

# The mental health and wellbeing impact of a Community Wealth Building programme in England: a difference-in-differences study



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## Summary

**Background** Wide differences in health exist between places in the UK, underscored by economic inequalities. Preston, an economically disadvantaged city in England, implemented a new approach to economic development, known as the Community Wealth Building programme. Public and non-profit organisations modified their procurement policies to support the development of local supply chains, improve employment conditions, and increase socially productive use of wealth and assets. We aimed to investigate the effect of this programme on population mental health and wellbeing.

**Methods** Difference-in-differences techniques compared trends in mental health outcomes in Preston, relative to matched control areas before (2011–15) and after (2016–19) the introduction of the programme. Outcomes were antidepressant prescribing, prevalence of depression, and mental health related hospital attendance rates using data provided by National Health Service Digital, the Quality and Outcomes Framework, and the Office for National Statistics. Additional analysis compared local authority measures of life satisfaction, median wages, and employment with synthetic counterfactuals created using Bayesian Structural Time Series.

**Findings** The introduction of the Community Wealth Building programme was associated with reductions in the prescribing of antidepressants (1.3 average daily quantities per person [95% CI 0.72–1.78]) and prevalence of depression (2.4 per 1000 population [0.42–4.46]), relative to the control areas. The local population also experienced a 9% improvement in life satisfaction (95% credible interval 0–19.6%) and 11% increase in median wages (1.8–18.9%), relative to expected trends. Associations with employment and mental health related hospital attendance outcomes did not reach statistical significance.

**Interpretation** During the period in which the Community Wealth Building programme was introduced, there were fewer mental health problems than would have been expected compared with other similar areas, as life satisfaction and economic measures improved. This approach potentially provides an effective model for economic regeneration potentially leading to substantial health benefits.

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## Introduction

The UK experiences some of the largest spatial health inequalities of any country in Europe, with people living in socioeconomically disadvantaged areas dying on average 9 years younger and living for 19 more years in poor health than more affluent areas.<sup>1</sup> Although there have been multiple place-based initiatives over decades that have sought to address these inequalities, they have had partial success.<sup>2–4</sup> Economic inequalities underlie these differences in health, and one criticism of previous approaches is that they have failed to change these underlying economic determinants of health.

Preston has a population of 140 000 people and is within the 20% most deprived local authorities in England based on the indices of multiple deprivation.<sup>5</sup> Measures of health are considerably worse than the national average; for example, an estimated 19% of the population have a common mental disorder compared

with 17% in England as a whole.<sup>6</sup> Since 2013, Preston has been developing a new approach to economic development, known as Community Wealth Building, that aims to build a local economy that addresses the underlying economic differences between places that drive health inequalities.<sup>1,7,8</sup> This multi-component programme was initially led by coalitions of anchor institutions (eg, large public or non-profit organisations such as the local government, universities, and housing providers). These institutions aimed to promote economic inclusion and wellbeing within Preston by changing procurement policies to support the development of local supply chains. This approach included supporting the development of local enterprises, investing local wealth (eg, local government pension funds) into the local economy, improving recruitment and employment conditions (eg, Living Wage policies), and maximising socially productive use of land and property.

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### Research in context

#### Evidence before this study

We searched PubMed and Web of Science Core Collection on Oct 13, 2022, using the search terms (“community wealth” OR “local wealth” OR “anchor institutions”) AND (“health” OR “well-being” OR “wellbeing”). We also searched using the single phrase “community wealth building”. We searched for all article types published from database inception to Oct 13, 2022, with no language restrictions, and found evidence focused on the practical experiences of implementing community wealth building, including critical appraisal of its philosophical underpinnings. Qualitative research examined perceptions of Preston’s Community Wealth Building programme among employees of anchor institutions. We found no previous studies that empirically evaluated the effect of a community wealth building programme on health or wellbeing outcomes. An umbrella review of the macroeconomic determinants of health also found a shortage of evidence indicating the public health benefits of alternative place-based economic strategies and highlighted the need for more robust evaluative evidence to understand which economic interventions are beneficial for health.

#### Added value of this study

A natural experiment was used to compare trends in population mental health outcomes in Preston, relative to matched control areas, before and after the introduction of Preston’s Community Wealth Building programme. The introduction of the programme was associated with a 3% decline in the prescribing of antidepressants, and a 2% decline in the prevalence of depression, relative to the control areas. Additional analysis suggested that, during the same period, the local population experienced a 9% improvement in life satisfaction, and 11% increase in median wages, relative to expected trends. Our findings are consistent with Preston’s Community Wealth Building programme having led to economic improvements that have translated into improvements in mental health and wellbeing.

#### Implications of all the available evidence

Our study provides evidence that alternative place-based approaches to economic development such as Preston’s Community Wealth Building, centred around economic democracy and social value, could potentially support the joint aims of economic regeneration, health and wellbeing improvements, and reduced regional inequalities.

