

debate

Measuring the health impact of Universal Basic Income as an upstream intervention: holistic trial design that captures stress reduction is essential

Elliott Aidan Johnson, ejohnsonresearch@gmail.com
Disability Research Consultant, UK

Matthew Thomas Johnson, m.johnson@lancs.ac.uk
Lancaster University, UK

Laura Webber, Laura.Webber@healthlumen.com
London School of Hygiene and Tropical Medicine, UK

Background: In the context of the UK Government's 'prevention agenda', Laura Webber and colleagues have called for a 'health in all policies' approach. Universal Basic Income (UBI) is a system of cash transfers to citizens. Recent research suggests it could significantly benefit population health, including via reducing stress. However, a Finnish trial of a policy with similarities to UBI has influenced debate. This was reported as a failure due to a policy objective of reducing unemployment, despite demonstrating significant benefits to well-being.

Aims and objectives: In this piece, we seek to advance the debate about the cost-benefit of UBI by identifying knowledge gaps and proposing a means of designing effective trials.

Methods: We review UBI trial design and findings in comparison with social gradient in health literature and biopsychosocial theory to identify knowledge gaps.

Findings: We highlight a need to refocus UBI trials on improved health, including via reduced stress, to provide policy makers the means of producing accurate cost-benefit analysis. Previous trials have either not reflected likely UBI policy or failed to measure impacts that enable accurate analysis. We contend that interdisciplinary work is required to establish trials that observe factors known to drive the social health gradient. Finally, we argue that statistical modelling is needed to extrapolate shorter-term findings to long-term population-level outcomes.

Discussion and conclusions: Resource allocation by Government and/or major funders is required to produce evidence that enables accurate analysis of UBI. Such trials would provide a platform for interdisciplinary work resulting in joined-up evidence and policy.

Key words Universal Basic Income • stress • public health • social gradient

Key messages

1. Existing Universal Basic Income trial designs have not enabled accurate assessment of the policy
2. Interdisciplinarity is needed in trials to observe key factors driving the social health gradient
3. Statistical modelling is essential to produce population-level evidence for policy development
4. Financial resource must be directed to establishing more thorough and evidence-based trials

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Introduction

The UK Government has recently developed a Green Paper on health advancing a ‘prevention agenda’ (Department of Health and Social Care, 2019). With concern about the NHS being understood as the ‘National Hospital Service’ (see Department of Health and Social Care, 2019), there is an emerging commitment to promote action conducive to avoidance of ill-health. In that context, Laura Webber and colleagues (2018) have called for a ‘health in all policies’ approach grounded in ‘upstream interventions’. We (Johnson and Johnson, 2019; Johnson et al, 2019) recently cited the prospective value of Universal Basic Income (UBI) to this end, arguing that its prospective effect in mitigating social sources of stress provides a qualitative shift in justification of the policy toward those in, as well as out of, work. Such an intervention offers the possibility of dealing with the crisis in stress-related ill health that imposes significant costs on the NHS and wider society. In part because of this research (see Standing, 2019: 17–19), the UK Labour Party committed to trialling UBI in such cities as Liverpool and Sheffield in its 2019 Manifesto (Labour Party, 2019: 60; Press Association, 2019). In the wake of the Conservative Party’s success in the 2019 General Election, Hull City Council has sought permission to conduct a trial of UBI (Halliday, 2019).

However, in 2018, a trial of a system with similarities to UBI in Finland was not extended beyond two years, despite calls from the nation’s social security agency to do so (Henley, 2018). Reporting of this focused on its ‘failure’ to increase employment, despite improved well-being for participants (Henley and agencies, 2019; Pohjanpalo, 2019). This perceived failure resulted from narrow policy objectives within the centre-right Government that focused solely on reducing the unemployment rate (Valero, 2019). Payments were given only to unemployed people and at a rate that was only around €50 above the previous benefit. Little change to the unemployment rate in a system of payments to all citizens would actually have the potential to counter criticism of UBI as likely reducing incentive to work (Gibson et al, 2018: 100). But the effect of evaluating UBI against a requirement to increase employment has been to cloud interest in it as a policy that addresses challenges to well-being. Our contention is that well-being – in particular UBI’s potential effect on health via stress – is crucial to the social and economic value of UBI as a policy. If policy makers are to be equipped with the means of calculating the cost-benefit of UBI through its impact on all in society, not solely those who are unemployed, trials that take proper account of population-level well-being are essential.

While the *BMJ* has called for a trial on health grounds (Painter, 2016), and while trials of UBI have indicated self-reported reductions in stress (Kangas et al, 2019: 30), existing research has failed to measure psychobiological stress in ways that establish UBI’s value as an upstream health intervention. This is because all measures of stress

are subject to biases in interpretation, especially given the influence of factors like physical activity on cortisol levels (Gerber et al, 2012). In the case of self-reported psychological stress, there are also challenges in subjective reporting (Brant et al, 2010; Epel et al, 2018: 4). All have value in predicting future health outcomes (Epel et al, 2018: 38–39), but physiological stress, in particular, has been studied in ways that enable predictive modelling for particular conditions and overall mortality (Kumari et al, 2011). In this analysis, we highlight deficits in trials and present recommendations for future research.

