Regional health organisations

An evidence review

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Abbreviations

Table 1 List of abbreviations

Abbreviation	Explanation
AB	Alberta
AC	autonomous communities
AHR	avoidable hospitalisation rate
ASL	Aziende Sanitarie Locali
BC	British Columbia
CEO	chief executive officer
CHO	Community healthcare organisation
CIHI	Canadian Institute for Health Information
DHB	district health board
DoH	Department of Health
GDP	gross domestic product
GP	general practitioner
HCCSJ	Health Care Corporation St. John's
HG	hospital group
HSE	Health Service Executive
HR	human resources
INSALUD	Instituto Nacional de la Salud
IT	information technology
LCI95%	lower 95% confidence interval
LOS	length of stay
MeSH	medical subject headings
MoH	Ministry of Health
N/A	not applicable
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
OECD	Organisation for Economic Co-operation and Development
PEI	Prince Edward Island
RHA(s)	regional health authority(ies)
RHO(s)	regional health organisation(s)
RIW	resource intensity weight
SD	standard deviation
SK	Saskatchewan
UCI95%	upper 95% confidence interval

Highlights

In June 2016 the Irish government established the Houses of the Oireachtas Committee on the Future of Healthcare with the goal of achieving cross-party, political agreement on the future direction of the health service, and devising a ten-year plan for reform. The output from this committee was the Sláintecare Report (2017) which is a 10-year strategic plan to transform how healthcare is delivered in Ireland. Major changes in terms of system overhaul, infrastructure development, improved access and increased accountability are mandated.

A core component of this health system reform is the regionalisation of the Irish health care system. In Ireland, as in other countries which have implemented healthcare regionalisation, this will entail the shifting of responsibility for healthcare from a series of local organisations to a regional agency, and a general devolution of power from a central governing agency to regional bodies.

The aim of this evidence review was to investigate the impact of introducing a regionalised healthcare system and to determine the key barriers to and facilitators of the successful implementation of regionalisation. This review will support the Department of Health as they define a new organisational and operational structure for a reconfigured health service.

Research questions

- What are the documented positive or negative **impacts** or outcomes of adopting a regionalised healthcare system?
- What are the documented **barriers to and facilitators** of effective regionalised healthcare systems?

Types of regionalised health system

The need for introducing a regionalised healthcare system comes from differences in preferences or needs, as well as geography, in different regions within a country.

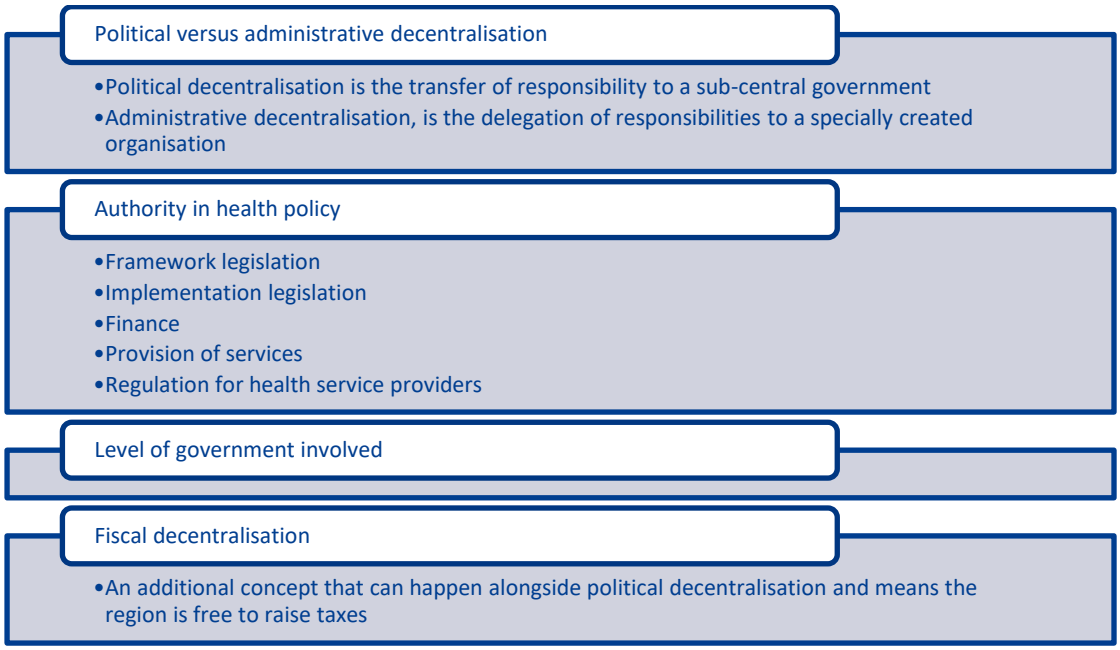
It is difficult to find a consensus on the exact properties a regionalised or decentralised healthcare system should have. However, two key questions arise in the literature: What powers are regionalised or decentralised and to whom are these powers devolved? These questions give rise to four distinct properties to be considered:

1. The first distinction made is between political and administrative decentralisation. Political decentralisation is the transfer of responsibility to sub-central government and administrative decentralisation, is the delegation of responsibilities to a specially created organisation. We have looked at both kinds in our review. Administrative decentralisation is commonly referred to as regionalisation, particularly in Canada and we will use that term to describe the process in general.
2. The second property is the authority the RHOs have in health. Authority can be subdivided into five competencies, for example finance and provision of services.
3. A third distinction refers to the level of government involved in the transfer of competencies, for example to regional governments or to local authorities.

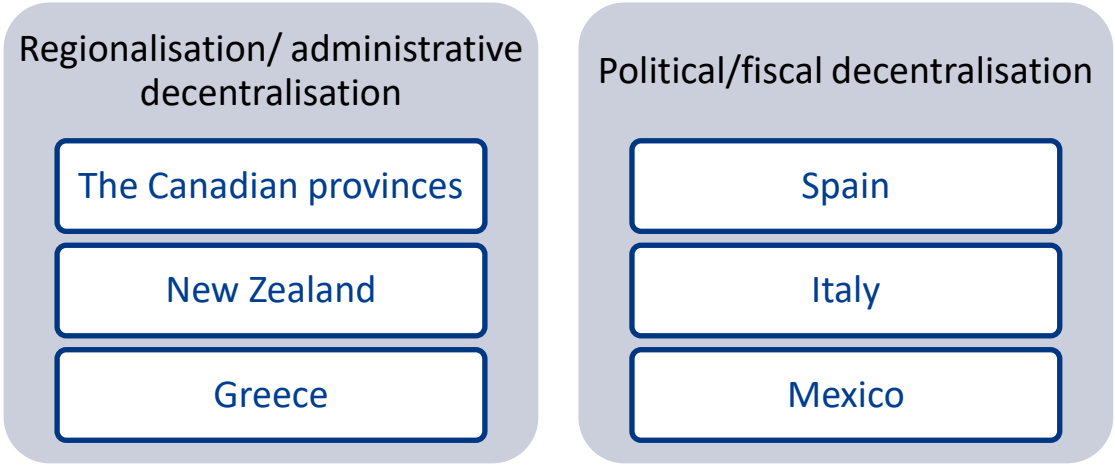
Regional health organisations

For the purpose of this review, a regional health organisation (RHO) refers to an organisation which is responsible for the provision of acute, primary and social/ community care to a geographically defined population. The health system in that particular country or province/state must be organised on a regional basis and the regional health organisation must have a population-based approach to service provision. Major health sector reforms designed to address the problems with the original regionalisation structure were also included.

4. Fiscal decentralisation is additional concept that can happen alongside political decentralisation and means the region is free to raise taxes.



Country overview



Methods

We conducted two systematic reviews using standard and well recognised methods; the first to examine the impact of the introduction of regionalisation and the second to assess the barriers and facilitators to the effective introduction of regionalisation. The reviews focused on OECD countries, with regionalised healthcare systems, and within these systems responsibility for acute, primary and social/community care had to be regionalised. The systematic reviews followed standard methods. We combined the results of both reviews in a logic model. The logic model presents chains of events, which ultimately lead to the outcomes (described in the systematic review of impact). Facilitators (described in the systematic review of barriers and facilitators) are indicated where they ease or improve such a chain of events. The logic model also outlines a template for the monitoring and evaluation of a regionalisation process.

Impact of adopting a regionalised healthcare system

We extracted data on the impact of regionalisation in the following outcome categories: utilisation of resources, care outcomes, efficiency, equity, patient flow, cost and cost-effectiveness, staff work experience/organisational culture, perceived quality of care received and supplied, and public trust. We summarised the main findings, in context, in this highlights section. In the summary findings, we present highlights on five key areas: utilisation of resources, care outcomes, efficiency, equity, and costs.

Country context

While interpreting the results of this evidence review it is important to note that the findings are country and context dependent. Different types of regionalisation were introduced in the countries; regionalisation versus decentralisation and for different reasons; cost-containment versus greater autonomy at a local level. Regionalisation was often introduced as part a package of healthcare reform, similar to the Sláintecare programme in Ireland, and so the whole package must also be taken into account when drawing conclusions from this evidence review.

Utilisation of resources

Canadian provinces: key points

- Regionalisation was introduced in the majority of Canadian provinces in the 1990s
- It was introduced as part of a package of healthcare reform with the primary aim of cost-containment
- The type of regionalisation is administrative.

The majority of resource utilisation data identified in this systematic review was from studies conducted in Canadian provinces, accounting for 8 out of 12 studies. The numbers of hospital separations (or discharges) fell in the years after regionalisation in Canada, which began in the early 1990s. This decrease was significant in two of the four provinces that evaluated hospital separations: Newfoundland and Labrador (NL) and British Columbia (BC). The authors of the separation studies indicated that in addition to regionalisation, there was also likely a causal link between the fall in the rate of separations and budget cuts. Indeed, changes in patterns of resource utilisation should also be viewed in the context of the healthcare landscape in Canada in the early 1990s. The 1990s was a time of major restructuring of Canada's healthcare system, which focused on reducing the accumulated public debt following a nationwide recession. As the Federal Government of Canada withdrew equalisation payments and the provinces struggled with their own budget deficits, redesigning the healthcare system at the provincial level became necessary in order to meet the new fiscal reality. The primary goals of regionalisation were similar across provinces and included hospital cost containment, increased efficiency and effectiveness, integrated care, and the provision of a system that was more responsive to the needs of the local population. Reductions in funding were passed on to the newly established Regional Health Organisations (RHOs) in the hope that local knowledge would identify efficiency savings.

The HRB was able to conduct a statistical pooling of results from three studies in a meta-analysis of hospital separations per 1,000 population. The three studies pooled were from NL, Alberta (AB), and BC. The meta-analysis found that the odds of separations per 1,000 population were lower two years after regionalisation, but this result was not statistically significant. Our meta-analysis was limited in that we only had data for all studies two years post-regionalisation; it is possible that if data from three or more years post-regionalisation were available, the results would have been more notable.

Across the included studies, average LOS appeared to fall post-regionalisation, apart from in NL, where it appeared to remain similar to pre-reform levels. The HRB conducted a second meta-analysis on average LOS and the meta-analysis found that mean LOS was shorter two years after regionalisation, although the standardised mean difference was not statistically significant. As with hospital separations, this outcome is likely to have been influenced by accompanying budget cuts.

Other outcomes were less frequently reported. In Canada, the case intensity was reduced in AB post-regionalisation, but this was not the case in NL, where there was little change. The number of days of care also fell in AB; however, there was no clear trend in NL. In one study, which examined regionalised versus centralised provinces in Canada, the authors reported no visible trends in general practitioner (GP) visits in the one year assessed; however, visits to specialists were highest in Ontario (which was not regionalised at the time of analysis). One study reported that the number of available acute care beds in NL fell dramatically outside of the capital of St. John's post-regionalisation, with a small decrease within the capital.

Regionalisation was introduced in Canada as a package of healthcare reforms. This package also had a fiscal component, with budget restrictions introduced in the majority of provinces. The possible influence of budget restrictions on resource utilisation cannot be ruled out.

It is important to note that the majority of the studies in this systematic review followed an interrupted time series design or a before-and-after comparative design. The counterfactual for this study design is the hypothetical scenario under which the intervention had not taken place and the trend continues unchanged (that is: the 'expected' trend, in the absence of the intervention, given the pre-existing trend). In order to examine the 'expected' trend, the HRB examined Canadian Institute for Health Information (CIHI) separations data between the years of 1976/1977 and 2002/2003. These data demonstrate that hospital separations per 100,000 population were declining steadily prior to 1990, and that the decline intensified between 1990 and 2003, the time frame during which major health system reform (including regionalisation) took place.

The results of this systematic review indicate that acute care resource utilisation decreases post-regionalisation, and this decrease was above and beyond what would be expected based on historical trends. This was likely due to a package of healthcare reforms, including regionalisation of the healthcare system and budget restrictions.

It is important to note that decentralisation of healthcare in Spain was not primarily aimed at improving the healthcare sector, but was part of a global devolution process involving the whole public administration due to political requests from autonomous communities (an autonomous community is a first-level political subdivision of Spain) to decentralise authority to sub-central government. It is possible that this is the reason why so few studies in Spain analysed resource utilisation in healthcare.

Health and care outcomes

In contrast to the studies that examined resource utilisation, there was a wider geographical spread of care outcomes data. The majority of the studies came from Spain and Canada, with one study each from Greece, Mexico, and Italy.

In Canada (NL), regionalisation did not appear to have an effect on infant mortality. There was a negative effect on patient wait times for diagnostic test and specialist visits, but this difference was not statistically tested. Care outcomes for specific procedures and diseases in NL and AB appeared to remain the same pre- and post-regionalisation. One study compared the mean Health Utilities Index, a measure of health status and health-related quality of life, between provinces which had been regionalised and those which had not. The study found that the Health Utilities Index was similar in all regions regardless of regionalisation status. Overall in Canada, regionalisation seemed to improve some care outcomes and have no impact on others. The only exception to this was waiting times, which appeared to be longer after regionalisation, but this difference was not statistically tested.

Overall mortality was measured over two periods in Spain by two studies. The first study examined overall mortality in the first wave of decentralisation (from 1992 to 2000), and found that decentralisation increased mortality more in fully fiscally decentralised regions (foral regions [regions which have both political and fiscal decentralisation]) than in other decentralised autonomous communities (ACs), with one exception (Galicia). The second study, conducted a few years later (from 1999 to 2001 and 2006 to 2008), examined mortality rates before and after the second wave of decentralisation and found that, for Spain as a whole, overall standardised mortality fell post-

decentralisation. This second study also examined avoidable mortality, but study authors were unable to identify a direct link between the declining avoidable mortality rate and healthcare decentralisation.

A Spanish study looked at care outcomes over a 30-year period in Spain (1980–2010). The authors found that decentralisation in fully decentralised regions (foral regions) decreased infant and neonatal mortality. A second Spanish study assessed the impact of decentralisation on infant mortality and life expectancy from 1992 to 2003. They found that it had led to a small increase in infant mortality and a small increase in life expectancy, but that other factors included in the statistical model, such as income per capita, had a much greater impact on these outcomes. The remaining two Spanish studies assessed the impact of decentralisation of self-reported health status and disease-specific outcomes. They found that there was no impact on health status, and the impact on disease-specific outcomes was inconclusive.

In Italy, one study found that infant mortality decreased after decentralisation. However, as this study was more focused on differences between the north and south of Italy, differences pre- and post-decentralisation were not statistically tested. This systematic review identified one study that focused on care outcomes in Mexico; the study authors reported a significant decrease in the infant mortality rate post-decentralisation, but only a small non-significant change in the foetal death rate.

Spain: key points

- Decentralisation of healthcare responsibility to the 17 ACs in Spain occurred over a long period of time and in two waves: from 1981 to 1994 (seven regions) and in 2002 (10 regions).
- The objectives of decentralisation in Spain were to make governments more accountable and responsive to citizens and to improve efficiency.
- Type of regionalisation is political in all states and fiscal in two states.
- The distribution of powers is different for every AC, as laid out in their Statutes of Autonomy. ACs have wide legislative and executive autonomy, with their own parliaments and regional governments. The Federal Government coordinates health policy for contracting, acquisition of health/pharmaceutical products, related goods and services, and basic health personnel policies.

In the studies included in this review, there was a paucity of data regarding the impact of regionalisation on primary care, as the included studies primarily focused on acute care. Despite these limited data, there are several important observations regarding regionalisation and primary care. The included studies indicated that there was greater pressure on GPs post-regionalisation. A study from BC used avoidable hospitalisations as an indicator of primary care system efficiency, viewing it as a proxy for access to GP care. They found that avoidable hospitalisations declined. However, rural areas did not make any gains in avoidable hospitalisation rates relative to urban areas, with avoidable, non-avoidable, and total hospitalisations remaining consistently higher in rural areas post-regionalisation. The authors suggested that access to effective primary care in rural areas in BC remained problematic post-regionalisation. A study assessed the workloads of those working in primary care in Madrid and found that physicians working in health centres had a much higher workload post-decentralisation. Unfortunately, this study did not assess workload in acute settings, as this would have been an interesting comparison and would have provided interesting guidance.

One Spanish study provided particularly relevant data to support the findings regarding pressure on primary care, as they assessed Spanish citizens' perceptions of both primary care and inpatient and outpatient hospital care. They reported that for primary and specialised care, decentralisation had a significant negative effect on the care and assistance that patients received from medical staff; the ease of getting appointments; and waiting times for patients before being seen by their physicians at health centres. Moreover, this negative effect increased over time. A similar impact was not found in

the acute care setting, and hospital care decentralisation had no effect on waiting times before admission to hospital for non-urgent health problems.

In one study that compared regionalised versus centralised provinces in Canada, the authors found that there was no visible trend in the number of GP visits in the one year assessed. However, the workload of GPs was not examined.

In a 30-year analysis of data from Spain, study authors reported that decentralisation was associated with a 9.8 increase in the number of GPs per 100,000 population. The estimated effect was larger in regions with full decentralisation (foral regions), with an increase of 25.9 GPs, and very small and insignificant increases for AC regions with political decentralisation only. This study could be an indication of the longer-term picture of primary care, in which RHOs need to deal with the increased pressure decentralisation places on primary care and increase the number of GPs and other community-based health professionals accordingly.

This systematic review also only retrieved limited data on social and community care. When examining efficiency outcomes, one study reported that there was no improvement over time in the proportion of acute care days that might have been avoided by access to alternative services, including continuing care. The study authors suggest that a lack of integration of acute and long-term care in St. John's was responsible for this lack of improvement; unlike in the rest of the province, a nursing home board was retained in St. John's, meaning that the RHO did not have responsibility for continuing care facilities.

Further research is needed to better understand the relationships between pressure on primary and community care, and regionalisation.

Efficiency

An important aim of any health system reform is to use the resources already allocated to the system in the most efficient way possible. Regarding regionalisation, governments typically aim to increase efficiency by allowing healthcare decisions to be made at a local level, where healthcare needs are better understood. We found four studies which explicitly reported on efficiency as an outcome. It was not appropriate to suggest a direction of effect based on the results of two of the four studies due to the design of their analysis, and so they are not discussed here. In the third study, which was based in NL, efficiency improved within the hospitals in the capital of St. John's but not in the rest of the province. Other data reported in the study found that there was no improvement over time in the proportion of acute care days that might have been avoided by access to alternative services, including continuing care. The fourth study, based in Mexico, found that the health expenditure for the non-insured population was used more efficiently after the reform took place than the health expenditure for the insured population which was not decentralised.

Efficiency is a complex endpoint comprising multiple inputs, including resource utilisation data. Acute care accounts for a large proportion of any healthcare budget; in 2001, the Organisation for Economic Co-operation and Development (OECD) reported that, on average, 38% of total healthcare expenditure was allocated to inpatient care, and this was likely to have been closer to 50% when the healthcare reforms were introduced in Canada in the early 1990s. This systematic review has shown that health resource utilisation, as measured by separations and LOS, decreased post-regionalisation.

Regarding care outcomes, the results from this systematic review suggest that mortality rates stayed the same or improved post-regionalisation. The results were the same for most other care outcomes reported, with the exception of waiting times. Taking the results of the resource utilisation studies and care outcomes studies together, we can infer that while savings in acute care resources were seen post-regionalisation, this did not have a negative impact on care outcomes. These results are generalisable to the acute care setting only, as little resource data were reported for the primary care setting.

Equity

The one equity study identified for Canada was conducted in BC and examined inequity between rural and urban areas. Inequity between rural and urban areas was negatively impacted by the introduction of regionalisation in BC, as measured by healthcare utilisation. Given that geographical equity was only explored in one study, caution is advised when interpreting the results.

This systematic review identified four studies on equity in Spain, and all four were led by Costa-Font and colleagues. All four of the studies found that there was no notable difference in equity as measured by healthcare outcomes or healthcare utilisation. Of the three studies assessing inequity in healthcare costs, two found no difference post-decentralisation, and the third suggested that decentralisation led to a decline in inequalities in healthcare spending.

In Italy, inequity as measured by healthcare utilisation was not impacted by decentralisation; however, decentralisation appeared to lead to an increase in interregional inequalities due to healthcare spending in one study, (first phase of decentralisation) and a decline in inequalities in another study (second phase of decentralisation).

Studies which explored income-related equity were based in countries which were politically, and sometimes fiscally, decentralised. Overall, these findings seemed to demonstrate that decentralisation did not have a negative impact on equity in these populations. One study explored geographical equity in Canada, finding that urban areas progressed at a faster, and greater, rate (as measured by separations/avoidable hospitalisations) than rural areas. However, as this finding is based on one study only, caution is advised in interpretation, and further research is warranted. This finding is possibly comparable to the situation in Italy, which saw northern regions progress across numerous outcomes at a faster rate than southern regions post-regionalisation. Together, these results seem to suggest that attention should be paid to the inherent weaknesses, such as lower socioeconomic status, in different regions and that these should be addressed accordingly when implementing regionalisation.

Patient flow

Two studies in Canada and two in Italy examined the impact of regionalisation on patient flow. All studies found that there was notable movement of patients between regions, i.e. not all patients were receiving treatment in their local RHO. In Canada (AB and NL), patients tended to travel to more metropolitan areas for treatment, and this seemed to stem from a mix of the patients' needs and wants. In Italy, one study found that there was a trend of more patients travelling from southern regions to northern regions for treatment, than from northern regions to southern regions.

Cost

In order to fully understand the implications of the cost findings presented in this systematic review, it is important to be aware of the local climates within which regionalisation was introduced as well as the main aims of regionalisation. The main driver behind regionalisation in Canada was cost – the Government wanted to restrict healthcare spending without disruption to service delivery. However, in Spain, Italy, and Mexico, there was less of a focus on fiscal savings and more of a push towards autonomy at the local level. Within the context of aiming to increase autonomy at a regional level, increases in spending may be seen as a more positive outcome.

In Canada, cost data were available for two regions: AB and NL. Adjusted per-capita spending decreased post-regionalisation in Alberta, which was in line with the key aim of cost containment in the 1994 AB health system reform. However, this was an exceptional result by comparison with all other cost data identified. Overall spending increased dramatically post-regionalisation in NL, and increases in costs for front-line workers and in overtime costs contributed in part to this increase.

There were four cost studies identified from Spain. The first two studies analysed cost data collected between 1992 and 1999. They found that decentralisation might have increased public spending per capita but that other determinants had a greater influence on spending, including population size,

resource utilisation, and socioeconomic factors. They also found that the fiscally and politically decentralised foral regions were likely to spend more than other ACs. The third study, looked at a slightly later year range of 1995–2002. The authors found that "political decentralisation appears to increase total expenditure when new region states are set up from scratch – as has been the Spanish case – given that there are significant sunk costs when designing a decentralised provision of healthcare. However, after a recognisable number of years efficiency effects come into place progressively when time with decentralised responsibilities is controlled for in the empirical specification. Therefore, unlike previous studies our findings suggest that some efficiency in the form of cost savings could be achieved from decentralisation in the long run." The fourth Spanish study also examined the earlier time period (1992-1999) and reported that there was no clear pattern or distinction in per-capita health expenditure between centralised and decentralised regions.

There was conflicting evidence on expenditures in Italy post-decentralisation, and this appears to be linked to differences between the north and south of Italy.

One study explored health expenditure in Mexico, finding that costs rose in four selected and unnamed states post-decentralisation; however, this difference was not statistically tested. The increases were of much greater magnitude of expenditure than in any other country included in this evidence review. And any increase in spending on healthcare in Mexico was considered a positive outcome.

Cost data were also commonly reported in our included studies. Resource utilisation data can be used as a predictor for healthcare costs, and therefore the results of this review are surprising in that trends of reduced resource utilisation did not translate into cost reductions. For example, in NL, hospital separation rates fell significantly post-regionalisation, but overall healthcare spending increased dramatically. A literature review found that RHOs across Canada were limited in their ability to reduce healthcare expenditures due to their lack of authority over physicians' salaries. Indeed, two major contributors to costs – physicians' salaries and prescription drugs – were outside the RHOs' authority.

In countries that have regionalised or decentralised, RHOs continue to have restricted authority over high-cost items, such as salaries. Therefore, little improvement in cost savings in this area can be expected.

It is interesting to note that in Spain, where the regions have greater autonomy than in Canada, there were some indications that decentralisation could lead to cost savings in the long-term. Further long-term examination of cost data would be useful to probe that indication of savings in the long-term. However, this examination would be limited by the rapidly evolving healthcare system.

In this systematic review, the two fully decentralised (foral) regions in Spain had consistently different results. Fiscally decentralised regions have the autonomy to increase or decrease spending on healthcare through taxation. It is important to keep this contextual factor in mind when interpreting the results of the impact review.

Barriers to and facilitators of effective regionalised healthcare systems

Three thematic areas were identified with respect to barriers to and facilitators of effective regional health organisations and these were:

1. Influence of the central government
2. Balancing competing interests
3. RHO processes and procedures

Influence of the central government

Defining the boundaries of RHOs is the first step in implementing regionalisation, and research from Canada and New Zealand demonstrated that RHOs that have uneven populations can pose a challenge. Smaller RHOs in New Zealand were perceived as being disadvantaged in terms of the cost of infrastructure and their ability to provide high-quality clinical services. Despite RHOs in New Zealand identifying the uneven size of regions as an ongoing problem, they did not want the sizes to change. This indicates the importance of choosing the RHO boundaries wisely from the outset.

Additionally, the pace at which the central government drives implementation of regionalisation is an important factor to consider. RHOs in Canada perceived the pace of change as too fast, but highlighted the challenge of driving change fast enough to sustain political will and slow enough to allow meaningful change to occur. Research in Canada also highlighted the importance of ongoing assessment of regionalisation, rather than halting regionalisation while assessing it.

Regarding services under the mandate of RHOs, RHOs in Canada and New Zealand reported a preference for the devolution of several key sectors that were not under their mandate: primary care services, pharmaceuticals, disability support, public health, and mental health services. However, it is important to note that before such services are devolved, RHOs must have the capacity to manage them. This illustrates a key tension evident in the studies in this review between RHOs' desire for greater control and their limited ability to exercise this control.

National health strategies developed by the MoH were perceived as pivotal to ensuring consistency across regions in New Zealand, and RHOs found national strategies especially important in guiding local policy in the early stages of regionalisation. However, RHOs in Mexico felt that the MoH was excessively controlling in its approach to national strategies, while RHOs in Canada desired more clear and consistent policies from the MoH.

The importance of support from the MoH was highlighted in Canada and New Zealand. RHOs in Canada highlighted the value of the MoH organising seminars and assigning MoH staff to the regions. However, RHOs in Canada and New Zealand reported that they required further support from the MoH, especially in terms of analytic capacity. Moreover, RHOs in New Zealand reported that they lacked practical guidance from the MoH on how to implement national strategies. They also felt that a national training programme to prepare them for devolution would have been helpful.

Challenges related to the provision of funding for RHOs were identified in New Zealand, Canada, and Mexico. A funding formula was introduced in New Zealand that distributed funds proportionally to the resident population and adjusted for lower socioeconomic status, rurality, elderly people, tertiary services supplied, and minority populations. However, RHOs were concerned that the funding formula did not adequately account for differences between regions, including the cost of services and population growth.

Regarding funding for specific national strategies, RHOs in New Zealand reported that it was very difficult to implement new MoH strategies that did not come with earmarked funding, while in Canada, RHOs reported that fiscal restraints limited the extent to which their priorities could be met.

Deficit management was a key tension point in New Zealand. RHOs reported that efforts to reduce deficits had dominated their decision-making, limited innovation, and led to a focus on short-term solutions rather than on long-term planning. However, they felt that the introduction of a three-year

guaranteed funding stream had allowed them to develop longer-term strategies for addressing their deficits.

Balancing competing interests

A main overarching theme identified in the included studies was tension between RHOs and the MoH regarding their competing interests. The working relationship between RHOs and the MoH was fundamental to this dynamic. RHOs in New Zealand and in Canada identified interference from the MoH as a challenge. In New Zealand, RHOs felt that the MoH was too involved in regional operational matters. Respondents also noted that the locus of decision-making was unclear; RHOs were responsible for needs assessment and prioritisation, but their decision-making capacity was constrained by the MoH dictating service funding and coverage requirements. In a mixed methods study in Canada, RHO CEOs and board members reported that the RHO board was overly restricted by rules laid down by the MoH. Additionally, RHO board members felt that they had been given responsibility for things over which they had insufficient control in practice.

RHOs' recognition of their primary accountability to the MoH was a key challenge in regionalisation in New Zealand, Canada, and Mexico. In New Zealand, elected RHO board members in particular struggled with recognising that their primary accountability was to the MoH and not to their local constituents. Formalised accountability agreements were reported as an important facilitator of RHOs' recognition of their primary accountability to the MoH in Canada.

RHOs in New Zealand and Canada felt frustrated with processes required by the MoH, including reporting requirements, strategic planning, and health needs assessments. While RHOs noted the value of planning processes, they felt that the MoH's approach to them proved challenging. For instance, in New Zealand, RHOs noted that reporting requirements were excessive, there was a lack of feedback from the MoH, high opportunity costs were incurred, and they did not capture desired outcomes. RHOs in New Zealand also felt that the time required for strategic planning was excessive, that it was impossible to prioritise between different areas that were all considered mandatory, and that overall, the process set expectations that they could not possibly meet.

RHO processes and procedures

Several key areas of interest emerged related to internal RHO processes and procedures. In Canada and New Zealand, coordination and collaboration between RHOs was identified as an important facilitator of the implementation of regionalisation. RHOs in Canada and New Zealand noted that shared IT and human resources (HR) services were particularly helpful. Additionally, RHOs in New Zealand reported that shared clinical services, including mental health and laboratory services, were critical to maintaining the viability of smaller RHOs.

In New Zealand, a national network of RHOs was established, and it was widely viewed as a key facilitator. It allowed RHOs to coordinate information sharing and action on key issues and stay abreast of policy and operational issues. Moreover, it promoted consistency across the sector and allowed greater connectedness between the Minister, the MoH, and RHOs.

RHO boards of management form the foundation of RHO internal governance. In New Zealand and Canada, several key issues related to RHO boards were identified. In Canada, RHO board members were elected, and both RHO management and RHO boards were in favour of continuing this system. In New Zealand, RHO boards comprised a mix of elected and appointed members, with the majority being elected. RHO CEOs felt that elected members lacked skills and expertise in relation to the health sector and expressed a preference for appointed board members.

Board members' knowledge, skills, and training were identified as a challenge in Canada and New Zealand. Board members in Canada reported that they were often more influenced by their own experience and knowledge than by data when making decisions. Additionally, board members in Canada felt that their training in setting priorities, health needs assessments, and healthcare legislation and guidelines was inadequate. In New Zealand, board membership was reported to be a steep learning curve for most members. Aspects of the board member role that were found to be

particularly challenging included: lack of clarity regarding boundaries between their governance role and that of RHO management; lack of clarity regarding boundaries between their decision-making role and that of the MoH; and the volume and complexity of the issues to be grasped.

Tension between RHO boards and RHO management was a key theme in Canada and New Zealand. In both settings, RHOs felt that there was a need to more clearly differentiate between the governance role of the board and the management role of the RHO management. Notably, RHO board chairs expressed concern that RHO management had not involved them early enough in decision-making processes.

Regarding the frequency of board meetings, RHOs in New Zealand reported that shifting to more frequent monthly meetings led to a better managed agenda and more efficient follow-up of issues.

In Canada, several key barriers to internal RHO performance monitoring were identified. These included: a lack of data in the continuing care sector (where access to data was not integrated within the province); areas where data were still paper based; and poor information sharing across the care continuum. RHOs in Canada also reported frustration that performance monitoring data were not acted on due to competing priorities and staffing constraints.

Healthcare sector staff perceptions of RHO reforms were explored in Mexico and Canada. In Mexico, health managers reported lacking information about decentralisation and felt that decentralisation had led to an increase in their workload. In Canada, nurses reported that restructuring had negatively affected the emotional climate of their workplace. Additionally, in Canada, RHO CEOs and board chairs were concerned about resistance to change among healthcare providers and managers. Physician commitment to system change was identified as particularly challenging, given that physician services were outside the mandates of the Canadian RHOs.

In Canada and New Zealand, physician engagement by RHOs was cited as an important facilitator of the implementation of regionalisation. In New Zealand, participants noted the particular importance of involving clinicians in resource allocation debates.

Community engagement was identified as a key aspect of regionalisation in Italy, Mexico, Canada, and New Zealand. Regarding community understanding of regionalisation, RHOs in Italy and Canada reported that their communities did not have a good understanding of the process. In terms of community input into RHO services, RHOs in Mexico and New Zealand reported that community engagement influenced service design and delivery in valuable ways. Additionally, in New Zealand, some RHO boards went to great lengths to engage their communities. This included holding open board meetings, allowing the public to speak at board meetings, and rotating the location of board meetings in order to increase public accessibility. RHOs did note that some board members were more reluctant to be forthcoming with their opinions during public meetings and that open meetings slowed the decision-making process. However, the benefits of transparency were perceived to be greater than the disadvantages.

Implications for policy makers

- Acute care resource utilisation decreased post-regionalisation, and this was above and beyond what would be expected based on historical trends. This was likely due to a package of healthcare reform, including budget restrictions.
- While savings in acute care resource utilisation were seen post-regionalisation, there was no negative impact observed on long-term care outcomes such as mortality; care outcomes remained the same or improved slightly post-regionalisation, with the exception of waiting times. This was on the basis of indictors that were studied in this review only.
- There is an inter-reliant relationship between resources in the acute, primary, and social and community care settings. For example, in our impact review we saw that a fall in resource utilisation in the acute setting led to increased waiting times to see GPs. If care is to be more

focused outside the acute setting, additional resources will be needed in the primary care and the social and community care settings.

- If funds provided by the MoH are not sufficient, RHOs cannot address the specific needs of their populations. Funding can be managed by using a resource allocation formula, which comprises inputs that adequately capture local needs and account for variations between regions.
- Training and support for RHO management and the RHO board is crucial, particularly during the early stages of regionalisation as they settle into their new roles. Clarity regarding roles and responsibilities is also important.
- Community engagement and staff engagement are pivotal to ensuring buy-in and to facilitating their input into health service design and delivery.
- Our logic model identifies the short-term and intermediate outcomes which need to be achieved before long-term health system goals can be achieved. An ongoing monitoring and evaluation process will need to be launched concurrently with regionalisation in order to assess these outcomes over time. Outcomes will need to be monitored in all healthcare settings, not just in the acute care setting.
- The timing of the evaluation of a regionalised healthcare system will have an effect on the outcomes. The first two to three years after regionalisation are marked by instability, and conclusions regarding the effectiveness of the reform should not be made based solely on data from this period.
- A high-functioning health information system will be needed in order to facilitate monitoring and evaluation.

Conclusions

There is some evidence to suggest that a regionalised healthcare system could ultimately lead to a healthy population and an efficient health system. However, policy-makers need to consider the important barriers to and facilitators of effective implementation. The impact of regionalisation will not be fully estimable for many years post-reform; however, a monitoring and evaluation process will be required at the start of regionalisation to ensure that the short-term and intermediate goals are being met, in order to achieve the ultimate long-term goals of regionalisation.

Furthermore, it is important to note that regionalisation is a complex process, encompassing a vast array of interconnected elements, which should be reflected in the design of a monitoring and evaluation template. Regionalisation should be implemented and evaluated as a complex intervention for which outcomes are neither straightforward nor predictable, but dependent on a country's socioeconomic and institutional context.

1 Introduction

1.1 Policy background

There has been an increasing focus in the past number of years on the appropriateness and effectiveness of the system of structures and governance for health services in Ireland. Current arrangements were put in place in 2004, with the establishment of the Health Service Executive (HSE), which was one of a number of major changes in health structures in recent decades. There is now a prevailing consensus that the current structure is not optimally configured and change is needed. This view was shared by the cross-party Oireachtas Committee on the Future of Healthcare, and its report, Sláintecare, makes a series of recommendations in this regard.

The following drivers for change have been identified in the Oireachtas Committee process and in the discussions that have taken place since then in the development of an implementation plan to progress the Committee's recommendations:

1. The HSE has become overly centralised, with decision-making far removed from the frontline. There is a need for a more appropriate balance between necessary central strategy and standard setting, and local flexibility, responsiveness, and decision-making.
2. The HSE is the largest public body in the State, with a wide and complex remit. There is a need for a robust and transparent system of devolved governance and accountability.
3. Current delivery structures operate in silos. Structures within the Department of Health (DoH) and the HSE maintain a separation across acute, primary, and social care, and even within the administrative regional structures that are currently in place (Hospital Groups and community healthcare organisations) there are separate structures for acute hospitals and community services. A key driver of new structures will be to facilitate and support integrated care and new models of care across the care continuum to improve patient experience, health outcomes, and sustainability of the system as a whole.
4. Linked to point 3 above, current funding allocation mechanisms are generally based on historic allocations (with the exception of some hospital services) and do not allow for 'pooled' budgets across services. The Sláintecare report recommends a shift to population-based funding allocation, and the development of regional structures would facilitate this.

The DoH has prepared an Implementation Plan in response to the Sláintecare Report, and this plan commits to the following in relation to health structures:

1. Geographic alignment of current administrative regional health structures (Hospital Groups and community healthcare organisations) – at present there are seven Hospital Groups (HGs) and nine community healthcare organisations (CHOs), and they do not align/cover the same populations.
2. Define and agree a new organisational and operational structure for a reconfigured health service, including respective roles and reporting relationships for the DoH, a leaner national HSE agency with responsibility for national planning, strategy, and standard setting, and new regional structures that will have responsibility for delivering almost all health and social care services within defined geographic areas.
3. Develop processes for collaboration and integrated performance management across newly aligned HGs and CHOs, and devolve decision-making and autonomy on an interim administrative basis.
4. Develop legislation to provide the statutory basis for new health structures (as defined in point 2 above).

The Minister for Health has made clear that he would like this to be a phased process and he would like to bed down new arrangements on an administrative basis before they are underpinned on a statutory basis.

1.2 Purpose

This evidence review continues from a previous evidence brief, which focused on the following research question: What are the purposes of, features of, processes for, and approaches to regional health organisations (RHOs) that deliver health and social care? This question was addressed in an evidence brief entitled *Regional health organisations in six jurisdictions*[1] and readers should refer to this report for further detail on that question.

The current review will feed into the first stage of the Sláintecare Implementation Strategy project to define a new organisational and operational structure for a reconfigured health service.

