Estimating population mental health effects of the rollout of Universal Credit in the UK using standard and novel Difference-in-Differences analysis, 2009 - 2019

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# Summary

#### **Objectives**

Universal Credit (UC) was introduced in the UK in April 2013 in selected areas, marking the beginning of its phased rollout. Previous research identifies acute health harms among unemployed people, but the policy's impacts longer-term and on broader claimant groups remain unknown. This study explored UC effects on population mental health for up to four years post-introduction on a larger cohort of claimants, including employed people.

#### Study design

Longitudinal study.

### Methods

We used data from the UK Household Longitudinal Study between 2009-2019 linking 108,247 observations (29,528 working age participants) to administrative UC Local Authority district data. We compared a UC-eligible population – reporting receipt of either UC or any of six legacy benefits (treatment group) – to individuals receiving alternative benefits (comparison group). We used standard and novel difference-in-differences approaches, exploiting geographical variation of UC rollout, and accounting for heterogeneity in treatment timing, to estimate mental health impacts (SF-12 Mental Component Summary) on average and at different time points post-introduction.

#### Results

UC was associated with mental health declining by 0.70 units (95% CI -1.24 to -0.15), a 1.5% relative reduction. Effects were larger during the first year of exposure (-1.01, 95% CI -1.93 to - 0.10) without returning to baseline levels. Between 2013 and 2019, an estimated 111,954 (95% CI 35,497 to 182,948) additional people experienced depression and/or anxiety after UC's introduction, 27,115 of whom may have reached diagnostic threshold for common mental disorders.

#### Conclusions

UC led to a sustained deterioration in population mental health, particularly marked in the first year of implementation. Reforms to UC are warranted to mitigate adverse mental health impacts.

Keywords: Population mental health; health inequalities; Universal Credit; social welfare reform; difference-in-differences

# Introduction

Globally, welfare programmes have been identified as important determinants of health and health inequalities.<sup>1</sup> Several studies have shown that contractionary welfare reforms, including tighter benefit eligibility, conditionality, and punitive sanctions are contributing to a growing public mental health crisis, disproportionately affecting the most vulnerable members of society.<sup>2–5</sup>

Introduced in the UK in 2013, Universal Credit (UC) has been described as one of the largest welfare changes enacted in a high-income country.<sup>6</sup> UC replaced six benefits and tax credits paid to people on low incomes or out of work (legacy benefits). The aims of UC were to simplify the benefits system, 'make work pay' and reduce system fraud and error.<sup>7</sup> To this end, UC introduced new features, including monthly benefit payments, frequent income assessments, and a fully digitalised service. The rollout of UC took place in three phases (see Appendix 1). Initially, only single working age individuals seeking employment (previously applying for Job Seekers Allowance – JSA) were eligible for UC. This was expanded gradually to include recipients of other legacy benefits.<sup>8</sup> Once the remaining claimants have been moved onto UC and legacy benefits are closed – currently scheduled for completion by March 2026 – it is anticipated that nearly eight million individuals will be receiving UC, accounting for around 21% of the UK working-age population.<sup>9</sup>

Although UC may increase income for certain claimant groups through improved earnings and increased employment hours compared to those receiving JSA – potentially leading to positive health outcomes – several studies have also highlighted associations between UC and various negative health-related outcomes, particularly in specific demographic groups. These contrasting findings underscore the complexity of UC's impact on health (see Appendix 2 for a review of the

literature). Prior research has shown that unemployed people eligible for UC (i.e. the initial eligible group) experience worse mental health compared to legacy groups, and that becoming unemployed under UC may have adverse effects on mental health compared to the legacy system.<sup>10,11</sup> In unemployed families, UC may exacerbate socio-emotional problems for children up to the age of eight.<sup>12</sup> Such impacts might arise due to increased uncertainty around benefit payments and changes in benefit rates, stricter conditionality rules and sanctions, contributing to financial distress.<sup>4,13–15</sup>

By February 2025, 7.5 million people were on UC, 35% of whom were employed (see Appendix 3).<sup>16</sup> Considering that the policy's objective is to reduce welfare dependency by moving unemployed people into employment and by helping employed people on low incomes to increase earnings, it is essential to understand potential impacts on this wider claimant population. Prior to this study the impact on all groups eligible for UC (i.e. people in work) was unknown. Likewise, how the effects vary over time has not been investigated in both employed and unemployed people. We used Difference-in-Differences (DiD) analysis to estimate the average mental health effects for all people likely exposed to UC during follow-up. We also implemented a novel DiD approach to address possible biases due to the staggered UC rollout and expose longer-term impacts, deriving by year effects post-rollout through an event study analysis.