See Online for appendix

Community Wealth Building could influence health through multiple pathways (panel). Although there is evidence for the health effect of some of these pathways as outlined, we do not know whether the magnitude and nature of the changes in Preston were sufficient to bring about population health impacts. We aimed to investigate whether mental health outcomes and wellbeing improved more in Preston after Community Wealth Building was introduced compared with other similar areas, and whether the programme was associated with relative improvements in economic indicators.

### Methods

#### Data sources, measures, and outcomes

The mental health outcomes were derived for each Lower-layer Super Output Area (LSOA) in England using data provided by National Health Service (NHS) Digital, the Quality and Outcomes Framework, and the Office for National Statistics (ONS). These outcomes were: antidepressant prescribing (average daily quantity per person); people aged 18 years and older with a diagnosis of depression in primary care (per 1000 population); and mental health related hospital attendance rate (emergency and elective combined with accident and emergency attendances for self-harm). Average daily quantity is a measure of prescribed medication based on an estimate of the typical daily dose of a medication prescribed to adult patients by general practices and is calculated as the total amount of medication prescribed (ie, number of tablets multiplied by the dose of each tablet) divided by the average daily quantity value (further

details can be found in the appendix). We also intended to analyse claims for Incapacity Benefit and Employment Support Allowance for mental illness; however, we decided to exclude this outcome due to potentially unreliable data from 2019 coinciding with welfare changes (eg, migration of claimants onto Universal Credit).

Additional outcomes were only available for local authorities. We used annual data on mean life satisfaction scores as measured by the ONS using the Annual Population Survey. The measure is derived from survey respondents’ answers to the question “Overall, how satisfied are you with your life nowadays?” in which 0 is not at all satisfied and 10 is completely satisfied. To investigate economic changes associated with Preston’s Community Wealth Building programme, we used the employment rate of individuals aged 16–64 years derived from the Annual Population Survey, and median wages derived from the Annual Survey of Hours and Earnings.

To define the matched control group for the LSOA-level analysis, we used available data on known factors associated with mental health outcomes, including indices of multiple deprivation 2015 income domain, the proportion of the population from a Black, Asian, Mixed, or other minority ethnic group, the proportion of the population younger than 16 years, the average distance to the nearest primary-care (general practitioner [GP]) practice, the number of GPs per head of population, and region. We also used annual data on the unemployment benefit claimant rate and previous values of each outcome to match by year. We used the unemployment benefit claimant rate to match on economic trends at LSOA-level

as this was the only economic measure available at this level of geography. Full details of the measures and data sources can be found in the appendix (p 2).

### Statistical analysis

In our LSOA-level analysis, for each outcome, we first matched the 86 LSOAs that cover the entire population of Preston on a 5:1 basis with 430 comparator LSOAs from other areas in the north of England and the Midlands that have not implemented Community Wealth Building (appendix pp 5–7). This matching provided a total sample size of 4644 LSOA-years for analysis. The Centre for Local Economic Strategies is working on community wealth building within several areas across England, which were excluded from our analysis.

We used propensity score<sup>17</sup> matching to ensure that these control areas had similar observed characteristics to the Preston LSOAs in the time period of 2011–15 before the start date for the intervention. The matching was based on the variables outlined above. The nearest neighbour method was used for matching, which selects controls with propensity scores that are closest to that of the intervention LSOAs.

We then used difference-in-differences methods to estimate the effect of the Community Wealth Building programme in Preston, calculated as the difference between the change in the outcomes in the Preston areas and the change in the outcomes in the comparator areas. This difference-in-differences approach uses a comparison both within and between areas accounting for secular trends in our outcomes and unobserved time invariant differences between areas that could confound findings. Full details of the regression model can be found in the appendix (p 8). The primary assumption was that trends in outcomes would have been parallel in Preston and the control areas in the absence of the Community Wealth Building programme. We investigated the parallel trends assumption using graphical methods and regression models to compare trends in outcomes between the intervention and control areas in the pre-intervention period of 2011–15. We also stratified the analysis by the level of deprivation of areas in Preston.

For our analysis of outcomes (life satisfaction, median wages, and employment rate) using local authority level data, there was only one intervention unit (ie, Preston). The single intervention unit presents estimation complications in deriving a relevant comparison group and for calculating SEs. We therefore use the synthetic control approach developed by Brodersen and colleagues,<sup>18</sup> which has previously been used to evaluate local authority level policies with single intervention units.<sup>19</sup> The synthetic controls are calculated using Bayesian Structural Time Series analysis based on weighted combinations of the control areas.

Controls for this analysis were defined as all lower tier local authorities in the north of England or the Midlands

### Panel: Preston's Community Wealth Building programme

The Community Wealth Building programme represents an innovative approach to address the economic difficulties faced by disadvantaged places. Preston has led the way in developing a Community Wealth Building programme that aims to create a resilient and inclusive economy for the benefit of the local area. This multicomponent programme was initially led by coalitions of anchor institutions (place-based organisations that are invested in the local area), including Preston City Council, Lancashire County Council, Preston College, Community Gateway Association, Cardinal Newman College, the Office of the Lancashire Police and Crime Commissioner, and the University of Central Lancashire. These institutions aimed to promote economic inclusion and wellbeing within Preston via actions based around the following key principles: (1) changing procurement policies to support the development of local supply chains; (2) supporting the development of local enterprises (eg, cooperatives, social enterprises, charities, and small businesses) that are more accountable and responsive to the local population; (3) investing local wealth, such as local government pension funds, into the local economy; (4) improving recruitment and employment conditions within anchor institutions and their suppliers; and (5) maximising socially productive use of land and property owned by anchor institutions.