This review will provide evidence to assist in informing the development of possible approaches to structural reform. It is hoped that it will identify approaches to change, how best to implement such change, challenges faced and how they were overcome, approaches that worked well and those that did not, the time frame for implementing change, any independent assessments of the value or otherwise of structural change, and the general time frame needed in order to have changes bedded down.

1.3 Research questions

This review will attempt to answer two overarching research questions:

- What are the documented positive or negative **impacts** or outcomes of adopting a regionalised healthcare system?
- What are the documented **enablers of, and challenges** to, effective regionalised healthcare systems?

These questions will be referred to hereafter as the **impact question** (Question 1) and the **barriers/facilitators question** (Question 2).

2 Background – Healthcare regionalisation

2.1 Concept of regionalisation

Regionalisation, or decentralisation, can be described as "the transfer of formal responsibility and power to make decisions regarding the management, production, distribution, and/or financing of health services, usually from a smaller to a larger number of geographically or organisationally separate actors."[2(p45-46)] Starting in the 1970s, various OECD countries have transferred healthcare responsibilities from central government to regional or local level. The majority of regionalisation in Europe and Canada took place throughout the 1990s and in the early 2000s.[2,3] The need for introducing a regionalised healthcare system comes from differences in preferences or needs, as well as geography, in different regions within a country. Regionalisation can take different forms, and different terminologies are used across countries. This report refers to regionalisation when discussing the concept in general, except in places where it is necessary to indicate a specific term (e.g. decentralisation).

It is difficult to find a consensus on the exact properties a regionalised or decentralised healthcare system should have. However, two key questions arise in the literature: What powers are regionalised or decentralised and to whom are these powers devolved?[2] These questions give rise to three distinct properties to be considered:

1. The first distinction made is between *political and administrative decentralisation*. Political decentralisation concerns the transfer of competencies to democratically elected sub-central government (as in Canada [national to provincial level], Italy, Mexico, Spain and the United Kingdom [England, Northern Ireland, Scotland and Wales],) which are directly accountable to their electorate. This is in contrast to administrative decentralisation, which refers to decentralised organs and their staff appointed by the central government (for example, Canada [provincial and territorial level], Greece, New Zealand, and Portugal). Accountability is to the central or provincial government rather than the local electorate [provincial in the case of Canada].[2] Administrative decentralisation is commonly referred to as regionalisation, particularly in Canada.
2. A second discriminating aspect regards the functions and autonomy of choice *(authority in health policy)* transferred to regional or local organisations. Adolph *et al.*[4] proposed a classification that subdivides authority in health policy into five basic competencies: (a) framework legislation; (b) implementation legislation; (c) finance (raising and allocation); (d) provision; (e) regulation. Depending on the country, these five functions may be diversely allocated at national, regional and local level.
    a) Framework legislation refers to the ability to set the definitive legal framework for policy. In national health service systems, it refers to the fundamental laws authorising the system.
    b) Implementation legislation designates responsibility for passing laws implementing policy within framework legislation.
    c) Finance denotes responsibility for allocating the bulk of the funds for a policy, whether those funds come via a financial formula or through general or specific taxes. In systems funding healthcare from general taxation, the level of government that sets the health budget is responsible.
    d) Provision means different things in different systems depending on whether the State directly hires or contracts with providers (as in national health systems such as the NHS in the UK), or whether payers and providers are both separate from the State, as is typical in social insurance systems. Adolph *et al.*[4] consider provision to be irrelevant for pharmaceuticals, where the key issues of 'provision' are really matters of funding.
    e) Regulation: responsibility for developing and enforcing restrictions on private, third sector and public sector. This is often only applied to pharmaceuticals, where it refers to the

decision to license medicines, rather than to the regulation of pharmacies, for example, as noted in Adolph *et al.*[4] However, outside of licensing pharmaceuticals, regulation is concerned with providers and professionals. Saltman *et al.* note that that "decentralization strategies need to be accompanied by effective regulatory measures, imposed by the central level, in such areas as standard setting, performance criteria and cross-subsidization across population and area groups". [2 (p. 30)]

3. A third distinction refers to the *level of government* involved in the transfer of competencies.[2] In some countries, healthcare decentralisation has involved a transfer of responsibilities from central to regional level (as in the case of the autonomous communities in Spain); in other cases, community health (and social) care competencies have been allocated to local government (such as municipalities in Finland or local councils in Scotland).

Table 6 provides an outline of the properties of regionalisation for each of the countries included in our systematic review.

Financial autonomy is an essential aspect in assessing decentralisation, since the power of a level of government tends to be weakened by the absence of financial autonomy.[2] Financial autonomy has two important aspects: (1) raising funds through taxation [income, property, consumption and spending] and grants; and (2) spending funds. Funds can also be raised by borrowing, so it is important to know whether a certain level of government or the RHO can run deficits. Additional sources of government funds include private payments (user charges, private insurance).

Some descriptions of regionalisation cover integration, autonomy, and fiscal powers. The Health Research Board (HRB) wanted to be able to include as many jurisdictions as possible in its review, so its definition was broad: "Health system organised into regional health organisations which are responsible for care across acute, primary, social/community setting, and established on a regional/geographic basis".

2.2 Aims of regionalisation

One of the foremost aims of regionalisation is to guarantee a better satisfaction of local demands; services can be 'tailored' to the needs and wants of each single constituency.[5-14] Regionalisation also promises greater efficiency in providing services and cost containment. For example, proximity to the level of service provision will make it easier for regionalised governments to identify, and thus resolve, any causes of inefficiency. Regionalisation is claimed to stimulate local innovation and policy experimentation, creating competition between the various local governments in order to attract citizens. Moreover, a regionalised structure favours accountability of office holders, bringing the government 'closer to the people'. A final benefit attributed to regionalisation is the greater responsibility transferred to local governments and the consequent encouragement of fiscal discipline or prudent use of tax payers' money. Several countries also use regionalisation to integrate health and social care services, to address long-term care needs using an integrated approach, and to address mental health issues.[2]

According to its opponents,[5,11,12,14] the main limitation of decentralisation is that it tolerates disparities of treatment between constituencies. It may undermine the equity of the national system, allowing and even favouring territorial inequalities. Furthermore, decentralisation can easily generate tension between central and peripheral governments. The different levels of government can attribute responsibility to one another with respect to inadequate financing or ineffective management of services.

2.3 Country profiles

Background of countries included in the two systematic reviews are summarised below. See supplementary appendix for full outline of each country.

2.3.1 Canada

The Constitution of Canada dictates that responsibility for healthcare falls primarily to provincial governments rather than to the Federal Government. Only provincial governments can pass laws governing the financing and delivery of health services to the majority of Canadians. For this reason, we will provide descriptions of the relevant provinces in Canada rather than a country profile. In Canada, RHOs within provinces are "entities with responsibility for healthcare administration within a defined geographic region within a province or territory. They have appointed or elected boards and are responsible for delivering community and institutional health services in their region"[15(p 16)] However, the regions are administrative rather than political and do not have the powers to raise taxes. The regions are typically allocated fund through a resource allocation formula, which can comprise things like population size, rurality and socioeconomic factors.

2.3.1.1 Alberta

Alberta (AB) has gone through three stages of regionalisation. Stage 1 was introduced in 1994 to reduce healthcare spending by 17%. Stage 1 saw 17 regional health authorities established in 1994 (our study relates to Stage 1). The type of regionalisation in AB is administrative.

2.3.1.2 British Columbia

British Columbia (BC) has gone through two stages of regionalisation. Stage 1 was introduced in 1997 to integrate and coordinate health services at the regional and community level and to devolve decision-making and control to local communities. Stage 1 saw the establishment of 52 local health authorities to oversee health planning and service delivery across the province (our study relates to Stage 1). The type of regionalisation in BC is administrative.

2.3.1.3 New Brunswick

New Brunswick (NB) has gone through two stages of regionalisation. In Stage 1 eight RHOs were established. In Stage 2 eight RHOs were reduced to two RHOs. The type of regionalisation in NB is administrative.

2.3.1.4 Newfoundland and Labrador

Newfoundland and Labrador (NL) has gone through two stages of regionalisation. Stage 1 was introduced in the 1990s (1994–1997) to contain cost and introduce efficiency. Fourteen regional health boards and six healthcare regions were established during Stage 1. The type of regionalisation in NL is administrative.

2.3.1.5 Nova Scotia

Nova Scotia (NS) has gone through three stages of regionalisation. Stage 1 was implemented in 1994 to introduce cost containment and increase accountability. Stage 1 saw the establishment of four regional health authorities in 1996. The type of regionalisation in NS is administrative.

2.3.1.6 Prince Edward Island

Prince Edward Island (PEI) has gone through three stages of regionalisation. Stage 1 was implemented in 1993 and established five RHOs. Stage 2 was implemented in 2005 and restored responsibility for healthcare to the MoH. In Stage 3 responsibility for healthcare was devolved to a single health authority. The type of regionalisation in PEI is administrative.

2.3.1.7 Saskatchewan

Saskatchewan (SK) has gone through three stages of regionalisation. Stage 1 was implemented in 1992 and established 32 RHOs. Stage 2 was implemented in 2002 and reduced the number of RHOs to 12. Stage 3 was the reversal of regionalisation, and the established of one provincial authority IN 2017. The type of regionalisation in SK is administrative.

2.3.2 Greece

In Greece, three healthcare laws were passed in 2001 to improve efficiency and reduce the costs of healthcare (the HRB study relates to 2001 restructuring). The 2001 laws included the establishment of 17 administrative regional health and welfare authorities (YPEs). The type of regionalisation in Greece is administrative.

2.3.3 New Zealand

Since 1983, the New Zealand public health sector has undergone four major structural reforms. The first major reform from 1983 to 1989 established 14 area health boards. As part of the second reform, from 1993 to 1997, four regional health authorities were set up to purchase primary and secondary services for their regions from a range of public and private providers. The third reform was combining the four RHAs into a single national Health Funding Authority (HFA). The fourth reform comprised 21 statutory district health boards (DHBs) which are Crown entities under the auspices of the New Zealand Public Health and Disability Act 2000. The establishment of these boards was based on the geographic locations of the hospital health services in the previous health system. In 2010, the number of boards was reduced to 20. (Included studies relate to 2000 restructuring). The type of regionalisation throughout New Zealand is administrative.

2.3.4 Italy

In Italy, legislative reform in the period 1992–1993 provided for decentralised management of the National Health Service. Legislation in the early 1990s meant a significant transfer of power from the State to the regions, which in turn were granted the freedom to decide on how to spend their healthcare budget allocation, as well as how to organise the healthcare system within the framework of the National Health Plan, in line with the essential levels of healthcare provision[2,11] Three further reforms were made in 2000, 2001 (constitutional amendment) and 2013. On the basis of the 2001 amendment, healthcare has become the subject of concurrent legislation between the State and the regions: this means that the regions have autonomy with respect to organising and managing healthcare services on their own territory, whereas the State must confine itself to formulating the general rules of the system. The municipalities in Italy can raise taxes. There are 21 health regions in Italy and the type of regionalisation generally is political, with some fiscal autonomy; however, within the regions, the healthcare organisations themselves are administrative.

2.3.5 Spain

Foral regions: Two autonomous communities in Spain, the Basque Country and Navarre have a special status and **full fiscal** responsibilities.

Decentralisation of healthcare responsibility to the 17 autonomous communities (ACs) in Spain occurred over a long period of time and in two waves: 1981 to 1994 (seven regions) and 2002 (10 regions). (Our study relates to 2002). The objective of decentralisation in Spain has not been to improve the healthcare sector, but it has been part of a global devolution process involving the whole public administration as a consequence of the political requests from autonomous communities to decentralise authority to a sub-central government.[2,5] The type of regionalisation in Spain is political in all states and fiscal in two states, although the other states do have the option to raise taxes to fund their health service. The distribution of powers is different for every AC, as laid out in their Statutes of Autonomy. ACs have wide legislative and executive autonomy, with their own parliaments and regional governments. A national-level authority coordinates health policy for contracting; acquisition of health/pharmaceutical products; related goods and services; and basic health personnel policies.

2.3.6 Mexico

Devolution and decentralisation of the healthcare system began in Mexico in the 1980s and continued throughout the 1990s. In Mexico, decentralisation has a strong legal basis, namely Article 4

of the Constitution. Decentralisation is justified on the following grounds: (a) the need to organise a national health service to overcome the differences between the health services offered by the two social security institutions and those services provided to the general population not entitled to the benefits of social security services; (b) to strengthen the operational efficiency and management of health services at the level of the state governments; (c) to link planning of the health services more closely to overall national planning.[12] The states can raise taxes and can charge user fees.

The main aim of the decentralisation in Mexico was to transfer financial resources and responsibilities to state and local governments for the provision of specific public goods, including healthcare. There are 31 states or health regions. The type of regionalisation in Mexico is political and fiscal.

2.3.7 Overview of regionalisation by country

Table 2 Summary of types of regionalisation in case countries

Country	Type of regionalisation	Authority in health policy at RHO level			
		Legislative ability	Financial	Provision	Regulation
Canada	Administrative (from province to RHO)	None	Provincial level responsible for budgeting and financing. Share of funding allocated to each RHO is determined using a population-based funding formula (except for NL)	All aspects of healthcare provided by RHOs.	No
Greece	Administrative	None	National level responsible for budgeting and financing	17 YPEs provide all aspects of hospital care.	No
Italy	Political, with some fiscal autonomy	Regions can enact implementation legislation	National government finances essential levels of care, calculated using a standard costs mechanism and transferring funds from the wealthier regions to the poorer ones. Regions can provide additional services from their own local taxes.	21 health regions provide all aspects of healthcare within 'essential levels of care' package.	Not known
New Zealand	Administrative	None	DHBs are centrally funded and the share of funding received was determined using a population-based funding formula.	DHBs deliver services within the parameters of national strategies and national minimum service coverage and service standards. In general, DHBs have flexibility over the types of services they fund and over service volumes, to reflect the needs of their population.	No
Spain	Political in all states and fiscal in two states	ACs have wide legislative autonomy, with own parliaments and governments	Foral regions have full fiscal responsibility, including collecting taxes. In non-foral regions they can raise petrol surcharges; receive 33% of the region's income tax take and 40% of the Value Added Tax take. Healthcare funds are part of a block grant transferred to ACs, which are free to determine spending.	All aspects of healthcare.	No
Mexico	Political and fiscal	Unknown	Funding for universal health insurance comes from three sources: the Federal Government, the state governments, and the families enrolled in the scheme.	Package of very basic health interventions, with a major focus on prevention	Not known

3 Methods

This evidence review was divided into two systematic reviews based on the two research questions. The first is a systematic review of the impact of regionalisation and the second is a systematic review of the barriers to and facilitators of the implementation of regionalisation. The methods for each of the reviews are outlined in the following sections. We followed preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidance when developing this report.[16]

3.1 Search process

As this evidence review included two similar but distinct questions, the impact question and the barriers/facilitators question, parallel search processes were adopted. In approaching the searches, the intention for both was to comprehensively identify all published, peer-reviewed research that addressed these topics. Individual searches were undertaken for each question.

3.1.1 Electronic bibliographic databases

Three specific concepts were identified in the impact question: impacts, regionalisation and healthcare organisations (Figure 1). Similarly, three specific concepts were identified in the barriers/facilitators question: barriers and facilitators, regionalisation and healthcare organisations (Figure 2). The search strategies for both questions were built around the three concepts, using a combination of Medical Subject Heading (MeSH) terms and keywords. A list of relevant keywords had been developed based on a search for grey literature from the previous evidence brief[1] and these keywords can be seen in the search strategies presented in the supplementary appendix.

Initially, for both questions, a broad search strategy was designed for the MEDLINE database. No language or date restrictions were applied. For the impact question, this strategy was then translated for CINAHL, the Database of Abstracts of Reviews of Effects (DARE), the NHS Economic Evaluation Database (NHS EED) and the Health Technology Assessment (HTA) database. For the barriers/facilitators question, the search strategy was translated for the CINAHL database on the EBSCO platform. The full search strategy for the MEDLINE database is presented in the appendix along with the list of databases searched. Details of other search strategies are available on request.

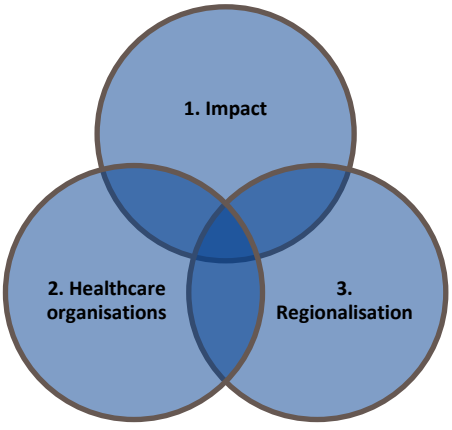


Figure 1 Search concepts for impact question

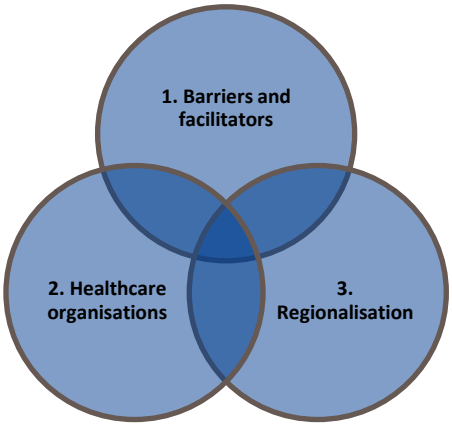


Figure 2 Search concepts for barriers/facilitators question

3.1.2 Supplementary searches

In addition to the main database search, additional supplementary searches were conducted. Using the papers identified for inclusion through the database search as a starting point, the following three supplementary search strategies were used:

1. Reference checking: The reference section of each included study was checked for relevant papers.
2. Citation chasing: Articles which had cited the included paper were checked for relevance. This was done for each study using the "cited by" function in Google Scholar.
3. Checking for related relevant studies using the "similar articles" function on PubMed. The first 20 similar articles for each study were screened.

These three strategies were used for each included study, including studies that were found through these supplementary search strategies and through the grey literature search. In addition to these three strategies, any systematic reviews that were identified at any stage of the screening process were flagged and their reference sections checked for relevant studies.

3.2 Study selection

3.2.1 Inclusion and exclusion criteria

Criteria for the impact question and for the barriers/facilitators question were similar, with some small differences in study design and outcomes (see Table 3 for the eligibility criteria for the impact question, and Table 4 for the eligibility criteria for the barriers/facilitators question). Given the variability in many of the key terms used in this review, definitions were discussed, and agreed upon, in advance, based on the previous HRB evidence brief.[1]

Regional health organisations

For the purpose of this review, a regional health organisation (RHO) refers to an organisation which is responsible for the provision of acute, primary and social/ community care to a geographically defined population. The health system in that particular country or province/state must be organised on a regional basis and the regional health organisation must have a population-based approach to service provision. Major health sector reforms designed to address the problems with the original regionalisation structure were also included.

For the impact question, quantitative outcomes that fell within the broad categories of interest were considered. These outcomes, which were agreed upon in collaboration with the DoH, included: utilisation of resources, care outcomes, efficiency, equity, patient flow, cost and cost-effectiveness, staff work experience, perceived quality of care received and supplied, and public trust. We restricted study design to experimental primary study designs to capture quantitative data which could be compared across countries. We did not pre-define each outcome and accepted individual study definitions.

For the barriers/facilitators question, the outcomes of interest were factors that facilitate (facilitators) or hinder (barriers) the implementation of, transition to, or successful functioning of, regional health organisations. These are also sometimes referred to in the literature under the terms of enablers, challenges, strategies and contextual factors. Neither opinion pieces nor systematic reviews were relevant for either question, although reference lists of relevant systematic reviews were checked for reference to primary studies which might be eligible for inclusion.

The review was limited to Organisation for Economic Co-operation and Development (OECD) countries. We focused on the OECD countries for comparability to Ireland, as they are generally high-incomes countries and are committed to sharing experiences and information to improve the economic and social well-being of people around the world.

3.2.2 Application of criteria

In order to meet the eligibility criteria, the regional health organisation in the study had to cover services across all three levels of care, but did not need to be responsible for every single service in each of these three areas. If a study contained mixed country data, including countries not of interest, it was excluded if results were not reported separately for countries of interest.

Primary care refers to the initial contact people have with medical care in their community, often through a general practitioner (GP). Acute care generally refers to hospital services, including inpatient and emergency services. Definitions of social care can vary widely between countries. In Ireland, the HSE provides the following services under the social and community care: children and family services; disability services; mental health services; audiology/hearing services and older people's services

Studies that investigated the impact or barriers/facilitators of specific aspects or processes within regional health organisations were excluded. Reported impact or barriers/facilitators must have been based on empirical findings. Studies based solely on the authors' interpretations were not included. Systematic reviews were excluded from the review, but were flagged during abstract and full-text screening, and their reference sections were checked for any relevant studies. Studies reporting empirical findings were sought from peer-reviewed journals, authoritative websites e.g. government, and in open-access repositories.

Table 3 Eligibility criteria for the impact question

Domain	Inclusion criteria	Exclusion criteria
Population	A general population-based approach to service delivery	Non-population-based approach to service delivery
Intervention	Health system organised into regional health organisations which are: o Responsible for care across acute, primary, social/community setting o Established on a regional/geographic basis	Health organisations which are not responsible for care across all three settings Health organisations which are not established on a regional/geographic basis
Comparator	Counterfactual: what would have occurred in the absence of the policy (regionalisation)	
Outcomes	Utilisation of resources e.g., change in number of emergency department admissions Health and care outcomes e.g. life expectancy, mortality rates Efficiency Equity Patient flow Cost and cost-effectiveness e.g. decreased per capita spend on health Staff work experience Perceived quality of care received and supplied e.g. patient satisfaction with care Public trust	
Study design	Before and after study Cost analysis/cost-effectiveness analysis Cost-utility analysis Cost-benefit analysis	Case studies Case series Qualitative studies (but include if mixed quantitative/qualitative) Conference abstracts

Domain	Inclusion criteria	Exclusion criteria
	Cost-minimisation analysis Clinical trials Evaluation studies Interrupted time series Historically controlled studies Observational studies	Opinion pieces, conceptual/theoretical papers, systematic reviews
Location	Organisation for Economic Co-operation and Development (OECD) countries	Non-OECD countries

Table 4 Eligibility criteria for barriers/facilitators question

Domain	Inclusion criteria	Exclusion criteria
Population	A general population-based approach to service delivery	Non-population-based approach to service delivery
Intervention	Health system organised into regional health organisations which are: o Responsible for care across acute,[a] primary, social/community setting o Established on a regional/geographic basis	Health systems which are not organised into regional health organisations Health organisations which are not responsible for care across all three settings Health organisations which are not established on a regional/geographic basis
Outcomes	Studies that identify strategies, barriers, facilitators, enablers, challenges or contextual factors to implementing or transitioning to regional organisations	
Study design	Any primary research design	Opinion pieces, conceptual/theoretical papers, analyses of secondary sources, conference proceedings, theses, systematic reviews[b]
Location	OECD countries	Non-OECD countries

[a] Hospital with an Accident & Emergency Department

[b] Systematic reviews were flagged during abstract review and full texts obtained to check their reference lists for any relevant primary research studies. Systematic reviews themselves were excluded from the review.

3.3 Screening

Abstracts of studies identified for review through the database search were downloaded to EndNote, version X7. The results of the searches for both questions were independently screened by title and abstract for eligibility by two of three reviewers (JQ, JL and COD). Full-text articles were retrieved and assessed for inclusion following independent screening by the same authors. Disagreements at both stages were resolved through discussion and consensus.

During each stage of the selection process for the impact question, articles identified that may have been relevant for the barriers/facilitators question were flagged by the reviewers and vice versa. Any full-text articles identified in this way were again reviewed by two independent reviewers, and queries dealt with in the same way.

3.4 Quality assessment

Due to the heterogeneous nature and variability of the included studies, quality was not used as an exclusion criterion. However, all studies were critically appraised independently by two reviewers in order to provide an overview of the studies included in this review.

3.4.1 Quality appraisal of quantitative studies

Quality appraisal of the quantitative studies was conducted in line with the Effective Public Health Practice Project quality assessment tool.[17] This eight-item scale assesses individual aspects of a study, providing an overall score of 'strong', 'moderate' or 'weak'. Studies were independently assessed by two of three authors (JQ, JL or DOB). Any discrepancies between scores were resolved through discussion and consensus. Studies were not excluded on the basis of the quality appraisal.

3.4.2 Quality appraisal of qualitative studies

A quality appraisal tool developed by researchers in the HRB Evidence Centre was used for this review. It was based on quality appraisal tools from McMaster University and the Joanna Briggs Institute.[18,19] This tool aimed to decrease the subjectivity of the quality assessment processes by asking clearly defined and objective questions of the studies. It is an 11-item questionnaire, with studies scoring either a 0 or 1 on each item. Studies were classified as being of weak (score of 0–3), moderate (score of 4–7), or strong quality (score of 8–11), depending on their total scores. Studies were independently assessed by two authors (COD and CC). Any discrepancies between scores were resolved through discussion and consensus. Studies were not excluded on the basis of the quality appraisal.

3.4.3 Quality appraisal of mixed methods studies

The Effective Public Health Practice Project quality assessment tool was used for the quantitative elements of mixed methods studies, and the 11-item tool that we adapted from quality appraisal tools from McMaster University and the Joanna Briggs Institute was used for the qualitative elements of mixed methods studies.

3.5 Data extraction and validation

Data were extracted by a single reviewer into a bespoke extraction sheet in Microsoft Excel®. Journal websites for the included articles were checked for supplementary data and errata. Extracted data were verified independently by a second reviewer against a clean copy of the publication.

For the impact question, some studies included secondary data in addition to their primary data (e.g. regional per capita expenditure from a national source). In these instances, if the data were relevant to the question and met the eligibility criteria, it was extracted.

For the barriers/facilitators question, only findings based on the analyses of primary data were extracted. Additionally, only barriers and facilitators that were explicitly based on empirical findings were considered. Barriers and facilitators that were based on author interpretations were not extracted.

3.5.1 Variables

See Table 5 for list of data extracted from the included studies.

Table 5 Data extracted from included studies

Extracted variables	
• Author and year • Study design • Country • Province, if applicable • Year of reform • Year analyses were carried out • Method of data collection • Method of data analyses • Participants • Setting	• Aim • Whether the RHO was integrated or not • Comparator (if applicable) • Documented strategies, barriers, facilitators, enablers, challenges or contextual factors that impacted the implementation of, the transition to, or the success of regional health organisations • Author's conclusions

3.5.2 Level of evidence

Based on the Joanna Briggs Institute guidelines for conducting systematic reviews of qualitative evidence,[19] each qualitative finding was assigned a level of evidence. As follows:

1. Unequivocal: relates to evidence beyond reasonable doubt which may include findings that are matter of fact, directly reported/observed and not open to challenge
2. Credible: those that are, albeit interpretations, plausible in light of data and theoretical framework. They can be logically inferred from the data. Because the findings are interpretive, they can be challenged.
3. Not-supported: when neither number 1 nor number 2 above apply and when, most notably, findings are not supported by the data.

3.6 Data analysis and synthesis

3.6.1 Impact question

3.6.1.1 Meta-analysis

The HRB aimed to analyse the data retrieved from the systematic review in a meta-analysis wherever this was deemed feasible. Meta-analysis is the statistical pooling of results from two or more separate studies. A comprehensive meta-analysis feasibility assessment was undertaken to determine which outcomes, from which studies, could be appropriately statistically pooled in a meta-analysis.[20]

3.6.1.1.1 Feasibility assessment

A feasibility assessment was conducted on the extracted data to determine which endpoints had sufficient and appropriate data to synthesise in this way. The feasibility steps were followed:

1. Endpoints were categorised into groups which assessed the same underlying concept. This was necessary, as studies often used different terms to convey the same outcome, for example, the concept of hospitalisations was described in some studies as 'hospitalisations' and in others as 'separations'.

2. Number of studies per endpoint was assessed. Any endpoint which was reported by fewer than two studies was not included in the meta-analysis.
3. Extracted data were examined. All studies which did not meet the data requirements (e.g. no measure of variance) were not included in the meta-analysis. In some cases where data were unclear or missing, authors were contacted for more information. (Although no information was retrieved in this instance)
4. Additional sources of heterogeneity were discussed (e.g. different types of regionalisation). At this stage the advice of an expert in the field of both health policy and statistics was obtained. All issues around heterogeneity were discussed and a consensus was reached.

Four studies were carried through the feasibility assessment, and thus were considered suitable for meta-analyses. Studies which were not suitable were retained for the narrative synthesis.

3.6.1.1.2 Analysis

Two analyses were conducted; one for hospital separations and one for average length of stay (LOS). Due to limitations in study reporting, we were only able to compare data at two points in time; at the point regionalisation was introduced and two years post-regionalisation. Missing measures of variance were imputed as outlined in the *Cochrane Handbook*.[21] Analyses were conducted using the Meta function in R version 3.5.1. Random treatment effects models were used to account for heterogeneity across trials.[22]

3.6.1.2 Narrative synthesis

All studies not included in the meta-analysis were analysed as part of the overall narrative synthesis. Extracted data were grouped into overarching categories (e.g. utilisation). In some case, where outcomes could be applied to more than one outcome category (e.g. a study exploring costs in the north or south of Italy was reported under costs, but was also related to equity); the data were reported in the primary outcome group (i.e. most relevant group for that outcome). Initially, outcomes were analysed separately in their outcome group. Data for each group were summarised, and provided with a direction of effect. When an outcome was only reported by one study, these study-level data are provided in the supplementary appendix only, but a summary of the study results is provided in the summary tables.

3.6.1.3 Impact of regionalisation indicators

In order to provide a clear and concise overview of whether an outcome was affected (positively or negatively) or not by regionalisation, an impact of regionalisation indicator was assigned. The method for assigning indicators was adapted from that used in Thomson and Thomas[23] (see Table 6). A negative or positive indicator of impact was not assigned to cost data, as the impact of this outcome is entirely context dependent. For example, in Mexico, greater spending on healthcare is seen as a positive impact,[24] whereas in Alberta cost containment was a primary aim of the 1994 reform package, a package which also contained funding cuts.[25]

Table 6 Legend for direction of effect

Symbol	Explanation
+	Positive impact
-	Negative impact
~	No impact or unclear impact
*	Impact is statistically significant at $p<0.05$ level

N/A was used in cases where the study authors deemed it inappropriate to assign an indicator of impact.

3.6.2 Barriers/facilitators question

Thematic analysis was used to analyse the results of the studies in the barriers/facilitators question. Studies included in this question used both qualitative and quantitative designs to explore barriers to and facilitators of the regionalisation process. The thematic analysis, conducted by CC, followed the steps outlined by Braun *et al*.[26] and was informed by Guest's approach to thematic analysis[27] and by Elliot and Timulak's approach to qualitative research.[28] After data familiarisation, concepts were coded based on their explicit content. Themes were then identified from the data by grouping common concepts. Once completed, themes were reviewed and defined. This became an iterative process, including input from DOB and JQ, until the themes were finalised. A coding structure table is available in the supplementary appendix.

3.6.3 Bringing together the results of the reviews in a logic model

Initially, the results section of the impact question and the barriers/facilitators question were analysed separately. We integrated the findings of the two reviews in a logic model, as described in Glenton *et al.*[29] This allowed us to propose chains of events that could lead to the outcomes measured in the impact systematic review. For example in the Glenton *et al.* study on lay healthcare worker (LHW) programmes; a component is the integration of the LHW programme with other health services, this leads to a good LHW-health professional relationships, leading to increased referrals to and from LHWs and leading to longer-term outcomes of better quality services and improved health outcomes among mothers and children. We categorised the findings from the qualitative synthesis of barriers/facilitators and the outcome measures from the systematic review of impact into one of the following elements:

- **A component**: Components were direct inputs from the Ministry of Health (MoH), which could be once-off, delivered at regular intervals, or delivered on an ongoing basis. All components were based on information from the synthesis of qualitative research.
- **A short-term outcome**: Short-term outcomes are outcomes that are expected to be achieved in the short term and are set for the RHO and by the RHO.
- **An intermediate outcome**: Intermediate outcomes are managed by the RHO and are expected to be achieved once the RHO has achieved its short-term outcomes.
- **A longer-term outcome** that the components might ultimately lead to: Long-term outcomes are observed in the whole health system, and are the result of all of the RHOs working together to achieve the overarching goals. These were all measured in the review of impact.
- **A barrier or facilitator**, i.e. a factor that could affect, either positively or negatively, the relationship between a component and the short, intermediate or longer-term outcome: All moderators were based on information from the synthesis of qualitative research.

Once these components and outcomes were finalised, they were organised into chains of events. The entire process of the development of the logic model was collaborative and iterative, with input from three authors (JQ, CC, and DOB). The final model is presented in Section 0.

3.7 Notes on terms used

As discussed in Section 2, the term 'regionalisation' does not refer to a unitary concept. There are many different forms of regionalisation, and terms used to describe it, in the countries included in this review. For the purpose of consistency, the term regionalisation is used throughout the report, other than when another specific term (e.g. decentralisation) is used within a study. An explanation of these terms is given in Section 4.

4 Findings – Impact review

The first section of the findings is organised by outcome category (e.g. utilisation), and the technical results of the systematic review are presented. Tables displaying units of measurement that are reported by only one study are placed in the supplementary appendix. A summary of regression results for included studies is included in each section. Supplementary regression results (e.g. multiple models) are provided in the supplementary appendix. At the end of each outcome section (e.g. utilisation), a summary table is presented to compile the results of all the studies in that section. Each of these tables outlines the headline results for the outcome relevant to that section, along with an indicator of the impact of regionalisation (see Section 3.6.1.3), which facilitates a high-level overview of the impact of each outcome. Findings in context are discussed subsequently in the Discussion (see Section 5.1).

4.1 Search results

Database searching identified a total of 1,780 records, and no duplicate references were found. Our database search was broad as is required for health systems research due an abundance of region specific terms and no international consensus on systems terminology. Our search was not limited by geography. For these reasons we were able to exclude a lot of studies at first round screening; of the 1,780 records, 1,654 were excluded at the abstract and title review stage. There were 126 results that met the inclusion criteria and these were subsequently screened on full text. Following full-text screening, 30 studies reported in 33 articles were retained for inclusion in the review. Ineligible studies were excluded based on population, intervention, comparator, outcomes and study design. The flow of literature through the assessment process is shown in the PRISMA flowchart (see Figure 5). The list of excluded studies alongside the reason for exclusion is set out in the supplementary appendix.

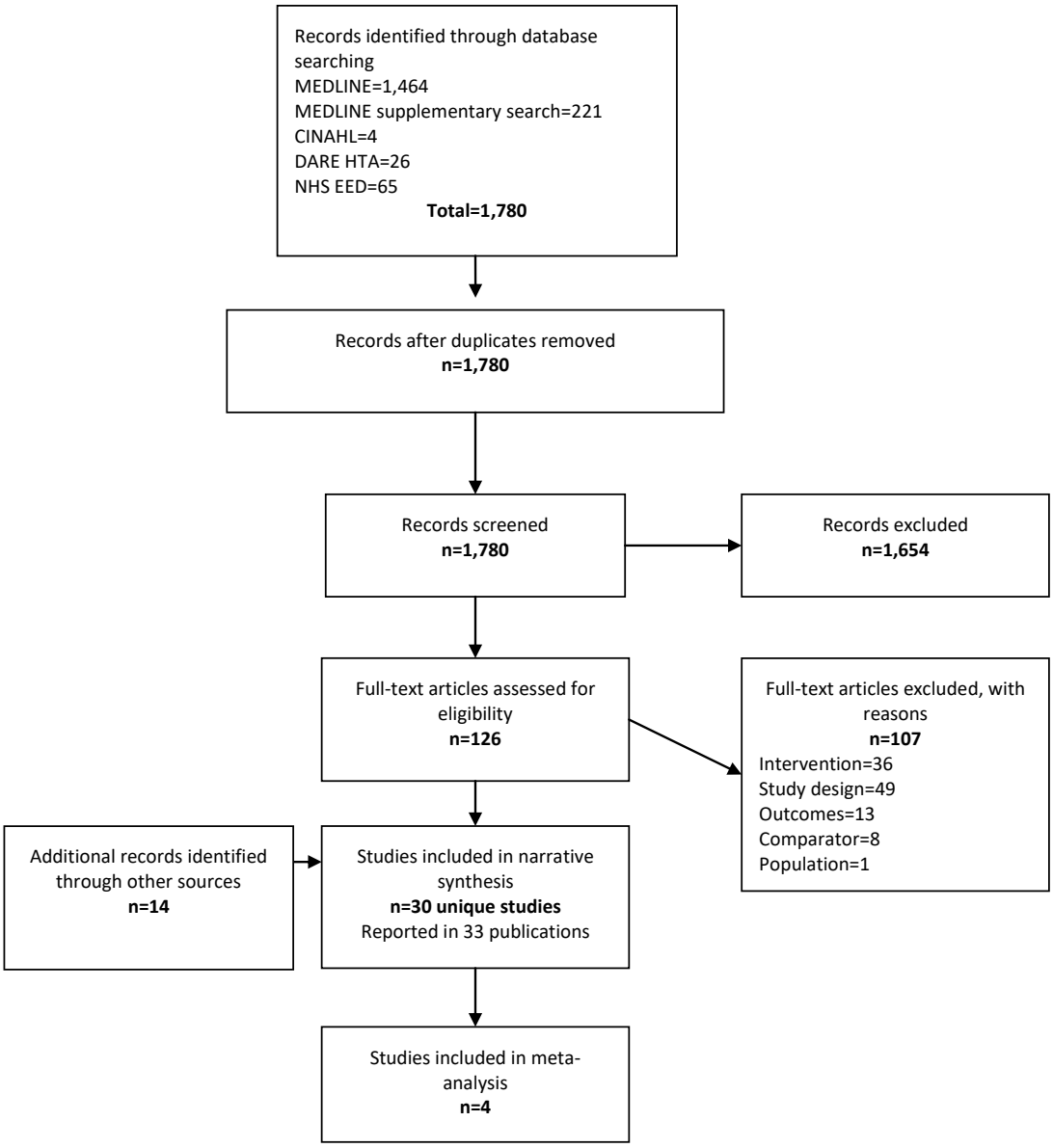


Figure 3: PRISMA diagram impact questions

The majority of studies identified were from Spain (n=14) and Canada (n=10). The geographic dispersal of the impact studies is shown in Figure 4. As we have treated the Canadian provinces as separate entities in this review we have also given a breakdown of the number of studies by province in Figure 5.

