GREATER MANCHESTER INDEPENDENT PROSPERITY REVIEW

EVIDENCE UPDATE: HEALTH INEQUALITIES

A research report for the
Greater Manchester Prosperity Review: Evidence Update
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Greater Manchester Combined Authority Research Team produces high quality research and intelligence to form the evidence base underpinning policy and strategy for the city region.

The SIPHER consortium is a collaborative project funded by the UK Prevention Research Partnership between six universities and three policy partners: GMCA, Sheffield City Council, and the Scottish Government. SIPHER (Systems Science in Public Health and Health Economics Research) aims to provide new insights into the complex links between causes and consequences, such as the interdependencies between work, income, housing, poverty, and health; and a new systems sciences approach to the economics of prevention.

The Greater Manchester Independent Prosperity Review was commissioned by a panel of distinguished experts, chaired by Professor Diane Coyle, to provide a detailed and rigorous assessment of the current state, and future potential, of Greater Manchester's economy. Commencing ten years on from the path-breaking Manchester Independent Economic Review, it provides a fresh understanding of what needs to be done to improve productivity and drive prosperity across the city region.

This latest update, the Greater Manchester Independent Prosperity Review: Evidence Update is a key part of the sustained work done by researchers at the Greater Manchester Combined Authority – with input and challenge from experts. The update explores seven inter-connected thematic areas: carbon neutrality, health inequalities, productivity and the business base, the labour market, skills utilisation and employer investment in skills, trade, and transport in light of the significant economic developments experienced since 2019 (Covid-19, UK's exit from the European Union and the energy and inflation shock).

This report, alongside the six other research reports on the thematic areas listed above, forms part of a suite of work from which the summary, the Evidence Update: Reflections Report is drawn. The evidence update will be used to inform the refresh of the Local Industrial Strategy.

Contents

Executive Summary

This report has brought together evidence on the relationships between health, health inequalities, employment, and productivity both from general literature and from Greater Manchester (GM) specific data and initiatives.

It has drawn on new evidence from the Marmot Build Back Fairer Report and specific projects, such as the SIPHER consortium, to help understand better the relationships between health and work, and to consider what initiatives GM should take forward.

In particular, the evidence base suggests that GM should complement the excellent work being done through health innovation initiatives with a broader approach to tackling the factors that can lead to poor health (especially mental health). This is imperative in order to succeed in reducing GM's deficit in terms of productivity with the rest of the country.

Part of this underperformance in productivity is a result of Greater Manchester having significantly poorer health than the country as a whole, with Life Expectancy in GM almost two years less than the England average. Inequalities within GM are also very large: in some areas Healthy Life Expectancy is almost 10 years less than the State Pension Age.

Due to the cyclical nature of the relationship between health and work, increasing the numbers of residents in good work in Greater Manchester will have a positive effect on their mental and physical health, helping reinforce the productivity and prosperity gains GM is seeking to achieve.

It is recommended that interventions to tackle poor health and productivity include:

- Continued expansion of mental health provision
- Recommissioning and scaling up employment support programmes that take a health and employment approach
- Building on the recent initiatives on good work and engaging with more employers

- Broadening the health innovation programme to include a greater focus on the social determinants of health, including employment
- Increased use of tools such as those being created by the SIPHER consortium project to support decision makers to optimise interventions and maximise the impacts on health, health inequalities, employment and productivity.

1. Introduction and scope

1.1 The place of health in the local economic system

The evidence base is strong on the relationship between health and productivity. The Independent Prosperity Review (GMCA, 2019) echoed previous findings from work looking at health, wellbeing and productivity, which estimated that up to 30% of the productivity gap between cities in the North of England and the UK average could be closed by raising participation in the workforce through addressing ill health. Research commissioned by the Northern Powerhouse Partnership (Bambra et al, 2018) finds that working people experiencing a period of ill health in the North of England are 39% more likely to lose their job compared to their counterparts in the rest of England; and decreasing rates of ill health by 1.2% and decreasing mortality rates by 0.7% would reduce the gap in productivity between the North and the rest of England by 10%. International studies have shown that when health experience as well as education are included as measures of human capital, good health had a large, positive and significant effect on aggregate output growth[1].

Subsequently, the health of the population, whilst fundamentally of value in itself, should also be considered as part of GM economy's underpinning infrastructure, meaning health itself has an impact on productivity. Coyle (2022) discusses spill-overs derived from improvements in human capital that are location-specific, meaning there will be "*a strong correlation between measures of health such as life expectancy and indicators of economic deprivation in particular localities, and therefore that local population health improvements can trigger positive productivity spirals in certain places*" (Coyle 2022 citing Azariardis & Drazen 1990).

Measuring human capital is an evolving discipline and as yet it is not standard to include health status (alongside knowledge and skills). However, this is changing and the World Bank has recently developed a new human capital index incorporating health metrics.[2]

[1] Bloom et al (2001) and Sharma (2018) – cited in Coyle (2022).
[2] https://www.worldbank.org/en/publication/human-capital

O'Mahony and Samek (2021) set out a framework to estimate the impact of poor health on the UK human capital stock, calculating that the total for 2018 would have been 12% higher if those in poor health had been in good health.

The World Health Organisation has estimated the impact on European nations' productivity if health inequalities were reduced. Even a small reduction (shifting the mortality rates for the bottom quintile of the population to those of the second lowest) had significant GDP gains of between 0.3% and 4.3%. GDP benefits of equalling out the whole population to those of the highest quintile are much higher (WHO, 2016).

One of the primary links in these discussions about health and productivity is the extent of the local population's participation in work. But the relationship between employment and health is complex and multi-faceted: health impacts upon a person's ability to be economically active, whilst industry / employment conditions impact upon health and can widen inequalities. Unemployed people with poor health are less likely to become employed; employees suffering from poor health are more likely to move towards unemployment with adverse consequences more likely for those in lower socioeconomic groups resulting from lack of job security, sick pay etc.

This report explores the knowledge base on the two-way relationship between health and work, in order to identify opportunities to improve both health and prosperity for residents of Greater Manchester. This relationship was not explored in detail in the Independent Prosperity Review, although the development of the Greater Manchester Good Employment Charter builds on the understanding that Health and Wellbeing is one of the seven key characteristics of good employment[3]. The Greater Manchester Independent Prosperity Review: Reviewers' Report (GMCA, 2019a) observed poor health in some Greater Manchester communities and that this was "*creating a barrier to work and to progression in work*" which provides an important explanation for why overall growth has been slow in the last decade". This was echoed in the Local Industrial Strategy (LIS) (GMCA, 2019b), which noted: "*poor health and deficits in certain types of skills and talent is restricting economic growth [in Greater Manchester]*".

[3] https://www.gmgoodemploymentcharter.co.uk/the-charter/

This report provides a summary of evidence produced since 2019, that considers the relationship between health / health inequalities and participation in work within Greater Manchester; this includes evidence drawn from 'Build Back Fairer in Greater Manchester' (Institute for Health Equity, 2021). The report, commissioned by the Greater Manchester Health and Social Care Partnership and produced by the Institute for Health Equity, provided evidence of the health inequality challenges Greater Manchester will face post-pandemic and made recommendations to monitor and reduce them.

1.2 The SIPHER Consortium project

This report also draws on evidence from the SIPHER Consortium[4], a collaborative project between six universities and three policy partners: GMCA, Sheffield City Council, and the Scottish Government. SIPHER (Systems Science in Public Health and Health Economics Research) aims to provide new insights into the complex links between causes and consequences, such as the interdependencies between work, income, housing, poverty, and health; and a new systems sciences approach to the economics of prevention.