The programme could influence health through multiple pathways. First, by procuring more services from the local economy and promoting quality local recruitment and employment policies throughout the supply chain, anchor institutions could increase jobs in the local economy and improve wages and working conditions. These factors are important determinants of health.<sup>9–11</sup> Second, the promotion of social enterprises, such as cooperatives, could also improve working conditions and be more responsive to needs.<sup>12–14</sup> Third, by increasing democratic engagement in the economy and enhancing wider civic engagement, the Community Wealth Building programme could also increase people's sense of control, which is associated with improved health outcomes.<sup>9–11</sup> Finally, the programme could promote a positive narrative of place, counteracting the stigma often associated with disadvantaged places such as Preston. This narrative could have positive population mental health benefits.<sup>15,16</sup> It is also possible that prioritising procurement from the local economy has negative effects compared with more competitive national and international tendering of services. For example, favouring less efficient local enterprises could lead to reduced value for money. Further details about Preston's Community Wealth Building programme are provided in the appendix (p 3).

that have a population between 90 000 and 250 000 that are within the 25% most deprived local authorities in England and are not already working with Centre for Local Economic Strategies on developing Community Wealth Building programmes. There were 16 local authorities that met this definition, which were used to construct the synthetic control group (appendix p 9). The approach uses Bayesian model averaging of the time-series in all control areas to create a synthetic time-series that is similar to the measured time-series in Preston before 2016 and a post-intervention synthetic time-series predicting what would have happened in the absence of the Community Wealth Building programme (ie, the counterfactual). Bayesian priors are placed on the regression coefficients of all control areas included in the pre-intervention model. The semiparametric Bayesian posterior distribution for the effect of the Community Wealth Building programme is obtained as the difference between the measured outcomes in Preston and the counterfactual time-series after the introduction of the intervention. The prior SD of the

	Preston	Controls	Standardised mean difference
Antidepressant prescribing (ADQs per person)	29.87 (3.56)	29.29 (8.09)	0.092
Adults with a diagnosis of depression (per 1000 population)	86.56 (17.90)	61.32 (17.38)	1.431
Mental health related hospital attendances (per 1000 population)	37.76 (18.55)	32.90 (18.36)	0.264
Median weekly wages*	£332.60	£388.92 (32.18)	..
Proportion of population employed aged 16–64 years*	0.71	0.69 (0.06)	..
Life satisfaction score*	7.23	7.49 (0.20)	..
Proportion of population claiming unemployment benefits aged 16–64 years	0.03 (0.02)	0.03 (0.02)	0.121
Proportion of population experiencing deprivation relating to low income	0.17 (0.10)	0.16 (0.10)	0.112
Proportion of population from Black, Asian, Mixed, or other minority ethnic groups	0.20 (0.18)	0.20 (0.29)	0.015
Proportion of the population aged <16 years	0.19 (0.06)	0.19 (0.06)	0.024
Distance to the nearest GP practice (km)	1.31 (1.25)	1.44 (1.39)	0.097
GPs per 10 000 population	4.78 (0.43)	4.70 (0.74)	0.138

Data are population weighted mean (SD), unless stated otherwise. Table shows population weighted means and standard deviations across the intervention and control Lower-layer Super Output Areas in 2013, and shows measures for the controls used to analyse the antidepressant prescribing outcome. ADQ=average daily quantity. GP=general practitioner. \*Local authority level data. As there is only one data point for Preston in 2013 for the local authority measures, it is not possible to estimate the SD of these measures for Preston or, therefore, the standardised mean difference.

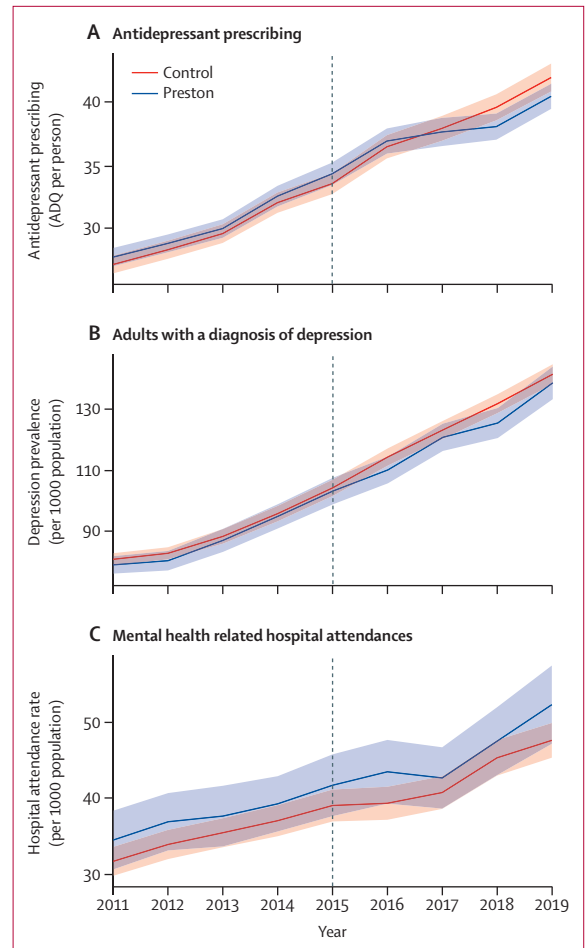
**Table 1: Socioeconomic deprivation, population health, ethnicity, and age profile measures of Preston and control areas in 2013**