Our study makes a distinct contribution to the existing literature by broadening the scope to include a wider range of individuals affected by UC—both those in work and those not employed for reasons other than long-term illness or disability. By examining the full spectrum of UC claimants, including those migrated from legacy benefits and those with varying employment statuses, our research provides a more comprehensive view of the mental health impacts of UC across different socio-economic groups. This broader perspective enables a more nuanced understanding of how UC and its associated policies, such as the five-week waiting period and monthly payments, affect mental health outcomes, moving beyond the traditional focus on the unemployed.

## Methods

#### Data and participants

In this longitudinal study, we used data from the UK Household Longitudinal Study (UKHLS), a nationally representative sample of approximately 40,000 households, collected annually since 2009.<sup>17</sup> We used data between 2009/2011-2019/2021 including respondents interviewed up to December 2019 to avoid the impact of mental health deterioration caused by the COVID-19 pandemic.

The sample comprised working-age participants (18-64) who reported receiving benefits at any point in time. We excluded full-time students, retired persons, and respondents residing in Northern Ireland. We also excluded individuals out of the labour market due to long-term sickness or disability as they were likely receiving additional benefits which may obscure the specific effects of UC. A special data license from the UK Data Service was obtained, providing respondents' Local Authority (LA) district of residence.

#### Treatment and exposure

We combined information about individual benefit receipt and UC implementation to define exposure. We assigned recipients to the treatment group if they reported receiving UC or any of the six legacy benefits at each wave (income-based Job Seekers Allowance, Working Tax Credit, Child Tax Credit, Housing Benefit, Employment and Support Allowance, and Income Support), reflecting those directly claiming or at risk of claiming UC. Respondents were assigned to the comparison group if they reported receiving state benefits other than UC/ legacy benefits (e.g. Child Benefit or Council Tax Benefit) (see Appendix 4 for a detailed account of the benefits reported by individuals in our sample). This 'alternative benefits' group would have to go through the state benefits system, but we assumed they should not be impacted by UC implementation directly.

To define UC rollout, we extracted data on people receiving UC at the LA district level from Stat-Xplore to construct a binary variable assigning 1 to the earliest time point UC had been recorded and, 0 if otherwise.<sup>18</sup> We linked participants to LA districts based on their residence, and month and year of interview. We interacted the binary indicator at the LA level with the

treatment group indicator to construct our 'exposure' measure; an individual is 'exposed' if they were in the treatment group *and* the LA they lived in was UC active (i.e. post-introduction period).

#### Outcomes

Our primary outcome was the mental health component score (MCS) of the 12-item Medical Outcomes Study Short Form Health Survey (SF-12). We used the continuous score ranging between 0-100 where higher values suggest better mental health, whilst in secondary analysis we used validated thresholds to dichotomise scores to indicate clinical depression (cutoff  $\leq$  45) and common mental disorders (cutoff  $\leq$  50).<sup>19,20</sup>

### Confounders and effect modifiers

We controlled for gender, age, age squared to account for non-linear effects between age and mental health, country of residence, marital status, highest educational qualification as a measure of socioeconomic status, ethnicity, presence of dependent child ( $\leq 16$  years), and long-standing illness to adjust for potential confounding by underlying health conditions. We also created a categorical variable indicating the number of years since UC started to be rolled out.

#### Statistical analysis

We used DiD methods comparing changes in average mental health between treatment and comparison groups before and after UC rollout.<sup>21</sup> Although baseline mental health may differ between the two groups, the DiD approach allows for this by relying on the parallel trends assumption, focusing on changes over time rather than baseline levels. We examined whether outcome trends between groups were stable during the pre-treatment period, using both graphical analysis and regression-based tests. We accounted for missing data bias in the outcome variable using multiple imputation by chained equations (10 imputation cycles).<sup>22</sup> Individual longitudinal weights were applied for correcting bias from over/under-represented populations and adjusting for non-response bias. We estimated linear and logistic regressions for continuous and binary outcomes, respectively.

