures on spending. Even if, at an individual technology level, new advances may improve cost effectiveness, they may also open the way to increasing volumes of treatment and overall costs.

In this section we focus on the first of these spending pressures to estimate projections for Northern Ireland’s health and care spending. We also look at perhaps more realistic estimates of future spending pressures by assuming the added effects of other cost pressures and then how these projections might be judged for their sustainability.

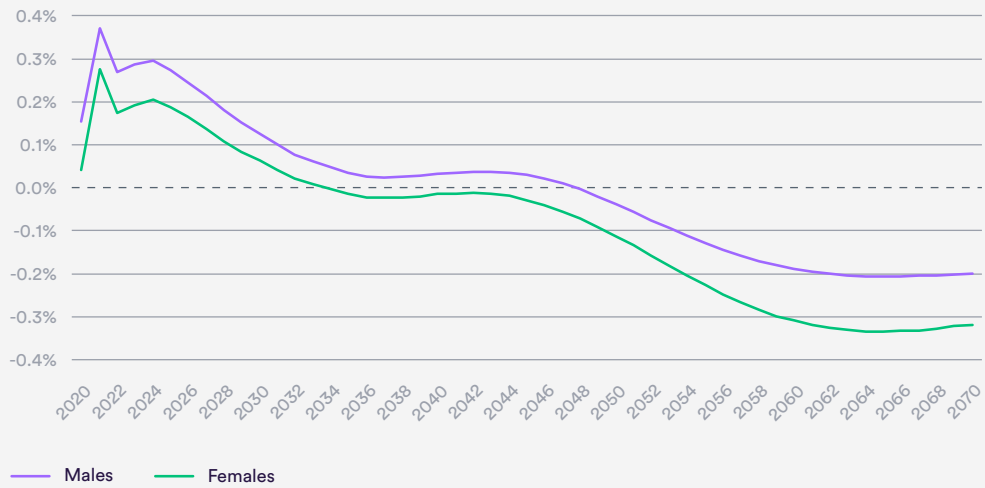
## Population-based spending projections for health and social care

Future changes in Northern Ireland’s population will drive changes in pressures to spend on health and social care. While the total population between 2020 and 2045 is projected to rise, it does so at a decreasing rate after 2030, and from 2045 is projected to start falling, with some differences in timing for males and females (Figures 2.1 and 2.2). However, the population of people aged 70 – whose annual per capita health and social care costs (around £9,000) are around four times higher than those aged under 70 – is projected to grow by 90%, with the proportion of over 70s doubling for both males and females (Figure 2.3).



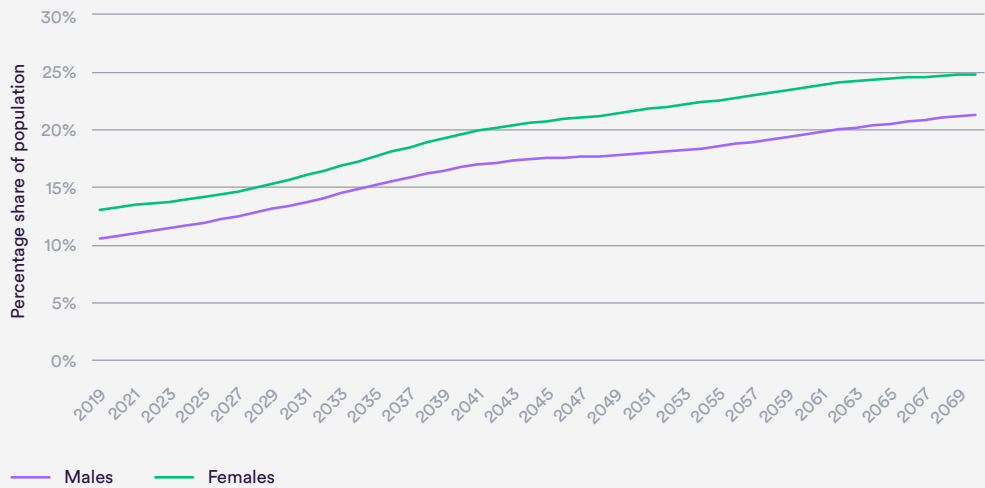
Source: Data: NISRA (2022a)

**Figure 2.2: Northern Ireland's annual population growth starts to turn negative in the 2030s/2040s**



Source: Data: NISRA (2022a)

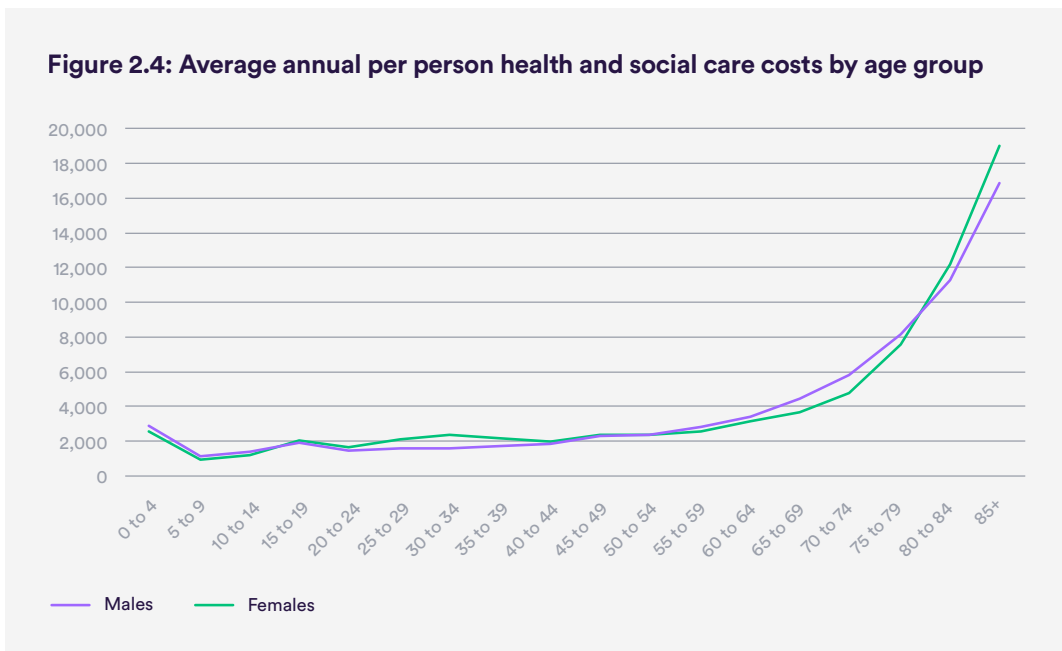
**Figure 2.3: The proportion of people aged over 70 is projected to double by 2070 in Northern Ireland**



Source: Data: NISRA (2022a)

The net combination of male and female population change and changes in the demographic structure of the population drive the trajectory of health and care spending in the future.

Using average age group and sex unit costs for health, community, family health services and personal social care (Figure 2.4), with population projections through to 2070 (NISRA, 2022a) and using 2019 as a jumping-off point, Figure 2.5 shows the projected trajectory of real (2019/20 prices) spending due to estimated changes in the population and its demography. As we have used the combined health and care spend in 2019/20 as a starting point, and a combined age-cost curve, the split between health and care remains constant over time. It should also be noted that using 2019/20 as a jumping-off point means that projections effectively ignore the large increase in spending in 2020/21 due to Covid-19 measures, with the implicit assumption that there will be no permanent upward shift in spend in following years.

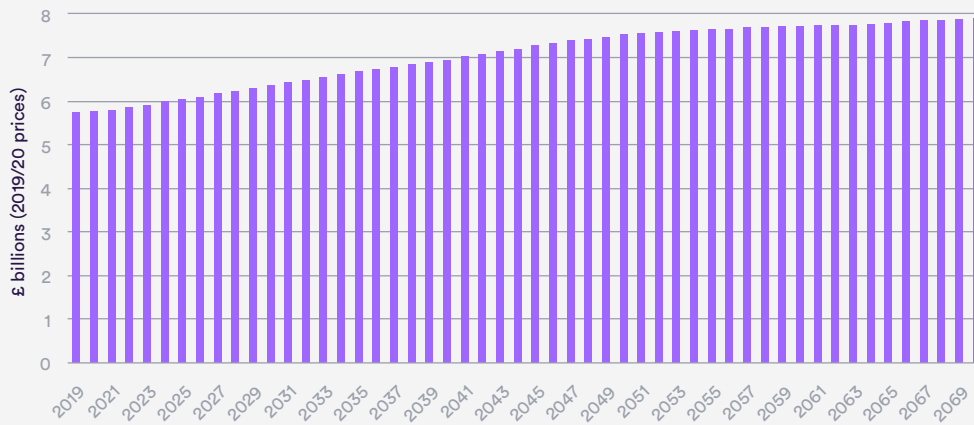


Source: Personal communication, Department of Health, Northern Ireland

NB: Cost curves rescaled to 2019/20 population and health and care outturn spend

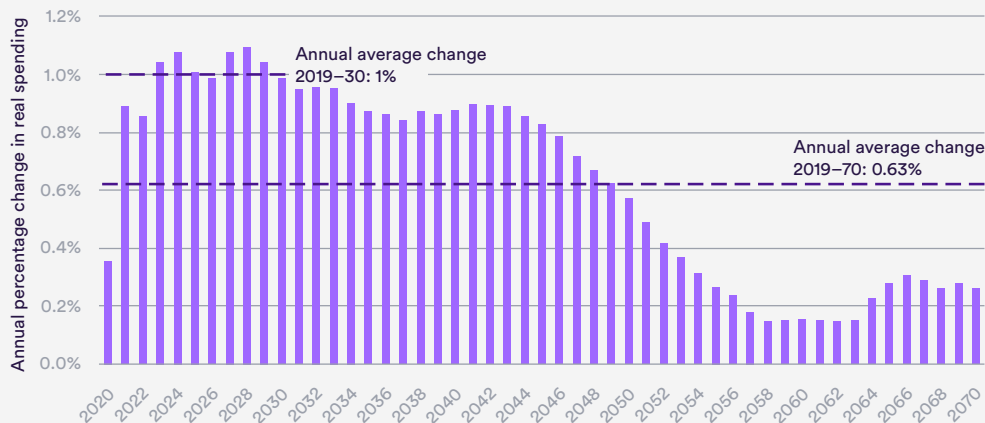


**Figure 2.5: Projections for Northern Ireland spending on health and social care based on changes in Northern Ireland’s population**

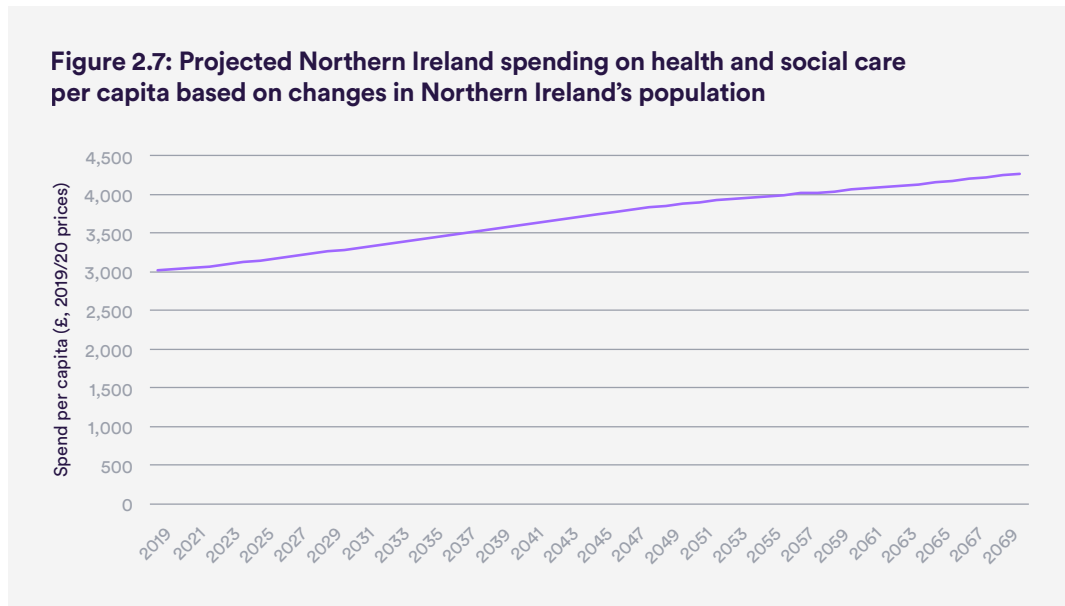


Over the whole period to 2070, population changes are estimated to add around 0.63% to annual spending. However, as Figure 2.6 shows, there is considerable variation around this average over time. In particular, given the estimates of future changes in population, over the decade to 2030 population and demographic spending pressures are estimated to be around 1% per year, but with a slowdown in population growth and changes in demographic structure after 2030 annual spending increases fall to 0.54% per year up to 2070.

**Figure 2.6: Annual percentage change in projected spending, 2019–70**



Compared to changes in total spending, spending per head is projected to rise at a slightly higher annual rate over the whole period (0.68% compared to 0.63%) and slightly slower up to 2030 (0.8% compared to 1%) as the net result of a combination of changing population in each age group and sex and the relative growth of older, more costly age groups. (Figure 2.7).



## Uncertainty and other cost pressures

There are many uncertainties in population-based spending projections. The problem is that population projections are often wrong (Appleby, 2014) – or at least, subject to change as new information from the decennial census emerges and assumptions about the factors that power forecasting models – such as fertility rates, net migration and life expectancy – change. These help account for variations from year to year in the OBR’s UK health spending projections (OBR, 2020) (see Box 2.2).

But as noted above, population changes are only one factor driving health and care spending pressures (and indeed, actual spending decisions). Other cost pressures – often wrapped up in a catch-all term of ‘technology’ – have been estimated to be more significant contributors to explaining past changes in health spending. A recent study has estimated that around 60% of the increases in health care expenditure in Denmark are attributable to technological progress and changes in medical practice,

for example (Laudicella and others, 2022). The OECD (2006) among others have suggested that for the UK, of the average real annual growth in health spending between 1970 and 2002 of 3.8%, 1.5% could be attributed to technological effects, with the rest accounted for by population changes, the impacts of growing national income and other factors such as higher relative inflation in health care.

To illustrate the fact that population changes only partially explain actual (and hence projected) changes in health and care spending, Box 2.1 (Figure B2.1) also shows, for Northern Ireland, population-based spending projections from 2002/3 to 2019/20 versus actual spending over that period. Real increases for the population-based projection average 1.2% per year, actual real spending on the other hand averages 3.3%, an average gap of 2.1 percentage points.