regression coefficients was set to 10% of the pre-intervention outcomes. The results are presented as point estimates and Bayesian 95% credible intervals (Cr Is). Analyses were conducted in R (version 4.2.0). Patient consent and ethics approval were not required due to the use of anonymised data aggregated to area-level.

**Robustness tests**

We repeated our difference-in-differences analysis of LSOA-level outcomes, including dummy variables, for each year to investigate the timing of the effects. We also investigated the impact of Universal Credit roll-out on our results. As matching can introduce bias related to regression to the mean,<sup>20</sup> and as the SEs in our main analysis did not take into account uncertainty related to the matching process,<sup>21</sup> we also repeated the analysis using the synthetic control method for microdata developed by Robbins and colleagues,<sup>22,23</sup> applying a permutation procedure to estimate robust SEs. Furthermore, as using multiple outcomes can introduce bias due to multiple testing, we repeated our analysis with a new index—the Small Area Mental Health Index—which we developed that combines four mental health measures into one index (appendix pp 14–15).

We repeated the Bayesian Structural Time Series analysis of local authority level outcomes with different Bayesian priors to evaluate the sensitivity of the models to



**Figure 1: Trends from 2011–19 in mental health outcomes in Preston and the control areas before and after the intervention**  
Shaded areas around the lines represent the 95% CIs. ADQ=average daily quantity.

the prior specifications. Specifically, we conducted analyses with more informative priors (prior SD set to 1%) and less informative priors (prior SD set to 25% of sample SD). As a falsification test, we repeated the Bayesian Structural Time Series analysis for each of the control local authorities in turn, as if they were the intervention site, comparing them with the synthetic time-series estimated from the other control local authorities. A priori, the difference between the measured time-series in these control areas and the modelled synthetic time-series should result in findings that randomly vary around the null.<sup>19</sup> To explore the sensitivity of the analysis to the assumption of the Bayesian Structural Time Series, we repeated the local authority analysis using traditional difference-in-differences approaches, recognising that SEs in these models will be underestimated.

**Role of the funding source**

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

## Results

The matched control areas were broadly similar to Preston across a wide range of characteristics (table 1; appendix pp 5–7).

Figure 1 shows the trends in the mental health outcomes in Preston and the control areas between 2011 and 2019. Trends in the outcomes in Preston were very similar to the control areas before 2015. Following the introduction of the Community Wealth Building programme, the antidepressant prescribing and depression prevalence rates appear to rise to a lesser extent in Preston relative to the control areas.

The difference-in-difference analysis shows that there were reductions in the prescribing of antidepressants and prevalence of depression in Preston relative to the control group after 2016 (table 2). The analysis indicates that the introduction of the Community Wealth Building programme was associated with a reduction in antidepressant prescribing of 1.3 average daily quantities per person (95% CI 0.72 to 1.78) in Preston, equivalent to a 3% reduction compared with what would have been expected in the absence of the programme. The prevalence of depression decreased by 2.4 per 1000 population (95% CI 0.42 to 4.46) in Preston relative to the control group after 2016, equivalent to a 2% reduction in relative terms. The introduction of the Community Wealth Building programme was not statistically significantly associated with mental health related hospital attendances.

When the analysis was stratified by the level of deprivation of areas in Preston, for the antidepressant prescribing outcome, we see a similar effect in the least and most deprived areas (table 3). The programme appeared to be associated with a greater reduction in the prevalence of depression in the most deprived areas within Preston.

When investigating the effects in each year separately, we see no evidence of an effect before 2016 as expected (appendix p 10). For antidepressant prescribing, in 2017, we start to see a small effect, with the rate 0.85 average daily quantities per person lower than expected (95% CI 0.15 to 1.55), with much larger effects in 2018 (2.08, 95% CI 1.35 to 2.82) and 2019 (2.04, 1.27 to 2.82). For the prevalence of depression, we see a large effect in 2018, with the rate 4.5 per 1000 population lower than expected (95% CI 0.87 to 8.18), but a smaller effect in 2019.