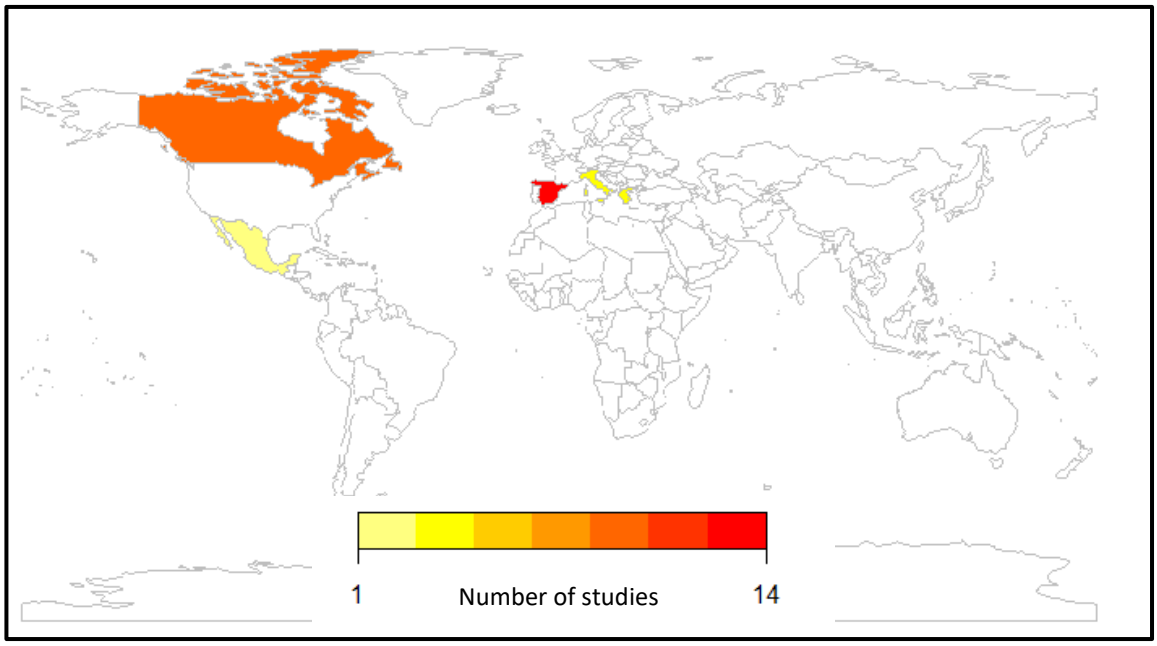


Figure 4 Geographic dispersal of impact studies

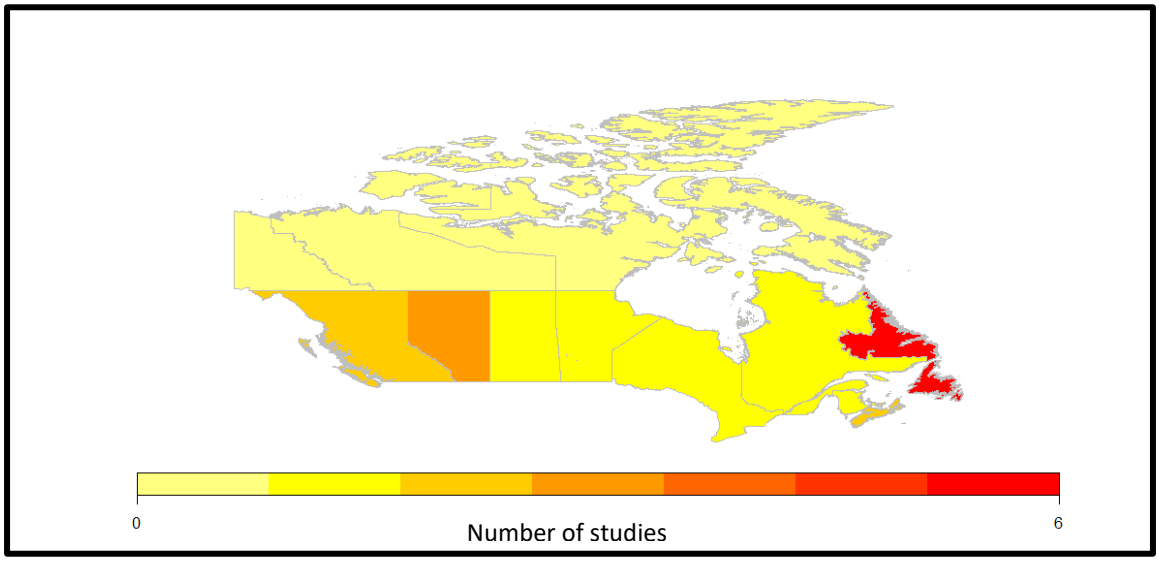


Figure 5 Geographic dispersal of impact studies in Canadian provinces

Table 7 lists the included studies, including the primary publication authors and any secondary publications for which additional data were extracted. The counterfactual in the study and the year of reform are also included. The year of reform has been standardised across publications reporting on the same country, based on background research conducted by the HRB (see Section 2).

4.2 Results of critical appraisal

Using the Effective Public Health Practice Project's quality appraisal tool,[17] 14 studies included in the impact question were found to be 'weak' with respect to design and/or analysis, 13 were found to be 'moderate', and three were found to be 'strong'. See the supplementary appendix for a full list of the studies and their scores.

Table 7 List of included studies

Study ID	Authors	Secondary publication	Country (province)	Counterfactual	Year of reform[a]	Outcomes
Aletras 2007[30]	Aletras *et al.*	–	Greece	Before and after regionalisation	2001	Utilisation; Health and Health and care outcomes; Efficiency
Anton 2014[5]	Anton *et al.*	–	Spain	Before and after regionalisation	1981–1994, 2002	Perceived quality of care
Arredondo 2004[31]	Arredondo and Parada	–	Mexico	Insured and uninsured populations before and after regionalisation	1993–1997	Costs; Equity
Barrasa-Villar 2013[32]	Barrasa Villar *et al.*	–	Spain	Intra-regional differences in devolved and non-devolved regions	1981–1994, 2002	Health and care outcomes
Barrett 2005[33]	Barrett *et al.*	–	Canada (NL)	At the start of, and after, regionalisation	1994–1997	Utilisation; Efficiency
Cantarero 2005[34]	Cantarero	–	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	Costs
Cantarero 2008[35]	Cantarero and Pascual	–	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	Health and care outcomes
Cloutier-Fisher 2006[8]	Cloutier-Fisher *et al.*	–	Canada (BC)	Before and after regionalisation	1997	Utilisation; Equity
Costa-Font 2005[36]	Costa-Font	–	Spain	Intra-regional differences in devolved and non-devolved regions	1981–1994, 2002	Equity
Costa-Font 2006[37]	Costa-Font and Rico	–	Spain	Devolved and non-devolved regions	1981–1994, 2002	Health and care outcomes; Costs; Equity
Costa-Font 2007[38]	Costa-Font and Pons-Novell[b]	–	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	Costs
Costa-Font 2008a[39]	Costa-Font and Moscone	Costa-Font 2016	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	Costs

Study ID	Authors	Secondary publication	Country (province)	Counterfactual	Year of reform[a]	Outcomes
Costa-Font 2018[40]	Costa-Font and Turati	Costa-Font 2016[41]	Spain	Before and after regionalisation	1981–1994, 2002	Equity
Costa-Font 2018[40]	Costa-Font and Turati	–	Italy	Before and after regionalisation	2000–2001	Equity
Costa-Font 2009[42]	Costa-Font and Gil	Costa-Font 2008b[43]	Spain	Devolved and non-devolved regions	1981–1994, 2002	Utilisation; Health and care outcomes; Equity
Curtis 2005[44]	Curtis *et al.*	–	Canada (NL)	At the start of, and after, regionalisation	1994–1997	Health and care outcomes
De Nicola 2014[45]	De Nicola *et al.*	–	Italy	Different regionalisation models	2000–2001	Utilisation; Costs; Efficiency; Patient flow
Giannoni 2002[46]	Giannoni and Hitiris	–	Italy	Before and after regionalisation	1992–1993	Costs; Equity
Hamilton 2001[25]	Hamilton *et al.*	–	Canada (AB)	Before and after regionalisation	1994	Utilisation; Health and care outcomes
Hanlon 2003[10]	Hanlon	–	Canada (NS)	Before and after regionalisation	1996	Utilisation; Patient flow
Jimenez-Rubio 2008[47]	Rubio *et al.*	–	Canada	Regionalised and non-regionalised provinces	–	Utilisation; Health and care outcomes; Equity
Jimenez-Rubio 2017[6]	Jimenez-Rubio and García-Gomez	–	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	Utilisation; Health and care outcomes
Jovell 2007[48]	Jovell *et al.*	–	Spain	Historical data	1981–1994, 2002	Perceived quality of care; Public trust
Librero 2017[49]	Librero *et al*.	–	Spain	At the start of, and after, regionalisation	1981–1994, 2002	Health and care outcomes
Martin-Fernandez 2007[50]	Martin-Fernandez *et al.*	–	Spain (Madrid)	Before and after regionalisation (and insured population)	1981–1994, 2002	Staff work experience

Study ID	Authors	Secondary publication	Country (province)	Counterfactual	Year of reform[a]	Outcomes
Martínez-Fritscher 2011[12]	Martínez-Fritscher and Rodríguez Zamora	–	Mexico	Before and after regionalisation and non-regionalised population	1993–1997	Health and care outcomes; Efficiency
Saunders 1999[51]	Saunders *et al.*	Martin 1998	Canada (AB)	Before and after regionalisation	1994	Utilisation; Costs; Patient flow
Toth 2014[11]	Toth	–	Italy	Before and after regionalisation	2000–2001	Perceived quality of care; Health and care outcomes; Costs; Patient flow
Twells 2005[52]	Twells *et al.*	–	Canada (NL)	At the start of, and after, regionalisation	1994–1997	Utilisation; Costs
Way 2005a[53]	Way *et al.*	–	Canada (NL)	At the start of, and after, regionalisation	1994–1997	Perceived quality of care; Staff work experience
Way 2005b[9]	Way *et al.*	–	Canada (NL)	At the start of, and after, regionalisation	1994–1997	Utilisation; Costs; Staff work experience

[a] Data from these columns based on research by the HRB.

4.3 Utilisation of resources

Twelve studies reporting healthcare resource utilisation data were included. Eight of these studies were conducted in Canada, one analysing Canada as a whole,[47] three in NL,[9,33,52] two in AB,[25,51] one in BC,[8] and one in NS.[10] Two studies were conducted in Spain,[6,42] one in Greece,[30] and one in Italy.[45,54] Most studies used data before and after regionalisation, and some studies fulfilled the criteria for an interrupted time series design, with some comparing two or three time points and others comparing trends over time (e.g. Barrett *et al*. 2005).[33] Others compared regionalised and non-regionalised states[42,47] or different models of regionalisation.[45] See Table 8 for full list of table characteristics.

4.3.1 Hospital separations

Hospital separations are defined as "discharge, death, sign-out or transfer of the patient to another facility".[55(p5)] Separations per 1,000 population were reported for four studies.[8,10,33,51] Studies that reported data for multiple time points are represented in Figure 6, Figure 7, and Figure 8. In NS, separations per 1,000 population were 93.5 in 1996/1997 and 99.1 in 1999/2000; these data exclude patients who entered hospital via the emergency department. The total number of separations for NL, AB, and NS in the time periods studies are reported in Table 9. Studies also reported avoidable hospitalisation rates (AHRs) (see Table 10).

Table 8 Study characteristics for utilisation studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Aletras 2007[30]	Aletras *et al.*	Greece	Before and after regionalisation	2001	2002, 2003	Administrative	Acute	Sample included 51 out of 72 general NHS hospitals, excluding; psychiatric and other specialty units, university-affiliated hospitals, and hospitals with fewer than 50 beds
Barrett 2005[33]	Barrett *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994–1997	1995–2001	Administrative	Acute	All resident of NL discharged from a provincial acute care facility after either an episode of acute care or a day surgical procedure
Cloutier-Fisher 2006[8]	Cloutier-Fisher *et al.*	Canada (BC)	Before and after regionalisation	1997	1990–2000	Administrative	Acute and primary	Health service users aged 50 years and older who lived in the province
Costa-Font 2009[42]	Costa-Font and Gil	Spain	Devolved and non-devolved regions	1981–1994, 2002	2000–2001	Political in all states and fiscal in two states	All	Not applicable (N/A)
De Nicola 2014[45]	De Nicola *et al.*	Italy	Different regionalisation models	2000–2001	2004–2005	Political, with some fiscal autonomy	All	101/103 provinces included (excluding Gorizia and Terni which represent the 3.67% and the 5.90% of the Italian resident population).
Hamilton 2001[25]	Hamilton *et al.*	Canada (AB)	Before and after regionalisation	1994	1993–1995, 1995–1997	Administrative	Acute	Condition specific: focused on routine surgical procedures in two major acute facilities
Hanlon 2003[10]	Hanlon	Canada (NS)	Before and after regionalisation	1996/1997	1992/1993–1995/1996, 1996/1997–1999/2000	Administrative	Acute	Surgical and medical procedures that are available within the district, but diagnostic procedures, entry through emergency, and billing codes used in Nova Scotia to indicate circumstances, such as cancelled surgeries, were excluded from analysis
Jimenez-Rubio 2008[47]	Jimenez-Rubio *et al.*	Canada	Regionalised and non-regionalised provinces	–	2001	Administrative	All	N/A

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Jimenez-Rubio 2017[6]	Jimenez-Rubio and García-Gomez	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	1980–2010	Political in all states and fiscal in two states	All	N/A
Saunders 1999[51]	Saunders *et al.*	Canada (AB)	Before and after regionalisation	1994	1991–1997	Administrative	Acute	N/A
Twells 2005[52]	Twells *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994 to 1997	1995/1996–2002/2003	Administrative	Acute	N/A
Way 2005b[9]	Way *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994 to 1997	1996–2002	Administrative	Acute	Acute care staff

[a] These columns are based on research conducted by the HRB.

Table 9 Quantitative results for utilisation outcomes: separations

Study ID	Country (province)	Year	Subgroup	Separations N[a]	n	Indexed rate
Barrett 2005	Canada (NL)	1995/1996	HCCSJ	–	33,453	100.0
		1995/1996	Rest of province	–	43,359	100.0
		1995/1996	Total	*563,548*[a]	76,812	
		1996/1997	HCCSJ	–	32,463	97.0
		1996/1997	Rest of province	–	41,571	95.9
		1996/1997	Total	*555,305*[a]	74,034	
		1997/1998	HCCSJ	–	31,963	95.5
		1997/1998	Rest of province	–	41,194	95.0
		1997/1998	Total	*545,377*[a]	73,157	
		1998/1999	HCCSJ	–	31,767	94.9
		1998/1999	Rest of province	–	39,857	91.9
		1998/1999	Total	*536,586*[a]	71,624	
		1999/2000	HCCSJ	–	30,549	91.3
		1999/2000	Rest of province	–	38,236	88.2
		1999/2000	Total	*530,648*[a]	68,785	
		2000/2001	HCCSJ	–	28,656	85.7
		2000/2001	Rest of province	–	35,814	82.6
		2000/2001	Total	*525,006*[a]	64,470	
		***p*-value all years**	HCCSJ	$p<0.001$		
		***p*-value all years**	Rest of province	$p<0.001$		
Saunders 1999	Canada (AB)	1991/1992	–	–	410,516	100.0
		1992/1993	–	–	402,705	98.1
		1993/1994	–	–	386,151	94.1
		1994/1995	–	–	364,366	88.8
		1995/1996	–	–	335,618	81.8
		1996/1997	–	–	330,730	80.6
Hanlon 2003	Canada (NS)	1992/1993	DHA 1	–	4,598	–
		1992/1993	DHA 2	–	5,320	–
		1992/1993	DHA 3	–	8,897	–
		1992/1993	DHA 4	–	4,161	–
		1992/1993	DHA 5	–	1,980	–
		1992/1993	DHA 6	–	3,623	–
		1992/1993	DHA 7	–	2,782	–
		1992/1993	DHA 8	–	17,511	–
		1992/1993	DHA 9	–	43,902	–

Study ID	Country (province)	Year	Subgroup	Separations N[a]	n	Indexed rate
		1992/1993	Total	–	92,774	–
		1996/1997	DHA 1	–	4,235	–
		1996/1997	DHA 2	–	5,373	–
		1996/1997	DHA 3	–	7,395	–
		1996/1997	DHA 4	–	3,810	–
		1996/1997	DHA 5	–	1,961	–
		1996/1997	DHA 6	–	3,319	–
		1996/1997	DHA 7	–	3,098	–
		1996/1997	DHA 8	–	15,581	–
		1996/1997	DHA 9	–	40,249	–
		1996/1997	Total	–	85,021	–
		1999/2000	DHA 1	–	4,714	–
		1999/2000	DHA 2	–	4,361	–
		1999/2000	DHA 3	–	7,298	–
		1999/2000	DHA 4	–	3,894	–
		1999/2000	DHA 5	–	2,083	–
		1999/2000	DHA 6	–	3,528	–
		1999/2000	DHA 7	–	3,668	–
		1999/2000	DHA 8	–	15,983	–
		1999/2000	DHA 9	–	47,598	–
		1999/2000	Total	–	93,127	–

[a] Values calculated by the HRB.

HCCSJ = Health Care Corporation St. John's

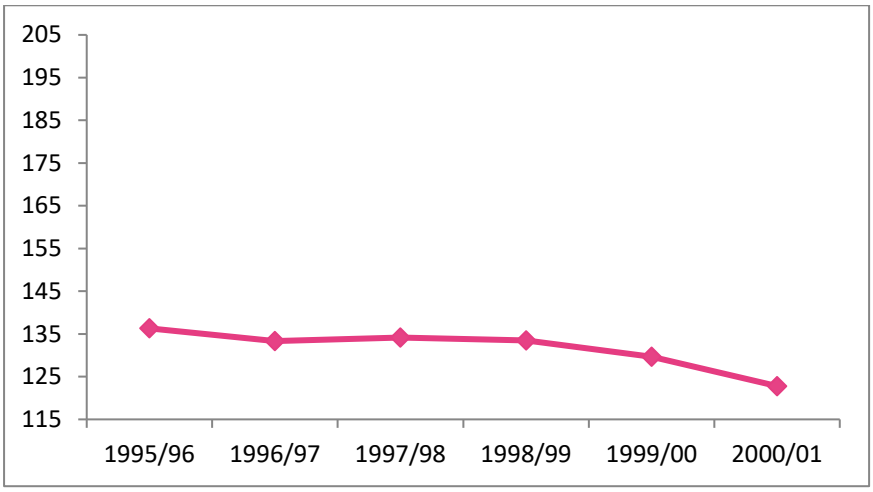


Figure 6 Separations per 1,000 population, NL

Source: Barrett *et al.*[33]

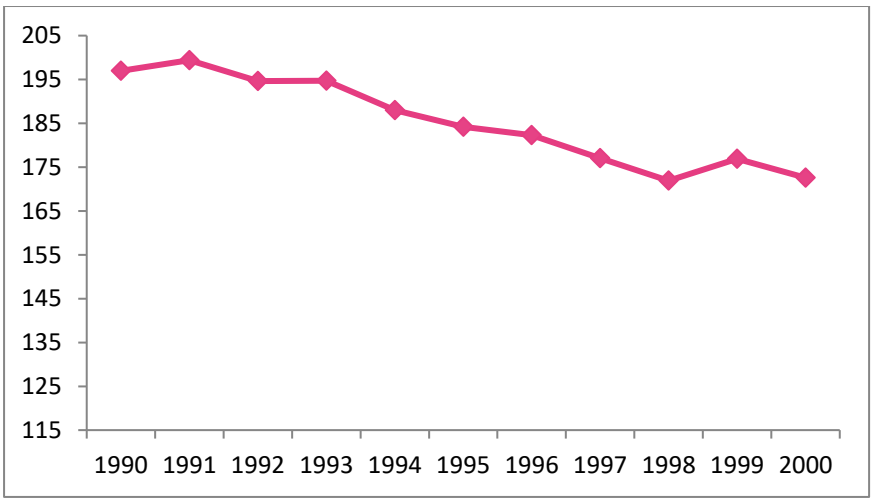


Figure 7 Separations per 1,000 population, BC

Source: Cloutier-Fisher *et al.*[8]

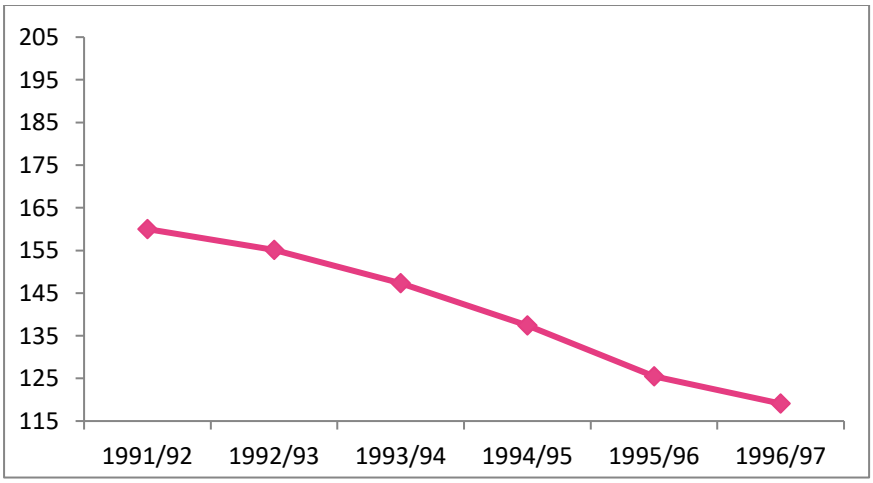


Figure 8 Separations per 1,000 population, AB

Source: Saunders *et al.*[51]

Table 10 Quantitative results for utilisation outcomes: AHR

Study ID	Country (province)	Year	Subgroup	AHR per 1,000	Non-AHR per 1,000
Cloutier-Fisher 2006	Canada (BC)	1990	Total pop	10.2	186.8
		1991	Total pop	11	188.4
		1992	Total pop	10.6	184
		1993	Total pop	10.5	184.1
		1994	Total pop	10.2	177.8
		1995	Total pop	9.5	174.7
		1996	Total pop	9.9	172.4
		1997	Total pop	9.6	167.4
		1998	Total pop	9.3	162.6
		1999	Total pop	8.9	168
		2000	Total pop	7.8	164.8

4.3.2 Average length of stay

Three studies reported on average LOS, and the results are set out in Table 11. A meta-analysis of these studies was also conducted, and results of this are set out in Section 4.3.7. The mean number of hospital nights for Canadian regions was reported by one study.[47] Hamilton *et al.* also reported average LOS and 30-day readmission rates for surgery patients.[25] Individual study data are provided in the supplementary appendix and are summarised in Table 16.

4.3.3 Case intensity

Studies also reported the change in case intensity as a result of utilisation, as depicted in Table 12. Resource intensity weight (RIW) was the measure used, and it is defined as "a value that represents the relative resources used by a patient. Specifically, RIWs are relative values that describe the expected resource consumption of an average patient".[56]

Table 11 Quantitative results for utilisation outcomes: LOS

Study ID	Country (province)	Year	Subgroup	Average LOS	L95%CI	U95%CI	Min	Max	Indexed rate	Average LOS per 1,000 (min, max)
Barrett 2005	Canada (NL)	1995/1996	HCCSJ	9.08	8.87	9.29			–	8.3
		1995/1996	Rest of province	6.30	6.16	6.43			–	7.1
		1995/1996	Total	*7.51*[a]						
		1996/1997	HCCSJ	9.30	9.08	9.51			–	8.7
		1996/1997	Rest of province	6.41	6.28	6.53			–	7.2
		1996/1997	Total	*7.68*[a]						
		1997/1998	HCCSJ	9.23	9.03	9.42			–	8.7
		1997/1998	Rest of province	6.38	6.26	6.49			–	7.1
		1997/1998	Total	*7.63*[a]						
		1998/1999	HCCSJ	8.62	8.46	8.79			–	8
		1998/1999	Rest of province	6.30	6.19	6.41			–	6.9
		1998/1999	Total	*7.33*[a]						
		1999/2000	HCCSJ	8.70	8.52	8.86			–	8.2
		1999/2000	Rest of province	6.43	6.31	6.55			–	6.8
		1999/2000	Total	*7.44*[a]						
		2000/2001	HCCSJ	9.65	9.45	9.85			–	8.8
		2000/2001	Rest of province	6.68	6.55	6.81			–	7.2
		2000/2001	Total	*8.00*[a]						
Saunders 1999	Canada (AB)	1991/1992	–	7.8	–	–	4.4	8.4	100	8.2 (5.5, 9.8)
		1992/1993	–	7.6	–	–	4.3	8.1	97.7	7.9 (5.8, 8.6)

Study ID	Country (province)	Year	Subgroup	Average LOS	L95%CI	U95%CI	Min	Max	Indexed rate	Average LOS per 1,000 (min, max)
		1993/1994	–	7.3	–	–	4.5	8.1	94.3	7.6 (5.9, 9.2)
		1994/1995	–	6.7	–	–	4.3	7.2	86.3	7 (5.6, 10.1)
		1995/1996	–	6.3	–	–	4.3	6.8	81.4	6.5 (5.3, 7.7)
		1996/1997	–	6.5	–	–	4.2	7.4	83.8	6.7 (5.2, 8)
Aletras 2007	Greece	2000	Hospital	4.09	–	–	1.95	7.61	–	–
	Greece	2003	Hospital	3.79	–	–	1.93	6.41	–	–

[a] Values calculated by the HRB.

Table 12 Quantitative result for utilisation outcomes: case intensity

Study ID	Country (province)	Year	Subgroup	Average RIW	L95%CI	U95%CI
Barrett 2005	Canada (NL)	1995/1996	HCCSJ	1.47	1.44	1.5
		1995/1996	Rest of province	1	0.98	1.01
		1996/1997	HCCSJ	1.52	1.5	1.55
		1996/1997	Rest of province	1.02	1	1.03
		1997/1998	HCCSJ	1.55	1.52	1.58
		1997/1998	Rest of province	1.04	1.03	1.06
		1998/1999	HCCSJ	1.5	1.47	1.52
		1998/1999	Rest of province	1.05	1.03	1.07
		1999/2000	HCCSJ	1.46	1.43	1.48
		1999/2000	Rest of province	1.07	1.05	1.08
		2000/2001	HCCSJ	1.74	1.7	1.77
		2000/2001	Rest of province	1.16	1.14	1.18
Saunders 1999	Canada (AB)	1991/1992		1.04	0.66[a]	1.18[a]
		1992/1993		1.07	0.68[a]	1.18[a]
		1993/1994		1.1	0.7[a]	1.21[a]
		1994/1995		1.09	0.68[a]	1.22[a]
		1995/1996		1.1	0.69[a]	1.24[a]
		1996/1997		1.13	0.68[a]	1.27[a]

[a] Min and max

4.3.4 Procedures and physician visits

The number of surgeries performed and visits to medical professionals pre- and post-regionalisation was reported by four studies.[30,33,42,47] However, there was no common unit of measure used across any of the studies. Individual study results are provided in the appendix and are summarised in Table 16.

4.3.5 Days of care

Days of care were reported for two studies before and after regionalisation, and the results of these studies are set out in Table 13. Aletras *et al.* reported similar endpoints: 'mean patient days' and 'mean inpatient days'.[30] However, no definitions were provided in the paper to allow the HRB to assess if they were the same as total days of care. Therefore, these study data are set out in the supplementary appendix and are summarised in Table 16

4.3.6 Hospital beds and staff

Data on hospital beds were reported by three studies, and results are set out in Table 14.[30,33,51] Data on staffing levels was reported by two studies.[9,30] However, units of measure were not common across the studies. Individual study data are set out in the supplementary appendix and are summarised in Table 16.

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Table 13 Quantitative results for utilisation outcomes: days of care

Study ID	Country (Province)	Year	Subgroup	Total days of care		Total days of care per 1,000 population			
				N	Indexed rate	N	L95%CI	U95%CI	Indexed rate
Barrett 2005	Canada (NL)	1995/1996	HCCSJ	303,789	100	949.72	949.58	949.86	100
		1995/1996	Rest of province	272,974	100	1028.25	1028.15	1028.35	100
		1995/1996	Total	576,763					
		1996/1997	HCCSJ	301,853	99.4	999.3	999.16	999.44	105.2
		1996/1997	Rest of province	266,299	97.5	1007.62	1007.52	1007.72	97.9
		1996/1997	Total	568,152					
		1997/1998	HCCSJ	294,983	97.1	992.22	992.08	992.36	104.5
		1997/1998	Rest of province	262,644	96.2	982.33	982.23	982.43	95.5
		1997/1998	Total	557,627					
		1998/1999	HCCSJ	273,932	90.2	904.82	904.69	904.95	95.3
		1998/1999	Rest of province	251,007	91.9	939.19	939.09	939.29	91.3
		1998/1999	Total	524,939					
		1999/2000	HCCSJ	265,824	87.5	907.01	906.88	907.14	95.5
		1999/2000	Rest of province	245,783	90	891.22	891.12	891.32	86.7
		1999/2000	Total	511,607					
		2000/2001	HCCSJ	276,577	91	915.88	915.75	916.01	96.4
		2000/2001	Rest of province	239,210	87.6	882.99	882.89	883.09	85.9
		2000/2001	Total	515,787					

Study ID	Country (Province)	Year	Subgroup	Total days of care		Total days of care per 1,000 population			
				N	Indexed rate	N	L95%CI	U95%CI	Indexed rate
Saunders 1999	Canada (AB)	1991/1992	–	3,191,660	100	1314.5	999[a]	2234	100
		1992/1993	–	3,058,141	95.8	1231.4	968[a]	2493	93.7
		1993/1994	–	2,829,662	88.7	1123.1	883[a]	2343	85.4
		1994/1995	–	2,444,824	76.6	955	728[a]	1922	72.7
		1995/1996	–	2,124,435	66.6	815.5	598[a]	1610	62
		1996/1997	–	2,155,534	67.5	795.3	591[a]	1412	60.5

[a] Minimum and maximum

Table 14 Quantitative results for utilisation outcomes: hospital beds

Study ID	Country (province)	Year	Subgroup	Beds per capita					
				Mean (SD)	%	N beds	Rate/1,000	% change (dates)	Occupancy rate (SD)
De Nicola 2014	Italy (Piemonte)	2005	ASL Centred Cost adjusted	–	0.33	–	–	–	–
	Italy (V. Aosta)	2005	ASL Centred National	–	0.56	–	–	–	–
	Italy (Lombardy)	2005	Purchaser-provider. Analytic	– –	0.37	–	–	–	–
	Italy (Bolzano)	2005	ASL Centred National	–	0.41	–	–	–	–
	Italy (Trento)	2005	ASL Centred National	–	0.4	–	–	–	–
	Italy (Veneto)	2005	ASL Centred Analytic	–	0.4	–	–	–	–

Study ID	Country (province)	Year	Subgroup	Beds per capita					
				Mean (SD)	%	N beds	Rate/1,000	% change (dates)	Occupancy rate (SD)
	Italy (Friuli)	2005	Regional Centred National	–	0.36	–	–	–	–
	Italy (Liguria)	2005	Regional Centred National	–	0.46	–	–	–	–
	Italy (Emilia R.)	2005	ASL Centred Analytic	–	0.39	–	–	–	–
	Italy (Tuscany)	2005	ASL Centred Analytic	–	0.37	–	–	–	–
	Italy (Umbria)	2005	ASL Centred Analytic	––	0.25	–	–	–	–
	Italy (Marche)	2005	ASL Centred Nation/al	–	0.35	–	–	–	–
	Italy (Lazio)	2005	ASL Centred Analytic	–	0.37	–	–	–	–
	Italy (Abruzzo)	2005	Regional Centred National	–	0.36	–	–	–	–
	Italy (Molise)	2005	Regional Centred National	–	0.49	–	–	–	–
	Italy (Campania)	2005	Regional Centred National	–	0.25	–	–	–	–
	Italy (Apulia)	2005	ASL Centred National	–	0.33	–	–	–	–
	Italy (Basilicata)	2005	ASL Centred National	–	0.36	–	–	–	–
	Italy (Calabria)	2005	ASL Centred National	–	0.27	–	–	–	–
	Italy (Sicily)	2005	Regional Centred Cost adjusted	–	0.32	–	–	–	–
	Italy (Sardinia)	2005	ASL Centred National	–	0.9	–	–	–	–
	Italy (all)	2005	–	–	0.39	–	–	–	–
	Italy (North)	2005	–	–	0.38	–	–	–	–
	Italy (Centre)	2005	–	–	0.36	–	–	–	–
	Italy (South)	2005	–	–	0.35	–	–	–	–

Study ID	Country (province)	Year	Subgroup	Beds per capita					
				Mean (SD)	%	N beds	Rate/1,000	% change (dates)	Occupancy rate (SD)
Twells 2005	Canada (NL)	1995	HCCSJ	–	–	940	4.7	-2.5 (1995–2002)	–
		1995	Rest of province	–	–	953	2.6	-12 (1995–2002)	–
		1995	Total pop	–	–	1,893	3.7	–	–
		2002	HCCSJ	–	–	786	4.1	–	–
		2002	Rest of province	–	–	815	2.5	–	–
		2002	Total pop	–	–	1,601	3.2	–	–
Aletras 2007	Greece	2000	Hospital	193.27 (104.47)	–	–	–	–	0.64 (0.11)
		2003	Hospital	197.21 (104.63)	–	–	–	–	0.68 (0.16)

Abbreviations: ASL=Aziende Sanitarie Locali, SD=standard deviation,

4.3.7 Meta-analysis

We conducted two meta-analyses; the first for separations per 1,000 population and the second for average LOS. We present random effects model results here, as "random-effects meta-analyses allow for heterogeneity by assuming that underlying effects follow a normal distribution."[21] Figure 9 shows that the odds of separations per 1,000 population were lower two years after regionalisation. However, this difference is not statistically significant.

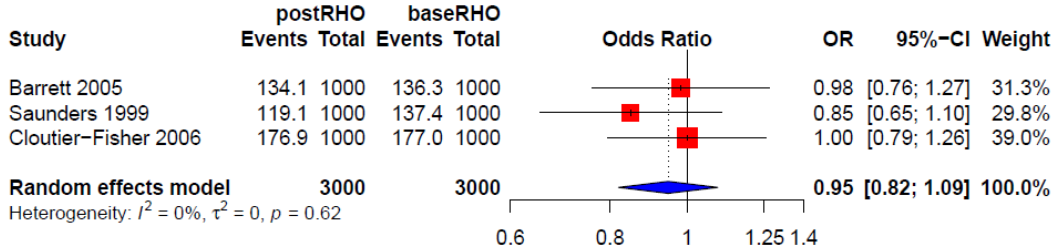

Figure 9 Meta-analysis results separations
Note: PostRHO refers to data recorded two years post-regionalisation, while baseRHO refers to data recorded the year regionalisation was introduced.

Figure 10 shows the meta-analysis results for average LOS two years after regionalisation. The analysis suggests that the mean LOS was shorter two years after regionalisation, but the standardised mean difference is not statistically significant. The Hamilton *et al.* study was not included in this analysis, as it looked at average LOS after surgery only.[25]

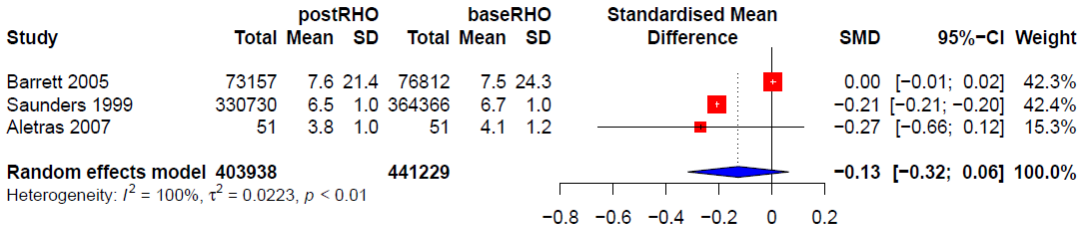

Figure 10: Meta-analysis results LOS
Note: PostRHO refers to data recorded two years post-regionalisation, while baseRHO refers to data recorded the year regionalisation was introduced. The exception to this is the Aletras *et al.* study, which only reported data for the year before regionalisation for comparison.[30]

4.3.8 Regression analysis results for utilisation outcomes

Three studies[6,8,25] assessed the impact of regionalisation on healthcare resource utilisation through regression analyses. The Hamilton *et al.* study focused on the impact of regionalisation on surgery only.[25] The results of these analyses are summarised in Table 15. Each of the studies measured utilisation using a different outcome and, therefore it was not possible to combine the individual study results.

4.3.9 Summary

See Table 16 for an overview of the impact of regionalisation on healthcare utilisation outcomes.

Table 15 Regression analysis results for utilisation outcomes

Study ID	Outcome	Model number	Subgroup	Other factors considered in model	Short descriptive summary of results	Statistically significant regionalisation variable
Cloutier-Fisher 2006	AHR	1	Urban, rural, total population	–	In the time period before and after regionalisation for total hospitalisations and non-AHR, there are statistically significant and diverging trends over the time interval, with the gap between rural and urban areas wider three years after regionalisation. There was no statistically significant trend for overall AHRs over the time period.	Assessing impact of regionalisation was not an aim of model
	Non-AHR	1				
	Hospitalisations	1				
Jimenez-Rubio 2017	Number of general practitioners (GPs) per 100,000 population	1 and 2	–	Province-fixed effects and year-fixed effects and other controls; gross domestic product (GDP) per capita; education; female activity rate; and mean age of women at childbirth.	Decentralisation is associated with a 9.8 increase in the number of GPs per 100,000 population on average. The estimated effect is larger in regions with full political and fiscal decentralisation (foral regions) at an increase of 25.9 GPs per 100,000, and very small and insignificant increase for fast-tracked regions (before 2002) with political decentralisation only.	Yes
Hamilton 2001	LOS	1	16 surgery types and one 'all procedures' group	Age, sex, alcohol abuse, malnutrition, Charlson Comorbidity Index, urgent and emergent admission, hospital discharge within 30 days before index admission, transfer from another hospital, discharged to subacute programme, and discharged to other in-region institution.	All of the coefficients were negative, indicating that post-regionalisation patients had a shorter LOS across all 17 procedure groups, but only 8 of 17 were significantly shorter post-regionalisation.	Yes
	30-day readmission rate	2		Age, sex, Charlson Comorbidity Index, urgent and emergent admission, transfer of a patient to the index hospital, hospital discharge within 30 days before the index admission, discharge to a subacute programme, and discharge to another	No odds ratio relating post-regionalisation status to 30-day readmission for any procedure was found to be significant at the $p<0.003$ level, which was chosen by Hamilton *et al.* The rate of readmissions was stable despite the fact	No

Study ID	Outcome	Model number	Subgroup	Other factors considered in model	Short descriptive summary of results	Statistically significant regionalisation variable
				in-region facility.	that LOS was considerably shorter. Therefore, earlier discharge did not increase readmission rates at Hamilton *et al.*'s chosen cut-off level of significance.	