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**Box 2.1: Uncertainties and incompleteness of spending projections**

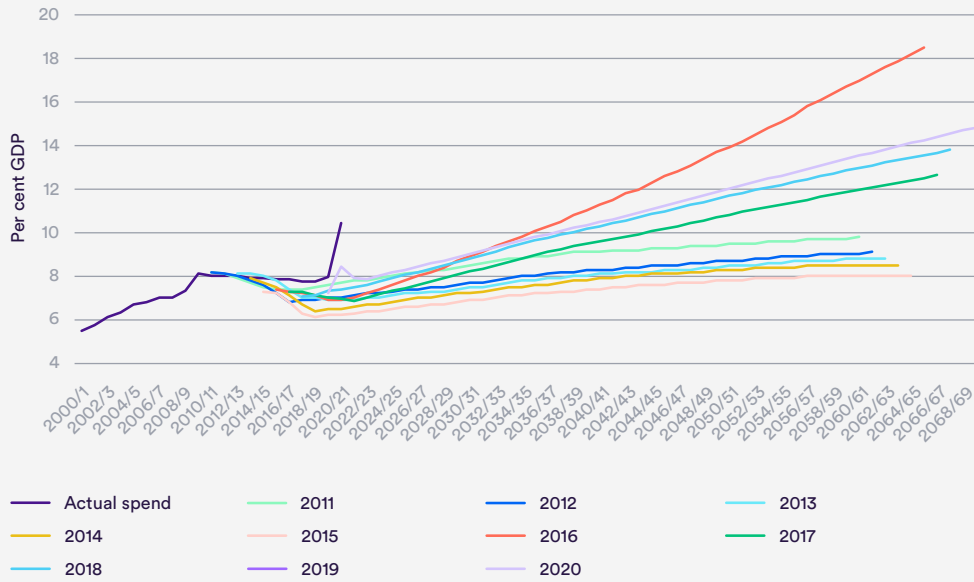
Figure B2.1 to some extent exaggerates UK NHS spending projections from successive OBR Fiscal Sustainability Reports (FSRs) (OBR, 2020) due to differences in starting points and medium term differences between government spending plans and outturns as well as variations in assumptions about future levels of GDP. However, differences do remain, and will reflect changes in underlying population data and projection methods.

The 2016 projections were not part of the FSR that year (which was abandoned due to Brexit) but part of more in-depth OBR work which modelled spending not just on population changes but other factors such as technological pressures.

And on the completeness or otherwise of projecting spending, Figure B2.2 compares projections for Northern Ireland’s health and care spending with a jumping off point of 2002 and population estimates from 2002 to 2019 with actual spending over this period. This shows that actual spending increased at a rate of 3.2% per year compared to the projection of 1.2%.

The difference will be accounted for by other pressures noted earlier, and reflected in the 2016 OBR projections for UK health spending.

**Fig B2.1: OBR central projections for UK health spending**

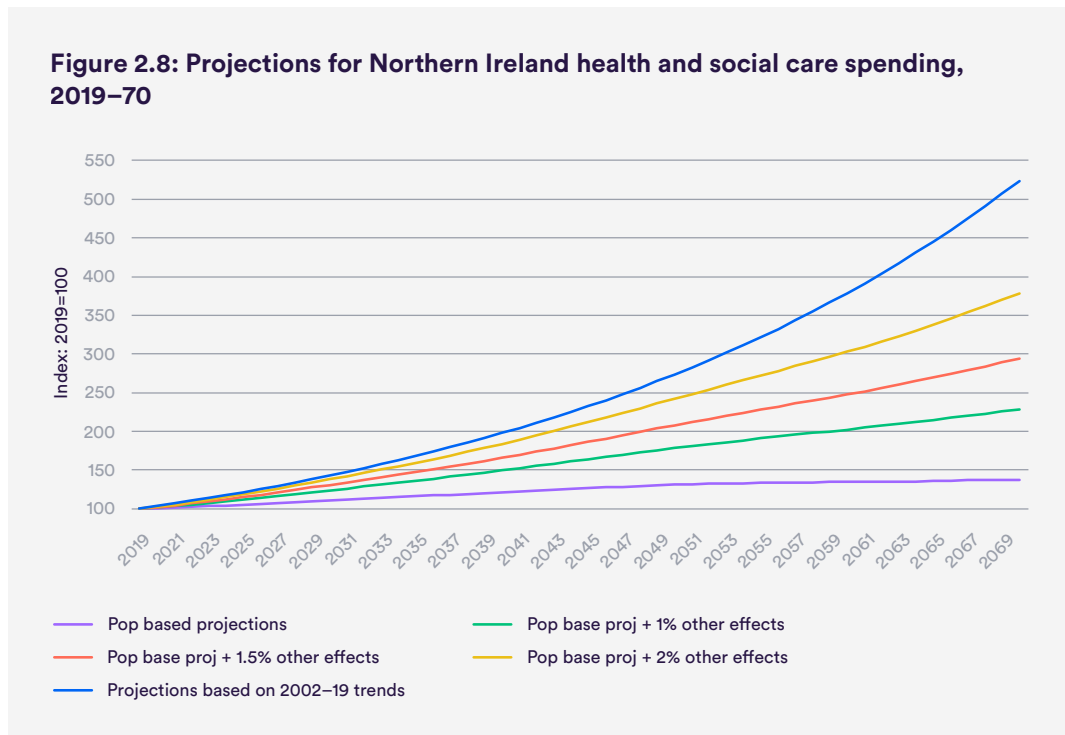


**Figure B2.2: Northern Ireland health and care spend population-based projections 2002–19 versus actual spending**



So, what might a more realistic projection of Northern Ireland’s health and care spending be?

Taking various values (1%, 1.5% and 2%) for cost pressures over and above changes driven by population changes as well as a projection based on average annual real increases in actual spending between 2002/3 and 2019/20 (3.3%), Figure 2.8 shows changes in Northern Ireland’s health and social care spending up to 2070. By 2030, projections of the increase in real spending compared to 2019/20 range from 11% (population-based) to 43% (historic trend). By 2070 these trajectories suggest higher spending of between 38% based on changes in population only and 424% if spending continued to grow as it did from 2002/3 to 2019/20.

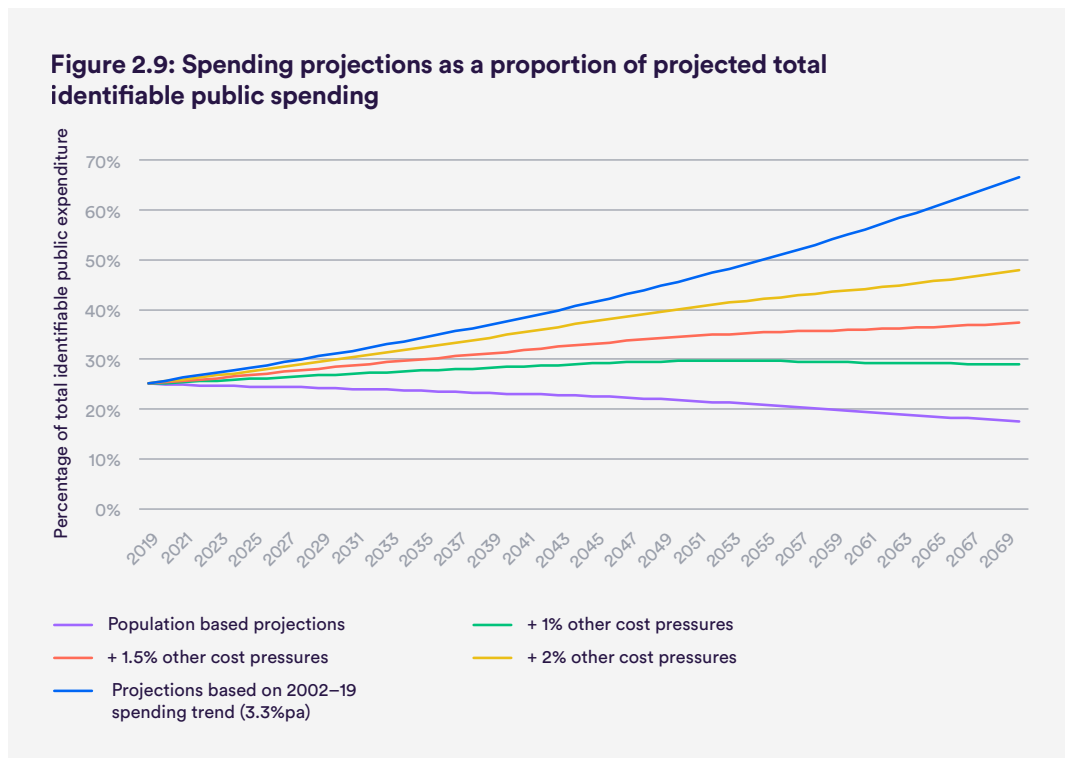


## Sustainability of future spending projections

These projections suggest up to a doubling in real spending on Northern Ireland’s health and care services over the next 20 years, and a quadrupling by 2070. While such extra costs will generate extra benefits, how might they be considered sustainable?

One indication of sustainability could be how future possible spending projections compare with future changes in total public spending in Northern Ireland. Here, we have projected total public spending on the basis of a continuation of spending trends between 2002/3 and 2019/20, i.e. a 1.4% increase per year.

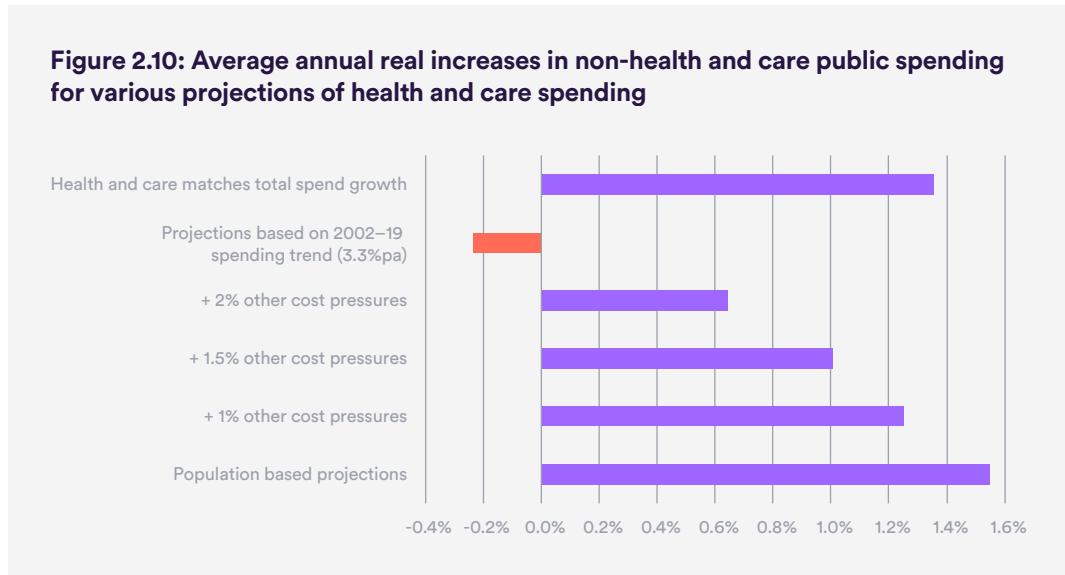
Figure 2.9 shows that, compared to 2019, when health and care spending amounted to around 25%<sup>2</sup> of total identifiable public spending, by 2030 this could increase to between 26% (population-based projection) and 31% (historic trend projection) and then, by 2070, to 18% and 67% respectively.



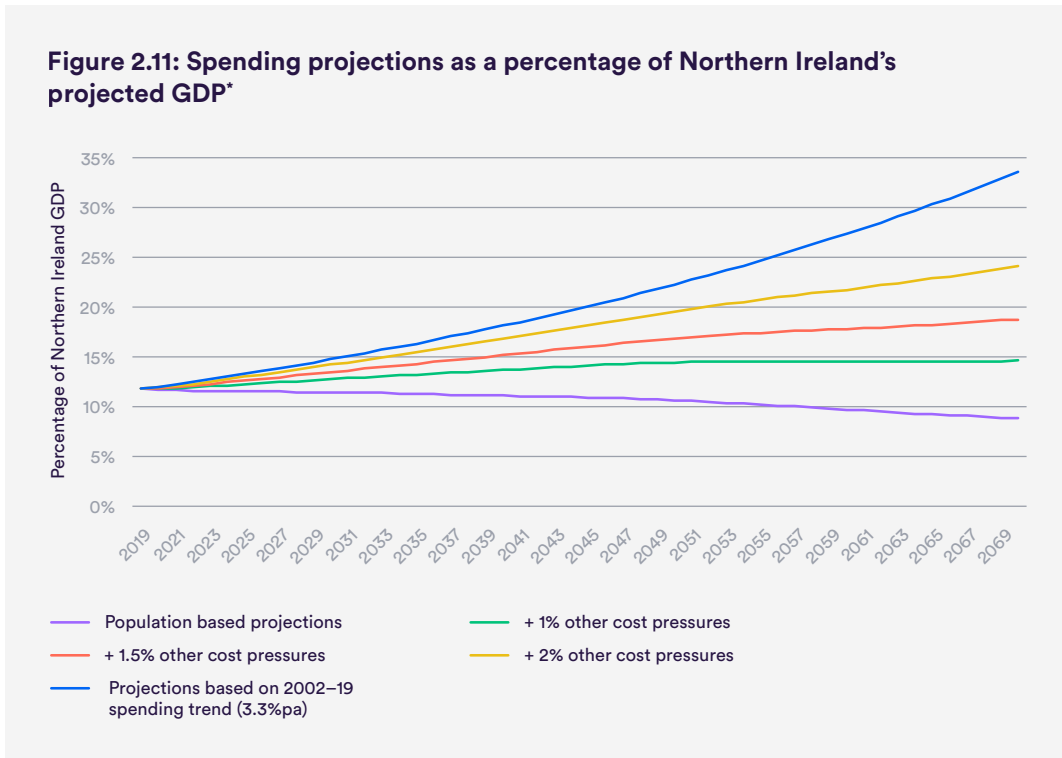
While such projections of the future proportion of health and care spending are sensitive to assumptions underlying future growth in total public and health and care spending, they suggest at the least that health and care will take up a growing proportion of public spending. If health and care spending simply grew in line with projected total spending, then all non-health and

2 This figure differs from the earlier proportion in Figure 1.2 of 22% due to differences in PESA reporting of NI health spend and the level of health and care spending used in the projections and based on figures obtained from the Department of Health NI.

care spending could grow at a real rate of around 1.4% per annum (i.e. equal to the projected growth in total public spending). However, on alternative (and more realistic) modelling of health and care spending, other spending areas will be squeezed over time in terms of the growth possible for their budgets, from between 1.2% to 0.6% real annual growth and possibly real annual reductions if health and care spending grows at the rate it has done since 2002 (Figure 2.10). The extent to which this might be considered sustainable in part hinges on the value placed by the Northern Ireland Executive and others on this trade-off between health and care and other public spending.



Another indicator of sustainability is the share of Northern Ireland’s GDP taken by health and care. Figure 2.11 shows various projections as a percentage of Northern Ireland’s GDP. As with the share of total public spending, except for the purely population-based projection, this suggests the share of Northern Ireland’s spend on health and care increasing from around 12% in 2019 to between 12.8% and 14.8% by 2030 and then to 14.6% and 33.6% by 2070.