The Bayesian Structural Time Series models show how life satisfaction, wages, and employment have changed in Preston after 2015 compared with what would have been expected given trends in these outcomes in other similar areas (figure 2, table 4). For these outcomes, we see an improvement after 2015 compared with the synthetic counterfactual, with the Community Wealth Building programme estimated to have led to a 9% improvement in life satisfaction (95% Cr I 0 to 19.6%), and 11% increase in median wages (1.8 to 18.9%). There was also a 7% increase in

	Absolute effect on outcomes (95% CI)	p value
Antidepressant prescribing (ADQs per person)	-1.25 (-1.78 to -0.72)	<0.001
Adults with a diagnosis of depression (per 1000 population)	-2.44 (-4.46 to -0.42)	0.018
Mental health related hospital attendances (per 1000 population)	0.66 (-1.32 to 2.64)	0.512

ADQ=average daily quantity.

**Table 2: Difference-in-difference analysis: estimates from the regression models indicating the change in the mental health outcomes in Preston before (2011–15) and after (2016–19) the start of the Community Wealth Building programme, compared with the change in these outcomes between the same time periods in the control areas**

	Absolute effect on outcomes (95% CI)	p value
<b>Antidepressant prescribing (ADQs per person)</b>		
Most deprived 50% LSOAs	-1.22 (-2.17 to -0.27)	0.012
Least deprived 50% LSOAs	-1.47 (-2.07 to -0.86)	<0.001
<b>Adults with a diagnosis of depression (per 1000 population)</b>		
Most deprived 50% LSOAs	-3.54 (-6.88 to -0.20)	0.038
Least deprived 50% LSOAs	-2.17 (-4.71 to 0.37)	0.094
<b>Mental health related hospital attendances (per 1000 population)</b>		
Most deprived 50% LSOAs	0.13 (-3.30 to 3.55)	0.943
Least deprived 50% LSOAs	1.15 (-1.19 to 3.48)	0.336

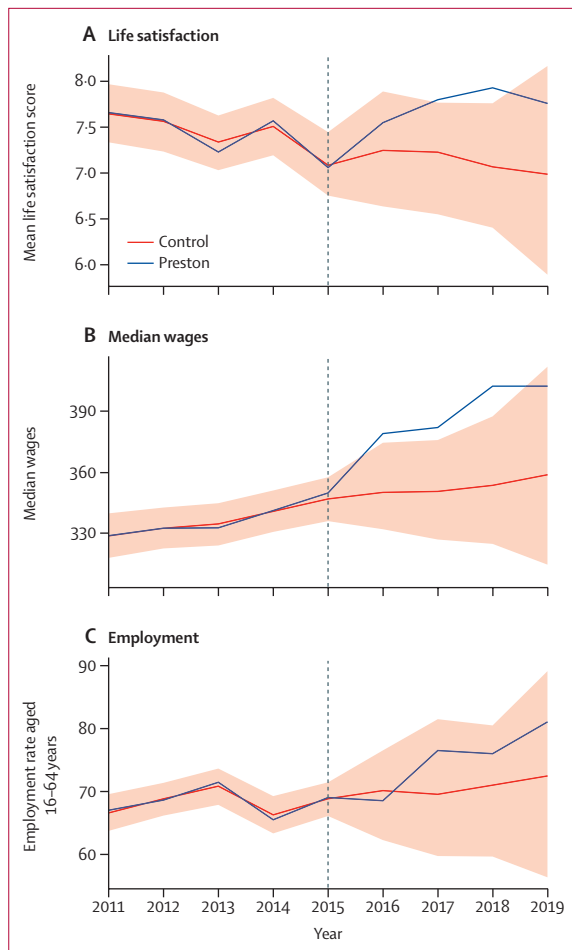
ADQ=average daily quantity. LSOA=Lower-layer Super Output Area

**Table 3: Estimates of the effect of the intervention on the mental health outcomes from the difference-in-difference regression models stratified by the most and least deprived 50% of LSOAs in Preston.**

employment, which did not reach statistical significance (-5.3% to 23.9%).

We found similar results to our LSOA-level analysis when adjusting for Universal Credit (appendix p 11), and when using the synthetic control approach estimating CIs using multiple permutations, indicating that the Community Wealth Building programme was associated with a 3% decline in the antidepressant prescribing rate (95% CI 2% to 4%), and a 2% decline in the prevalence of depression (95% CI 1% to 4%; appendix pp 11–13). We also found comparable results analysing the Small Area Mental Health Index, whereby the introduction of the programme was associated with a reduction of 0.11 SDs in the Small Area Mental Health Index score in Preston (95% CI 0.06 to 0.16; appendix pp 14–15).

Estimating the Bayesian Structural Time Series models using more and less informative priors corroborated our findings. In the falsification tests for life satisfaction and median wages, using each of the control local authorities as an intervention area, gives a posterior tail-area probability of greater than 0.05 for all the intervention areas, whereas for employment using each of the control local authorities as an intervention



**Figure 2: Trends in life satisfaction, median wages, and employment in Preston and synthetic control from 2011 to 2019**

Synthetic counterfactual modelled using Bayesian Structural Time Series (red lines). The blue lines show trend in Preston.

area gives a posterior tail-area probability of greater than 0.1 for all the intervention areas, suggesting that the findings do seem to be specific to Preston (appendix pp 16–18). Using a standard difference-in-differences model for the local authority level outcomes indicated the intervention was associated with an effect for all three outcomes with  $p < 0.001$ . As noted, however, SEs are likely to be underestimated with this model (appendix p 19). We did not observe any serious violations of model assumptions, and additional analysis log transforming wages provided almost identical results (appendix p 20).