[4] https://sipher.ac.uk/

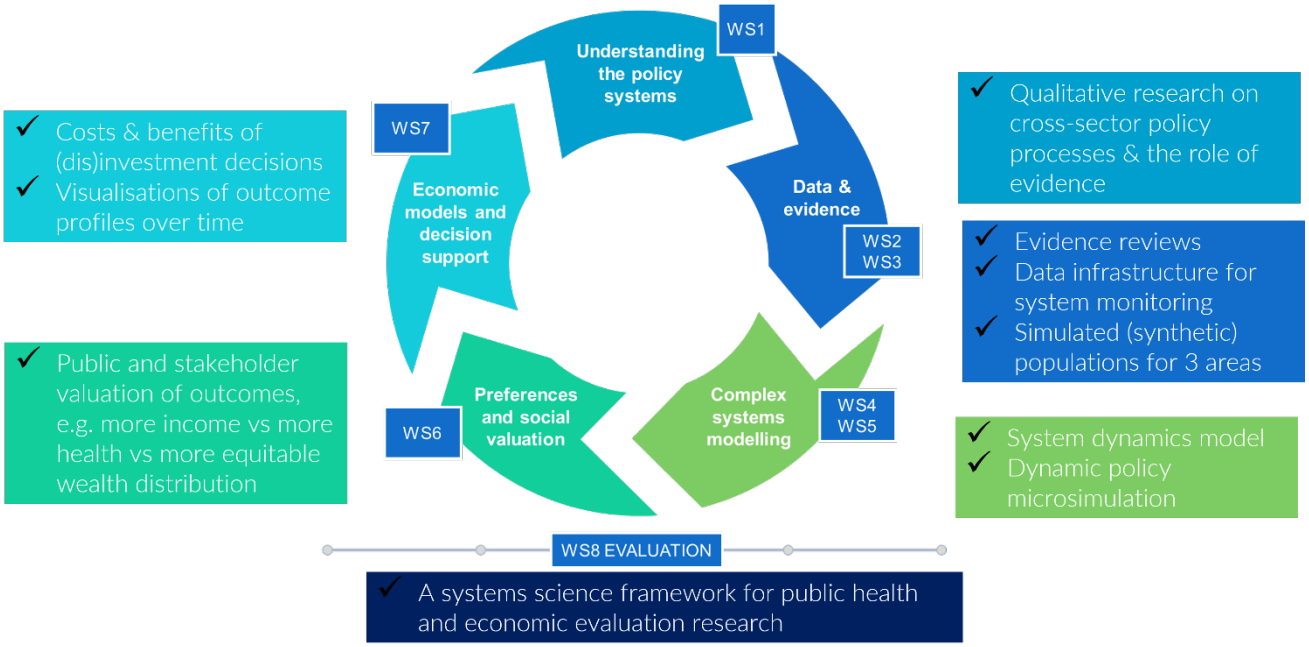

Figure 1: The SIPHER Wheel

Figure 1 shows the range of qualitative and quantitative research, analysis and modelling that the SIPHER consortium are using to explore the complex systems related to health, and how policy changes may shift outcomes for society. The initial topic being considered by SIPHER is 'Inclusive Growth/Economies'. This is focusing on the role of employment, income and good work on health and is therefore very relevant for this evidence paper, and to support decision makers in the choice and prioritisation of interventions for the refreshed GM Local Industrial Strategy.

2. Framing of health and health inequalities in previous GM strategies

2.1 SIPHER policy document analysis

One of the SIPHER workstrands is focused on understanding the policy landscape in which decisions are made and the opportunities to embed systems science approaches into the decision-making process in order to improve health and wellbeing and reduce health inequalities. One ongoing study is reviewing the existing policy documentation for each of the policy partners (including GMCA) to understand their framing of health and health inequalities. Ten Greater Manchester policy documents have been studied including the 2019 GM Local Industrial Strategy (GMCA, 2019b).

Initial findings from this study identified that the 2019 GM Local Industrial Strategy, whilst not targeted specifically at the health of the population, did have a number of references to health and its impact on the prosperity of GM. Assessment of the document identified that:

- Poor health is framed through poor mental and physical health in general terms, the issues affecting the older workforce and ageing population of Greater Manchester (under the national Health Ageing Grand Challenge) and in relation to the impacts of poor air quality, and is looked at from a person-based perspective chiefly in terms of the constraints this presents for the economy, for people to be economically active and in terms of living standards.
- The medical causes of poor health are addressed in terms of the opportunities presented through devolution and health innovation to both improve the effectiveness of the local heath and care system and for Greater Manchester's health innovation ecosystem and assets to facilitate the introduction of new treatments, diagnostics and large-scale clinical trials involving the local population. The basis for these opportunities is the coordination that was made possible through health and social care

devolution, the integrated academic health science ecosystem, the digital care record and the innovation activity coordinated through Health Innovation Manchester (see below). The social and economic factors that can contribute to good health (e.g. financial security, good work, decent housing, safe neighbourhoods) were not covered in detail by the Strategy or in its evidence base, the Independent Prosperity Review, as this was not in their scope.

- Poor health is identified in the Strategy as a drag on productivity, but the actions suggested to improve health are limited to those relating to improving the local health and care system, and by improving Greater Manchester's capacity to adopt new treatments and interventions. The Strategy introduced the Greater Manchester Good Employment Charter, which has a focus on wellbeing in work, and includes Working Well as a flagship programme.
- The logic in the Strategy theorised that the presence of health and social care devolution and associated budgets, medical research institutions and facilities in GM, and the coordinating role of Health Innovation Manchester would create opportunities to trial new medical interventions to both improve the health of GM residents and the effectiveness of the local health and care system. This in turn would reduce health inequalities whilst creating new economic opportunities.
- The SIPHER analysis identified the risk that health innovation on its own may increase health inequalities due to the unequal access to treatment and the time needed for diffusion of innovation. As such, medical interventions should be complemented with wider innovations focused on targeting the social determinants of health for the population as a whole.

The SIPHER analysis commented that the Local Industrial Strategy conveyed a highly medicalised model of health, based on technological, policy, and market-based logic. This logic came from the framework for the strategy that was set by UK Government under the national Industrial Strategy that provided the master framework for the Local Industrial Strategies that followed it. The national framework created a dual logic of 1) capitalising on an area's unique economic strengths (including scientific assets and industrial clusters) and 2) strengthening the foundations of productivity in a place, including by supporting people through the skills and work system (and the GM LIS included the Working Well programmes as one of its key dependencies). The national Industrial Strategy also set a series of 'Grand Challenges' for the UK using the mission-based approach, one of which was healthy ageing.

Figure 2: Overview of the 2019 GM Local Industrial Strategy

Integrating the ‘health innovation’ and ‘people’ elements of the Local Industrial Strategy more closely could potentially create further opportunities for Greater Manchester’s refreshed Local Industrial Strategy to consider additional framings of the interactions between health and the economy, such as social determinants of poor health.

Therefore, there are opportunities to bring economic and health policy closer together via the refreshed strategy by expanding the discussion of health to include the wider societal factors influencing health as they connect to the economy, and in particular addressing the two-way relationship between health and good work.

3. The academic evidence on the linkages between health and employment

3.1 SIPHER Employment and Health Evidence Gap Map

To determine the relationships between employment and health to support the modelling strands of SIPHER, a large academic literature review has been undertaken covering the domains of Employment and Health. This has involved analysis of 239 systematic reviews for UK and international studies. In order to make this resource accessible to other researchers, policy makers and the general public, this analysis has then been converted into an Evidence and Gap Map which is available here:

https://eppi.ioe.ac.uk/cms/Portals/35/Maps/SIPHER_EMPLOYMENT_HEALTH.html

Individual systematic reviews have been coded and aligned to a matrix which has employment 'exposures' on one axis and health outcomes on the other. Exposures include elements such as employment status, type of employer, contract conditions and working environment. Outcomes are categorised under headings of physical health, psychological health, social outcomes and work-related outcomes. These categories can all be broken down into more specific describing factors.

The map indicates where there is evidence by a circle on the map (the size of the circle indicates the number of studies). Where there have been no systematic reviews, there is a gap which indicates a limited review-level evidence base and the potential need for further research.

We have used the evidence and gap map to pull out some overall findings on the two-way relationship between employment and health.

Key reviews identified are summarised below. The first three reviews looked at the impact of poor health on employment status and productivity. The remainder of the reviews summarised below looked at the reverse relationship and the impact of being in or out of work on someone's health.

3.1.1 Relationship between health and employment/productivity

The impact of health on economic and social outcomes in the United Kingdom: A scoping literature review, Gondek et al, December 2018

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0209659

This review looked at the long-term impact of health conditions at different life stages on economic (and social) outcomes. This found that poor mental health at different stages of the life span was consistently associated with poor economic outcomes. The evidence identified that "*those who experienced psychological distress, attention deficits or externalising behaviour problems in their childhood or adolescence may be more susceptible to unemployment, lower earnings or lower occupational class*."

When looking at early and middle adulthood, mental health conditions were shown to be associated with poorer economic outcomes, such as long-term sickness absence, reduced job security and reduced income. Poor physical health was also seen to be associated with poor economic outcomes for this cohort, in particular through the impact of disability due to an accident, musculoskeletal symptoms, and poor vision.

The final life stage considered was the looked at older working age populations and showed that early retirement was associated with poor mental and physical health.

Influence of poor health on exit from paid employment: a systematic review, van Rijn et al, October 2013

https://oem.bmj.com/content/71/4/295

This paper also looks at the impact on poor health into disability pension, unemployment or early retirement, and also shows an association between poor mental and physical health and these outcomes. The study proposed that workplace interventions to promote good health may lead to sustained employment outcomes. Another interesting finding was that, in comparison to other countries, the Scandinavian Welfare regimes have a protective effect and reduce the risk of workers with health problems exiting the labour market.

Relationships between psychological, physical, and behavioural health and work performance: A review and meta-analysis, Ford et al, September 2011

https://www.tandfonline.com/doi/abs/10.1080/02678373.2011.609035

As well as the relationship between health and the incidence of employment, it is important to consider the impact of health issues on productivity at work. This paper reviewed 111 studies and concluded that there was a moderate to strong correlation between mental health (psychological well-being, depression, general anxiety, and life satisfaction) and work performance. Physical health relationships to work performance were much weaker. The review also looked at health behaviours, finding that alcohol consumption and smoking were only weakly associated with work performance, and that sleeping problems were moderately associated.

