



World Health Organization
Collaborating Centre on Investment
for Health and Well-being



GIG
CYMRU
NHS
WALES | Iechyd Cyhoeddus
Cymru
Public Health
Wales



Llywodraeth Cymru
Welsh Government

Influencing the Health Gap in Wales: Decomposition analysis discussion paper



The Welsh Health Equity Status Report initiative (WHESRI)

Influencing the Health Gap in Wales: Decomposition analysis discussion paper

The Welsh Health Equity Status Report initiative (WHESRi)

Authors

James Allen, Mariana Dyakova, Andrew Cotter-Roberts, Oliver Darlington, Rebecca Masters, Mark A Bellis
World Health Organization (WHO) Collaborating Centre on Investment for Health & Well-being,
Public Health Wales

Peer reviewers

Lin Yang, WHO Regional Office for Europe
Luke Munford, The University of Manchester

WHESRi Scientific and Advisory Group Contributors

We are grateful for the continuous support and extensive feedback, provided by the Group, at every stage of the report development.

Welsh Government: Brendan Collins, Joanna Charles, Siobhan Evans, Nicola Evans, Rachel Dolman, Ed Wilson, Steven Macey, Carwyn Wycherley

Welsh Local Government Association: Paul Lewis, Sam Hall, Stewart Blythe

Public Health Wales: Rebecca Hill, Lauren Couzens, Rajendra Kadel, Sumina Azam, Liz Green, Nathan Lester, Hugo Cosh, Ciarán Humphreys, Christian Heathcote-Elliot, Iain Bell, Kirsty Little, Sara Peacock, Daniela Stewart, Golibe Ezenwugo.

WHO European Office for Investment for Health and Development, Venice, Italy: Christine Brown (Head of Office), Tatjana Buzeti, Sara Darias-Curvo, Andrea Bertola

Acknowledgments

Special thanks to Public Health Wales' Chief Executive, Dr Tracey Cooper, as well as Board and Executive Team members, for the continuous support to and engagement in the WHESRi development and progress during difficult times.

We are also thankful to Benjamin Bainham for developing an interactive dashboard for the Decomposition Analysis; and to Michael Fletcher for proofreading the paper.

ISBN 978-1-83766-037-7

© 2022 Public Health Wales NHS Trust.

Material contained in this document may be reproduced under the terms of the Open Government Licence (OGL)

www.nationalarchives.gov.uk/doc/open-government-licence/version/3/
provided it is done so accurately and is not used in a misleading context.

Acknowledgement to Public Health Wales NHS Trust to be stated.

Copyright in the typographical arrangement, design and layout belongs to Public Health Wales NHS Trust.

Foreword

“The welfare of each is bound up in the welfare of all.”

Helen Keller

Reducing the health equity gap has never been more important.

Too many people are living with chronic or acute insecurity from poor housing, low wages, unsafe neighbourhoods, discrimination and limited livelihood opportunities. This increases their risk of poor mental health, hinders the adoption of healthy behaviours and leads to poorer health outcomes. Ultimately this reduces the potential to live a full life and prosper.

These inequities place substantial strain on the sustainability of our societies to be vibrant and inclusive, while increasing demands on public systems and services and slowing economic development and resilience. This is especially relevant now, with the Coronavirus pandemic continuing to expand the health equity gap; and the escalating cost of living crisis having the potential to increase health inequities further.

However, health inequities are not inevitable.

Coordinated and coherent policy action on their drivers can help reduce the health gap, improve population health and well-being; and achieve inclusive and sustainable economic growth and prosperity for all within and beyond Welsh borders.

Over the past five years, we have been working closely with the World Health Organization (WHO) and its European Office for Investment for Health and Development in Venice, Italy, enabling Wales to become a global influencer and a live innovation site for advancing health equity and prosperous lives for all.

Building on Wales’ forward-looking legislation and assets, and as part of a Memorandum of Understanding between the WHO Regional Office for Europe and the Welsh Government, Public Health Wales has established the first Welsh Health Equity Status Report initiative (WHESRi). Delivered through our WHO Collaborating Centre on Investment for Health and Well-being, the WHESRi provides a Health Equity Solutions Platform for Wales, which enables gathering and sharing of evidence, intelligence and good practices; developing practical tools; and bringing key stakeholders and disciplines together to help close the health gap in Wales and beyond.

This discussion paper is the second from the WHESRi initiative, applying an innovative analytic approach to inform and facilitate better understanding of what is driving gaps in health and where policies and investments might make the most difference. It shows that interventions to reduce health inequities should not be planned in isolation, but across several sectors in order to maximise value and impact where it matters most.

We hope, this paper and further WHESRi outputs, can help inform and support transformative thinking, action and solutions towards creating a sustainable, healthier, more equal and prosperous Wales and Europe for the current and future generations.



Dr Tracey Cooper
Chief Executive
Public Health Wales



Christine Brown
Head, WHO European Office
for Investment for Health and
Development, Venice, Italy

Table of Contents

| | |
|---|----|
| About this report | 3 |
| Key messages..... | 5 |
| Background and rationale | 8 |
| Methodological approach | 9 |
| Influencing the health gap in Wales: results from the decomposition analysis | 10 |
| Discussion..... | 16 |
| Appendix | 19 |
| References..... | 33 |

About this report

Purpose

The ultimate aim of this discussion paper is to help inform further policy action and potential solutions in order to reduce the health gap in Wales and beyond.

It applies innovative analytical methodology (a Decomposition Analysis) to generate an insight into the drivers of health inequities in Wales, and identify those that contribute the most.

The paper also explores the challenges, lessons learnt and opportunities arising when applying novel techniques to the Welsh context, contributing to Wales' leading role as an influencer and a live innovation site at the forefront of the health equity agenda in Europe and globally.

Strategic context and contribution

Wales is the first country to apply a milestone European Health Equity Status Report initiative (HESRi) (1), positioning itself as a global influencer and a live innovation site for health equity. Through a Memorandum of Understanding (MoU) (2) between the WHO Regional Office for Europe and the Welsh Government, a **Welsh Health Equity Status Report initiative (WHESRi)** (3) was established to facilitate and support evidence-informed sustainable solutions and investment prioritisation towards closing the health gap in Wales and beyond.

WHESRi contributes to implementing the *Well-being of Future Generations (Wales) Act* (4), the *Socio-economic Duty* (5) and *A Healthier Wales* long-term plan for health and social services (6). It builds upon *Public Health Wales' Making a Difference: Investing in Sustainable Health and Well-being for the People of Wales* (7), reinforcing the case for investment in prevention, well-being and equity towards achieving a healthier, more equal and prosperous Wales for current and future generations. This work also supports Wales and other countries to progress the *United Nations (UN) 2030 Agenda for Sustainable Development* (8), and the *WHO European Programme of Work United Action for Better Health* (9).

This discussion paper follows the first WHESRi report *Placing health equity at the heart of the COVID-19 sustainable response and recovery: Building prosperous lives for all in Wales* (10).

Scope and focus

This discussion paper provides a snapshot of the health inequities (*Box 1*) experienced by different population groups in the years leading up to the Coronavirus (COVID-19) pandemic, applying an **innovative statistical methodology, a 'Decomposition Analysis'**. It attempts to quantify the health gap in Wales, as well as to provide a better understanding of its main drivers across the five essential conditions for healthy prosperous lives for all, using a novel WHO framework (*Box 2*).

The analysis uses **three measures of self-reported health**: 1) the prevalence of fair/poor health; 2) the prevalence of low mental well-being; and 3) the prevalence of low life satisfaction.

Comparisons of self-reported health were made between:

- Those who are **able to make a saving** of at least £10/month and those who are not;
- Those who report being in **material deprivation** and those who do not; and
- Those who report a **limiting longstanding illness, disability or infirmity** and those who do not

Target audience

This discussion paper aims to inform the following national and international stakeholders:

- Public health professionals
- Public policy makers and budget holders on national and local levels
- Statisticians, health scientists and data analysts
- All those who have a role in influencing the health equity gap in Wales and further afield

Box 1: Definitions of key terminology



Equity is the absence of avoidable, unfair, or remediable differences among groups of people, whether those groups are defined socially, economically, demographically or geographically or by other means of stratification.



Health equity (or equity in health) implies that ideally everyone should have a fair opportunity to attain their full health potential and that no one should be disadvantaged from achieving this potential.



Health inequities are avoidable inequalities in health between groups of people, which arise from inequalities within and between countries/societies.

Vulnerable people/groups are those at a greater risk of poor health and well-being due to disparities in their physical and/or mental characteristics, economic and social status, when compared with the average population. Vulnerability refers to the likelihood of contracting disease or illness. Vulnerable populations may be less able to anticipate, cope with, resist, or recover from the impact of a negative event, e.g. COVID-19.

Box 2: The five essential conditions for healthy prosperous lives for all: WHO HESRI framework showing the different types of policies across sectors to address the wider determinants of health



1. Health and health services

Policies that aim to ensure availability, accessibility, affordability and quality of preventative and health care services and interventions.

For example, health protection, health promotion and improvement, primary, secondary and scheduled care.



2. Health and income security and social protection

Policies that aim to provide economic security and support to reduce the health and social consequences of poverty and low income throughout a person's life.

For example, financial support for parents, older people or unemployed.



3. Health and living conditions

Policies that aim to ensure opportunities for, and access and exposure to living conditions and environments that have a positive influence on people's health and well-being.

For example, planning, good quality and secure housing, clean air, green spaces.



4. Health and social and human capital

Policies that aim to develop and strengthen social relations and community assets, including education, skills, community resources and meaningful social interactions to promote learning, and protect and promote health and well-being throughout a person's life.

For example, improving training, apprenticeship, building community cohesion and resilience, trust, sense of belonging.



5. Health and employment and working conditions

Policies that aim to improve the health impact of employment, working conditions and workplace equality.

For example, availability of work, a living wage, physical and mental demands, ensuring health and safety at work.



Key messages



- **Significant health gaps** existed between different populations groups in the years leading up to the Coronavirus pandemic, which have since been **exacerbated by COVID-19**

- **Significant gaps in self-reported health** are observed (2016/17 - 2019/20 data) between:



those who are financially secure and those who are not;



those who are in material deprivation or not;



and those who report a limiting long-standing illness, disability or infirmity

- **Reporting negative health outcomes** (fair/poor health, low mental well-being, and low life satisfaction) is found to be **significantly higher in those who are disadvantaged** (financially, materially and physically).

- Applying a **Decomposition Analysis** has generated an insight into the **drivers of health inequities**, identifying those which **contribute the most** to the differences in self-reported health

- **Social and Human Capital** and **Income Security and Social Protection** account the most for the health gaps observed, in the majority of health outcomes explored



- **Health Services** account the least for differences observed, in the majority of health outcomes explored



- The model used is **not able to account for all the factors and pathways** that influence the health gaps between different population groups, which should be considered when interpreting the results and making decisions

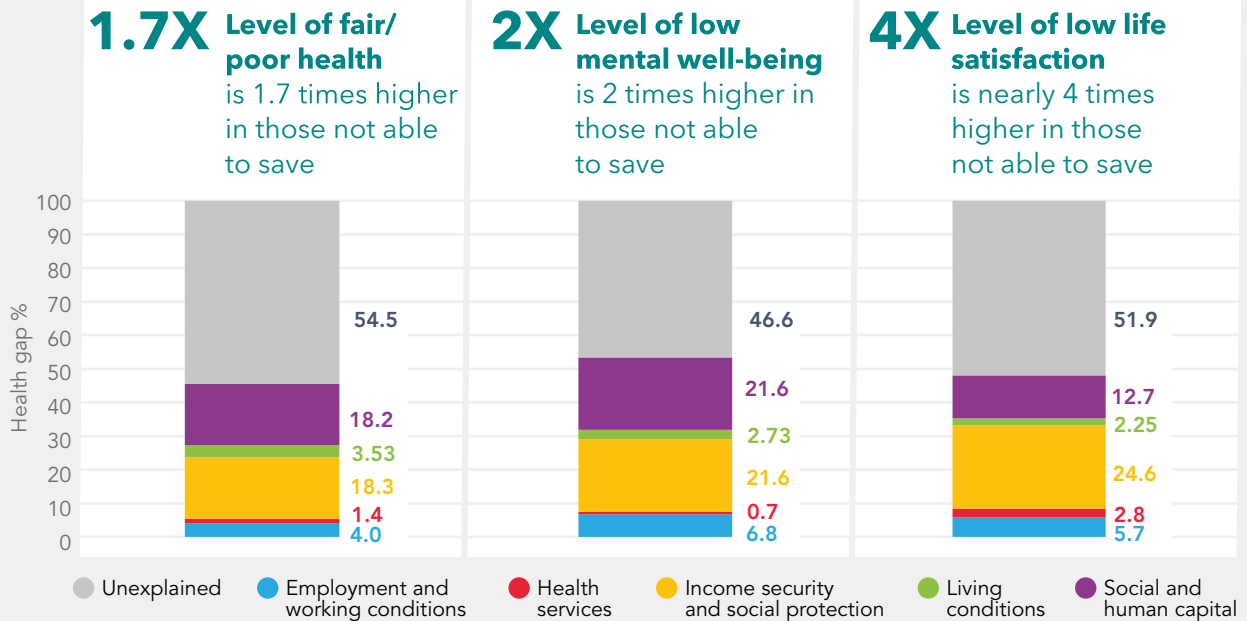
- **Systematic differences** in the essential conditions (wider determinants) are able to **explain less than half (<50%) of the health gaps** for the majority of the health outcomes, based on the statistical model used

