

**IHE WORKING PAPER:**  
ESTIMATING THE IMPACT  
OF ACTION ON THE  
SOCIAL DETERMINANTS OF  
HEALTH ON INEQUALITIES  
IN HEALTH IN SCOTLAND

**SEPTEMBER 2026**

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# ACKNOWLEDGEMENTS

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We would like to thank Elizabeth Richardson from Public Health Scotland for her help with the data analysis.

**Suggested citation:** Donkin, A. Jones, A. (2026) *IHE Working Paper: Estimating The Impact of Action on The Social Determinants of Health on Inequalities in Health in Scotland*. UCL Institute of Health Equity

# INTRODUCTION

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## WIDENING INEQUALITIES AND PROGRESSIVE POLICIES

In 2023, the Scotland Government established the Collaboration for Health Equity in Scotland (CHES), a partnership between the UCL Institute of Health Equity, Public Health Scotland and three collaborating places, Aberdeen City, North Ayrshire and South Lanarkshire. The aim was to demonstrate practical ways to support greater health equity and advise local and national systems. The backdrop was increasing inequalities in health despite progressive policies such as the Scottish Child Payment [1] and an understanding that ambition and policy intent was not matched by people's experiences or the outcomes seen at a national level [2]. Analysis and overview of the experience of CHES and resulting actions is summarised in 3 reports and an executive summary published by the IHE [3, 4, 5].

This supplementary analysis, which is summarised as a case study in the main report [5], explores possible impacts on health equity in Scotland from three broad intervention outcomes: increased household incomes for the poorest, improved energy efficiency for low-income households in energy inefficient dwellings, and expanded/maintained early childhood interventions.

One explanatory factor for the variation between policy intent, people's experiences and health inequities at a national level is that support during the early years and reductions in child poverty, which is the lowest in the UK, are not likely to have a measurable impact on standard measures of health inequality (healthy life expectancy or life expectancy) for a generation, while at the same time increases in deep poverty brought on by reductions in the purchasing power of the basic level of Universal Credit [6], have a more immediate impact, worsening adult health.

This paper provides plausible estimates of action in key social determinants of health, on health inequities. The insights are based on evidence currently available from a number of sources and provide a rationale for action at scale, however should not be seen as a prescription for specific policy choices or a definitive prediction of an exact outcome. This new analyses supports more ambitious action and targets that are more likely to effect positive change [7].

## FOCUSING ON THOSE FACTORS MOST LIKELY TO REDUCE HEALTH INEQUALITIES

We focus on action targeting material deprivation, housing (including heating) and improving educational outcomes – three of the largest drivers of health inequalities. These factors explain 70% of the variation in self-rated health within countries in Europe [8]. To enable us to show the possible impact of improvements in these areas we need to choose specific interventions which have been evaluated – we show the impact of increases in income; improvements to housing quality through insulation and ventilation; and improvements in education outcomes through improvements in early years childcare and education. While the percentage contribution of these factors to health inequalities in Scotland may be higher or lower than the European figure, given the prevalence of low incomes, fuel and housing poverty and the educational attainment gap in Scotland, it is likely that sufficient action on these factors would also significantly reduce health inequalities.

This report is a working paper, making use of the best information currently available. It reveals broad dynamics about changes in health equity, and which policy options have larger or smaller impacts. But specific numbers should be treated with caution because the evidence base is based on past interventions in different places. This work is not intended to provide information regarding which interventions should be employed to deliver changes in income, housing or education through early years intervention; however, a similar approach to that taken with the Triple I model, exploring specific policy options in each policy area, could provide rich information to inform policy makers [9].

# CONTEXT - HEALTH INEQUALITIES

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## HEALTH INEQUITIES IN SCOTLAND

Deprivation based inequality in healthy life expectancy is increasing in Scotland and is currently at its highest level since 2013 (when it was first routinely reported). This is true for both relative and absolute inequality. Between 2019 and 2021, people in the most affluent communities could expect nearly 26 more years of healthy life than people in the most deprived communities [10].

Similarly there are wide health inequities in premature mortality, coronary heart disease deaths and cancer deaths. However, it is not true across all areas of health. Some inequalities have remained stable over time, such as the rate of first ever hospital admissions for heart attack (aged under 75 years) and cancer incidence. Others have reduced, such as alcohol related hospital admissions, which are now less common and less unequally distributed across levels of community deprivation than they were before. Health inequalities are not inevitable. They can be managed and reduced.

## HEALTH INEQUITY IN GOVERNMENT POLICIES, STRATEGIES AND FRAMEWORKS

Health inequality features heavily across Scottish government policies, strategies and frameworks. The ten year population health framework, which targets health inequality through action on the social determinants of health [11]. Addressing the determinants of health and inequality also plays an important part in the latest Programme for Government, which is structured around the four priorities of eradicating child poverty, growing the economy, tackling the climate emergency and improving public services [12]. The National Strategy for Economic Transformation includes a section on building a fairer, more equal society, in which health is highlighted [13].

# CONTEXT – EXISTING POLICIES AND INTERVENTIONS

## MATERIAL DEPRIVATION

Scotland has a devolved social security system that operates under the Social Security Act 2018 [14]. It has responsibility for disability and carer benefits, fuel support, funeral support and family benefits. The Scottish Child Payment currently pays £28.20 per child per week for eligible low-income families [15] and, through the Council Tax Reduction, Local Authorities can reduce council tax for low-income households [16]. There is also the Scottish Welfare Fund, which provides grant-based support for people facing financial difficulty [17]. Some of the largest forms of social security however, such as Universal Credit, operate and are managed at the UK level.

