The effect of devolution on health: a generalised synthetic control analysis of Greater Manchester, England

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Summary

Background The devolution of public services from central to local government can increase sensitivity to local population needs but might also reduce the expertise and resources available. Little evidence is available on the impact of devolution on population health. We evaluated the effect of devolution affecting health services and wider determinants of health on life expectancy in Greater Manchester, England.

Methods We estimated changes in life expectancy in Greater Manchester relative to a control group from the rest of England (excluding London), using a generalised synthetic control method. Using local district-level data collected between Jan 1, 2006 and Dec 31, 2019, we estimated the effect of devolution on the whole population and stratified by sex, district, income deprivation, and baseline life expectancy.

Findings After devolution, from November, 2014, life expectancy in Greater Manchester was 0·196 years (95% CI 0·182–0·210) higher than expected when compared with the synthetic control group with similar pre-devolution trends. Life expectancy was protected from the decline observed in comparable areas in the 2 years after devolution and increased in the longer term. Increases in life expectancy were observed in eight of ten local authorities, were larger among men than women (0·338 years [0·315–0·362] for men; 0·057 years [0·040–0·074] for women), and were larger in areas with high income deprivation (0·390 years [0·369–0·412]) and lower life expectancy before devolution (0·291 years [0·271–0·311]).

Interpretation Greater Manchester had better life expectancy than expected after devolution. The benefits of devolution were apparent in the areas with the highest income deprivation and lowest life expectancy, suggesting a narrowing of inequalities. Improvements were likely to be due to a coordinated devolution across sectors, affecting wider determinants of health and the organisation of care services.

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Introduction

The decentralisation of public services has become a key element of public sector reform, which has been implemented to differing extents globally,1 including the devolution of responsibilities for the provision of health services.2 Central to this shift has been the assumption that policy makers are able to closely identify and address the needs and preferences of the population at a local level.3 However, critics have argued that devolved systems might be unable to exploit the same expertise and cost advantages as central governments, lack the organisational structures required to implement change, and lead to larger inequalities between regions.4–6

Empirical evidence on the impact of devolution on health is mixed.7 Although previous studies have estimated positive effects of devolution on population health,8 questions remain with regard to whether these effects will translate to high-income countries,9,10 might widen inequalities between devolved regions,11 and depend on the extent and type of powers that are devolved.12,13 In particular, studies have primarily examined the effects of health-care devolution using fiscal measures of decentralisation.14 Less is known about the extent to which health outcomes are associated with the political transfer of responsibilities to local governments for the organisation of health and wider public services.

Since 2014, the UK Government has devolved powers for the provision of a range of different services to 12 regional governments in England with the aim of improving economic performance and increasing local accountability.15 The establishment of a mayoral combined authority and the transfer of core powers, often including transport, adult education, employment support, and strategic planning have been a common aspect of such agreements. However, unique responsibilities have also been granted to specific regions, including powers over housing and policing, and an agreement to devolve health and social care responsibilities in Greater Manchester, the first and most devolved region in England outside of London.16

However, to date, no peer-reviewed empirical evidence is available on the impact of these devolution arrangements in England on health. We aimed to investigate the impact of devolution on life expectancy in...
Research in context

Evidence before this study
We searched for and screened journal articles published on PubMed before March 29, 2022 that used robust policy evaluation methods to identify the impact of devolution or decentralisation on health, using the search terms "(decentral* OR devol*) AND (health) AND (data)". No language restrictions were used. Overall, our search yielded 48 studies. The majority of the literature analysed the impact of health system devolution in low-income and middle-income countries, or in Spain or Italy. These studies generally established positive associations between devolution and population health, particularly in relation to infant mortality. However, findings from cross-country analyses suggest that health system devolution was associated with smaller changes in high-income countries. Studies primarily examined the effects of decentralisation using indicators of fiscal decentralisation, limiting their ability to distinguish between the impact of powers to increase spending through taxation and the transfer of responsibilities regarding the organisation and delivery of services. Little evidence was available on the impact of devolving wider public services on health. Few studies analysed the impact of devolution on alternative measures of health system performance, with a focus on immunisation coverage or patient satisfaction. No peer-reviewed studies have investigated the impact of devolution in England.