## Discussion

We found that after 2015 in Preston, following the introduction of their Community Wealth Building programme, the prescribing of antidepressants and prevalence of depression decreased, and wellbeing improved compared with the expected trends estimated from other similar areas. These findings occurred

alongside improvements in wages that were also greater in Preston. The improvements in wages and life satisfaction occurred from 2015. The reductions in antidepressant prescribing started in 2017, with the largest effects in 2018 and 2019, and occurred at a similar level across areas of deprivation within Preston. Reductions in the prevalence of depression occurred in 2018 and appeared to be greater in the most deprived areas of Preston. The findings are consistent with Preston's Community Wealth Building programme having led to economic improvements that have translated into improvements in mental health and wellbeing.

There are several limitations in this analysis. Although this study shows that improvements occurred in Preston between 2015 and 2019, and that these improvements have not occurred in other similar areas, we cannot necessarily conclude that these are entirely related to the Community Wealth Building programme. For example, the University of Central Lancashire (an anchor institution involved in the programme) announced a £200 million investment for its Preston campus in 2015, which could have independently affected wages and employment. Qualitative investigation, being conducted as a component of this study, will be crucial in understanding the potential pathways through which the observed effects could have occurred and potential alternative explanations. These investigations will involve in-depth interviews with those involved in, and observations of, Preston's Community Wealth Building programme. We also plan to investigate potential causal relationships highlighted by this study in greater detail using person-level survey data.

It is also difficult to rule out the possibility that different trends in unobserved confounding factors between the Preston and control areas could have influenced the results. Although there were differences between the intervention and control groups, time invariant differences between the two groups could not bias the results due to the difference-in-differences methods. Propensity score matching identified control populations that followed similar trends in the outcomes before the intervention, confirmed by the parallel nature of the trends in the outcomes before the intervention. Although we are unable to confirm that nothing happened in the control areas that influenced mental health, our robustness tests (appendix pp 11–20) indicate that other factors differentially affecting mental health are unlikely to bias our results. Additionally, the control areas were geographically dispersed (appendix pp 5–7), and the rates of the prescribing of antidepressants and prevalence of depression follow the same linear trend over the study period for the control group, suggesting that there were no major shocks affecting these outcomes in the control areas. We also found no significant effects when repeating our analysis of the local authority outcomes using each of the control local authorities as if they were the intervention site.

The mental health outcomes derived from health-care utilisation data (prescribing and hospital admissions) could be affected by trends in diagnosis. For example, the increasing trend over time, which is seen in all areas, is probably due to increases in the share of conditions being diagnosed rather than a true increase in incidence. Our results could be biased if there were changes in diagnosis potential that disproportionately affected Preston after 2015; however, we are not aware of any major changes in health-care provision in Preston from 2015. We nonetheless sought to partially account for this potential source of bias by controlling for distance to the nearest GP practice and numbers of GPs per head of population. The ecological nature of this study means that conclusions cannot be drawn about individual-level factors, and the results represent the estimated population-level effect of the Community Wealth Building programme. Additionally, it was not possible to present results by sex and gender, and we acknowledge that some programme activities were implemented before 2015 in Preston, which could have resulted in underestimation of the improvements observed.

There is extensive evidence linking economic improvements with better health and, in particular, that good quality work<sup>24</sup> and improved income lead to better health.<sup>25</sup> Economic growth however does not necessarily lead to improved health and there are examples of economic growth adversely affecting health.<sup>26</sup> Whether economic improvements contribute to improvement in health will probably depend on who gains and who loses from economic improvements and the nature of those benefits.<sup>27</sup> The approach taken in Preston has many of the characteristics that have been associated with economic models that are likely to promote health, in particular, focusing on more equitable distribution of income, and more inclusive employment.<sup>28,29</sup> There has however been very little previous evaluative research indicating which economic interventions or strategies are beneficial for health.<sup>30</sup> The evidence that is available focuses on active labour market programmes, workplace interventions, and welfare policies.<sup>30</sup> To our knowledge, this is the first evaluation of the health impact of a local place-based economic strategy of this nature in the UK. Our findings suggest that the strategy applied in Preston shows potential to improve health and wellbeing. We estimate that the introduction of the Community Wealth Building programme was associated with a cost saving to the NHS of approximately £108 000 due to reduced antidepressant prescribing in Preston between 2016 and 2019 (appendix p 21). The timing of the estimated effects on mental health 1–2 years after economic changes is also plausible based on previous research.<sup>31</sup> Although there is uncertainty in interpreting specific timings, one initial focus of the programme was to promote Living Wage policies within anchor institutions, which could explain both wage and mental health improvements. We observed no significant reduction in