The government's income security policy includes a long-term plan to introduce a Minimum Income Guarantee [18]. This is intended to act as a floor below which one's income cannot fall, and an acknowledgement of the Social Security Act's recognition of social security as a human right. The current design suggests that this would be achieved through a combination of fair pay, affordable costs, high-quality services, and stronger social security, working together as a single system. It is significantly influenced by the Joseph Rowntree Foundation's Minimum Income Standard, but it is still at the conceptualisation and design phase of the overall policy cycle.

## HOUSING AND FUEL DEPRIVATION

The Scottish Government aims to end fuel poverty by 2040. It has identified four key areas to address – poor energy efficiency, high energy costs, low incomes and inefficient energy use. The Fuel Poverty Act 2019 sets a series of legislative targets [19]. It is supported by the 'Tackling fuel poverty in Scotland' strategy paper, which offers policies and proposals for national government, local authorities and third sector partners [20].

These policies are supplemented with a range of energy saving home improvement schemes to support people who have difficulty paying their fuel bills or keeping their home warm [21]. Under the 'area-based schemes' category, local authorities develop and deliver their own energy efficiency programmes (such as solid wall insulation in areas with high levels of fuel poverty). Warmer Homes Scotland is a national scheme helping fuel-poor households with heating and insulation measures. Third, the Grant and Loan Scheme offers interest free loans and/or grants to support the installation of clean heating systems and energy efficiency measures.

## FAMILY SUPPORT, EARLY EDUCATION AND CARE

Scotland's family support and early childhood intervention landscape is guided by the Early Years Framework [22]. This defines early childhood as pre-birth to eight years old. It recognises the right of all young children to high quality relationships, environments and services, and is intended to be interpreted broadly, encompassing play, learning, social relationships and emotional and physical wellbeing. However, it is, at the moment, aspirational. In practice, key early childhood interventions include the recently expanded access to early learning and childcare, as well as a range of child support payments and community services such as health visitors and community midwives.

All three- and four-year-olds, as well as eligible two-year-olds, can get up to 1,140 hours of free early learning and childcare per year [23]. In addition to the Scottish Child Payment (mentioned above), families with young children can access Best Start Grants and Best Start Foods [24]. Best Start Grants provide up to three lump sum payments to families for support during pregnancy and infancy (£767.50), early learning (£319.80), and school age years (£319.80). Best Start Foods offers a monthly payment to support with the purchase of healthy food throughout pregnancy (£21.60), infancy (£43.20) and ages one to three (£21.60). The Universal Health Visiting Service starts during pregnancy and continues until the child goes to school [25]. All families are entitled to up to 11 home visits, with formal child health reviews to identify developmental concerns around 14, 28 and 56 months. If needed, health visitors or community midwives can offer gateways to other services too. For first time mothers aged 19 or under (or 25 or under in areas that have enough resources), this can be supplemented with the Family Nurse Partnership [26]. This is a much more intensive package of home visits, covering the period from early pregnancy through to the child's second birthday.

## BROAD APPROACH

Three broad example interventions are chosen, each targeting one of the above mentioned major determinants of health inequalities:

- Expansion of income security measures (such as increased welfare payments) to reduce material deprivation
- Provision of energy efficiency retrofits for low-income households (such as insulation or new boilers) to reduce housing and fuel deprivation
- Expansion/ consolidation of early childhood interventions in low-income communities (such as childcare and health visits) to reduce variation in educational outcomes

Evidence about the impacts of each broad category of intervention is used to explore the potential subsequent changes in population health inequalities in Scotland.

Health inequalities are measured as differences in life expectancy or healthy life expectancy across household income deciles. Because measures of health outcome are not routinely published by household income decile, we use healthy life expectancy by Scottish Index of Multiple Deprivation as a proxy. We assume that healthy life expectancy in the lowest income 10% of households is the same as healthy life expectancy in the most deprived 10% of communities, and so on throughout the deciles.

For each scenario, the slope index of inequality is calculated. The change in inequality between the status quo and a given scenario is calculated as the percentage change from one to the other. For example, a reduction in the slope index of inequality from eight to four would be quantified as a 50% reduction in inequality.

In addition to the percentage change in the slope index of inequality, the plausible number of healthy life years gained is calculated by multiplying the expected number of beneficiaries by the individual level expected benefits. This is then multiplied by £25,000 to quantify the social value of the healthy life years gained. This is based on the general (although not universal) guidance that the Scottish government recommends medicines for use if they cost less than £20,000-£30,000 per quality adjusted life year gained [27]. This is done for the provision of energy efficiency retrofits for low-income households scenarios and the expansion/ consolidation of early childhood interventions in low-income communities scenarios. It is not done for the scenarios looking at the expansion of income security measures, because these look at gains in life expectancy (rather than healthy life expectancy). We do not have a benchmark

for how much the Scottish government or Scottish society values in financial terms, an extra year of life (regardless of health state).

The quality of evidence available on the population level health impacts of social policies is generally quite weak. Due to the nature of the scenarios being explored, this is probably unavoidable and is an issue globally. First, many social policies are thought to have potentially lifelong health impacts, so their full scale cannot be known until all beneficiaries have died. However, research studies generally look at much shorter-term impacts (such as one- to five-year follow up periods). Second, ethical concerns around withholding social policies from some groups of people result in a lack of concrete counterfactual information. For these two reasons (lack of robust information about the long-term impacts, and lack of robust information about the counterfactuals), we must treat estimates of the health impacts of social policies with a high level of uncertainty. To mitigate this, for each area of intervention, we add an informed hypothetical scenario as sensitivity analysis.