Added value of this study
We provide the first robust evidence on the impact of devolution in England on population health, focusing on changes occurring in Greater Manchester, and in doing so, we address two key limitations of the literature. First, devolution in Greater Manchester extended beyond the provision of health-care services, whereby powers were granted over a range of public services with the potential to impact wider determinants of health. The combination of devolved powers allowed us to assess the combined impact of health system and public service devolution on population health. Second, devolution agreements in England did not transfer fiscal powers to raise taxation, only responsibilities for setting and delivering policies. This form of devolution allowed us to focus on the extent to which outcomes were associated with the political transfer of responsibilities regarding the organisation of certain services.

Implications of all the available evidence
Devolution in Greater Manchester was associated with higher life expectancy compared with similar regions. This result is consistent with findings from countries with greater devolved control of health service provision. Our findings suggest that similar changes might not have been replicated without the devolution of powers over wider determinants of health. However, further research is needed to investigate the mechanisms that might have contributed to this effect and whether the results are generalisable to other contexts.

Greater Manchester, using the generalised synthetic control method.

Methods
Institutional setting
On Nov 3, 2014, Greater Manchester was the first region in England, outside of London, where a devolution deal was negotiated in exchange for a directly elected mayor.6 This agreement built on a history of joint collaboration between the ten boroughs in Greater Manchester and was made possible by the establishment of the Greater Manchester Combined Authority in 2011.5,9 The deal granted the new mayor and the Greater Manchester Combined Authority increased decision-making and budgetary powers for various areas of regional policy that are likely to impact wider determinants of health, including housing, employment, transport, adult education, policing, strategic planning, and business support. The initial agreement was then expanded over time in a series of additional deals made between July, 2015, and November, 2017, which granted the mayor and the Greater Manchester Combined Authority further powers over the provision of services in the region.10 On April 1, 2017, Greater Manchester also became a pilot for allowing local governments to retain taxes raised from local businesses, allowing greater flexibility in the allocation of local government funding.12

In addition to these measures, Greater Manchester and National Health Service (NHS) England also made an agreement on Feb 27, 2015, to devolve health and social care in the region from April 1, 2016. Unlike the devolution of other public services, however, health and social care powers were never fully devolved to Greater Manchester. Local NHS organisations in Greater Manchester were subject to the same national rules, targets, routine financial flows, and mechanisms for budget pooling between health and social care as elsewhere in England.11,12 As such, the health and social care devolution in Greater Manchester has previously been described as a so-called soft transfer of powers.12

The health and social care devolution agreement did include substantive changes in other areas with the potential to support beneficial improvements in health.13,14 First, region-wide partnership boards were established to cover a number of important functions, including an overarching collaborative board for partners within the region (the Greater Manchester Health and Social Care Partnership [GMHSCP]) and a similar board for the...
Clinical Commissioning Groups. Second, NHS England granted the region control of its share of the national sustainability and transformation fund. The ten local areas in Greater Manchester were then able to bid for money from the Transformation Fund via investment agreements, monitored by the GMHSCP. This provided Greater Manchester with a discretionary fund of £450 million with which to support local transformational change. Similar transformation funding was made available elsewhere in the country through the roll-out of the Sustainable Transformation Partnerships. However, transformation funding in the rest of England was mainly used to cover provider deficits.23

The new GMHSCP began by outlining an ambitious strategic plan, Taking Charge, with overarching aims of improving population health and wellbeing, reducing health inequalities, and closing the health and social care funding gap, which was predicted to reach £2 billion per year by 2020–21.24 These overarching aims were operationalised through a number of local district and region-wide plans, including the Population Health Plan, which set out a place-based approach to improving population health, in addition to more strategic and collaborative efforts to facilitate health and social care integration and wider system reconfiguration.25 The GMHSCP policy priorities also formed components of the Greater Manchester Strategy, a plan derived by Greater Manchester Combined Authority to transform and integrate public services within the conurbation.26

However, the GMHSCP had limited mechanisms through which to implement change, beyond the allocation of the transformation funding to local government organisations within the region. The benefits and risks of the health and social care devolution deal might therefore have been smaller in comparison with the devolution of powers over other public services, or the interaction between the two.