	Absolute effect (95% Cr I)	Relative effect (95% Cr I)	p value
Life satisfaction score	0.6 (0 to 1.3)	9% (0% to 19.6%)	0.025
Median wages (per week)	£38.30 (6.8 to 62.1)	11% (1.8% to 18.9%)	0.014
Employment rate of individuals aged 16–64 years	4.7% (–4.2 to 14.6)	7.2% (–5.3% to 23.9%)	0.097

Cr I=credible interval. The p value is based on a comparison of the actual values of the outcomes with Preston to the posterior distribution of the outcome that would be expected in the absence of the intervention. The tail-area probability is the probability under the calculated posterior that the response is at least as extreme, relative to the expected value, as the one observed.

**Table 4: Estimated effect of the introduction of the Community Wealth Building programme on life satisfaction, wages, and employment**

mental health related hospital attendances associated with the Community Wealth Building programme, possibly because this measure is more likely to capture severe mental health issues requiring hospitalisation, which could be beyond the influence of the programme.

Our findings have several implications for policy. There is growing interest in rethinking the fundamental purpose of the economy with an increasing focus on wellbeing and health as key outcomes from the economy.<sup>27,32</sup> Our study indicates that health improvements are a feasible goal of local economic strategies and could be realised within a short time period. Further, our study indicates that the approach to economic development applied in Preston provides lessons for the UK Government. Policies to level-up the health, wellbeing, and economy of disadvantaged places are often based on the principles of agglomeration economics and attracting inward investment into places such as Preston.<sup>33,34</sup> Such approaches have not always led to improved wellbeing and decreased inequality.<sup>35</sup> Our research indicates that an approach focused on the Community Wealth Building programme could be effective at achieving wellbeing improvements, although additional evidence is needed to understand this process.

Our finding that public sector organisations could have an effect on health through their procurement and employment practices has implications for the NHS. The NHS has a key role to play in shaping local economies as a major employer and procurer of services. Although the NHS long-term plan recognises the role of the NHS as an anchor organisation,<sup>8</sup> as yet, the potential for NHS Trusts to maximise their contribution to Community Wealth Building initiatives remains limited. Limitations are partly due to national policy that mandates the use of national supply chains making it difficult for NHS Trusts to adopt progressive local spend policies.<sup>36</sup> Our findings suggest that the NHS could contribute to the joint goals of improving health and supporting inclusive economic growth by taking a greater role in Community Wealth Building.

As we emerge from a pandemic that has disproportionately affected the health and economy of the most disadvantaged places, new inclusive approaches for economic recovery are needed that support the resilience of disadvantaged places to economic and health shocks.

Place-based approaches such as Preston's Community Wealth Building programme provide a model that can potentially support the joint aims of economic regeneration, health and wellbeing improvements, and reduced regional inequalities.

#### Contributors

BB conceived the study and wrote the initial draft. KD, TCR, JM, MM, EH, TLG, and BH reviewed, commented on, and revised further drafts. Data analysis was conducted by BB, KD, and TCR. BB and TCR directly accessed and verified the underlying data reported in the study. All authors had full access to the data in the study and were responsible for the decision to submit for publication.

#### Declaration of interests

We declare no competing interests.

#### Data sharing

The publicly available datasets generated and analysed during this study have been cited within the appendix and are available from the Office for National Statistics, Place-based Longitudinal Data Resource, and Ministry of Housing, Communities and Local Government.

