
 **Briefing: A microsimulation identifying tax and social security policies to improve health**
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**Addressing the need for actionable evidence**

Strong evidence exists that economic circumstances determine health outcomes. However, there is little actionable evidence for how tax and social security policies can use these pathways to improve health. This is due to complex inter-relationships between determinants, ethical restrictions preventing real-world trials, and the time required for the health effects to emerge. Microsimulation can overcome these barriers to provide projections for future health outcomes resulting from real or hypothetical policies. This tool can help inform policies to reduce health inequalities.

**SimPaths microsimulation framework**

In the Health Equity and its Economic Determinants project ([HEED](https://bmjopen.bmj.com/content/12/7/e062405)), researchers at the University of Glasgow and the University of Essex have developed the SimPaths microsimulation framework. Microsimulations combine the best available evidence, theory, and data to project outcomes from defined scenarios. Subjects are cycled through a series of processes that predict specific outcomes over various life domains, including income, employment, and health.

The approach can be adapted to evolving policymaking needs. SimPaths has been used to compare the effects of the policy response to the Covid-related economic crisis against a scenario where those policies were not introduced. The framework has also assessed the short-term effects of a Universal Basic Income (UBI) prior to implementation.

**Emerging evidence**

*Evaluation of an implemented policy: Covid-related economic crisis*



**Figure 1. Median projected employment rate (left hand graph) and level of psychological distress (right hand graph)**

The figure above shows the output from SimPaths analysis of the Covid economic crisis. The employment rate is estimated to have dropped during 2020 and 2021 under both simulated policy scenarios, but the decrease is projected to have been much larger in the absence of the policy response. The median difference in the employment rate between the scenarios was 12.5%pt in 2020 and 13.9%pt in 2021. This contributed to an increase in the median level of psychological distress (as measured by the 12-item General Health Questionnaire) within the UK population. Although the difference in employment rates between the scenarios narrows from 2022, the positive impacts of the Covid policies persists until the final simulated, with approximately one million more people employed due to the policy response to the crisis. Similarly, the estimated poverty rate is 2.1%pt lower in 2025 due to the observed policy response. This represents around 725,000 fewer working-age individuals living in poverty.

Although the change is psychological distress is smaller than observed for employment, we estimate that this represents almost 1.2 million potential cases of common mental disorders within the working-age population prevented in 2020 due to the policy response. The direct value of this health benefit is estimated to be £11.31 billion in 2020. This shows that policies protecting the income and employment outcomes of individuals and households during periods of economic crisis can have important mental health benefits.

*Evaluation of a hypothetical policy: Universal Basic Income*

In a separate analysis (see paper below) four versions of a UBI policy were examined in SimPaths. The two most generous policies, set at the level of the Joseph Rowntree Foundation Minimum Income Standard, practically eradicated poverty. However, the effects of the policies on the number of common mental disorders heavily depended on assumptions about how individuals would respond to the change in employment incentives (which can be modified within SimPaths). If a large number of people stop working, a UBI policy may worsen population mental health for those of working age, with around 160,000 additional cases of common mental disorders. If people instead continue working after receiving the benefit, a UBI meeting living costs may improve population mental health with a reduction of around 110,000 cases, especially for women, the least educated, and those without children.

**Next steps**

Ongoing projects using the SimPaths framework include an evaluation of Universal Credit, and investigating the effects of reductions in child poverty on later life outcomes. We are developing projects incorporating macroeconomic modelling and health economic evaluations within SimPaths, and examining multidimensional wellbeing. We welcome any requests or suggestions for scenarios to model that would be useful for policymaking.

**Links to relevant papers**

* [Short-term impacts of Universal Basic Income on population mental health inequalities](https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1004358)
* [Detailed description of the SimPaths microsimulation framework](https://www.iser.essex.ac.uk/wp-content/uploads/files/working-papers/cempa/cempa6-23.pdf)
* [Commentary on the potential of microsimulation for health research](https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762%2823%2900177-1/fulltext)
* [To what extent does income explain the effect of unemployment on mental health?](https://www.cambridge.org/core/journals/psychological-medicine/article/to-what-extent-does-income-explain-the-effect-of-unemployment-on-mental-health-mediation-analysis-in-the-uk-household-longitudinal-study/A4977C50058C9E7EC8622FC9B7740559)
* [Health Equity and Its Economic Determinants (HEED) protocol](https://bmjopen.bmj.com/content/12/7/e062405)
* [Evaluation of the Covid-related economic crisis](https://www.sciencedirect.com/science/article/pii/S0277953624003976)

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