- The **health gaps for those reporting a limiting long-standing illness, disability or infirmity remains the least explained** by systematic differences in the wider determinants



Comparing self-reported health in those able to make a saving of at least £10/month and those who are not

Decomposing the gap in prevalence of fair/poor health, low mental well-being and low life satisfaction in survey respondents who are able to make a saving of at least £10/month, and those who are not using the Binder-Oaxaca methodology, persons aged 16-65, Wales, 2016-17 to 2019-20

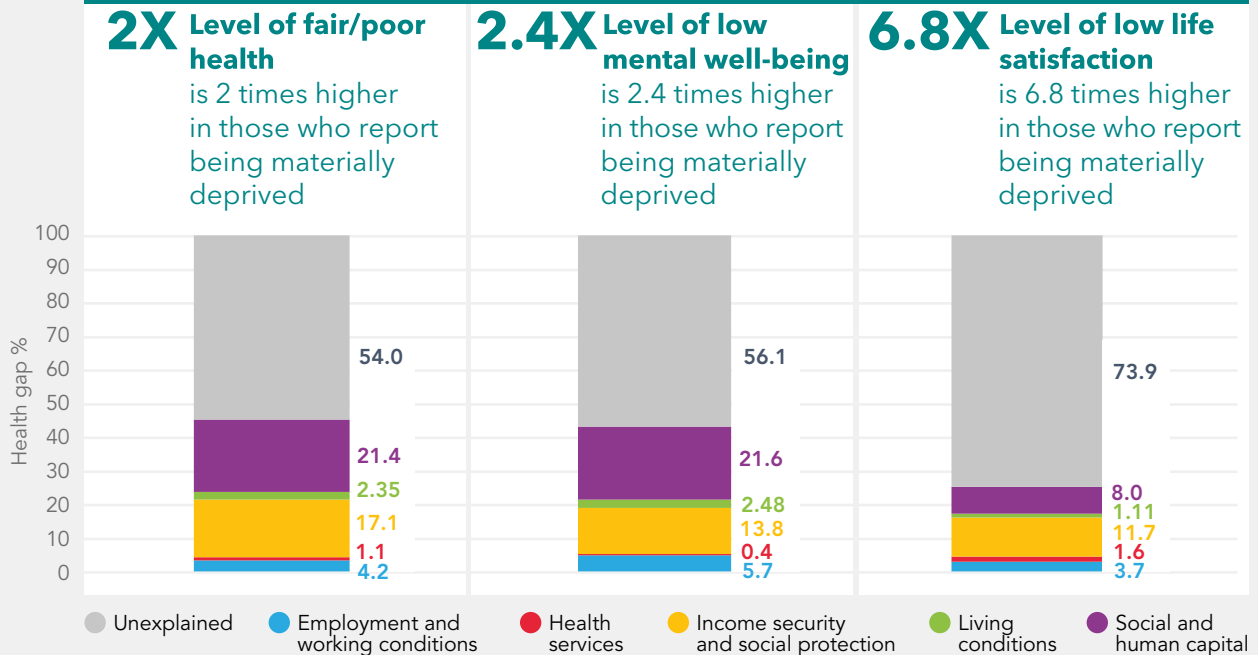


Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales



Comparing self-reported health in those who report being in material deprivation and those who do not

Decomposing the gap in prevalence of fair/poor health, low mental well-being and low life satisfaction between those who report being in material deprivation and those who do not using the Binder-Oaxaca methodology, persons aged 16+, Wales, 2016-17 to 2019-20

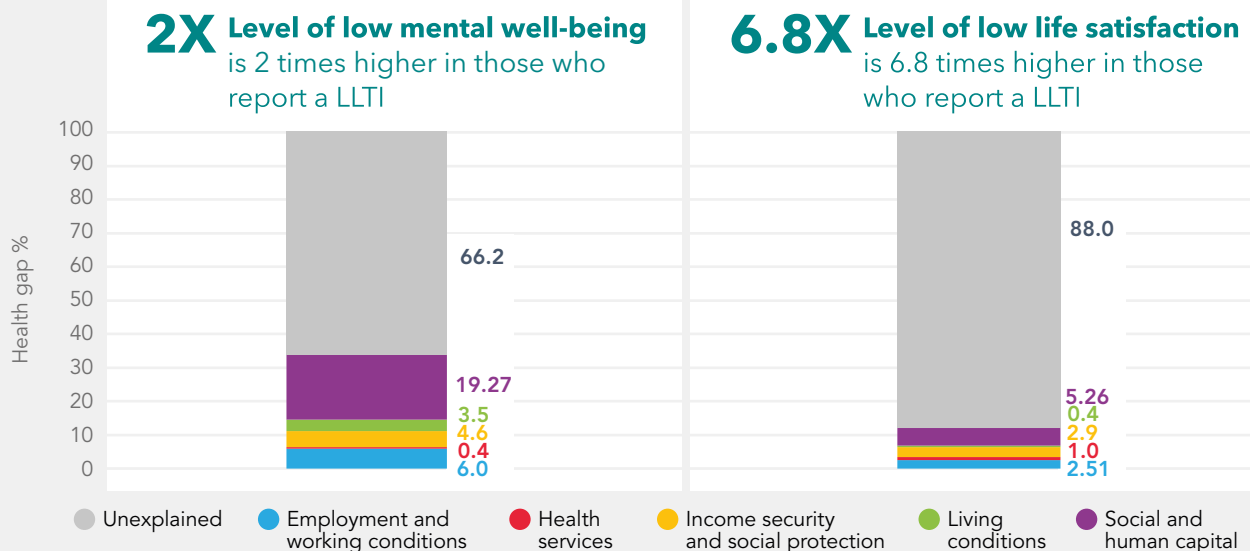


Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales



Comparing self-reported health in those who report a limiting longstanding illness, disability or infirmity (LLTI) and those who do not

Decomposing the gap in prevalence of low mental well-being and low life satisfaction between those reporting a limiting long-standing illness, disability or infirmity, and those who do not using the Binder-Oaxaca methodology, persons aged 16+, Wales, 2016-17 to 2019-20



Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales



Policy implications and forward look

- In order to successfully reduce the health gap in Wales, policy and investment decisions should take into account **the drivers of health inequities, prioritising those, which have the largest impact**
- The **health sector alone cannot address the health gap** in Wales and other sectors play a significant role in driving and having the potential to reduce it, as shown by this and previous analyses
- **The NHS in Wales has the potential to be a strong 'anchor'**, bringing social value to, and partnering with, local communities, which could influence the wider determinants of well-being and health equity
- Interventions to reduce health inequities **should not be planned in isolation**, in only one policy area (essential condition), but across several sectors, engaging relevant stakeholders and **building on synergies and co-benefits to maximise value and impact**
- The **escalating cost of living crisis** has the potential to **increase health inequities further**, having a direct impact on the two essential conditions, which drive the largest (explained) part of the health gap in Wales, namely Social and Human Capital and Income Security and Social Protection
- **Further exploration, research, data gathering and analysis** is needed, engaging with and involving relevant groups and communities, to understand the health gap and its drivers
- Application of the Decomposition Analysis across different countries, population groups, settings and health outcomes can **develop the methodology further** to help explain the health gap and its drivers better

An interactive dashboard to illustrate the decomposition analysis of the health gap in Wales is available here: <https://improvementcymru.shinyapps.io/whesri-influencing-the-health-gap-in-wales/>

Background and rationale



The effects of globalisation have delivered a number of benefits, though not fairly distributed to all, with high unemployment levels, rising inequalities, and poor health outcomes remaining a problem (1). Health inequity is interconnected with wider and complex social, economic and environmental factors (11). Action to tackle inequalities and inequities in health outcomes must take place at a structural and system level, acknowledging the constraints affecting an individual's capability to enable change (12).

There are stark inequities in health outcomes in the UK population and despite continuous research and recommendations to reduce these (13), issues remain in closing the 'health gaps'. In Wales, differences in health outcomes have been observed for many years between the most and least deprived areas, and in some cases have worsened (14,15). For example, the gap in death rates between the most and least deprived fifth has slightly widened in recent years (16), largely driven by worsening life expectancy in the most deprived areas of Wales (5). The COVID-19 pandemic has also had an impact on health outcomes in Wales, particularly so among the most deprived (10).

Wales has a policy landscape which is well positioned towards helping the identification and tackling of health inequities. The Well-being of Future Generations (Wales) Act provides an overarching framework for understanding commitments towards reducing inequality (4). The Socio-economic Duty underlines the need to understand how actions influence inequality, its creation and reduction (17). 'A Healthier Wales', the Welsh Government's long-term plan for health and social care, outlines the need to measure health and well-being outcomes, and drives transformative change in places where these outcomes can be improved.

Despite the wealth of data exposing inequities in health and their trends, and the policy commitment to reducing these, achieving a healthier and a more equal Wales, the health gap remains somewhat poorly explored and understood. While the social (wider) determinants of health concept is now well established (11), understanding the health gap composition and contributing factors is essential to identify its drivers and opportunities to influence it.

The application of novel analytical methods to inform public health priorities are not only key to explore the factors contributing to health inequities, but are crucial in identifying the policy levers to tackle them. With the much needed recovery from COVID-19 and the emergence of the cost of living crisis, it is more important now than ever to understand the drivers of the health gap in Wales. For example, inequities in life expectancy in Wales before the COVID-19 pandemic have been explored using a statistical decomposition by age and cause of death (18).

This discussion paper is answering this need, aiming to explore and 'decompose' the gaps in measures of self-reported health and well-being, and quantify their relationship with the five essential conditions (wider determinants) for healthy prosperous lives for all.

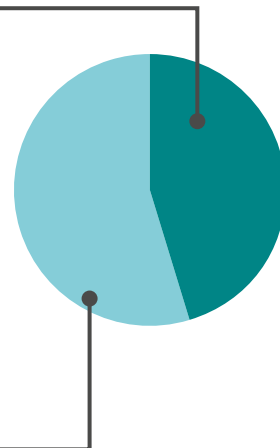
Methodological approach

Applying decomposition analysis to understand health inequities

The application of the **Blinder-Oaxaca decomposition methodology** can be applied to health inequities to understand the factors which account the most for observed differences. This method determines the relative contribution of each factor to the explained and unexplained components.

The **'explained component'** of the decomposition quantifies the portion of the health gap that is due to differences in the levels of determinants/ contributing factors (drivers). This can be used to help identify policy areas and levers, which could facilitate change in the levels of drivers to narrow the health gap.

The **'unexplained component'** of the decomposition quantifies the portion of the health gap that is not explained by the levels of determinants/ contributing factors, but by differences in response to changes in these factors. This component can also be due to unobserved factors not included in the model.



It is important to note that this methodological approach is **not able to account for all the factors that influence gaps in health between different population groups**, which should be borne in mind when interpreting the results.

Data analysis: using the National Survey for Wales

The National Survey for Wales (NSW) (19) is a monthly survey of Welsh residents (aged 16+) running from April to March annually (20,21). It covers a **broad range of topics**, including: Local area and environment; Well-being and finances; Housing; Democracy and government; Population health; Internet and media; Culture and Welsh language; Sport and recreation; Children and education; and National Health Service (NHS) and social care.

The NSW is conducted via a **random sample** with a sample size of approximately 1,000 individuals per month. For the purpose of this paper, a **combined survey data set (2016-17 to 2019-20)** has been analysed, yielding **responses to over 4,200 questions by 46,189 people**. To be able to decompose the gap in health outcomes between distinct population groups according to the five essential conditions, questions from the surveys were categorised based on their ability to act as proxy variables for those five essential conditions, using a systematic approach.

In the case of stratification factors, **variables measured at an individual level were chosen in preference to area-based measures**. For example, the ability of an individuals to save at least £10 a month was thought to be a better measure of relative financial deprivation than the Welsh Index of Multiple Deprivation (WIMD), which will inherently capture less inter-person variation as it is based on the demographics of approximately 1,500 people living in an area. People living in more deprived areas are not necessarily deprived, however, we can say that someone who is unable to save at least £10 a month is likely less financially secure than someone who can.

The outcomes considered for the decomposition were: reported poor or fair health, low mental well-being, and low life satisfaction. The decomposition analysis sought to explain the differences in the prevalence of these outcomes in groups stratified by their ability to save at least £10 a month, whether they were in material deprivation, and the presence of a limiting long-standing illness, disability of infirmity.

A full description of the methodology with examples and analytic tables is available in the Appendix.