3.1.2 Impact of precarious employment on health

Differences in the impact of precarious employment on health across population subgroups: a scoping review, Gray et al, December 2020
https://journals.sagepub.com/doi/10.1177/1757913920971333

This review explored the relationships between precarious employment and concluded that for both males and females, precarious employment had negative impacts on mental wellbeing. As there is no consensus on the definition of precarious employment, they explored studies that had looked at factors such as contract length; workplace rights and bargaining; and low wages. Continued exposure to precarious employment appeared to be more detrimental to male workers than female workers, and there was also a link identified between male precarious employment and premature mortality.

The review also looked at whether there was evidence on the differential impact of precarious employment on young workers or migrant workers – both cohorts which have a higher prevalence of being in precarious work.

How unemployment and precarious employment affect the health of young people: A scoping study on social determinants, Vancea and Utzet, November 2016

https://journals.sagepub.com/doi/10.1177/1403494816679555

This study considered research that had focused on young people and the impact of unemployment and precarious employment. As with the previous review, associations were found with mental health conditions. They also categorised each individual research study they considered by the causal explanation explored. Most studies focused on the lack of economic and social benefits resulting in poorer health. Other causal hypotheses included the life course approach - the need for educational and economic incentives in the transition to adulthood, and the male breadwinner model which refers to the need for men to earn an income and provide for their family.

Flexible working conditions and their effects on employee health and wellbeing, Joyce et al, February 2010

https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD008009.pub2/full

This review did find some positive benefits on health of flexible working, where the employees were in control of the flexible arrangements, rather than the employer.

Review of 30 Years of Longitudinal Studies on the Association Between Job Insecurity and Health and Well-Being: Is There Causal Evidence?, De Witte et al, February 2016

https://www.researchgate.net/publication/291388897_Review_of_30_Years_of_Longitudinal_Studies_on_the_Association_Between_Job_Insecurity_and_Health_and_Well-Being_Is_There_Causal_Evidence

The final review of job insecurity discussed here found similar associations with poor health (in particular mental health). The review also investigated whether the individual studies had considered the casual relationship direction of the association. Most of the studies had focused on the relationship between working conditions and

health, but 10 studies also considered the possibility that job insecurity was caused by poor health. 7 out of 10 studies ruled out this reverse causation, but the other 3 studies did identify some relationship between poor health and job insecurity, especially as part of a loss cycle – e.g. job insecurity leading to exhaustion, which in turn leads to greater job insecurity.

3.1.3 Impact of returning to work on health

Association of Returning to Work With Better Health in Working-Aged Adults: A Systematic Review, Rueda et al, February 2012
https://ajph.aphapublications.org/doi/10.2105/AJPH.2011.300401

This review looked at studies that considered the association between returning to work from unemployment and the impact on health. The conclusions were that return to work does have a positive association with better health outcomes, either through improved health on return to the workforce, or through avoidance of further deterioration in health of the employed versus those who remained unemployed.

The review did also look at the direction of causation and concluded that whilst a reinforcing relationship between work and health exists, the impact of returning to work on health is greater than the association between improved health and return to work.

3.1.4 Impact on health of employment for older workers

Is working in later life good for your health? A systematic review of health outcomes resulting from extended working lives, Baxter et al, July 2021
https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-11423-2

The final two systematic reviews included here relate to the impact of working in later life on health and vice versa. This review concludes that continuing working over the age of 64 is associated with positive or neutral impacts on physical health (less so

for mental health) especially where the worker has some control their working situation, e.g. working part time. However, for the subset of workers who are in poorly paid work and have a financial need to extend their working lives, the impacts may be negative. This leads to concerns that extended working lives may exacerbate health inequalities.

Extending Working Lives: A Systematic Review of Healthy Working Life Expectancy at Age 50, Parker et al, February 2020

https://link.springer.com/article/10.1007/s11205-020-02302-1

This study considers whether it is possible to extend average working lives of the population, or whether this is constrained by health issues. By looking at average working patterns after age 50, it was identified that the average number of yearsspent in both work and good health for over 50s was less than 10 for all except one population cohort (Finnish male executives). This suggests that relying on increased economic output (and tax revenues) through extending the working lifetime may be constrained by the health of the workforce.

3.2. Evidence from employment support programmes delivered in Greater Manchester

3.2.1 Work and Health programme

Rates of unemployment have long been a problem in Greater Manchester. In response, since 2014 several services have been commissioned to support people that are experiencing, or are at risk of, long-term unemployment. This has included the Working Well (Work and Health Programme) launched in 2018. The programme offers over 200 different health interventions through a keyworker-based delivery model.

The Working Well (Work and Health Programme) annual report (SQW, 2021), produced by the consultancy SQW, found that "the proportion of clients reporting specific health conditions (regardless of whether they see them as a barrier to work) has remained similar, with 55% of clients pre-pandemic and 53% post the start of the

pandemic reporting at least one". However, the report goes on to note that whilst the percentage of participants reporting health conditions remains similar, the severity of health conditions has worsened: "*the pandemic has exacerbated existing conditions for some and led to new conditions presenting for others. Mental health issues and anxiety have arisen through stress and social isolation resulting from the pandemic, physical health issues worsened from limited physical activity, and clients suffering from COVID-19 and long COVID*" (SQW, 2021). It is also reported that participants' access to healthcare services had been inhibited by the pandemic, due to factors such as the closure of services and increased waiting lists. As a result, the health conditions which act as barriers to participants' entering / remaining in employment are noted in the annual report as having worsened.

SQW's analysis of programme data finds that "*with each additional health condition the probability [that the] client has started a job falls by 1.31 percentage points*" (SQW, 2021). However, the analysis found that the variables "*that have the largest magnitude of effect [on the likelihood of a client starting a job] are length of unemployment, confidence in starting work, engagement with the programme, age, and timing in relation to COVID*" (SQW, 2021).

3.2.2 Working Well Early help

Working Well (Early Help), launched in Greater Manchester in 2019, aims to support and advise people (with health conditions or disabilities) who are at risk of falling out of work or are newly unemployed due to their health complications and / or disabilities. An annual report of the programme, conducted by the Centre for Regional Economic and Social Research at Sheffield Hallam University (CRESR, 2021) found that "*mental ill health is the most common health issue among participants, with 57 per cent of participants reporting a mental health problem as their primary health condition. 'Health management' was also by far the most common barrier to work reported*". 21 per cent of participants that were in work reported depression and low mood as their primary health problem, followed by anxiety (19 per cent). For those participants not in work, "*anxiety disorders were the primary health problem for 25 per cent of participants. Depression or low mood was a barrier for a further 24 per cent.*". Back problems were the third most common health problem amongst those both in work and not in work. Given that the

programme targets those with health conditions, it is expected that physical and mental health issues will be a key barrier to participants' employment.

Noting the two-way relationship between health and employment, findings from the report authors' qualitative research show that "*it is not the health condition alone but the interaction of workplace experiences and health that shapes decisions to take medical leave or leave work altogether*". In-work issues such as overwork, bullying / harassment, working conditions, job insecurity, and poor management were all cited as being contributory factors in participants taking medical leave and / or leaving employment.

3.3 Other ongoing research into the relationships between health and work

The understanding of the relationships between health and work are currently being studied further by a number of academics and think tanks.

Institute of Health Equity and Legal & General

A new partnership between the Institute of Health Equity at University College London, and Legal & General is examining how businesses can help to reduce health inequalities.

Their initial report explores how businesses can reduce improve health through creating good quality work, supporting the health of clients and customers, and influencing the wider community.

https://www.instituteofhealthequity.org/resources-reports/the-business-of-health-equity-the-marmot-review-for-industry/read-report.pdf

Mental Health Foundation

Recent research with the London School of Economics has looked at quantifying the economic impacts of poor mental health. In total the impact was estimated at £117.9bn per year for the UK. Of this, £36.2bn was related to productivity losses due to poor mental health.

https://www.mentalhealth.org.uk/explore-mental-health/publications/economic-case-investing-prevention-mental-health-conditions-UK

Future of Work partnership

This new partnership between the University of Cambridge and KPMG will start by looking at the relationships between work and wellbeing. They aim to "*show how evidence-based support can positively affect individual mental wellbeing, enhance workplace productivity and promote a healthy workforce for the future*."

https://www.cam.ac.uk/stories/future-of-work

Tackling poverty: how can collaboration and data help drive success?

This collaboration between the King's Fund and the Centre for Progressive Policy is looking to use data to inform policy related to poverty and health. In particular they propose to undertake work which "*will be both qualitative and quantitative to develop practical insight to help local places and systems more effectively mitigate, reduce and prevent poverty's impact on population health*"

https://www.kingsfund.org.uk/projects/tackling-poverty-collaboration-data-drive-success

3.4 Summary of the evidence base

There is a large evidence base on the links between health, employment, productivity and the resultant prosperity of individuals and society. In general, the evidence points to a virtuous relationship where good work provides both meaning and income for individuals. This in turn maintains good health and avoids the wider impacts of poverty. This then enables individuals to remain in work later in life, and be more productive in work providing a greater economic and social benefit to society.