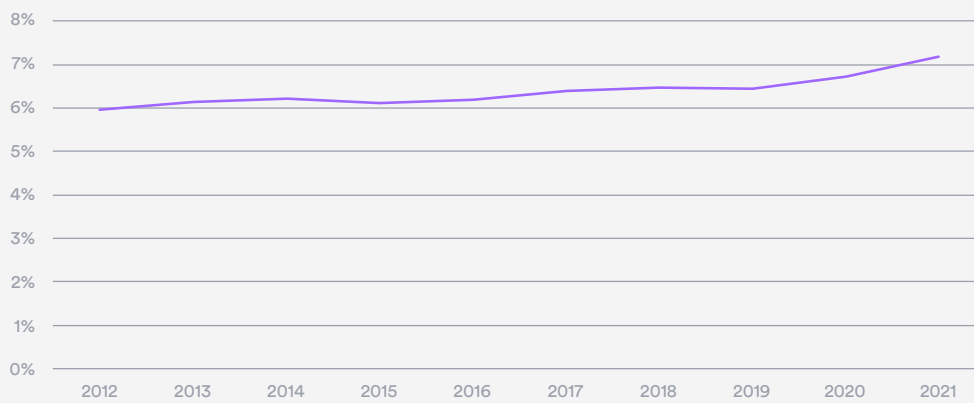
\* Note: NI GDP (ONS, 2021) projected on the basis of real annual growth between 2002 and 2019 of 1.2%

These shares depend, of course, on projecting GDP (in this case on the average annual growth between 2002 and 2019 of 1.2% per annum).

One implication of health and care spending taking a greater share of Northern Ireland's GDP is the possible impact on the labour market in other sectors of its economy. Currently, (in 2021), around one in 14 of Northern Ireland's economically active population works for health and social care services (based on data from Department of Health (2021) and NISRA (2022b)). For health care staff only, the share is around one in 16. As Figure 2.12 shows, since 2012 the proportion of health and care staff as a proportion of all Northern Ireland's economically active people has grown from 6% (1 in 17) to 7.2% (1 in 14).



**Figure 2.12: Health and care staff as a share of all economically active people, 2012–21**



Source: Data: NISRA (2022), Department of Health (NI) (2021)

The quantification of an increase in spending and an increasing share of GDP for health and care staff numbers are beyond the resources for this review. However, there are some possible lessons from England where, between 2001 and 2019, real spending on the NHS doubled and led to a 23% increase in staff and a consequent increase in the share of NHS staff of all economically active people from 1 in 27 to 1 in 25. Over this period the number of economically active people also grew (by around 17%), to an extent mitigating the growth in NHS employment. Equivalent staff population ratios for 2019/20 for Scotland and Wales are 1 in 20 and 1 in 18 respectively.

For Northern Ireland, however, while spending on health and care could double by 2040 (based on historic projections) with the share of GDP increasing by 50% – from 12% to 18% – the number of economically active people in 2040 may, on the basis of population trends, remain similar to the number in 2020. In which case, and based on England’s experience,<sup>3</sup> the share of health and care staff could increase from 1 in 14 to 1 in 11 of all economically active people.

<sup>3</sup> That is, England’s experience of a doubling in real spending, an approximate 50% increase in NHS spending as a share of GDP and increase in NHS staff of 23% but with no change in the number of economically active people.

A third indicator of sustainability of future projections of health and care spending involves one of the key sources of funding for public services in Northern Ireland: the Barnett block grant.

In 2019, Northern Ireland's Barnett formula-determined block grant was £12.75 billion – around 56% of all identifiable public expenditure. Over time, we project this grant to rise in real terms to around £43 billion in 2070, an average rate of 2.4% per annum in real terms (see Box 2.2).

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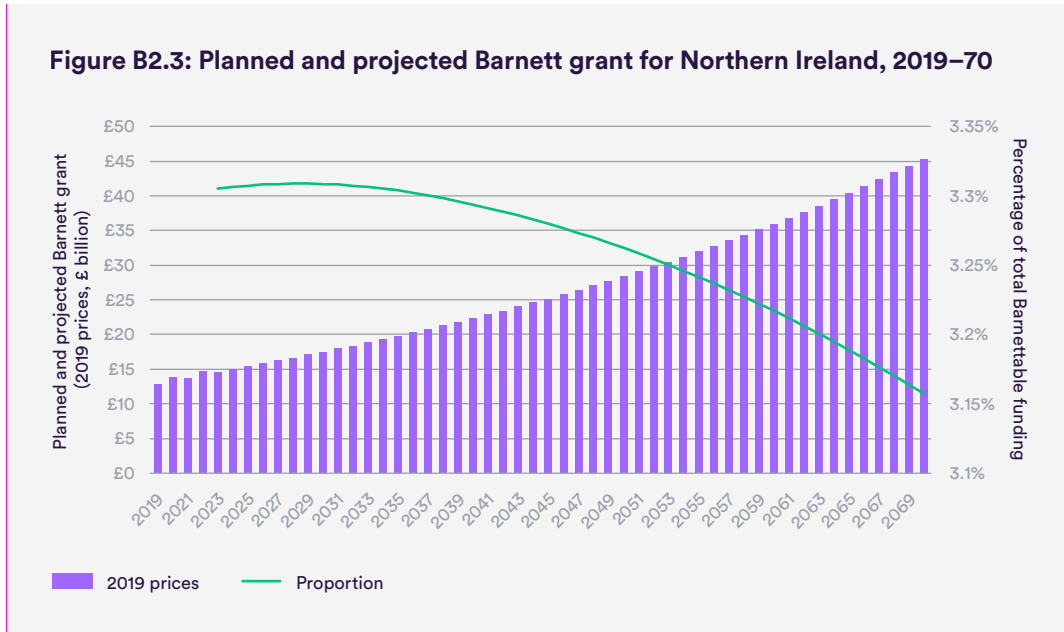
### **Box 2.2: Future trends in Northern Ireland's Barnett block grant**

The Barnett formula was introduced in 1978 by Joel Barnett, Labour's Chief Secretary to the Treasury, as an intended short term method of allocating funding between the UK's nations. It has remained in use ever since.

The formula is based on applying the proportion of the total UK population within each UK country to allocate changes in UK spending to the devolved administrations through the block grant which accounts for the majority of their budgets, including health. It is not weighted for need or other factors. Current levels remain arbitrarily influenced in part by a 20-year period during which 1976 population proportions continued to be used, favouring countries whose populations declined during the late 20th century.

The chart below shows projections in real terms based on extrapolating total growth in the block grant to devolved administrations from 2000 to 2019 on the current Barnett methodology, and then adjusting the projected changes past this point to reflect the allocation of additional funding based on proportional population. On these assumptions Northern Ireland's budget would increase by an average of around 2.5% in real terms across the period.

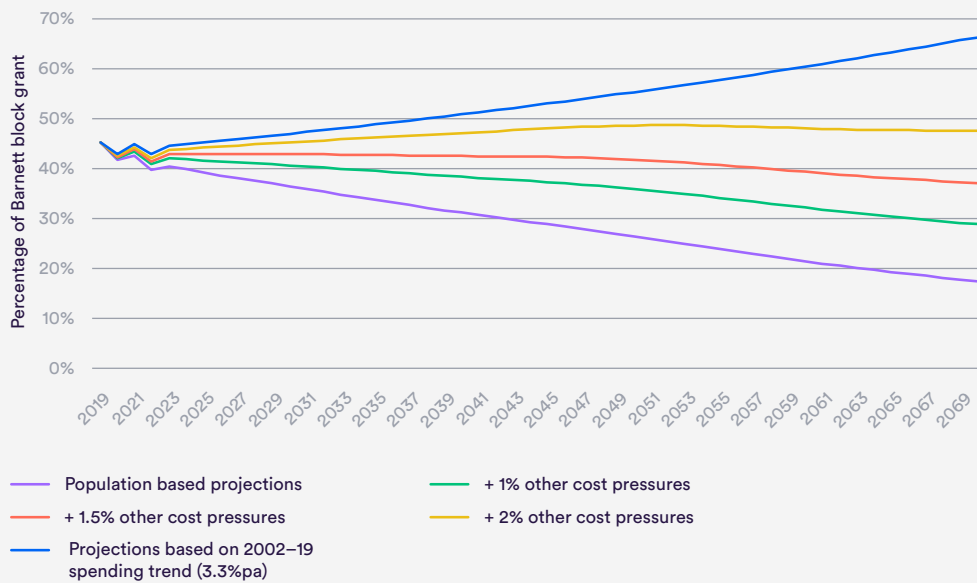
However, it would see a steady fall in its share of funding allocated in this way (shown in percentages), due to a steady reduction in its share of the UK population. The Barnett formula applies to changes in spending each year, not the total, and so the actual share of funding moves only gradually towards the relevant proportion.



Baseline projection source: HMT (2000). Initial period population share source: HMT (2021a)

Figure 2.13 shows future health and care spending projections as a proportion of Northern Ireland’s future Barnett block grant. From a share of around 45% in 2019, three of the projections suggest health and care spending to take a declining proportion of the block grant up to 2070. Projections based on a 2% increase for other cost pressures over and above population-driven changes in spending imply an increase in health and care’s spending share of the block grant to around 50%. And projections based on a continuation of historic spending suggest a rising share of the block grant, of around 5 percentage points a decade, to 70% by 2070.

**Figure 2.13: Spending projections as a percentage of Northern Ireland's projected Barnett block grant**



## Conclusion

Similar to many countries, Northern Ireland will face pressures to spend more on health and care services in future. Changes in the size and demography of the population will contribute to spending pressures. However, other factors such as medical advances, higher relative cost inflation, and a desire to devote a higher share of growing national income to health care, are likely to add a greater pressure on spending.

On the basis of various scenarios for the size of these cost and population factors, projections suggest up to a doubling in real spending on Northern Ireland's health and care services over the next 20 years (and a quadrupling by 2070). Whether such trends are considered sustainable will in part depend on judgements about the opportunity costs of extra spending on health and care and UK government spending decisions. These are likely to include reduced real growth on other public services and trade-offs with other parts of Northern Ireland's economy as health and care services take an increased share of the labour market. To an extent, such trade-offs can be attenuated by improvements in productivity. The next section examines the scope for such improvements and Northern Ireland's comparative performance on some key performance measures.

# 3 Performance and productivity

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## Summary

A comparison of the costs of providing particular procedures in a hospital setting across the two countries suggests that Northern Ireland has considerably higher costs than England.

Northern Ireland spends 25% more on elective inpatient care than it would if it provided the same types of treatments at English costs, and 33% more on long staying emergency patients.

Around a third of higher costs are attributable to Northern Ireland's higher rate of 'excess' bed days, where patients who might normally stay between one and three nights are instead in hospital longer than is usual for the procedure in question.

A lower proportion of patients in Northern Ireland are cared for as single day or short overnight-only patients than in England, adding to higher relative costs. These reflect data showing generally somewhat longer lengths of hospital stay in Northern Ireland.

Overall, our estimates suggest that Northern Ireland would save £410m if it treated its elective, non-elective and outpatients at English costs and with English rates of overnight stays and excess bed days.

Since 2016 unit costs of hospital care have risen by around 28% in Northern Ireland, compared to 7–8% in England.

Northern Ireland has 35% more registered nurses in total than England relative to the size of its population, and likely a lower rate of admissions per nurse. Precise estimates are impossible because of limited data

collection. Hospital beds in Northern Ireland are run at a slightly lower rate of occupancy, though the level of crowding in England may be undesirable.

However, indicators of inefficiency do not only point in one direction. Northern Ireland prescribes a higher proportion of generic medicines, implying better use of pharmaceutical budgets, although its per capita spend is much higher. The crude output of admissions per doctor is similar.

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## Introduction

There are many possible measures of the performance of health systems. In this section we firstly examine trends in Northern Ireland's hospital costs in comparison with the English NHS. Second, we look at the use of hospital beds and patients' experience of waiting to access hospital care. Finally, we describe trends and differences between Northern Ireland and England in the volumes and costs of prescribing.

## Hospital cost analysis

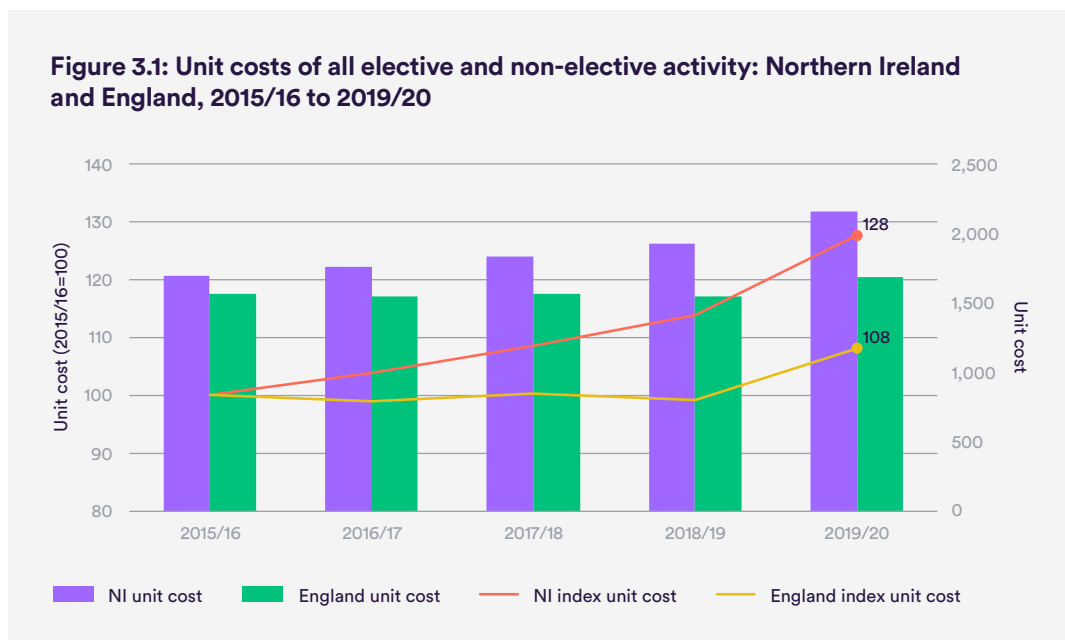
### Elective and non-elective cost comparisons

To explore differences in the unit costs of hospital-based care between Northern Ireland and England, we compared published annual data collections known as the Reference Cost data collection in Northern Ireland and the National Cost Collection in England. Despite the different names, the two collections have identical aims: to identify the average costs of thousands of uniformly defined units of hospital activity, known as Healthcare Resource Groups (HRGs) to which patient episodes are assigned using both the International Classification of Disease standard coding system and a UK-wide system for classifying clinical interventions and procedures. Although there are important differences in the context in which hospital unit costs are collected (discussed below), activity attributed with the same HRG code in Northern Ireland and England should, for all intents and purposes, be comparable. Indeed, in both 2018/19 and 2019/20, the Department of Health in Northern Ireland directed trusts to follow detailed guidance

published by NHS England and Improvement in order to complete the Northern Ireland data collection for those years.

### Admitted patient care unit cost comparisons

The overall unit cost of all admitted patient care hospital episodes (i.e. HRGs aggregated into the broad categories of elective and non-elective cases) in Northern Ireland in 2019/20 was 28% higher in cash terms than in England, with total finished consultant episodes in Northern Ireland costing on average £2,161 and costing £1,688 in England – a difference that has grown since 2015/16 (Figure 3.1).



Source: Data: Northern Ireland: Department of Health (2022a); England: NHSE (2021)

Over the five years from 2015/16 these aggregate unit costs have grown in Northern Ireland by 28% – three-and-a-half times the rate in England.