Influencing the health gap in Wales: results from the decomposition analysis

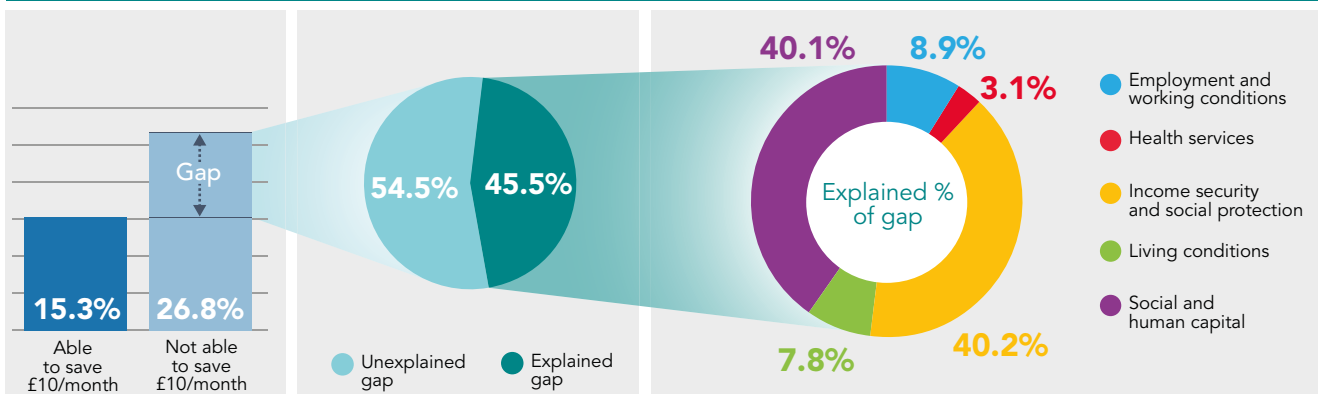
The health gap between those who are able to make a saving of at least £10/month and those who are not

This analysis quantifies the prevalence of low mental well-being, low life satisfaction and fair/poor health in those who are able to make financial savings and those who are not (Figures 1, 2 & 3). 31.7% of survey respondents who were not able to make savings reported low mental well-being, compared to 16.6% of those who were able to save, a significant difference of 15.1 percentage points. 4.3% of survey respondents not able to make savings reported low life satisfaction compared to 1.1% of respondents who were able to make savings, a significant difference of 3.2 percentage points. 26.8% of survey respondents who were not able to make savings reported being in fair/poor health, compared to 15.3% of respondents who were able to make savings, a significant difference of 11.5 percentage points.

Decomposing the gap in prevalence of self-reported health between those able to make a saving of at least £10/month and those who are not, reveals that *Social and Human Capital* (26.4% - 40.4% of explained component) and *Income Security and Social Protection* (40.2% - 51.2% of explained component) are the essential conditions accounting the most for the differences in fair/poor health, low mental well-being and low life satisfaction. The *Living Conditions and Health Services* are the essential conditions accounting the least for differences in health (Figures 1, 2 & 3).

From the gap in prevalence of fair/poor health between those who are able to save at least £10/month and those who are not (11.5 percentage point difference) - 45.5% can be explained by systematic differences in the essential conditions; and 54.5% remains unexplained. From the explained component, *Income Security and Social Protection* and *Social and Human Capital* accounts the most, 40.2% and 40.1%, respectively; while *Living Conditions* (7.8%) and *Health Services* (3.1%) accounts the least (Figure 1).

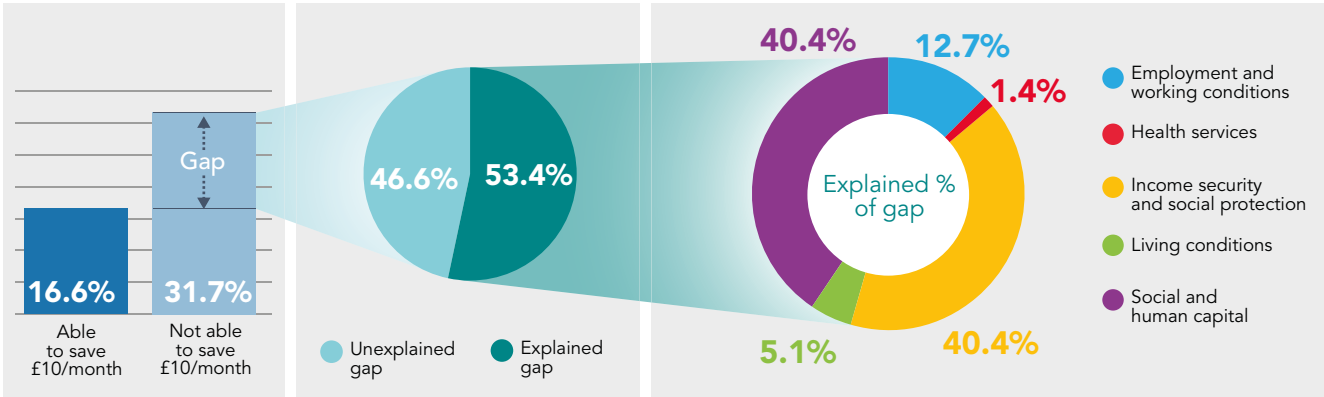
Figure 1: Decomposing the gap in prevalence of fair/poor health between those who are able to make a saving of at least £10/month, and those who are not using the Blinder-Oaxaca methodology, non-pensioner adults (aged 16-65), Wales, 2016-17 to 2019-20



Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales

From the gap in the prevalence of low mental well-being (15.1 percentage point difference) - 53.4% can be explained by systematic differences in the essential conditions; and 46.6% remains unexplained. From the explained component, *Social and Human Capital* (40.4%) and *Income Security and Social Protection* (40.4%) account the most for differences in health and have equal shares, relative to the other essential conditions. *Health Services* accounts the least for differences in fair/poor health (1.4%) (Figure 2).

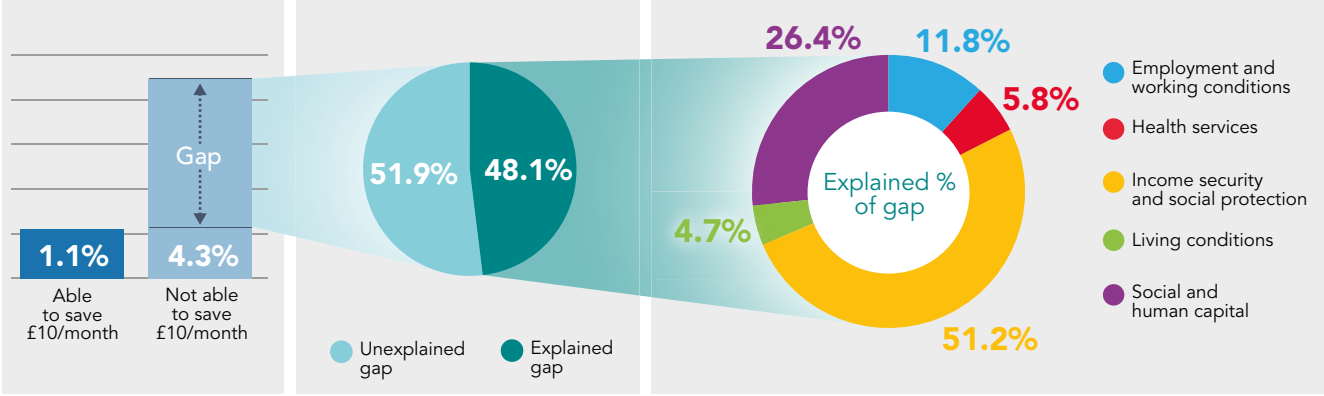
Figure 2: Decomposing the gap in prevalence of low mental well-being between those who are able to make a saving of at least £10/month, and those who are not using the Blinder-Oaxaca methodology, non-pensioner adults (aged 16-65), Wales, 2016-17 to 2019-20



Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales

While the gap in prevalence of low life satisfaction (Figure 3) is smaller than the gap observed in low mental well-being and fair/poor health (Figures 1 & 2), the prevalence of low life satisfaction is still approximately four times higher in those that are not able to make a saving than those who are. From this, 48.1% can be explained by systematic differences in the essential conditions; while more than half of the gap (51.9%) remains unexplained. Of the explained component, *Income Security and Social Protection* (51.2%) and *Social and Human Capital* (26.4%) accounts the most for the differences in low life satisfaction; while *Living Conditions* accounts the least, 4.7% (Figure 3).

Figure 3: Decomposing the gap in prevalence of low life satisfaction between those who are able to make a saving of at least £10/month, and those who are not using the Binder-Oaxaca methodology, non-pensioner adults (aged 16-65), Wales, 2016-17 to 2019-20



Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales

Applying the decomposition analysis to the gap in the prevalence of the three health outcomes (low mental well-being, low life satisfaction and fair/poor health) between those able to make savings and those who are not, shows that a considerable portion of the gap (45.5% - 53.4%) can be explained by systematic differences in the five essential conditions. Modelling the three different health outcomes shows that *Social and Human Capital* and *Income Security and Social Protection* accounts the most for differences in health, ranging from 26.4% to 51.2% of the explained component. In the majority of scenarios, *Health Services* accounts the least for differences in health outcomes (less than 6% of the explained component).

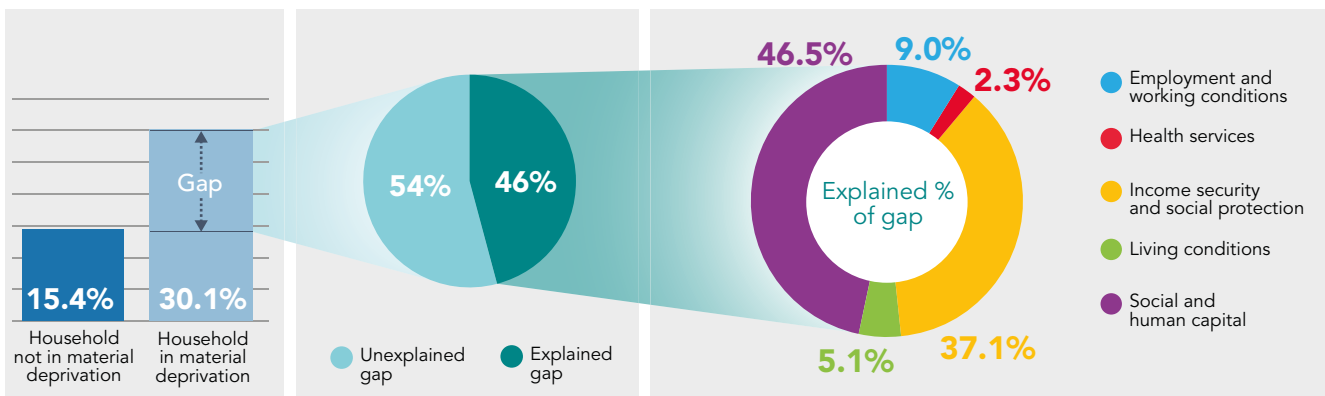
The health gap between those who report being in material deprivation and those who do not

Breaking down self-reported measures of health by whether the respondent is in material deprivation or not reveals stark health gaps. The prevalence of negative health outcomes (fair/poor health, low mental well-being and low life satisfaction) is at least twice as high in those who report being in material deprivation compared to those who do not: 22.9 significant percentage point difference in the prevalence of low mental well-being; 14.7 significant percentage point difference in fair/poor health; and a 5.2 significant percentage point difference in low life satisfaction.

The decomposition analysis of the health gaps observed between those in material deprivation and those who aren't shows that most of the gap cannot be explained by the model (54% to 73.9%). Of the proportion that can be explained, *Social and Human Capital* and *Income Security and Social Protection* accounts the most for differences in health. In the majority of scenarios, Health Services accounts the least for the differences in health (Figures 4, 5 & 6).

46% of the gap in fair/poor health between those who report being in material deprivation and those who do not can be explained by the model; 54% of the gap remains unexplained. From the explained component, *Social and Human Capital* and *Income Security and Social Protection* accounts the most for differences in fair/poor health, 46.5% and 37.1%, respectively (Figure 4).

Figure 4: Decomposing the gap in prevalence of fair/poor health between those who report being in material deprivation and those who do not using the Binder-Oaxaca methodology, persons aged 16+, Wales, 2016-17 to 2019-20