However, the reverse is also possible. Poor health at all stages of life if not treated quickly leads to exit from the labour market or transition into poor work, resulting in

lower incomes, poverty and further deterioration in health. In turn this is a drag on both the social and economic outcomes of a place such as Greater Manchester.

4. Trade-offs between health, employment and wellbeing

4.1 Wellbeing measures for economic evaluation

Another workstream from the SIPHER consortium, which is relevant to this topic, grapples with how we can value and trade-off between improvements on a number of wellbeing domains, including disposable household income, physical and mental health, and employment, when it is not possible to improve everything at the same time.

The research has developed a suite of wellbeing indicators known as the SIPHER-7:

Table 1: SIPHER-7 wellbeing indicators

Domain	Indicator	Response categories
Income	Disposable[§] income of your household is …	Median values of deciles of household disposable income after housing costs.
Employment	Your employment situation is….	FT employment[‡]; PT employment; FT education / training / apprenticeship; PT education / training / apprenticeship; volunteering; informal caregiving; home making; job seeking; retired; long term sick or disabled; other
Effects of physical health	You accomplish less because of your physical health …	

Effects of mental health	You accomplish less because of your emotional problems …	None of the time / a little of the time / some of the time / most of the time / all the time
Neighbourhood safety	You are concerned about the safety of the neighbourhood you live in …	Hardly ever / some of the time / often
Housing	Your home is in a reasonable state of repair, has reasonable facilities (cooking/washing) and provides reasonable warmth …	Yes to all of these / yes to some of these / none of these
Social isolation	You feel isolated from others …	Hardly ever / some of the time / often

§ Monthly (or weekly) income after tax, national insurance, any occupational pension contributions, and after deducting your rent, mortgage payments or other housing costs.

ǂ Employment includes self-employment. Employment includes being on maternity / parental / sick / furlough leave.

Thus, SIPHER-7 has seven indicators of wellbeing, of which Neighbourhood safety, Housing, and Social isolation have three response categories each; Effects of physical health and Effects of mental health have five categories each; Employment has 11 categories; and Income is continuous. To illustrate, leaving the Income indicator aside (since it is a continuous variable), the remaining six indicators would allow 7,425 different combinations, or profiles, to classify individuals into.

4.2 Valuation of Wellbeing and trade-offs between the SIPHER-7 Wellbeing measures

Discrete choice experiments have been undertaken with a large sample of individuals over the last two years to elicit their personal preferences in respect of the SIPHER-7 indicators and to provide insight into the views of members of the public. The surveys gave research participants scenarios where they were asked to imagine they faced different combinations of better and worse wellbeing across the SIPHER-7 indicators. They were asked to choose which situation they would choose for their own lives. This then allows all 7425 different combinations of the SIPHER-7 domains to be compared and converted into a monetary metric – known as an equivalent income (Tsuchiya, 2022 and Fleurbaey, 2005).

This analysis gives insight into the relationship between working, income and physical and mental health. As examples:

- Moving from job seeking to working may lead to additional health demands on individuals such as stress or exhaustion due to difficult work or long working hours. However, as outlined in section 4 above, it is generally considered that being in work provides better overall wellbeing for individuals than not being employed. This is supported by the SIPHER-7 analysis which shows that if an average person with no current mental health and physical health problems moves from ‘Not working’ or ‘Job seeking’ to ‘Full time working’ – their overall wellbeing will improve unless the job means that their health deteriorates to the level of “Most of the time accomplishing less due to” physical or mental health.

  However, the inverse is also true: if someone’s job is the main cause of them having poor physical and mental health that impacts their accomplishments most of the time – they may be better off not working.

- The difference in average preferences between being in Part-time work and Full-time work, other things being the same, is very slight and not statistically significant.

- A deterioration in health can be compensated by an increased income, but the necessary increase is large. As an example, moving from the best to the

worst state in physical and mental health, would need compensating by roughly a doubling of disposable household income. So, from a wellbeing perspective, moving from a comfortable to a stressful job may only be worth it if the increase in pay is substantial.

5. Overview of health inequalities in GM

Before the next section of the report, that models the geographic distribution of poor health and economic outcomes (developed through the SIPHER project), it is useful to set out what we know about existing health inequalities in GM as a whole and the 10 individual Local Authorities and how that has been affected by COVID-19.

5.1 Healthy Life Expectancy in Greater Manchester

Since the publication of the Independent Prosperity Review and the Local Industrial Strategy in 2019, new data on Healthy Life Expectancy (HLE) in Greater Manchester has been released by the Office for National Statistics. Analysis of Life Expectancy and Healthy Life Expectancy data (covering 2018-20, and published in 2022), completed by the Greater Manchester Combined Authority / Greater Manchester Health and Social Care Partnership, found two distinct phases: a slow steady increase in the years up to the start of the COVID-19 pandemic followed by a relatively sharp decline due to the increase in mortality related to the disease.

5.1.1 Period up until 2019:

- Life expectancy at birth in Greater Manchester for the period 2017-19 is the highest ever observed for both sexes; **78.07 years** for males and **81.66 years** for females.
- Improvements in life expectancy for both males and females in Greater Manchester happened at a faster rate of change than occurred at a national level.
- The gap between male and female life expectancy in Greater Manchester narrowed to a difference of **3.58 years**.

- However, considerable inequality in outcomes remained across Greater Manchester; a male born in Manchester could expect to live an average of **3.92 years** less than a male born in Trafford, for females the gap across Greater Manchester areas was **3.36 years**.
- Healthy Life Expectancy at birth for males in Greater Manchester improved relatively rapidly to **61.68 years**, surpassing the female HLE figure, but still remaining below the national average. For females HLE was **60.83** years, **2.47** years below the national average.

5.1.2 Impact of devolution:

A study undertaken by the University of Manchester (Britteon et al, 2022) and recently published in the Lancet, assessed the impact of the devolution of health and social care powers to Greater Manchester between 2014 and 2019.

The study found in comparison to areas elsewhere in England with similar pre-devolution trends, following devolution, life expectancy in Greater Manchester was 0·196 years (95% CI: 0·182 to 0·210) higher than expected.

These figures may seem modest for an individual but are significant when considered for the population as a whole. Another way of looking at the increase is that it was 2.2 times greater than the average change in the rest of the country.

Encouragingly, these gains also seem to have reduced health inequalities to a certain extent, with gains larger for males, and larger in areas with high income deprivation and lower life expectancy prior to devolution.

The analysis was unable to determine the exact mechanism of the increase, but the authors suggest they might be due to "*coordinated devolution across sectors, affecting wider determinants of health and the organisation of care services*."

5.1.3 Period from 2019-2020:

- Following these sustained years of increases, the COVID-19 pandemic, which started in early 2020, significantly raised mortality levels across the globe with

the resultant decreases in life expectancy and healthy life expectancy. The latest data spans 2018-2020 and so includes the first year of the COVID-19 pandemic. Life expectancy at birth reduced to **81.31 years** for females and **77.54 years** for males. In the previous release of this data (2017-19), life expectancy was **81.66 years** for females and **78.07 years** for males.

- The decrease in life expectancy and healthy life expectancy for both males and females in Greater Manchester was larger than the decrease found at the national level.
- A large factor in these figures was the bigger impact of COVID-19 pandemic in GM than in some other areas of the country. COVID-19 infection rates have been higher during the pandemic in all local authorities in Greater Manchester and the North West than in England as a whole (Institute of Health Equity, 2021).
- The gap between male and female life expectancy in Greater Manchester increased to a difference of **3.77 years** from **3.59 years** in the previous release.
- Healthy life expectancy at birth for males in Greater Manchester decreased to **61.39 years** from **61.68 years**. For females there was a slight improvement in healthy life expectancy from **60.83 years** to **60.87 years**.
- Considerable inequality in outcomes persist across Greater Manchester; a male born in Manchester can expect to live an average of **3.9 years** less than a male born in Trafford.
- Healthy life expectancy is of particular importance to the overall productivity of the population, due to the impacts on the working age population. For this measure the inequality is even greater with up to almost 10 years difference between individual local authorities. Healthy life expectancy for males in Oldham is just **56.63 years:** 10 years less than the State Pension age.