Since UC was rolled out across LA districts at different points in time, using early treated units as controls for later treated units may bias estimates by entering the DiD regression with negative weights.<sup>23</sup> To address potential biases, we took a novel local-projections DiD analysis (LP-DiD)

regressing the differenced outcome in the pre- and post-treatment period on the differenced treatment indicator across a three-year horizon using a balanced panel of 7,710 observations, while restricting the comparison group to not-yet-treated units.<sup>24</sup> This analysis covers the period from 2009 to 2018, tracking individuals from the point of their transition onto UC. Effectively, we estimated a variance-weighted average mental health effect during follow-up with strictly positive weights and retrieved the estimates for different periods post-UC through an event study analysis. We ran the baseline LP-DiD regression without covariates as this was expected to alter the variance-weighted scheme.<sup>24</sup>

#### Alternative measures and sensitivity analyses

We repeated the analysis using the General Health Questionnaire (GHQ-12) as a continuous outcome (scored 0-36) and as a caseness scale (scored 0-12), where higher scores indicate higher psychological distress.<sup>25–27</sup> Additionally, we estimated the percentage point change in prevalence of depression (values  $\geq$  4) and common mental disorders (values  $\geq$  3).<sup>26,27</sup> Finally, we explored impacts on physical health using the SF-12 Physical Component Summary (PCS) as a continuous score, ranging 0-100 with higher values indicating better physical health, and as a binary measure with scores  $\leq$  50 suggesting worse health.<sup>19</sup>

We undertook sensitivity analyses to explore whether results remained robust to model specification. Since receipt of alternative benefits was not means-tested in some cases (e.g. Child Benefit), we restricted the comparison group on people with household incomes below the median income (OECD modified scale adjusted for inflation). We also performed complete case analyses as an alternative solution to missing data. Finally, we ran the LP-DiD analysis with covariates using inverse probability weighting to ensure the variance-weighted scheme was preserved in the staggered setting.<sup>24</sup>

## Results

The sample consisted of 108,247 observations from 29,528 participants (see Appendix 6), comparing 64,363 and 43,884 person-year observations in the treatment and comparison groups, respectively. Mental and physical health scores were lower in the treatment group compared to the comparison group in the pre-UC period. UC recipients were on average younger, more likely

to be single, had non-British background, suffered from a longstanding illness, had lower educational qualifications and lower incomes relative to the comparison group (see Appendix 7). The parallel trends pre-intervention were consistent with the parallel trends assumption p = 0.254) (see Appendix 8).

Table 1 summarises the main findings. UC rollout was associated with a 0.70-unit mental health deterioration (95% CI -1·24 to -0·15) in the treatment relative to the comparison group, a 1·5% reduction (see Appendix 9). There were also increases in the prevalence of depression by 3·0 (95% CI 0·4 to 5·5) (8·1% relative increase), and of common mental disorders by 4·1 (95% CI 1·3 to 6·7) percentage points (7·5% relative increase). Applied to the UK population, the rollout of UC between April 2013 and December 2019 led to approximately 81,917 (95% CI 10,922 to 150,182) additional individuals developing depression and 111,954 (95% CI 35,497 to 182,948) developing a common mental disorder (see Appendix 10).

We broadly found similar evidence using the GHQ-12 whereas no clear physical health harms were found based on the continuous and binary PCS measures (see Appendix 11). Finally, the complete case analysis (see Appendix 12) and using a conservative comparison group produced similar estimates (see Appendix 13).

	DiD estimate	95% CI	p value
Change in continuous Mental Component Summary (MCS) score	-0.70	-1·24 to -0·15	0.012
Percentage point change in prevalence of depression (<=45 cutoff)	3.0	0.4 to $5.5$	0.022
Percentage point change in prevalence of common mental disorders (<=50 cutoff)	4.1	1·3 to 6·7	0.003

Table 1: Difference-in-Differences Estimates of the Impact of Universal Credit Rollout on MentalHealth Outcomes: Treatment Group vs. Comparison Group

Note: Difference-in-Differences estimates of the impact of Universal Credit (UC) on population mental health using multiple imputation by chains with ten imputation cycles, comparing individuals who reported receiving Universal Credit (UC) or any of the six legacy benefits (treatment group) with those who reported receiving alternative benefits (comparison group) following UC rollout. Mental health is measured using the continuous Mental

Component Summary (MCS) score, ranging from 0 to 100, where higher scores indicate better mental health. The study covers the period from 2009 to December 2019. Total number of observations: 108,247.