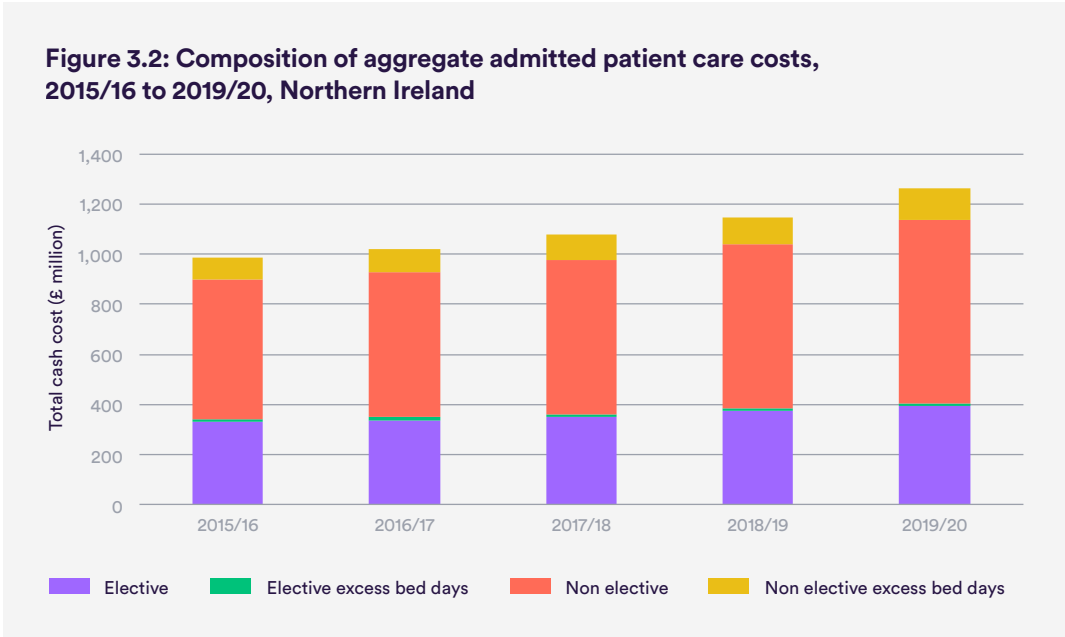


In both countries, broad trends in the share of care costs spent on non-elective as opposed to elective patients have been similar, and both countries have experienced a falling share of costs spent on elective patients over the last five years as pressures from emergency admissions have mounted. However, Northern Ireland has started from a slightly lower base of 35% of aggregate costs spent on elective patients in 2015/16 compared to England's 37%.

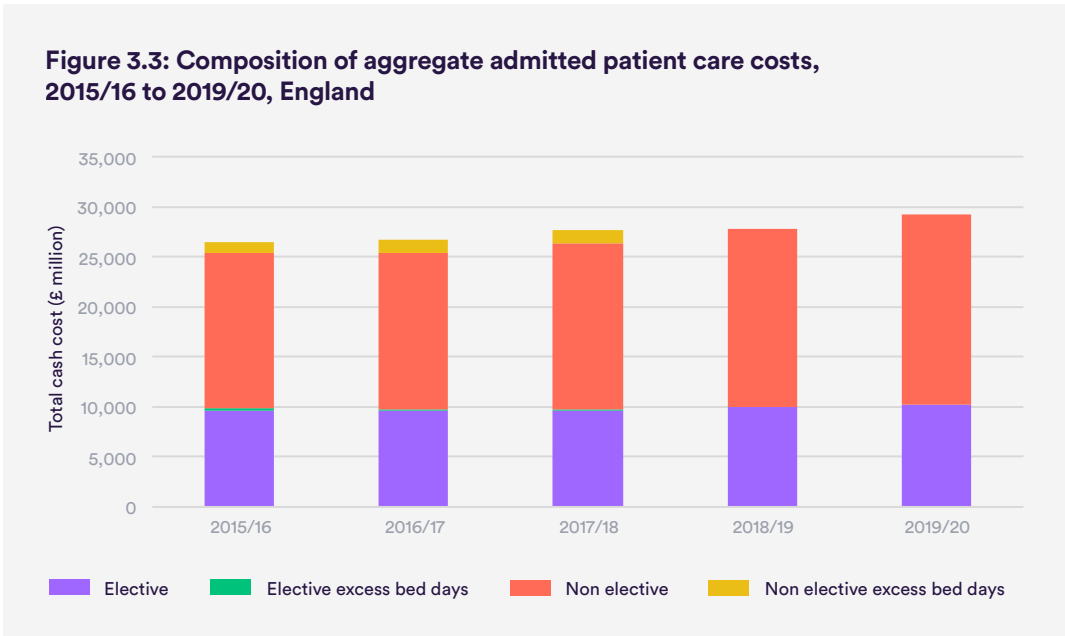
Figures 3.2 and 3.3 below show the broad components of these aggregate costs. A notable feature are the 'excess bed days' Northern Ireland records for its activity. These are the costs recorded for outlier patients whose length of stay for inpatient elective care, and 'long stay' non-elective care (that is, non-elective episodes of care beyond a two-night stay) are longer than expected for their particular HRG. These excess costs comprised 10% of total admitted patient care costs in Northern Ireland in 2015/16, rising to 11% in 2019/20.

By contrast, in England excess bed days comprised around 5% of total admitted patient care costs in 2015/16 and stayed constant until 2017/18, after which such costs ceased to be reported separately and were instead absorbed into the average unit costs reported for each relevant HRG, reflecting the adoption in England of patient-level costing systems. The largest component of excess bed day costs in both Northern Ireland and England is for non-elective patients, making up just over 13% of Northern Ireland's total non-elective costs in 2015/16 and growing to 15% in 2019/20, while excess bed days for elective patients comprised a steady 3% of total elective costs over the five-year period.

In England, non-elective excess bed days comprised 7% of non-elective costs in 2017/18 with both the unit costs and volume of such days appearing to stay constant as a share of non-elective cost and activity between 2015/16 and 2017/18. Elective excess bed day costs made up just under 2% of total elective costs in England in 2017/18 and again was steady throughout the 2015/16 to 2017/18 period these costs were separately enumerated.



Source: Data: Department of Health (NI), (2022a)



Source: Data: NHS England, 2021

NB: From 2018/19 onwards, excess bed day costs in England are included within the aggregate costs for elective and non-elective costs

Box 3.1 shows the breakdown of these aggregate trends by various types of hospital activity between 2015/16 and 2019/20. For example, the cost per day case in cash terms has increased by 25% in Northern Ireland (from £722 to £901) – an average annual increase of 6%. In England, by contrast day case unit costs have increased by 11% over the same period (from £733 to £813, or around 2.6% per year). If costs in Northern Ireland had risen at the same pace as those in England, the total day case cost of around £172 million in 2019/20 would have been £152 million. Applying England’s unit cost growth rate across all elective and non-elective hospital activity would result in Northern Ireland’s total costs for care in those settings being around £1,012m in 2019/20, a theoretical saving of £108 million, or the possibility of treating around 57,000 more patients – an increase of approximately 10% on 2019/20 combined inpatient, non-elective and day case activity.

**Box 3.1: Unit cost trends, Northern Ireland and England (2015/16 to 2019/20): elective, non-elective and day case activity**



Source: Data: NI: Department of Health (NI) (2022a); England: NHSE (2021)

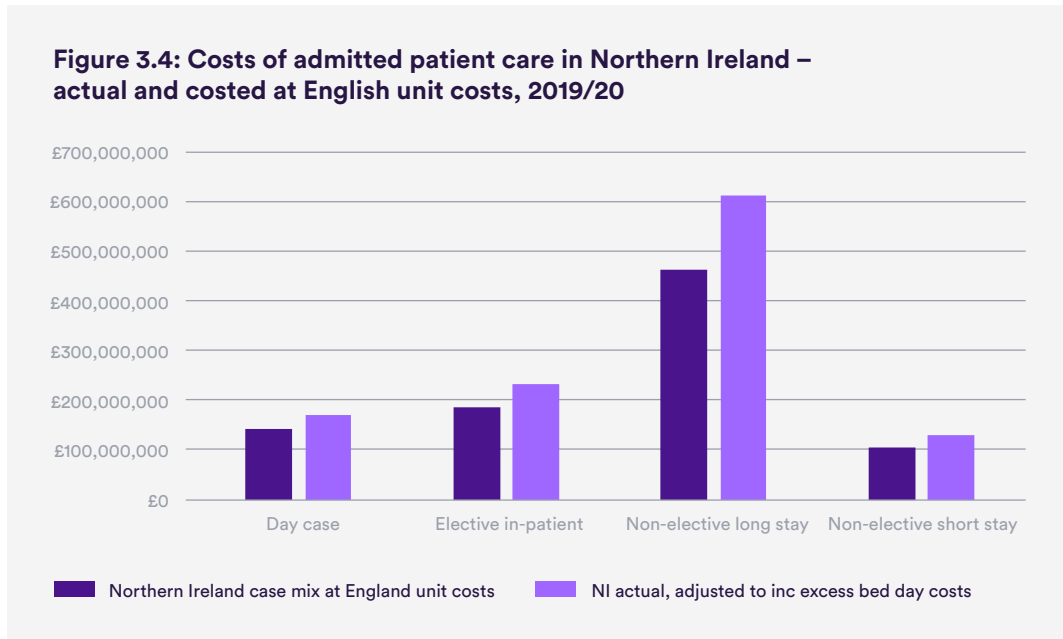
However, these cost comparisons are based on aggregated unit costs. This conceals differences in the mix of types of activity between Northern Ireland and England across the thousands of different procedures provided by hospitals – from hip replacements and cataract interventions to abdominal hernias and kidney transplants.

To account for these differences, we explored how much Northern Ireland’s hospital care would cost if its particular activity and patient mix were treated at the the same cost as patients in England. That is, Northern Ireland activity but at English unit costs. This case-mix adjustment provides another indicator of relative cost efficiency between the two national health systems. These estimates are detailed in Table 3.1 and Figure 3.4 below. This analysis suggests that elective care in Northern Ireland costs around £76m (or 23%) more than it would *if carried out at the average unit costs of the same activity in England*, while non-elective care costs around £179m (32%) more than the same mix of care would cost in England. The table also shows differences in cost for components of elective and non-elective care – day cases and inpatients, and the equivalent for non-elective care – short stay and long stay.

**Table 3.1: Actual and expected total costs of hospital care in Northern Ireland based on England’s unit costs, 2019/20**

| Hospital activity    | Total costs <sup>1</sup>   | Total costs at English unit costs | Nominal ‘excess’ above English cost |
|----------------------|----------------------------|-----------------------------------|-------------------------------------|
| <b>Elective:</b>     | £402                       | £326                              | 23%                                 |
| Day case             | £171m                      | £141m                             | 21%                                 |
| Inpatient            | £231m                      | £185m                             | 25%                                 |
| <b>Non-elective:</b> | £744                       | £565                              | 32%                                 |
| Long stay            | £613m                      | £461m                             | 33%                                 |
| Short stay           | £131m                      | £104m                             | 25%                                 |
| <b>Total</b>         | <b>£1,145m<sup>2</sup></b> | <b>£891m</b>                      | <b>29%</b>                          |

NB: 1: Northern Ireland’s total costs have been adjusted to include ‘excess bed day’ costs to make commensurate with English reporting of HRG costs. 2: Total costs are lower than the overall cost of £1,264m as obstetrics and uncoded/unmatched activity has been excluded. Figures have been rounded.



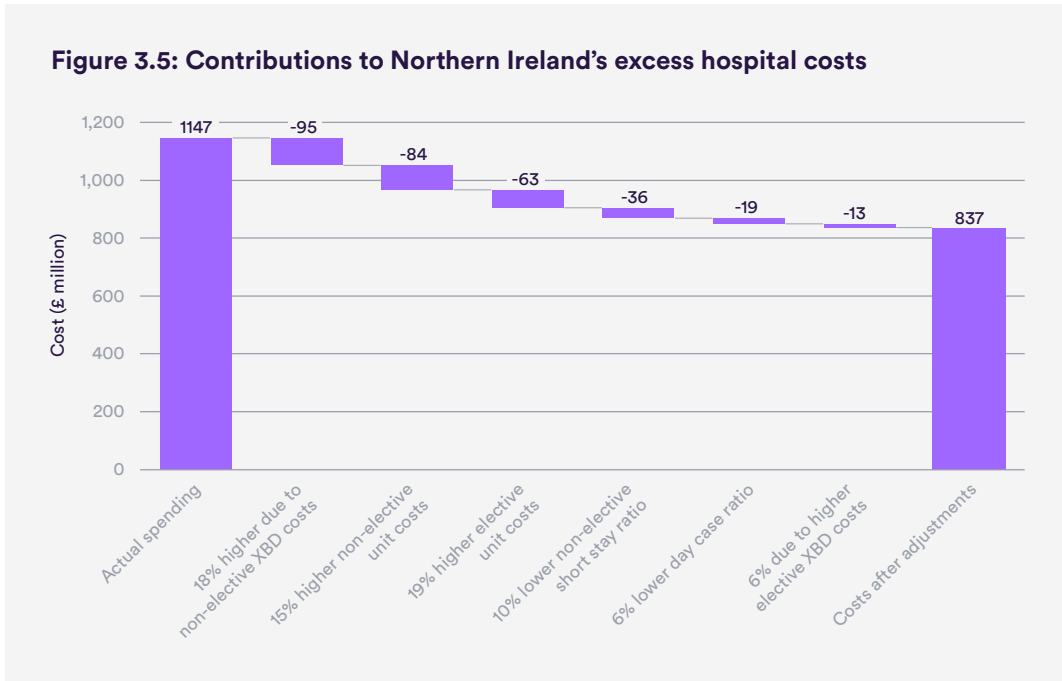
A further insight into cost differences between Northern Ireland and England is accessible by re-estimating total costs as if the Northern Ireland day case rate were the same as England’s (i.e. 85% of all electives as opposed to 80%) as procedures are generally cheaper when delivered as day cases rather than involving overnight stays.

An increase in the proportion of Northern Ireland’s elective admissions treated as day cases to match the relevant ratio (for each specific procedure) in England would reduce overall elective costs in Northern Ireland by a further £19m – in addition to the £76m noted above – and suggest an increase in excess cost of elective activity from 23% to 31%.

Similarly, while 53% of Northern Ireland’s non-elective activity is treated as a short stay episode (involving overnight stays of two days or less) in England, the equivalent proportion is 59% (based on the Northern Ireland case mix). If Northern Ireland’s non-elective short stay proportion matched England’s, then its overall non-elective costs would decrease by a further £35 million, suggesting excess costs for non-electives overall are around 41%.

Overall, these adjustments suggest excess costs across elective and non-elective activity of around £310 million – or 37% higher than the equivalent activity would cost in England.

Figure 3.5 below summarises all these further adjustments to Northern Ireland’s elective and non-elective expected costs – from a total actual expenditure of £1.147 billion to an expected total of £837 million when Northern Ireland activity is costed using English unit costs.



NB: ‘XBD’: Excess bed day

## Explaining cost differences

Why unit costs for some elements of hospital care in Northern Ireland are higher than in England will depend on a range of factors. Some may be unavoidable, for example, arising from an inability to realise lower unit costs through larger scales of production due to limits on population size. Others will include variations in the use of the independent sector by the NHS, with, for example, less complex (and hence less costly) cases treated by the independent sector as part of drives to reduce waiting lists, leaving more complex and higher cost cases with the NHS.<sup>4</sup> Cost differences may also be to some extent an artefact of the units of comparison. To what extent is a comparison between Northern Ireland and England valid given differences

4 Note that privately treated NHS patients are not included as part of the HRG cost analysis.

in size – from populations and their care needs, to the scale of health services, and so on? Differences may also simply reflect avoidable inefficiencies in the provision of care between Northern Ireland and England.