## INTERVENTIONS EXPLORED

To explore the impact of a decrease in 'material deprivation' on health in Scotland, we look at increases in the income of low-income households – be that through increased pay or cash benefits. Income and the ability to afford certain basic items forms the basis of the UK government's work on material deprivation [28]. It is important to note, however, that income is not the only determinant of material deprivation. It may also be contributed to by characteristics such as disability or lack of access to certain products and services [29].

To explore the impact of a decrease in 'housing and fuel deprivation', we look at increasing the energy efficiency of dwellings occupied by low-income households. In addition to increased warmth and reduced fuel bills, improved energy efficiency and ventilation should reduce the spread of damp and mould and improve respiratory health. However further interventions would be necessary to tackle other important aspects of housing deprivation, such as affordability, homelessness, leaks and disrepair.

To explore the impact of an improvement in 'educational outcomes', we look at increasing access to a package of family support and early childhood interventions (targeting children from birth up to school age). The European Health Equity Status Report highlights the foundational importance of early childhood interventions, both with respect to longer term education and health outcomes [30]. This is corroborated in publications on educational inequalities by the Organisation for Economic Cooperation and Development (OECD) [31] and the Institute for Fiscal Studies (IFS) [32].

EFFECT SIZES

Potential per person health impacts of the interventions are taken either from published research (household energy efficiency improvements and early childhood interventions) or bespoke adaptations of published research (increasing household incomes). These are supplemented with hypothetical impact sizes as sensitivity analysis to reflect the broad uncertainty around the estimates.

The impact of an increase in **household incomes** up to the Joseph Rowntree Foundation's Minimum Income Standard (MIS) on life expectancy is loosely taken from work on the effects of income changes resulting from changes in income tax and devolved benefits in Scotland on health inequalities [33]. It required an adaptation to the published research to cover much larger increases in household income than were presented in the original publication. This was conducted by Elizabeth Richardson (the lead author of that research), and further details are presented in the technical supplements. They estimate that, on average, if households were brought up to the MIS, life expectancy would increase by 1.2% for affected women, and 1.5% for affected men. They do note, however, that the methods employed may overestimate the impact of an increase in household income on health (through inevitably missing variables out of their regression analysis), so they include a hypothetical example with the effect size halved.

The impact of an improvement in **household energy efficiency** on healthy life expectancy is taken from modelling work using English household data on the long term health impacts of both increased indoor temperatures and altered air quality [34], and follow up work using broadly the same assumptions to inform NICE guidance on excess winter deaths and illness and the health risks associated with cold homes [35]. The modelling suggests an average person in an average dwelling gains 0.22 Quality Adjusted Life Years (QALYs)

over a 50 year time period if they upgrade their home energy efficiency to basic standards. For our purposes, one additional QALY gained is considered equivalent to one additional healthy life year, with a social value of £25,000. These estimates may be conservative as we are imagining a policy that targets energy inefficient dwellings inhabited by low-income households (as opposed to average dwellings and average households), so an additional hypothetical effect size of one QALY per person per upgrade is also considered.

The impact of **family support and early childhood interventions** on healthy life expectancy is taken from mixed empirical and modelling work by Garcia and Heckman [36]. They use data from an American randomised early childhood intervention targeting disadvantaged children. They have longitudinal follow-up data from birth until adulthood. The experiment was implemented during the 1970s, but its design means that it is an extremely powerful demonstration of the life-long health impacts such interventions (particularly early education) can have. Children in the treatment arm of this study, aged 0 to 5, received cognitive and social stimulation for eight hours a day in centre-based care. They also received nutritious meals and medical check-ups. The authors calculate that boys averted, on average, 3.8 Disability Adjusted Life Years (DALYs) because of the intervention. On the other hand, the girls that they observed only averted 0.05 DALYs (on average). Subsequent research has also noted lower health impacts from early interventions or education among women than men, but not to the same extent [37]. As such, an additional hypothetical effect size of two DALYs averted per girl benefiting from such interventions is included. For our purposes, one additional DALY averted is considered equivalent to one additional healthy life year gained, with a social value of £25,000. This is not a perfect match, but informative as a rough approximation.

Table 1: Description of scenarios explored

| Intervention category               | Scenario | Description of interventions                                                                                                                                                |
|-------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reduced material deprivation        | 1        | All household incomes raised to the JRF MIS (average life expectancy gain of 1 year for women, or 1.1 years for men)                                                        |
|                                     | 2        | All household incomes raised to the JRF MIS (average life expectancy gain of 0.5 years for women, or 0.55 years for men)                                                    |
| Home Energy Efficiency Improvements | 1        | Home energy efficiency improvements for the lowest income 20% of households (assuming 0.22 QALYs gained per person living in an improved dwelling)                          |
|                                     | 2        | Home energy efficiency improvements for the lowest income 20% of households (assuming 1 QALY gained per person living in an improved dwelling)                              |
| Early Childhood Education           | 1        | Comprehensive early childhood interventions taken up by all children aged 0-4 in the lowest income 40% of households (assuming almost no health benefit for girls)          |
|                                     | 2        | Comprehensive early childhood interventions taken up by all children aged 0-4 in the lowest income 40% of households (assuming impact size for girls is half that for boys) |

# RESULTS

## REDUCED MATERIAL DEPRIVATION

We estimate that 28.8% of the Scottish population (786,680 households), lived below the Joseph Rowntree Foundation’s MIS in 2023/24.<sup>1</sup> The average annual income uplift required to ensure every household in Scotland met the 2023 MIS was £1,915. Across all 786,680 households, this would amount to £1.5 billion per annum. We estimate that the corresponding increase in life expectancy from implementing this uplift would be 1 year for females (1.2% increase) and 1.1 years for males (1.5% increase). The predicted increases are greater in more deprived areas (around 2.5 years in the most deprived decile) with smaller average increases in less deprived areas (1-2 months in the least deprived decile). If achieved, this would translate into a 22% reduction in overall inequality in life expectancy for females, and a 19% reduction for males.