Table 16 Summary table for utilisation outcomes

Study ID	Country (province)	Utilisation variable examined	Comparison type	Post-regionalisation	Impact of regionalisation
Saunders 1999	Canada (AB)	Separations	Before and after regionalisation	Fall in hospital separations. The biggest reductions in utilisation rates occurred in the years of major restructuring of health services in Alberta (1994/1995 and 1995/1996). Fall in separations appeared to be linked to changes in budget allocations. There was a 64% greater reduction in hospital separations than expected by extrapolating the historical trend between 1971 and 1991.	+
Hanlon 2003	Canada (Nova Scotia [NS])		Before and after regionalisation	There was a decrease in separations for people not admitted via the emergency department in the year regionalisation was introduced (1996/1997), which then reverted three years later. The authors believe the decrease to be linked to stagnation in the growth of the NS population.	~
Barrett 2005	Canada (NL)		At the start of, and after, regionalisation	Separations fell in all years (1995/1996 to 2000/2001) post-regionalisation. However, the degree to which regionalisation versus financial constraints contributed to these trends is unclear.	+*
Cloutier-Fisher 2006	Canada (BC)		Before and after regionalisation	AHRs declined over the 11-year interval, from 10.2 per 1,000 population in 1990 to 7.8 per 1,000 population in 2000. AHRs declined significantly and more sharply than total hospitalisations. For total hospitalisations and non-AHRs, there is evidence to suggest that the gap between rural and urban AHRs is wider at the end of the time interval.	+*

Study ID	Country (province)	Utilisation variable examined	Comparison type	Post-regionalisation	Impact of regionalisation
Jimenez-Rubio 2008	Canada (all)	Hospital nights	Regionalised and non-regionalised provinces	There was no notable trend in hospital nights per person in regionalised provinces versus non-regionalised provinces.	~
Meta-analysis				The odds of hospital separations per 1,000 population are lower two years after regionalisation. However, this difference is not statistically significant.	+
Saunders 1999	Canada (AB)	LOS and readmissions	Before and after regionalisation	There have been large decreases in the average LOS of patients admitted to acute care hospitals in Alberta. This is associated with healthcare restructuring that began in 1994, which also consisted of budget decreases at the time.	+
Hamilton 2001	Canada (AB)		Before and after regionalisation	For surgery procedures, the median LOS decreased from 8.0 days pre-regionalisation to 7.0 days post-regionalisation (p<0.001). Post-regionalisation, patients had a shorter LOS across all procedure groups as measured by regression analysis.	+*
				The readmission rates were similar for both groups (8.0% versus 7.0%) (p=0.06). No odds ratio relating post-regionalisation status to 30-day readmission for any procedure was found to be significant at Hamilton *et al.*'s chosen cut-off level (p<0.003) in regression analysis.	~
Barrett 2005	Canada (NL)		At the start of, and after, regionalisation	There was little change in average LOS between 1995/1996 and 2000/2001.	~[a]
Aletras 2007	Greece		Before and after regionalisation	Average LOS was lower in 2003, two years after regionalisation.	N/A
Meta-analysis				The mean LOS was shorter two years after regionalisation, but the standardised mean difference is not statistically significant.	+
Saunders 1999	Canada (AB)	Case intensity	Before and after regionalisation	Reduction in case intensity. The biggest reductions in utilisation rates occurred in the years (1994/1995 to 1995/1996) of major restructuring of health systems. There was a 37% greater reduction than expected, by comparison with historical trends between 1971 and 1991.	+
Barrett 2005	Canada (NL)		At the start of, and after, regionalisation	RIW changed little, with the largest changes seen in the capital, St. John's, between 1995/1996 and 2000/2001.	~[a]

Study ID	Country (province)	Utilisation variable examined	Comparison type	Post-regionalisation	Impact of regionalisation
Barrett 2005	Canada (NL)	Procedures	At the start of, and after, regionalisation	There are no clear trends in the number of procedures performed or the weights assigned to these at the start of, and after, regionalisation (1995/1996 by comparison with 2000/2001).	~[a]
Aletras 2007	Greece		Before and after regionalisation	The mean number of surgeries was greater post-regionalisation (year 2000 by comparison with year 2003).	N/A
Jimenez-Rubio 2008	Canada (all)	Physician/outpatient visits	Regionalised and non-regionalised provinces	Mean GP visits showed great variation between the provinces in 2001, which was the year that was analysed.	~
				By comparison with all other regions, specialist visits were highest in Ontario in 2001, which was not regionalised at the time of analysis.	+
Aletras 2007	Greece		Before and after regionalisation	Mean outpatient visits increased in the two years post-regionalisation in 2003.	N/A
Costa-Font 2009	Spain		Devolved and non-devolved regions	No clear trend. In 2001, the probability of a physician visit varied from a high 30% in Madrid to a moderate 13% in Navarre. There was also significant variability between regions that were subject to a common healthcare management system.	~
Saunders 1999	Canada (AB)	Days of care	Before and after regionalisation	Reduction in days of care. The biggest reductions in utilisation rates occurred in the years of major restructuring of health systems (1994/1995 to 1995/1996). The rate of reduction was 163% higher between 1991 and 1992 and between 1996 and 1997, and was higher than would have been anticipated when compared with historical trends between 1971 and 1991.	+
Barrett 2005	Canada (NL)		At the start of, and after, regionalisation	Days of care per 1,000 population were seen to rise slightly just after regionalisation in 1996/1997 but began to fall after 1997. There were not enough data to identify or analyse trends.	~[a]
Aletras 2007	Greece		Before and after regionalisation	The number of hospital days was higher in 2003, two years after regionalisation.	N/A
De Nicola 2014	Italy	Hospital beds	Different regionalisation models	There were no clear trends with regard to regionalisation model and beds per capita in 2005, the year of analysis.	~

Study ID	Country (province)	Utilisation variable examined	Comparison type	Post-regionalisation	Impact of regionalisation
Twells 2005	Canada (NL)		At the start of, and after, regionalisation	The number of hospital beds had fallen dramatically outside of the capital in 2002, after regionalisation in 1995.	**N/A**
Aletras 2007	Greece		Before and after regionalisation	There was a small increase in the number of beds per capita in 2003, two years after regionalisation.	**N/A**
Way 2005b	Canada (NL)	Staff	At the start of, and after, regionalisation	Between 1996/1997 and 2001/2002, the average employee count rose each year post-regionalisation.	**N/A**[b]
Aletras 2007	Greece		Before and after regionalisation	All staff levels increased by the end of 2003, two years after regionalisation.	**N/A**
Jimenez-Rubio 2017	Spain		Before and after decentralisation, and types of decentralisation	Decentralisation is associated with a 9.8 increase in the number of GPs per 100,000 population on average. The estimated effect is larger in foral regions, with full political and fiscal decentralisation estimated at an increase of 25.9 GPs, and very small and insignificant for fast-tracked regions (before 2002) with political decentralisation only.	**N/A**[b]

[a] A statistical test found that there was a significant difference across all years examined. However, the outcome was seen to both rise and fall, with no clear trend.

[b] It is unclear whether results for this endpoint have a negative or positive impact.

Legend: + positive impact, - negative impact, ~ no impact or unclear impact, * impact is statistically significant at $p<0.05$ level

4.4 Health and care outcomes

Twelve studies explored the impact of regionalisation on health and care outcomes. Six studies were based in Spain;[6,32,35,37,42,49] three were based in Canada, with one looking at all regions,[47] one at AB,[25] and one at NL;[44] one study was based in Greece;[30] one was based in Mexico;[12] and one was based in Italy.[11] Most studies looked at points in time or time trends before and after regionalisation, while a minority compared regionalised and non-regionalised provinces. See Table 17 for a full list of study characteristics.

Table 17 Study characteristics for health and care outcomes studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Aletras 2007[30]	Aletras *et al*.	Greece	Before and after regionalisation	2001	2002, 2003	Administrative	Acute	Sample included 51 out of 72 general NHS hospitals, excluding psychiatric and other specialty units, university-affiliated hospitals, and hospitals with fewer than 50 beds
Barrasa-Villar 2013[32]	Barrasa Villar *et al.*	Spain	Intra-regional differences in devolved and non-devolved regions	1981–1994, 2002	1999–2001, 2006–2008	Political in all states and fiscal in two states	All	0–74 years of age
Cantarero 2008[35]	Cantarero and Pascual	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	1992–2003	Political in all states and fiscal in two states	All	N/A
Costa-Font 2006[37]	Costa-Font and Rico	Spain	Devolved and non-devolved regions	1981–1994, 2002	1992–2002	Political in all states and fiscal in two states	All	N/A
Costa-Font 2009[42]	Costa-Font and Gil	Spain	Devolved and non-devolved regions	1981–1994, 2002	2000–2001	Political in all states and fiscal in two states	All	N/A
Curtis 2005[44]	Curtis *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994–1997	1995, 1999, 2001	Administrative	Acute	Condition specific: focused on outcomes for cardiology, respiratory medicine, neurology, nephrology, psychiatry, surgery and women's health programmes for individuals over 18 years of age
Hamilton 2001[25]	Hamilton *et al*.	Canada (AB)	Before and after regionalisation	1994	1993–1995, 1995–1997	Administrative	Acute	Condition specific: focused on surgical procedures
Jimenez-Rubio	Jimenez-Rubio *et al.*	Canada	Regionalised and non-regionalised provinces	N/A	2001	Administrative	All	N/A

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
2008[47]								
Jimenez-Rubio 2017[6]	Jimenez-Rubio and García-Gomez	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	1980–2010	Political in all states and fiscal in two states	All	N/A
Librero 2017[49]	Librero *et al.*	Spain	At the start of, and after, regionalisation	1981–1994, 2002	2002–2013	Political in all states and fiscal in two states	Acute	Condition specific: focused on percutaneous coronary intervention, colectomy in colorectal cancer, and chronic obstructive pulmonary disease, in patients aged 20 years and older
Martínez-Fritscher 2011[12]	Martínez-Fritscher and Rodríguez Zamora	Mexico	Before and after regionalisation and non-regionalised population	1993–1997	1993–2003	Political and fiscal	All	Uninsured population
Toth 2014[11]	Toth	Italy	Before and after regionalisation	2000–2001	1999–2009	Political, with some fiscal autonomy	All	Those who have experienced a hospital stay during the three months before the interview in a nationally representative survey

[a] These columns are based on research conducted by the HRB.

4.4.1 Mortality

Overall mortality and avoidable mortality data were reported by two studies from Spain.[32,37] Individual study data for mortality per 1,000 population and avoidable mortality per 100,000 population are graphically displayed in Figure 11 and Figure 12 in order to facilitate trend analysis. Statistical and percentage comparison data for overall mortality are provided in Table 18. Infant mortality rates for Italy[11] and NL[44] are shown in Table 19.

Table 18 Quantitative results for health and care outcomes: overall mortality

Study ID	Country (province)	Year	% change	Ratio	LCI95%	UCI95%
Barrasa-Villar 2013	Spain	2006–2008/ 1999–2001	–	0.85	0.85	0.86
Costa-Font 2006	Spain (Andalusia)	1992–2000	6.4			
	Spain (Valencia)	1992–2000	3.4			
	Spain (Canary Islands)	1992–2000	4.4			
	Spain (Catalonia)	1992–2000	5.8			
	Spain (Galacia)	1992–2000	7.1			
	Spain (Basque Country)	1992–2000	11.4			
	Spain (INSALUD)	1992–2000	6.6			

INSALUD = Instituto Nacional de la Salud
LCI95% or UCI95% = lower or upper 95% confidence interval, respectively.

Table 19 Quantitative results for health and care outcomes: infant mortality

Study ID	Country	Year	Rate per 1,000 population
Toth 2014	Italy (Centre-North)	1999	4.0
	Italy (Centre-South)	1999	5.8
	Italy (National)	1999	4.9
	Italy (Centre-North)	2009[a]	2.9
	Italy (Centre-South)	2009	4.1
Curtis 2005	Canada (NL)	1995	3.9
		1997	4.0
		1998	9.0
		1999	5.7
		2000	3.8

[a] No 2009 national rate was provided.

All other health and care outcomes were reported by individual studies only, including waiting time data,[44] hospital quality as measured by the Roemer Index,[30] and health status as measured on the Health Utilities Index[47] and by the self-reported health status questionnaire.[42] See supplementary appendix for individual study data.

Disease-specific health and care outcomes were reported by three studies.[25,44,49] Surgery-specific in-hospital deaths were reported by Hamilton *et al.*, and results are provided in the supplementary

appendix.[25] Outcomes for multiple chronic conditions and procedures were reported by Curtis *et al.* including schizophrenia, women's health, acute myocardial infarction, cerebrovascular accident, pneumonia, haemodialysis care, coronary artery bypass grafting, and number of patients who received surgery within optimal waiting time.[44] The results are provided in the supplementary appendix.[44] Librero *et al.* reported incidence of major chronic conditions and procedures, including percutaneous coronary intervention, colectomy in colorectal cancer, and chronic obstructive pulmonary disease.[49] Individual study results are provided in the supplementary appendix.

4.4.2 Regression analysis results for health and care outcomes

Three studies[6,12,35] used regression analysis to explore the impact of regionalisation on infant mortality, foetal death rate, neonatal mortality, and life expectancy. See Table 20 for a summary of the results.

4.4.3 Summary

See Table 21 for an overview of the impact of regionalisation on health and care outcomes.

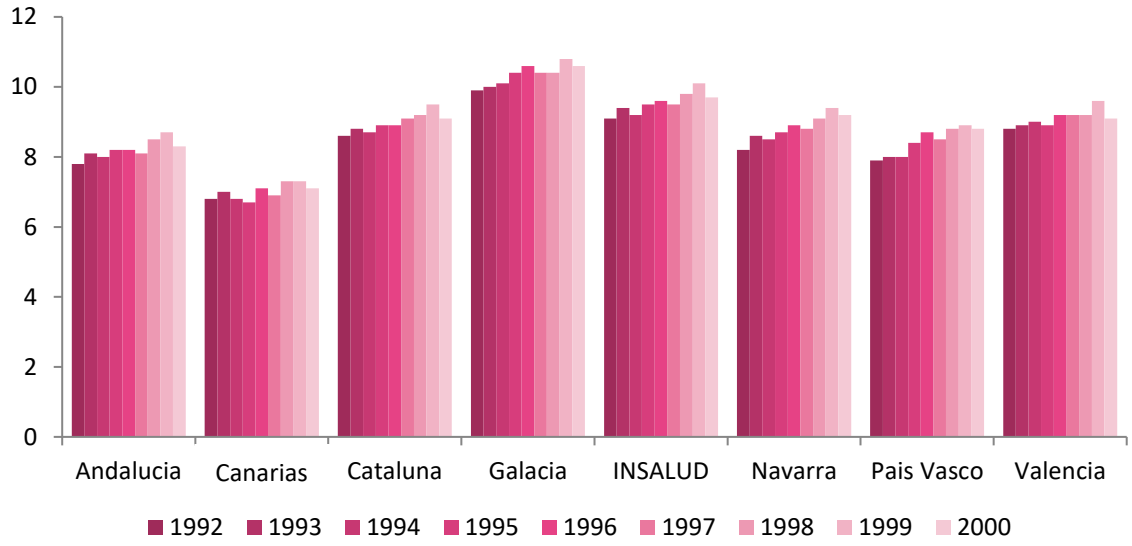

Figure 11 Mortality per 1,000 population

Source: Costa-Font and Rico[37]

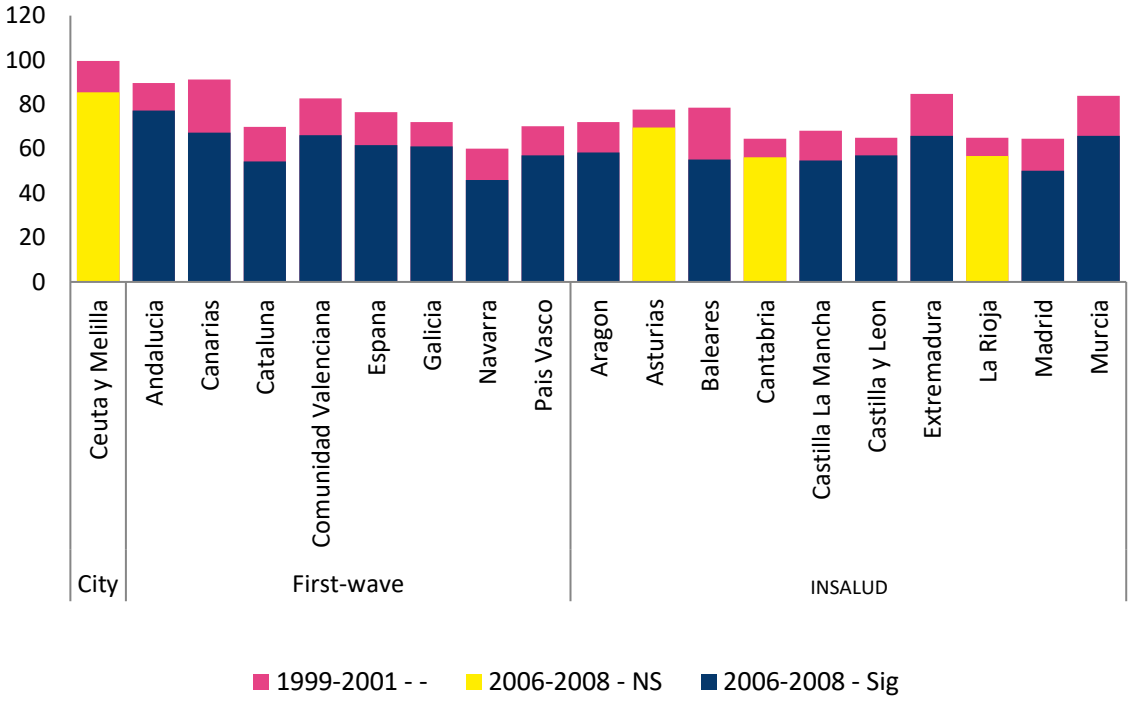

Figure 12 Avoidable mortality per 100,000 population

Source: Barrasa-Villar *et al.*[32]

Table 20 Regression analysis results for health and care outcomes

Study ID	Outcome	Model number	Other factors considered in model	Short descriptive summary results	Statistically significant regionalisation variable
Martínez-Fritscher 2011	Log infant mortality rate	1	Federal government direct spend on health services for state pre-reform and post-reform; health services fund for state; gross state product per capita; population density; per insured person expenditure; percentage of uninsured population; primary school completion rate; hospital beds per 1,000 inhabitants in the private health sector	The paper analyses five increasingly complex models arriving at a model which has decentralisation and all the other factors included. In all five models the decentralisation coefficient is negative and statistically significant at 1% level, indicating that the infant mortality rate is decreasing post-decentralisation. The magnitude of effect decreases when the model includes either a time trend or year fixed effects and has a very small effect in the final model (coefficient=-0.074)	Yes
	Log foetal death rate	2		Decentralisation had an a very small impact on foetal death rate; coefficient=0.0864	No
		3	Per insured person expenditure; primary school completion rate; population density; hospital beds per 1,000 inhabitants in the private health sector; gross state product per capita; percentage of uninsured population; infant mortality ratio	Assessing two linked variables; insurance status and decentralisation. This result suggests that average foetal death rate is 0.026 lower for the non-insured population relative to the insured population after the decentralisation reform took place relative to previous years. Only health services for the non-insured population had been decentralised.	No
		4	Total expenditure for the state divided by population of state; primary school completion rate; population density; hospital beds per 1,000 inhabitants in the private health sector; gross state product per capita; percentage of uninsured population; infant mortality ratio	Assessing three linked variables; total health expenditure for the state, insurance status and decentralisation. If health expenditure increases by 1% for both groups and both periods, the foetal death rate exhibits a larger fall by 0.19% for the non-insured population relative to the insured population. Contrary to the other results in the paper, the health expenditure for the non-insured population is significantly more effective after the reform took place than the health expenditure for the insured population.	No
Jimenez-Rubio 2017	Infant mortality	1–4	Province fixed effects and year fixed effects and other controls; GDP per capita; education; female activity rate; mean age of women at childbirth	Once the authors allow for heterogeneous effects by type of decentralisation, decentralisation of health services lowers infant and neonatal mortality rates in foral regions only. In particular, it is estimated that, on average, decentralisation in fully decentralised regions, i.e. politically and fiscally accountable regions, has stimulated roughly a 1.1	No

Study ID	Outcome	Model number	Other factors considered in model	Short descriptive summary results	Statistically significant regionalisation variable
				reduction in the number of deaths of children younger than 12 months per 1,000 live births (approximately a 17% reduction in the whole post-reform period).	
Cantarero 2008	Neonatal mortality	5–8	Logarithm of real per capita income; acute care beds per 1,000 population; logarithm of GPs (density per 1,000 population)	For neonatal mortality the estimated improvement following decentralisation is very similar, i.e. around 0.8 reduction in the number of deaths of children younger than one month per 1,000 live births (around a 19% reduction overall).	Yes[a]
	Infant mortality	1–2		Infant mortality is negatively related to healthcare decentralisation but infant mortality's relationship to income per capita and the relative number of GPs is much greater.	N/A[b]
	Life expectancy	3–4		Life expectancy is positively related to healthcare decentralisation, but life expectancy's relationship to income per capita, acute care beds per 1,000 population and the relative number of GPs is much greater.	N/A[b]

[a] Foral regions only

[b] Statistical significance of results not reported

Table 21 Summary table for health and care outcomes

Study ID	Country (province)	Care outcome examined	Comparison type	Post-regionalisation	Impact of regionalisation
Barrasa-Villar 2013	Spain	Overall mortality	Intra-regional differences in devolved and non-devolved regions	For Spain, as a whole, the study found overall standardised mortality rates fell between the period 1999–2001 and 2006–2008. Individual autonomous communities (Acs) were not examined.	+*
Costa-Font 2006				This study indicates that with the exceptions of the foral regions (the Basque Country and Navarre) and Galicia (which is the only AC exhibiting a higher average mortality rate than the average rate of INSALUD ACs) all the remaining ACs experienced a smaller increase in average	~

Study ID	Country (province)	Care outcome examined	Comparison type	Post-regionalisation	Impact of regionalisation
				mortality rates as compared with INSALUD ACs. (Result does not appear to be standardised.)	
Barrasa-Villar 2013	Spain	Avoidable mortality	Intra-regional differences in devolved and non-devolved regions	Avoidable mortality has declined in all districts over time. The authors conclude that even though there were large differences in avoidable mortality between districts, avoidable mortality trends do not appear to be due to healthcare decentralisation itself.	~*
Toth 2014	Italy	Infant/foetal/ neonatal mortality	Before and after regionalisation	In 1999, the infant mortality rate in the regions of the Centre-North was equal to 4.0 (per 1,000 live births). During the same year, in the Centre-South regions, the infant mortality rate reached 5.8, by comparison with the mean national rate of 4.9. A decade later, the infant mortality rate dropped appreciably in both northern and southern regions. Nonetheless, there still exists a marked difference between Centre-North and Centre-South: in 2009, the infant mortality rate was 2.9 in the Centre-North and 4.1 in the Centre-South.	N/A
Curtis 2005	Canada (NL)		At the start of, and after, regionalisation	This study compared data in three years (1995, 1998 and 2000) and there was a significant increase in infant mortality in 1998. Therefore, the study authors looked at two additional years (1997 and 1999), and suggest that 1998 is an aberration.	~
Martínez-Fritscher 2011	Mexico		Before and after regionalisation and non-regionalised population	Infant mortality rate is decreasing post-decentralisation. Decentralisation had a very small impact on foetal death rate.	+* ~
Jimenez-Rubio 2017	Spain		Before and after decentralisation and types of decentralisation	Decentralisation in fully decentralised regions (foral regions), has stimulated roughly a 1.1 reduction in the number of deaths of children younger than 12 months per 1,000 live births (approximately a 17% reduction in the whole post-reform period). For neonatal mortality, the estimated improvement following decentralisation (foral regions) is very similar, around 0.8 reduction in the number of deaths of children younger than one month per 1,000 live births (around a 19% reduction overall).	+ +*
Cantarero 2008				Decentralisation has a small negative effect on infant mortality, but other factors investigated e.g. income per capita were much more important.	~
Cantarero 2008	Spain	Life expectancy	Before and after decentralisation and	Decentralisation has a very small positive effect on life expectancy, but other factors investigated, e.g. income per capita, were more important.	~

Study ID	Country (province)	Care outcome examined	Comparison type	Post-regionalisation	Impact of regionalisation
			types of decentralisation		
Curtis 2005	Canada (NL)	Median patient wait times	At the start of, and after, regionalisation	Median wait time increased for all diagnostic tests. Overall waiting time to see a specialist and then receive treatment also increased (not disease specific).	- -
Aletras 2007	Greece	Roemer hospital quality index	Before and after regionalisation	Mean index score fell.	N/A
Jimenez-Rubio 2008	Canada	Health Utilities Index	Regionalised and non-regionalised provinces	Health Utilities Index was similar in all regions.	~
Costa-Font 2009	Spain	Self-reported Health status	Intra-regional differences in devolved and non-devolved regions	There seem to be significant differences in self-reported health status between ACs, but this does not appear to be linked to decentralisation status.	~
Hamilton 2001	Canada (AB)	In-hospital death after surgery	Before and after regionalisation	There was no statistical difference between the rates of in hospital death before and after regionalisation.	~
Curtis 2005	Canada (NL)	Health and care outcomes for specific conditions	At the start of, and after, regionalisation	Patient care improved between 1995 and 2001 for those who had a stroke or an acute myocardial infarction, and for those who required dialysis or coronary artery bypass grafting. Patient care remained the same between 1995 and 2001 for those who had pneumonia or required surgery. Maternity health and care outcomes for caesarean section and post-operative infection disimproved.	~
Librero 2017	Spain			The number of percutaneous coronary intervention cases has risen, as have admission rates. There were no clear trends in colectomy in colorectal case or admission rates. The number of chronic obstructive pulmonary disease cases and the number of admissions fell.	- ~ +

Legend: + positive impact, - negative impact, ~ no impact or unclear impact, * impact is statistically significant at p<0.05 level

4.5 Efficiency

We did not pre-define efficiency; we accepted the study author's definition. Four studies explored the impact of regionalisation on efficiency. One of these studies was based in Greece,[30] one in Italy,[45] one in Mexico,[12] and one in NL.[33] Aletras *et al*.[30] compared two time points before and after regionalisation, Barrett *et al*.[33] analysed trends at the start of and post-regionalisation, and De Nicola *et al*.[45] examined different regionalisation models. Martínez-Fritscher *et al*.[12] explored time points before and after regionalisation, as well as regionalised and non-regionalised groups. See Table 22 for full list of study characteristics.

4.5.1 Regression analysis results for efficiency outcomes

Two studies[12,45] used regression analysis to explore the impact of regionalisation on efficiency scores and foetal death rate. See Table 23 for a table of the results.

4.5.2 Summary

See Table 24 for an overview of the impact of regionalisation on efficiency outcomes.

Table 22 Study characteristics for efficiency studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Aletras 2007[30]	Aletras *et al*.	Greece	Before and after regionalisation	2001	2002, 2003	Administrative	Acute	Sample included 51 out of 72 general NHS hospitals, excluding psychiatric and other specialty units, university-affiliated hospitals, and hospitals with fewer than 50 beds
Barrett 2005[33]	Barrett *et al*.	Canada (NL)	At the start of, and after, regionalisation	1994–1997	1995–2001	Administrative	Acute	All resident of NL discharged from a provincial acute care facility after either an episode of acute care or a day surgical procedure
De Nicola 2014[45]	De Nicola *et al.*	Italy	Different regionalisation models	2000–2001	2004–2005	Political, with some fiscal autonomy	All	101/103 provinces included (excluding Gorizia and Terni, which represent the 3.67% and the 5.90% of the Italian resident population).
Martínez-Fritscher 2011[12]	Martínez-Fritscher and Rodríguez Zamora	Mexico	Before and after regionalisation and non-regionalised population	1993–1997	1993–2003	Political and fiscal	All	Uninsured population

[a] These columns are based on research conducted by the HRB.

Table 23 Regression analysis results for efficiency outcomes

Study ID	Outcome	Model number	Other factors considered in model	Short descriptive summary results	Statistically significant regionalisation variable
De Nicola 2014	Efficiency score	1	Total patients outflow, total patients inflow, south, province populations, year	Hospitals characterised by the purchaser–provider split template organisational model received higher efficiency scores as compared with the Region and the Aziende Sanitarie Locali (ASL) centred template models. The positive coefficient of the ASL-centred template dummy indicates that provinces located in regions adopting this organisational model are less efficient than those that have opted for a Region-centred template model. The analysis of the regression results indicates that the national reimbursement system produces a negative and significant impact on healthcare	Yes[a]

Study ID	Outcome	Model number	Other factors considered in model	Short descriptive summary results	Statistically significant regionalisation variable
				efficiency.	
		2	Interregional patients outflow, interregional patients inflow, south, province populations, year	Supports Model 1.	Yes[a]
Martínez-Fritscher 2011	Log foetal death rate	5	Insured population, non-insured population, total expenditure, primary school completion rate, population density, hospital beds per 1,000 population, gross state product per capita, infant mortality ratio, total health from public institutions per capita	The health expenditure for the non-insured population is significantly more effective after the reform took place than the health expenditure for the insured population.	Yes

[a] For national reimbursement systems

Table 24 Summary for efficiency outcomes

Study ID	Country (province)	Comparison type	Post-regionalisation	Impact of regionalisation
Barrett 2005	Canada (NL)	At the start of, and after, regionalisation	Inefficiency within hospitals fell in St. John's, but increased in the rest of the province.[1]	~
			Inefficiency due to lack of access to alternate services, e.g. rehabilitation, increased in St. John's and in the rest of the province.[1]	-
			In the elderly population (age ≥75 years) inefficiency due to lack of access to alternate services increased and then decreased in St. John's. In the rest of the province, it decreased and then increased. The same trend was seen with a secondary assessment of the impact on delayed discharges due lack of alternative care for the elderly – percentage of care days due to stays >60 days.[1]	~$_2$
Aletras 2007	Greece	Before and after regionalisation	The analysis indicates that technical and scale efficiency was reduced following the policy changes.	N/A

Study ID	Country (province)	Comparison type	Post-regionalisation	Impact of regionalisation
De Nicola 2014	Italy	Different regionalisation models	A degree of decentralisation from the regional governments to local health units may yield substantial gains for the healthcare system. However, an excessively decentralised healthcare system may lead to possible deficits in the production of healthcare services. The best organisational model is characterised by a well-defined separation between healthcare service providers and purchasers, and it is based on freedom of choice for users between public and private accredited providers. For reimbursement systems, regions can increase their healthcare system's efficiency whenever the average cost to deliver care takes into account regional characteristics of the population and healthcare structures. Provincial healthcare efficiency is increased by the influx of patients to a region (interregional patients' inflows).	N/A[3]
Martínez-Fritscher 2011	Mexico	Before and after regionalisation and non-regionalised population	The health expenditure for the non-insured population was significantly more effective after the reform took place than the health expenditure for the insured population which was not regionalised.	+*

[1] The years of the nursing strike in NL (1998/1999) were not considered when summarising the results of this study.

[2] There is a statistical difference detected in days, due to efficiency and lack of alternative care for the elderly (≥75) across the years. However, this is likely due to a nursing strike in 1998/1999.

[3] Different models of regionalisation adopted within Italian provinces examined, rather than overall impact of regionalisation at a country level.

Legend: + positive impact, - negative impact, ~ no impact or unclear impact, * impact is statistically significant at $p<0.05$ level

4.6 Equity

Seven studies in this report explored the impact of regionalisation on equity. These studies were based in Canada,[8] Italy,[40,46] Spain,[36,37,40,42] and Mexico.[31] These were published between 2002 and 2018. Some studies described trends over a period of time (e.g. Cloutier-Fisher *et al.*),[8] while others examined differences between decentralised and centralised states at one point in time (e.g. Costa-Font[36] See Table 25 for these studies' characteristics.

The studies identified by this systematic review used the terms 'equity/inequity' and 'equality/inequality' interchangeably and inconsistently. We recognise that these terms mean slightly different things, however, in this report we have used the term equity or equality directly as they were used by the original authors in the identified studies.

Equity was explored in the included studies in a variety of ways, including focusing on the impact of regionalisation on equity in health and care outcomes, the impact of regionalisation on equity in healthcare utilisation, and the impact of regionalisation on equity in healthcare costs. Table 26 reports the results of regression-based models exploring the impact of regionalisation on equity. Table 27 reports an overall summary of the results in this section. See the supplementary appendix for all extracted data from included studies related to equity.

Three studies explored the impact of regionalisation on income-related health and care outcome inequities, inequality in self-reported health status, and mortality. These three studies were conducted in Spain, with data collected between 1992 and 2001.[36,37,42] All three compared regions with centralised healthcare (i.e. not regionalised) with regions that had decentralised healthcare. Costa-Font[36] assessed inter-regional inequalities in health, Costa-Font and Gil[42] explored inequalities in health between centralised and decentralised regions, and Costa-Font and Rico[37] explored inequalities in health, as measured by mortality.

Three studies explored the impact of regionalisation on healthcare utilisation outcomes. Costa-Font and Gil[42] analysed inequalities in healthcare with regard to physician visits, and Costa-Font and Turati[40] investigated inequalities in health system satisfaction. Cloutier-Fisher *et al.* explored the impact of regionalisation on avoidable and non-avoidable hospitalisation in urban and rural areas of British Columbia.[8]

Four studies examined the impact of regionalisation on inequalities on various aspects healthcare expenditure and costs. Arredondo *et al.*[31] explored the changes in healthcare expenditure in Mexico, comparing insured and uninsured groups. Costa-Font and Rico[37] and Costa-Font and Turati[40] explored the impact of regionalisation on inequality in healthcare expenditure per capita, as well as inequality in fiscal capacity (as measured by GDP per capita) and needs (as measured by the percentage of people aged over 65 years). Costa-Font and Gil[42] explored levels of progressivity in healthcare financing in Spanish regions.

Table 25 Study characteristics for equity studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Arredondo 2004[31]	Arredondo and Parada	Mexico	Insured and uninsured populations before and after regionalisation	1993–1997	1991–2000	Political and fiscal	All	N/A
Cloutier-Fisher 2006[8]	Cloutier-Fisher *et al.*	Canada (BC)	Before and after regionalisation	1997	1990–2000	Administrative	Acute and primary	Health service users aged 50 years and older who lived in the province
Costa-Font 2005[36]	Costa-Font	Spain	Intra-regional differences in devolved and non-devolved regions	1981–1994, 2002	1997	Political in all states and fiscal in two states	All	Representative of all Spanish regions, other than the Basque Country, Navarre and the Canary Islands
Costa-Font 2006[37]	Costa-Font and Rico	Spain	Devolved and non-devolved regions	1981–1994, 2002	1992–2002	Political in all states and fiscal in two states	All	N/A
Costa-Font 2018[40]	Costa-Font and Turati	Spain	Before and after regionalisation	1981–1994, 2002	1998–2009	Political in all states and fiscal in two states	All	N/A
Costa-Font 2009[42]	Costa-Font and Gil	Spain	Devolved and non-devolved regions	1981–1994, 2002	2000–2001	Political in all states and fiscal in two states	All	N/A
Giannoni 2002[46]	Giannoni and Hitiris	Italy	Before and after regionalisation	1992–1993	1980-1995	Political, with some fiscal autonomy	All	N/A

[a] These columns are based on research conducted by the HRB.

4.6.1 Regression analysis results for equity outcomes

Two studies[40,46] used decomposition analyses and econometric models to explore the impact of regionalisation on equity, again specifically focusing on elements of health status, healthcare, and healthcare expenditure. These results are reported in Table 26. See the supplementary appendix for full regression results.

4.6.2 Summary

See Table 27 for an overview of the impact of regionalisation on equity outcomes.

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Table 26 Regression analyses results for equity outcomes

Study ID	Outcome	Model	Other factors considered in model	Short descriptive summary results	Statistically significant regionalisation variable
Costa-Font 2018	Health system satisfaction	Italy	Healthcare spending per capita (Model 1)	Overall, differences in health system satisfaction were not statistically significant. Results indicate that government decentralisation did not increase regional inequality in outputs and outcomes in Italy or Spain.	No
		Spain			
		Italy and Spain	Healthcare spending per capita, GDP, population over 65 years, alignment (Model 2)		N/A
Giannoni 2002	Public health expenditure per capita.	1	GDP per capita., ageing population, hospital beds, hospital staff, expenditure-based area clusters, regional time series	In the framework of the inter-regional inequalities detected by the area clusters, certain regions in Italy with healthcare expenditures below the national average reduced health expenditures further while others increased it towards the average or above the average. Overall, the regions which were below the average in 1980 continued to remain there in 1995, demonstrating that the reforms did not ameliorate the interregional inequalities in healthcare expenditure; on the contrary they increased them.	Yes

Table 27 Summary table for equity outcomes

Study ID	Country (province)	Equity variable	Comparison type	Post-regionalisation	Impact of regionalisation
Costa-Font 2005	Spain	Health and care outcome inequalities	Intra-regional differences in devolved and non-devolved regions	Although there are small inter-regional inequalities in self-perceived health status, these do not appear to be due to the regionalisation of healthcare.	~
Costa-Font 2009			Devolved and non-devolved regions	Regions with healthcare responsibilities do not exhibit higher inequalities in self-reported health status than those with centralised healthcare responsibilities.	~
Costa-Font 2006				Regionalisation has not resulted in an increase of inequalities in health, as measured by mortality.	~

Study ID	Country (province)	Equity variable	Comparison type	Post-regionalisation	Impact of regionalisation
Costa-Font 2009	Spain	Healthcare utilisation inequalities	Devolved and non-devolved regions	No systematic inequalities in healthcare use were exhibited among regionalised areas, as measured by probability of a visit to a physician.	~
Costa-Font 2018			Before and after regionalisation	The results of applying the Gini index for health system satisfaction in Spain identified significant inequality in the period after decentralisation.[a] When examining coefficient of variation across the time period, it was found that decreased inequality in health system satisfaction occurred in Spain from 1998 to 2009. Results from the decomposition analysis show that differences in procedural outcomes appear to be better explained by differences in the coefficients than by differences in the observed determinants of outcomes. These results indicate that government decentralisation consistently did not increase regional inequality in outputs.	~ ~
Costa-Font 2018	Italy		Before and after regionalisation	The results of applying the Gini index demonstrated pervasive, although minor, inequalities in healthcare satisfaction before and after decentralisation. The coefficient of variation showed that inequalities in health system satisfaction were unaffected by regionalisation for Italy from 1998 to 2009. Results from the decomposition analysis indicate that government decentralisation did not consistently increase regional inequality in outputs and outcomes.	~ ~
Cloutier-Fisher 2006	Canada (BC)		Before and after regionalisation	Post-regionalisation, avoidable, non-avoidable, and total hospitalisations remain consistently higher in rural areas by comparison with urban areas. There was no significant different between the rate of change in urban and rural avoidable hospitalisations. For non-avoidable and total hospitalisations, rural and total hospitalisations had a significantly different rate of change, demonstrating that the rates in rural areas are declining more slowly than urban during time period under investigation.	~ -*
Costa-Font 2006	Spain	Healthcare cost inequalities	Devolved and non-devolved regions	From 1992 to 1999, there was no significant change across autonomous communities a result of regionalisation, with regard to inequalities in public healthcare expenditure	~
Costa-Font 2009				In 2000, regionalised ACs (other than the Basque Country) which assumed healthcare responsibilities exhibited moderate progressivity in their healthcare financing, which suggests that principles of equality are being upheld.	~

Study ID	Country (province)	Equity variable	Comparison type	Post-regionalisation	Impact of regionalisation
Costa-Font 2018			Before and after regionalisation	The results of applying the Gini index demonstrated pervasive, although minor, inequalities in healthcare spending before and after decentralisation. From 1998 to 2009, regionalisation in Spain resulted in a significant increase in inequality in healthcare expenditure per capita initially, which then declined over time. Spain experienced a decline in inequality in fiscal capacity (as measured by GDP per capita), and inequality in needs (as measured by the percentage of the population over 65 years) decreased over the same period.	-* +*
Giannoni 2002	Italy		Before and after regionalisation	From 1980 to 1995 certain regions with healthcare expenditures below the national average reduced it further, while others increased healthcare expenditure towards the average or above the average. Overall, the regions which were below the average in 1980 continued to remain there in 1995. Consequently, the reforms, which affected proportionally rich and poor regions, did not ameliorate the interregional inequalities in healthcare expenditure; on the contrary they worsened them.	-*
Costa-Font 2018				The results of applying the Gini index demonstrated pervasive, although minor, inequalities in healthcare spending before and after decentralisation. However, from 1998 to 2009, Italy experienced a significant decrease in inequality in healthcare expenditure. It also experienced a decline in inequality in fiscal capacity, whereas inequality in needs increased over the same period.	+* +* -*
Arredondo 2004	Mexico		Insured and uninsured populations before and after regionalisation	Of the total invested for the state during the period, 23.4% was invested in the uninsured population. Of this percentage, 4.1% was invested in preventive programmes and 19.3% in curative programmes. The insured population received 76.6% of the total budget for health, of which 3.8% was dedicated to prevention, and 72.8% to curative care. After the reforms, the spending on the insured preventative programme dropped by -0.9% in one state and spending on the uninsured preventative programmes dropped by 28.2% in another state.	N/A

[a] The authors attribute the low Gini index result pre-decentralisation as due to the fact that during that period a large number of policy innovations in some regions were extended to the rest of the country
Legend: + positive impact, - negative impact, ~ no impact or unclear impact, * impact is statistically significant at p<0.05 level

4.7 Patient flow

Four studies, published between 1999 and 2014, looked at the impact of regionalisation on patient flow/mobility. Two of these studies[10,51] are based in Canada (one from Nova Scotia [NS], one from AB) and two studies focused on Italy.[11,45] Three of the studies explored the impact of regionalisation by comparing data from before and after regionalisation, and one study compared different models of regionalisation. One of these studies looked at trends over time,[51] while the other three looked at one point before, and one point after, regionalisation or a single point in time. See Table 28 for a full list of study characteristics.