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#### References

- Whitehead M, Barr B, McInroy N, et al. Due North report of the inquiry for health equity in the North of England. Liverpool: University of Liverpool and the Centre for Economic Strategies, 2014.
- Popay J, Whitehead M, Carr-Hill R, et al. The impact of New Deal for Communities approaches to community engagement: within-person changes in social and health outcomes in New Deal for Communities areas. In: The impact on health inequalities of approaches to community engagement in the New Deal for Communities regeneration initiative: a mixed-methods evaluation. Southampton: NIHR Journals Library, 2015.
- Stafford M, Nazroo J, Popay JM, Whitehead M. Tackling inequalities in health: evaluating the New Deal for Communities initiative. *J Epidemiol Community Health* 2008; **62**: 298–304.
- Walthery P, Stafford M, Nazroo J, et al. Health trajectories in regeneration areas in England: the impact of the New Deal for Communities intervention. *J Epidemiol Community Health* 2015; **69**: 762–68.
- Ministry of Housing. National statistics. English indices of deprivation 2015. 2015. <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015> (accessed March 27, 2023).
- Office for Health Improvement and Disparities. Common mental health disorders. <https://fingertips.phe.org.uk/profile-group/mental-health/profile/common-mental-disorders/data#page/1/gid/8000026/pat/6/ati/201/are/E07000123/iid/93495/age/164/sex/4/cat/-1/ctf/-1/yr/1/cid/4/tbm/1> (accessed Feb 4, 2022).
- The Economist. Preston, Jeremy Corbyn's model town. 2017. <https://www.economist.com/britain/2017/10/19/preston-jeremy-corbyns-model-town> (accessed Nov 8, 2019).
- NHS England. The NHS long term plan. 2019. <https://www.longtermplan.nhs.uk/publication/nhs-long-term-plan/> (accessed Nov 11, 2019).
- Marmot MG, Bosma H, Hemingway H, Brunner E, Stansfeld S. Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *Lancet* 1997; **350**: 235–39.
- Siegrist J. Chronic psychosocial stress at work and risk of depression: evidence from prospective studies. *Eur Arch Psychiatry Clin Neurosci* 2008; **258**: 115–19.
- Whitehead M, Orton L, Pennington A, Nayak S. Is control in the living environment important for health and wellbeing, and what are the implications for public health interventions. London: Public Health Research Consortium, 2014.
- Pérotin V. Worker cooperatives: good, sustainable jobs in the community. *J Entrepreneurial and Organ Diversity* 2014; **2**: 34–47.
- Sarracino F, Gosset A. The non-economic outcomes of social entrepreneurship in Luxembourg. Germany: University Library of Munich, 2015.
- The National Institute for Health and Care Excellence. Community engagement. NICE. <https://www.nice.org.uk/guidance/ng44> (accessed March 27, 2023).
- Kearns A, Kearns O, Lawson L. Notorious places: image, reputation, stigma. The role of newspapers in area reputations for social housing estates. *Housing Stud* 2013; **28**: 579–98.
- Kelahr M, Warr DJ, Feldman P, Tacticos T. Living in 'Birdsville': exploring the impact of neighbourhood stigma on health. *Health Place* 2010; **16**: 381–88.
- Austin PC. An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behav Res* 2011; **46**: 399–424.
- Brodersen KH, Gallsusser F, Koehler J, Remy N, Scott SL. Inferring causal impact using Bayesian structural time-series models. *Ann Appl Stat* 2015; **9**: 247–74.
- de Vocht F, Tilling K, Pliakas T, et al. The intervention effect of local alcohol licensing policies on hospital admission and crime: a natural experiment using a novel Bayesian synthetic time-series method. *J Epidemiol Community Health* 2017; **71**: 912–18.
- Daw JR, Hatfield LA. Matching and regression to the mean in difference-in-differences analysis. *Health Serv Res* 2018; **53**: 4138–56.
- Austin PC, Cafri G. Variance estimation when using propensity-score matching with replacement with survival or time-to-event outcomes. *Stat Med* 2020; **39**: 1623–40.
- Robbins MW, Davenport S. microsynth: synthetic control methods for disaggregated and micro-level data in R. *J Stat Softw* 2021; published online Jan 14. <https://doi.org/10.18637/jss.v097.i02>
- Robbins MW, Saunders J, Kilmer B. A framework for synthetic control methods with high-dimensional, micro-level data: evaluating a neighborhood-specific crime intervention. *J Am Stat Assoc* 2017; **112**: 109–26.
- Waddell G, Burton K. Is work good for health and wellbeing? London: The Stationery Office, 2006.
- Cooper K, Stewart K. Does money in adulthood affect adult outcomes? 2015. <http://www.jrf.org.uk/publications/does-money-adulthood-affect-adult-outcomes> (accessed July 30, 2015).
- Frakt AB. How the economy affects health. *JAMA* 2018; **319**: 1187–88.
- Naik Y, Abbs J, Elwell-Sutton T, Bibby J, Spencelayh E. Using economic development to improve health and reduce health inequalities. London: The Health Foundation, 2020.
- Pickett KE, Wilkinson RG. Income inequality and health: a causal review. *Soc Sci Med* 2015; **128**: 316–26.
- Black CM. Working for a healthier tomorrow: Dame Carol Black's review of the health of Britain's working age population. London: The Stationery Office, 2008.
- Naik Y, Baker P, Ismail SA, et al. Going upstream—an umbrella review of the macroeconomic determinants of health and health inequalities. *BMC Public Health* 2019; **19**: 1678.
- Barr B, Taylor-Robinson D, Scott-Samuel A, McKee M, Stuckler D. Suicides associated with the 2008–10 economic recession in England: time trend analysis. *BMJ* 2012; **345**: e5142.
- Local Government Association. Nobody left behind: maximising the health benefits of an inclusive local economy. London: Local Government Association, 2018.
- GOV.UK. Levelling Up the United Kingdom. <https://www.gov.uk/government/publications/levelling-up-the-united-kingdom> (accessed Feb 4, 2022).
- McInroy N, Lloyd-Goodwin T. What will it really take to level-up? London: Class—Centre for Labour and Social Studies, 2020.
- OECD. Opportunities for all: a framework for policy action on inclusive growth. Paris: OECD, 2018.
- Lloyd-Goodwin T. Unlocking the potential within the NHS as an anchor institution. 2020. <https://www.hsj.co.uk/finance-and-efficiency/unlocking-the-potential-within-the-nhs-as-an-anchor-institution/7026933.article> (accessed Feb 4, 2022).