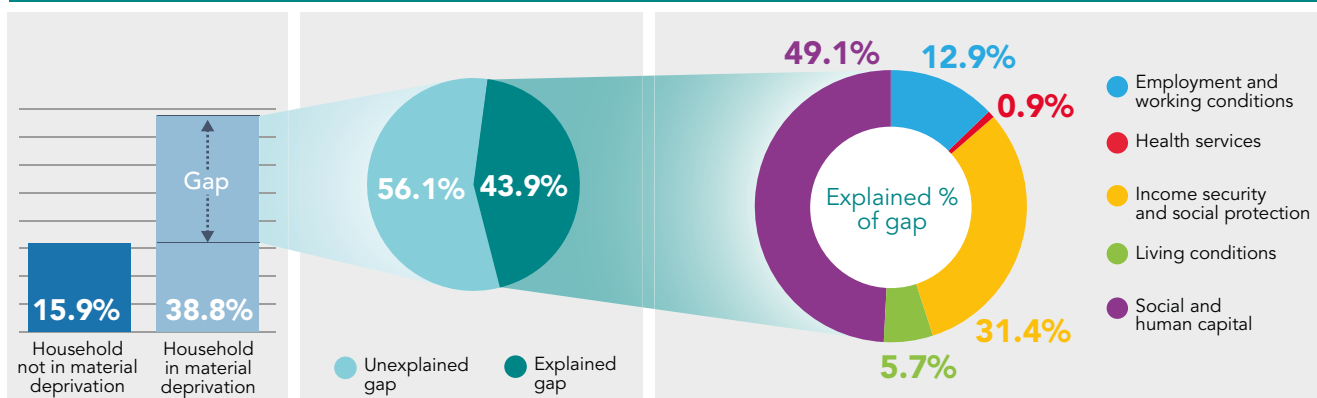


Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales



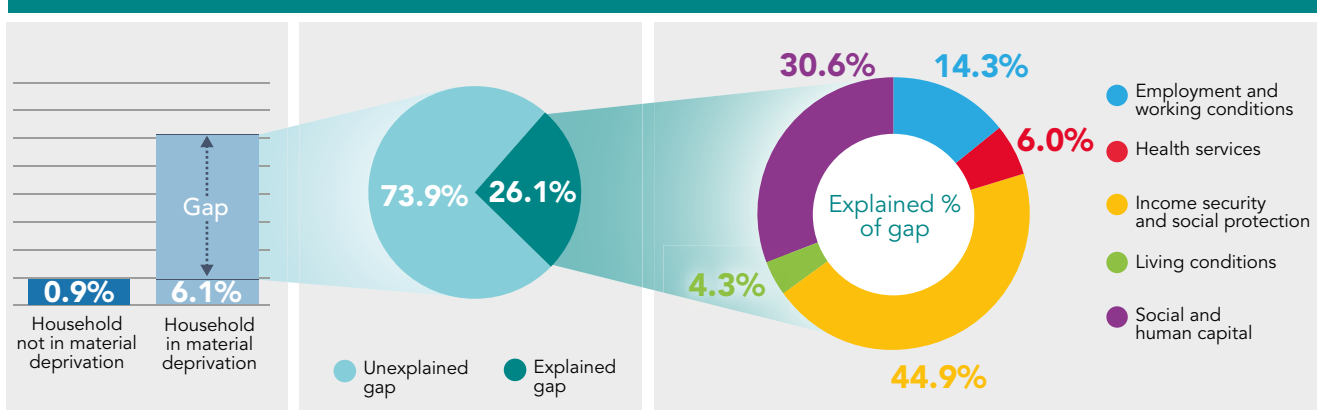
Social and Human Capital accounts the most for differences in low mental well-being (49.1% of explained component); *Health Services* accounts the least (0.9% of explained component) (Figure 5). *Income Security and Social Protection* accounts the most (approx. 44.9% of explained component) for differences in low life satisfaction and *Living Conditions* accounts the least (4.3% of explained component) (Figure 6).

Figure 5: Decomposing the gap in prevalence of low mental well-being between those who report being in material deprivation and those who do not using the Binder-Oaxaca methodology, persons aged 16+, Wales, 2016-17 to 2019-20



Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales

Figure 6: Decomposing the gap in prevalence of low life satisfaction between those who report being in material deprivation and those who do not using the Binder-Oaxaca methodology, persons aged 16+, Wales, 2016-17 to 2019-20



Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales

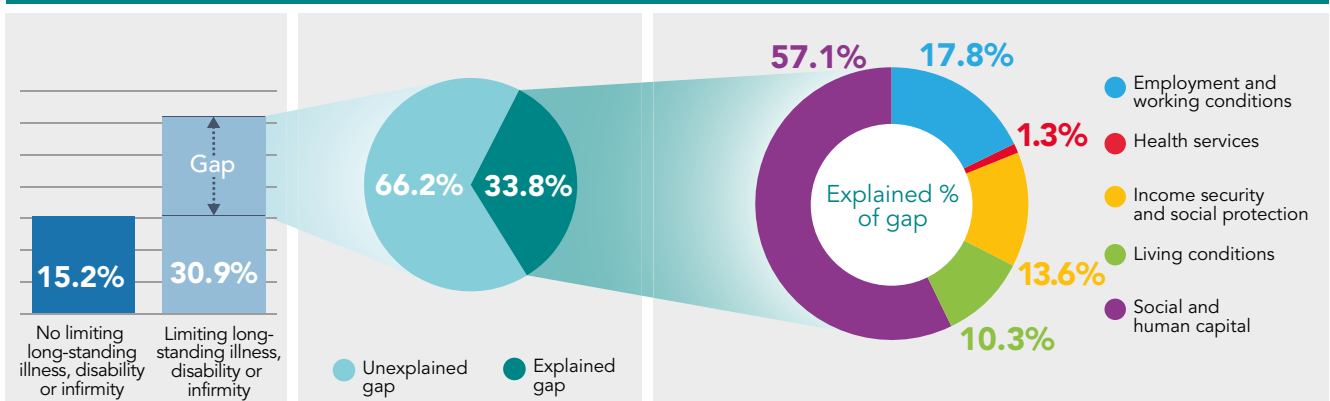
The health gap between those who report a limiting long-standing illness, disability or infirmity and those who do not

Analysis shows that the prevalence of low mental well-being and low life satisfaction is significantly higher in those who report a limiting long-standing illness, disability or infirmity, compared to those who do not (Figures 7 & 8). 4.8% of survey respondents who report a limiting long-standing illness, disability or infirmity report low life satisfaction, compared to 0.7% in respondents who do not, a significant difference of 4.1 percentage points. The prevalence of low mental well-being is also higher in those reporting a limiting long-standing illness, disability or infirmity (30.9%) compared to those not reporting (15.2%), a significant difference of 15.7 percentage points.

Exploring the health gap experienced between those who report a limiting long-standing illness, disability or infirmity and those who do not, shows that a large proportion of the gap in low mental well-being and low life satisfaction cannot be explained by the model: 66.2% of the gap observed in low mental well-being and 88% of the gap in low life satisfaction is unexplained by the model. Of the explained component, *Social and Human Capital* accounts the most for differences in health (Figures 7 & 8).

Decomposing the gap in low mental well-being shows that from the explained component, *Social and Human Capital* accounts the most for the difference in low mental well-being (57.1%), and *Health Services* accounts for the least, 1.3% (Figure 7).

Figure 7: Decomposing the gap in prevalence of low mental well-being between those reporting a limiting long-standing illness, disability or infirmity, and those who do not using the Binder-Oaxaca methodology, persons aged 16+, Wales, 2016-17 to 2019-20

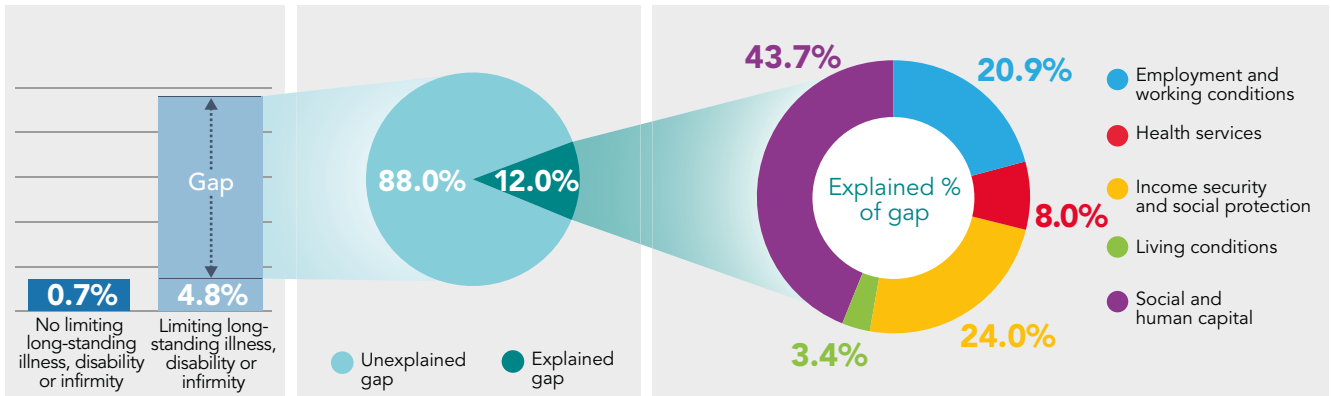


Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales



Of the small proportion of the health gap in low life satisfaction that can be explained (12%), *Social and Human Capital* and *Income Security and Social Protection* accounts the most for differences in health, 43.7% and 24%, respectively. *Health Services* and *Living Conditions* accounts the least for differences in low life satisfaction, 8% and 3.4%, respectively (Figure 8).

Figure 8: Decomposing the gap in prevalence of low life satisfaction between those reporting a limiting long-standing illness, disability or infirmity, and those who do not using the Binder-Oaxaca methodology, persons aged 16+, Wales, 2016-17 to 2019-20



Source: Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales



Discussion



Policy application

Exploring the persisting inequalities in Wales has revealed stark differences in health outcomes before COVID-19. Since the start of the pandemic there is growing evidence on the unequal impact COVID-19 has had on different population groups (10).

The persistent gaps and fragmentation in public health data and the need to invest in strong health information systems has been acknowledged by the WHO (22). Wales (and the UK) benefits from collecting robust data on demographics, health outcomes and lots of the wider determinants (essential conditions) needed for health. This provides a data landscape comparatively richer than other countries in the WHO European Region.

The decomposition analysis has revealed what more can be done in the population health intelligence field to gain a deeper understanding to what is driving health inequity in Wales and beyond. It has quantified the health gaps that exist in Wales between population groups, whether the groups are defined financially (by their ability to make financial savings); materially (by whether they are materially deprived); or physically (by whether they have long-standing limiting illness, disability or infirmity). Reporting of negative health outcomes (fair/poor health, low mental well-being, and low life satisfaction) is found to be significantly higher in those who are disadvantaged.

The applied decomposition analysis has not only quantified the health gap, but it has also generated a unique insight into the drivers (essential conditions) that contribute the most to the differences in health within defined population groups. This can allow policy and decision-makers to see the potential of applying this methodology further to identify policy areas most likely to influence the health gaps and reduce inequities in health.

In all scenarios, *Social and Human Capital* and *Income Security and Social Protection* account for the largest portions of differences in self-reported general health, mental well-being and life satisfaction. *Health Services* and *Living Conditions* are found to have a much smaller contribution.

This analysis has shown that the health services alone cannot address the health gap in Wales and other sectors play a greater role in tackling them. These findings are consistent with the wider evidence base showing that it is the wider determinants (referred to as essential conditions throughout this paper) that exert the greatest impact on health and well-being. Studies have shown that only 20% of a person's health outcomes are attributed to access to good quality health care and have highlighted the crucial role of communities and local settings (23,24).

It is also important to note that the health sector is delivering more than clinical health services; it also delivers public health services, as well as its strong links with the wider economic, social and environmental domains, such as employment, all of which are interconnected with population well-being and health equity.

The NHS, often referred to as an 'anchor', can go beyond direct healthcare and look to influence the wider determinants of health by purchasing locally for social benefit, use buildings and spaces to support communities, widen access to quality work, work more closely with partners and reduce its environmental impact (25,26).

Policy implications of the decomposition analysis include, but are not limited to:

- ✓ In order to successfully reduce the health gap in Wales, policy and investment decisions should take into account **the drivers of health inequities, prioritising those, which have the largest impact.**
- ✓ Interventions to reduce health inequities **should not be planned in isolation**, in only one policy area (essential condition), but across several sectors, engaging relevant stakeholders and **building on synergies and co-benefits to maximise value and impact**
- ✓ The **escalating cost of living crisis** has the potential to **increase health inequities further**, having a direct impact on the two essential conditions, which drive the largest (explained) part of the health gap in Wales, namely *Social and Human Capital* and *Income Security and Social Protection*

Application for investment prioritisation

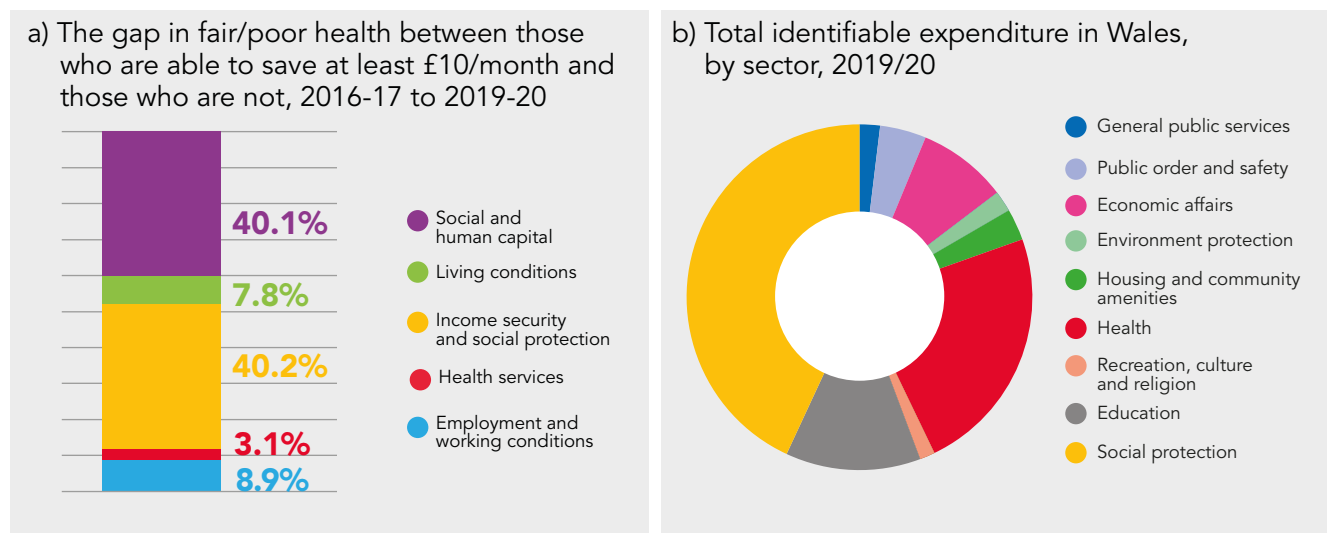
Comparing government or local expenditure to the drivers of health inequity, can provide useful insights into where further resources and investment can be shifted and targeted to make the most difference.