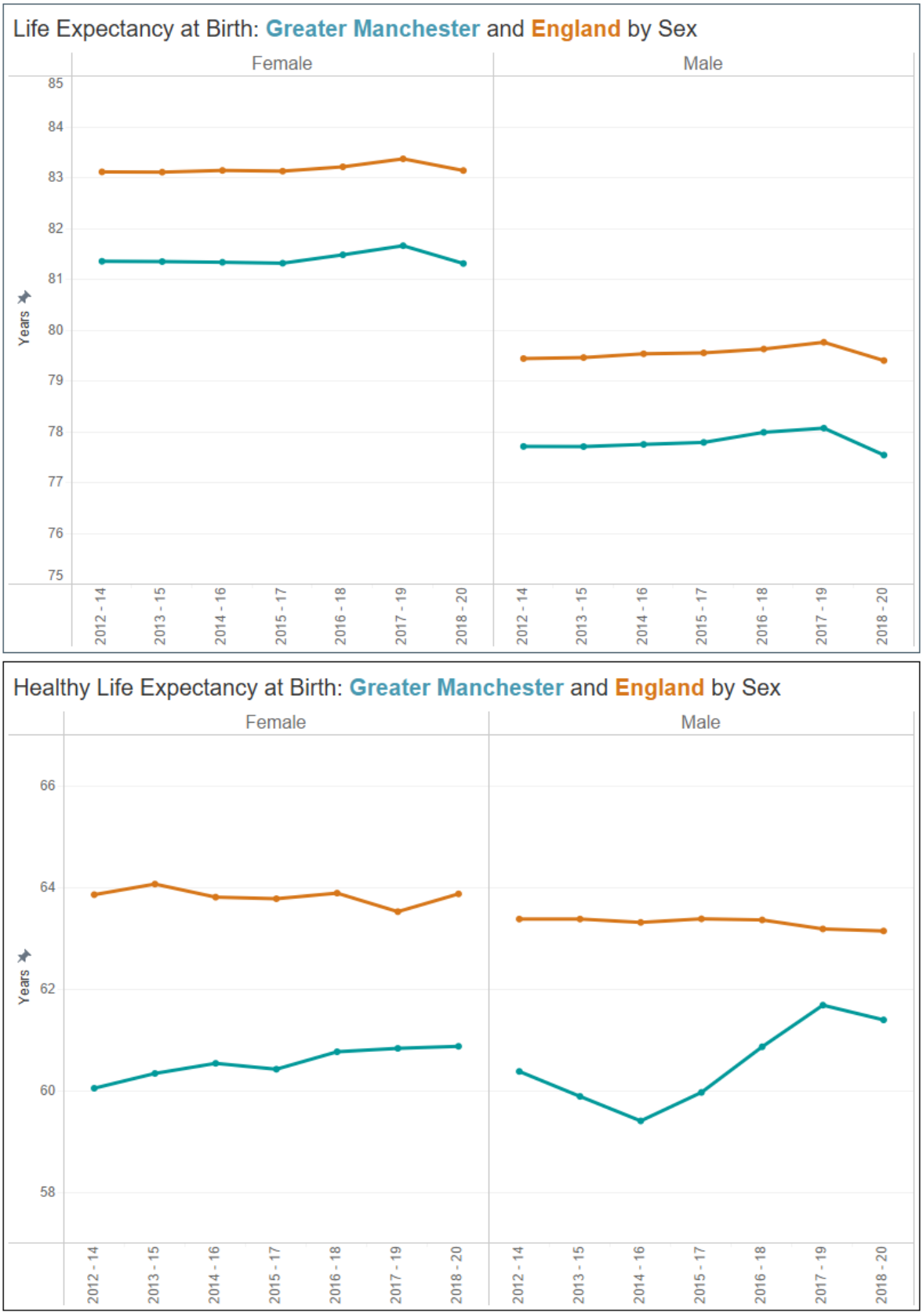

Figure 3: GM Life expectancy and Healthy Life Expectancy over time

Figure 4: Life Expectancy and Healthy Life Expectancy for GM Local Authorities: 2018-2020

5.2 Covid-19 and health inequalities in Greater Manchester

Covid-19 infection rates have been higher during the pandemic in all local authorities in Greater Manchester and the North West than in England as a whole. As noted in the 'Build Back Fairer in Greater Manchester' report, the Covid-19 mortality rate in Greater Manchester has been higher than the average in England: "*The Covid-19 mortality rate between March 2020 and April 2021 in Greater Manchester was 307.1 per 100,000 population for men and 195.2 for women compared with England averages of 233.1 per 100,000 for men and 142.0 for women*" (Institute of Health Equity, 2021). Covid-19 mortality is associated with deprivation: mortality ratios: "*Mortality ratios in Greater Manchester were equally high in the three most deprived deciles and then decreased as the level of deprivation decreases*". The Institute for Health Equity conclude that high Covid-19 mortality rates in Greater Manchester relate to its socio-demographic characteristics, previous health status, living and working conditions and occupations, ethnicity, levels of deprivation and physical interconnectedness.

People working in certain occupations, and in particular conditions, have experienced greater risk of contracting and dying from Covid-19. Nationally, people working in occupations requiring higher qualifications reported to be working from home compared with those in elementary and manual occupations. Those working as managers, directors, and senior officials were much more likely to be able to work from home, "*leading to clear socioeconomic inequalities in risk of exposure and mortality from Covid-19*". Within Greater Manchester, "*the overwhelming majority of those who are managers, directors and senior officials are White*". The percentages of these employee groups that are White in Greater Manchester range from 73% in Manchester to over 95% in Stockport (ONS Annual Population Survey).

People working in different sectors have been differently impacted by Covid-19 containment measures, including the requirement to self-isolate upon receiving a positive test result. As reported in the 'Build Back Fairer in Greater Manchester' (Institute of Health Equity, 2021) report, "*For those on zero-hour contracts, self-employed or on low pay, taking 10 days off to self-isolate is difficult or impossible and self-reported ability to self-isolate or quarantine is three times lower for those*

with incomes less than £20,000 or savings less than £100". It is possible that these measures may have deterred some workers (i.e. those on zero-hour contracts, self-employed or low pay) from testing for Covid-19 and therefore increased risk of exposure to Covid-19 amongst colleagues and members of their households; therefore contributing to higher rates of Covid-19 amongst particular demographic groups and in particular geographies. For those that participated in testing regimes and complied with self-isolation when required to, the economic impact of loss of earnings may have had adverse impacts on people's health, particularly on mental health due to increased stress and anxiety.

The 'Build Back Fairer in Greater Manchester' (Institute of Health Equity, 2021) report notes that "*Being in good work is usually protective of health, while poor quality work, stressful jobs, and unemployment, particularly long-term unemployment, contribute significantly to poor health, low wellbeing and increase the risk of mortality*". The Institute for Health Equity recommended that Greater Manchester needs to ensure all jobs are of good quality as part of efforts to increase employment are introduced after the pandemic.

6. Granular distribution of poor health across GM and the link to employment

6.1 SIPHER Synthetic Population

One of the products produced by the SIPHER consortium is a synthetic population for GM. This population is a 'digital twin' of individuals with attributes very similar to the actual population of Greater Manchester, that can then be used for analysis, simulation and decision making. The synthetic population is built from existing data sets such as the Census and surveys such as Understanding Society. Whilst the UK Census covers the whole population, surveys are typically only available for a representative sample of a few thousand or tens of thousands of people rather than all 66 million people so a method called spatial microsimulation is used to estimate what these characteristics should look like for the whole population in an area.

One of the uses of the synthetic population is to get a much more granular detail of key outcomes than are generally available. For this report it has been used to produce maps and stats to better understand the spatial variation in health and economic outcomes across GM and explore these relationships. In particular this enables focus on areas much smaller geographies than Local Authorities, for example Neighbourhoods of 30-50,000 population, or Middle Super Output Areas (MSOAs).

The following maps show the pre-pandemic distribution of employment, long term disability, physical health issues and mental health issues at a neighbourhood level.