Saunders *et al.*[51] calculated a self-sufficiency index and De Nicola *et al.*[45] examined interregional outflow. One paper[11] calculated a synthetic index of mobility to compare the north and south of Italy, and Hanlon[10] explored resident retention rate and net patient transfers in NS. Individual study data are provided in the supplementary appendix. A summary of the results for this section is provided in Table 30.

4.7.1 Import index

Table 29 provides the results of two studies that explored the impact of regionalisation on patient flow in Italy and AB. These two studies used the import index, which refers to the care given by a regional health organisation to patients who reside in another regional health organisation catchment area.[45,51]

4.7.2 Summary

See Table 30 for an overview of the impact of regionalisation on patient flow outcomes.

Table 28 Study characteristics for patient flow studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
De Nicola 2014[45]	De Nicola *et al.*	Italy	Different regionalisation models	2000–2001	2004–2005	Political, with some fiscal autonomy	All	101/103 provinces included (excluding Gorizia and Terni, which represent the 3.67% and the 5.90% of the Italian resident population).
Hanlon 2003[10]	Hanlon	Canada (NS)	Before and after regionalisation	1996	1992–1993, 1999–2000	Administrative	Acute	Surgical and medical procedures that are available within the district, but diagnostic procedures, entry through emergency, and billing codes used in NS to indicate circumstances, such as cancelled surgeries, were excluded from analysis.
Saunders 1999[51]	Saunders *et al.*	Canada (AB)	Before and after regionalisation	1994	1991–1997	Administrative	Acute	N/A
Toth 2014[11]	Toth	Italy	Before and after regionalisation	2000–2001	1999–2009	Political, with some fiscal autonomy	All	Those who have experienced a hospital stay during the three months before the interview in a nationally representative survey

[a] These columns are based on research conducted by the HRB.

Table 29 Quantitative results for patient flow outcomes: import index

Study ID	Country	Province	Year	Perspective	Subgroup	Import index		
						%	Mean	SD
Saunders 1999	Canada	AB	1991/1992	Health system	Chinook	87.9	–	–
			1996/1997			8.1	–	–
			1991/1992		Palliser	11.6	–	–
			1996/1997			5.9	–	–
			1991/1992		Healthwater	19.6	–	–
			1996/1997			14.1	–	–
			1991/1992		Calgary	14.3	–	–
			1996/1997			14.3	–	–
			1991/1992		Region 5	17.2	–	–
			1996/1997			17.5	–	–
			1991/1992		David Thompson	18.9	–	–
			1996/1997			12.1	–	–
			1991/1992		East central	16.1	–	–
			1996/1997			11.6	–	–
			1991/1992		Weswiew	26.1	–	–
			1996/1997			18.1	–	–
			1991/1992		Crossroads	41.0	–	–
			1996/1997			36.8	–	–

Study ID	Country	Province	Year	Perspective	Subgroup	Import index		
						%	Mean	SD
			1991/1992		Capital	34.5	–	–
			1996/1997			29.8	–	–
			1991/1992		Aspen	22.3	–	–
			1996/1997			13.8	–	–
			1991/1992		Lakeland	16.9	–	–
			1996/1997			12.1	–	–
			1991/1992		Mistahla	20.3	–	–
			1996/1997			14.3	–	–
			1991/1992		Peace	34.2	–	–
			1996/1997			26.4	–	–
			1991/1992		Keeweetinok Lake	23.3	–	–
			1996/1997			11.4	–	–
			1991/1992		Northern Lights	18.2	–	–
			1996/1997			5.6	–	–
			1991/1992		Northwestern	20.2	–	–
			1996/1997			7.0	–	–
De Nicola 2014	Italy	Piemonte	2005	Health system	ASL Centred cost adjusted	7.29	–	–
		V. Aosta			ASL Centred national	12.16	–	–
		Lombardy			Purchaser-provider analytic	9.83	–	–

Study ID	Country	Province	Year	Perspective	Subgroup	Import index		
						%	Mean	SD
		Bolzano			ASL Centred national	11.47	–	–
		Trento			ASL Centred national	11.45	–	–
		Veneto			ASL Centred analytic	9.32	–	–
		Friuli			Regional Centred national	9.35	–	–
		Liguria			Regional Centred national	12.49	–	–
		Emilia R.			ASL Centred analytic	13.88	–	–
		Tuscany			ASL Centred analytic	11.3	–	–
		Umbria			ASL Centred analytic	15.16	–	–
		Marche			ASL Centred national	9.57	–	–
		Lazio			ASL Centred analytic	9.32	–	–
		Abruzzo			Regional Centred national	13.38	–	–
		Molise			Regional Centred national	24.64	–	–
		Campania			Regional Centred national	2.86	–	–
		Apulia			ASL Centred national	4.24	–	–
		Basilicata			ASL Centred national	12.58	–	–
		Calabria			ASL Centred national	4.42	–	–
		Sicily			Regional Centred cost adjusted	2.09	–	–
		Sardinia			ASL Centred national	2.24	–	–
		Italy			–	8.16	–	–

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Study ID	Country	Province	Year	Perspective	Subgroup	Import index		
						%	Mean	SD
		North			–	10.31	–	–
		Centre			–	10.34	–	–
		South			–	4.58	–	–
					ASL centred	–	8.67	4.82
					Regional centred	–	7.83	8.5
					Purchaser-provider split	–	7.2	4.21

Abbreviations: ASL= Aziende Sanitarie Locali, SD=standard deviation

Table 30 Summary table for patient flow outcomes

Study ID	Country (province)	Comparison	Post-regionalisation	Impact of regionalisation
Saunders 1999	Canada (AB)	Before and after regionalisation	The self-sufficiency index, patient care provided by RHA to own residents, remained unchanged post-regionalisation. The import indices for hospital separations decreased for most RHAs post-regionalisation. Results indicate a transfer of more resource intensive patients to larger metropolitan facilities.	~ +
Hanlon 2003	Canada (NS)	Before and after regionalisation	A pattern of metropolitan dominance in general hospital services exists in NS. Wide variations persist, post-regionalisation, in hospitals' commitment to residents within their own districts.	~
Toth 2014	Italy	Before and after regionalisation	From 1999 to 2009, the flow of residents in the south of Italy who seek medical treatment in the north of Italy has further increased by comparison with the flow of patients in the opposite direction. It must be noted that there is a high degree of variability in the regions, with some regions in the north demonstrating deteriorating ability to treat their own residents, and some regions in the south improving.	~
De Nicola 2014		Different regionalisation models	Overall, in 2005, regions with an ASL-centred template and region-centred template experienced greater interregional outflow than inflow, whereas regions with a purchaser-provider split template experienced greater inflow than outflow.	N/A

Legend: + positive impact, - negative impact, ~ no impact or unclear impact, * impact is statistically significant at p<0.05 level

4.8 Cost

Eleven studies explored the impact of regionalisation on healthcare costs. Three of these studies were based in Canadian regions (NL and AB); one was based in Mexico; five were based in Spain; and three were based in Italy. The majority of these studies explored trends in spending over time. See Table 31 for study characteristics.

The vast majority of studies focused on health expenditure per capita, although two studies focused on overall health expenditure.[31,52] Additionally, two studies focused on human resource costs,[9,52] and one study looked at deficits in healthcare financing.[11]

4.8.1 Cost-adjusted results by country

In order to provide meaningful comparisons, cost data were adjusted to 2017 euro figures, where possible (see Table 32). See supplementary appendix for individual study data, and see Table 34 for a summary of all studies.

4.8.2 Regression analysis results for cost outcomes

Three studies used regression analyses to explore the impact of regionalisation on per capita expenditure, per capita pharmaceutical expenditure, per capita inpatient expenditure, and per capita primary expenditure.[37-39] See Table 33 for an overview of the findings.

4.8.3 Summary

See Table 34 for an overview of the impact of regionalisation on cost outcomes.

Table 31 Study characteristics for cost studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Arredondo 2004[31]	Arredondo and Parada	Mexico	Insured and uninsured populations before and after regionalisation	1993–1997	1991–2000	Political and fiscal	All	N/A
Cantarero 2005[34]	Cantarero	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	1993–1999	Political in all states and fiscal in two states	All	N/A
Costa-Font 2006[37]	Costa-Font and Rico	Spain	Devolved and non-devolved regions	1981–1994, 2002	1992–1999	Political in all states and fiscal in two states	All	N/A
Costa-Font 2007[38]	Costa-Font and Pons-Novell	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	1992–1999	Political in all states and fiscal in two states	All	N/A
Costa-Font 2008a[39]	Costa-Font and Moscone	Spain	Before and after decentralisation and types of decentralisation	1981–1994, 2002	1995–20002	Political in all states and fiscal in two states	All	N/A
De Nicola 2014[45]	De Nicola *et al.*	Italy	Different regionalisation models	2000–2001	2004–2005	Political, with some fiscal autonomy	All	101/103 provinces included (excluding Gorizia and Terni, which represent 3.67% and the 5.90% of the Italian resident population).
Giannoni 2002[46]	Giannoni and Hitiris	Italy	Before and after regionalisation	1992–1993	1980–1995	Political, with some fiscal autonomy	All	N/A
Saunders 1999[51]	Saunders *et al.*	Canada (AB)	Before and after regionalisation	1994	1991–1997	Administrative	Acute	N/A
Toth 2014[11]	Toth	Italy	Before and after regionalisation	2000–2001	1999–2009	Political, with some fiscal autonomy	All	Those who have experienced a hospital stay during the three months before the interview in a nationally representative survey

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Twells 2005[52]	Twells *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994–1997	1995/1996–2002/2003	Administrative	Acute	N/A
Way 2005b[9]	Way *et al*.	Canada (NL)	At the start of, and after, regionalisation	1994-–1997	1996–2002	Administrative	Acute	Acute care staff

[a] These columns are based on research conducted by the HRB.

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Table 32 Cost-adjusted results by country (2017 euros)

Study ID	Country (province)	Average spend in 2017 € per capita before decentralisation	Average spend in 2017 € per capita after decentralisation	Overall spend in 2017 € before decentralisation	Overall spend in 2017 € after decentralisation
Toth 2014[a]	Italy	€1,527 north, €1,345 south	€2,086 north, €2,053 south	N/A	N/A
Saunders 1999[b]	Canada (AB)	Rising to a height of €1,538 in 1987, but falling to €1,324 in 1994	Average of €1,187, post reform	N/A	N/A
Twells 2005[b]	Canada (NL)	N/A	N/A	€346,594,367	€478,635,771
Costa-Font 2006	Spain	Rising from €765 in 1995 to €964 in 1999	Rising from €731 in 1995 to €911 in 1999	N/A	N/A
Arredondo 2004[2]	Mexico	N/A	N/A	State A: €25.8m to €61.1m	State A: €46.4m to €110m
				State B: €52.5m to €118.8m	State B: €84.6m to €174m
				State C: €20.8m to €36m	State C: €25m to €76m
				State D: €18.6m to €53.8m	State D: €37.4m to €179.8m

[a] http://www.in2013dollars.com/1999-euro-in-2017

[b] https://www.poundsterlinglive.com/best-exchange-rates/euro-to-canadian-dollar-exchange-rate-on-2017-12-31

Table 33 Regression analysis results for cost outcomes

Study ID	Outcome	Model number	Subgroup	Other factors considered in model	Short descriptive summary results	Statistically significant regionalisation variable
Costa-Font 2008a	Per capita total expenditure	1	N/A	Population; time from decentralisation; decentralisation; per capita GDP percentage; left wing party; GDP* left wing party; doctors per 100,000 population; population aged 64–75 years; fiscal responsibility; beds per	Decentralisation in Spain initially increased regional healthcare expenditure. There is evidence of an 'experience effect', indicating that decentralisation enables expenditure cuts in the long run. However, these effects are	N/A
	Per capita pharmaceutical expenditure	2				

Study ID	Outcome	Model number	Subgroup	Other factors considered in model	Short descriptive summary results	Statistically significant regionalisation variable
	Per capita inpatient expenditure	3		100,000 population	different, depending on the type of spending.	
	Per capita primary care expenditure	4				
Costa-Font 2007	Health expenditure per capita	1–4	Autonomous communities Foral (regions with tax collecting rights)	Log (GDP per capita), Log (population), Log (Physicians/population), Log (Stays/population), Decentralised autonomous community (AC)	Evidence suggests that the developments of political and fiscal decentralisation in a context characterised by some inter-jurisdictional competition might increase public health expenditure. Regions with fiscal, in addition to political, responsibilities spend the most.	Yes
Costa-Font 2006	Per capita public health expenditure	1	Total excluding foral	Population (logs); GDP (logs); percentage >65 years age; hospital length of stay; medical staff adjusted by population size fiscally accountable autonomous communities: beds per 1,000 population.	Decentralisation might increase public spending per capita, but other determinants have greater influence on spending, including population size, resource utilisation and socioeconomic factors.	N/A

Table 34 Summary table for cost outcomes

Study ID	Country (province)	Comparison type	Post-regionalisation
Costa-Font 2006	Spain	Decentralised and centralised regions	Patterns of per-capita health expenditure varied substantially between decentralised regions. In centralised regions, figures ranged between 1995 and 1999, rising from €765 in 1995 to €964 in 1999. In decentralised regions, figures rose from €731 in 1995 to €911 in 1999. This evidence suggests that in Spain, per-capita health expenditure is driven by factors other than decentralisation.[a] Results from the regression analysis show that decentralisation might increase public spending per capita but other determinants have a greater influence on spending, including population size, resource utilisation, and socioeconomic factors. Fiscally accountable ACs tend to expend roughly 13% more per capita than other ACs once other expenditure determinants are

Study ID	Country (province)	Comparison type	Post-regionalisation
			controlled for.
Cantarero 2005	Italy	Before and after decentralisation and types of decentralisation	Interregional differences increased considerably in the 1990s, when some regions had centralised healthcare and others did not. There was no clear pattern or distinction in per-capita health expenditure between the types of regions.
Costa-Font 2007			Evidence suggests that the developments of political and fiscal decentralisation in a context characterised by some inter-jurisdictional competition might increase public health expenditure per capita. Those ACs with fiscal, in addition to political, responsibilities expend the most.
Costa-Font 2008a		Before and after decentralisation	Decentralisation initially increased regional health expenditure per capita. There is evidence of an 'experience effect', indicating that decentralisation enables expenditure cuts in the long run. However, these effects are different depending on the type of spending.
De Nicola 2014		Different regionalisation models	There does not appear to be large differences between the different regionalisation models with regard to health expenditure per capita. The average spend of the region-centred model is slightly higher than that of the ASL-centred model or the purchaser-provider model.
Giannoni 2002			Post-decentralisation expenditure increased for most regions (particularly for those in the north), albeit at a much slower rate than prior to the reforms.
Toth 2014		Before and after decentralisation	Average spend per capita increased from €1,527 to €2,086 in the north and from €1,345 to €2,053 in the south.[a] Overall, in Italy, the deficit reduced between 1999 and 2009. However, the gap between the north and south widened, with the south responsible for 98.9% of the deficit in 2009 and the north responsible for 1.1%.
Saunders 1999	Canada (AB)		Before the commencement of reforms, age/sex/inflation/population-adjusted per-capita spending was €1,324 in 1994. This decreased post-reform, to an average of €1,187.[a]

Study ID	Country (province)	Comparison type	Post-regionalisation
Twells 2005	Canada (NL)	At the start of, and after, decentralisation	Overall spend increased from €346.6 million to €478.6 million after decentralisation.[a] After restructuring, management costs decreased in one region but costs for front-line workers substantially increased in all regions.
Way 2005b			The pattern of sick leave costs in all regions of NL varied considerably post-regionalisation, with increases for some professions (e.g. allied health professionals) and decreases for others (e.g. management personnel in the non-urban regions). Overtime costs increased for all professionals in all regions of NL.
Arredondo 2004	Mexico	Before and after decentralisation	All states demonstrated an upward trend in spending post-decentralisation. State A spent between €25.8 million and €61.1 million pre-decentralisation and between €46.4 million and €110 million in the years after. State B spent between €52.5 million and €118.8 million in the years before decentralisation and between €84.6 million and €174 million in the years after. State C spent between €20.8 million and €36 million in the years before decentralisation and between €25 million and €76 million in the years after. State D spent between €18.6 million and €53.8 million pre-decentralisation and between €37.4 million and €179.8 million after.[a]

[a] Figures adjusted to 2017 euros.

4.9 Staff work experience

Three studies explored the impact of regionalisation on staff work experience. Two of these studies were conducted in NL, Canada,[9,53] and one was conducted in Madrid, Spain.[50] All of these studies compared two or three points in time before and after regionalisation. See Table 35 for a full list of study characteristics.

Two studies explored staff experience in NL.[9,53] Way *et al.*[9] examined the turnover rate of acute care staff in the St. John's region, as well as paid sick hours per eligible employee. Way *et al.* [53] measured acute care nurses' attitudes to the healthcare reforms in NL, as well as their attitudes towards the emotional climate and practice issues in 1999. Martin-Fernandez and colleagues[50] explored the impact of regionalisation on professional quality of life among healthcare workers (including physicians, nurses, and auxiliary staff) in Madrid, focusing on perception of workload, management support, and intrinsic motivation. See supplementary appendix for individual study data.

Table 35 Study characteristics staff work experience studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Martin-Fernandez 2007[50]	Martin-Fernandez *et al.*	Spain (Madrid)	Before and after regionalisation, and insured population	1981–1994, 2002	2001–2005	Political in all states and fiscal in two states	Primary	Primary care area, which includes 1,500 workers and covers more than 790,000 patients
Way 2005a[53]	Way *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994–1997	1995, 1999, 2000, 2002	Administrative	Acute	A random sample from the Association of Registered Nurses of Newfoundland and Labrador
Way 2005b[9]	Way *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994–1997	1996–2002	Administrative	Acute	Acute care staff

[a] These columns are based on research conducted by the HRB.

4.9.1 Summary

See Table 36 for an overview of the impact of regionalisation on staff work experience outcomes.

Table 36 Summary table for staff work experience outcomes

Study ID	Country (province)	Comparison	Post-regionalisation	Impact of regionalisation
Way 2005b	Canada (NL)	At the start of, and after, regionalisation	Paid sick leave declined in the period post-regionalisation in the St. John's region of NL. The turnover rate followed a more variable pattern during this period.	+ ~
Way 2005a	Canada (NL)	At the start of, and after, regionalisation	Acute care nurses in NL viewed the health reforms as important. Initially, nurses perceived a decline in workplace conditions. However, by 2002, their perceptions of the emotional climate, practice issues, and collaboration had begun to improve.	~[a] ~[a]
Martin-Fernandez 2007	Spain (Madrid)	Before and after regionalisation, and insured population	Regionalisation did not result in a decrease in professional quality of life for healthcare staff in Madrid (constant for group 1 [physicians] and improvement for groups 2 and 3 [nurses and auxiliary personnel]). For groups 2 and 3, there was an improvement in management support, although for group 1 and, to a lesser extent, group 3, this time period was associated with an increase in demands.	~,+* +* -*

[a] significance set at $p<0.001$

Legend: + positive impact, - negative impact, ~ no impact or unclear impact, * impact is statistically significant at p<0.05 level

4.10 Perceived quality of care received and supplied

Four studies explored the impact of regionalisation on perceived quality of care.[5,11,48,53] These studies, based in NL,[53] Italy,[11] and Spain,[5,48] were published between 2005 and 2014. All studies examined points in time before or at the start of regionalisation compared with points in time after regionalisation. See Table 37 for a full list of study characteristics.

Way *et al.* compared nurses' ratings of quality and standards of care before and after regionalisation.[53] Toth examined the level of satisfaction patients experienced with their hospital care in Italian regions.[11]

Jovell *et al.*[48] explored how Spanish citizens felt about their healthcare system, and how satisfied they were with the services they had used in the past year. They compared their findings to previous data, which had been collected prior to decentralisation. Results of these studies are summarised in Table 38. See supplementary appendix for individual study data.

Anton *et al.*[5] used regression analyses to compare citizen satisfaction with various aspects of the health service before and after regionalisation. See appendix for extracted data.

4.10.1 Summary

See Table 38 for an overview of the impact of regionalisation on perceived quality of care outcomes.

Table 37 Study characteristics for perceived quality of care studies

Study ID	Authors	Country (province)	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Anton 2014[5]	Anton *et al.*	Spain	Before and after regionalisation	1981–1994, 2002	1996–2009	Political in all states and fiscal in two states	Acute and primary	Representative of all Spanish citizens aged 18 years and older
Jovell 2007[48]	Jovell *et al.*	Spain	Historical data	1981–1994, 2002	1991, 2005, 2006	Political in all states and fiscal in two states	All	N/A
Toth 2014[11]	Toth	Italy	Before and after regionalisation	2000–2001	1999–2009	Political, with some fiscal autonomy	All	Those who have experienced a hospital stay during the three months before the interview in a nationally representative survey
Way 2005a[53]	Way *et al.*	Canada (NL)	At the start of, and after, regionalisation	1994–1997	1995, 1999, 2000, 2002	Administrative	Acute	A random sample from the Association of Registered Nurses of Newfoundland and Labrador

[a] These columns are based on research conducted by the HRB.

Table 38 Summary table for perceived quality of care outcomes

Study ID	Country (province)	Comparison	Post-regionalisation	Impact of regionalisation
Anton 2014	Spain	Before and after regionalisation	For primary and specialised healthcare, decentralisation had a significant negative effect (which increased over time) on the care and assistance received from medical staff, the ease of getting appointments, and the waiting times for patients before being seen by their physicians at health centres.	-*
			For primary and specialised healthcare, decentralisation had no effect on citizens' opinions about the medical equipment and technology.	~
			For hospital care, decentralisation had a negative effect (which increased over time) on the number of people who shared a hospital room.	-*
			For hospital care, decentralisation had no effect on waiting times for admission in cases of non-urgent health problems or on information received by patients about their health problems.	~
Way 2005a	Canada (NL)	At the start of, and after, regionalisation	Immediately post-reform, perceived quality of care (including standards of care and safety issues) significantly decreased, although this trend gradually improved again over time, with a significant increase in perceived safety.	~
Toth 2014	Italy	Before and after regionalisation	Post-reform, levels of dissatisfaction with the health service decreased in the north of Italy, whereas they increased in the south of Italy.	~
Jovell 2007	Spain	Historical data	Post-reform, significantly fewer citizens felt that the whole health system needed to be rebuilt.	+*
			There was a small but significant decrease in satisfaction with services received in the same time period.	-*

Legend: + positive impact, - negative impact, ~ no impact or unclear impact, * impact is statistically significant at p<0.05 level

4.11 Public trust

One study[48] explored the impact of regionalisation on public trust. This study, which was conducted in Spain, used survey data to compare public trust of healthcare institutions and professionals to other types of institutions and professionals. Historical data, pre-regionalisation, was used as a comparison. See Table 39 for study characteristics.

Jovell *et al.*[48] investigated public trust in healthcare institutions as well as public trust in professionals, after a period of regionalisation. See supplementary appendix for individual study data.

4.11.1 Summary

See Table 40 for an overview of the impact of regionalisation on public trust outcomes.

Table 39 Study characteristics for public trust study

Study ID	Authors	Country	Counterfactual	Year of reform[a]	Year of analysis	Type of regionalisation[a]	Setting	Population restrictions
Jovell 2007[48]	Jovell *et al.*	Spain	Historical data	1981–1994, 2002	1991, 2005, 2006	Political in all states and fiscal in two states	All	N/A

[a] These columns are based on research conducted by the HRB.

Table 40 Summary table for public trust outcomes

Study ID	Country	Comparison	Post-regionalisation	Impact of regionalisation
Jovell 2007	Spain	Historical data	Compared with other professionals and institutions, the public places a high degree of trust in healthcare professionals and institutions.	**N/A**

4.12 Summary of impact findings

This section is organised by the type of regionalisation implemented; findings from the Canadian provinces, and Greece are summarised under the heading Regionalised health systems (administrative decentralisation), and findings from Spain, Italy, and Mexico are summarised under the heading Decentralisation (political and/or fiscal).

While interpreting the results of this evidence review it is important to note that the findings are country and context dependent. Different types of regionalisation were introduced in the countries; regionalisation versus decentralisation and for different reasons; cost-containment versus greater autonomy at a local level. Regionalisation was often introduced as part a package of healthcare reform, similar to the Sláintecare programme in Ireland, and so the whole package must also be taken into account when drawing conclusions from this evidence review. The results are synthesised in context in the section 5.1.

4.12.1 Utilisation of resources

4.12.1.1 Regionalised health systems (administrative decentralisation)

The numbers of hospital separations fell in the years after regionalisation in Canada, which began in the early 1990s. This decrease was significant in two provinces: NL[33] and BC.[8 54]

The HRB was able to conduct a statistical pooling of results from three studies in a meta-analysis of hospital separations per 1,000 population. The three studies pooled were from NL,[33] AB,[51] and BC.[8] The meta-analysis found that the odds of separations per 1,000 population were lower two years after regionalisation; however, this difference is not statistically significant.

Across the included studies, average length of stay (LOS) appeared to fall post-regionalisation,[25,30,51] apart from in NL, where it appeared to remain similar to pre-reform levels.[33] In another Canadian study (AB) that also assessed 30-day readmission rates, there was no difference pre- and post-regionalisation (8% versus 7%, p=0.06), indicating that patients were unlikely to have been released from hospital before it was clinically appropriate to do so.[25] A study from Greece measured average LOS at two time points, one year before regionalisation and two years after regionalisation, and reported that average LOS was lower post-regionalisation, although this was not statistically tested.[30] The HRB conducted a second meta-analysis on average LOS, pooling data from three studies: one each from NL,[33] AB,[51] and Greece.[30] The meta-analysis found that mean LOS was shorter two years after regionalisation, but the standardised mean difference is not statistically significant.

Other outcomes were less frequently reported. In Canada, the case intensity was reduced in AB post-regionalisation,[51] but this was not the case in NL, where there was little change.[33] The number of days of care also fell in AB;[51] however, in NL, there was no clear trend.[33] In one study, which examined regionalised versus centralised provinces in Canada, the authors reported no visible trends in general practitioner (GP) visits in the one year assessed; however, visits to specialists were highest in Ontario (which was not regionalised at the time of analysis).[47] Twells *et al.* reported that the number of available acute care beds in NL fell dramatically outside of the capital, St. John's, with a small decrease within the capital post-regionalisation.[52]

While other resource utilisation data were reported for Greece, the results from this study were only recorded at one point pre-regionalisation and one point post-regionalisation; therefore, no inferences can be drawn from this data.[30]

4.12.1.2 Decentralisation (political and/or fiscal)

Three resource utilisation studies from countries with political and/or fiscal regionalisation were identified. No clear trends were identified across these studies, which focused on physician/outpatient visits, numbers of beds, and staffing levels.[6,42,45]

4.12.2 Care outcomes

In contrast to the studies that examined resource utilisation, there was a wider geographical spread of care outcomes data. The majority of the studies came from Spain and Canada, with one study each coming from Greece, Spain, and Italy.

4.12.2.1 Regionalised health systems (administrative decentralisation)

In Canada (NL), regionalisation did not appear to have an effect on infant mortality.[44] There was a negative effect on patient wait times, but this difference was not statistically tested.[44] Care outcomes for specific procedures and diseases appeared to remain the same pre- and post-regionalisation, with some minor exceptions, such as the number of percutaneous coronary intervention cases, which have risen in Spain.[25,44,49] One study compared the mean Health Utilities Index, a measure of health status and health-related quality of life, between provinces which had been regionalised and those which had not been regionalised.[47] The study found that the Health Utilities Index was similar in all regions regardless of regionalisation status.[47]

4.12.2.2 Decentralisation (political and/or fiscal)

Overall mortality was measured over two periods in Spain by two studies.[32,37] Costa-Font and Rico examined overall mortality in the first wave of decentralisation (from 1992 to 2000), and found that decentralisation increased mortality more in fully fiscally decentralised foral regions than in other decentralised ACs, with one exception (Galicia).[37] The second study, conducted a few years later (from 1999 to 2001 and from 2006 to 2008), examined mortality rates before and after the second wave of decentralisation and found that for Spain as a whole, overall standardised mortality fell post-decentralisation.[32] Barrasa-Villar *et al*. also examined avoidable mortality but were unable to identify a direct link between the declining avoidable mortality and healthcare decentralisation.[32] The results were similar for other care outcomes measured in Spain.

Jimenez-Rubio and Garcia-Gomez looked at care outcomes over a 30-year period in Spain (from 1980 to 2010).[6] The authors found that decentralisation in fully decentralised (foral) regions decreased the rates of infant and neonatal mortality, and the effect on neonatal mortality was statistically significant. Cantarero and Pascual assessed the impact of decentralisation on infant mortality and life expectancy from 1992 to 2003.[35] They found that it had led to a small increase in infant mortality and a small increase in life expectancy, but that other factors investigated, e.g. income per capita, had a much greater impact on these rates. The remaining two Spanish studies assessed the impact of decentralisation on self-reported health status and disease-specific outcomes.[42,49] They found that there was no impact on health status, and the impact on disease-specific outcomes was inconclusive.[42,49] Results from Spain suggest that the greater autonomy granted to the foral regions (i.e. regions which were fully decentralised) was leading to differences in care outcomes in these regions by comparison with regions which were only politically decentralised.

In Italy, one study found that infant mortality decreased after decentralisation.[11] However, as this study was more focused on differences between the north and south of Italy, differences pre- and post-decentralisation were not statistically tested.[11] This systematic review identified one study that focused on care outcomes in Mexico.[12] Martínez-Fritscher and Rodríguez Zamora reported a statistically significant decrease in the infant mortality rate post-decentralisation, but only a very small change in the foetal death rate.[12]

4.12.3 Efficiency

We found four studies[12,30,33,45] which explicitly reported on efficiency as an outcome. It was not appropriate to suggest a direction of effect based on the results of two of the four studies due to the design of their analysis, and so they are not discussed here. In the third study, based in NL, efficiency improved within the hospitals in the capital of St. John's, but not in the rest of the province.[33] Other data reported in the study showed that there was no improvement over time in the proportion of acute care days that might have been avoided by access to alternative services, including continuing

care. Barrett *et al.* suggest that a lack of integration of acute and long-term care in St. John's was responsible for this lack of improvement; unlike in the rest of the province, a nursing home board was retained in St. John's, meaning that the regional health organisation (RHO) did not have responsibility for continuing care facilities.[33] The fourth study, based in Mexico, found that the health expenditure for the non-insured population was used more efficiently after the reform took place than the health expenditure for the insured population which was not decentralised.[12]

4.12.4 Equity

4.12.4.1 Regionalised health systems (administrative decentralisation)

The one equity study identified for Canada was conducted in BC and examined inequity between rural and urban areas. Inequity between rural and urban areas was negatively impacted by the introduction of regionalisation in BC as measured by healthcare utilisation.[8] Given that geographical equity was only explored in one study, caution is advised when interpreting the results.

4.12.4.2 Decentralisation (political and/or fiscal)

This systematic review identified four studies on equity in Spain, [36,37,40,42] and all four were led by Costa-Font and colleagues. All four of the studies found that there was no notable difference in equity as measured by healthcare outcomes or healthcare utilisation.[36,37,40,42] Of the three studies assessing inequity in healthcare costs, two found no difference post-decentralisation,[37,42] and the third suggested that decentralisation led to a decline in inequalities in healthcare spending.[40]

In Italy, inequity as measured by healthcare utilisation was not impacted by decentralisation; however, decentralisation appeared to lead to an increase in interregional inequalities due to healthcare spending in one study[46] (first phase of decentralisation) and a decline in inequalities in another study (second phase of decentralisation)[40]

4.12.5 Patient flow

Two studies in Canada[10,51] and two in Italy[11,45] examined the impact of regionalisation on patient flow. All studies showed that there was notable movement of patients between regions, i.e. not all patients were receiving treatments in their local RHO. In Canada (AB and NL), patients tended to travel to more metropolitan areas for treatment, and this seemed to stem from a mix of patients' needs and wants.[10,51] In Italy, there was a trend of more patients travelling to northern provinces for treatment, but there was a high degree of variability between regions.[11]

4.12.6 Cost

4.12.6.1 Regionalised health systems (administrative decentralisation)

In Canada, cost data were available for two regions: AB[51] and NL.[9,52] Adjusted per-capita spending decreased post-regionalisation in Alberta,[51] which was in line with the key aim of cost containment in the 1994 AB health system reform. However, this was an exceptional result by comparison with all other cost data identified. Overall spending increased dramatically post-regionalisation in NL, and increases in costs for front-line workers and overtime costs contributed in part to this increase.[9,52]

4.12.6.2 Decentralisation (political and/or fiscal)

Costa-Font and colleagues carried out three of four cost studies from Spain. [34,37-39] The first two studies analysed cost data collected between 1992 and 1999.[37,38] They found that decentralisation might have increased public spending per capita, but other determinants had a greater influence on spending, including population size, resource utilisation, and socioeconomic factors.[37,38] The studies also found that the fiscally decentralised foral regions were likely to spend more. The third study, from Costa-Font and Moscone, looked at a slightly later time period, from 1995 to 2002. The authors found that "political decentralisation appears to increase total expenditure when new region states are set up from scratch – as has been the Spanish case – given that there are significant sunk costs

when designing a decentralised provision of healthcare. However, after a recognisable number of years, efficiency effects come into place progressively when time with decentralised responsibilities in controlled for in the empirical specification. Therefore, unlike previous studies our findings suggest that some efficiency in the form of cost savings could be achieved from decentralisation in the long run."[39(p180)] The fourth Spanish study also examined the earlier time period of 1992–1999 and reported that there was no clear pattern or distinction in per-capita health expenditure between centralised and decentralised regions.[34]

There was conflicting evidence on expenditures in Italy post-decentralisation,[11,46] and this appears to be linked to differences between the north and south of the country. One study explored health expenditure in Mexico, finding that costs rose in four selected and unnamed states post-decentralisation; however, this difference was not statistically tested.[31] There were some issues with the comparability of the cost data in Mexico due to historical fluctuations in interest rates in Mexico and the peso to US dollar exchange rates.

4.12.7 Staff work experience

4.12.7.1 Regionalised health systems (administrative decentralisation)

Two studies from NL looked at healthcare staff experience of work conditions post-regionalisation.[9,53] The results were variable; while there were no notable negative trends in work experience, there was no clearly positive impact either.

4.12.7.2 Decentralisation (political and/or fiscal)

Martin-Fernandez *et al*. assessed the workloads of those working in primary care in Madrid, Spain, and found that physicians working in health centres had a much higher workload post-decentralisation.[50] These authors also examined work experiences in Madrid and found that decentralisation did not result in a decrease in professional quality of life for physicians in primary care, and actually improved for nurses and auxiliary personnel.[50] For nurses and auxiliary personnel, there was an improvement in management support, although for physicians and auxiliary personnel, there was also an increase in demands.[50]

4.12.8 Perceived quality of care received and supplied

4.12.8.1 Regionalised health systems (administrative decentralisation)

This systematic review identified one study that reported on nurses' perspectives regarding quality of care post-regionalisation.[53] The study found that perceived quality of care significantly decreased, although this trend gradually improved over time, along with a significant increase in perceived safety.[53]

4.12.8.2 Decentralisation (political and/or fiscal)

Two studies from Spain assessed quality of care as perceived by patients.[5,48] The first study found that waiting times were longer and that it was harder to get an appointment post-decentralisation, although these problems were not seen at the hospital level.[5] The second study confirmed that there was a small but significant decrease in patient satisfaction with the health system as a whole post-decentralisation.[48] However, citizens were less likely to agree with the statement that the "health system must be completely rebuilt."[48(p353)]

In an Italian study investigating perceived quality of care, there were conflicting views regarding levels of dissatisfaction with the healthcare system.[11] As was the case with other outcomes reported from Italy, these conflicting results align with differences between the north and the south of Italy.[11]

4.12.9 Public trust

This systematic review only identified one study examining public trust, and therefore the results of this single study cannot be extrapolated into any meaningful conclusions regarding public trust post-regionalisation.[48]

5 Discussion and conclusion – Impact review

5.1 Synthesis of findings in context

Important questions about the healthcare system can often be answered by analysing resource utilisation data.[57] The majority of resource utilisation data identified in this systematic review was from studies conducted in Canadian provinces, accounting for 8 out of 12 studies.

Regionalised: Canadian provinces, New Zealand, Greece

Decentralised: Spain, Italy, Mexico

The numbers of hospital separations (or discharges) fell in the years after regionalisation in Canada, which began in the early 1990s. This decrease was significant in two of the four provinces that evaluated hospital separations: NL[33] and BC.[8] The authors of the separation studies indicated that in addition to regionalisation, there was also likely a causal link between the fall in the rate of separations and budget cuts. Indeed, changes in patterns of resource utilisation should also be viewed in the context of the healthcare landscape in Canada in the early 1990s. The 1990s was a time of major restructuring of Canada's healthcare system, which focused on reducing the accumulated public debt following a nationwide recession.[25,58] As the Federal Government of Canada withdrew equalisation payments and the provinces struggled with their own budget deficits, redesigning the healthcare system at the provincial level became necessary in order to meet the new fiscal reality.[25] The primary goals of regionalisation were similar across provinces and included hospital cost containment, increased efficiency and effectiveness, integrated care, and the provision of a system that was more responsive to the needs of the local population.[59] Reductions in funding were passed on to the newly established RHOs in the hope that local knowledge would identify efficiency savings.[3,51]

[54]The HRB was able to conduct a statistical pooling of results from three studies in a meta-analysis of hospital separations per 1,000 population. The three studies pooled were from NL,[33] AB,[51] and BC.[8] The meta-analysis found that the odds of separations per 1,000 population were lower two years after regionalisation, but this result was not statistically significant. Our meta-analysis was limited in that we only had data for all studies two years post-regionalisation; it is possible that if data from three or more years post-regionalisation were available, the results would have been more notable. This limitation is discussed further is Section 5.2.