A detailed analysis to quantify the various contributions of all the factors that explain differences in costs is beyond the scope of this review. However, some indications of the impact of three explanations that have been raised as part of our work for this review – volume and cost, the use of the independent sector and the validity of comparison – are summarised below.

### **Volume and cost**

There is a substantial literature exploring the relationship between hospital or hospital department size and efficiency, as well as the relationship between the volume of patients treated by an individual consultant or surgeon, or clinical team, and the cost and quality of care (for a summary, see Giacotti and others (2017)). Such studies typically analyse the cost and quality of care inputs and outputs at a detailed level – including, for example, breakdowns of bed numbers and occupancy by treatment type. It is also necessary for such studies to control for a range of factors that may influence quality and efficiency, including hospital type (for example, teaching hospital, general hospital, or hospital with or without a 24-hour A&E), unavoidable variations in staff costs, travel times and market factors (which in Northern Ireland might relate to the proximity of a hospital to the border with the Republic of Ireland, or to an independent sector hospital).

As with an analysis exploring the reasons for cost differences, a full analysis of the relationship between cost and volume is beyond this review. However, an indication of the impact of volume on cost differences between Northern Ireland and England at a national level can be given by excluding low volume HRGs from our initial cost comparison analysis, which suggests a small reduction in the overall excess cost across elective and non-elective care of just 2 percentage points (see Appendix for more details).

A further analysis at hospital level also suggested a small reduction in Northern Ireland’s excess costs if low-volume subchapters of HRG activity were excluded from our initial cost analysis. Table 3.2 summarises the changes in excess cost estimates at different levels of low volume activity exclusions

compared to an overall excess cost of 17% (see Appendix for details). Overall, while low-volume activity was associated with slightly higher costs, the impact on the relative costs between Northern Ireland and England was not particularly large.

Further work exploring the relationship between cost and volume would help not only to quantify the impact on excess costs, but would help to suggest areas where greater consolidation may help to reduce this effect.

**Table 3.2: Relationship between scale and excess cost at provider subchapter level**

|   | Finished consultant episode volume as proportion of median activity |       |        |       |      |       |
|---|---|-------|--------|-------|------|-------|
|   | No low-volume exclusions  | >0.75 | Median | >1.25 | >1.5 | >1.75 |
| <b>Excess cost measure</b>                              | 17%   | 16%   | 15%    | 14%   | 13%  | 13%   |
| Finished consultant episodes excluded from measure      | N/A   | 3%    | 7%     | 12%   | 16%  | 18%   |
| Proportion of overall excess cost excluded from measure | N/A   | 6%    | 13%    | 25%   | 30%  | 33%   |

### The use of the independent sector

Commentators on this review have suggested that part of the explanation for Northern Ireland’s higher unit costs is the scale of its use of the independent sector as part of its tactics to reduce waiting lists and times and in particular, for less complex – and by implication less costly cases – to be treated by independent sector providers, leaving more complex and more costly cases with the NHS.

Leaving aside the impact and effectiveness this strategy has had on waiting lists and waiting times, and the fact that at least some of any case-mix difference between NHS and independent sector-treated patients should be accounted for through the HRG classification system (which distinguishes between



different levels of complexity for the same procedure),<sup>5</sup> the scale of use of the independent sector by the NHS in Northern Ireland is relatively small and of minor impact on unit cost differences. In 2019/20, for example, 9,157 NHS-funded inpatient and day cases were treated by the independent sector – around 3.9% of combined inpatient and day case for the NHS. Even if this activity cost half the NHS unit cost due to lower complexity, repatriating that activity to the Northern Ireland NHS would only reduce the headline difference (before case-mix adjustment) in the combined inpatient and day case elective unit costs between Northern Ireland and England from 18% to 15% in 2019/20.

Indeed, correspondence from the NI Department of Health in response to an earlier draft of this report suggests that the average unit cost of elective patients treated in the independent sector in 2019/20 was around £996. As 95% of these patients were day cases, the relevant cost comparison with patients treated in Northern Ireland’s NHS hospitals is around £1,092, suggesting a unit cost difference of only around 9% – too small, particularly given the low volumes involved, to make a significant difference to the analysis here (Information Analysis Directorate, 2020). Furthermore, it seems likely that if the lower complexity of NHS patients treated in independent sector hospitals were to have a residual impact on the unit costs of patients treated in NHS hospitals, this impact would have been greater in England than in Northern Ireland, where the percentage of NHS patients treated in the independent sector is substantially higher (7%) compared to Northern Ireland (4%).

### Appropriate comparators

Part of the reason for higher costs of hospital care in Northern Ireland could be due to higher levels of need for health care. There is no agreed estimate of the size of any difference in need and no estimate of how this does or should translate into differences in spending or costs between Northern Ireland

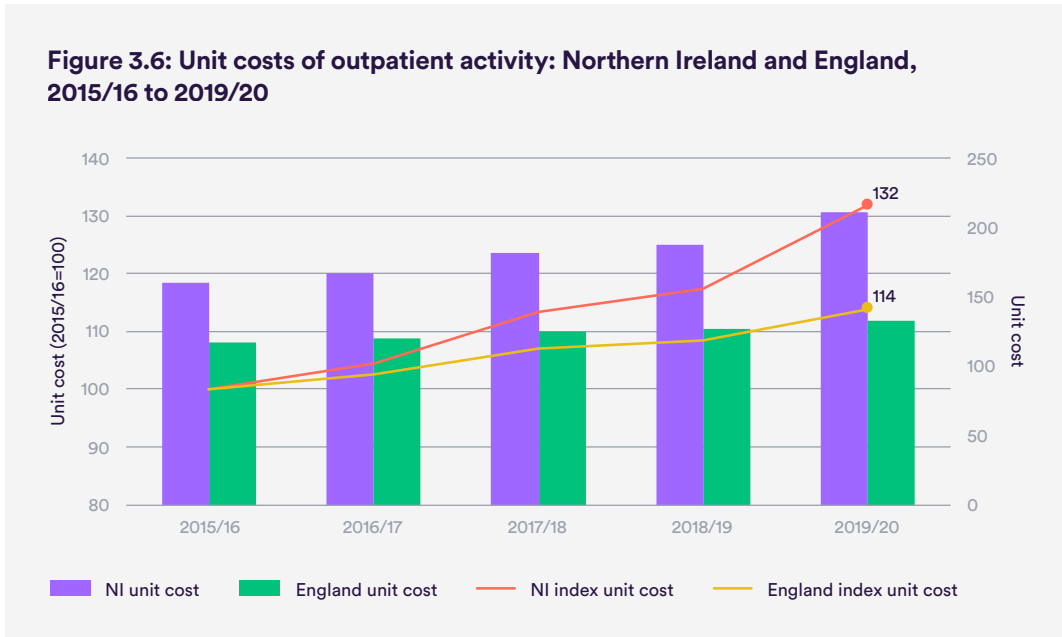
5 It is acknowledged that the Northern Ireland health system has not been subject to the same financial regime as in England, which is thought to entail that, in Northern Ireland, recording of activity units and costs has not been as well developed as in England. This may account for some of the differences in unit costs which emerge from this analysis, although it is not possible to quantify how much.

and England. Appleby (2011) summarised need estimates at the time, which have ranged from +4% to +16.5%. The review made a judgement that need was around 9% higher in Northern Ireland compared to England, and that this translated one for one into 9% higher need for spending.

On this basis, perhaps a more appropriate geographical comparison would be with an English NHS region with similarly higher health care needs compared to England as a whole. The North East NHS region has a needs-weighted capitation target for hospital services of around 6%, implying 6% higher need for health care than the average for England as a whole. Nevertheless, unit costs of hospital care in the North East are actually around 1% lower than the average for England as a whole after adjusting for labour and other unavoidable differences in supply costs. While higher needs may well drive a need or pressure for higher overall spending as a result of greater volume of demand and intensity of use of health care, it does not necessarily drive higher unit costs.

## Outpatient cost comparisons

Based on published reference costs, in 2019/20, the total cost of providing around 1.9 million first and follow-up outpatient attendances in Northern Ireland amounted to £399.6 million. The average unit cost per attendance was £211. The equivalent unit cost across all 73.3 million outpatient attendances recorded for the English NHS was £133 – around 63% less than Northern Ireland’s cost. Furthermore, since 2015/16, unit costs in Northern Ireland have risen at an annual average of 7% compared to just over 3% in England (Figure 3.6).



Source: Department of Health (NI) (2022a); NHSE (2021)

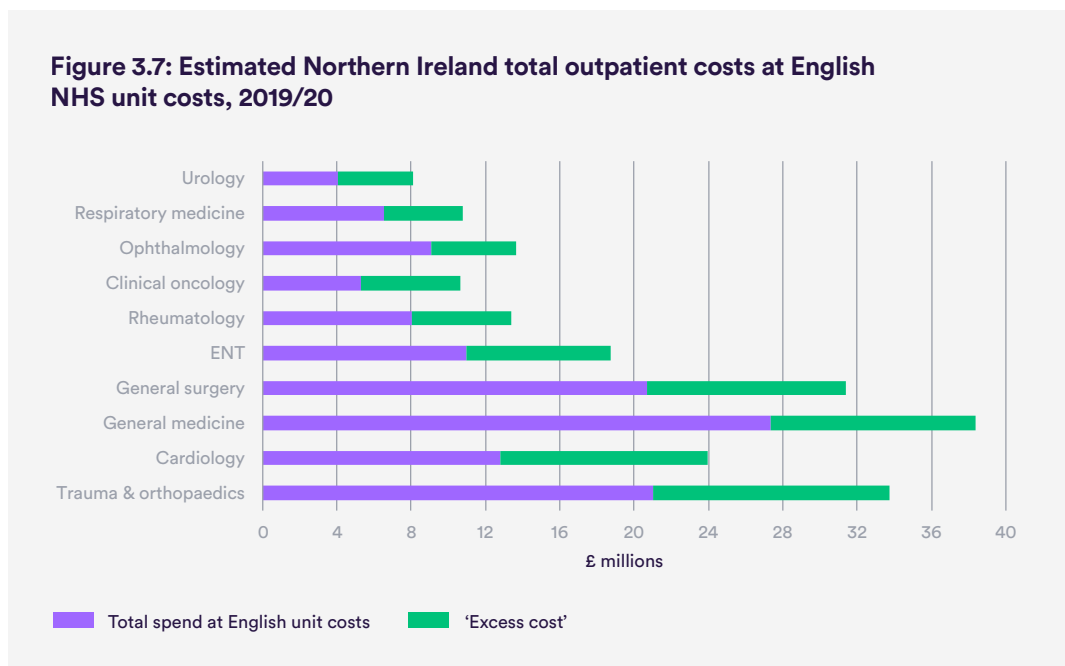
Data on the costs of outpatient activity are published at the level of specialties and are less detailed than for inpatient and other hospital activities in both Northern Ireland and England. Cost data for Northern Ireland covers 44 specialties, while for England it covers 148. Based on matching specialties in both countries,<sup>6</sup> the average unit cost of an outpatient attendance in Northern Ireland was £214 and in England, £144 – around 67% of Northern Ireland’s average unit cost.

However, as with inpatient, day case and other types of hospital activity, Northern Ireland has a different mix of cases across specialties compared to England and different patterns of clinical practice in the use of outpatients compared to other ways of delivering care (e.g. as day cases). So, as with the unit cost analysis for other types of hospital activity above, applying England’s unit costs to Northern Ireland’s activity for the matched specialties produces a different overall unit cost for Northern Ireland of £159, which, compared to the actual average unit cost for Northern Ireland’s outpatient attendances, is around 34% less.

6 Matching specialties ends up excluding four from Northern Ireland (2% of total activity and 1.4% of total cost) but 108 (37% of activity and 31% of cost) from English outpatient data.

Overall, and all other things being equal, if Northern Ireland produced the volume and case mix of outpatient activity at English unit costs, total expenditure in 2019/20 would have been around £298.3m compared to the actual spend of £399.6m.

Speciality-level total costs (based on English unit costs) for the top 10 specialties ranked on the absolute size of ‘excess’ cost are shown in Figure 3.7. ‘Excess’ costs vary from £12.7m for trauma and orthopaedics (38% of actual spending) to around £4m for urology (half of actual spending).

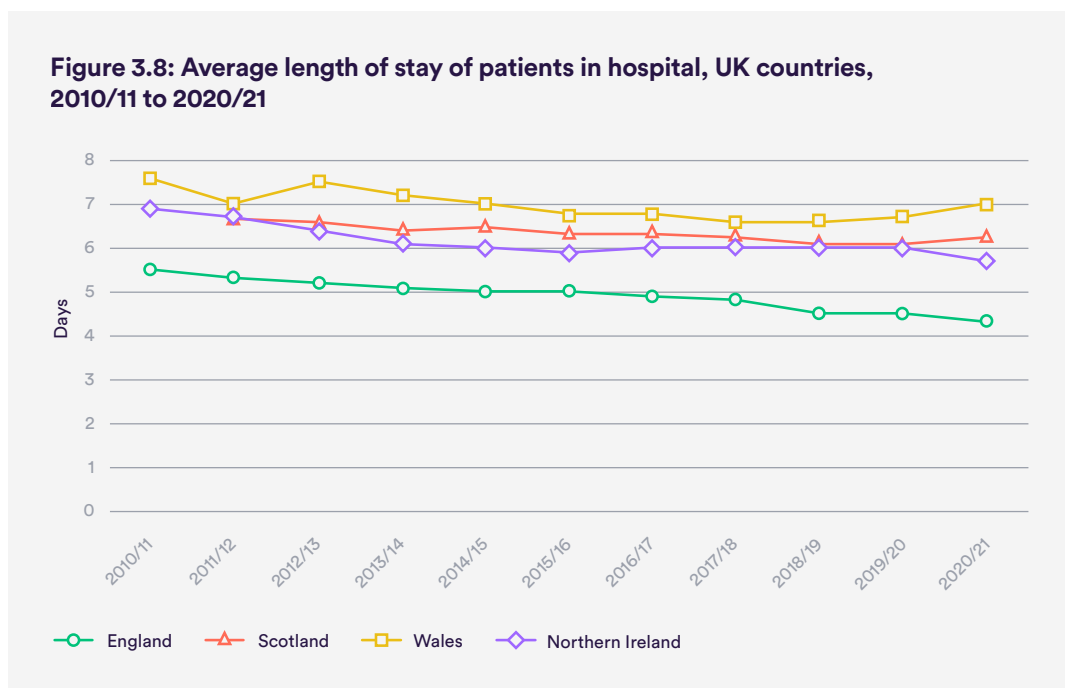


NB: ENT: Ear, nose and throat

As with the unit cost analysis of other types of hospital activity detailed above, estimates for matched outpatient costs should be seen as indicative rather than definitive. The use of a wider range of specialties in England compared to Northern Ireland suggests differences in coding and probably clinical practice, with activity allocated to many of the excluded English specialties being wrapped up in broader specialties such as general medicine, and treatments that might be delivered in outpatient settings in England being delivered in other ways in Northern Ireland. It is also not clear from reference cost publications how Northern Ireland treats the costs of procedures carried out in outpatient clinic settings (in England such costs are reported separately and have not been included in the cost comparisons above).