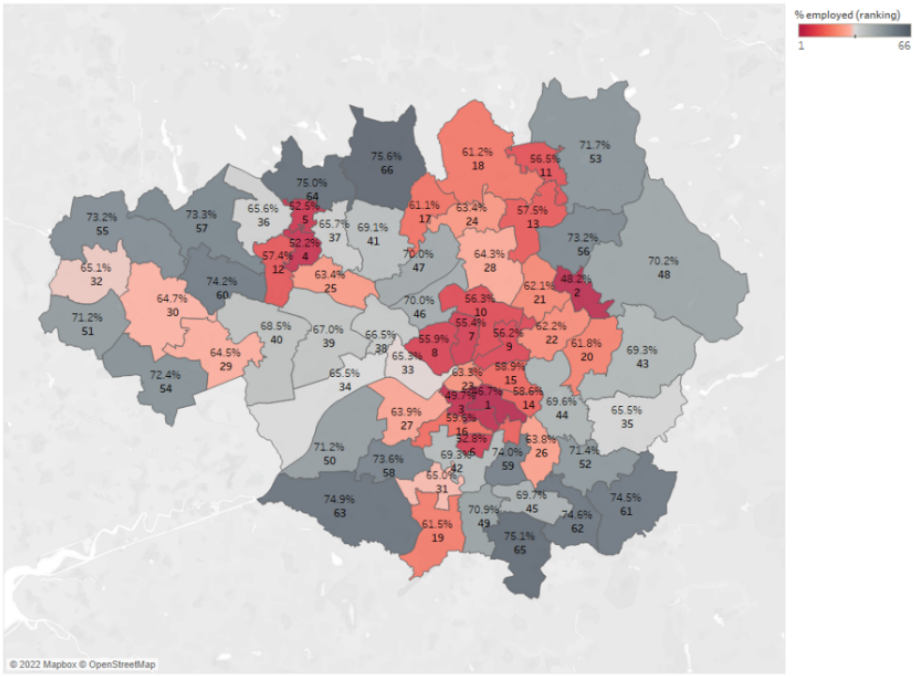

Figure 5: % of working age population employed

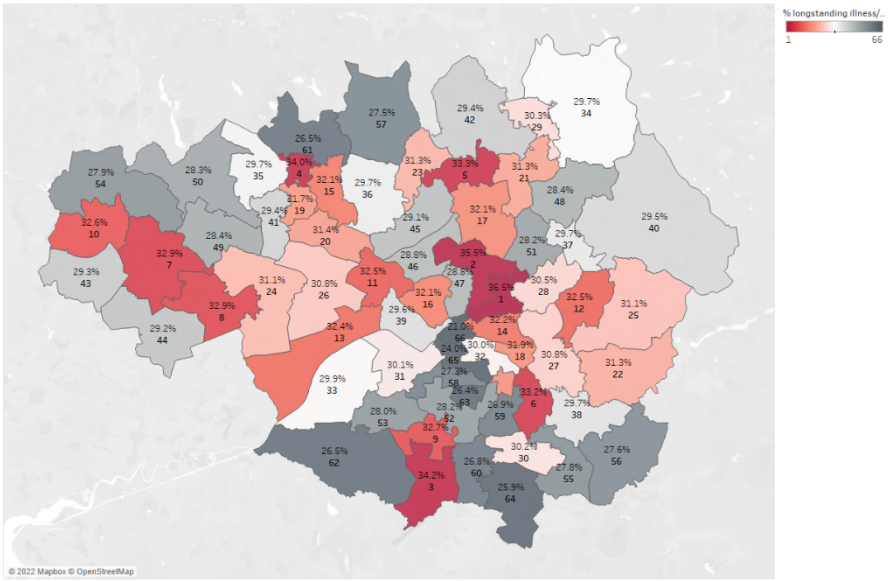

Figure 6: % of population with longstanding illness or disability

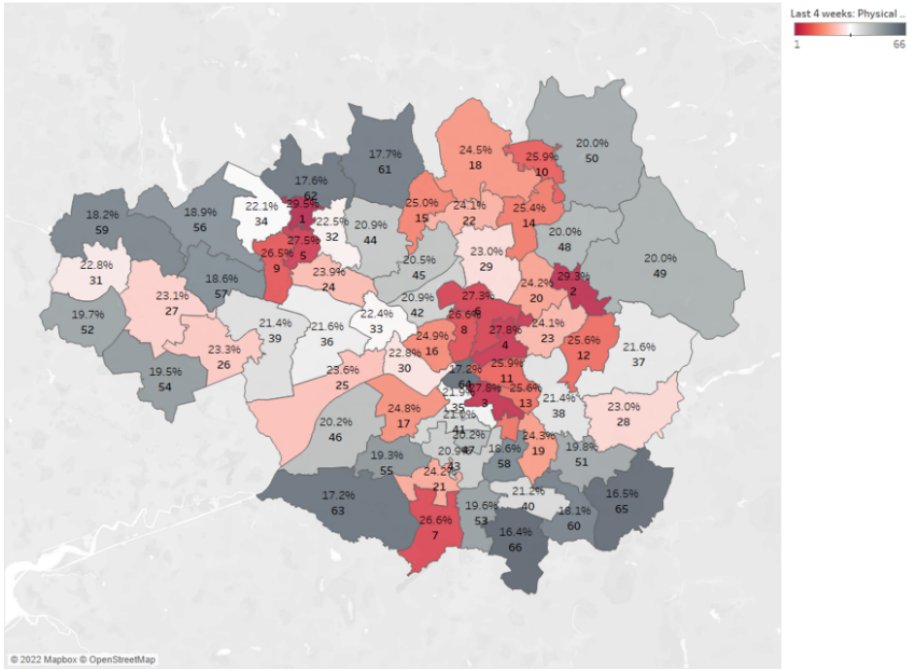

Figure 7: % of working age population with recent physical health issues

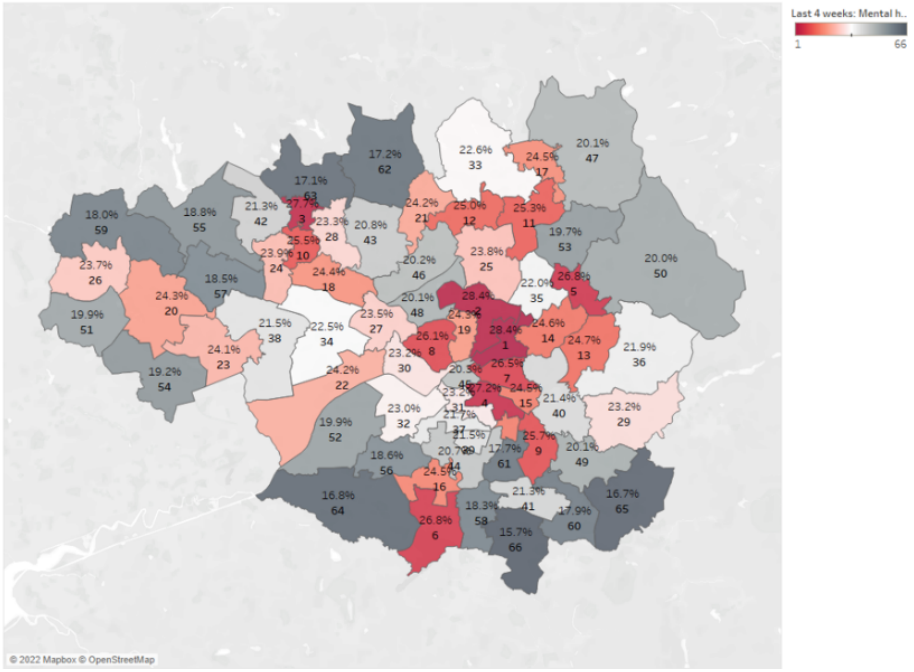

Figure 8: % of working age population with recent mental health issues

The maps indicate areas of Greater Manchester where poor outcomes exist and cluster and therefore could be suitable for focused intervention. The geographies chosen are the 66 GM neighbourhoods, which have been defined as service delivery 'footprints' by each of the 10 GM Local Authorities. In general, they have between 30,000 to 50,000 population. The synthetic population can also be used to explore the data at smaller geographies, for example Middle Super Output Areas (MSOAs) which have an average population of 7200.

As expected, the data sets map closely to deprivation with poorer health and lower employment rates found in deprived areas (as measured by the Indices of Deprivation). However, there are exceptions to the general trend that can be explored. For example, Wythenshawe in South Manchester has a higher employment rate than would be anticipated based on deprivation alone, and areas of Wigan have higher levels of the population reporting longstanding illness or disability than would be expected.

The analysis confirms the correlations between poor physical and mental health and employment discussed in the previous section of this report. Areas where a greater proportion of residents report recent poor mental or physical health also have lower employment levels, as can be seen from the following plots showing correlations at MSOA level between the indicators.