Within the total identifiable expenditure in Wales (2019/20), the largest category is Social Protection which, when broken down further, covers expenditure on personal social services, unemployment benefits etc., accounting for 43% (£14.8 billion) of total expenditure in Wales. It is followed by the Health sector which accounts for 23% (£8.3 billion) of total expenditure.

Triangulation of the results from the decomposition analysis and Wales' expenditure data has the potential to reveal alignment or mismatch; and can provide a useful lever for informing and strengthening the case for investing in well-being and health equity (Figure 9).

The analysis suggests that with a longer term view, health gaps can be tackled through greater investment in prevention and the wider determinants of health, rather than reactive investment in the provision of clinical (care) services (27).

Figure 9: Example of comparing findings from the decomposition of the health gap in Wales and total expenditure by sector in Wales



Source: a) Analysis of the National Survey for Wales by WHO CC on Investment for Health and Well-being, Public Health Wales
 b) Public Expenditure Statistical Analyses 2021, HM Treasury

Limitations

There are limitations to the analysis that should be considered when interpreting the results, as follows:

Age: the analysis uses the NSW which surveys Welsh residents aged 16+. This means that the health gaps measured are only representative of the Welsh adult population and do not capture how the wider determinants of health are associated with health outcomes in children aged <16.

Self-reported bias: survey respondents may not provide answers that are accurate and may be more likely to give responses that are socially desirable. For some variables, recognised scales are used as a measurement tool e.g. well-being is measured using the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS). For other variables, Likert scales have been used, where the respondent is provided with five possible answers to a statement indicating positive-to-negative strength.

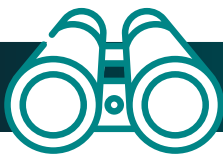
Time period: the analysis uses survey data ranging from 2016/17 to 2019/20, which means that any health gaps quantified have not taken into account the impact of the COVID-19 pandemic in exacerbating inequalities (28), which would likely impact the results of the analysis.

Proxy variables: variables measured using the NSW have been used as proxies for each of the essential conditions, which, taken in isolation are difficult to measure (e.g. there are limited variables within the NSW that align to Health Services). Mapping the variables to the essential conditions is detailed in the methods section and need to be considered when interpreting results.

Survey design: data management and survey design means that the analysed dataset considers the four years' worth of survey data as one time period, meaning a cross-sectional study design. This type of survey design limits the analysis to exploring strengths of associations between variables and no causality can be determined from the analysis.

Alignment of survey variables to WHO HESRI framework: our analysis reveals that there is variation in the extent to which 'essential conditions' were represented in the survey. For example, there is significantly less variables aligning to Health Services compared to alignment to *Social and Human Capital*. This impacted our approach to analysis.

Inconsistency of survey questions: the data requirements of the methodology demand a large survey sample sizes and, in our experience, the inconsistency of survey questions over different years of survey data proves challenging. This has restricted what has been feasible in this exploratory analysis and it has limited the proxy variables chosen for each of the essential conditions.



Looking forward

This discussion paper has outlined the challenges and opportunities in applying the decomposition analysis method.

Further exploration, research, data gathering and analysis is needed, engaging with and involving relevant groups and communities, to understand the health gap and its drivers, for example:

- ✓ Exploring the application of the decomposition methodology to linked data to allow for stronger alignment between the WHO HESRI framework and individual-level variables, particularly those that represent health services;
- ✓ Exploring other stratification factors, for example, those that capture deprivation, but are measured on an individual-level;
- ✓ Applying the methodology to longitudinal survey data (e.g. Understanding Society and the Millennium Cohort Study), to assess whether causality can be determined, and to what extent;
- ✓ Applying the methodology to a dataset that captures the impacts of COVID-19; and
- ✓ Using the methodology as part of a mixed methods study in a defined population group, combining the decomposition method to quantify and understand the health gap, and also using qualitative methods (such as in depth interviews) to further understand factors contributing to observed gaps

Application of the Decomposition Analysis across different countries, population groups, settings and health outcomes can develop the methodology further to help explain the health gap and its drivers better.

Appendix

Applying decomposition analysis to understand health inequities

Background

Originating from studies designed to analyse labour market outcomes by groups such as sex and ethnicity, the Blinder-Oaxaca methodology divides the wage differential between two defined groups into a part that is termed explained and a part that is termed unexplained.

The explained component quantifies the group differences in productivity characteristics such as work experience and education. The unexplained component captures a residual part that cannot be accounted for by determinants of the outcome of measure, it subsumes the effect of group differences in the unobserved predictors, and in the context of the labour market, can be used as a measure of discrimination (29,30).

The majority of studies using this methodology can be found in the labour market and discrimination literature e.g. exploring the gender pay gap (31), however, there is acknowledgement in the literature that there may be merit in applying the methodology to other fields (32). For example, a report by the Northern Health Science Alliance (NHSA) described the decomposition of the gap in economic productivity between the North and the rest of England, using factors including morbidity and mortality. (33).

Blinder-Oaxaca decomposition methodology and interpretation

The Blinder-Oaxaca decomposition methodology can be applied to health inequalities to understand the factors which account most for observed differences. The methodology determines the relative contribution of each variable to each one of the explained and unexplained components.

The 'explained component' of the decomposition quantifies the portion of the health gap (i.e. the difference in predicted means of the health outcome variable) that is due to differences in the levels of observable predictor variables between the two comparison groups. This portion is also known as 'endowments effect'. It can be used to help identify policy areas and levers, which, if acted upon could facilitate change in the levels of these predictor variables to narrow the health gap.

The 'unexplained component' of the decomposition quantifies the portion of the health gap that is not explained by the levels of predictor variables, but by differences in response to changes in predictor variables. This part is also known as 'coefficients effect'. This component can also be due to unobserved factors not included in the model.

The model uses a pooled form of the Blinder-Oaxaca decomposition methodology. This generates a two-fold decomposition using the coefficients from a pooled model over both groups as the reference coefficients. This is partly due to encountering an index problem, where it is not clear which regression co-efficient should be used as the reference.

In a public health context, explained variation can capture systematic differences in the five essential conditions, unexplained variation can capture group differences in the effects of the essential conditions.

Further detail on the application of the methodology to health inequalities has been published by Rahimi and Nazari (2021) (34).

Can the unexplained component be broken down further?

If a given change in predictor variables is applied to both groups, and the change is the same for both groups, the unexplained component or coefficients effect captures any differences in response of the health outcome to this common change between the two groups. For example, the improvement in average health due to an improvement in housing quality may be larger for the more disadvantaged group than for the more advantaged group.

Since the pathways are unclear for policy to influence these differences in responses to changes in predictor variables, the value in breaking down and further analysing the unexplained component is limited.

Scenario

The prevalence of poor health is higher in the most deprived parts compared to the least deprived parts of Wales. A hypothetical public health intervention results in identical improvements in access to healthcare across Wales – the improvements in the most deprived parts of Wales are the same as the improvement in the least deprived parts of Wales.

A decomposition analysis of the gap in poor health (the outcome variable), examining the contribution to the gap attributed to access to healthcare (the predictor variable), shows that 40% of the gap can be attributed to systematic differences in access to healthcare; however, 60% of the gap is unexplained. The unexplained component quantifies how much of the gap is due to differences in the responses to the improvement in healthcare access e.g. a change in the prevalence of poor health due to the same intervention may be different for those in the least deprived compared to the most deprived parts of Wales due to a differential response to the same intervention.

Pathways for policy to influence different responses to changed predictor variables are not clear and so further analysis of this component is limited.

To explore the unexplained component further, exploration of other available variables may generate further insight into the differing response by both population groups.



It is important to note that the models used in this discussion paper are not able to account for all the factors that influence gaps in health between different population groups. This should be borne in mind when interpreting the results.

Examples of application

In recent years, applying the Blinder-Oaxaca method to understand health inequities has started to progress, for example:

- The WHO Regional Office for Europe explored measures of health at a European level and how the population/health is influenced by the five essential conditions. The subsequent publication, the European Health Equity Status Report, found that differences between socio-economic groups in terms of *Income Security and Social Protection* and *Living Conditions* were the largest contributors to inequities in self-reported health, mental health and life satisfaction (1)
- EU member states, such as Slovenia, have decomposed health outcomes such as self-reported health between high- and low-income populations groups. The report, published by National Institute of Public Health found that *Income Security and Social Protection* contributes the largest portion (42%) to the gap in self-reported health, followed by *Health Services* which contributes 23% to the gap. *Employment and Working Conditions* contributed the smallest portion (8%) (35)

Data collection

Unlike some countries in the WHO European Region, Wales (UK), is fortunate to have access to extensive data, information and intelligence relating to the health of its population, and the wider factors that determine population health. It is common for data to be analysed to generate indicators broken down across the life course, by sex, level of deprivation and by other measures where the data allow. This is done routinely by The Welsh Government (WG) and civil service departments such as The Office for National Statistics and National Health Service (NHS) Health Boards and Trusts. Similar work is also done across the third and academic sectors. Often, such indicators are used to inform policy action.

Although there are examples of complex analysis relating to population health using data, even linked data; indicators routinely produced by WG and related departments rarely go beyond quantifying the indicator.

Using the National Survey for Wales to decompose the health gap

The **National Survey for Wales (NSW)** (19), conducted by the Office for National Statistics (ONS) on behalf of the Welsh Government, is a monthly survey of Welsh residents (aged 16+) running from April to March annually (20,21). Initiated in 2012, the NSW covers a broad range of topics, and since 2016 has incorporated a number of other surveys including the Welsh Health Survey, the Arts in Wales Survey, the Welsh Outdoor Recreation Survey and the Active Adults Survey. Topics include:-

- Local area and environment
- Wellbeing and finances
- Housing
- Democracy and government
- Population health
- Internet and media
- Culture and Welsh language
- Sport and recreation
- Children and education
- NHS and social care

The NSW is conducted via a random sample (using the Royal Mail postcode address file) and a large-scale telephone survey with a sample size of approximately 1,000 individuals per month. Prior to the COVID-19 pandemic the survey was conducted via face-to-face interviews.

Data requirements and considerations

The first step in being able to decompose the health gap in Wales according to the five essential conditions was to assemble a single dataset comprising all the questions and associated responses that were collected as part of the NSW between 2016-17 and 2019-20. From this combined dataset, we could then identify:

- ✓ the questions most aligned to the five essential conditions
- ✓ the questions allowing for stratification of the population into distinct groups where potentially significant gaps in health outcomes were present, and to generate the health outcomes themselves.

The combined survey data (2016-17 to 2019-20) yielded responses to over 4,200 questions by 46,189 people.

It was not possible to use questions that were not asked concurrently over the 4 year period as the decomposition analysis requires complete cases only.

An important consideration was which questions could be included in the analysis alongside one another. For example, if one question was only asked in the 2016/17 survey, and conversely, another question was only asked in the 2019/20 survey, these two questions could never be jointly included in the analysis, as a single respondent would have been unable to provide answers to both questions due to the cross-sectional design of the survey.

The wording of the questions must remain the same over the 4 year period to be included in the analysis. *Although there were cases where questions in different years may have been in effect the same, or attempted to investigate the same issue, it was not possible to quantify how similar two questions were, or subsequently decide a threshold to determine if questions were similar enough to aggregate across survey years.*

Mapping the National Survey for Wales variables to the 5 essential conditions

To be able to decompose the gap in health outcomes between distinct population groups according to the five essential conditions, questions from the surveys were categorised based on their ability to act as proxy variables for those five essential conditions. We used a systematic approach to classifying the available questions; for each of the included questions, two reviewers independently attempted to categorise them according to the five essential conditions, health outcomes, and population stratification variables (or as irrelevant to the study). Where the two reviewers disagreed on the categorisation of a variable, the final decision was made by consensus, with the final category of each question being mapped back onto the combined analysis dataset.

It should be noted that although we used a systematic approach to categorise the available questions into those aligning to the five essential conditions to minimise bias, ultimately the decision is a subjective one based on our judgement, and the included variables, and associated results, should be considered in that context.

Trade-offs between sample size and quality of variables

When determining which variables representing the five essential conditions, stratification factors and health outcomes should be included in the final decomposition analysis, a qualitative assessment must be made regarding both the perceived strength of a given question as a proxy for an essential condition, but also the corresponding sample size for the analysis resulting from its inclusion. As such, a balance must be struck between trying to include those variables that are felt to be the best indicators, while retaining enough observations to enable robust statistical analysis.

In order to determine this, a technical team made assessments of the questions and their alignment to each essential condition. This created a shortlist of the most appropriate questions for inclusion in the analysis under each condition. The final variable selection was then made by choosing the combination of variables from this shortlist that covered all five essential conditions, appropriate stratification factors and health outcomes, while minimising the reduction in sample sizes due to the requirement for complete cases only.

In the case of stratification factors particularly, variables measured at an individual level were chosen in preference to area-based measures. For example, the ability of an individual respondent to save at least £10 a month was thought to be a better measure of relative financial deprivation than Welsh Index of Multiple Deprivation (WIMD), which will inherently capture less inter-person variation as it is based on the demographics of approximately 1,500 people living in an area. People living in more deprived areas are not necessarily deprived, however, we can say that someone who is unable to save at least £10 a month is likely less financially secure than someone who can.