## Hospital bed use

Average length of stay can be used as an indicator of the success of health systems in using medical innovations and arranging safe discharges to use bed space and nurse coverage as efficiently as possible. Northern Ireland’s length of stay is considerably longer than in England. It has seen no consistent improvement over the last six years, resulting in the gap increasing from around a day to around a day and a half (Figure 3.8).



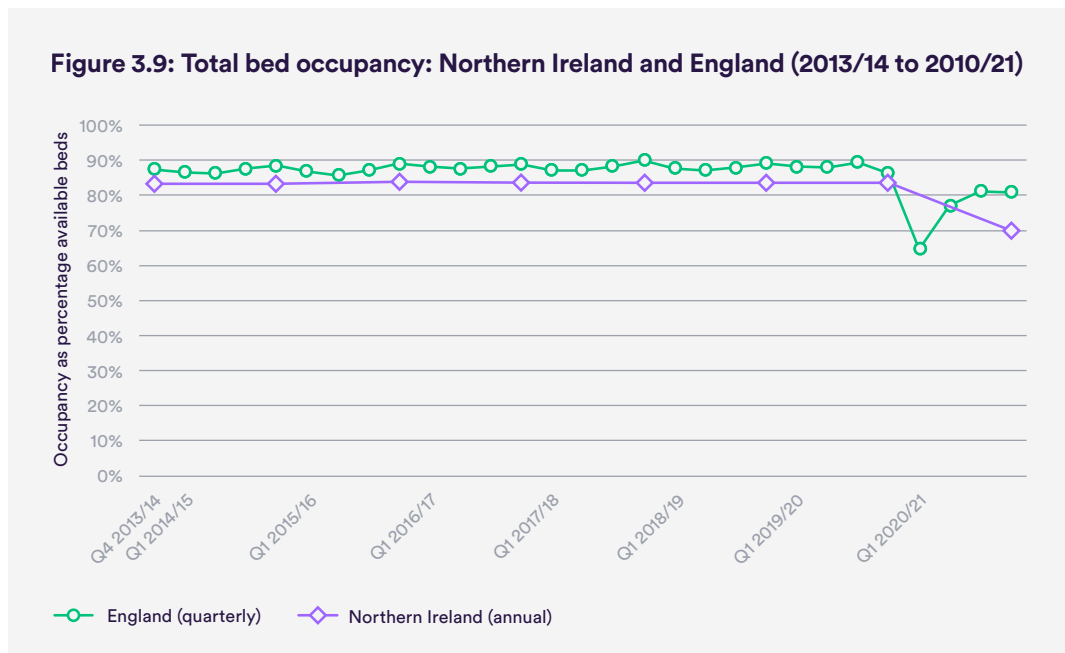
Source: Data: Department of Health (NI) (2021a). Public Health Scotland (2021). NHS Digital (2020). NHS Wales (2022)

This large discrepancy suggests considerable room for more efficient use of hospital resources and staff. Even if Northern Ireland’s mix of patients required longer stays in hospital, the lack of recent improvement implies space to catch up.

To understand the potential impact of reducing patients’ time in hospital, in terms of capacity, a 35% reduction in length of stay in Northern Ireland to match English levels (all else being equal) would allow 200,000 more admissions per year, taking the total from 597,380 in 2019/20 to over 800,000.

If a quarter of these admissions were for planned care, they could hypothetically eliminate Northern Ireland’s total waiting list for admission of 120,000 in just over two years. Northern Ireland has considerably more total beds available relative to its population size than England – 3 per 1,000 as opposed to 2.1 per 1,000 in England. At least on this crude metric, it should have a greater advantage in its capacity for activity than it does as a result of its longer stays in hospitals.

The intensity with which beds are used in hospitals reflects a combination of factors: how long patients stay in hospital, the interval between patients occupying a bed, etc. Northern Ireland has consistently had lower bed occupancy over recent years compared to England, and lower occupancy ahead of the Covid-19 pandemic (Figure 3.9). Both countries saw a marked drop in 2020/21 due to Covid-19.



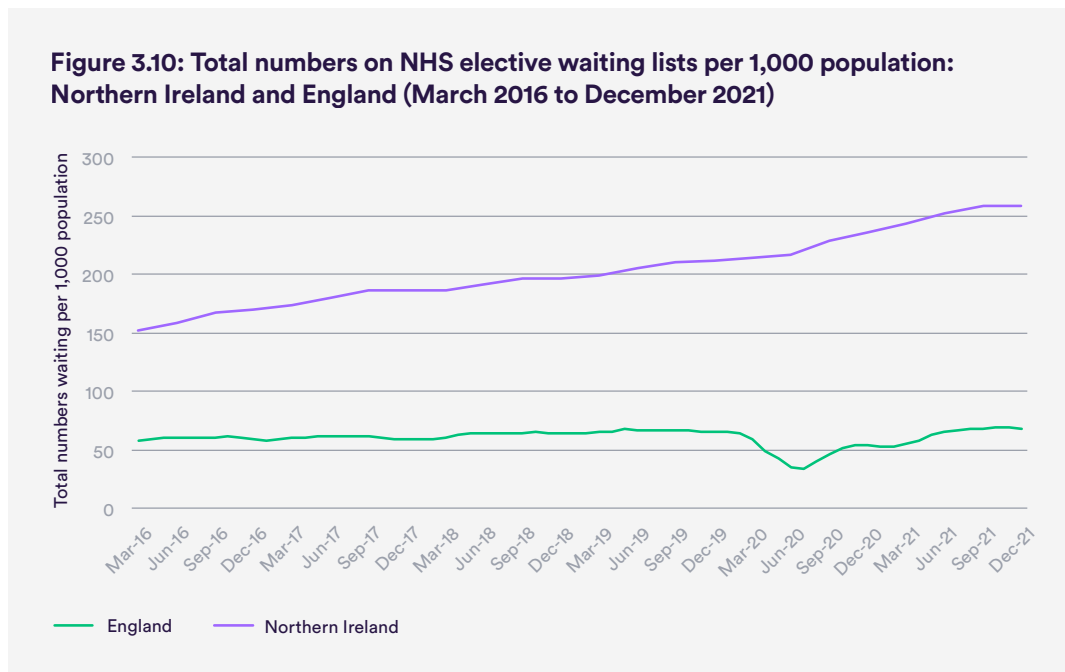
Source: Department of Health (NI) (2022b). NHS England (2022d)

This difference suggests that Northern Ireland could perhaps treat slightly more patients through using beds more intensively. However, there are potential risks to doing so. Evidence from England suggests that higher bed occupancy can be associated with higher mortality among patients (NICE, 2018).

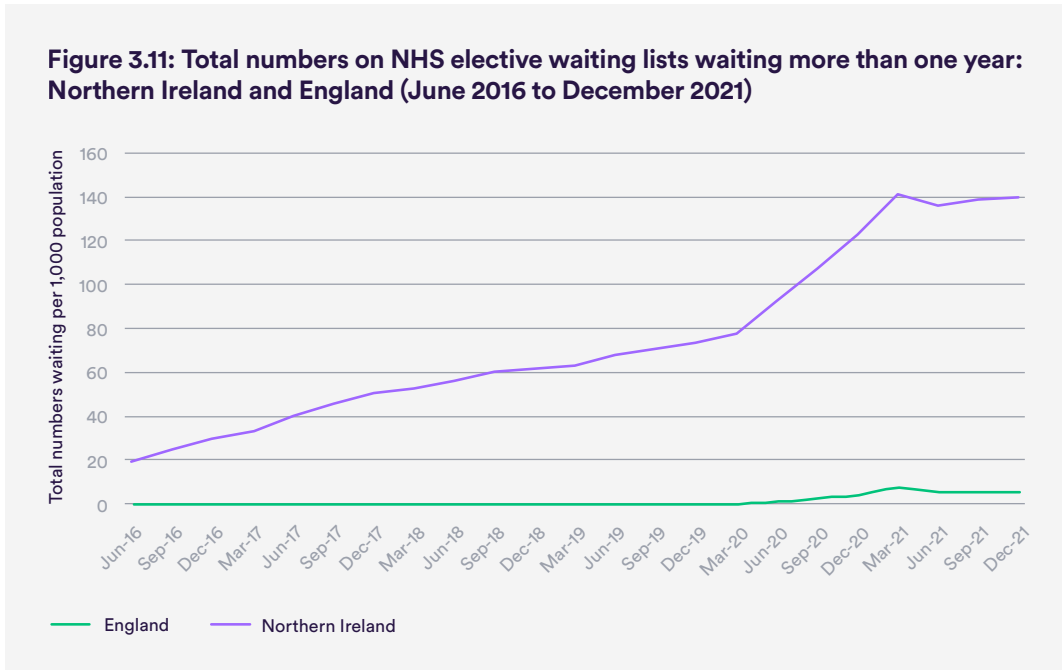
## Waiting lists and times

A key performance measure for the public is how easily and quickly they can access health care. The 2021 British Social Attitudes survey showed that, for the first time in 20 years, more people across the UK were dissatisfied than were satisfied with the way the NHS was being run. The most often-cited reason, by 65%, was that “It takes too long to get a GP or hospital appointment” (Wellings and others, 2022).

Making precise comparisons in waiting lists for planned care between England and Northern Ireland is difficult. Northern Ireland counts waits for inpatient treatment from the decision to treat, whereas England counts from the point of referral, capturing more patients. However, when comparing the two sets of headline figures it is apparent that Northern Ireland is far less successful in providing timely access to planned care. In 2016, people in Northern Ireland were nearly three times as likely to be waiting for planned care as those in England, and the situation has deteriorated since: they are now nearly four times as likely (Figure 3.10 and Figure 3.11).



Source: NHS England (2022e); Department of Health (NI) (2022c); Department of Health (NI) (2022d)

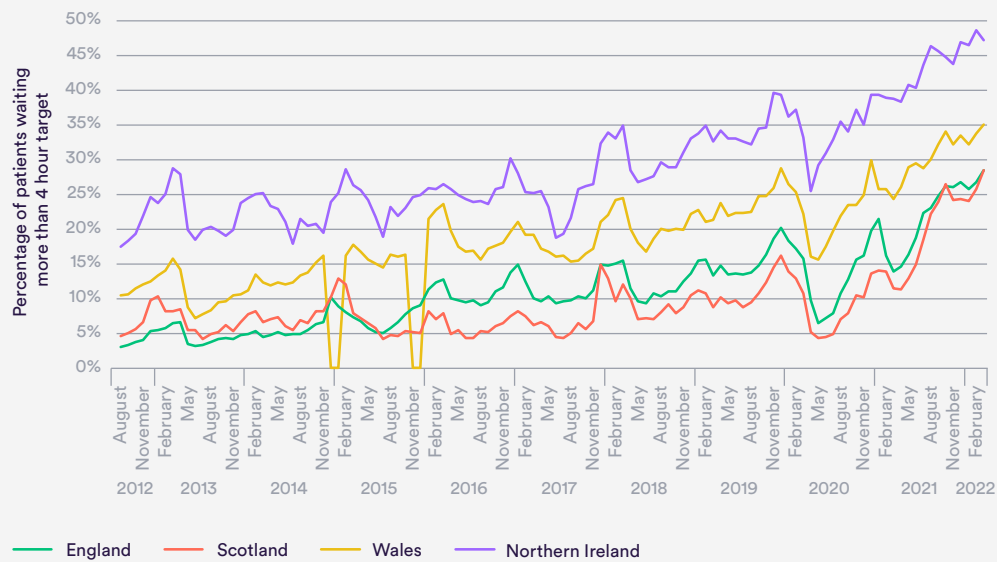


Source: Data: Source: NHS England (2022e); Department of Health (NI) (2022c); Department of Health (NI) (2022d)

Waiting times in accident and emergency departments have also been longer in Northern Ireland than in England (and indeed longer than in Wales and Scotland). As Figure 3.12 shows, the proportion of patients waiting longer than four hours in A&E has been consistently higher than all other UK countries since the start of this data in 2013. Despite a longstanding target that no more than 5% of patients should have to wait longer than four hours before treatment, discharge or admission into hospital, and while Covid-19 measures have badly affected waiting times across all nations, currently over 45% of patients wait longer than four hours in Northern Ireland’s A&E departments. That is compared to 30% in England, with NI’s share being significantly higher than the other three nations.



**Figure 3.12: Proportion of patients waiting more than four hours in emergency departments: UK countries (2012–22)**



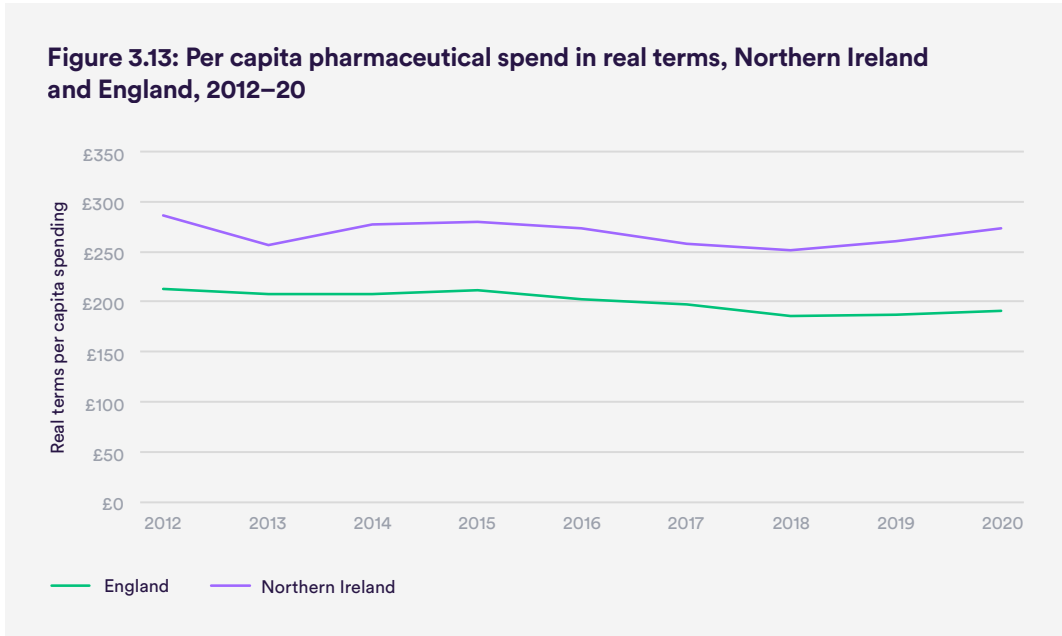
Sources: Data: England: NHS England (2022b); Wales: Stats Wales (2022b); Northern Ireland: Department of Health (2022e); Scotland: Public Health Scotland (2022)

While, intuitively, there is likely to be a positive relationship between overall funding and waiting lists and times – rapidly increasing funding in England earlier this century was associated with reductions in lists and times, for example – it is clear that higher spending does not necessarily guarantee good performance on these measures.

## Medicines costs and generic prescribing

Patterns of prescribing differ significantly between Northern Ireland and England. Northern Ireland appears to prescribe significantly more items relative to population size, although precise comparison is impossible as items can cover very different quantities of medicine (Figure 3.13). Among the largest categories, Northern Ireland prescribes more nervous system drugs (including for mental health) relative to cardiovascular drugs. Its total prescribing spend per person is considerably higher than England’s. Both countries have not increased spending per person meaningfully over the

past decade. Northern Ireland’s average cost per prescription is considerably higher than England’s, at £9.49 compared to £7.79.