Outcomes

We assessed the effect of devolution on population mortality, summarised using period life expectancy at birth, a measure frequently used in the international literature and to assess public health in England. Period life expectancy is the mean number of years a hypothetical cohort would live if they experienced the age-specific mortality rates of the population within a given area and time period throughout their lives. We opted to use this measure because the health and social care devolution deal and the devolution of powers over other public services might have affected health via different pathways, influencing not only the care received by patients, but also wider determinants of health, including social and economic factors. Our analysis therefore required a broad measure of population health to capture the overall impact of devolution in the region. Furthermore, increased life expectancy was also a key goal of interventions implemented in response to devolution in Greater Manchester, including the regional Taking Charge: Start Well, Live Well and Age Well Plan.26

We used data on life expectancy published by the Office for National Statistics27 for 312 local authority districts in England, whereby each local authority district defined a geographical area within which a single local government body (known as a local authority) was responsible for the provision of public services. Data for each local authority were reported by sex and as 3-year rolling averages to account for differences in life expectancy between men and women and to smooth out the impact of exceptional events, such as an influenza outbreak.

We used data collected between 2006 and 2019 in our analysis. We limited the follow-up period to 2017–19 to avoid misattributing the effect of devolution to regional differences in unobserved factors associated with the spread of COVID-19 and severity of the pandemic. We defined the timepoint 2014–16, the last datapoint that overlapped with the initial devolution agreement on Nov 3, 2014, as the first post-devolution period in the analysis, recognising that changes in decision making in response to devolution might have taken time to translate to improvements in health. This start point was preferred to timepoints 2012–14 and 2013–15 because it minimised the likelihood of attributing the impact of devolution to changes that might have occurred before devolution in 2012 and 2013.

Statistical analysis

We estimated the impact of devolution on life expectancy using the generalised synthetic control method.28 The method estimated changes in life expectancy by sex and for each local authority in Greater Manchester relative to a synthetic control group with the same pre-devolution trends in life expectancy, estimated using tools from interactive fixed-effects models and the synthetic control method. Each control group was constructed using a weighted subset of local authorities from the rest of England, where weights were derived to minimise differences in the outcome from each treatment unit throughout the pre-devolution period. This approach adjusted for observable and unobservable time-varying factors under the assumption that life expectancy trends for local authorities in Greater Manchester would be the same as those for the synthetic control group throughout the post-devolution period, in the absence of the reform. Estimates by sex for each local authority in Greater Manchester were then aggregated to calculate the overall impact of devolution in the region. Further information on the generalised synthetic control method is included in the appendix (pp 4–5).

We included all 270 local authorities outside of London in the pool of potential control units when estimating the generalised synthetic control method. We excluded London because progress towards greater health and social care devolution in the region during the study period might have biased the results.29 We adjusted for

See Online for appendix
We estimated the effects of devolution on life expectancy for the whole population, by sex, and for each local authority. Additionally, we examined whether devolution contributed to a narrowing of inequalities within Greater Manchester in comparison with the rest of England by restricting the intervention group and control group to only include local authorities with high levels of income deprivation in 2015 (within the highest tertile of deprivation in England) and low life expectancy before devolution (within the lowest tertile of England by restricting the intervention group and control group to only include local authorities with high levels of income deprivation in 2015 (within the highest tertile of deprivation in England)). We estimated income deprivation as the proportion of the population in each local authority experiencing high deprivation due to income.

We also did a set of robustness tests. First, we tested the performance of the generalised synthetic control method model in identifying a suitable control group by estimating whether differences in the outcome between Greater Manchester and the synthetic control group in the years before devolution were statistically different from zero. Second, we restricted the control group to only include regions that did not receive devolved powers during the study period. Third, we restricted the control group to only include authorities in the rest of England by restricting the intervention group and control group to only include regions that did not receive devolved powers near the end of the study period. Fourth, we included local authorities from London in the pool of potential control units. Fifth, we restricted the control group to only include local authorities that were similar to Greater Manchester throughout the pre-devolution period on the basis of a set of 21 covariates associated with life expectancy. Sixth, we estimated the effect of devolution on a placebo treatment group that only received devolved powers near the end of the study period. Finally, we examined whether there were anticipatory effects of devolution before the start date defined in the analysis, by re-estimating the impact of devolution from 2012–14 to 2013–15 (appendix pp 7–10).