Alberta: key points

- AB has gone through three stages of regionalisation; the first stage started in 1994 to reduce healthcare spending by 17%.
- Stage 1 established 17 regional health authorities in 1994 (the studies we examined relate to Stage 1).
- The type of regionalisation is administrative.

Across the included studies, average LOS appeared to fall post-regionalisation,[25,30,51] apart from in NL, where it appeared to remain similar to pre-reform levels.[33] The HRB conducted a second meta-analysis on average LOS, pooling data from three studies: one each from NL,[33] AB,[51] and Greece.[30] The meta-analysis found that mean LOS was shorter two years after regionalisation, although the standardised mean difference was not statistically significant. As with hospital separations, this outcome is likely to have been influenced by accompanying budget cuts. While cutting the average LOS could be seen as an approach to cost containment, it did not appear to affect care outcomes in AB based on Hamilton *et al.*'s study, which also assessed 30-day readmission rates and found that there was no difference in readmissions pre- and post-regionalisation (8% versus 7%, p=0.06), indicating that patients were unlikely to have been released from hospital before it was clinically appropriate to do so.[25]

Other outcomes were less frequently reported. In Canada, the case intensity was reduced in AB post-regionalisation,[51] but this was not the case in NL, where there was little change.[33] The number of days of care also fell in AB;[51] however, there was no clear trend in NL.[33] In one study, which examined

regionalised versus centralised provinces in Canada, the authors reported no visible trends in GP visits in the one year assessed; however, visits to specialists were highest in Ontario (which was not regionalised at the time of analysis).[47] Twells *et al.* reported that the number of available acute care beds in NL fell dramatically outside of the capital of St. John's post-regionalisation, with a small decrease within the capital.[52]

As discussed, in Section 2 regionalisation was introduced in Canada as a package of healthcare reforms. This package also had a fiscal component, with budget restrictions introduced in the majority of provinces.[3,25] The possible influence of budget restrictions on resource utilisation cannot be ruled out.

It is important to note that the majority of the studies in this systematic review followed an interrupted time series design or a before-and-after comparative design.[60] The counterfactual for this study design is "the hypothetical scenario under which the intervention had not taken place and the trend continues unchanged (that is: the 'expected' trend, in the absence of the intervention, given the pre-existing trend)."[49(p349)] In order to examine the 'expected' trend, the HRB examined Canadian Institute for Health Information (CIHI) separations data between the years of 1976/1977 and 2002/2003; the trends are displayed in Figure 13. These data show that hospital separations per 100,000 population were declining steadily prior to 1990, and that the decline intensified between 1990 and 2003, the time frame during which major health system reform (including regionalisation) took place.

The results of this systematic review show that acute care resource utilisation decreases post-regionalisation, and this decrease was above and beyond what would be expected based on historical trends. This was likely due to a package of healthcare reforms, including regionalisation of the healthcare system and budget restrictions.

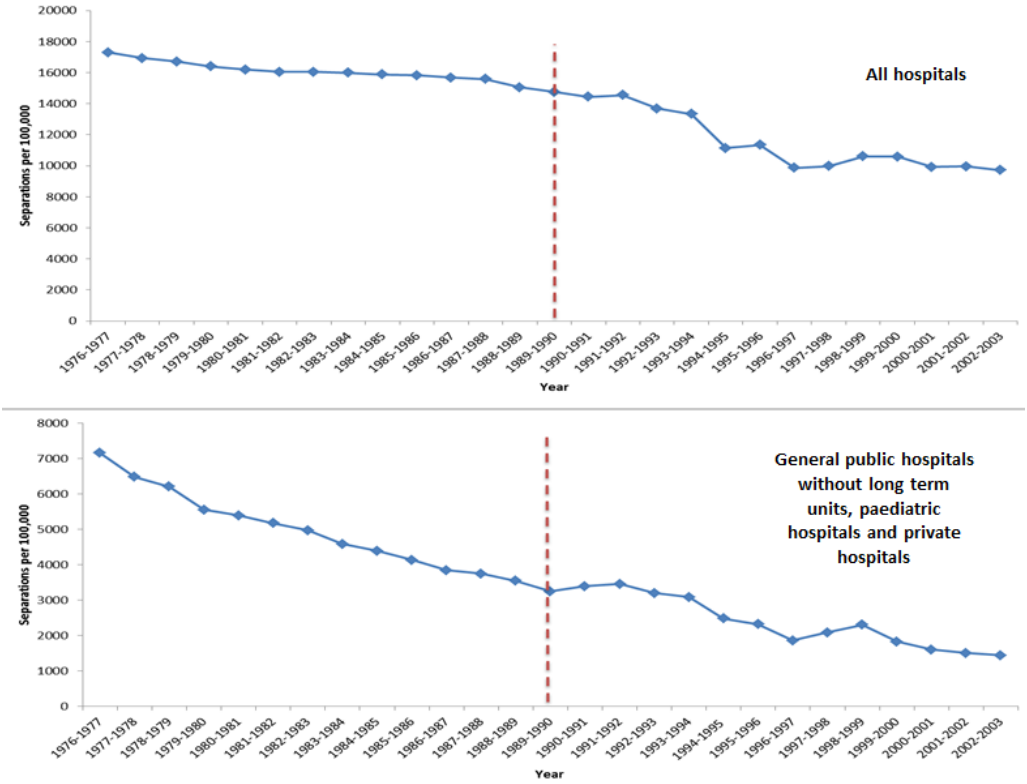

Figure 13 Historical separations data for Canada
Source: CIHI[61]

It is important to note that decentralisation of healthcare in Spain was not primarily aimed at improving the healthcare sector, but was part of a global devolution process involving the whole

public administration due to political requests from autonomous communities to decentralise authority to sub-central government.[2,5] It is possible that this is the reason why so few studies in Spain analysed resource utilisation in healthcare.

In contrast to the studies that examined resource utilisation, there was a wider geographical spread of care outcomes data. The majority of the studies came from Spain[6,32,35,37,42,49] and Canada,[25,44,47] with one study each from Greece,[30] Mexico,[12] and Italy.[11]

In Canada (NL), regionalisation did not appear to have an effect on infant mortality.[44] There was a negative effect on patient wait times for diagnostic test and specialist visits, but this difference was not statistically tested.[44] Care outcomes for specific procedures and diseases in NL and AB appeared to remain the same pre- and post-regionalisation.[25,44] One study compared the mean Health Utilities Index, a measure of health status and health-related quality of life, between provinces which had been regionalised and those which had not.[47] The study found that the Health Utilities Index was similar in all regions regardless of regionalisation status.[47] Overall in Canada, regionalisation seemed to improve some care outcomes and have no impact on others. The only exception to this was waiting times, which appeared to be longer after regionalisation.

Overall mortality was measured over two periods in Spain by two studies.[32,37] Costa-Font and Rico examined overall mortality in the first wave of decentralisation (from 1992 to 2000), and found that decentralisation increased mortality more in fully fiscally decentralised (foral) regions than in other decentralised autonomous communities (ACs), with one exception (Galicia).[37] The second study, conducted a few years later (from 1999 to 2001 and 2006 to 2008), examined mortality rates before and after the second wave of decentralisation and found that, for Spain as a whole, overall standardised mortality fell post-decentralisation.[32] Barrasa-Villar *et al.* also examined avoidable mortality but were unable to identify a direct link between the declining avoidable mortality rate and healthcare decentralisation.[32] The results were similar for other care outcomes measured in Spain.

Jimenez-Rubio and Garcia-Gomez looked at care outcomes over a 30-year period in Spain (1980–2010).[6] The authors found that decentralisation in fully decentralised regions (foral regions which have both political and fiscal decentralisation) decreased infant and neonatal mortality. Cantarero and Pascual assessed the impact of decentralisation on infant mortality and life expectancy from 1992 to 2003.[35] They found that it had led to a small increase in infant mortality and a small increase in life expectancy, but that other factors included in the statistical model, such as income per capita, had a much greater impact on these outcomes. The remaining two Spanish studies assessed the impact of decentralisation of self-reported health status and disease-specific outcomes.[42,49] They found that there was no impact on health status, and the impact on disease-specific outcomes was inconclusive.[42,49] Results from Spain suggest that the greater autonomy granted to the foral regions may be leading to differences in care outcomes in these regions by comparison with other Spanish regions which have only politically decentralised.

In Italy, one study found that infant mortality decreased after decentralisation.[11] However, as this study was more focused on differences

Spain: key points

- Decentralisation of healthcare responsibility to the 17 ACs in Spain occurred over a long period of time and in two waves: from 1981 to 1994 (seven regions) and in 2002 (10 regions).
- The objectives of decentralisation in Spain were to make governments more accountable and responsive to citizens and to improve efficiency.
- Type of regionalisation is political in all states and fiscal in two states.
- The distribution of powers is different for every AC, as laid out in their Statutes of Autonomy. ACs have wide legislative and executive autonomy, with their own parliaments and regional governments. The Federal Government coordinates health policy for contracting, acquisition of health/pharmaceutical products, related goods and services, and basic health personnel policies.

between the north and south of Italy, differences pre- and post-decentralisation were not statistically tested.[11] This systematic review identified one study that focused on care outcomes in Mexico.[12] Martínez-Fritscher and Rodríguez Zamora reported a significant decrease in the infant mortality rate post-decentralisation, but only a small non-significant change in the foetal death rate.[12]

In the studies included in this review, there was a paucity of data regarding the impact of regionalisation on primary care, as the included studies primarily focused on acute care. Despite these limited data, there are several important observations regarding regionalisation and primary care. The included studies indicated that there was greater pressure on GPs post-regionalisation. Cloutier-Fisher *et al.* used avoidable hospitalisations as an indicator of primary care system efficiency, viewing it as a proxy for access to GP care.[8] They found that avoidable hospitalisations declined. However, rural areas did not make any gains in avoidable hospitalisation rates relative to urban areas, with avoidable, non-avoidable, and total hospitalisations remaining consistently higher in rural areas post-regionalisation. The authors suggested that access to effective primary care in rural areas in BC remained problematic post-regionalisation.[8] Martin-Fernandez *et al.* assessed the workloads of those working in primary care in Madrid and found that physicians working in health centres had a much higher workload post-decentralisation.[50] Unfortunately, this study did not assess workload in acute settings, as this would have been an interesting comparison and would have provided interesting guidance.

Anton *et al.* provided particularly relevant data to support the findings regarding pressure on primary care, as they assessed Spanish citizens' perceptions of both primary care and inpatient and outpatient hospital care.[5] They reported that for primary and specialised care, decentralisation had a significant negative effect on the care and assistance that patients received from medical staff; the ease of getting appointments; and waiting times for patients before being seen by their physicians at health centres. Moreover, this negative effect increased over time. A similar impact was not found in the acute care setting, and hospital care decentralisation had no effect on waiting times before admission to hospital for non-urgent health problems.[5]

In one study that compared regionalised versus centralised provinces in Canada, the authors found that there was no visible trend in the number of GP visits in the one year assessed.[47] However, the workload of GPs was not examined.[47]

In a 30-year analysis of data from Spain, Jimenez-Rubio and García-Gomez reported that decentralisation was associated with a 9.8 increase in the number of GPs per 100,000 population on average.[6] The estimated effect was larger in regions with full decentralisation (foral regions), with an increase of 25.9 GPs, and very small and insignificant increases for AC regions with political decentralisation only.[6] This study could be an indication of the longer-term picture of primary care, in which RHOs need to deal with the increased pressure decentralisation places on primary care and increase the number of GPs and other community-based health professionals accordingly.

This systematic review also only retrieved limited data on social and community care. When examining efficiency outcomes, Barrett *et al.* reported that there was no improvement over time in the proportion of acute care days that might have been avoided by access to alternative services, including continuing care.[33] Barrett *et al*. suggest that a lack of integration of acute and long-term care in St. John's was responsible for this lack of improvement; unlike in the rest of the province, a nursing home board was retained in St. John's, meaning that the RHO did not have responsibility for continuing care facilities.[33] In order to reduce acute care resource utilisation, it is necessary to increase available resources in the community and in social care settings.

Further research is needed to better understand the relationships between pressure on primary and community care, and regionalisation.

An important aim of any health system reform is to use the resources already allocated to the system in the most efficient way possible. Regarding regionalisation, governments typically aim to increase efficiency by allowing healthcare decisions to be made at a local level, where healthcare needs are better understood.[59] We found four studies[12,30,33,45] which explicitly reported on efficiency as an

outcome. It was not appropriate to suggest a direction of effect based on the results of two of the four studies due to the design of their analysis, and so they are not discussed here. In the third study, which was based in NL, efficiency improved within the hospitals in the capital of St. John's but not in the rest of the province.[33] Other data reported in the study showed that there was no improvement over time in the proportion of acute care days that might have been avoided by access to alternative services, including continuing care. Barrett *et al.* suggest that a lack of integration of acute and long-term care in St. John's was responsible for this lack of improvement; unlike in the rest of the province, a nursing home board was retained in St. John's, meaning that the RHO did not have responsibility for continuing care facilities.[33]

The fourth study, based in Mexico, found that the health expenditure for the non-insured population was used more efficiently after the reform took place than the health expenditure for the insured population which was not decentralised.[12]

Efficiency is a complex endpoint comprising multiple inputs, including resource utilisation data.[57] Acute care accounts for a large proportion of any healthcare budget; in 2001, the Organisation for Economic Co-operation and Development (OECD) reported that, on average, 38% of total healthcare expenditure was allocated to inpatient care, and this was likely to have been closer to 50% when the healthcare reforms were introduced in Canada in the early 1990s.[62] This systematic review has shown that health resource utilisation, as measured by separations and LOS, decreased post-regionalisation.

Regarding care outcomes, the results from this systematic review suggest that mortality rates stayed the same or improved post-regionalisation. The results were the same for most other care outcomes reported, with the exception of waiting times. Taking the results of the resource utilisation studies and care outcomes studies together, we can infer that while savings in acute care resources were seen post-regionalisation, this did not have a negative impact on care outcomes. These results are generalisable to the acute care setting only, as little resource data were reported for the primary care setting.

The one equity study identified for Canada was conducted in BC and examined inequity between rural and urban areas.[8] Inequity between rural and urban areas was negatively impacted by the introduction of regionalisation in BC, as measured by healthcare utilisation.[8] Given that geographical equity was only explored in one study, caution is advised when interpreting the results.

This systematic review identified four studies on equity in Spain, and all four were led by Costa-Font and colleagues.[36,37,40,42] All four of the studies found that there was no notable difference in equity as measured by healthcare outcomes or healthcare utilisation.[36,37,40,42] Of the three studies assessing inequity in healthcare costs, two found no difference post-decentralisation,[37,42] and the third suggested that decentralisation led to a decline in inequalities in healthcare spending.[40]

In Italy, inequity as measured by healthcare utilisation was not impacted by decentralisation; however, decentralisation appeared to lead to an increase in interregional inequalities due to healthcare spending in one study[46] (first phase of decentralisation) and a decline in inequalities in another study (second phase of decentralisation).[40]

Studies which explored income-related equity were based in countries which were politically, and sometimes fiscally, decentralised. Overall, these

Italy: key points

- Legislative reform from 1992 to 1993 provided for a decentralised management of the National Health Service. Three further reforms were made in 2000, 2001 (constitutional amendment), and 2013 (our studies relate to the 1992–1993 and 2001 restructuring).
- On the basis of the 2001 amendment, healthcare has become the subject of concurrent legislation between the State and the regions; this means that the regions have autonomy in organising and managing healthcare services on their own territory, whereas the State must confine itself to formulating the general rules of the system.
- There are 21 health regions.
- The type of regionalisation is political, with some fiscal autonomy.

findings seemed to demonstrate that decentralisation did not have a negative impact on equity in these populations. One study explored geographical equity in Canada, finding that urban areas progressed at a faster, and greater, rate (as measured by separations/avoidable hospitalisations) than rural areas. However, as this finding is based on one study only, caution is advised in interpretation, and further research is warranted. This finding is possibly comparable to the situation in Italy, which saw northern regions progress across numerous outcomes at a faster rate than southern regions post-regionalisation. Together, these results seem to suggest that attention should be paid to the inherent weaknesses in different regions and that these should be addressed accordingly when implementing regionalisation.

Two studies in Canada[10,51] and two in Italy[11,45] examined the impact of regionalisation on patient flow. All studies showed that there was notable movement of patients between regions, i.e. not all patients were receiving treatment in their local RHO. In Canada (AB and NL), patients tended to travel to more metropolitan areas for treatment, and this seemed to stem from a mix of the patients' needs and wants.[10,51] In Italy, one study found that there was a trend of more patients travelling from southern regions to northern regions for treatment, than from northern regions to southern regions.[11]

In order to fully understand the implications of the cost findings presented in this systematic review, it is important to be aware of the local climates within which regionalisation was introduced as well as the main aims of regionalisation. The main driver behind regionalisation in Canada was cost – the Government wanted to restrict healthcare spending without disruption to service delivery. However, in Spain, Italy, and Mexico, there was less of a focus on fiscal savings and more of a push towards autonomy at the local level. Within the context of aiming to increase autonomy at a regional level, increases in spending may be seen as a more positive outcome.

In Canada, cost data were available for two regions: AB[51] and NL.[9,52] Adjusted per-capita spending decreased post-regionalisation in Alberta,[51] which was in line with the key aim of cost containment in the 1994 AB health system reform. However, this was an exceptional result by comparison with all other cost data identified. Overall spending increased dramatically post-regionalisation in NL, and increases in costs for front-line workers and in overtime costs contributed in part to this increase.[9,52]

Costa-Font and colleagues carried out three of four cost studies from Spain. The first two studies analysed cost data collected between 1992 and 1999.[37,38] They found that decentralisation might have increased public spending per capita but that other determinants had a greater influence on spending, including population size, resource utilisation, and socioeconomic factors.[37,38] They also found that the fiscally and politically decentralised foral regions were likely to spend more than other ACs. The third study, from Costa-Font and Moscone, looked at a slightly later year range of 1995–2002. The authors found that "political decentralisation appears to increase total expenditure when new region states are set up from scratch – as has been the Spanish case – given that there are significant sunk costs when designing a decentralised provision of healthcare. However, after a recognisable number of years efficiency effects come into place progressively when time with decentralised responsibilities is controlled for in the empirical specification. Therefore, unlike previous studies our findings suggest that some efficiency in the form of cost savings could be achieved from decentralisation in the long run."[39(p180)] The fourth Spanish study also examined the earlier time period (1992-1999) and reported that there was no clear pattern or distinction in per-capita health expenditure between centralised and decentralised regions.[34]

There was conflicting evidence on expenditures in Italy post-decentralisation,[11,46] and this appears to be linked to differences between the north and south of Italy.

One study explored health expenditure in Mexico, finding that costs rose in four selected and unnamed states post-decentralisation; however, this difference was not statistically tested.[31] The increases were of much greater magnitude of expenditure than in any other country included in this evidence review. In a literature review on Mexico's healthcare reform, Frenk *et al*. indicated that any increase in spending on healthcare in Mexico was considered a positive outcome[24] and that, given the comparatively much larger spending increases in Mexico than in other countries examined, the

impacts of decentralisation in Mexico are not likely to be generalisable to higher-income countries introducing regionalisation.

Cost data were also commonly reported in our included studies. Resource utilisation data can be used as a predictor for healthcare costs,[57] and therefore the results of this review are surprising in that trends of reduced resource utilisation did not translate into cost reductions. For example, in NL, hospital separation rates fell significantly post-regionalisation, but overall healthcare spending increased dramatically.[52] A review by Barker and Church[3] found that RHOs across Canada were limited in their ability to reduce healthcare expenditures due to their lack of authority over physicians' salaries. Indeed, two major contributors to costs – physicians' salaries and prescription drugs – were outside the RHOs' authority. A breakdown of Canadian healthcare expenditure per capita by health spending category is provided in Figure 14.

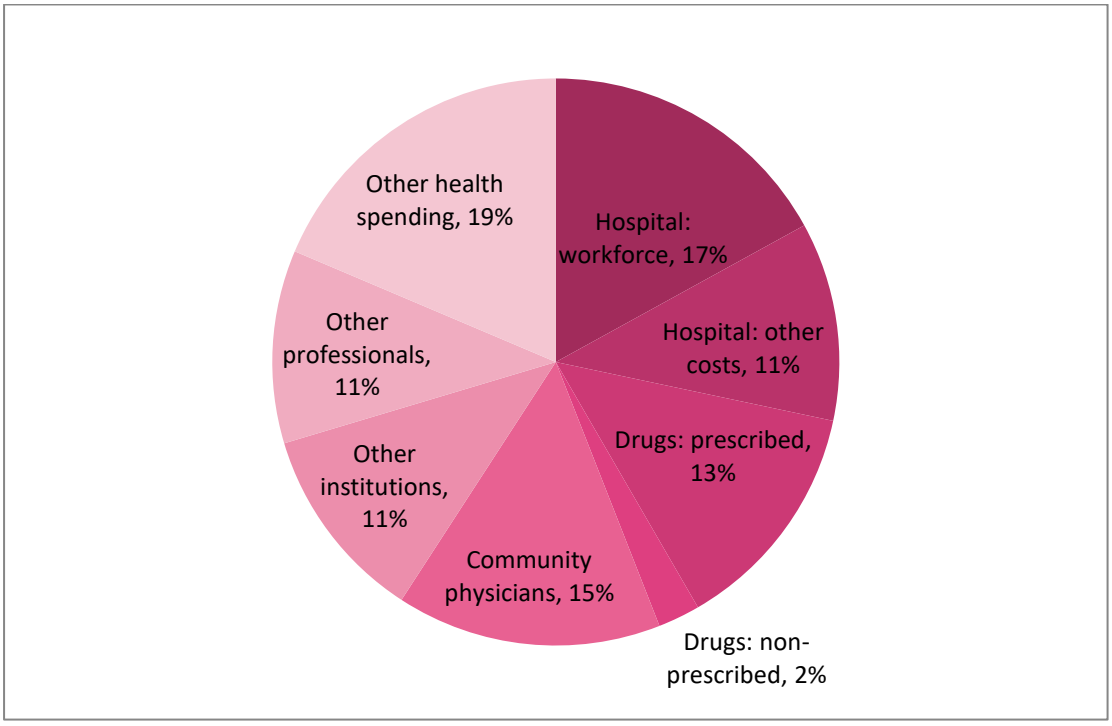

Figure 14 Percentage of health expenditure in Canada, 2018

Source: CIHI[63]

In Ireland, healthcare spending on the workforce in 2018 was estimated to be between 73% and 80%.[64] In countries that have regionalised or decentralised, RHOs continue to have restricted authority over high-cost items, such as salaries. Therefore, little improvement in cost savings in this area can be expected.

It is interesting to note that in Spain, where the regions have greater autonomy than in Canada, there were some indications that decentralisation could lead to cost savings in the long term.[39] Further long-term examination of cost data would be useful to probe Costa-Font and Moscone's conclusion.[39] However, this would be limited by the rapidly evolving healthcare system, as described in Section 5.2.1.

In this systematic review, the two fully decentralised (foral) regions in Spain had consistently different results. Fiscally decentralised regions have the autonomy to increase or decrease spending on healthcare through taxation. It is important to keep this contextual factor in mind when interpreting the results of the impact review.

5.2 Strengths and limitations

The main strengths and weaknesses of this systematic review are outlined in the Sections 5.2.1 and 5.2.2.

5.2.1 Strengths

5.2.1.1 Outcomes

This systematic review is the only one which we are aware of that includes such a large number and diverse range of outcomes, and the inclusion of this range of outcomes has allowed us to explore the findings in a more comprehensive manner. The incorporation of such a variety of outcomes facilitates an overview of the patterns across the health system as a whole, enabling us to see the links between them; for example, the relationship between resource utilisation, care outcomes, and efficiency. Furthermore, this broad view helps to identify key time points in the regionalisation process, demonstrating the short-, medium-, and long-term outcomes.

5.2.1.2 Counterfactual

The fact that our inclusion criteria specified the need for a counterfactual is a further strength of this review. This ensures that all outcomes were analysed in comparison to either a non-regionalised area or to a time prior to regionalisation. Although there were limitations associated with some of the study designs used (see Section 5.2.2), use of a counterfactual does increase the rigour of the evidence provided in this review.[60]

5.2.1.3 Expert involvement

We consulted an independent health systems expert during the meta-analysis feasibility assessment. This validated our chosen approach to our analysis.

5.2.1.4 Systematic review methods

A key strength of this review was the systematic approach taken at all stages. The use of two independent screeners at abstract, full-text, and critical appraisal stages ensures a rigorous and robust review. In addition to this, all extracted data were validated by a second reviewer in order to ensure agreement and avoid errors.

5.2.2 Limitations

5.2.2.1 Type of study

The studies identified by this systematic review mainly followed an interrupted time series design or a before and after design. Researchers studying health system reform are limited in their choice of study design, as, for example, a randomised controlled trial cannot be conducted. Instead, health system reforms provide opportunities for natural experiments, whereby researchers can examine the effects of experimental and control conditions that are outside their control. Interrupted time series designs are often applied to natural experiments when an intervention is introduced at a known point in time, and therefore it is an appropriate design for examining the effects of healthcare reforms. However, interrupted time series designs cannot control for confounding, due to extraneous interventions or events occurring contemporaneously with healthcare reforms.[60] Also, several design flaws were noted for some of the studies identified in this review: for some there are no data presented prior to 'interruption' by regionalisation; for some the data were collected at the ' interruption' point only and then again at follow-up time points; and finally, for some studies, data were collected at only a few time points. The counterfactual for this study design is "the hypothetical scenario under which the intervention had not taken place and the trend continues unchanged (that is: the 'expected' trend, in the absence of the intervention, given the pre-existing trend)."[49(p349)] In order to address some of the issues created by the variable study designs, the HRB examined CIHI

separations data from between 1976/1977 and 2002/2003, as described in Section 5.1. It is very difficult to fully determine the impact of potential confounders, such as overall health budget, on the results of this review. We have, however, presented relevant context when describing our main findings so that the results can be interpreted within the context of possible confounders. Many studies in our review have attempted to mitigate the influence of confounders on their study results by conducting a regression analysis, and this is captured in our critical appraisal of study design.

Other study designs that could be considered in evaluating the quantitative impact of healthcare systems reform could include cohort analyses and case studies.[65] Each of these study designs would need to be carefully considered for their susceptibility to confounder bias.

5.2.2.2 Timing of evaluation

We must also consider the timing of the evaluations included in this review; specifically, whether the evaluation was conducted shortly after regionalisation was introduced or whether it was conducted with a follow-up several years post-regionalisation will influence the results. Regarding the timing of evaluations in the Irish healthcare sector in particular, Butler has said: "Also to be considered when deciding when a policy/programme/project should be evaluated is whether the programme is ready for an evaluation. The timing of an evaluation can influence the accuracy of the findings because sufficient time will be required for the programme to have an effect, the programme may not yet be operating at its full scope and data may not yet be readily available."[66(p9)] Burt *et al*. have suggested that evaluation planners should first ask, "Is the project operating at its full scope, and is it stable (not just beginning, or not just having changed or being about to change some major aspect of program operations)?"[67(p13)]

The importance of timing can be seen in the cost results of this review; three studies from the same group (Costa-Font and colleagues, reported on cost data in Spain.[39] They identified the possibility that decentralisation could lead to cost savings in the long run only when they examined long-term cost data (over a 21-year period).[39]

The HRB suggests that the majority of studies included in this review did not have sufficient follow-up to capture the full impact of healthcare reforms. However, the ability to follow healthcare services in the long term is hindered by the rapidly changing field of healthcare system reform. As outlined in Section 2.3, the countries and provinces included in this review have gone through several rounds of regionalisation. AB, Canada, for example, has gone through three rounds of major reform. RHOs were introduced in 1994; in 2003, the number of RHOs was reduced from 17 to 9; and in 2008, the nine RHOs were merged into one health authority. Therefore, it would have been difficult for the authors of the studies identified in this systematic review to monitor the impacts of regionalisation in the long term given the changeable nature of healthcare sector reforms.

5.2.2.3 Heterogeneity

This systematic review was restricted to OECD countries; however, there is still significant geographic heterogeneity present in the studies identified (Figure 4). The principal source of heterogeneity was the disparate types of regionalisation and decentralisation introduced in the various countries and provinces. We have provided a typology of regionalisation and decentralisation in Section 2.1.

Socioeconomic differences between settings were an important consideration for one country in particular: Mexico. This is highlighted by fundamental differences in the spending goals of reforms. Frenk *et al*. have indicated that as part of decentralisation, the Mexican Government aimed to increase spending; therefore, any increase in spending was considered a positive outcome.[24] This demonstrates that the impacts of decentralisation in Mexico are likely not generalisable to higher-income countries.

5.2.2.4 Meta-analysis

This systematic review aimed to analyse the data retrieved in a meta-analysis wherever this was deemed feasible. The HRB undertook a comprehensive meta-analysis feasibility assessment in order

to determine which outcomes and which studies could be appropriately statistically pooled in a meta-analysis. Lack of homogeneity in the reporting of outcomes data (both in terms of follow-up and definition) as well as heterogeneity in study characteristics were the main reasons that our meta-analyses were limited to two outcomes: the rate of separations and average LOS.

5.2.2.5 Setting of studies

In the studies included in this review, there was a paucity of data regarding the impact of regionalisation on primary care, as the included studies primarily focused on acute care. Only three studies specifically examined primary care.[5,8,50] Seventeen of the 31 studies addressed all settings, but specific data on primary care outcomes were absent from most of these studies. We found no studies which specifically examined the impact of regionalisation on community and social care. Further research in the primary care and community and social care settings is needed in order to fully determine the impact of regionalisation on the healthcare system.

5.3 Relation to other literature

We identified three systematic reviews that focused on similar research questions to those of the HRB research team.[68-70] Alves *et al.* found that decentralisation can result in better health outcomes as measured by infant mortality and higher expenditure, resulting in ambiguous consequences for efficiency.[68] The study authors also reported that equity consequences were controversial. While the results of this systematic review are largely in agreement with the finding of Alves *et al*. on infant mortality and expenditure, we found less controversial evidence on equity; this is likely due to our stricter inclusion criteria regarding setting and intervention. We also included one additional study which was published after the Alves *et al*. paper.

Sumah *et al*. explored the impact of decentralisation on health-related equity, overlapping with the HRB's systematic review on five studies.[69] They found conflicting results, stating that decentralisation could either increase the equity within a country or exacerbate inequities, depending on the context. Contextual factors of particular importance were related to pre-existing socioeconomic disparities and financial barriers to access. Where the studies overlapped, findings were consistent with our review; however, much of the data related to countries for which we did not have data (e.g. Switzerland, China, Colombia, and Chile). Sumah *et al.* conclude that the complementary mechanisms implemented alongside regionalisation can help to negate any potential negative effects.[69]

Dwicaksono *et al.* focused on low- and middle-income countries, and only the data that they included from Mexico would be relevant to the HRB's systematic review.[70] The authors found that there was "little rigorous evidence documenting the impact of decentralisation processes on health system performance or outcomes in part due to challenges in measuring such far-reaching and multifaceted system-level changes."[70] The findings of Dwicaksono *et al.*'s review indicate the difficulties in conducting a research study on the impact of regionalisation, which align with the limitations described in our systematic review of impact.

5.4 Conclusion – Impact review

This systematic review set out to explore the impact of regionalisation of healthcare systems. Regionalisation can result in reductions in acute hospital resource use without negatively affecting overall care outcomes such as mortally. The long-term cost implications are heavily context dependent. These findings indicate that a regionalised healthcare system can be an efficient healthcare system; however, careful consideration must be given to what resources are provided in each healthcare setting including acute, primary, community, and social care settings.

6 Findings – Barriers and facilitators review

The search results from the review examining the barriers to and facilitators of regionalisation are presented below, followed by the themes, with associated subthemes, that arose from analysis of the included studies.

6.1 Search results

Database searching identified a total of 1,013 records, and no duplicate references were found. Of the 1,013 records, 944 were excluded at the abstract and title review stage. There were 69 results that met the inclusion criteria and were subsequently screened at the full-text review stage. Following full-text screening, 27 studies were retained for inclusion in the review. The flow of literature through the assessment process is shown in a PRISMA flowchart (see Figure 15). The list of excluded studies alongside the reason for exclusion is provided in the supplementary appendix.

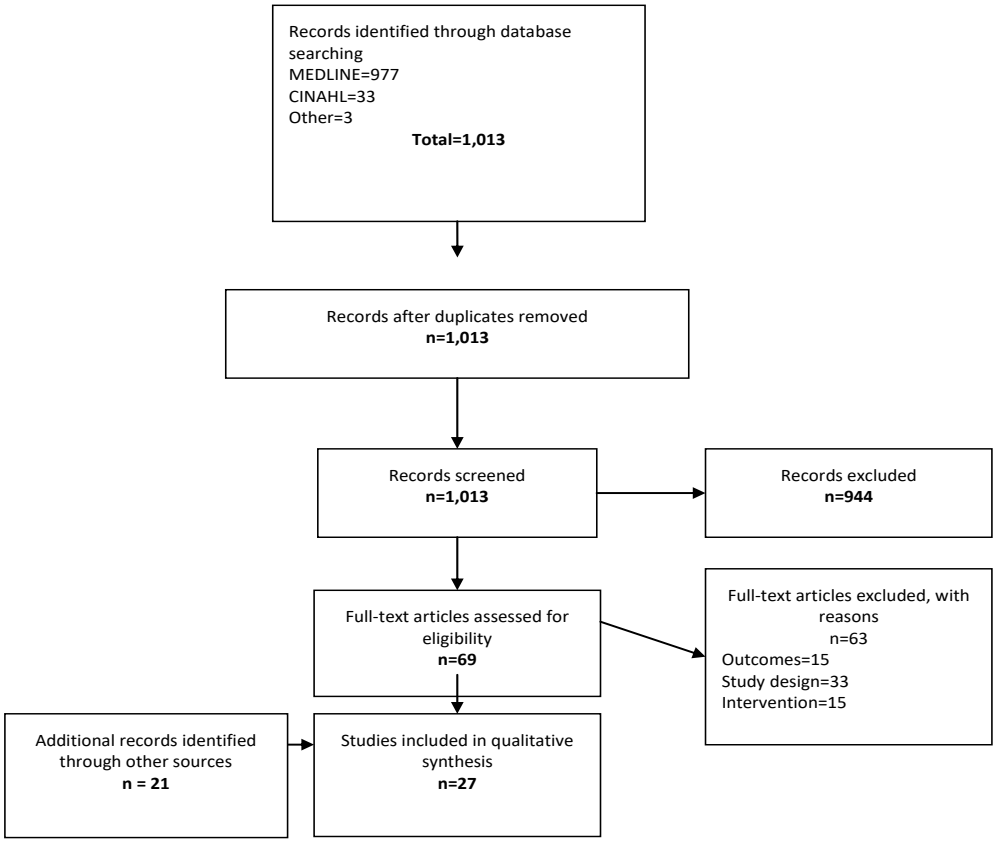

Figure 15 PRISMA diagram – barriers/facilitators review

The studies identified were from Canada (n=11), New Zealand (n=9), Mexico (n=5), and Italy (n=2). The geographic dispersal of the barriers/facilitators studies is shown in Figure 16. As we have treated the Canadian provinces as separate entities in this review we have also given a breakdown of the number of studies by province in Figure 17.

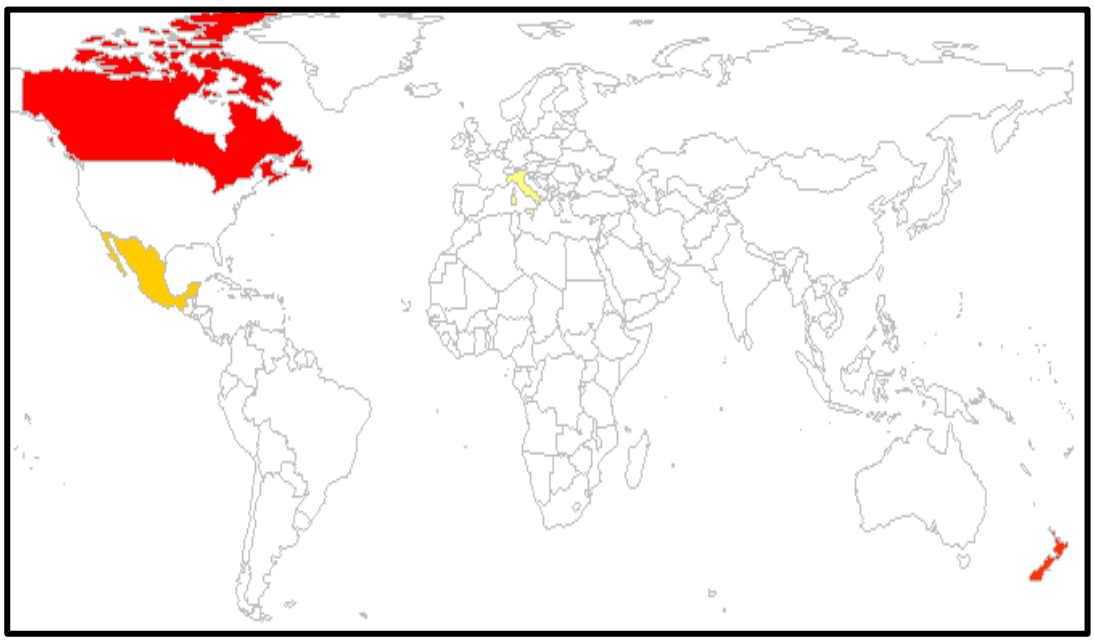

Figure 16 Geographic dispersal of barriers and facilitators studies

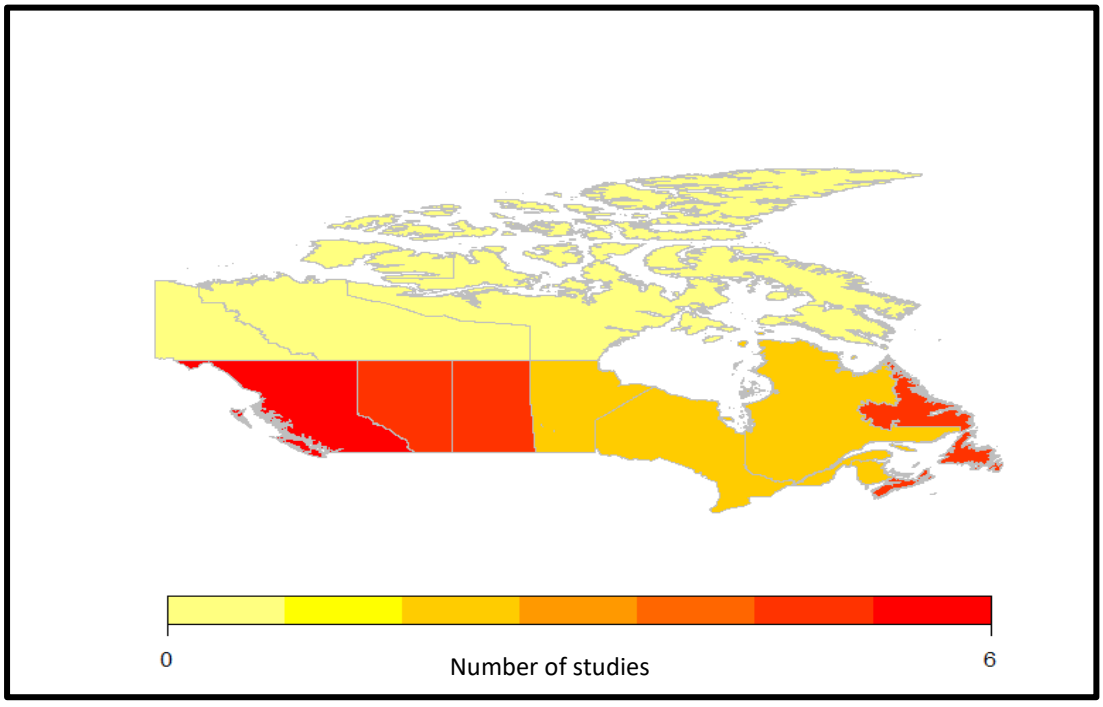

Figure 17 Geographic dispersal of barriers and facilitators studies in Canadian provinces

6.2 Results of the critical appraisal

Qualitative data from mixed methods and qualitative studies were assessed using a tool that HRB researchers adapted from quality appraisal tools from McMaster University and the Joanna Briggs Institute.[18,19] Two studies were found to be of 'high' quality with respect to study design and/or analysis, 17 were found to be 'moderate', and two were found to be 'weak'.