Note that this scenario looks at inequalities in life expectancy rather than healthy life expectancy. This means that the percentage change value is not directly comparable to those presented for household energy efficiency improvements or early childhood interventions. The difference in life expectancy between the most and least deprived communities is around ten years, whereas the difference in healthy life expectancy is around 25 years. Not only is the substantive health benefit different (life expectancy vs healthy life expectancy), but the absolute quantity of the health benefit needed to achieve a given percentage reduction in inequality is different. For example, in terms of a percentage reduction in health inequality, a two year improvement in life expectancy for the most deprived communities would be equivalent to a five year improvement in healthy life expectancy.

Table 2: Reductions in inequalities associated large scale roll out of social policies

| Intervention category               | Scenario | Brief description of intervention (DALYs and QALYs are treated as equivalent to healthy life years) | % reduction in life expectancy health inequalities (Females) | % reduction in life expectancy health inequalities (Males) |
|-------------------------------------|----------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------|
| Social Security <sup>2</sup>        | 1        | Full impact                                                                                         | 19%                                                          | 22%                                                        |
|                                     | 2        | 50% of full impact                                                                                  | 9.5%                                                         | 11%                                                        |
| Home Energy Efficiency Improvements | 1        | 0.22 QALYS per person                                                                               | 0.74%                                                        | 1.04%                                                      |
|                                     | 2        | 1 QALY per person                                                                                   | 3.47%                                                        | 3.68%                                                      |
| Early Childhood Education           | 1        | 3.8 DALYs for boys. 0.05 DALYs for girls.                                                           | 0.37%                                                        | 19.44%                                                     |
|                                     | 2        | 3.8 DALYs for boys. 2 DALYs for girls.                                                              | 10.66%                                                       | 19.44%                                                     |

<sup>1</sup>For more details on the method behind the reduced material deprivation estimates, please see the supplementary technical note, written by Elizabeth Richardson and available on the IHE CHES web page. <https://www.instituteofhealthequity.org/resources-reports/scotland---collaboration-for-health-equity-ches>.

<sup>2</sup>Note that this scenario is looking at impacts on life expectancy rather than healthy life expectancy.

Figure 1: Female life expectancy at birth in the baseline (status quo) and MIS uplift scenario, by SIMD 2020 decile

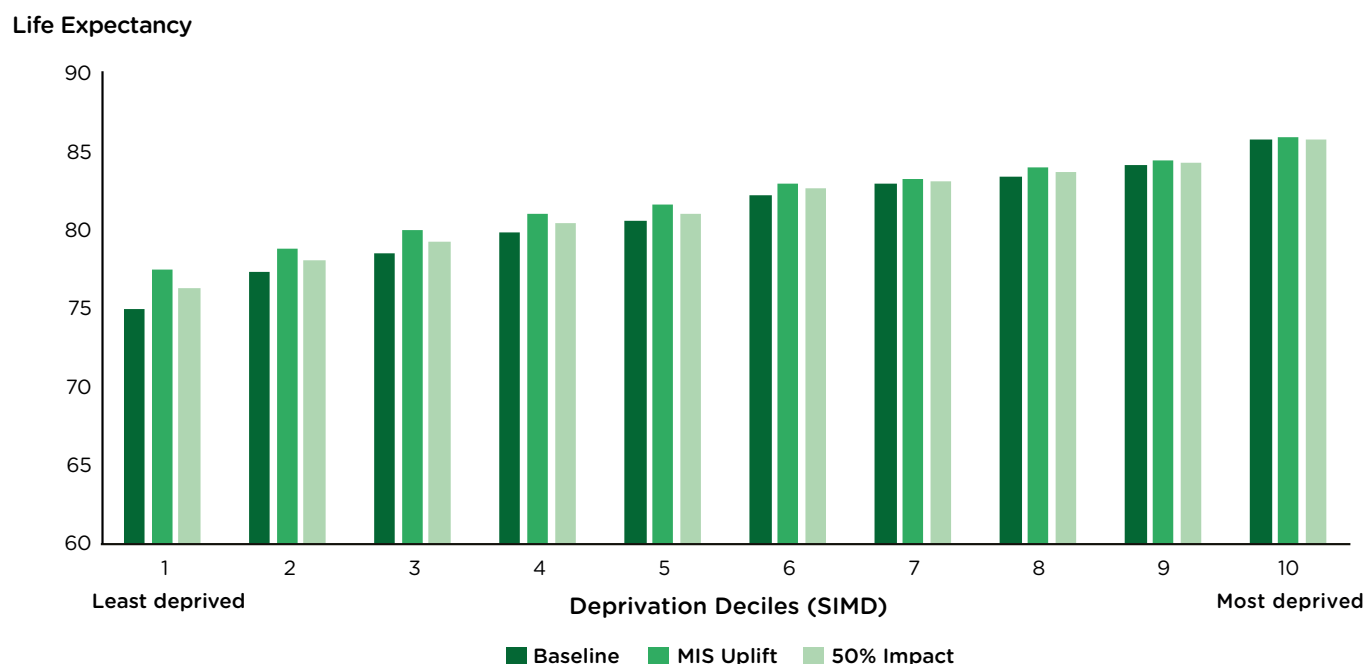
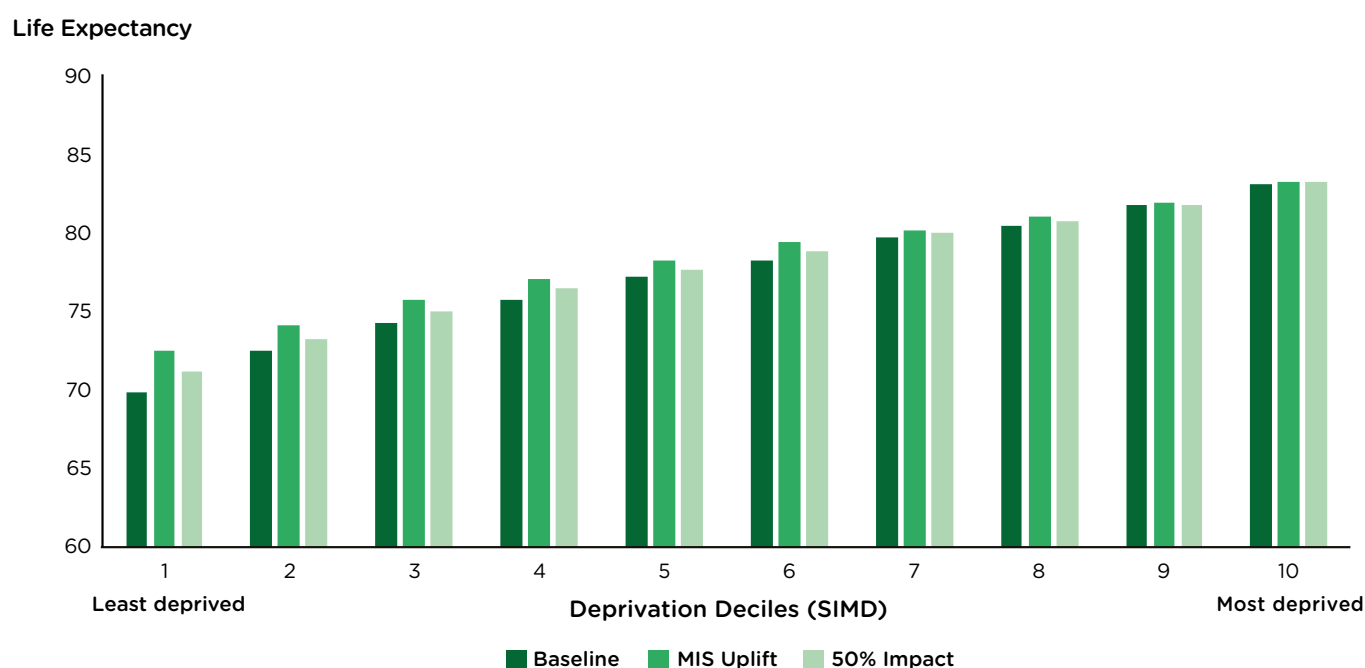