Table 2 presents findings from the LP-DiD analysis. On average, the introduction of UC was associated with a 0.71-unit decline in mental health (95% CI -1·59 to 0·16) over four years of follow up, albeit not statistically significant. Examining, however, the results from the event study analysis, we found a larger and statistically significant negative mental health impact one year after exposure, at -1·01 points (95% CI -1·93 to -0·10). This effect declined in the following periods, nevertheless without returning to baseline levels (Figure 1; see Appendix 14). The sensitivity analysis including covariates into the model generated similar results (see Appendix 15).

	LP-DiD estimate	95% CI	p value	observations
Pooled estimates				
Pre-reform period	-0.30	-0.95 to 0.35	0.364	4,299
Post-reform period	-0.71	-1.59 to 0.16	0.110	3,292
<i>Even study estimates</i> (before and after UC rollout)				
Three years prior	-0.25	-0.97 to 0.47	0.493	4,299
Two years prior	-0.35	-1.13 to 0.42	0.376	5,070
One year prior	0			
Universal Credit rollout	-0.01	-0.80 to 0.77	0.972	5,841
One year after	-1.01	-1.93 to -0.10	0.029	4,942
Two years after	-0.69	-1.67 to $0.28$	0.165	4,140
Three years after	-0.60	-1.80 to $0.60$	0.325	3,292

Local Projections Difference-in-Differences Estimates of the Mental Health Effects of Universal Credit Rollout: Treatment Group vs. Comparison Group

Note: Local projections Difference-in-Differences estimates of the impact of Universal Credit (UC) on population mental health using a balanced panel of 7,710 observations covering the period from 2009 to 2018 within a three-year pre- and post-treatment horizon, comparing individuals who reported receiving UC or any of the six legacy benefits (treatment group) with those who reported receiving alternative benefits (comparison group) following UC rollout. The year 2019 was excluded due to a low number of observations. Mental health is measured using the continuous Mental Component Summary (MCS) score, ranging from 0 to 100, where higher scores indicate better mental health.



Figure 1: Event study analysis of the mental health impact of Universal Credit across a threeyear horizon before and after the introduction of the reform, depicting changes from the previous year (-1) to the year Universal Credit was introduced (0) and so forth.

# Discussion

Our longitudinal study suggests that the rollout of UC in the UK was associated with a deterioration in mental health among an expanded cohort of people exposed to the reform, including those in employment. While the average decline in mental health scores may appear modest at the individual level, it reflects the consequences of a structural policy change impacting millions. Based on our estimates, between 2013 and 2019, an additional 111,954 individuals experienced depression and/or anxiety attributable to UC, with approximately 27,115 potentially reaching the threshold for a clinical diagnosis. We found the adverse effects to be more pronounced in the first year after exposure without returning to baseline levels. Moreover, the relative increase for those meeting thresholds for depression and common mental disorders

was greater than the relative change in the mean suggesting that the effects have been even more detrimental for those with pre-existing mental health problems.

Our findings are supported by international literature. This evidence suggests that contractionary social policy reforms – like UC – entailing harsher eligibility rules, reductions in benefit generosity for some groups and extended sanctioning, are contributing to poorer mental health and widening health inequalities.<sup>1,2</sup> Our findings are also in line with studies focusing on unemployed individuals – the first group exposed to the reform – and their children.<sup>10–12</sup> We add to this body of evidence by extending the exploration of mental health effects of UC to a wider cohort of recipients, including employed persons, on average and how these effects vary year by year in the post-exposure period.