Source: Department of Health (NI) (2022f). DHSC (2022)

NB: Figures reflect “prescribing costs” plus “pharmaceutical services” for England

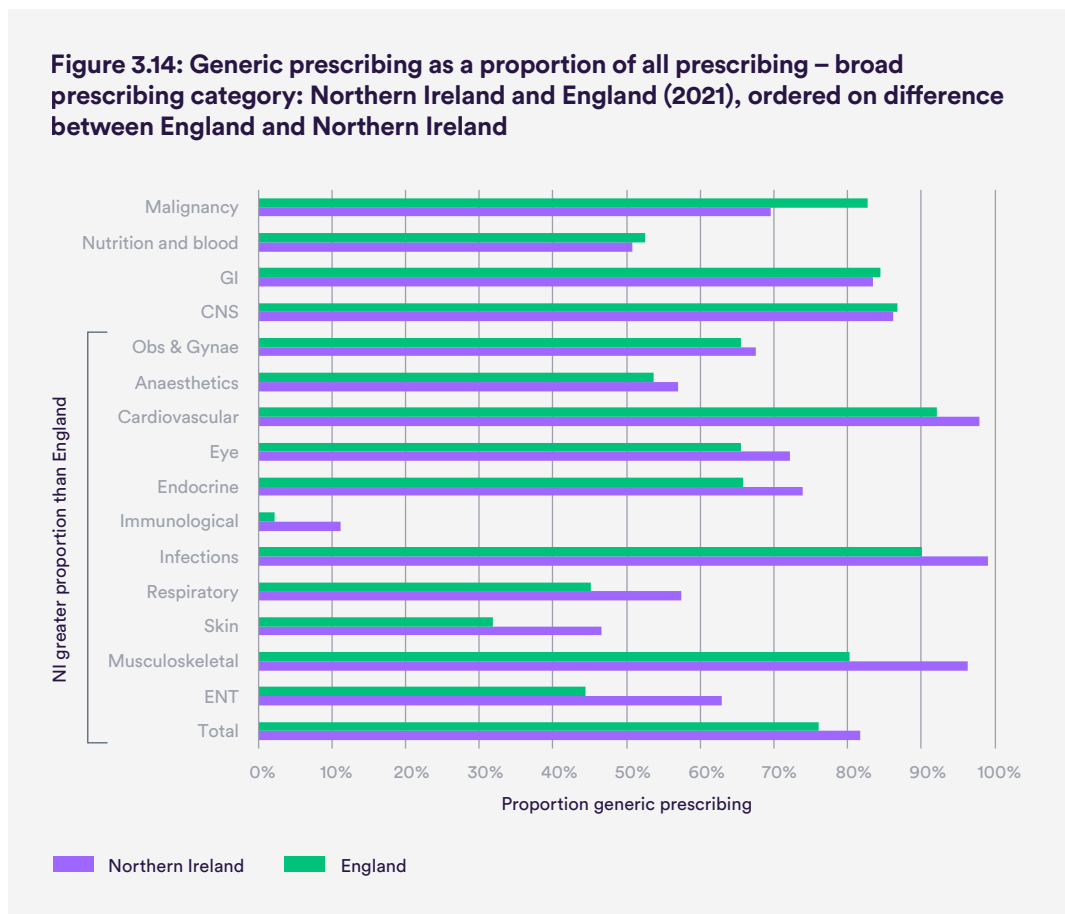
It is extremely difficult to compare the total amount of medicines prescribed in any meaningful way. Each medicine’s quantity is counted differently (for example as milligrams of liquid as opposed to individual tablets) and prescriptions may be for different amounts.

Indicators of price and efficiency suggest Northern Ireland’s higher spend on drugs is driven by prescribing more drugs of different types, not by a higher unit cost in prescribing the same products.

Comparing products dispensed in Northern Ireland and England exactly like for like, the net ingredient cost – the gross rate at which medicines are reimbursed – is standardised across Northern Ireland and England. Comparisons of the ‘actual cost’, taking into consideration discounts and adjustments, show Northern Ireland’s costs are slightly lower per item prescribed. A significant number of extreme outliers, driven by different definitions of ‘items’ across countries – for example, liquids counted in millilitres rather than litres – make precise comparison very difficult.

Apparently lower costs in Northern Ireland are likely due to its non-inclusion of the costs of containers for medicines: it is difficult to see any evidence of meaningful differences.

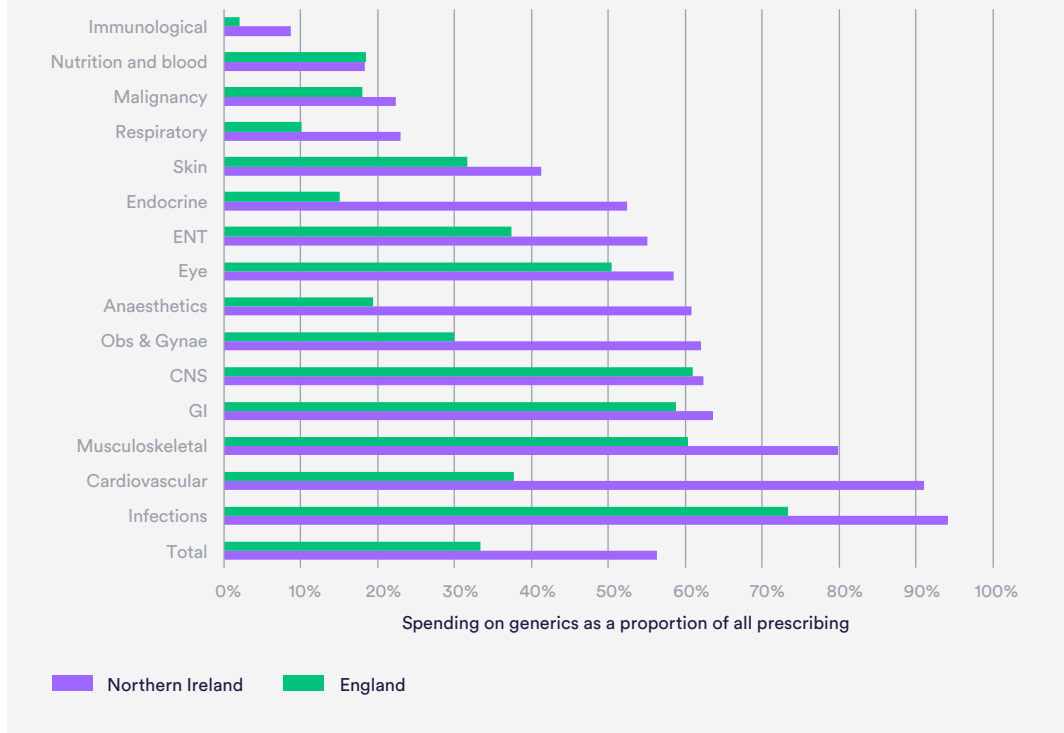
Because generic medicines offer chemically identical products at a lower cost than their branded equivalents, the proportion of medicines which are generic is an indicator of efficiency. Increasing generic prescription rates has been a focus of efforts to improve value in both countries. In November 2021, the latest month with full data, comparison of England and Northern Ireland’s prescription patterns showed that a slightly greater proportion of medicines prescribed in Northern Ireland were generic rather than branded (Figure 3.14). A significantly higher proportion of Northern Ireland’s spending on medicines was on generic medicines (Figure 3.15).



Source: Data: Health and Social Care Board (NI) (2022) NHS Business Services Authority (2022)

NB: ENT: Ear, Nose and Throat; CNS: Central Nervous System; GI: Gastrointestinal

**Figure 3.15: Generic prescribing spending as a proportion of prescribing cost by broad prescribing category: Northern Ireland and England (2020), ordered on Northern Ireland spending**



Source: Data: Health and Social Care Board (NI) (2022) NHS Business Services Authority (2022)

NB: ENT: Ear, Nose and Throat; CNS: Central Nervous System; GI: Gastrointestinal

These findings do not suggest that Northern Ireland has straightforward efficiencies to make by switching medicines further towards generics, relative to other countries. The UK is in aggregate already a relatively high user of generic medicines.

Higher Northern Ireland costs are instead driven by some combination of the mix and quantity of medicines prescribed: comparing volumes is very difficult due to the different measures used across liquid and solid drugs of different types. The gap in costs is not explained by the difference between Northern Ireland and England in terms of the disease areas for which medicines are prescribed, but by higher costs per prescription within each disease area. The total discrepancy is quite large: the average Northern Irish prescription in November 2021 cost £9.49 in Northern Ireland compared to £7.79 in England.

The gap in the average cost of generic prescriptions is even larger: £6.54 in Northern Ireland, relative to £3.42 in England. This divergence, driven by the mix of items or the amount prescribed per prescription, is why even though cheaper generics account for the majority of cost in Northern Ireland and only a minority in England, average cost is still higher.

A 2014 NI Audit Office report looking at more specific classes of medicines suggested that Northern Ireland could have saved money if its GPs and hospitals prescribed different, cheaper but equally effective drugs in smaller prescriptions. They estimated significant savings relative to other UK countries (NI Audit Office, 2014). However, differences in the volume and mix of prescriptions may also be due to genuinely different needs in Northern Ireland, which has a younger, more deprived population affected by the legacy of the Troubles. They could in theory even represent superior quality care, with a more clinically appropriate mix of drugs than in England.

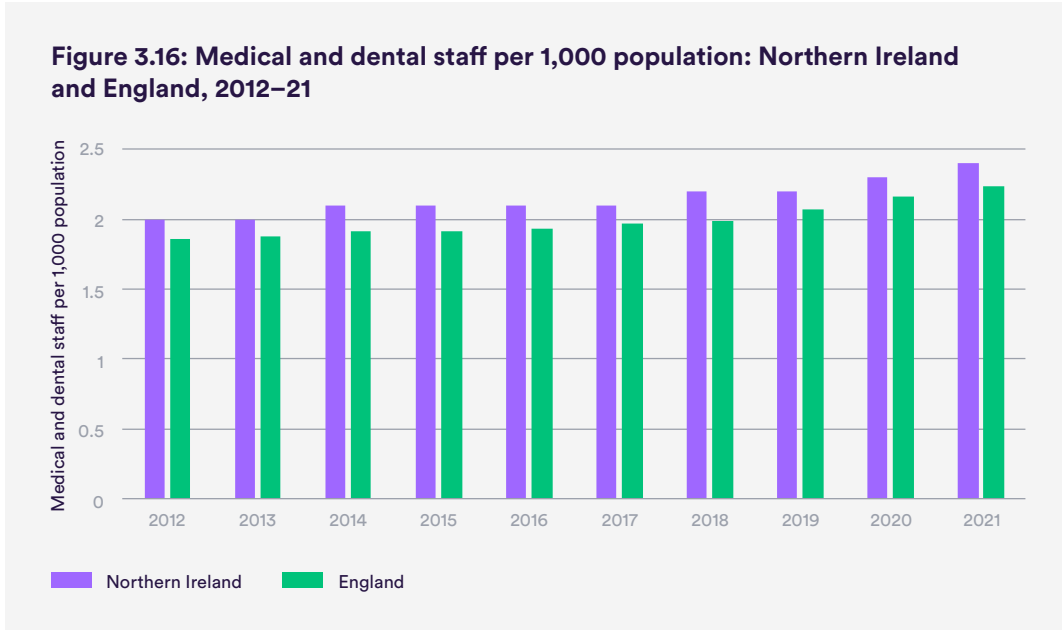
Another deep review by a team qualified to determine which prescribing options are most effective and efficient could help to identify whether Northern Ireland could reduce its higher spend without harming patient care. If this were possible, the gains would be significant: Northern Ireland would have spent £165m less than England in 2019/20 if its prescribing cost per head was the same as England – perhaps less still if it retained its high rate of generic prescribing.

## Staffing resources

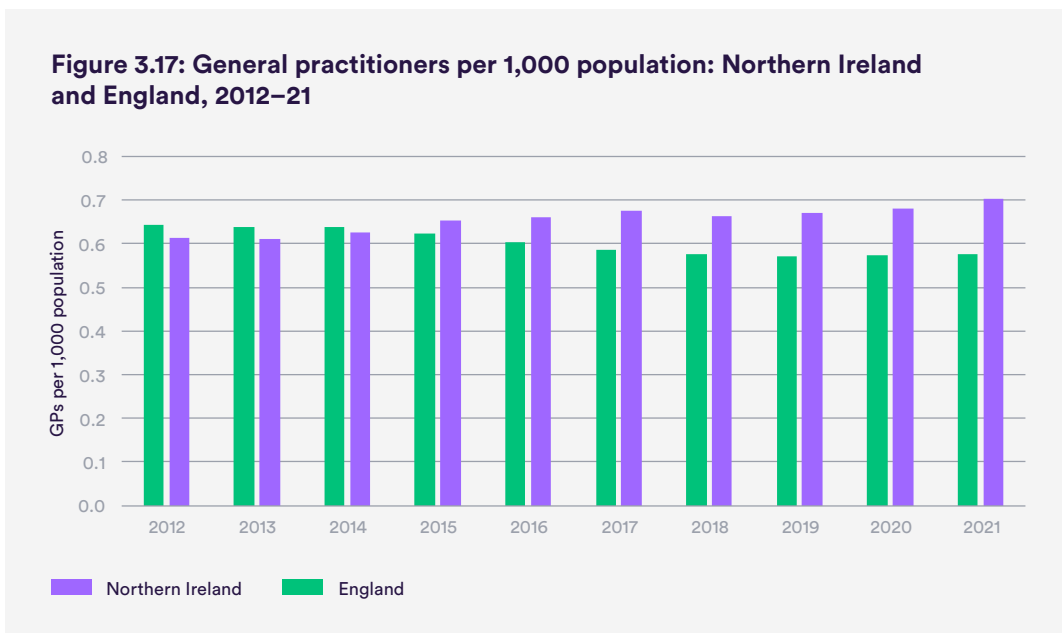
Staffing is the main input for any health service, and illustrates the real resources available when considering questions of capacity and efficiency.

Comparing staff across Northern Ireland's health system and those of the other UK countries is difficult. The Department of Health NI informed us that they have no record of how many staff work in hospital settings, as opposed to other types of health care or social care. This shortcoming should be addressed. Staff datasets for Scotland and England routinely collect the setting or the specialty in which staff work at a more detailed level than this.

For medical and dental staff, who are more comparable as it can be assumed that they work within health care (Figure 3.16), Northern Ireland has somewhat more than England generally, and over 20% more in the specific case of GPs (Figure 3.17).