### Results

Life expectancy was lower in Greater Manchester (mean age 79·39 years [SD 2·28]) than in the rest of England (age 81·21 years [2·31]) before the introduction of devolution (table 1). This difference was consistent for both men and women. The population of Greater Manchester was also younger than the rest of the country (38·12 years vs 40·48 years) and more likely to live in an income-deprived household (18·73% vs 13·86%). After devolution, a larger increase in life expectancy was observed within Greater Manchester than in the rest of England (0·09 years vs 0·06 years). The proportion of the population living in areas of high deprivation declined at the pre-devolution and post-devolution periods.

| Table 1: Comparison of life expectancy and population characteristics in Greater Manchester and the rest of England before and after devolution |
|-------------------------------|-------------|-------------|-------------|
| **Greater Manchester** | **Rest of England** | **Greater Manchester** | **Rest of England** | **Difference** |
| **Life expectancy, years** | | | | |
| Overall | 79·39 (2·28) | 79·53 (2·26) | 0·14 | 81·21 (2·31) | 81·30 (2·33) | 0·09 |
| Men | 77·52 (1·40) | 77·72 (1·37) | 0·20 | 79·34 (1·52) | 79·47 (1·58) | 0·13 |
| Women | 81·24 (1·17) | 81·33 (1·29) | 0·09 | 83·04 (1·24) | 83·10 (1·30) | 0·06 |
| **Population characteristics** | | | | |
| **Sex** | | | | |
| Men, % | 49·80% (0·59) | 49·93% (0·64) | 0·13% | 49·58% (0·57) | 49·65% (0·60) | 0·07% |
| Women, % | 50·20% (0·59) | 50·07% (0·64) | -0·13% | 50·42% (0·57) | 50·35% (0·60) | -0·07% |
| **Age, years** | 38·12 (2·69) | 38·24 (2·82) | 0·11 | 40·48 (2·73) | 40·79 (2·90) | 0·31 |
| **Income deprivation score†, %** | 18·73% (4·15) | 17·31% (3·76) | -1·42% | 13·86% (5·19) | 12·36% (4·34) | -1·50% |

SDs are shown in parentheses. Averages are weighted by the population size in each local authority and period. Life expectancy data at the local authority level were only disaggregated by sex and were not available by ethnicity. *Statistics for the rest of England excluded London for consistency with the estimation strategy. †Income deprivation score is the proportion of the population in each local authority experiencing high deprivation due to income.
similar rates (−1.4% points in Greater Manchester vs −1.5% points in the rest of England).

Six of the ten local authorities in Greater Manchester were within the most deprived tertile of local authorities in England (table 2). Similarly, the life expectancy in eight local authorities was among the lowest tertile in England before devolution. Manchester local authority was the most deprived in the region, with the highest proportion of the population on a low income (24.2%) and the lowest life expectancy before devolution. Manchester local authority was among the lowest tertile in England or with a baseline life expectancy in the lowest tertile of local authorities in England.

Overall life expectancy increased between 2006–08 and 2012–14 in Greater Manchester, but then plateaued between 2013–15 and 2015–17, before increasing again from 2016–18 onwards (figure 1). A similar trend was observed for the rest of England. In contrast, life expectancy decreased between 2013–15 and 2015–17 timepoints in the most deprived areas and in the areas with the lowest life expectancy at birth in each local authority from 2006–08 to 2013–15 timepoints. *Relative rank of each local authority in relation to the rest of the country, from least (1) to most (12) deprived or from highest (1) to lowest (12) life expectancy. †Local authorities within the most deprived tertile of local authorities in England or with a baseline life expectancy in the lowest tertile of local authorities in England.

Life expectancy in Greater Manchester was similar to the estimated synthetic control group throughout the pre-devolution period but higher from 2014–16 onwards (figure 2). This difference persisted throughout the majority of the post-devolution period. By the 2017–19 timepoint, average life expectancy in Greater Manchester was 0.265 years (95% CI 0.216–0.314) higher than in the estimated control group. The initial positive effect on life expectancy was driven by a reduction in life expectancy in the synthetic control group and no change in life expectancy in Greater Manchester. In comparison, life expectancy increased in both Greater Manchester and the estimated control group in 2018, but at a faster rate in Greater Manchester than in the control group.