Each qualitative finding was assigned a level of evidence based on the Joanna Briggs Institute guidelines for conducting systematic reviews of qualitative evidence,[19] and the results of this are given in the supplementary appendix.

Quantitative data from mixed methods studies were assessed using the Effective Public Health Practice Project's quality appraisal tool.[17] All 13 studies that contained quantitative data were found to be 'weak' quality with respect to design and/or analysis.

6.3 Study characteristics

The characteristics of the included studies are described in Table 41.

Table 41 Study characteristics – barriers and facilitators question

Study ID	Authors	Country (province)	Year of reform [a]	Year of analysis	Type of regionalisation[a]	Study design	Participants
Arredondo 2006[71]	Arredondo and Orozco	Mexico (Four anonymised regions)	1993–1997	2004	Political and fiscal	Qualitative case study	N=80 (decision-makers, service providers, representatives of civil organisations, members of health committees, and service users)
Arredondo 2008[72]	Arredondo and Orozco	Mexico (Six anonymised regions)	1993–1997	2004–2006	Political and fiscal	Qualitative case study	N=240 (decision-makers, service providers, representatives of civil organisations, members of health committees, and service users)
Arredondo 2015[73]	Arredondo *et al.*	Mexico (Baja Sur California, Colima, Jalisco, Hidalgo, Oaxaca, Tabasco, Yucatan)	1993–1997	2002–2010	Political and fiscal	Qualitative case study	N=240 (decision-makers, service providers, representatives of civil organisations, members of health committees, and service users)
Arredondo 2018[74]	Arredondo *et al*.	Mexico (Six anonymised regions)	1993–1997	Not reported	Political and fiscal	Qualitative case study	N=189 (senior-level managers, local representatives, and service users)
Ashton 2007[75]	Ashton	New Zealand	1983; 1993	2002/2003; 2004/2005	Administrative	Mixed methods case study	Total number not reported (included all RHO chief executive officers [CEOs] and all RHO board chairs from 20 participating RHOs, as well as 19 key informants, including ministers and health officials)
Barnett 2007[76]	Barnett and Clayden	New Zealand	1983; 1993	2001, 2002, 2004	Administrative	Mixed methods	Total number not reported (included interviews with national and government stakeholders, two interviews with RHO CEOs, two interviews with RHO chairs, and two postal surveys of RHO board members)
Barnett 2009[77]	Barnett *et al.*	New Zealand	1983; 1993	2001/2002; 2003/2004	Administrative	Mixed methods case study	Total number not reported (included postal surveys of board members (N=144), interviews with RHO chairs, RHO CEOs, national policy-makers/officials, non-government providers, and local stakeholders)
Brunelle 1998[78]	Brunelle *et al.*	Canada (All provinces)	1994–1997	1997	Administrative	Quantitative	N=121 (chairs of RHO boards and chairs of hospital boards)

Study ID	Authors	Country (province)	Year of reform [a]	Year of analysis	Type of regionalisation[a]	Study design	Participants
CIHI 2016[79]	CIHI	Canada (BC and NS)	1996	2014–2015	Administrative	Qualitative multiple case studies	N=42 (senior health system decision-makers)
Casebeer 1998[80]	Casebeer and Hannah	Canada (AB)	1994	1994–1995	Administrative	Qualitative	N=33 (CEO and/or chair of each RHO, and key stakeholders)
Cumming 2007[81]	Cumming	New Zealand	1983; 1993	2002/2003; 2004/2005	Administrative	Mixed methods case study	Total number not reported (included all RHO CEOs and all RHO board chairs from 20 participating RHOs, as well as 19 key informants, including ministers and health officials)
Frankish 2002[82]	Frankish *et al.*	Canada (BC)	1997	1996	Administrative	Mixed methods	N=130 (RHO board members)
Goodhead 2007[83]	Goodhead *et al.*	New Zealand	1983; 1993	2002/2003; 2004/2005	Administrative	Mixed methods case study	Total number not reported (included all RHO CEOs and all RHO board chairs from 20 participating RHOs, as well as 19 key informants, including ministers and health officials)
Kouri 1997[84]	Kouri *et al.*	Canada (SK)	1994	1997	Administrative	Mixed methods	N=525 (275 RHO board members, 150 RHO managers, and 100 health managers)
Kouri 2002[85]	Kouri *et al.*	Canada (All provinces)	1994–1997	2001–2002	Administrative	Quantitative	N=987 (835 RHO board members, 71 RHO CEOs, and 81 health ministry staff)
Lomas 1997a[86]	Lomas *et al.*	Canada (AB, SK, PEI, BC, NS)	1994–1997	1995	Administrative	Mixed methods	N=514 (RHO board members)
Lomas 1997b[87]	Lomas *et al.*	Canada (AB, SK, PEI, BC, NS)	1994–1997	1995	Administrative	Mixed methods	N=514 (RHO board members)
Longo 2011[88]	Longo *et al.*	Italy	2000–2001	2007	Political, with some fiscal autonomy	Mixed methods	N=40 (RHO managers)
Mays	Mays and	New Zealand	1983;	2002/2003;	Administrative	Mixed methods	Total number not reported (included all RHO CEOs and all RHO board chairs from 20 participating RHOs, as well as 19 key informants, including

Study ID	Authors	Country (province)	Year of reform [a]	Year of analysis	Type of regionalisation[a]	Study design	Participants
2007[89]	Cumming		1993	2004/2005		case study	ministers and health officials)
Neville 2005[90]	Neville *et al.*	Canada (NL)	1994–1997	2002	Administrative	Qualitative	N=35 (12 senior Ministry of Health (MoH) officials and 23 RHO CEOs/senior administrators)
Nunez 2013[91]	Nunez and Lopez	Mexico (Baja California Sur, Colima, Jalisco)	1993–1997	2007	Political and fiscal	Qualitative case study	N=90 (clinicians, healthcare service staff, political representatives, leaders of civic groups, and service users)
Tenbensel 2007a[92]	Tenbensel	New Zealand	1983; 1993	2002/2003; 2004/2005	Administrative	Mixed methods case study	Total number not reported (included all RHO CEOs and all RHO board chairs from 20 participating RHOs, as well as 19 key informants, including ministers and health officials)
Tenbensel 2007b[93]	Tenbensel *et al.*	New Zealand	1983; 1993	2002/2003; 2004/2005	Administrative	Mixed methods case study	Total number not reported (included all RHO CEOs and all RHO board chairs from 20 participating RHOs, as well as 19 key informants, including ministers and health officials)
Tenbensel 2008[94]	Tenbensel *et al.*	New Zealand	1983; 1993	2002/2003; 2004/2005	Administrative	Mixed methods case study	N=217 (surveys of RHO board members) N=323 (interviews with ministers, MoH officials, national provider organisations, RHO CEOs, RHO chairs, RHO funding and planning managers, board members, representatives from non-governmental organisations, and local community groups)
Twells 2005[52]	Twells *et al.*	Canada (NL)	1994-1997	1995/1996–2002/2003	Administrative	Qualitative	Total number not reported (former deputy Ministers of Health who were involved in regionalisation, and CEOs of RHOs)
Villa 2008[95]	Villa *et al.*	Italy (Marche)	2000–2001	Not reported	Political, with some fiscal autonomy	Mixed methods case study	N=44 (RHO management and staff)
Way 2005a[53]	Way *et al.*	Canada (NL)	1994–1997	1995; 1999; 2000; 2002	Administrative	Quantitative survey	N=793 (acute care nurses)

[a] These columns are based on research conducted by the HRB.

6.4 Themes

Three overarching themes relating to barriers to and facilitators of regionalisation were identified: the influence of the central government; balancing competing interests between RHOs and the central government; and RHO processes and procedures.

6.4.1 Influence of central government

6.4.1.1 Formation of RHOs

6.4.1.1.1 Division of RHO boundaries

Perceptions of the boundaries of RHOs were explored in Canada and New Zealand. In Canada, a mixed methods study in Saskatchewan (SK), Canada, reported contrasting views between participants regarding RHO size.[84] A majority of RHO board members thought that SK's RHOs were the right size in terms of area and population. However, a majority of health managers felt that the RHO populations were too small.[84] In New Zealand, a mixed methods study (hereafter referred to as the Health Reforms 2001 Research Project) found that most respondents, including RHO CEOs, RHO board chairs and members, health officials, and Government Ministers, identified the large number and small size of the many RHOs as a weakness of the new system and a barrier to achieving strategic change.[76] Specifically, smaller RHOs were perceived as being disadvantaged in terms of the cost of infrastructure and their ability to provide high-quality services. Despite this, participants did not support forced consolidation of RHOs by the MoH, and many said that it was not likely that RHOs would voluntarily merge, which appears to have been due to reform fatigue.[76]

New Zealand: key points

- Since 1983, the New Zealand public health sector has undergone four major structural reforms.
- The first major reform, from 1983 to 1989, established 14 area health boards .
- As part of the second reform, from 1993 to 1997, four RHAs were set up to purchase primary and secondary services for their regions from a range of public and private providers
- The fourth reform comprised 21 statutory DHBs (referred to as RHOs here) under the auspices of the New Zealand Public Health and Disability Act 2000. The establishment of these boards was based on the geographic locations of the hospital health services in the previous health system. In 2010, the number of boards was reduced to 20. (Studies in the B/F review are from this wave)
- The type of regionalisation throughout New Zealand is administrative.

6.4.1.1.2 Pace of implementation

The pace of implementation was explored in Italy and Canada. A mixed methods study in Italy found that RHOs felt that the pace of implementation was too fast.[95] Three studies in Canada identified challenges related to the pace of the implementation of regionalisation. In SK, a mixed methods study reported that 62% of RHO board members, 72% of RHO managers, and 63% of RHO health managers felt that the pace of change of the reform had been too fast.[84] A qualitative study in AB among RHO CEOs and board chairs reported that there were tensions between driving change fast enough to sustain political will and slow enough to allow meaningful change to occur.[80] Additionally, in a mixed methods study in BC, RHO board members reported that their work was hindered by the Government's decision to put regionalisation on hold while the impact of regionalisation was being assessed.[82] Specifically, they felt that it reduced morale, and they were frustrated because it put RHO activities that were already underway, such as hiring staff and amalgamating services, on hold as well.[82]

6.4.1.2 Influence of political parties

Research in Canada and Mexico reported on challenges related to the influence of political parties and changes in the party in power. A qualitative study in AB, Canada, reported that MoH officials and RHO CEOs felt that sustaining political will was essential to implementing regionalisation.[80] However, they were unsure of how this could be done across changes in government.[80] A qualitative study in Mexico reported that political parties were perceived to have had a large influence on decentralisation.[72] There was a sense that disagreements among political parties in federal and state governments were reflected in difficulties in the effective management of the decentralisation reform.[72] A second qualitative study in Mexico reported that in RHOs where federal and provincial political parties differed, participants specifically reported that the MoH had limited or even blocked the implementation of priority programmes that RHOs hoped to roll out.[74]

6.4.1.3 Interpretation of national strategies

Perceptions of national strategies were explored in Mexico, Canada, and New Zealand. A qualitative study in Mexico reported that RHOs perceived the MoH to have been excessively controlling in strategy and in setting priority programmes.[74] In contrast, a mixed methods study in BC, Canada, reported that RHO board members wanted more clear and consistent policies from the MoH.[82] In New Zealand, the Health Reforms 2001 Research Project found that that there was substantial agreement among participants (including RHO CEOs, RHO board chairs and members, health officials, and Ministers) regarding the objectives of national health strategies.[81] Participants also agreed that strong national policy was critical because it promoted consistency across RHOs.[77] National policy in New Zealand clearly places responsibility for the implementation of government strategies at the district level, and RHOs reported that they appreciated the opportunity to develop their own approaches and solutions.[92] RHOs also reported that national strategies were pivotal in directing their priorities. In particular, RHO CEOs noted that in the early stages of regionalisation, when RHOs had not yet developed strategic leadership capacity, national strategies were especially important.[77]

However, CEOs from smaller RHOs in New Zealand reported that the large number of service strategies created confusion in setting priorities. The MoH had provided a 'start here' list regarding these strategies, and while some RHOs felt that it had provided the necessary focus, others noted that the list had proved restrictive.[77] Additionally, RHOs reported frustration with the lack of practical guidance from the MoH on how to implement strategies; they also reported frustration with the scope and scale of the innovation they were expected to foster. Notably, the national strategies that were perceived as more effective were those linked to new funding streams, such as the primary healthcare strategy. Conversely, RHOs reported that it was very difficult to implement new MoH strategies that did not come with earmarked funding.[92]

6.4.1.4 Provision of funding

Qualitative research in New Zealand and Mexico described perceptions of the provision of funding to RHOs. In New Zealand, a population-based funding formula was implemented in 2003. The formula distributed funds proportionally to the resident population and adjusted for lower socioeconomic status, rurality, elderly people, tertiary services supplied, and minority populations. The Health Reforms 2001 Research Project in New Zealand reported that the majority of respondents felt that the population-based funding formula was likely to result in more equitable allocation of funds over time.[75] However, there were concerns among some participants regarding the quality of the data used to determine funding allocation. Additionally, some voiced concern about the lack of compensation for differences in the cost of service provision among RHOs.[75] Respondents also noted that the funding formula's allowance for rurality was inadequate because of poor economies of scale and workforce issues in rural areas.[83]

Moreover, there was a perception among participants in New Zealand that the funding formula did not adequately account for differences in population growth; deficits among providers; insufficient devolved funds; growth in services; costs not under the control of RHOs (including blood products,

exchange rates, and the cost of insurance); inadequate compensation by the inter-district flow payment system; increases in the cost of labour; public expectations of access to new technologies and treatments; and demand being higher than expected.[83]

In Mexico, a qualitative study reported that participants (including RHO officials and service providers) felt that RHOs had played a leading role in the adjustment and application of the funding formula that was introduced with decentralisation.[72]

Studies in New Zealand and Canada explored RHOs' ability to access new funds. The Health Reforms 2001 Research Project in New Zealand found that some RHOs were able to expand services into new areas through access to new funds.[94] One RHO reported setting aside one million New Zealand dollars per year for new projects through a Strategic Investment Fund. The central government also provided new money for RHOs for health services related to the national Primary Health Care Strategy.[94] However, RHOs reported that, overall, they were constrained by the MoH in their use of new resources.[93]

Similarly, qualitative research in BC, Canada, found that RHOs reported using funds allocated for new health services in integrated primary and community care to roll out a primary care initiative.[79] However, in a qualitative study in NL, Canada, RHOs reported that, overall, budget restraints limited the extent to which the priorities could be met.[90] For example, they felt that due to a lack of resources, information systems to support planning and decision-making remained underdeveloped in many regions. Additionally, RHOs reported feeling frustrated that they only managed 'bare-bones' budgets for internal resources; they required government-approved funding to begin any major projects.[90]

6.4.1.5 Deficit management

Deficit management was explored in New Zealand's Health Reforms 2001 Research Project. The project found that there was a clear understanding among RHOs that the Government expected them to remain within their budgets and that the Minister of Health would accept "no excuses for over-spending".[75(p30)] Participants noted that efforts to reduce deficits had dominated RHO decision-making, limited innovation, and led to a focus on short-term solutions rather than on long-term planning. RHOs with significant deficits were monitored by the MoH, whereas better performing RHOs were given more autonomy, and this approach was perceived by RHOs as punitive rather than supportive.[75]

Yet, participants also reported that there had been a shift over time towards a longer-term approach to financial management.[75] A three-year guaranteed funding stream was introduced in December 2001, and RHOs reported that this allowed them to develop longer-term strategies for addressing their deficits. RHOs also felt that the shift to a population-based funding formula helped to reduce their deficits. Moreover, there was a perception among some RHOs that the MoH had been helpful in working with them to find solutions to their deficit problem.[75]

6.4.1.6 Services under RHO mandate

Studies in both Canada and New Zealand reported frustration within RHOs regarding services under the mandate of the RHOs. Qualitative research in NL, Canada, found that RHOs were frustrated that physician contracts and pharmaceuticals remained outside of their mandate.[90] In New Zealand, the Health Reforms 2001 Research Project reported frustration at the slow pace at which the MoH devolved funding for disability support, public health, and mental health services to RHOs.[76] Board chairs and CEOs supported devolution of more services, yet they were concerned about the financial risks posed to their RHOs because they had inherited a large amount of over-funding for specialist services from the pre-regionalisation system. They also expressed frustration that outstanding issues from the previous system had not been resolved, and felt that this had negatively impacted on their relationships with service providers.[76]

6.4.1.7 Support from the MoH

Research in Italy, Canada, and New Zealand described perceptions of support from the MoH to RHOs. In Italy, a mixed methods study found that RHOs wanted further support and training from the MoH, especially in terms of management skills.[88] In a mixed methods study in BC, Canada, RHO board members reported that the MoH was useful in terms of acting as a resource and providing information to RHOs.[82] In particular, they noted the value of the MoH organising seminars and seconding MoH staff to the regions.[82] However, a more recent qualitative study from Canada (BC and NS) reported a perceived lack of analytical capacity within RHOs.[79]

A similar contrast between perceived support from the MoH, yet a lack of capacity within RHOs, was reported in New Zealand. The Health Reforms 2001 Research Project reported that MoH personnel were generally considered helpful and supportive.[83] However, a board member survey from the project reported that 59% of respondents either agreed or strongly agreed that the RHO board needed more support from the MoH.[81] Additionally, participants noted the absence of any national training programme to prepare RHO personnel for the devolution process.[75] They also reported that the lack of analytical capacity within RHOs made using data to prioritise local services a challenge.[83] Additionally, some felt that the MoH had not adequately ensured equitable access to support among RHOs regarding specialist services, information technology and management, and resolving capacity problems.[83]

6.4.2 Balancing competing interests

6.4.2.1 Working relationship between RHO and MoH

Research in Canada and New Zealand explored the dynamics of RHO-MoH working relationships. A quantitative study in all Canadian provinces reported that RHO board members (77%) and RHO CEOs (80%) were more likely than MoH officials (59%) to believe that RHO boards had been given responsibility for things over which they had insufficient control in practice.[85] Moreover, significantly more RHO board members (71%) and RHO CEOs (73%) by comparison with MoH officials (30%) felt that boards were overly restricted by rules laid down by the MoH.[85] Additionally, a qualitative study from NL, Canada, specifically noted frustration among RHO board members that board decisions were sometimes overturned by the MoH when interest groups by-passed the boards and went directly to elected representatives.[90] In contrast to these negative findings regarding MoH (or political) interference, in a mixed methods study in BC, Canada, RHO board members reported that the MoH had been helpful by allowing the RHOs to govern without significant interference.[82]

In New Zealand, RHOs in the Health Reforms 2001 Research Project reported that the MoH had inappropriately interfered in the work of the RHO boards at times.[81] In fact, increasing majorities over time agreed that the MoH had interfered with the work of the RHO (61.8% in 2001/2002, rising to 71% in 2003/2004).[77] Moreover, there was a reduction over the same period in the number of RHO board members who agreed that RHOs had adequate autonomy to spend resources (i.e. a decrease from 40% to 30.1%).[77] RHOs also felt strongly that the MoH was unwilling to devolve power, and they expressed frustration that the MoH was too involved in operational matters such as contracting arrangements and financing decisions.[76] Specifically, participants noted problems with continued MoH responsibility for public health funding; overly prescriptive requirements, leaving little room to demonstrate local leadership; and micro-management by the MoH.[81] Respondents also noted that the locus of decision-making was unclear; RHOs were responsible for needs assessment and prioritisation, but their decision-making capacity was constrained by the MoH dictating service funding and coverage requirements.[76]

Among RHO CEOs in particular, there was a perception that regionalisation had centralised more power with the MoH, thus compromising the ability of the RHOs to meet local needs.[81] In contrast, RHO board chairs (who were appointed by the Minister of Health rather than by the board as RHO CEOs were) had a more positive view of the central government, noting that as a funder and policy-maker the MoH did limit the autonomy of the RHOs, but acknowledging this as a normal public sector

dynamic. Notably, overall, participants in the Health Reforms 2001 Research Project reported that relationships between RHOs and the MoH had improved over time.[81]

6.4.2.2 Lines of accountability

Research in Mexico, Canada, and New Zealand described challenges with lines of accountability. In a qualitative study in Mexico, RHOs reported confusion regarding the flow of authority and power in decision-making.[71] In another qualitative study from Mexico, RHOs noted the lack of a clear accountability system as a challenge.[72] Qualitative research from NL, Canada, found that RHOs also reported a lack of clarity regarding lines of accountability.[90] Respondents from another qualitative study in Canada (BC and NS) noted the importance of formalised accountability agreements between the MoH and RHOs in facilitating healthcare system efficiency.[79]

In New Zealand, the Health Reforms 2001 Research Project Board reported specific challenges among RHO board members regarding lines of accountability. RHO board members who were elected reported that they considered themselves accountable to both the MoH and their local communities.[81] Moreover, RHO CEOs expressed concern that many elected members had a strong sense of community and therefore struggled to recognise that their primary accountability was to the MoH.[81] However, over time, elected board members increasingly recognised their primary accountability to the MoH (50% in 2002/2003 compared with 65% in 2004/2005).[76] Moreover, elected board members' self-reported ability to handle dual accountability to their local community and the Government also increased, from 54% to 74%.[76]

6.4.2.3 Reporting requirements

The Health Reforms 2001 Research Project in New Zealand found that there was widespread criticism of the MoH's reporting requirements among RHOs.[83] Participants reported several key challenges: reporting requirements were excessive, there was a lack of feedback, high opportunity costs were incurred, and reporting did not capture desired outcomes. RHO CEOs in particular reported being frustrated that the MoH's performance monitoring system required excessive detail and had a limited focus on outcomes.[77] They suggested that the MoH reduce reporting to a few key indicator variables and that more meaningful indicators were required.[77]

Additionally, RHOs noted that reporting to the MoH had placed further demands on their capacity and capability. However, they had built up their planning and funding teams to try to meet these demands, which had helped, as did collaboration between RHOs on how to handle reporting.[83] Despite widespread frustration with reporting requirements, some participants in New Zealand noted that reporting had been a useful starting point in RHOs developing their own internal strategic monitoring.[83]

6.4.2.4 RHO strategic planning and prioritisation

Studies in Canada and New Zealand examined RHO strategic planning. In a qualitative study in AB, Canada, RHO CEOs and board chairs reported engaging primarily in short-term planning and relying on traditional bureaucratic planning frameworks; more strategic planning was only reported in regions where innovation had been prioritised.[80] Another qualitative study in BC identified balancing local initiatives with Government mandates as a challenge. It also reported difficulties in adapting quickly enough to changing Government priorities.[79] In SK, a mixed methods study reported that more than 90% of health managers, 63% of board members, and 66% of district managers felt that reform had increased local control of services.[84] In a quantitative study of RHO board members, RHO CEOs, and MoH staff across all Canadian provinces, more respondents in each of the three groups surveyed thought that regionalisation had increased local control than those who thought it had decreased local control.[85] When the survey responses were analysed, RHO board members were found to be less likely (46%) than MoH staff (68%) to agree that regionalisation had increased local control.[85]

In New Zealand, participants in the Health Reforms 2001 Research Project reported that the District Strategic Plan (covering a 5- to 10-year period and reviewed every three years) was helpful in identifying priorities for their population.[93] However, some felt that the amount of time required for planning was burdensome. Participants also felt that strategic plans were not really implemented in reality and that they raised expectations that RHOs could not possibly meet.[93] Additionally, RHOs in New Zealand expressed concern about their capacity to link strategic planning documents to the prioritisation of resources.[93] RHOs described both the imperative to prioritise and the existence of many significant restrictions on their capacity to do so. While most RHOs carried out formal prioritisation exercises, they felt that these exercises had few practical consequences. One participant noted that it was impossible to prioritise between areas that were all considered mandatory.[93] Many expressed the view that even if they wanted to disinvest from existing services that they no longer considered a priority, it would not get past central government because "the public sector is not allowed to stop doing anything that it does."[92(p29)]

Participants in New Zealand also described their perceptions of formal assessments of health needs, which were required as part of reporting. The Health Reforms 2001 Research Project found that the initial health needs assessment following regionalisation was seen as an essential first step towards priority setting and planning, but was constrained by being carried out in a very tight time frame.[83] Overall, the requirement for health needs assessments was met with enthusiasm by RHOs.[92] Notably, participants felt that health needs assessments sharpened RHOs' focus on population health. However, there were concerns about the paucity of data regarding primary care utilisation and about the capacity of smaller RHOs to collect data.[92]

6.4.2.5 Statutory committees

The Health Reforms 2001 Research Project in New Zealand reported that each RHO was required to establish three statutory committees: the Community Public Health Advisory Committee, the Hospital Advisory Committee, and the Disability Support Advisory Committee.[83] These committees had an advisory function, and each RHO was free to adopt other additional advisory committees. In practice, each RHO adopted a committee monitoring finance and auditing, along with a range of others according to the perceived needs of the RHO. Participants reported a number of barriers related to statutory committees, including that: the required structure of the committees did not necessarily fit with the service arrangements within the RHO; the cost of servicing the committees was greater than the benefits they provided; there were boundary issues between RHO boards, the committees, and RHO managers; there was inefficiency due to overlap in handling of issues; and there was confusion over whether the committees were independent initiators or were to be directed by the board. However, some advantages were also reported, including that they: undertook debate and evaluation regarding particular issues; served as a channel for input through the community representatives on the committee; and provided further assurance to the community that their interests were being looked after.[83]

6.4.3 RHO processes and procedures

6.4.3.1 Coordination and collaboration between RHOs

Qualitative research from Canada and New Zealand explored coordination and collaboration between RHOs. In Canada, senior health system decision-makers in BC noted the importance of cross-sectoral planning and shared services, such as information technology (IT) and payroll. In contrast, respondents in NS described an overall lack of coordination across regions and a lack of integration related to strategic planning and funding priorities, which they believed led to inefficient resource use.[79]

The Health Reforms 2001 Research Project in New Zealand reported that the formation of an RHO-initiated national network of RHOs was viewed positively by participants.[77] Over the research period, the RHO network was reported to have become a focal point for RHOs to coordinate information sharing and action on key issues.[83] Additionally, the RHO network took up topics and issues of

collective interest with the MoH on behalf of individual RHOs. This was seen as promoting consistency across the sector and allowing greater communication between the Minister, the MoH, and RHOs. For individual RHOs, involvement in the network allowed them to stay abreast of policy and operational issues and to participate in working groups on topics of concern. Notably, most RHO board chairs and CEOs did not feel that their RHO's autonomy had been compromised by membership of the network.[83]

In particular, a majority of RHO CEOs in New Zealand indicated that despite some tensions, the network was generally well-regarded and its work in difficult areas was appreciated.[77] RHO CEOs noted particularly challenging areas in which the network was helpful, including dealing with economies of scale in service delivery, inter-district flows of patients and related reimbursement, contractual negotiations, industrial relations, and pharmaceuticals management.[77,93] RHO board chairs spoke positively about the regular regional meetings of chairs and CEOs facilitated by the network, which helped to address capital developments, service configurations, regional clinical networks, and problems caused by the large number and small size of RHOs.[77] RHO chairs also reported that relationships among RHOs were positive and cordial, although some chairs noted slightly competitive dynamics between RHOs.[77]

Both RHO board chairs and CEOs noted that strategic alliances between RHOs were especially important for smaller RHOs.[76] They highlighted the value of shared services, including IT and human resources for smaller RHOs. Additionally, shared clinical services, including mental health and laboratory services, were perceived as critical to maintaining the clinical viability of smaller RHOs.[76]

6.4.3.2 Boards of management

6.4.3.2.1 Board processes

Studies in Canada and New Zealand examined RHO boards of management. Regarding board selection, a mixed methods study in SK, Canada, reported that RHO board members were elected through a ward system and that a majority of respondents were in favour of continuing this system (83% of RHO board members, 74% of RHO managers, and 68% of health managers).[84] Notably, 50% of elected board members, 58% of RHO managers, 64% of health managers, and 22% of appointed board members felt that elected board members had more legitimacy and credibility in the community than appointed members. There were also pronounced differences between elected and appointed members in terms of their views regarding the authority of RHOs within SK. For example, 79% of elected members felt that RHOs were legally responsible for things over which they had no control, by comparison with 59% of appointed members.[84]

In New Zealand, the Health Reforms 2001 Research Project reported that both RHO board chairs and CEOs felt that elected members lacked skills and expertise in relation to the health sector.[76] RHO CEOs also reported electioneering behaviour as the elections approached and destabilisation of the board due to the elections. While RHO CEOs valued the community network and knowledge of elected members, all CEOs expressed a preference for appointed members.

Regarding the frequency of board meetings, in New Zealand participants in the Health Reforms 2001 Research Project reported that by 2004, all boards met monthly.[76] One RHO had previously met every six weeks, and participants reported that the shift to more frequent monthly meetings led to a better managed agenda and more efficient follow-up of issues arising at meetings.[76]

6.4.3.2.2 Board members' expertise and training

Research in Canada and New Zealand reported on RHO board members' expertise and training. In Canada, a mixed methods study in five provinces (AB, BC, NS, PEI, and SK) reported that two-thirds of RHO board members felt that they were given enough information (e.g. regarding population needs, service benefit, and citizens' preferences) to make good decisions.[86] In contrast, a mixed methods study in SK, Canada, reported that 90% of board members and health managers and 83% of district managers thought that RHO boards needed more research-based findings to inform decision-

making.[84] In particular, board members reported that they were often more influenced by their own experience and knowledge than by statistical data when making decisions.[84]

Regarding RHO board members' perceptions of the adequacy of their training, Lomas *et al.* found that in AB, BC, NS, PEI, and SK, one-third of respondents believed that their training in setting priorities, health needs assessments, and healthcare legislation and guidelines was inadequate.[86] Respondents were most satisfied with their training in the areas of governance, effective participation in meetings, and their roles and responsibilities.[86] Members of boards that had been in place for a shorter period of time expressed more concern about their training in health needs assessments and setting priorities than those in mature boards.[86]

The Health Reforms 2001 Research Project in New Zealand found that according to RHO CEOs, the level of strategic leadership demonstrated by boards was limited early on.[76] Indeed, board membership was reported to be a steep learning curve for most members.[83] Some members needed time to become comfortable with their new roles and to develop an understanding of the sector, their accountability, and how to work together as a team. Aspects of the board member role that were found to be particularly challenging included: lack of clarity regarding boundaries between their governance role and that of RHO management; lack of clarity regarding boundaries between their decision-making role and that of the MoH; and the volume and complexity of the issues to be grasped. However, participants reported that over time, the board's knowledge of the health sector had improved. Additionally, as members adjusted to the role, there was a perceived increase in constructive debate.[83] Board chairs in particular reported that a team approach had developed within boards, with collaboration and collective decision-making improving over time.[76] Notably, in 2002, 87% of board members agreed that they had a clear understanding of their role, and this figure rose to 94.8% in 2004.[76]

Regarding conflicts of interest on RHO boards, the Health Reforms 2001 Research Project found that the most commonly reported conflicts of interest were among RHO employees on boards.[83] Moreover, in one RHO, there was a perception that board members who were also RHO staff sometimes acted as a barrier to progress.[76] RHOs also noted ambiguity in defining conflicts of interest when health professionals were included as board members and thus brought a bias to discussions.[83] Indeed, some conflicts of interest were reported when general practitioners (GPs) were on boards and issues around primary healthcare strategy were being discussed, yet these were perceived to be generally well handled.[76] Overall, interviews with CEOs indicated that conflicts were declared and issues surrounding them were clear.[83]

In New Zealand, RHO CEOs also indicated that the leadership of the board chair was crucial to improving board functioning.[76] Chairs had taken on important roles, including mentoring board members and acting as a bridge between the RHO board and RHO management.[76]

6.4.3.2.3 Relationship between RHO board and RHO management

Qualitative studies in Canada and New Zealand described perceptions of the relationship between the RHO board and RHO management. In Canada, a qualitative study in AB reported that RHOs struggled to define the boundaries between governance by the RHO board and the RHO management's responsibilities.[80] In particular, both RHO CEOs and board chairs felt that there was a need to more clearly differentiate between the governance role of the board and the management role of the CEO and regional managers.[80]

There was also confusion regarding boundaries between RHO board responsibilities and RHO management responsibilities in New Zealand. The Health Reforms 2001 Research Project in New Zealand reported that the role of the board was perceived by participants as ensuring that health services were run appropriately for the district's residents.[83] Strategic leadership and strategic monitoring were seen as central to this. In contrast, the CEO and management were considered responsible for making this direction operational. Most RHOs reported some confusion between the role of the RHO board and the role of RHO management during the initial phases of regionalisation,

which caused some tensions. In particular, a majority of RHO CEOs noted that there were challenges in maintaining boundaries between governance and management.[76]

Additionally, board chairs expressed concern that RHO management had not involved them early enough in decision-making processes. For instance, they reported that issues were brought to the board that had already been addressed by RHO management.[76] Despite these tensions, the relationship between the board and management was perceived to have improved over time as understanding of their respective roles improved.[83] CEOs commented that formal education of boards, a letter from the CEO, discussions with members, and the chair working with the board all improved role clarity.[76]

6.4.3.3 Internal performance monitoring

In Canada, a qualitative study in BC and NS reported that senior health system decision-makers noted several examples of performance monitoring being used to improve efficiency in RHOs.[79] In BC, this involved the use of financial incentives and managers monitoring daily dashboards. BC also facilitated dialogue between managers regarding system performance. Some RHOs in BC reported frustration that data resulting from performance monitoring was not acted on, mainly due to competing priorities and staffing constraints. In NS, respondents identified a need to implement performance monitoring, and they reported that there was a lack of data to support evidence-based decision-making. Participants identified key barriers related to the performance monitoring system: a lack of data in the continuing care sector (where access to data was not integrated within the province); areas where data were still paper based; and poor information sharing across the care continuum.[79]

6.4.3.4 Contracts

In New Zealand, the Health Reforms 2001 Research Project identified challenges related to managing contracts with providers. The shift to purchasing by RHOs required the devolution of existing contracts that had been negotiated by either the central government or by the Health Funding Authority.[75] Contracts for personal health services and mental health were transferred to RHOs six months after the establishment of the RHOs. This was followed two years later by the contracts for disability support services for those aged 65 years and older. Both of these rounds of contract devolution were problematic, with RHOs describing the process as “appalling”, “a disgrace”, and “an absolute mess”.[75(p13)] However, a small number of CEOs reported that the process had gone more smoothly in the second round.[75]

Several key barriers related to the devolution of contracts were identified, including: long delays in accessing copies of contracts; inaccuracies in the contracts, requiring excessive reviewing; a lack of information to allow RHOs to undertake due diligence; a lack of information regarding historic patterns of service use and expenditure trends, especially in the case of older people; the slow pace of the process (partially due to delays in the process of changing from paper copies to scanned copies of the contracts); and a lack of capacity within RHOs to undertake the processes required for contract devolution.[75] Across the RHOs, there was a desire to move towards shorter and more concise contracts, for greater flexibility to allow for local innovation, and for contracts that were more oriented to outcomes and that reflected integrated care systems.[83]

The Health Reforms 2001 Research Project also reported that both RHOs and providers perceived the quality of the relationship between the RHO (as purchaser) and the service providers as the key to successful negotiation.[83] At least one RHO initially chose to roll over contracts in order to allow time to build relationships, but there was tension between this objective and the providers’ need for price adjustments. The RHO also needed to adapt and update contracts to population health objectives. There were mixed reports about the quality of negotiations and relationships across the RHOs, although some reported improvements over the research period (2002–2005) and that the duration of contracts was extended, which provided greater certainty for planning purposes.[83]

In New Zealand, monitoring of contracts was perceived as a key mechanism for minimising risk.[83] Monitoring procedures had identified cases in which providers had failed to deliver according to the

contract, but the problem had not previously been identified by the MoH.[83] Both RHOs and providers wanted the monitoring of contracts to improve in order to ensure that services were delivered to those who needed them and to correct perceived inequities.[75] Efforts to improve contract monitoring included reviewing devolved contracts, building relationships with providers, and refining reporting requirements.[83]

6.4.3.5 Managing providers

Qualitative research in New Zealand and Italy explored issues related to the management of service providers. It is important to note that these findings are not generalisable beyond settings that have implemented a purchaser-provider split model. The Health Reforms 2001 Research Project in New Zealand found that, with respect to choice of provider, RHOs had the intention of treating their own provider arms as equal to other providers.[75] However, in practice this was hard to achieve, and there was a widespread perception among non-governmental organisations that RHOs favoured their own provider arm over non-governmental providers when allocating contracts. Non-governmental organisations suggested that it would be useful for each RHO to develop a policy outlining how it planned to deal with private providers.[75] In terms of managing hospitals, RHO directors regarded hospitals as not being effectively influenced by strategic decision-making because they were demand driven. They noted that restraining hospital expenditure was a major challenge because actual demand among hospitals always exceeded projected demand; therefore, hospitals were the first in line for new money that was not tied to specific projects.[93]

A qualitative study in Italy reported that RHOs felt that they lacked managerial tools and information systems that would be necessary to monitor the network of providers that they purchased services from.[88] Some felt that without these tools, there was no reason to collect data from providers because they would not able to put the data to any use. Additionally, some participants reported that uncooperative relationships and poor communication between local health authorities and providers, such as independent hospitals, hindered their ability to collect data regarding service use.[88]

6.4.3.6 Staff perceptions of regionalisation

Research in Mexico and Canada examined staff perceptions of decentralisation or regionalisation. A qualitative study in Mexico found that health managers reported lacking information about decentralisation and felt that decentralisation had led to an increase in their workload.[71] In AB, Canada, respondents were concerned about resistance to change among healthcare providers and managers.[80] They identified a need for sustained buy-in from all partners involved in the reform. Physician commitment to system change was identified as particularly challenging given that their services were outside the mandates of the RHOs.[80]

A quantitative study in NL, Canada, surveyed nurses regarding the emotional climate of their workplace at four time points between 1995 and 2002.[53] At all time points, nurses thought that restructuring had had a negative impact on: the emotional climate of their workplace (it was less satisfying and challenging, and more stressful due to greater demands, and they received less respect and decreased co-worker support); practice issues (they had less involvement in decision-making and less control over practice, and there were reduced educational development opportunities); and collaborative relations (they had less visible, accessible, and informative managers, and experienced more strained interdisciplinary relations). In comparison to the 1995 data (mean=2.88, standard deviation [SD]=0.96), which was collected at the beginning of regionalisation but prior to restructuring, there was a significant worsening of nurses' perceptions of the emotional climate of their workplace in 1999 (mean=2.33, SD=0.86). These attitudes showed improvement by 2000 (mean=2.47, SD=0.97) and approached 1995 levels by 2002 (mean=2.70, SD=0.98).[53]

6.4.3.7 Engagement with clinicians

Qualitative research in Canada and New Zealand explored RHOs' engagement with clinicians. A qualitative study in Canada (BC and NS) found that clinician engagement was cited as an important facilitator when making system changes.[79] For example, in BC, an organisation called Divisions of

Family Practice was set up by clinicians to provide a voice for clinicians and facilitate collaboration between clinicians and health authorities. Study respondents noted that this facilitated the uptake of electronic medical records by physicians.[79]

The Health Reforms 2001 Research Project in New Zealand reported that many RHOs had made efforts to engage the clinicians.[83] Notably, participants felt that RHO managers had engaged clinicians in a more collaborative manner by comparison with the previous healthcare system. They identified many ways in which they engaged with clinicians, including: having clinicians on boards; having managers with clinical backgrounds; meeting with clinicians; establishing clinical boards and attendance of clinical board members at RHO board meetings; including clinical directors on management teams; and involving clinicians in resource allocation discussions.[83]

6.4.3.8 Community engagement

Research in Italy, Mexico, Canada, and New Zealand examined community engagement. In Italy, a qualitative study in the Marche region reported a perception within the RHO that it could have managed the communication process regarding the reform much better.[95] In particular, participants criticised the lack of explanation and information regarding the reform provided to the community.[95] A qualitative study in Mexico reported perceptions among RHOs and community representatives that there was increased community input regarding financing, infrastructure, and priority setting following decentralisation.[71] Community leaders were reported to have played an especially important role in establishing health priorities based on local needs.[71]

In Canada, a survey among board members in BC found that 92% of RHO board members felt that the purpose of RHOs was not widely understood within their regions, based on their one-to-one conversations with the public and on the content of media coverage.[82] Respondents felt that certain stakeholders, including municipal politicians and the general public, needed to be better informed about regionalisation. In particular, it was suggested that the media should increase coverage of the reform and provide an accurate and balanced account.[82]

In New Zealand, the Health Reforms 2001 Research Project found that communities had been much more extensively involved in healthcare sector decision-making processes after regionalisation when compared to their involvement prior to regionalisation, and this was consistent with the government's intention to broaden input into the health sector.[92] While RHOs reported recognising the statutory requirements for community involvement, there was significant variation in how these were implemented. Some RHOs made concerted efforts to gather community input, whereas others adopted a more passive approach. A strong theme that emerged among participants was an emphasis on community engagement as a more encompassing process than community consultation. Community engagement was perceived as relationship-building so that channels of two-way communication were established. RHOs felt that these relationships facilitated their ability 'take the pulse' of their communities.[92]

The Health Reforms 2001 Research Project also found that closer relationships were reported in smaller RHOs, but that these closer relationships also increased expectations of a greater community role in decision-making, which were difficult for RHOs to meet.[92] In general, community representatives were more interested in engagement with RHOs in order to help shape service design and delivery, rather than in participating in consultation exercises that fed into planning documents. RHOs were also generally appreciative of community input into service design and delivery, and over time, RHOs focused less on community involvement in formal consultation processes.[92]

RHO boards in New Zealand varied in the degree to which they attempted to make meetings accessible to the public. One of the boards added in a public forum prior to board meetings in order to give the public the opportunity to ask questions about local health and disability services. Two boards provided members of the public with the opportunity to speak at board meetings, one of which rotated the location of board meetings in order to increase accessibility to the public throughout the region.[76] Notably, boards in New Zealand that were more transparent were attended

more by members of the public compared with the boards which were less accessible and more formal.[76]

In New Zealand, respondents reported both benefits and drawbacks of having board meetings open to the public.[76] Some CEOs noted that open meetings helped with managing public expectations, building relationships with the media, and improving transparency. On the other hand, some respondents felt that they slowed decision-making, as board members felt that they needed to spend longer explaining the rationale for their decisions. It was also noted that some board members may be reluctant to be forthcoming with their opinions on more sensitive topics during public meetings. Difficulties also arose when confidential issues needed to be discussed at board meetings. For example, in one RHO, meetings were sometimes closed if board members were discussing issues that were still under negotiation with the MoH.[76] Some RHOs used statutory committee meetings as an opportunity for board members to discuss strategic issues without external members of the public.[83]

Most of the RHOs reported members becoming more relaxed about being open to the public over the research period.[83] The benefits of transparency were judged to be greater than any perceived disadvantages. Transparency was seen as the key to engagement with the public in order to raise awareness and knowledge of health matters, which was expected to result in more active participation in health-promoting behaviour and more realistic expectations of the health services. Transparency was also seen as facilitating accountability.[83]

6.5 Table of barriers to and facilitators of the implementation of regional health organisations

Table 42 outlines the barriers to and facilitators of regionalisation that were identified in this review. Check marks were assigned based on the assessments of two reviewers.