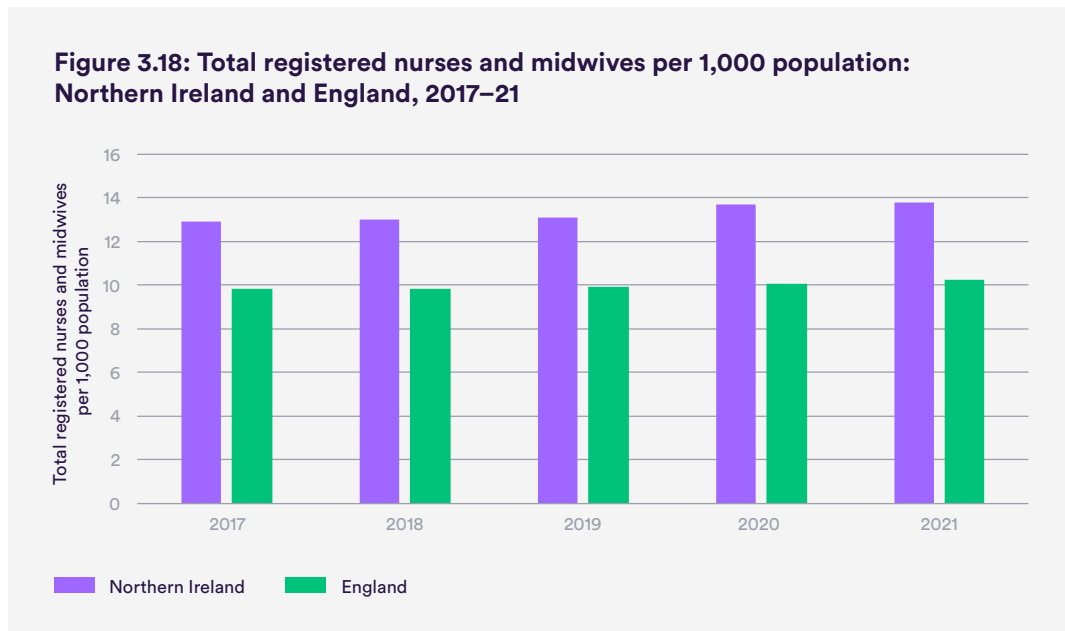
Source: Data: Department of Health (NI) (2021); England: NHS Digital (2022b)



Source: Data: HSC Business Services Organisation (2022b). NHS Digital (2022c)

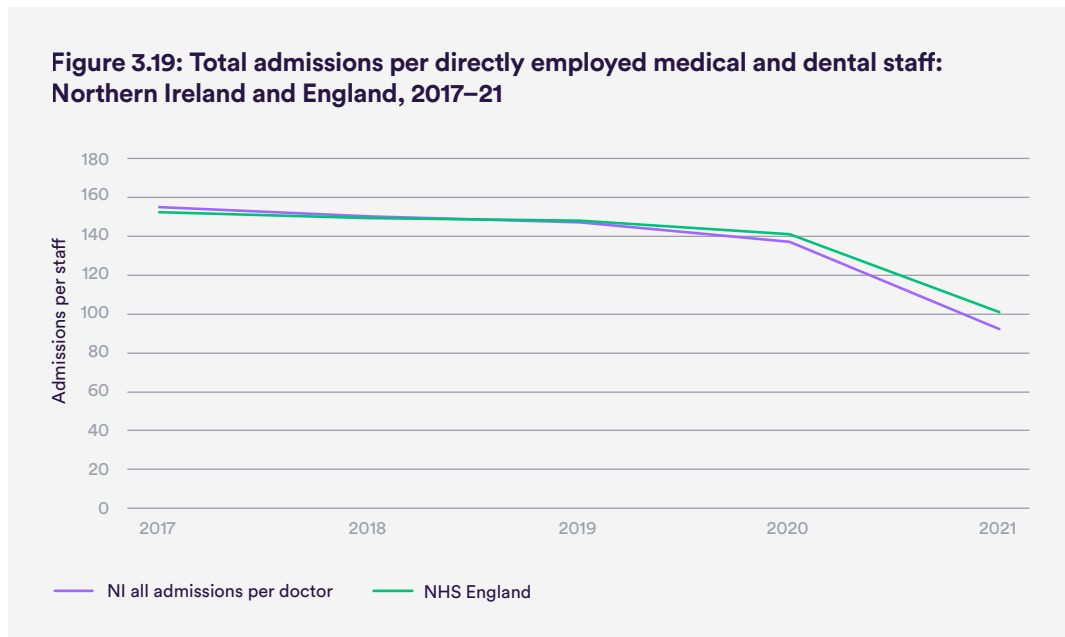
Both these gaps have grown recently: in general practice, Northern Ireland has gone from a lower rate per head than England until 2014, to a considerably higher rate today. The Department of Health NI informed us that they saw a less favourable trend in ‘full time equivalent’ GPs, with increased part-time working meaning an 8% decrease on this measure since 2014/15. No publicly available comparable data exists. Northern Ireland has pursued an intentional strategy of increasing numbers, increasing training places from 65 in 2015 to 121 in 2022/23.

It is not possible to compare nursing levels in Northern Ireland with those in England as the Department of Health NI is unable to differentiate between nurses working in health care and those working in social care. Some indication of the difference in nurse staffing levels is possible by comparing the total numbers of nurses and midwives registered in Northern Ireland with the equivalent register in England, regardless of the setting in which they work (which will include the independent sector). This shows that Northern Ireland has around 35% more qualified nurses and midwives relative to the size of its population (Figure 3.18). Nurse staffing is a key resource in determining overall capacity.



Source: Nursing and Midwifery Council (2022)

These limited findings suggest that the Northern Ireland health service is able to use its higher funding to secure more staff. However, the larger workforce does not appear to result in better performance. Northern Ireland does have a similar number of admissions per member of medical staff than England, measured across all programmes of care (Figure 3.19).



Source: Data: NHS Digital (2022) Hospital Admitted Patient Care Activity Department of Health (NI) (2021b, 2022g)

However, because Northern Ireland has a far greater advantage in numbers of nurses, it is almost certainly the case that the number of admissions per member of nursing staff is significantly lower. But the lack of staffing records by setting make providing a precise figure impossible.

## Conclusions

Waiting times in Northern Ireland are far worse across the board than in England, with a high proportion in particular of people waiting over a year for treatment. Yet the budget is considerably higher per person, and there appear to be more clinically trained staff per person. This discrepancy suggests some mixture of more patients requiring treatment for more serious problems, or lower efficiency.



There is already wider evidence that higher need does exist (cf Appleby, 2011), although precision is very difficult. We aimed to contribute further by assessing relative productivity at a high level, in order to see whether this is likely to play a role.

Across both admitted patient care and outpatients, our analysis has identified in the region of £410m higher costs in Northern Ireland compared to carrying out the same care in England in 2019/20. As we have noted, there are important caveats to this analysis: not all activity can be directly compared and there is very little information on the third of higher costs in admitted patient care driven by excess bed days. Northern Ireland also has a much smaller population than England and some of the additional costs it experiences may be attributable to unavoidably higher costs of serving a more sparsely distributed population.

However, these factors are unlikely to explain all of the cost difference observed between the two countries and, further, do not explain why Northern Ireland has seen much higher unit cost growth over recent years than England. We estimate that this unit cost growth of 28% between 2015/16 and 2019/20, compared to 7–8% in England,<sup>7</sup> contributed around a third of the overall higher costs seen for admitted patient care in Northern Ireland in 2019/20, with the remaining higher costs attributable to Northern Ireland starting 2015/16 with an already higher unit cost base.

This higher unit cost growth seen in Northern Ireland is important because while the most commonly cited mitigating factors for higher costs in Northern Ireland – data gaps, volume and scale and sharper incentives for more granular cost and activity coding in England – might plausibly be linked to an overall higher unit cost base, it is harder to see why these factors would result in a cost growth rate four times that of England over a period of four years during which the factors themselves are unlikely to have substantially changed.

<sup>7</sup> The headline increase in admitted patient care unit costs in England between 2015/16 and 2019/20 was 8.1%. However, when applied to Northern Ireland’s case mix (which includes marginally lower complexity procedures), the increase was 7.4%.

Other measures are broadly consistent with a less intensive or productive use of the acute sector in Northern Ireland. Length of stay is longer and has not fallen in recent years, potentially indicating less progress in clinical or organisational changes that allow patients to pass through hospitals more quickly, and reflecting the higher rate of excess bed days. While the ratio of admissions to doctors in Northern Ireland is broadly similar to England, it is probable that the ratio of admissions to nurses is lower. A full account of this will require better data on how many nurses work in hospital settings in Northern Ireland.

Medicines data, meanwhile, does not show an obvious comparable gap in efficiency. Although it spends significantly more per person, Northern Ireland prescribes a slightly higher proportion of generic medicines relative to England. Northern Ireland's generic proportion is higher in the majority of individual disease areas as well, implying a genuine success in switching to lower cost equivalent products. It is possible that a deeper look at specific medicines might show opportunities for efficiency in the type and volume of medicines prescribed.

## 4 Conclusions

Like many developed countries, Northern Ireland is facing difficult questions about funding and sustainability in health and social care provision. Spending has risen relentlessly over the past 20 years, and is now the highest per person in the UK. Yet pressure on the system remains intense: more than 200,000 people have been waiting over a year for care, far worse than in the other three countries and implying a system struggling to keep up with people's needs.

Looking into the future emphasises how challenging it will be to find more funding. Northern Ireland has higher needs than England (cf Appleby, 2005, 2011) and will probably always need to spend more per person. A growing and ageing population alone will need small increases to keep up. Precise projections are a fool's errand, but we can be almost certain that real pressures will demand much more. Maintaining the growth rates of the past two decades would result in over a third of Northern Ireland's GDP, and 70% of its block grant funding, being accounted for by this single sector in 2070. None of this accounts for the money needed to address the shortfalls in people's experience of care today.

Comparing the efficiency of Northern Ireland's hospital sector to that of England shows striking findings which may offer some hope that there may be a path to greater efficiency, albeit a difficult and far from straightforward one. Costs for hospital treatment in Northern Ireland appear to be systematically higher, and they have risen more than in England over the last few years.

We have identified higher costs in admitted patient and outpatient care in hospitals of around £410m a year, as well as substantially higher staffing ratios. This implies that there may be scope for Northern Ireland to deliver more care with the staff, buildings and equipment that its health system currently has and that at least some of the higher costs seen in comparison to England could be absorbed through productivity savings over future years. This impression is reinforced by the fact that patients in Northern Ireland spend on average more than a third longer in hospital than their

English counterparts, implying patients are treated and are helped to recover considerably more slowly. Northern Ireland probably has considerably more nurses working in health care relative to the level of admissions, though it is difficult to be certain due to poor data collection.

Other comparisons also support a system which uses resources less intensively – though more intensity is not always the better outcome. Northern Ireland typically has a lower proportion of hospital beds full than England, but England’s overflowing wards have been a cause for concern over safety. Meanwhile, although Northern Ireland spends more on prescribed medicines, a greater proportion are generic, suggesting greater efficiency – a reminder that there is no intrinsic difference in the capability of health systems to be productive.

Ascertaining the true extent of lower efficiency and addressing it is a vital task which will require more research and a commitment to changes that may be difficult for staff and for the public. We found some evidence that the rate of extra bed days spent beyond what should be necessary to recover from a procedure is highest in sites performing the fewest procedures. The tendency to carry on services at many small sites in Northern Ireland has been highlighted by successive reviews, and may be a factor: political will is needed to address this. There will be a careful balancing act needed for any effort to duplicate the intense squeeze on unit costs seen in England during recent years, without also duplicating the widespread deficits and lack of investment it has caused. It is also important to note that there are few ‘quick wins’ available in health service cost efficiencies, with modelling by NHS England suggesting that between 2008/9 and 2017/18, NHS providers in England became on average 0.9% more efficient a year – a pace that has slowed below this average rate in recent years (NHS England, 2022c).

If Northern Ireland’s health and care system can begin to catch up in efficiency, length of stay, and staff output, this holds out a hopeful prospect for a system that today is struggling. Over the coming years and decades, it may be able to deliver more than it does today with less need for additional spending than other countries.

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# Appendix

## Exploring the reasons for cost differences between Northern Ireland and England

### Volume and cost: National level

We explored the impact of low volume procedures on estimates of excess costs in elective and non-elective care, in two ways. First, at a national level, we excluded from the original analysis low volume HRGs – that is, those with fewer than half the Northern Ireland average number of finished consultant episodes (FCEs) per HRG (the equivalent of 119 FCEs). This left 91% of total combined elective and non-elective activity, with a cost (excluding excess bed days – which cannot be explored at this level) of £790m.

Excluding these low volume HRGs resulted in a 2 percentage point reduction in the nominal excess cost measure – from 24% before accounting for excess bed days, to 22%, with a slightly larger impact on reducing the measure in elective care compared to non-elective care. The measure of nominal excess cost in the excluded low volume HRGs was 5 percentage points higher than for all HRGs overall.

As a further test on the sensitivity of the data to volumes at a national level, we compared the unit costs of what might be considered high volume HRGs – those with more than twice the Northern Ireland average number of FCEs per HRG (equivalent of 500+ FCEs). These amounted to 239 HRGs.

These HRGs accounted for 397,826 FCEs (72% of the total, excluding maternity) and £540m of cost (52% of the total). Elective inpatient costs again showed the most sensitivity to volume, with the nominal excess unit cost measure above England reducing by 6 percentage points (to 21%) but overall excess costs (22%) were similar to those found when only the lowest volume HRGs were excluded.

## Volume and cost: Provider level

We also explored the relationship between cost and scale at a provider level, as this is the level at which any economic benefits of scale would most likely be felt.

By matching each of Northern Ireland's 19 hospitals' 2019/20 activity and actual costs at an individual HRG level to the average unit cost for the same HRG reported in England for the same year, we calculated an actual and expected cost for each provider. We then aggregated each Northern Ireland provider's individual HRGs into the 70 'subchapters' used to group together individual procedures or care activities with those in the same speciality to which they are similar. This allowed us to exclude from the comparison with England's costs, groups of procedures or care types which providers in Northern Ireland undertook in only small volumes. It should be noted that this analysis had to exclude the role of excess bed days, and did not make adjustments to take account of Northern Ireland's lower day case and short stay ratios.<sup>8</sup>

The results of this summary analysis are presented in Table A1.

Across all subchapters with no exclusions, the cost of Northern Ireland's hospital activity was 17% higher than the same activity (matched at HRG level) in England. However, excluding provider-level subchapters where FCEs fell below selected cut-off points relative to the Northern Ireland provider-level median for that same subchapter slightly reduced the relative size of Northern Ireland's costs.

Excluding subchapters with volumes equal to or less than 75% of the median subchapter FCE volume resulted in 3% of total FCEs being excluded from the cost/excess cost analysis, and reduced overall excess costs measure from 17% to 16%.

<sup>8</sup> Adjustments for day case and short stay ratios were not appropriate at this level of analysis, where patient volumes could be quite small. Not adjusting Northern Ireland activity for the cost saving opportunity entailed by England's higher day case and short stay rate would have the result of reducing the nominal excess cost measure in this analysis, as it essentially assumes that day case and short stay rate observed at each individual hospital for each subchapter in Northern Ireland is already optimal.

**Table A1: Relationship between scale and excess cost at provider subchapter level**

|  | Finished consultant episode volume as proportion of median activity |        |          |        |       |        |
|--|---|--------|----------|--------|-------|--------|
|  | All finished consultant episodes                                    | <=0.75 | <=Median | <=1.25 | <=1.5 | <=1.75 |
| Excess cost measure                                | 17%   | 16%    | 15%      | 14%    | 13%   | 13%    |
| Finished consultant episodes excluded from measure | N/A   | 3%     | 7%       | 12%    | 16%   | 18%    |
| Excess cost excluded from measure                  | N/A   | 6%     | 13%      | 25%    | 30%   | 33%    |

Increasing the cut-off point defining low volume reduced excess costs marginally up to 13% at a cut-off of 1.75 times the median volume where the association flattened off.

It is important to note that due to data availability (particularly on excess bed days), this analysis has only been able to explore in summary form just under half of the nominal excess costs seen in Northern Ireland’s elective and non-elective hospital costs.

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