Our study has several strengths. We employed DiD analysis, exploiting the phased implementation of UC, and conducted a novel local-projections analysis to address possible biases due to variation in treatment timing. We used a large nationally representative sample providing adequate statistical power to explore UC effects over a longer time-period. We used multiple imputation to address potential bias due to missingness and sample weighting to adjust for attrition so that sample best reflected the general population. We replicated our analysis using well-validated mental health measures. We conducted several sensitivity tests confirming our main findings, for example, restricting the comparison group to individuals with relatively low incomes, adjusting for household size, to increase comparability with the treatment group. Finally, we expanded the analysis of UC impacts by investigating possible physical health harms.

This study has some limitations. First, we were unable to precisely capture individual-level UC receipt due to both underreporting (or misreporting in general) in survey data — particularly for UC, which may be more stigmatised than other benefits — and the lack of specific timing and duration of benefit receipt. These limitations may have led to exposure misclassification, with some affected individuals incorrectly included in the comparison group, suggesting conservative estimates. As our primary focus was on estimating population-level effects rather than individual-level exposure, these limitations are unlikely to have significantly affected the overall interpretation of our findings. Second, there is a small level of uncertainty around the LP-DiD effect estimates since the method has only recently been implemented empirically. Despite this, it yielded similar estimates to standard DiD. Third, the UKHLS uses self-reported measures which

may have introduced bias due to subjectivity. To mitigate against this, we used well-validated, multidimensional mental health scales and cutoff scores to identify probable cases of depression and anxiety disorders. However, we acknowledge that the SF-12 is not a diagnostic tool and may overestimate mental health symptoms. As such, our findings should be interpreted as reflecting elevated self-reported distress rather than clinically diagnosed mental health conditions. Finally, problems may arise if time-varying factors were confounding the relationship between exposure and outcome (e.g. austerity effects). However, these effects are unlikely to have been differential in areas in which UC was introduced earlier.

In summary, UC – a large reorganisation of the UK welfare system – appears to have adverse consequences for claimants' mental health, many of whom are employed. The real-world impact may be substantial since an increasing proportion of the UK population is affected. This is noteworthy, considering one of the policy goals involves moving unemployed, and employed people on low incomes away from welfare support. Requirements to complete work-related activities, and sanctioning if those are not met, may be a mechanism through which claimants' mental health is undermined. Our findings also reveal a mental health 'shock' recipients may experience when transitioning to UC for the first time, possibly related to the new UC elements, including the five-week waiting period, benefit deductions, intensified conditionality and sanctions, and a fully digitalised system.

The UC reform may have significant implications for rising healthcare, welfare needs and associated costs. It is possible that a reconsideration of the new elements as well as timely and preventative mental health provision, and tailored employment support, especially during the first year of UC receipt, could be avenues for intervention. However, by June 2022, 1·2 million people were in the waiting list for receiving mental health care in England, implying that mental health services cannot keep up with the rising demand.<sup>28</sup> It is imperative that governments globally conduct health impact assessments before social welfare reforms are widely implemented. This could be supported by improving routine data linkage between health and social organisations (e.g. NHS and DWP). For instance, a recent study demonstrated the potential of linking health and social care data to gain insights into social determinants and health outcomes.<sup>29</sup> This approach highlights the importance of integrated data systems in providing a more comprehensive understanding of the effects of welfare policies, like UC, on mental health.

Future research is needed to explore the mechanisms through which UC affects mental health, particularly for vulnerable groups (e.g. low-income families, lone parents, and disabled people). Whilst we did not find evidence of physical health harms on the general population, investigating the experience of UC on both mental and physical health of those living with disabilities is needed. For example, large welfare reforms have been associated with poorer physical health among unemployed persons.<sup>30</sup> In addition, the transitional protection period for individuals migrating from legacy benefits may have alleviated some of the financial stress typically associated with the shift to UC. Further research is needed to assess the role of this provision in shaping mental health outcomes. Finally, it is important to investigate possible mental health impacts of UC during periods of heightened vulnerability, such as the COVID-19 pandemic and periods of austerity. Robust empirical evidence is required to inform policy makers seeking to improve the unintended consequences of welfare changes, both in the UK and internationally.

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## Ethical approval

Ethics were not required. The study's protocol has been published on the Open Science Framework (OSF) site to ensure transparency: <u>https://osf.io/9n82w/</u>. We detail how this analysis deviates from the initial protocol in Appendix 16 of the supplementary material.

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### Competing interests

None declared.

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