Figure 2: Male life expectancy at birth in the baseline (status quo) and MIS uplift scenario, by SIMD 2020 decile



While the ‘average uplift needed to meet the MIS’ estimate presented above is useful for gauging aggregate fiscal implications, it is also important to consider variation within the group of households that currently live below the MIS. In the UK in 2023/24, the average annual household disposable income in the poorest 10% of households was £14,300 (after taxes and cash benefits), or £275 per week. This increased to £25,300 (£485 per week) in the second decile, and

£31,100 (£600 per week) in the third [38]. The MIS in 2024, after housing, childcare, and council tax costs, was £498 for a working age couple with no children, or £622 a week for a family with two adults and two children [39]. Many households in the third income decile are below but close to the MIS. The poorest households, however, potentially need a 50%-100% increase in their incomes, on top of existing cash benefits, to achieve the standard.

HOME ENERGY EFFICIENCY IMPROVEMENTS

In 2022, 791,000 households in Scotland (31%) were estimated to be in fuel poverty, of which 530,000 households were also income poor [40].

Both household energy efficiency related scenarios target the lowest income 20% of households, reaching around 500,000 dwellings. This roughly corresponds with the 530,000 income poor households in fuel poverty noted above. Under scenario one (0.22 additional QALYs per person living in an upgraded dwelling), if implemented fully, we estimate that the

upgrades could generate around 235,000 extra years of healthy life for the current cohort of beneficiaries, along with a 0.7% (female) to 1% (male) reduction in health inequality. Under scenario two (1 additional QALY per person living in an upgraded dwelling), we estimate around 1.05 million extra years of healthy life for the current cohort of beneficiaries, along with a 3.5% (female) to 3.7% (male) reduction in health inequality. The social value of these healthy life years could range from £5.9 billion (scenario one) up to £26.2 billion (scenario two).

Figure 3: Home energy efficiency improvements and inequalities in HLE, Scotland (Females)