The difference in life expectancy between Greater Manchester and the synthetic control group after devolution was larger for men (0.338 years [95% CI 0.216–0.314]) than women (0.057 years [0.040–0.074]; table 3). In the short term, the relative increase in life expectancy for men was driven by a reduction in life expectancy in the estimated synthetic control group (figure 2). By contrast, the estimated effect of devolution...
on life expectancy among women was only observed from the 2016–18 timepoint onwards and was smaller in magnitude than for men.

The effect of devolution on life expectancy was also positive when estimated for local authorities in the most deprived tertile in England (0·390 years [95% CI 0·369–0·412]; table 3). Similarly, devolution was associated with an increase in life expectancy (0·291 years [0·271–0·311]) for local authorities with a baseline life expectancy in the lowest tertile in England. Both of these estimates were larger than the average effect in Greater Manchester, suggesting that inequalities within Greater Manchester reduced relative to the rest of England.

The estimated difference in life expectancy was positive in eight of the ten local authorities within Greater Manchester at the 95% CI level (table 3). The largest increase in life expectancy was observed in Salford (0·521 years [95% CI 0·459 to 0·583]), the third most deprived local authority and the local authority with the second lowest life expectancy in Greater Manchester before devolution. By contrast, Rochdale, the second most deprived local authority in Greater Manchester, was the only local authority in which a reduction in life expectancy was observed (–0·074 years [–0·146 to –0·002]).

Results from the robustness tests are included in the appendix (pp 7–10). Differences in life expectancy between Greater Manchester and the estimated synthetic control group throughout the pre-devolution period were small and were not statistically significant in any of the analyses. Estimates were similar to the main analysis when restricting control units to exclude other devolved city regions (0·181 years [95% CI 0·167 to 0·196]) and to only include local authorities that had similar changes in local government funding (0·165 years [0·151 to 0·179]). The estimated impact of devolution remained positive and statistically significant when London was included in the control group, but as predicted, was smaller in magnitude (0·128 years [0·115 to 0·141]) than the estimated effect in the main analysis. The estimated effect was slightly larger when restricting the control group to only include local authorities with similar pre-devolution characteristics to Greater Manchester (0·244 years [0·230 to 0·259]). There was no evidence of a change in life expectancy when estimating the main analysis on a placebo treatment group (ie, a region not exposed to devolution during the study period; –0·005 years [–0·034 to 0·025]), but an increase in life expectancy in the pre-devolution period was observed (0·158 years [0·127 to 0·188]).

### Discussion

Modest improvements in life expectancy were observed in Greater Manchester compared with the rest of the country after the introduction of devolution until the start of the COVID-19 pandemic, using robust statistical methods. Life expectancy was 0·196 years higher in Greater Manchester than in the estimated synthetic control group. This change was 2·2 times larger than the average change in life expectancy observed in the rest of England during the same period. The change persisted throughout the post-devolution period and was larger for men (0·338 years) than women (0·057 years). The effect of devolution in the short term, however, was not driven by an increase in life expectancy in Greater Manchester, but rather by a protection against the decline in life expectancy identified in the synthetic control group: a decline in life expectancy was also identified in the literature.32,33

Statistically significant increases in life expectancy were observed in eight out of the ten local authorities in Greater Manchester, with the exception of Oldham and Rochdale. The change in life expectancy in Oldham was positive, but smaller in magnitude and not statistically significant at the 95% CI level. Lower life expectancy was observed in Rochdale following devolution compared with the control group. There was also tentative evidence to suggest that improvements in life expectancy were larger in the local authorities with high income deprivation and low levels of life expectancy before devolution, when compared with similarly deprived areas in the rest of England.