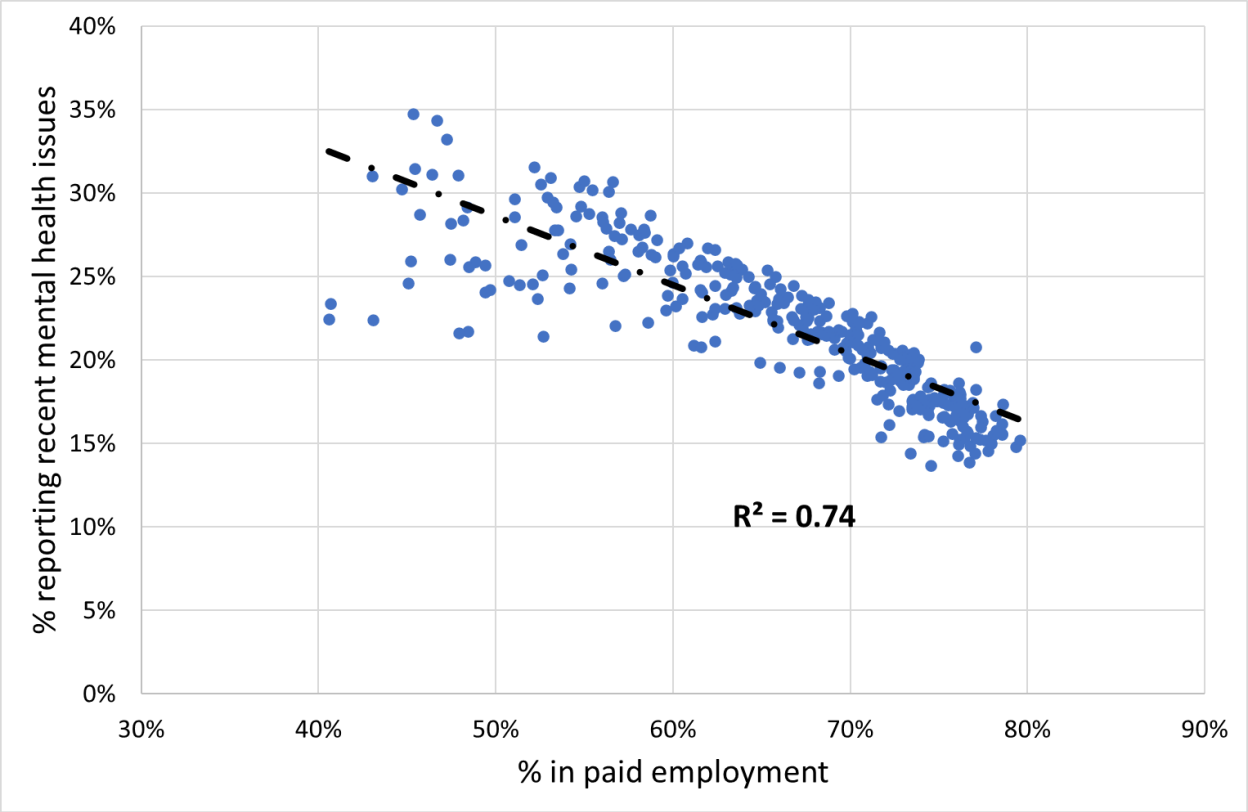

Figure 9: Relationship between mental health and employment for GM MSOAs

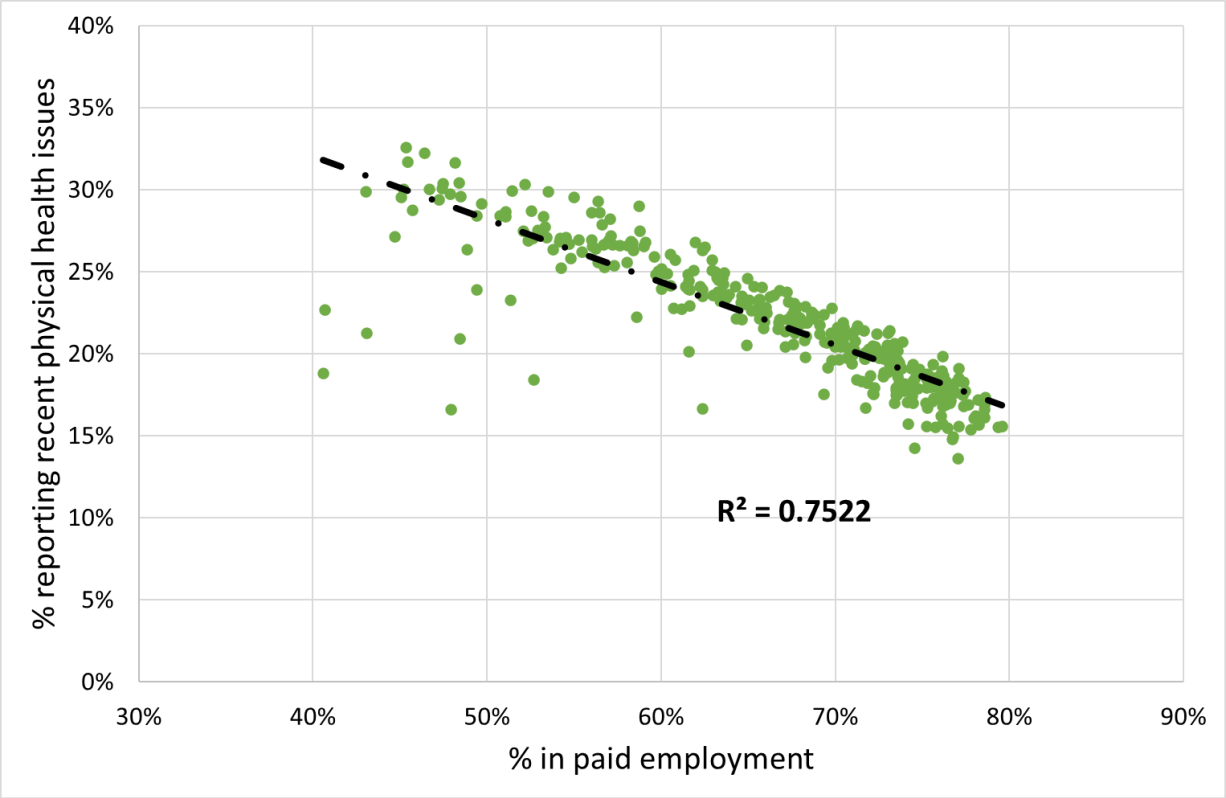

Figure 10: Relationship between physical health and employment for GM MSOAs

Interestingly, the correlation is much less strong between those areas with high levels of self reported longstanding illness or disability and employment rates. Further analysis is needed to fully understand this.

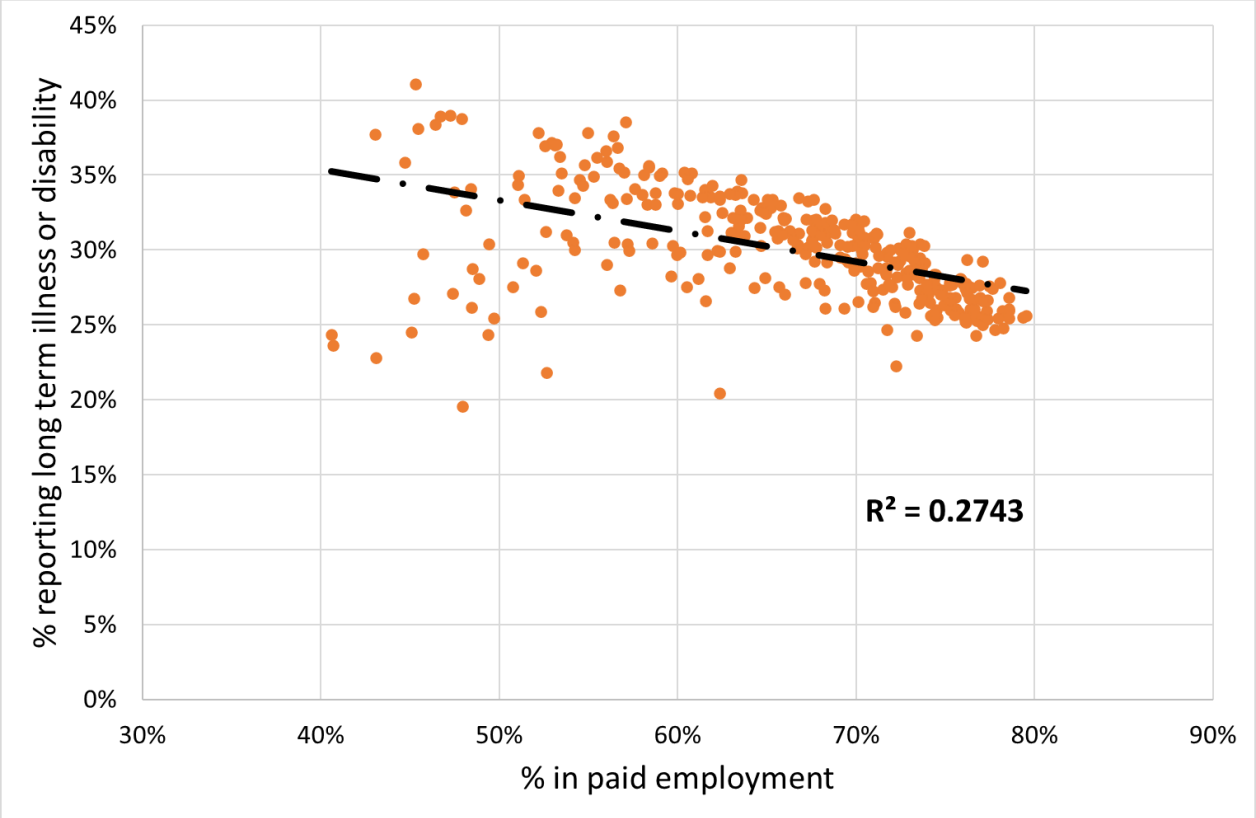

Figure 11: Relationship between longstanding illness or disability and employment for GM MSOAs

7. Future opportunities from the SIPHER consortium

A number of research outputs from the SIPHER consortium project have been used in the previous sections of this report. There are also many future opportunities to use the tools and modelling being created through SIPHER to support decision makers to optimise investment in activity that will both increase economic impact and health.

7.1 SIPHER Synthetic population

Some early outputs from the SIPHER synthetic population are included in section 6 above. Additional metrics are currently being added to the population to make it more comprehensive. The fully developed synthetic population will include wider inclusive economy indicators, and additional health indicators. These health indicators include QALE (Quality Adjusted Life Expectancy) which gives an overview view of health across the whole life course, and complements other metrics such as life expectancy and healthy life expectancy explored in Section 5 above.

These additions will allow greater insight from the tool to further target investment. The population will also be updated when the full results of the 2021 Census are released improving the recency of the data set.

Further work planned with the population includes looking at demographic cuts of the data to understand the distribution of outcomes for individual cohorts. This will include ethnicity, gender and age.

7.2 Dynamic modelling

Building on the static picture provided by the synthetic population, a number of workstrands within SIPHER are exploring the dynamics of the inclusive economy complex system in order to help simulate the impact over time of specific interventions, or general shifts in society.