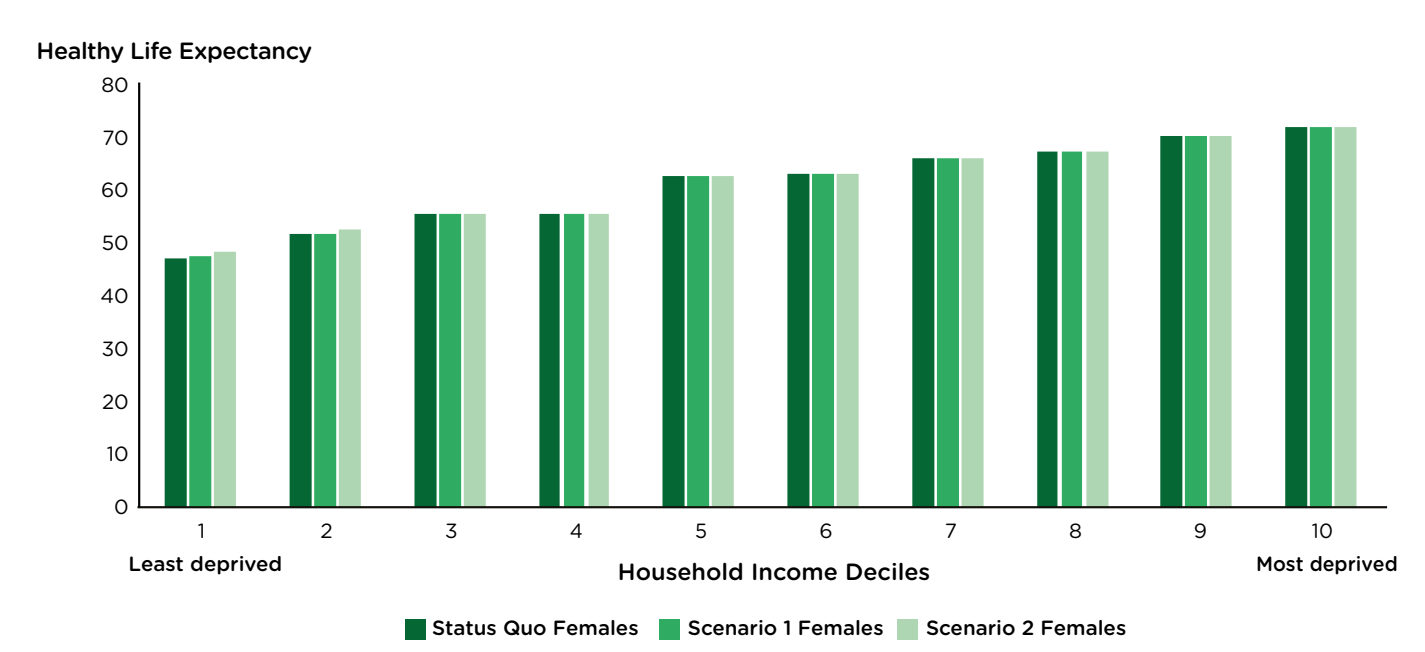
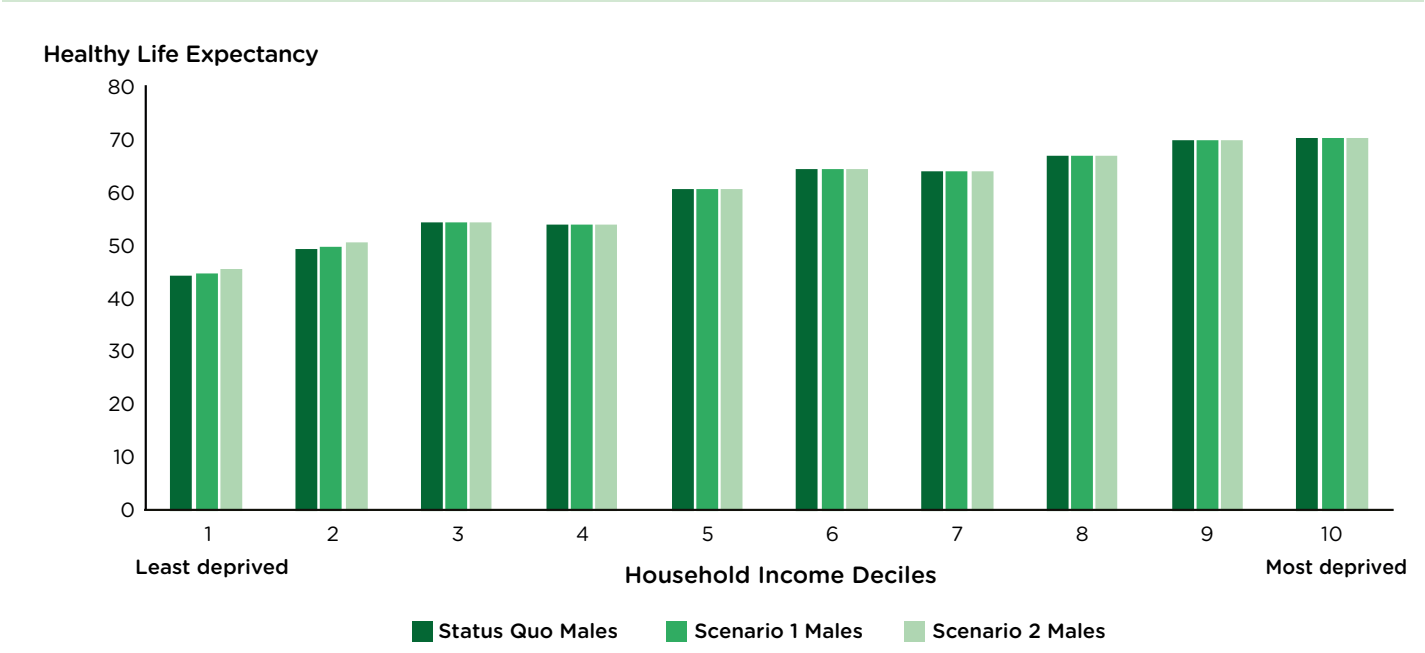


Figure 4: Home energy efficiency improvements and inequalities in HLE, Scotland (Males)