Observed increases in life expectancy might have been caused by improvements triggered by a combination of changes in response to the health and social care devolution agreement, the devolution of powers over wider determinants of health, or the election of a new
mayor. Differences between local authorities might have arisen due to challenges in implementing change in deprived areas on the periphery of the region (ie, Rochdale and Oldham) or reflected differences in how local authorities responded to the allocation of local transformation funding, a key component of the health and social care devolution deal. Conversely, short-term improvements in male life expectancy might have been driven by reductions in deaths from alcohol and drug misuse or road traffic injuries. These factors were amenable to short-term change, more likely to affect men, and were directly targeted by interventions implemented in response to devolution. However, further research is required to understand these potential mechanisms.

Additionally, the implementation of devolution was not instantaneous in practice and changes in decision making might have also taken time to translate into improvements in services. Early improvements in life expectancy could therefore also be considered a reflection of the commitment in Greater Manchester to improve population health before devolution. This interpretation is supported by the finding that higher life expectancy rates were also observed before the first devolution deal. The modest increase in life expectancy might therefore not be attributable exclusively to the impact of health and social care devolution, nor to devolution of powers in other sectors. However, both might have contributed to strengthening the implementation of interventions to improve public health across sectors, particularly in the later period.

These findings contribute to the scarce evidence on the impact of the devolution of public services in high-income countries. By focusing on changes occurring in Greater Manchester, we not only provide new evidence on the impact of so-called soft devolution of health and social care services, but also evidence on the devolution of powers over other wider determinants of health and the interaction between the two.

However, a number of limitations are notable. First, life expectancy in Greater Manchester might have been affected by other region-specific changes that were unrelated to devolution. To investigate this, we estimated a robustness test to assess whether changes in life expectancy were driven by cuts in local government funding. Second, we focused on life expectancy. Although this allowed us to estimate a single overarching effect of devolution that was easy to interpret, it meant that we were not able to comment on the full impact of devolution and its mechanisms. In particular, further research is required to understand differences in the results by sex and between local authorities. Third, life expectancy data at the local authority level were not available by ethnicity, which prevented further analysis of the effect of devolution on different ethnic groups. Fourth, although the analyses of heterogeneous effects by income deprivation and life expectancy allowed us to interpret the impact on inequality between local authorities in Greater Manchester, it did not allow us to investigate the impact of devolution on inequality within each local authority.

Further research is therefore needed to establish the mechanisms that might have caused life expectancy to change and to determine whether these changes were driven by health and social care devolution, the devolution of powers over wider determinants of health, or the interaction between the two. This could be achieved through further quantitative work evaluating the impact of devolution on measures of health system inputs, outputs, and wider determinants of health; or a qualitative review of the different interventions.
implemented in response to devolution and their targeted outcomes.

Nonetheless, the findings of this study have important implications on the design of future policy. At the national level, the findings provide early evidence on the potential success or failure of Integrated Care Systems in England. Indeed, the GMHSCP has often been considered a prototype of the Integrated Care Systems approach. However, there are key differences that should be considered when drawing comparisons between the structure of the GMHSCP and the organisation of Integrated Care Systems outlined in the Health and Care Bill 2021. In particular, there is a difference in the representation of local authorities on Integrated Care Boards, responsible for the day-to-day running of the Integrated Care Systems. This organisational structure contrasts with the findings of this study, which suggest that Greater Manchester local authorities might have collaborated to tackle wider determinants of health. Similar improvements in population health might therefore not be replicated in Integrated Care Systems without a greater regional representation of councils on Integrated Care Boards.

The findings also have implications for population health in different settings. Different from previously analysed systems, improvements in Greater Manchester were observed despite the soft transfer of health and social care powers to the region and without the fiscal powers to raise taxation. The success of future devolution reforms might therefore depend on other factors beyond the types and strength of powers devolved to a health system, including the extent to which health and wider public services are aligned within a region.

Contributors
All authors were involved in the conceptualisation of the research. Data were accessed, verified, curated, and analysed by PB and AF. PB performed the analysis and wrote the first draft. All authors revised and edited the manuscript and agreed on the decision to submit the final version of the manuscript for publication. The research was supervised by YSL, LA, AJT, PW, and MS.

Declaration of interests
We declare no competing interests.

Data sharing
All data sources used in this study are publicly available online and do not require ethics approval to use. Office for National Statistics life expectancy and population estimates are available online. Income deprivation scores from the Index of Multiple Deprivation have been published by the Ministry of Housing, Communities and Local Government and are available online.

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