Variables included in the decomposition

The final decomposition analysis included 16 variables aligned to the five essential conditions; two representing working conditions (excessive hours worked and job satisfaction), one representing access to health services (satisfaction with health services), three representing income security (not in paid work, use of foodbanks, trouble keeping up with bills), four representing living conditions (satisfaction with the local area, internet access, if the respondent was living in a single person household, and if the respondent felt safe in the local area), and six representing social and human capital (highest qualification, sense of trust in their community, sense of community more broadly, if they volunteered, and participation in sports and other activities).

The outcomes considered for the decomposition were: reported poor or fair health, low mental well-being, and low life satisfaction (see below coding of variables). The decomposition analysis sought to explain the differences in the prevalence of these outcomes in groups stratified by their ability to save at least £10 a month, whether they were in material deprivation, and the presence of a limiting long-standing illness, disability or infirmity. A full description of the survey questions included in the analysis and how they were mapped to analysis variables is shown in *Table 1*. Any responses where the respondent either refused to answer the question, or did not know the answer to the question were omitted from the analysis.

Using percentages to understand and quantify the health gap

In order to make the outputs from the Blinder-Oaxaca methodology meaningful and easy to interpret by stakeholders, raw analytical outputs from Stata are further manipulated to display percentages (see below). The calculated percentage shows how much of the total difference in a health outcome is accounted for by the level of observed covariates in the model. This follows a similar approach taken by Rahimi and Nazari (2021) (34).

Table 1: Mapping of survey questions to analysis variables

| Description | Response | Analysis value |
|---|---|----------------|
| Outcomes | | |
| Health in general | Very good | 0 |
| | Good | 0 |
| | Fair | 1 |
| | Bad | 1 |
| | Very bad | 1 |
| Well-being - Overall satisfaction with life (0-10 scale) | 0 | 1 |
| | 1 | 1 |
| | 2 | 1 |
| | 3 | 1 |
| | 4 | 0 |
| | 5 | 0 |
| | 6 | 0 |
| | 7 | 0 |
| | 8 | 0 |
| | 9 | 0 |
| 10 | 0 | |
| Warwick-Edinburgh Mental Well-being Scale - Grouped | Low well-being (14-44) | 1 |
| | Medium well-being (45-57) | 0 |
| | High well-being (58-70) | 0 |
| Stratification factors | | |
| Has a limiting long-standing illness, disability or infirmity | Yes | 1 |
| | No | 0 |
| Do you make regular savings of £10 a month or more | We / I have this | 0 |
| | We / I would like to have this but cannot afford this at the moment | 1 |
| | We / I do not want / need this at the moment | 0 |
| Material deprivation | In material deprivation | 1 |
| | Not in material deprivation | 0 |
| Employment and working conditions | | |
| Hours usually worked in main job (paid and unpaid) | 15 or less | 0 |
| | 16 - 30 | 0 |
| | 31 - 48 | 0 |
| | 49 or more | 1 |
| Overall satisfaction with present job | Low (0-4) | 1 |
| | Medium (5-6) | 0 |
| | High (7-8) | 0 |
| | Very high (9-10) | 0 |
| Health services | | |
| Overall satisfaction with the state of health services in Wales (0 -10 scale) | 0 | 0 |
| | 1 | 0 |
| | 2 | 0 |
| | 3 | 0 |
| | 4 | 1 |
| | 5 | 1 |
| | 6 | 1 |
| | 7 | 1 |
| | 8 | 1 |
| | 9 | 1 |
| 10 | 1 | |

| Income security and social protection | | |
|---|---|---|
| Keeping up with bills | Keeping up with all bills and commitments without any difficulties | 0 |
| | Keeping up with all bills and commitments but it is a struggle from time to time | 0 |
| | Keeping up with all bills and commitments but it is a constant struggle | 1 |
| | Falling behind with some bills or credit commitments | 1 |
| | Having real financial problems and have fallen behind with many bills or credit commitments | 1 |
| | Have no bills | 0 |
| Respondent currently in paid work (either full-time or part-time) | Yes | 0 |
| | No | 1 |
| Has household received food from a food bank in the last 12 months / Has household received food from a food bank in the last 12 months? (CASI) | Yes | 1 |
| | No | 0 |
| Living conditions | | |
| Household type | Single pensioner (no children) | 1 |
| | Married couple pensioner (no children) | 0 |
| | Single person, not a pensioner (no children) | 1 |
| | Two adult household with children | 0 |
| | Two adult household (up to one pensioner) without children | 0 |
| | Single parent household | 0 |
| | Other households | 0 |
| Household has access to the internet | Yes | 0 |
| | No | 1 |
| Overall satisfaction with local area as a place to live | Very satisfied | 0 |
| | Fairly satisfied | 0 |
| | Neither satisfied nor dissatisfied | 0 |
| | Fairly dissatisfied | 1 |
| | Very dissatisfied | 1 |
| People feeling safe (at home, walking in the local area, and travelling) | Feel safe | 0 |
| | Don't feel safe | 1 |
| Social and human capital | | |
| Participating in any activity | Yes | 1 |
| | No | 0 |
| Participation in sporting activities three or more times a week | Yes | 1 |
| | No | 0 |
| There are many people I can trust completely | Yes | 1 |
| | More or less | 1 |
| | No | 0 |
| People who volunteer (formally or informally) | Yes | 1 |
| | No | 0 |
| Have a sense of community (belonging; different backgrounds get on, treat with respect) | Yes | 1 |
| | No | 0 |
| Highest level of qualification | Higher degree / postgraduate qualifications | 0 |
| | First degree | 0 |
| | Diplomas, etc. | 0 |
| | A/AS level | 0 |
| | Trade apprenticeships | 0 |
| | O level / GCSE grades A-C, etc. | 0 |
| | O level / GCSE D-G | 0 |
| | Foreign qualifications | 0 |
| | Other qualifications | 0 |
| | No qualifications | 1 |

Table 2: Blinder-Oaxaca decomposition of low life satisfaction, stratified by “Do you make regular savings of £10 a month or more”, non-pensioner adults (aged 16-65), Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | |
|--|---|-------|
| Group 1: able to make regular saving of £10 a month or more | Number of observations: | 3,928 |
| Group 2: not able to make regular saving of £10 a month or more | Model: | Logit |
| | Number of observations in group 1: | 3,275 |
| | Number of observations in group 2: | 653 |

| lowlifesatbin | Coef. | Robust Std. Err. | z | P>z | [95% Conf. Interval] | |
|----------------|--------|------------------|--------|-------|----------------------|--|
| Overall | | | | | | |
| Group 1 | 0.011 | 0.002 | 6.240 | 0.000 | 0.008 0.014 | |
| Group 2 | 0.043 | 0.008 | 5.680 | 0.000 | 0.028 0.058 | |
| Difference | -0.032 | 0.008 | -4.110 | 0.000 | -0.047 -0.017 | |
| Explained | -0.016 | 0.004 | -3.510 | 0.000 | -0.024 -0.007 | |
| Unexplained | -0.016 | 0.009 | -1.770 | 0.077 | -0.035 0.002 | |

| explained | | | | | | |
|--------------------|--------|-------|--------|-------|---------------|--|
| age_rs | 0.001 | 0.000 | 1.370 | 0.172 | -0.000 0.002 | |
| gender_rs | -0.001 | 0.001 | -1.500 | 0.134 | -0.002 0.000 | |
| Working Conditions | -0.002 | 0.001 | -2.720 | 0.007 | -0.003 -0.000 | |
| Health Services | -0.001 | 0.000 | -1.880 | 0.061 | -0.002 0.000 | |
| Income Security | -0.008 | 0.003 | -2.540 | 0.011 | -0.014 -0.002 | |
| Living Conditions | -0.001 | 0.001 | -1.130 | 0.259 | -0.002 0.001 | |
| Social Capital | -0.004 | 0.001 | -3.160 | 0.002 | -0.006 -0.002 | |

| unexplained | | | | | | |
|--------------------|--------|-------|--------|-------|--------------|--|
| age_rs | -0.078 | 0.126 | -0.620 | 0.536 | -0.324 0.168 | |
| gender_rs | 0.018 | 0.033 | 0.550 | 0.585 | -0.047 0.083 | |
| Working Conditions | -0.013 | 0.019 | -0.670 | 0.501 | -0.050 0.024 | |
| Health Services | 0.008 | 0.011 | 0.760 | 0.448 | -0.013 0.029 | |
| Income Security | -0.003 | 0.010 | -0.290 | 0.775 | -0.023 0.017 | |
| Living Conditions | 0.019 | 0.025 | 0.730 | 0.464 | -0.031 0.068 | |
| Social Capital | -0.002 | 0.041 | -0.050 | 0.961 | -0.082 0.078 | |
| _cons | 0.034 | 0.104 | 0.330 | 0.741 | -0.169 0.238 | |

Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job

Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale)

Income security and social protection: Keeping up with bills

Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling)

Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification

Table 3: Blinder-Oaxaca decomposition of low mental well-being, stratified by "Do you make regular savings of £10 a month or more", non-pensioner adults (aged 16-65), Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | | | | | |
|--|--------|------------------|---|-------|------------|-----------|
| Group 1: able to make regular saving of £10 a month or more | | | Number of observations: | | 3731 | |
| Group 2: not able to make regular saving of £10 a month or more | | | Model: | | Logit | |
| | | | Number of observations in group 1: | | 3119 | |
| | | | Number of observations in group 2: | | 612 | |
| lowmentalwellbei~n | Coef. | Robust Std. Err. | z | P>z | [95% Conf. | Interval] |
| Overall | | | | | | |
| Group 1 | 0.166 | 0.007 | 25.430 | 0.000 | 0.153 | 0.179 |
| Group 2 | 0.317 | 0.018 | 17.140 | 0.000 | 0.281 | 0.353 |
| Difference | -0.151 | 0.020 | -7.710 | 0.000 | -0.190 | -0.113 |
| Explained | -0.083 | 0.011 | -7.760 | 0.000 | -0.104 | -0.062 |
| Unexplained | -0.068 | 0.021 | -3.270 | 0.001 | -0.109 | -0.027 |
| explained | | | | | | |
| age_rs | 0.000 | 0.001 | -0.540 | 0.587 | -0.001 | 0.001 |
| gender_rs | -0.005 | 0.002 | -2.250 | 0.025 | -0.008 | -0.001 |
| Working Conditions | -0.010 | 0.003 | -3.690 | 0.000 | -0.015 | -0.005 |
| Health Services | -0.001 | 0.001 | -1.170 | 0.243 | -0.003 | 0.001 |
| Income Security | -0.032 | 0.008 | -3.980 | 0.000 | -0.047 | -0.016 |
| Living Conditions | -0.004 | 0.002 | -1.850 | 0.064 | -0.008 | 0.000 |
| Social Capital | -0.032 | 0.005 | -6.000 | 0.000 | -0.042 | -0.021 |
| unexplained | | | | | | |
| age_rs | -0.038 | 0.050 | -0.770 | 0.441 | -0.136 | 0.059 |
| gender_rs | 0.041 | 0.025 | 1.630 | 0.103 | -0.008 | 0.091 |
| Working Conditions | 0.012 | 0.010 | 1.150 | 0.250 | -0.008 | 0.032 |
| Health Services | -0.015 | 0.009 | -1.710 | 0.087 | -0.033 | 0.002 |
| Income Security | -0.005 | 0.010 | -0.530 | 0.596 | -0.025 | 0.014 |
| Living Conditions | 0.013 | 0.016 | 0.800 | 0.425 | -0.019 | 0.045 |
| Social Capital | -0.037 | 0.046 | -0.800 | 0.423 | -0.128 | 0.054 |
| _cons | -0.039 | 0.081 | -0.480 | 0.633 | -0.198 | 0.121 |
| Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job | | | | | | |
| Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale) | | | | | | |
| Income security and social protection: Keeping up with bills; Has household received food from a food bank in the last 12 months / Has household received food from a food bank in the last 12 months? (CASI) | | | | | | |
| Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling) | | | | | | |
| Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification | | | | | | |

Table 4: Blinder-Oaxaca decomposition of fair/poor health, stratified by "Do you make regular savings of £10 a month or more", non-pensioner adults (aged 16-65), Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | | | | | |
|--|--------|------------------|------------------------------------|-------|------------|-----------|
| Group 1: able to make regular saving of £10 a month or more | | | Number of observations: | | 3954 | |
| Group 2: not able to make regular saving of £10 a month or more | | | Model: | | Logit | |
| | | | Number of observations in group 1: | | 3291 | |
| | | | Number of observations in group 2: | | 663 | |
| poorhealthbin | Coef. | Robust Std. Err. | z | P>z | [95% Conf. | Interval] |
| Overall | | | | | | |
| Group 1 | 0.153 | 0.006 | 24.500 | 0.000 | 0.140 | 0.165 |
| Group 2 | 0.268 | 0.017 | 15.680 | 0.000 | 0.235 | 0.302 |
| Difference | -0.116 | 0.018 | -6.360 | 0.000 | -0.152 | -0.080 |
| Explained | -0.048 | 0.009 | -5.200 | 0.000 | -0.066 | -0.030 |
| Unexplained | -0.068 | 0.020 | -3.410 | 0.001 | -0.107 | -0.029 |
| explained | | | | | | |
| age_rs | 0.003 | 0.002 | 1.810 | 0.071 | 0.000 | 0.007 |
| gender_rs | 0.005 | 0.002 | 2.750 | 0.006 | 0.001 | 0.009 |
| Working Conditions | -0.005 | 0.002 | -2.920 | 0.003 | -0.008 | -0.002 |
| Health Services | -0.002 | 0.001 | -1.760 | 0.078 | -0.004 | 0.000 |
| Income Security | -0.023 | 0.007 | -3.160 | 0.002 | -0.037 | -0.009 |
| Living Conditions | -0.004 | 0.002 | -1.960 | 0.050 | -0.009 | 0.000 |
| Social Capital | -0.023 | 0.004 | -5.910 | 0.000 | -0.030 | -0.015 |
| unexplained | | | | | | |
| age_rs | -0.033 | 0.044 | -0.760 | 0.449 | -0.119 | 0.053 |
| gender_rs | 0.004 | 0.021 | 0.200 | 0.838 | -0.036 | 0.045 |
| Working Conditions | -0.002 | 0.008 | -0.260 | 0.795 | -0.019 | 0.014 |
| Health Services | 0.004 | 0.007 | 0.540 | 0.589 | -0.010 | 0.018 |
| Income Security | 0.004 | 0.009 | 0.510 | 0.610 | -0.012 | 0.021 |
| Living Conditions | -0.009 | 0.014 | -0.680 | 0.495 | -0.037 | 0.018 |
| Social Capital | -0.046 | 0.038 | -1.200 | 0.229 | -0.122 | 0.029 |
| _cons | 0.011 | 0.067 | 0.160 | 0.871 | -0.121 | 0.143 |
| Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job | | | | | | |
| Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale) | | | | | | |
| Income security and social protection: Keeping up with bills; Has household received food from a food bank in the last 12 months / Has household received food from a food bank in the last 12 months? (CASI) | | | | | | |
| Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling) | | | | | | |
| Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification | | | | | | |

Table 5: Blinder-Oaxaca decomposition of low life satisfaction, stratified by material deprivation, persons aged 16+, Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | | | | | |
|--------------------------------------|--------|------------------|------------------------------------|-------|----------------------|--------|
| Group 1: Not in material deprivation | | | Number of observations: | | 4231 | |
| Group 2: in material deprivation | | | Model: | | Logit | |
| | | | Number of observations in group 1: | | 3693 | |
| | | | Number of observations in group 2: | | 538 | |
| lowlifesatbin | Coef. | Robust Std. Err. | z | P>z | [95% Conf. Interval] | |
| Overall | | | | | | |
| Group 1 | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 |
| Group 2 | 0.061 | 0.010 | 6.200 | 0.000 | 0.042 | 0.081 |
| Difference | -0.052 | 0.010 | -5.240 | 0.000 | -0.072 | -0.033 |
| Explained | -0.013 | 0.005 | -2.490 | 0.013 | -0.023 | -0.003 |
| Unexplained | -0.040 | 0.012 | -3.420 | 0.001 | -0.062 | -0.017 |
| explained | | | | | | |
| age_rs | 0.002 | 0.001 | 2.810 | 0.005 | 0.001 | 0.004 |
| gender_rs | -0.001 | 0.001 | -1.380 | 0.167 | -0.002 | 0.000 |
| Working Conditions | -0.002 | 0.001 | -2.730 | 0.006 | -0.003 | -0.001 |
| Health Services | -0.001 | 0.000 | -1.840 | 0.066 | -0.002 | 0.000 |
| Income Security | -0.006 | 0.003 | -2.040 | 0.042 | -0.012 | 0.000 |
| Living Conditions | -0.001 | 0.001 | -0.670 | 0.501 | -0.002 | 0.001 |
| Social Capital | -0.004 | 0.002 | -2.710 | 0.007 | -0.007 | -0.001 |
| unexplained | | | | | | |
| age_rs | -0.098 | 0.046 | -2.140 | 0.032 | -0.187 | -0.008 |
| gender_rs | 0.024 | 0.015 | 1.560 | 0.119 | -0.006 | 0.054 |
| Working Conditions | 0.001 | 0.005 | 0.270 | 0.789 | -0.009 | 0.012 |
| Health Services | 0.001 | 0.004 | 0.340 | 0.737 | -0.006 | 0.009 |
| Income Security | -0.003 | 0.005 | -0.560 | 0.577 | -0.013 | 0.007 |
| Living Conditions | 0.006 | 0.008 | 0.690 | 0.491 | -0.011 | 0.022 |
| Social Capital | -0.019 | 0.024 | -0.810 | 0.419 | -0.065 | 0.027 |
| _cons | 0.048 | 0.053 | 0.890 | 0.372 | -0.057 | 0.152 |

Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job

Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale)

Income security and social protection: Keeping up with bills.

Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling)

Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification

Table 6: Blinder-Oaxaca decomposition of low mental well-being, stratified by material deprivation, persons aged 16+, Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | | | | | |
|--|--------|------------------------------------|---------|-------|------------|-----------|
| Group 1: Not in material deprivation | | Number of observations: | | 4,019 | | |
| Group 2: in material deprivation | | Model: | | Logit | | |
| | | Number of observations in group 1: | | 3,524 | | |
| | | Number of observations in group 2: | | 495 | | |
| lowmentalwellbei~n | Coef. | Robust Std. Err. | z | P>z | [95% Conf. | Interval] |
| Overall | | | | | | |
| Group 1 | 0.159 | 0.006 | 26.160 | 0.000 | 0.147 | 0.171 |
| Group 2 | 0.388 | 0.022 | 17.990 | 0.000 | 0.346 | 0.430 |
| Difference | -0.229 | 0.022 | -10.240 | 0.000 | -0.273 | -0.185 |
| Explained | -0.104 | 0.014 | -7.500 | 0.000 | -0.131 | -0.077 |
| Unexplained | -0.126 | 0.024 | -5.140 | 0.000 | -0.173 | -0.078 |
| explained | | | | | | |
| age_rs | -0.001 | 0.002 | -0.520 | 0.601 | -0.005 | 0.003 |
| gender_rs | -0.004 | 0.002 | -2.100 | 0.036 | -0.008 | 0.000 |
| Working Conditions | -0.013 | 0.003 | -4.020 | 0.000 | -0.019 | -0.007 |
| Health Services | -0.001 | 0.001 | -0.910 | 0.364 | -0.003 | 0.001 |
| Income Security | -0.031 | 0.010 | -3.040 | 0.002 | -0.051 | -0.011 |
| Living Conditions | -0.006 | 0.003 | -1.610 | 0.108 | -0.012 | 0.001 |
| Social Capital | -0.048 | 0.006 | -7.530 | 0.000 | -0.061 | -0.036 |
| unexplained | | | | | | |
| age_rs | -0.135 | 0.054 | -2.470 | 0.013 | -0.241 | -0.028 |
| gender_rs | 0.051 | 0.031 | 1.640 | 0.101 | -0.010 | 0.112 |
| Working Conditions | 0.010 | 0.013 | 0.760 | 0.448 | -0.015 | 0.034 |
| Health Services | -0.018 | 0.011 | -1.720 | 0.086 | -0.039 | 0.003 |
| Income Security | 0.015 | 0.015 | 1.030 | 0.303 | -0.014 | 0.044 |
| Living Conditions | 0.020 | 0.021 | 0.940 | 0.347 | -0.022 | 0.062 |
| Social Capital | 0.056 | 0.058 | 0.970 | 0.334 | -0.057 | 0.169 |
| _cons | -0.125 | 0.092 | -1.350 | 0.178 | -0.306 | 0.057 |
| Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job | | | | | | |
| Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale) | | | | | | |
| Income security and social protection: Keeping up with bills; Has household received food from a food bank in the last 12 months / Has household received food from a food bank in the last 12 months? (CASI). | | | | | | |
| Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling) | | | | | | |
| Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification | | | | | | |

Table 7: Blinder-Oaxaca decomposition of low fair/poor health, stratified by material deprivation, persons aged 16+, Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | | | | | |
|--------------------------------------|--------|------------------|------------------------------------|-------|----------------------|--------|
| Group 1: Not in material deprivation | | | Number of observations: | | 4,246 | |
| Group 2: in material deprivation | | | Model: | | Logit | |
| | | | Number of observations in group 1: | | 3,694 | |
| | | | Number of observations in group 2: | | 552 | |
| poorhealthbin | Coef. | Robust Std. Err. | z | P>z | [95% Conf. Interval] | |
| Overall | | | | | | |
| Group 1 | 0.154 | 0.006 | 26.120 | 0.000 | 0.142 | 0.166 |
| Group 2 | 0.301 | 0.019 | 15.440 | 0.000 | 0.263 | 0.339 |
| Difference | -0.147 | 0.020 | -7.210 | 0.000 | -0.187 | -0.107 |
| Explained | -0.059 | 0.012 | -4.790 | 0.000 | -0.083 | -0.035 |
| Unexplained | -0.088 | 0.023 | -3.800 | 0.000 | -0.133 | -0.043 |
| explained | | | | | | |
| age_rs | 0.011 | 0.003 | 4.370 | 0.000 | 0.006 | 0.016 |
| gender_rs | 0.005 | 0.002 | 2.770 | 0.006 | 0.002 | 0.009 |
| Working Conditions | -0.007 | 0.002 | -3.250 | 0.001 | -0.011 | -0.003 |
| Health Services | -0.002 | 0.001 | -1.670 | 0.095 | -0.004 | 0.000 |
| Income Security | -0.028 | 0.010 | -2.900 | 0.004 | -0.047 | -0.009 |
| Living Conditions | -0.004 | 0.003 | -1.170 | 0.243 | -0.010 | 0.003 |
| Social Capital | -0.035 | 0.005 | -7.030 | 0.000 | -0.045 | -0.025 |
| unexplained | | | | | | |
| age_rs | 0.032 | 0.042 | 0.780 | 0.435 | -0.049 | 0.114 |
| gender_rs | -0.001 | 0.023 | -0.040 | 0.969 | -0.047 | 0.045 |
| Working Conditions | 0.009 | 0.010 | 0.870 | 0.382 | -0.011 | 0.028 |
| Health Services | -0.007 | 0.008 | -0.900 | 0.369 | -0.023 | 0.009 |
| Income Security | 0.017 | 0.011 | 1.580 | 0.114 | -0.004 | 0.037 |
| Living Conditions | -0.031 | 0.017 | -1.820 | 0.069 | -0.064 | 0.002 |
| Social Capital | -0.050 | 0.040 | -1.250 | 0.210 | -0.127 | 0.028 |
| _cons | -0.057 | 0.070 | -0.820 | 0.410 | -0.194 | 0.079 |

Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job

Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale)

Income security and social protection: Keeping up with bills.

Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling)

Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification

Table 8: Blinder-Oaxaca decomposition of low life satisfaction, stratified by limiting long-standing illness, disability or infirmity, persons aged 16+, Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | | | | | |
|--|--------|------------------|------------------------------------|-------|------------|-----------|
| Group 1: No limiting long-standing illness, disability or infirmity | | | Number of observations: | | 4,292 | |
| Group 2: Has a limiting long-standing illness, disability or infirmity | | | Model: | | Logit | |
| | | | Number of observations in group 1: | | 3,388 | |
| | | | Number of observations in group 2: | | 904 | |
| lowlifesatbin | Coef. | Robust Std. Err. | z | P>z | [95% Conf. | Interval] |
| Overall | | | | | | |
| Group 1 | 0.007 | 0.001 | 5.150 | 0.000 | 0.005 | 0.010 |
| Group 2 | 0.048 | 0.007 | 7.010 | 0.000 | 0.034 | 0.061 |
| Difference | -0.040 | 0.007 | -5.790 | 0.000 | -0.054 | -0.027 |
| Explained | -0.006 | 0.002 | -3.870 | 0.000 | -0.009 | -0.003 |
| Unexplained | -0.034 | 0.007 | -4.630 | 0.000 | -0.048 | -0.020 |
| explained | | | | | | |
| age_rs | -0.001 | 0.001 | -2.160 | 0.031 | -0.003 | 0.000 |
| gender_rs | 0.000 | 0.000 | -1.420 | 0.154 | -0.001 | 0.000 |
| Working Conditions | -0.001 | 0.000 | -2.520 | 0.012 | -0.002 | 0.000 |
| Health Services | 0.000 | 0.000 | -1.630 | 0.103 | -0.001 | 0.000 |
| Income Security | -0.001 | 0.000 | -2.770 | 0.006 | -0.002 | 0.000 |
| Living Conditions | 0.000 | 0.000 | -0.370 | 0.710 | -0.001 | 0.001 |
| Social Capital | -0.002 | 0.001 | -2.840 | 0.004 | -0.003 | -0.001 |
| unexplained | | | | | | |
| age_rs | -0.005 | 0.016 | -0.290 | 0.769 | -0.035 | 0.026 |
| gender_rs | -0.009 | 0.007 | -1.310 | 0.191 | -0.022 | 0.004 |
| Working Conditions | -0.004 | 0.003 | -1.270 | 0.203 | -0.011 | 0.002 |
| Health Services | 0.000 | 0.002 | -0.020 | 0.984 | -0.004 | 0.004 |
| Income Security | -0.001 | 0.001 | -0.530 | 0.594 | -0.003 | 0.002 |
| Living Conditions | 0.002 | 0.004 | 0.480 | 0.630 | -0.007 | 0.011 |
| Social Capital | -0.010 | 0.014 | -0.680 | 0.497 | -0.037 | 0.018 |
| _cons | -0.008 | 0.025 | -0.330 | 0.743 | -0.057 | 0.040 |
| Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job | | | | | | |
| Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale) | | | | | | |
| Income security and social protection: Keeping up with bills. | | | | | | |
| Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling) | | | | | | |
| Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification | | | | | | |

Table 9: Blinder-Oaxaca decomposition of low mental well-being, stratified by limiting long-standing illness, disability or infirmity, persons aged 16+, Wales, 2016-17 to 2019-20

| Blinder-Oaxaca decomposition | | | | | | |
|--|--------|------------------|------------------------------------|-------|----------------------|--------|
| Group 1: No limiting long-standing illness, disability or infirmity | | | Number of observations: | | 4,079 | |
| Group 2: Has a limiting long-standing illness, disability or infirmity | | | Model: | | Logit | |
| | | | Number of observations in group 1: | | 3,221 | |
| | | | Number of observations in group 2: | | 858 | |
| lowmentalwellbei~n | Coef. | Robust Std. Err. | z | P>z | [95% Conf. Interval] | |
| Overall | | | | | | |
| Group 1 | 0.152 | 0.006 | 24.500 | 0.000 | 0.140 | 0.164 |
| Group 2 | 0.309 | 0.015 | 20.090 | 0.000 | 0.279 | 0.339 |
| Difference | -0.157 | 0.017 | -9.480 | 0.000 | -0.190 | -0.125 |
| Explained | -0.051 | 0.006 | -8.310 | 0.000 | -0.063 | -0.039 |
| Unexplained | -0.106 | 0.016 | -6.460 | 0.000 | -0.139 | -0.074 |
| explained | | | | | | |
| age_rs | 0.006 | 0.003 | 2.170 | 0.030 | 0.001 | 0.010 |
| gender_rs | -0.002 | 0.001 | -1.770 | 0.077 | -0.004 | 0.000 |
| Working Conditions | -0.010 | 0.002 | -4.150 | 0.000 | -0.014 | -0.005 |
| Health Services | -0.001 | 0.001 | -1.040 | 0.299 | -0.002 | 0.001 |
| Income Security | -0.007 | 0.002 | -3.710 | 0.000 | -0.011 | -0.003 |
| Living Conditions | -0.006 | 0.002 | -2.700 | 0.007 | -0.010 | -0.002 |
| Social Capital | -0.031 | 0.004 | -7.410 | 0.000 | -0.039 | -0.023 |
| unexplained | | | | | | |
| age_rs | 0.121 | 0.047 | 2.550 | 0.011 | 0.028 | 0.214 |
| gender_rs | -0.027 | 0.021 | -1.300 | 0.194 | -0.067 | 0.014 |
| Working Conditions | 0.012 | 0.009 | 1.340 | 0.181 | -0.006 | 0.030 |
| Health Services | -0.013 | 0.007 | -1.820 | 0.068 | -0.027 | 0.001 |
| Income Security | 0.001 | 0.006 | 0.210 | 0.833 | -0.010 | 0.012 |
| Living Conditions | -0.004 | 0.014 | -0.300 | 0.761 | -0.032 | 0.023 |
| Social Capital | 0.045 | 0.045 | 0.990 | 0.320 | -0.044 | 0.133 |
| _cons | -0.242 | 0.075 | -3.220 | 0.001 | -0.389 | -0.095 |
| Employment and working conditions: Hours usually worked in main job (paid and unpaid); Overall satisfaction with present job | | | | | | |
| Health services: Overall satisfaction with the state of health services in Wales (0 - 10 scale) | | | | | | |
| Income security and social protection: Keeping up with bills; Has household received food from a food bank in the last 12 months / Has household received food from a food bank in the last 12 months? (CASI). | | | | | | |
| Living conditions: Household type; Household has access to the internet; Overall satisfaction with the local areas as a place to live; People feeling safe (at home, walking in the local area, and travelling) | | | | | | |
| Social and human capital: Participating in any activity; Participation in sporting activities three or more times a week; There are many people I can trust completely; People who volunteer (formally or informally); Have a sense of community (belonging; different backgrounds get on, treat with respect); Highest qualification | | | | | | |

References

1. **WHO Regional Office for Europe.** Healthy, prosperous lives for all: the European Health Equity Status Report. [Online] 2019. [Cited 24 01 2022.] <https://www.who.int/europe/publications/item/9789289054256>
2. **WHO Regional Office for Europe.** New agreement between WHO/Europe and Welsh Government launched to accelerate action on health equity. [Online] 2020. [Cited 24 01 2022.] <https://www.who.int/europe/news/item/05-11-2020-new-agreement-between-who-europe-and-welsh-government-launched-to-accelerate-action-on-health-equity>
3. **Public Health Wales.** Welsh Health Equity Status Report initiative (WHESri) [Online] 2022. [Cited 24 01 2022.] <https://phw-whocc.co.uk/ih/our-work/welsh-health-equity-status-report-initiative-whesri/>
4. **Welsh Government.** The Well-being of Future Generations [Online] 2015. [Cited 24 01 2022.] <https://gov.wales/well-being-of-future-generations-wales>
5. **Welsh Government.** A More Equal Wales: The Socio-economic Duty [Online] 2022. [Cited 24 01 2022.] <https://gov.wales/more-equal-wales-socio-economic-duty>
6. **Welsh Government.** A Healthier Wales: our Plan for Health and Social Care [Online]. 2021. [Cited 24 01 2022.] <https://gov.wales/sites/default/files/publications/2021-09/a-healthier-wales-our-plan-for-health-and-social-care.pdf>
7. **Public Health Wales.** Making a Difference: Investing in Sustainable Health and Well-being for the People of Wales [Online]. 2016. [Cited 24 01 2022.] <https://phwwhocc.co.uk/resources/making-a-difference-investing-in-sustainable-health-and-well-being-for-the-people-of-wales/>
8. **United Nations.** The Sustainable Development Agenda [Online]. 2020. [Cited 24 01 2022.] <https://www.un.org/sustainabledevelopment/development-agenda/>
9. **WHO Regional Office for Europe.** European Programme of Work (2020–2025) – “United Action for Better Health in Europe” [Online]. 2022. [Cited 24 01 2022.] <https://www.who.int/europe/about-us/our-work/european-programme-of-work>
10. **Public Health Wales.** Placing health equity at the heart of the COVID-19 sustainable response and recovery: Building prosperous lives for all in Wales [Online]. 2021. [Cited 24 01 2022.] <https://phwwhocc.co.uk/resources/welsh-health-equity-status-report-whesri/>
11. **Institute of Medicine (U.S.), editor.** The future of the public's health in the 21st century. Washington, D.C: National Academies Press; 2003. 509 p.
12. **Marmot M.** The health gap: Doctors and the social determinants of health. *Scandinavian Journal of Public Health* [Online]. 2017. [Cited 24 01 2022.] <http://journals.sagepub.com/doi/10.1177/1403494817717448>
13. **Institute of Health Equity.** Fair society, healthy lives: the Marmot review [Online] 2010. [Cited 24 01 2022.] <https://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-full-report-pdf.pdf>
14. **Tudor Hart J.** THE INVERSE CARE LAW. *THE LANCET* [Online]. 1971. [Cited 24 01 2022.] <https://linkinghub.elsevier.com/retrieve/pii/S014067367192410X>
15. **Welsh Government.** Chief Medical Officer: annual report 2021 to 2022 [Online]. 2022. [Cited 01 07 2022.] <https://gov.wales/chief-medical-officer-annual-report-2021-2022>
16. **Public Health Wales.** Life Expectancy and Mortality in Wales (2020) [Online]. 2022. [Cited 24 01 2022.] <https://phw.nhs.wales/services-and-teams/observatory/data-and-analysis/life-expectancy-and-mortality-in-wales-2020/>
17. **Welsh Government.** Socio-economic Duty: an overview [Online]. 2020. [Cited 24 01 2022.] <https://gov.wales/socio-economic-duty-overview>
18. **Currie J, Boyce T, Evans L, Luker M, Senior S, Hartt M, et al.** Life expectancy inequalities in Wales before COVID-19: an exploration of current contributions by age and cause of death and changes between 2002 and 2018. *Public Health* [Online]. 2021. [Cited 24 01 2022.] <https://linkinghub.elsevier.com/retrieve/pii/S0033350621000470>
19. **Welsh Government.** National Survey for Wales [Online]. 2022. [Cited 24 01 2022.] <https://gov.wales/national-survey-wales>
20. **Office for National Statistics.** National Survey for Wales [Online]. 2022. [Cited 24 01 2022.] <https://www.ons.gov.uk/surveys/informationforhouseholdsandindividuals/householdandindividualsurveys/nationalsurveyforwales>
21. **Welsh Government.** National Survey for Wales: technical information [Online]. 2021. [Cited 24 01 2022.] <https://gov.wales/national-survey-wales-technical-information>
22. **World Health Organization.** DATA, ANALYTICS & DELIVERY FOR IMPACT IN FOCUS: 2021 [Online]. 2021. [Cited 24 01 2022.] <https://www.who.int/publications/i/item/in-focus-2021>
23. **Remington PL, Catlin BB, Gennuso KP.** The County Health Rankings: rationale and methods. *Population Health Metrics* [Online]. 2015. [Cited 24 01 2022.] <https://pophealthmetrics.biomedcentral.com/articles/10.1186/s12963-015-0044-2>
24. **National Health Service.** Population Health and the Population Health Management Programme [Online]. 2022. [Cited 24 01 2022.] <https://www.england.nhs.uk/integratedcare/what-is-integrated-care/phm/>
25. **The Health Foundation.** The NHS as an anchor institution [Online]. 2022. [Cited 24 01 2022.] <https://www.health.org.uk/news-and-comment/charts-and-infographics/the-nhs-as-an-anchor-institution>
26. **The King's Fund.** Anchor institutions and how they can affect people's health [Online]. 2021. [Cited 24 01 2022.] <https://www.kingsfund.org.uk/publications/anchor-institutions-and-peoples-health>
27. **Masters R, Anwar E, Collins B, Cookson R, Capewell S.** Return on investment of public health interventions: a systematic review. *Journal of Epidemiology & Community Health* [Online]. 2017. [Cited 24 01 2022.] <https://jech.bmj.com/lookup/doi/10.1136/jech-2016-208141>
28. **Bambra C, Riordan R, Ford J, Matthews F.** The COVID-19 pandemic and health inequalities. *Journal of Epidemiology & Community Health* [Online]. 2020. [Cited 24 01 2022.] <https://jech.bmj.com/lookup/doi/10.1136/jech-2020-214401>
29. **Neumark D.** Employers' Discriminatory Behaviour and the Estimation of Wage Discrimination. *The Journal of Human Resources* [Online]. 1988. [Cited 24 01 2022.] <https://www.jstor.org/stable/145830?origin=crossref>
30. **Oaxaca RL, Ransom MR.** On discrimination and the decomposition of wage differentials. *Journal of Econometrics* [Online]. 1994. [Cited 24 01 2022.] <https://linkinghub.elsevier.com/retrieve/pii/0304407694900744>
31. **Tharp DT, Lurtz M, Mielitz KS, Kitces M, Ammerman DA.** Examining the gender pay gap among financial planning professionals: A Blinder-Oaxaca decomposition. *Financial Planning Review*. [Online]. 2019. [Cited 24 01 2022.] <https://onlinelibrary.wiley.com/doi/abs/10.1002/cfp2.1061>
32. **Jann B.** The Blinder–Oaxaca Decomposition for Linear Regression Models. *The Stata Journal: Promoting communications on statistics and Stata* [Online]. 2008. [Cited 24 01 2022.] <http://journals.sagepub.com/doi/10.1177/1536867X0800800401>
33. **Northern Health Sciences Alliance.** Health for Wealth: Building a Healthier Northern Powerhouse for UK Productivity [Online]. 2018. [Cited 24 01 2022.] <https://www.thenhsa.co.uk/app/uploads/2018/11/NHSA-REPORT-FINAL.pdf>
34. **Rahimi E, Hashemi Nazari SS.** A detailed explanation and graphical representation of the Blinder–Oaxaca decomposition method with its application in health inequalities. *Emerging Themes in Epidemiology* [Online]. 2021. [Cited 24 01 2022.] <https://ete-online.biomedcentral.com/articles/10.1186/s12982-021-00100-9>
35. **National Institute of Public Health.** Inequalities in health future challenges for intersectoral cooperation [Online]. 2021. [Cited 24 01 2022.] <https://www.nijz.si/en/publikacije/inequalities-in-health-future-challenges-intersectoral-cooperation>



World Health Organization
Collaborating Centre on Investment
for Health and Well-being



GIG
CYMRU
NHS
WALES | Iechyd Cyhoeddus
Cymru
Public Health
Wales



Llywodraeth Cymru
Welsh Government

Public Health Wales
works to protect and improve
health and well-being and
reduce health inequalities for
the people of Wales.

Public Health Wales
Number 2 Capital Quarter
Tyndall Street
Cardiff CF10 4BZ
Tel: +44 (0)29 2022 7744

phw.nhs.wales

Email: generalenquiries@wales.nhs.uk

 [@PublicHealthW](https://twitter.com/PublicHealthW)

 [/PublicHealthWales](https://www.facebook.com/PublicHealthWales)

phwwhocc.co.uk

 [@phwwhocc](https://twitter.com/phwwhocc)  [Phwwhocc](https://www.facebook.com/Phwwhocc)