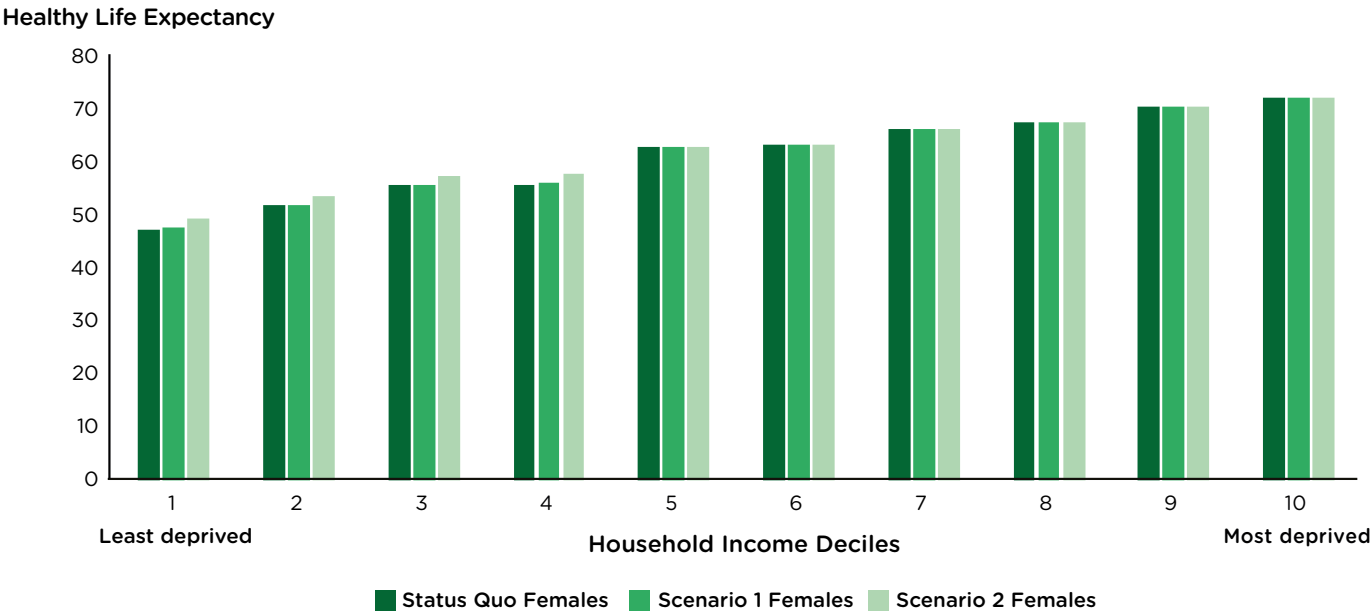
The scenario one estimates may be conservative. They are based on an effect size that was modelled using a predefined list of clinical benefits (i.e. reduced risk of stroke, asthma etc). This effect size does not consider indirect health gains from increased disposable income (through reduced energy bills) and incorporates a notably small mental health gain. Evidence published since suggests a much larger mental health impact of fuel poverty [41]. Moreover, the effect size used here reflects an average health benefit potentially achievable in the general population. This scenario, however, targets the home improvements at low-income households in fuel poverty. The intervention would plausibly generate a larger health benefit among this subgroup than in the general population.

**INCREASED ACCESS TO FAMILY SUPPORT  
EARLY CHILDHOOD INTERVENTIONS**

There are nearly 250,000 children aged 0-4 in Scotland today. We estimate that roughly 100,000 of these children live in households below the MIS.<sup>3</sup>

Under scenario one, we estimate such a package of family support and early childhood interventions could generate nearly 4 million additional healthy life years among the first complete population to benefit, along with a 20% reduction in health inequality among males. Under scenario two (in which females are assumed to receive health benefit, but only half as much as males) total healthy life years gained increases to 6 million, and the reduction in health inequality among women increases from almost nothing to 10%. The social value of the extra healthy life years lived could range from £100 billion to 150 billion per complete Scottish population of beneficiaries. To achieve this, assuming the population remains a similar size, over 2 million children would have to pass through the services (everyone in the most deprived two quintiles), potentially taking up to 70 years to fully materialise.

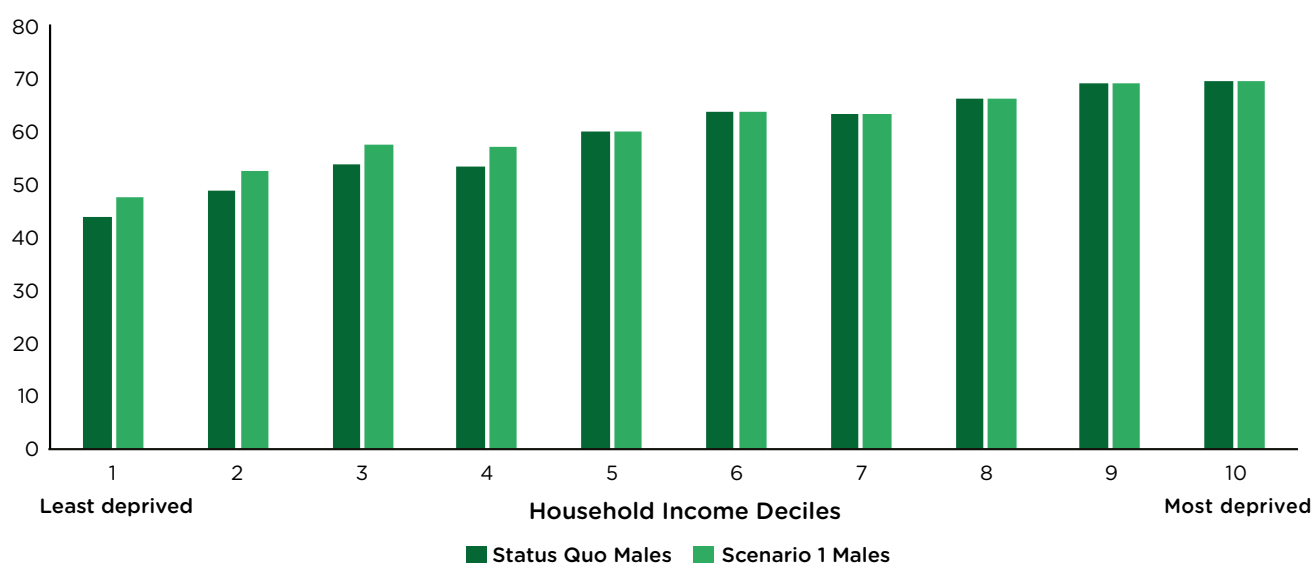
Figure 5: Early childhood interventions and inequalities in HLE, Scotland (Females)



<sup>3</sup>This is based on the JRF estimate that nearly 40% of households live below the MIS.