Table 42 Barriers to and facilitators of the implementation of regional health organisations

Barriers and Facilitators	Countries								
	Canada						New Zealand	Mexico	Italy
	Saskatchewan	Alberta	British Columbia	Nova Scotia	Newfound-land and Labrador	All provinces			
Formation of RHOs									
Uneven population sizes (B)*	✓						✓		
Pace of implementation too fast (B)	✓								✓
Halting regionalisation during assessment (B)			✓						
Influence of political parties									
Sustaining political will for regionalisation (F)**		✓					✓		
Conflicts between regional and national political parties (B)								✓	
National strategies									
National strategy helpful in the early stages of regionalisation when RHOs have limited leadership capacity (F)							✓		
Strong national strategy promotes consistency across regions (F)			✓				✓		
Clear and consistent policies from MoH (F)			✓						
National service strategies linked to funding streams (F)							✓		
MoH excessively controlling in RHO interpretation of strategy (B)								✓	
Too many service strategies can create confusion in setting priorities (B)							✓		
Lack of practical guidance from MoH in how to implement strategies (B)							✓		
Provision of funding									
Population-based funding formula (F)							✓	✓	

Barriers and Facilitators	Countries								
	Canada						New Zealand	Mexico	Italy
	Saskatchewan	Alberta	British Columbia	Nova Scotia	Newfound-land and Labrador	All provinces			
Adjusting funding formula for lower socioeconomic status, rurality, elderly people, tertiary services supplied, and minority populations (F)							✓		
Inadequate compensation for differences between regions in population (population growth, socioeconomic status, rurality, elderly people, and minority populations) (B)							✓		
Inadequate compensation for system level differences between regions (inter-district flow of patients, tertiary services supplied, increases in the cost of labour, public expectations of access to new technologies and treatments, and demand being higher than expected) (B)							✓		
RHOs constrained by the MoH in the use of new funds (B)							✓		
Insufficient funding (B)					✓		✓		
Deficit management									
Guaranteed funding streams (F)							✓		
Focus on reducing deficits in short term rather than on long term planning (B)							✓		
Services under RHOs' mandate									
Physician contracts and pharmaceuticals outside of RHO mandate (B)					✓				
Slow devolution of disability, public health, and mental health services (B)							✓		
MoH support									
MoH seconding staff to RHOs (F)			✓						
RHOs lacking support for management skills development (B)									✓

Barriers and Facilitators	Countries								
	Canada						New Zealand	Mexico	Italy
	Saskatchewan	Alberta	British Columbia	Nova Scotia	Newfound-land and Labrador	All provinces			
RHOs lacking support for analytic skills development (B)			✓	✓			✓		
Lack of a national training programme to prepare RHOs for regionalisation (B)							✓		
MoH-RHO relationship									
MoH reluctance to devolve power (B)							✓		
RHO boards overly restricted by MoH rules (B)						✓			
MoH inappropriately interfering with the RHO work (B)							✓		
Locus of decision making unclear (B)							✓	✓	
RHO given responsibility for things over which they have insufficient control (B)						✓			
Lines of accountability									
Formalised accountability agreements (F)							✓		
Elected RHO board members feel more accountable to constituents than to MoH (B)								✓	
Lack of clarity regarding accountability (B)								✓	
Reporting requirements									
Collaboration between RHOs on how to address reporting requirements (B)							✓		
Expanding RHO planning and funding personnel (B)							✓		
Excessive reporting requirements (B)							✓		
Lack of feedback from MoH on reporting (B)							✓		
High opportunity costs in terms of time required (B)							✓		

Barriers and Facilitators	Countries								
	Canada						New Zealand	Mexico	Italy
	Saskatchewan	Alberta	British Columbia	Nova Scotia	Newfound-land and Labrador	All provinces			
Limited focus on relevant outcomes (B)							✓		
RHO strategic planning and prioritisation									
Assessment of health needs for priority setting and planning (F)							✓		
District strategic plans for priority setting and planning (F)							✓		
Statutory committees									
Served as channels for community input through community representatives on the committees (F)							✓		
Required structure of the committees not aligned with the service arrangements within the RHO (B)							✓		
High cost of servicing statutory committees (B)							✓		
Lack of clarity regarding boundaries between statutory committees and RHO boards (B)							✓		
Coordination and collaboration between RHOs									
National network of RHOs (F)							✓		
Shared IT services (F)			✓				✓		
Shared payroll services (F)			✓						
Shared HR services (F)							✓		
Shared mental health and laboratory services (F)							✓		
Boards of management									

Barriers and Facilitators	Countries								
	Canada						New Zealand	Mexico	Italy
	Saskatchewan	Alberta	British Columbia	Nova Scotia	Newfound-land and Labrador	All provinces			
Elected board members have more legitimacy and credibility in the community than appointed members (F)	✓								
Monthly board meetings rather than every six weeks (F)							✓		
Elected members lacking skills and expertise in relation to the health sector (B)							✓		
Board members lacking evidence-based information for decision-making (B)	✓								
Insufficient training for board members	✓	✓	✓	✓					
Lack of clarity regarding boundaries between board's governance role and that of RHO management (B)							✓		
Conflicts of interest from board members who are also RHO staff (B)							✓		
Internal RHO performance monitoring									
Performance monitoring not leading to action (B)			✓	✓					
Paper-based performance monitoring (B)									
Contracts									
Contracts reflect integrated care systems (F)									
Contracts linked to outcomes (F)									
Lack of detail in contracts inhibiting RHOs from undertaking due diligence (B)							✓		
Lack of capacity within RHOs to manage contracts (B)							✓		
Shorter and more concise contracts (B)							✓		
Managing providers									

Barriers and Facilitators	Countries								
	Canada						New Zealand	Mexico	Italy
	Saskatchewan	Alberta	British Columbia	Nova Scotia	Newfound-land and Labrador	All provinces			
Clear RHO policy on managing private providers (F)									
RHOs lacking managerial tools to monitor the network of providers (B)									✓
Poor communication between RHOs and providers (B)									✓
Staff perceptions of regionalisation									
Regionalisation increasing health managers' workload (B)								✓	
Resistance to change among health staff (B)		✓							
Engagement with clinicians									
Involving clinicians in resource allocation discussions (F)							✓		
Having clinicians on boards of management (F)							✓		
Community engagement									
Establishing two-way channels of communication with the community (F)							✓		
Community input into service design and delivery (F)							✓		
Community leaders providing input regarding local health priorities (F)								✓	
Poor communication with the public regarding regionalisation (B)			✓						✓
Community engagement slows decision-making (B)							✓		

7 Discussion and conclusion – Barriers and facilitators review

7.1 Main findings

7.1.1 Influence of the central government

Defining the boundaries of RHOs is the first step in implementing regionalisation, and research from Canada and New Zealand demonstrated that RHOs that have uneven populations can pose a challenge.[76,84] Smaller RHOs in New Zealand were perceived as being disadvantaged in terms of the cost of infrastructure and their ability to provide high-quality clinical services.[76] Despite RHOs in New Zealand identifying the uneven size of regions as an ongoing problem, they did not want the sizes to change.[76] This indicates the importance of choosing the RHO boundaries wisely from the outset.

Additionally, the pace at which the central government drives implementation of regionalisation is an important factor to consider. RHOs in Canada perceived the pace of change as too fast,[84] but highlighted the challenge of driving change fast enough to sustain political will and slow enough to allow meaningful change to occur.[80] Research in Canada also highlighted the importance of ongoing assessment of regionalisation, rather than halting regionalisation while assessing it.[82]

Regarding services under the mandate of RHOs, RHOs in Canada and New Zealand reported a preference for the devolution of several key sectors that were not under their mandate: primary care services, pharmaceuticals, disability support, public health, and mental health services.[76,90] However, it is important to note that before such services are devolved, RHOs must have the capacity to manage them. This illustrates a key tension evident in the studies in this review between RHOs' desire for greater control and their limited ability to exercise this control.

National health strategies developed by the MoH were perceived as pivotal to ensuring consistency across regions in New Zealand, and RHOs found national strategies especially important in guiding local policy in the early stages of regionalisation.[77] However, RHOs in Mexico felt that the MoH was excessively controlling in its approach to national strategies,[74] while RHOs in Canada desired more clear and consistent policies from the MoH.[82]

The importance of support from the MoH was highlighted in Canada and New Zealand.[75,79,82,83] RHOs in Canada highlighted the value of the MoH organising seminars and assigning MoH staff to the regions.[82] However, RHOs in Canada and New Zealand reported that they required further support from the MoH, especially in terms of analytic capacity.[79,83] Moreover, RHOs in New Zealand reported that they lacked practical guidance from the MoH on how to implement national strategies.[92] They also felt that a national training programme to prepare them for devolution would have been helpful.[75]

Challenges related to the provision of funding for RHOs were identified in New Zealand, Canada, and Mexico.[72,75,83,90,92] A funding formula was introduced in New Zealand that distributed funds proportionally to the resident population and adjusted for lower socioeconomic status, rurality, elderly people, tertiary services supplied, and minority populations.[75] However, RHOs were concerned that the funding formula did not adequately account for differences between regions, including the cost of services and population growth.[83]

Regarding funding for specific national strategies, RHOs in New Zealand reported that it was very difficult to implement new MoH strategies that did not come with earmarked funding,[92] while in Canada, RHOs reported that fiscal restraints limited the extent to which their priorities could be met.[90]

Deficit management was a key tension point in New Zealand. RHOs reported that efforts to reduce deficits had dominated their decision-making, limited innovation, and led to a focus on short-term solutions rather than on long-term planning.[75] However, they felt that the introduction of a three-

year guaranteed funding stream had allowed them to develop longer-term strategies for addressing their deficits.[75]

7.1.2 Balancing competing interests

A main overarching theme identified in the included studies was tension between RHOs and the MoH regarding their competing interests. The working relationship between RHOs and the MoH was fundamental to this dynamic. RHOs in New Zealand and in Canada identified interference from the MoH as a challenge.[77,90] In New Zealand, RHOs felt that the MoH was too involved in regional operational matters.[76] Respondents also noted that the locus of decision-making was unclear; RHOs were responsible for needs assessment and prioritisation, but their decision-making capacity was constrained by the MoH dictating service funding and coverage requirements.[76] In a mixed methods study in Canada, RHO CEOs and board members reported that the RHO board was overly restricted by rules laid down by the MoH.[85] Additionally, RHO board members felt that they had been given responsibility for things over which they had insufficient control in practice.[85]

RHOs' recognition of their primary accountability to the MoH was a key challenge in regionalisation in New Zealand, Canada, and Mexico.[71,76,79,81,90] In New Zealand, elected RHO board members in particular struggled with recognising that their primary accountability was to the MoH and not to their local constituents. Formalised accountability agreements were reported as an important facilitator of RHOs' recognition of their primary accountability to the MoH in Canada.[79]

RHOs in New Zealand and Canada felt frustrated with processes required by the MoH, including reporting requirements, strategic planning, and health needs assessments.[77,80,83,92,93] While RHOs noted the value of planning processes, they felt that the MoH's approach to them proved challenging. For instance, in New Zealand, RHOs noted that reporting requirements were excessive, there was a lack of feedback from the MoH, high opportunity costs were incurred, and they did not capture desired outcomes.[77] RHOs in New Zealand also felt that the time required for strategic planning was excessive, that it was impossible to prioritise between different areas that were all considered mandatory, and that overall, the process set expectations that they could not possibly meet.[93]

7.1.3 RHO processes and procedures

Several key areas of interest emerged related to internal RHO processes and procedures. In Canada and New Zealand, coordination and collaboration between RHOs was identified as an important facilitator of the implementation of regionalisation.[76,77,79,83] RHOs in Canada and New Zealand noted that shared IT and human resources (HR) services were particularly helpful.[76,79] Additionally, RHOs in New Zealand reported that shared clinical services, including mental health and laboratory services, were critical to maintaining the viability of smaller RHOs.[76]

In New Zealand, a national network of RHOs was established, and it was widely viewed as a key facilitator.[76,77,83,93] It allowed RHOs to coordinate information sharing and action on key issues and stay abreast of policy and operational issues.[83] Moreover, it promoted consistency across the sector and allowed greater connectedness between the Minister, the MoH, and RHOs.[83]

RHO boards of management form the foundation of RHO internal governance. In New Zealand and Canada, several key issues related to RHO boards were identified. In Canada, RHO board members were elected, and both RHO management and RHO boards were in favour of continuing this system.[84] In New Zealand, RHO boards comprised a mix of elected and appointed members. RHO CEOs felt that elected members lacked skills and expertise in relation to the health sector and expressed a preference for appointed board members.[76]

Board members' knowledge, skills, and training were identified as a challenge in Canada and New Zealand. Board members in Canada reported that they were often more influenced by their own experience and knowledge than by data when making decisions.[84] Additionally, board members in Canada felt that their training in setting priorities, health needs assessments, and healthcare legislation and guidelines was inadequate.[86] In New Zealand, board membership was reported to be a

steep learning curve for most members.[83] Aspects of the board member role that were found to be particularly challenging included: lack of clarity regarding boundaries between their governance role and that of RHO management; lack of clarity regarding boundaries between their decision-making role and that of the MoH; and the volume and complexity of the issues to be grasped.[76]

Tension between RHO boards and RHO management was a key theme in Canada and New Zealand. In both settings, RHOs felt that there was a need to more clearly differentiate between the governance role of the board and the management role of the RHO management.[76,80] Notably, RHO board chairs expressed concern that RHO management had not involved them early enough in decision-making processes.[76]

Regarding the frequency of board meetings, RHOs in New Zealand reported that shifting to more frequent monthly meetings led to a better managed agenda and more efficient follow-up of issues.[76]

In Canada, several key barriers to internal RHO performance monitoring were identified. These included: a lack of data in the continuing care sector (where access to data was not integrated within the province); areas where data were still paper based; and poor information sharing across the care continuum.[79] RHOs in Canada also reported frustration that performance monitoring data were not acted on due to competing priorities and staffing constraints.[79]

Healthcare sector staff perceptions of RHO reforms were explored in Mexico and Canada. In Mexico, health managers reported lacking information about decentralisation and felt that decentralisation had led to an increase in their workload.[71] In Canada, nurses reported that restructuring had negatively affected the emotional climate of their workplace.[53] Additionally, in Canada, RHO CEOs and board chairs were concerned about resistance to change among healthcare providers and managers.[80] Physician commitment to system change was identified as particularly challenging, given that physician services were outside the mandates of the Canadian RHOs.[80]

In Canada and New Zealand, physician engagement by RHOs was cited as an important facilitator of the implementation of regionalisation.[79,83] In New Zealand, participants noted the particular importance of involving clinicians in resource allocation debates.[83]

Community engagement was identified as a key aspect of regionalisation in Italy, Mexico, Canada, and New Zealand.[71,76,82,83,92,95] Regarding community understanding of regionalisation, RHOs in Italy and Canada reported that their communities did not have a good understanding of the process.[82,95] In terms of community input into RHO services, RHOs in Mexico and New Zealand reported that community engagement influenced service design and delivery in valuable ways.[71,92] Additionally, in New Zealand, some RHO boards went to great lengths to engage their communities. This included holding open board meetings, allowing the public to speak at board meetings, and rotating the location of board meetings in order to increase public accessibility.[76] RHOs did note that some board members were more reluctant to be forthcoming with their opinions during public meetings and that open meetings slowed the decision-making process.[76] However, the benefits of transparency were perceived to be greater than the disadvantages.[83]

7.2 Strengths and limitations

7.2.1 Strengths

This systematic review is the only one that we are aware of that has examined the barriers to and facilitators of implementing regionalised health organisations. A key strength was the systematic approach that was applied to all stages of the review. A highly comprehensive and sensitive systematic search strategy was developed by a health information specialist. Rigorous eligibility criteria were used, and two independent reviewers assessed the eligibility of studies at every step of the selection process. Data extraction was validated by a second reviewer, and critical appraisal was carried out by two reviewers independently. Additionally, a rigorous thematic analysis of the findings was carried out. Finally, the inclusion of both qualitative and quantitative evidence in this review adds to the strength of the findings.

7.2.2 Limitations

Limitations of our review include variability in the type of regionalisation implemented and variability in study design and setting. There was also wide variation in sampling techniques; many studies used convenience sampling rather than more rigorous methods of selection. The variable sampling techniques and definitions of target populations and parameters could have led to substantial biases. Additionally, the range of items that were evaluated in each individual study was limited, and as a result there is limited universal knowledge regarding barriers to and facilitators of regionalisation.Therefore, further research regarding the implementation of RHOs is important. Moreover, such research ought to cover longer time periods. Finally, very few studies explored the MoH's perceptions of regionalisation; most focused on the perceptions of RHOs.

7.3 Relation to other literature

While no other systematic reviews have examined the barriers to and facilitators of regionalisation, in 2007 the European Observatory on Health Systems and Policies commissioned a series of literature reviews focusing on regionalisation.[2] In the report, Atkinson noted that policy-makers must acknowledge the deep complexity of regionalisation and must address this complexity in an ongoing manner, rather than viewing it as a once off administrative mechanism.[2] This aligns with our findings that RHOs require consistent support from the MoH in order to realise their mandates.

In this same report, Ostergren *et al.* found that regionalisation can best be characterised as an 'arena of struggle' between central and local levels of government.[2] In particular, the authors noted the influence of time frame of implementation, managerial competence (including adequate information), and political legitimacy.[2] Our analysis also identified the pacing of regionalisation, managerial skills, and political support as pivotal to the implementation of regionalisation.

Smith and Hakkinen reviewed literature related to information strategies for regionalisation as part of the European Observatory on Health Systems and Policies report.[2] They noted that regionalisation increases information load in national systems, because the creation of more administrative units requires more system management data. They concluded that information has three broad, overlapping roles – managerial, research, and accountability – and that health systems require appropriately structured information strategies to address these three key areas.[2] Similarly, our review highlights the crucial role that collection of, access to, and use of information plays in regionalisation.

7.4 Conclusion – Barriers and facilitators review

Regionalisation involves major shifts in the roles and responsibilities of key actors in the health system, and as a result, the implementation process is marked by tension. Clear roles, responsibilities, and accountabilities, particularly between the MoH and RHOs, are crucial. Additionally, RHO management and RHO boards require settling-in time in order to adjust to their new roles, and the MoH can play a key role in supporting RHOs throughout this pivotal period. Moreover, this support can lay the foundation for close working relationships between the MoH and RHOs, which could contribute to the viability and sustainability of RHOs in the long term.

RHO boundaries must be chosen wisely, in order to mitigate the challenges that can come from wide variations in RHO populations. A funding formula that adequately accounts for inevitable differences between RHO populations must be established from the start. The importance of adequate funding for RHOs cannot be overstated. If the MoH empowers RHOs to do the hard work of assessing the needs of their populations and prioritising key needs, yet does not provide adequate financial support to address these needs, frustration ensues. RHOs can only address the specific needs of their populations if they have the resources, capacity, and capability required to do so. Finally, relationship-building between key stakeholders is critical at all stages of regionalisation.

Key facilitators:

- RHO boundaries must be chosen wisely.
- The funding formula needs to adequately capture local needs and account for variations between regions.
- Training and support for RHOs is crucial, especially early on.
- Community engagement and staff engagement can ensure buy-in and facilitate their input into health service design and delivery.
- It is important to ensure that funding is sufficient.

8 Logic model

The findings from the systematic review of impact and from the systematic review of barriers and facilitators were synthesised and used to develop a logic model, presented in Figure 18. The model demonstrates interacting chains of events, which ultimately lead to various outcomes (based on the findings from the systematic review of impact). Facilitators (based on the findings from the systematic review of barriers and facilitators) are indicated where they help or improve such a chain of events. The model is an aspirational model, and as such, barriers identified in the review are reported in their inverse – that is, as facilitators. The logic model is intended to be used as a template for the monitoring and evaluation of a regionalisation process.

The model is divided into components, short-term outcomes, intermediate outcomes, and long-term outcomes. Components are direct inputs from the MoH which are delivered at regular intervals (e.g. provision of funding), once-off (e.g. division of boundaries), or on an ongoing and needs-driven basis (e.g. ongoing monitoring, evaluation, and support). Short-term outcomes are expected to be achieved at the outset of regionalisation (e.g. setting a realistic budget) and are set for, and by, the RHO. Intermediate outcomes are managed by the RHO and are expected to be achieved once the RHO has achieved its short-term outcomes. Long-term outcomes, which are observed in the whole health system, are the results of all of the RHOs working together to achieve the overarching goals. We have not provided a timeline for achievement of these outcomes as this will be entirely system dependent, it is also possible that there could be some overlap in timings, between the short, intermediate and long-term outcomes.

The criteria for achieving the outcomes will also need to be set by the country or region applying this model for monitoring and evaluation. The criteria will differ by country due to contextual factors including aim of the reform. Gains will also need to be interpreted within a broader, societal framework of what is going on in contemporary social, cultural and political and economic sectors.

8.1 Bringing together the results of the reviews in a logic model: chain of events

8.1.1 Provision of funding

The MoH is responsible for providing funding to each RHO. The use of a resource allocation formula, comprising inputs that adequately capture local needs, can facilitate each RHO having sufficient and appropriate funds. This means that the RHO can set a budget which covers all necessary local services. The RHO budget will ensure that all appropriate resources are available in each care setting: acute, primary, and social and community. In the logic model, we show that there is an inter-reliant relationship between each of these settings, demonstrating that if insufficient resources are available in one setting this will have an impact on the other two settings.

Appropriate resource utilisation feeds into most of the long-term outcomes, including good care outcomes, balanced budget, patient satisfaction with services, and staff satisfaction. Good care outcomes ultimately lead to a healthy population, and a balanced budget leads to an efficient health system. If patients are satisfied with the care they receive, they are more likely to stay in their region, meaning that there will be a low flow of patients between regions. The combination of these factors leads to a more efficient health system. In addition, having appropriate resources in place leads to staff satisfaction. Patient satisfaction and staff satisfaction also contribute to a positive perception of the health system.

Setting a realistic RHO budget will also play a role in the good operational functioning of the RHO, which should result in a balanced budget, ultimately feeding into an efficient health system. Our research shows that the MoH can facilitate RHOs achieving a balanced budget by providing support and advice where needed.

8.1.2 Division of RHO boundaries

The MoH is responsible for devising the geographical boundaries for each RHO, which will determine the demographics of that region. The size of the RHO moderates the RHO's ability to meet local needs, as smaller RHOs can struggle with the cost of infrastructure and their ability to provide high-quality services. The number of RHOs is also influential in the MoH's ability to implement strategic change, as having too many RHOs can create challenges. Once the division of boundaries has been set, the RHOs will decide on the local services be provided. This often manifests in each RHO adapting the basket of services (mandated by the MoH) to suit local needs. Deciding on appropriate services will contribute to appropriate and efficient resource utilisation. The chain of events thereafter is described in Section 8.1.1.

8.1.3 Monitoring, evaluation, and support

In this logic model, the MoH is expected to monitor and evaluate the regionalisation process on an ongoing basis. In this instance, support refers to instances where the MoH steps in to provide support and or/expertise to RHOs experiencing difficulties. The MoH also may provide support based on feedback from evaluation. In the logic model, each RHO ensures that a sufficient performance management system is in place to monitor the MoH stipulated indicators. Our research shows that the RHOs will only be able to establish this system if they have adequate, skilled staff available. The RHO should use the performance management system to improve operational functioning within the RHO; however, a high-functioning health information system infrastructure (e.g. up-to-date technology) will improve this process.

8.1.4 National healthcare goals mandated

The final component in this logic model is the mandating of national healthcare goals by the MoH. This is often done through a national healthcare strategy. These goals generally stipulate active involvement of healthcare staff and the community with the RHO. The involvement of healthcare staff in the regionalisation process should contribute to staff satisfaction. However, it is important to note that the research indicates that effective communication about the regionalisation process will facilitate this chain of events. The involvement of the community will lead to good public trust, but again, good communication about the regionalisation process can also strengthen this outcome. Public trust will in turn lead to a positive perception of the health system.

The national mandated healthcare goals will also help the RHO to decide which local services are to be provided, leading to the intermediate resource utilisation outcomes.

8.1.5 Equity

The research indicates that all components of the logic model are required in order to have an equitable health system, both between and within RHOs. An equitable health system is desirable at each outcomes stage in a regionalised health system. Equity can be explored in a variety of ways, including focusing on the impact of regionalisation on equity in health and care outcomes, the impact of regionalisation on equity in healthcare utilisation, and the impact of regionalisation on equity in healthcare costs.

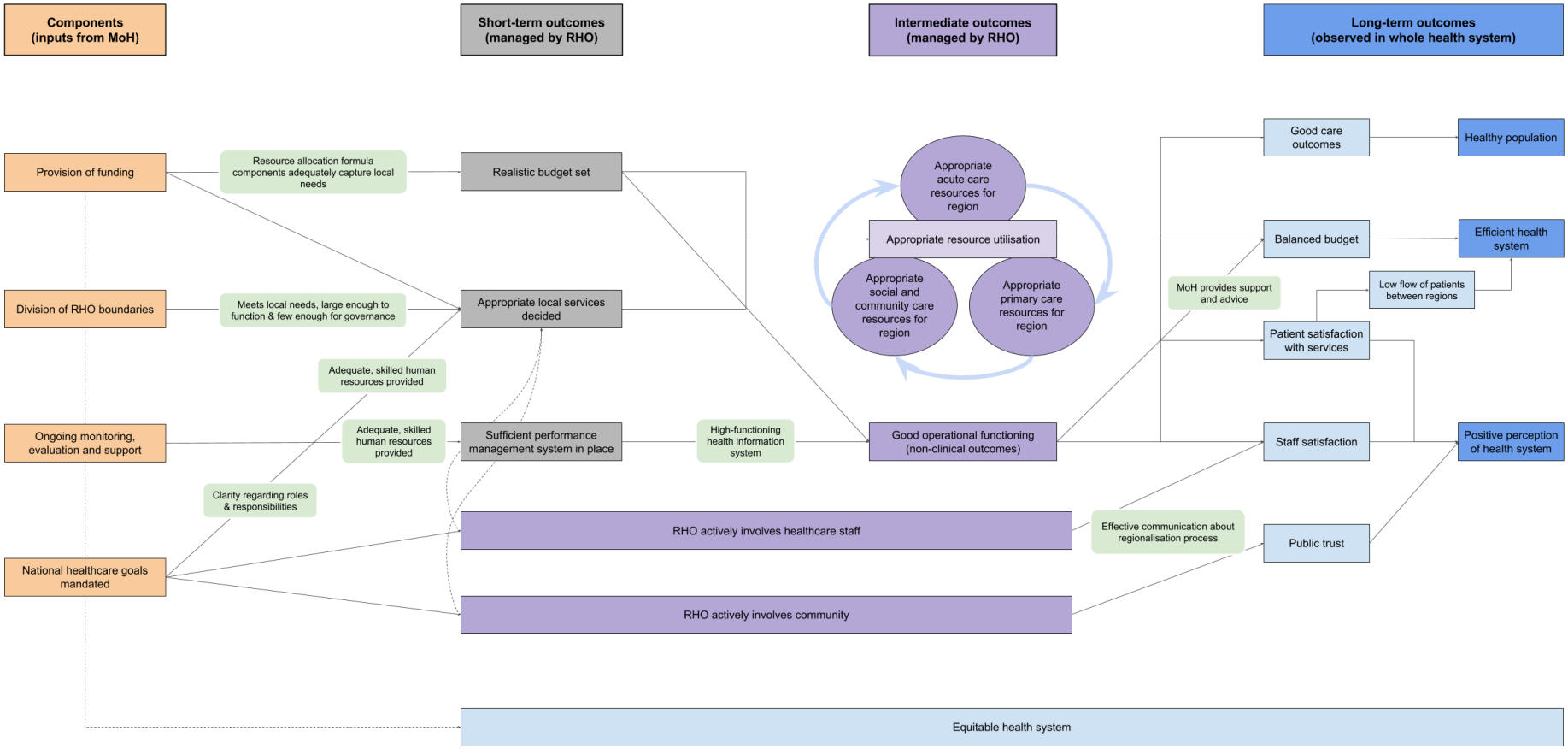

Figure 18 Logic model of the regionalisation process

8.2 Using the logic model to identify outcomes for monitoring and evaluation

We have used this logic model to identify the expected outcomes of the regionalisation of a healthcare system. Our logic model leads to three ultimate goals: a healthy population, an efficient health system, and a positive perception of the health system. Our model provides high-level suggestions of which outcomes should be measured during the regionalisation process, and provides an indication of the stage in which they are expected to be present. Below, we have listed these outcomes and, in order to demonstrate how this model may be used as a template for monitoring and evaluation, we have provided some suggestions for how they could be measured.

These suggestions are based on the included studies from the systematic reviews. It is worth noting that the majority of the studies were published on data from the 1990s, and so more modern indicators are likely missing from the examples we give here.

Short-term outcomes

These outcomes are expected to be achieved at the outset of regionalisation and should be monitored on an ongoing basis by the MoH:

- Realistic budget set by RHO
- Appropriate local services decided, and
- Sufficient performance management system in place.

Intermediate outcomes

We have not included a timeframe here as achievement of these outcomes will be entirely system dependent.

- Appropriate resource utilisation: resource utilisation should be monitored in primary, acute, and social/community care. The resources needed and used in each of these settings are co-dependent. Examples of possible indicators (based on the findings from the review) are listed below:
    - Acute care: discharges, length of stay, avoidable hospitalisation rate, and resource intensity weight
    - Primary care: number of GPs per 1,000 population, waiting time to see a GP, and
    - Social and community care: number of acute care visits which may have been avoided by accessing appropriate social or community care facilities.
- Operational functioning of RHO: this includes all non-clinical functionality of the organisation.
    - This could be measured though auditing and through the use of HR indicators, such as the number of employee absentee days or employee turnover.
- RHOs actively involve healthcare staff.
    - Regular staff surveys or interviews could explore this concept. Audits of meetings involving staff could be monitored.
- RHOs actively involve the community.
    - Audits of community engagement events, such as opening board meetings to the public, could be monitored and/or surveys in the community could be conducted.

Long-term outcomes

- Good care outcomes

  - Examples of possible indicators include life expectancy, mortality, and infant mortality figures.
- Balanced budget
  - This could be measured through financial audits of the RHOs.
- Staff satisfaction
  - This could be measured through staff surveys or interviews.
- Patient satisfaction with services
  - This could be measured through surveys or interviews.
- Public trust
  - This could be measured through surveys or interviews.
- Low flow of patients between regions
  - This could be measured through an audit of patients seeking care in regions other than their own.
- Equity across healthcare outcomes, healthcare access, and healthcare financing
  - These concepts could be monitored by examination of the data surrounding care outcomes, access, and financing across the RHOs.

It must be noted that our logic model is based on analysis of secondary data and is intended to be used as a template only. Our findings were based on data from six countries over different time periods, all of which have their own unique form of regionalisation, as well as differing populations, historical contexts, financial situations, etc. As such, we have not provided any contextual factors to be considered. However, in developing a logic model for regionalisation for a specific country, it is imperative that context be captured, such as the rural/urban divide and the age of the population. Furthermore, it is important to note that regionalisation is a complex process, encompassing a vast array of interconnected elements, which should be reflected in the design of a monitoring and evaluation template. As described in Sumah *et al.*, "[regionalisation should] be implemented and evaluated as a complex intervention for which outcomes are neither straightforward nor predictable, but dependent on the pre-existing socio-economic and institutional context".[69]

9 Implications for policy-makers

- Acute care resource utilisation decreased post-regionalisation, and this was above and beyond what would be expected based on historical trends. This was likely due to a package of healthcare reform, including budget restrictions.
- While savings in acute care resource utilisation were seen post-regionalisation, there was no negative impact observed on long-term care outcomes such as mortality; care outcomes remained the same or improved slightly post-regionalisation, with the exception of waiting times. This was on the basis of indictors that were studied in this review only.
- There is an inter-reliant relationship between resources in the acute, primary, and social and community care settings. For example, in our impact review we saw that a fall in resource utilisation in the acute setting led to increased waiting times to see GPs. If care is to be more focused outside the acute setting, additional resources will be needed in the primary care and the social and community care settings.
- If funds provided by the MoH are not sufficient, RHOs cannot address the specific needs of their populations. Funding can be managed by using a resource allocation formula, which comprises inputs that adequately capture local needs and account for variations between regions.
- Training and support for RHO management and the RHO board is crucial, particularly during the early stages of regionalisation as they settle into their new roles. Clarity regarding roles and responsibilities is also important.
- Community engagement and staff engagement are pivotal to ensuring buy-in and to facilitating their input into health service design and delivery.
- Our logic model shows that there are short-term and intermediate outcomes which need to be achieved before long-term health system goals can be achieved. An ongoing monitoring and evaluation process will need to be launched concurrently with regionalisation in order to assess these outcomes over time. Outcomes will need to be monitored in all healthcare settings, not just in the acute care setting.
- The timing of the evaluation of a regionalised healthcare system will have an effect on the outcomes. The first two to three years after regionalisation are marked by instability, and conclusions regarding the effectiveness of the reform should not be made based solely on data from this period.
- A high-functioning health information system will be needed in order to facilitate monitoring and evaluation.

10 Overall conclusions

There is some evidence to suggest that a regionalised healthcare system could ultimately lead to a healthy population and an efficient health system. However, policy-makers need to consider the important barriers to and facilitators of effective implementation. The impact of regionalisation will not be fully estimable for many years post-reform; however, a monitoring and evaluation process will be required at the start of regionalisation to ensure that the short-term and intermediate goals are being met, in order to achieve the ultimate long-term goals of regionalisation.

Furthermore, it is important to note that regionalisation is a complex process, encompassing a vast array of interconnected elements, which should be reflected in the design of a monitoring and evaluation template. Regionalisation should be implemented and evaluated as a complex intervention for which outcomes are neither straightforward nor predictable, but dependent on a country's socioeconomic and institutional context.

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