This modelling builds on systems maps and causal loop diagrams that have been created for the project. The dynamics between different outcomes and the feedback

loops within the maps are then estimated by analysing historic change in the indicators over time.

This dynamic view of the population should enable decision makers to better understand the impact of an intervention or suite of interventions, including the length of time that would be expected for that change to occur.

7.3 Decision Support tools

Bringing all the different elements of SIPHER together, one workstrand is creating a Decision Support tool to enable policy makers to test out potential interventions, and to optimise investment. This will allow users to determine a potential set of interventions, the desired objectives (e.g. maximising overall increases in wellbeing or reducing inequalities) and limits or constraints (e.g. costs). The tool then uses a machine learning algorithm to explore all potential sets of interventions and suggest the optimum approach.

7.4 Future topic areas

Following on from the inclusive economy topic area, SIPHER will be considering two additional topics: housing, and mental health. Whilst not as directly relevant to the refreshed Local Industrial Strategy and the inclusive economy, we expect these findings to be able to complement the insight and further support decision making on interventions to strengthen GM's economy and increase prosperity of the city region.

8. Summary and Recommendations

8.1 Evidence summary

This report has brought together the evidence on the relationships between health, health inequalities, employment, and productivity both from the general literature and from Greater Manchester specific data and initiatives.

The previous Prosperity Review (GMCA, 2019a) and the 2019 Local Industrial Strategy (GMCA, 2019b) that responded to the Review did consider the importance of health in the economic fortunes of Greater Manchester. However, GM now has a greater evidence base to draw upon, including the Marmot Build Back Fairer Report (Institute for Health Equity, 2021) and specific projects such as the SIPHER consortium, to help understand better the relationships between health and work, and to consider what initiatives should be taken forward.

In particular, the evidence base suggests that GM complements the work being done through health innovation initiatives with a broader approach to tackling the social determinants of poor health (especially mental health). This should allow the city region to make faster progress with reducing its deficit in terms of productivity with the rest of the country.

Part of this underperformance in productivity is a result of Greater Manchester having significantly poorer health than the country as a whole, – with Life Expectancy in GM almost two years less than the England average. Inequalities within GM are also very large: in some areas Healthy Life Expectancy is almost 10 years less than the State Pension Age.

Due to the cyclical nature of the relationship between health and work, increasing the numbers of residents in good work in Greater Manchester will have a positive effect on their mental and physical health, helping reinforce the productivity and prosperity gains GM should achieve.

The evidence base suggests a number of recommendations for action and inclusion in the refreshed Local Industrial Strategy:

8.2 Mental health improvement

Whilst both poor physical health and mental health are associated with poor economic outcomes, the academic evidence base suggests that mental health plays the larger role, and it is an important factor through the entire life course.

Mental health historically has not been treated with the same attention as physical health in society at large, and funding for mental health services has historically been more constrained than for physical health services. Addressing this imbalance will not only lead to greater mental health and wellbeing of the population, but will also support Greater Manchester's economic ambitions.

Over the last five years through GM's health and social care devolution, a greater focus was put on mental health, and there is an opportunity to strengthen this further though the new GM Integrated Care System. Examples of existing innovative initiatives ongoing in Greater Manchester to support residents that could be expanded include:

- the **#Beewell programme** which explored young people's attitudes to Wellbeing and is involving young people in designing programmes of activities to support their mental health and wellbeing
- A **digital mental health platform** for all residents over 10 across Greater Manchester providing access to a free, confidential and safe digital mental health service 24 hours a day, seven days a week
- The **Live Well** social prescribing initiative, which is building on local social prescribing schemes and wider community and voluntary sector provision to build a structured and consistent offer for all residents of Greater Manchester.

Ensuring that these programmes continue to be funded and where possible expand will help strengthen GM's mental health support, and support greater economic engagement of all GM residents.

8.3 Employment support programmes

Greater Manchester has been at the forefront of recognising that Employment programmes need to have adequate health provision included to enable residents to access jobs. Examples of these programmes include:

- the **Working Well pilot** which was established in 2014 and supported people who weren't successful through the National Work Programme and hadn't been in work for 2 years. This provided wrap around support including for mental and physical health. The success of this programme led through a devolution agreement to the **GM Work and Health Programme** which will have supported almost 23,000 people by the time it has finished in 2024. This provides tailored and integrated health support for participants to support their journey into work.
- the **Working Well Early Help (WWEH) programme** which has just completed and supported people who were on long term sickness absence from work, or who had recently become unemployed and had health needs. The evaluation of this project found that whilst there were some challenges in delivering the programme including the COVID-19 pandemic, the biopsychosocial model underpinning WWEH demonstrated the value of addressing health and wellbeing issues as the precursor to a return to work.
- the **Specialist Employment Service** which provides employment support for residents with learning disabilities, autism or severe mental illness. A key element of the programme is engagement with employers to make jobs possible for this cohort.

Learning from these projects indicates the value of health in employment support programmes which should be considered in future commissioning of employment support.

8.4 Good work

The evidence shows that not only is increasing overall employment rates important for improving the health of the population, but the quality of the employment matters.

Good work includes not only fair pay, but also security in work, engagement of the workforce, and the opportunities for flexibility to match the needs of the employees.

Initiatives underway in Greater Manchester include:

- the **Greater Manchester Employment Charter** which has over 400 private, public and third sector businesses signed up as supporters. The charter sets out standards for good work in seven domains: secure work; flexible work; pay; engagement & voice; recruitment; people management; and health & wellbeing. The charter programme also provides guidance for employers – including a Mental health toolkit for employers (GMHSCP, 2021).
- A goal of Greater Manchester becoming a **Real Living Wage City Region,** with all employers paying a living wage.

A continued focus on good work through these and other initiatives will help to ensure that employment is a positive influence on the health of GM's residents.

8.5 Health Innovation

The operating model coordinated by Health Innovation Manchester provides a route to supporting health and care services and residents to recover from the pandemic, by using a population health management approach. Example projects since the publication of the 2019 Local Industrial Strategy include:

- **Asthma pathway transformation:** Health Innovation Manchester is collaborating with industry and pharmaceutical partners to deliver a project to improve the diagnosis and management of adult asthma patients across Greater Manchester, through proactive identification and reviews with high-risk patients to help optimise their asthma management.

  The project is initially taking place in 30 GP Practices in five localities in Greater Manchester during 2022, which focusses on optimising high quality, consistent, AI-guided asthma consultations through a digital platform; targeted work for high risk patients; education for health professionals and consultant-led multi-disciplinary team (MDT) and streamlined referrals to specialist services.

The project will also utilise products to improve the diagnosis, treatment, and management of asthma. The project will also aim to have an environmental impact by reducing the emissions from the use of inhalers.

- **Develop the GM Care Record into a digital asset with potential to tackle health inequalities and transform care:** use of the record has increased 103% since March 2020 and is used by around 10,000 users each month to change care pathways including COVID-19 wards, heart failure, dementia and frailty. Collaboration between the GM clinical-academic community, health and care partners and citizens has identified new COVID-19 research studies using de-identified data, with 25 studies underway or in the pipeline.

Whilst Greater Manchester's strengths in health innovation and life sciences are recognised, along with the potential to use the devolved health and care system to accelerate improvements, it is also acknowledged that: 1) there is potential for further growth of the Health innovation and life sciences sector across different areas of Greater Manchester, and 2) that the health and care system in Greater Manchester is left with significant challenges after COVID-19 and more marked challenges than other places in England, and 3) that continued innovation will be needed to boost population health (including mental health) and recovery from the pandemic.

A programme of work has also been undertaken to identify the routes for strengthening Greater Manchester's innovation 'ecosystem', called the InnovationGM project, which included a focus on health innovation. The work clarified GM's life sciences priority as: "*maximise the synergies between two complementary goals: improving the health outcomes of GM's population and closing health inequalities, and developing a high productivity life sciences industry, including by attracting major global life science R&D and manufacturing companies*." The Levelling Up White Paper (HM Government, 2022) introduced three Innovation Accelerators in Greater Manchester, the West Midlands and Glasgow, which will be the key first step in realising the Innovation Plan for GM, with £100m available for projects between 2022-25.

8.6 Targeting interventions

The greater granularity seen through using tools such as the SIPHER synthetic population allows GM to understand better the geographic areas where both health and employment are a drag on the prosperity of the city region. This provides an opportunity to maximise the impact of both health and economic interventions by targeting them at these areas, in order to achieve the greatest gains.

This is especially the case for some of the specific interventions referenced above which can be designed around specific cohorts or geographic areas. However, it also applies to universal services, as all groups in society access them equally. Increasing outreach and awareness campaigns in these areas could help to reduce health and economic inequalities.

8.7 Use of future SIPHER tools

Alongside the existing insight and evidence GM has so far got from the SIPHER project, there is a great opportunity to use the tools that will be developed further over the next 12 months. These will assist decision makers to compare and contrast different intervention options, and maximise the impact of interventions identified through the refreshed Local Industrial Strategy. Hopefully through use of these tools GM can accelerate improvements in health, health inequalities, employment and productivity.

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