**Figure 6: Early childhood interventions and inequalities in HLE, Scotland (Males)**

### Healthy Life Expectancy



If early childhood interventions (taken to mean a package of early childhood services, including health, family support and education) are offered to disadvantaged children over a sustained period, an ever-increasing share of the total population will benefit (as more people pass through as young children). Eventually, if the policy is maintained, the entire population of eligible people will have benefited from the services. These children will continue experiencing the benefits throughout their lives. Scenarios 1 and 2 reflect this end point. They reflect the aspirational societal outcome in which everyone living in the lowest income four deciles of household income has decent access to publicly funded family support and early childhood interventions.

It must be noted that this may overestimate true impact sizes in Scotland. The empirical data used to inform the analysis comes from a setting in which control group families (those not benefiting from the full intervention) had very little public services to support them. In Scotland, as described above, there are already a range of policies and ambitions in place to support mothers, babies and toddlers; not to mention a much larger health service, ready to support people throughout their lives.

We estimate that interventions to reduce material deprivation and improve income security among the poor could bring inequality in life expectancy across deprivation deciles down by around 20%. This would mean increasing the incomes of nearly 800,000 households, at a total cost of around £1.5 billion. In some cases, it would mean more than doubling the income of the very poorest. This is change at the scale of the (aspired to) Minimum Income Guarantee, but far beyond what is currently offered. Further work that considers the economic value of improvements to lives, and savings to the NHS for example is warranted.

We estimate that interventions to improve the energy efficiency of low-income, fuel-poor dwellings could reduce inequality in healthy life expectancy across household income deciles. Under the more optimistic scenario assumptions, such work could generate up to 1 million extra healthy life years and reduce health inequality about nearly 4% over the next 50 years. This would mean funding the imminent retrofit of 500,000 dwellings (much more than is currently being done). As a comparison, since 2013 just over 100,000 households have benefited from the Area Bases Schemes support to improve energy efficiency and warmth [42].

We estimate that interventions to expand and consolidate the provision of family services and early childhood interventions could generate between four and six million extra healthy life-years over the next 70 years, along with a reduction in health inequality of up to 20% among men, and 10% among women. This would mean providing free childcare, nutritious food and home visits to all disadvantaged children aged 0 to 5. This would be a major expansion on the current provision of childcare to all three- and four-year-olds, as well as eligible two-year-olds. Not only would it require expansion to children from birth, but it would also require an increase in hours. Eight hours a day as was offered in the referenced experiment, aggregates to around 2,000 hours a year. This is almost double the 1,140 hours that eligible children in Scotland can currently access.

It is worth highlighting that, of all three areas of intervention explored, the evidence base for family support and early childhood interventions is the best. The randomised experiment design, along with the very long follow-up period make it an extremely rich source. This cannot be said to the same extent with the work on income (which is based on cross section observational data) and the work on home energy efficiency (which is based almost entirely on modelled clinical outcomes caused by expected changes in household temperature and air quality). Moreover, there have been wide range of other studies corroborating the idea that early childhood interventions can have substantial life-long health impacts [43].

To make the immense impact explicit, Garcia and Heckman write:

***“By age 70, treatment group males are half as likely to have a stroke than control group counterparts. Similar results hold for heart disease, lung disease, and cancer. By age 50, a significant difference between the likelihood of dying due to any of these diseases emerges between treatment and control group participants, both male and female. For males after age 60, this difference grows substantially. At age 70, control group males are almost four times as likely to die as their treatment group counterparts. Results for women are less stark.” [44]***

It is plausible that, in the Scottish context, our estimated benefits from income security improvements and expansions in family support/early childhood interventions are inflated. The author of the analysis behind the income support estimates included a 50% impact size sensitivity analysis – acknowledging that their methodology may be picking up non-income factors. Regarding early childhood interventions, the original analysis is comparing the intervention to a control group that had very limited access to any government support at all. In Scotland, however, any expansion of early childhood interventions would be on top of an existing portfolio of government funded childcare, financial grants and home visits, not to mention a wide array of social services throughout life.

Nonetheless, in all three examples presented in this paper, the gaps between what is currently offered and what is necessary to achieve a significant reduction in health inequality are large.

The broad policy objectives are there. All else equal, a Minimum Income Guarantee aligned with the Joseph Rowntree Foundation's MIS would go a very long way towards eliminating material deprivation. However, many households currently live a long way from this standard, and current policies do not show any sign of getting them there soon. Removing all households from fuel poverty would go a long way towards giving everyone the ability to keep warm and breath cleaner air. But it is happening far too slowly. Ensuring all children (aged zero to eight) have space to play, learn and develop strong social relationships, emotional wellbeing and physical health would have an enormous life-long health impact on every beneficiary child. However, in the lowest income households it will take much more than 1,140 hours of care (for two- to four-year-olds), a series of one-off payments and gifts and 11 home visits to achieve this.

In all cases, more must be done if the tide of increasing health inequalities is to turn.

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