UBI and health

UBI is a system of universal cash transfers to (adult) citizens that is typically presented as an alternative to need-based welfare systems. It differs starkly from Universal Credit, which is currently being introduced in the UK to replace a number of means-tested benefits, and which is tapered down as recipients enter work and earn above a set threshold (Government Digital Service, 2014). UBI is paid to all regardless of means or needs, though there is debate over whether it should be conditional on good citizenly behaviour (participation in voting, avoidance of crime, and so on). Historically, it has been justified by those on the left and right variously as a means of promoting citizens' rights (Pettit, 2008) within a state (see discussion in Ferry, 1995), increasing efficiency in welfare systems (Gordon, 2014) and promoting growth (Sheahan, 2003). Because UBI has been seen as an economic instrument, the notion of deploying UBI specifically for reasons of public health, and grounding those reasons in the medical literature, marks a key development within the field.

Trials of programmes that resemble UBI have often noted an effect on health (Gibson et al, 2018; Haagh and Rohregger, 2019). The Canadian case of Mincome, in Manitoba, which provided an unconditional payment to lower income households (an income guarantee similar to negative income taxation), established a series of impacts, such as adult mental health and hospital admissions (Forget, 2011). The US case of Gary, Indiana, in which low-income families received a minimum income guarantee, demonstrated an impact on birth weight (Kehrer and Wohlin, 1979). These schemes are in no substantive way comparable to the forms of UBI proposed for the UK because they are targeted at low-income groups in which poverty is a significant driver of ill health. Indeed, initial socioeconomic status (SES) was shown to be the key explanatory factor of obesity in the US case of Tribal Casino Cash Transfers, in which Indigenous Americans receive twice annual taxable cash payments (Akee et al, 2013). Such studies suggest potential impact on health from those forms of UBI that increase income among those with low income, but they have neither been designed in such a way as to map health impact via reduction in social sources of stress, nor to evaluate impact on whole populations.

Indeed, in general, few have either advanced health as a primary or key justification for UBI or designed evaluations of trials in such a way as to measure effect reliably and holistically. This inconsistency may be because proponents assume an effect, because they believe health to be an ancillary concern or because the means by which to understand and assess that effect are complex and demand methodological precision. As Gibson et al, (2018: 11) note,

A number of studies reported modest to strong positive effects on a range of health outcomes, including low birthweight, adult and child mental health, service use, and diet. Improved parenting quality and reduced financial strain were among the suggested mechanisms underlying some of these improvements. These effects were less consistent than those for labour market outcomes and educational participation, possibly because the outcome measures or the samples included in the analyses differed.

The possibility of an assumption of an effect is apparent in [Richardson et al's \(2018: 4\)](#) model examining the potential impact of income-based policies on health inequalities. This model assumes a causal, linear correlation between income and mortality, in which an increase in income will cause a decrease in mortality. Again, this assumption needs clarification.

UBI as a 'health in all policies' upstream intervention

UBI offers the capacity to deal with disincentives to healthy behaviour inherent in needs- and means-based welfare systems (see [Johnson and Spring, 2018](#)). People no longer face costs for being active and making health-promoting decisions, such as avoiding opioid painkillers that are often seen as indicators of incapacity by fitness for work benefits assessments ([Johnson et al, 2019](#)).

However, as [Johnson and Johnson's \(2019\)](#) review indicates, UBI's larger impact may lie in its prospective contribution to dealing with Britain's crisis of stress. This crisis was responsible for '44% of all work related ill health cases and 57% of all working days lost due to ill health' in 2017/2018 ([Health and Safety Executive, 2018: 2](#)), up from 37% and 45% in 2015/16 ([Health and Safety Executive, 2016](#)). Meanwhile, in 2010/2011, more than a quarter (around 15 million people) of the population of England had at least one long-term, stress-related chronic health condition such as heart disease, stroke, cancer, type 2 diabetes, arthritis or depression ([Department of Health, 2012](#)).

Stress is an evolutionary adaptation to enable humans to respond to short-term threats to homeostasis. Perception of threat triggers a cascade of biological changes that prime the body to respond to physical and existential harm, leading to 'increased cardiovascular tone, respiratory rate, and intermediate metabolism, along with inhibition of general vegetative functions such as feeding, digestion, growth, reproduction' ([Smith and Vale, 2006: 383](#); see also [Henderson and Baum, 2004](#)).

While this serves us well in dealing with mortal threats during times of war and natural disaster, we find that there are socioeconomic circumstances that prime us for stress unnecessarily. Research suggests that hierarchical organisational models, in particular, create forms of what republican political theorists have termed domination: the capacity for individuals to make arbitrary decisions that affect others without reference to those individuals' interests.

This concept of domination refers to the possibility of harm being inflicted, rather than the harm itself. In this regard, it refers to those sources of unpredictability that stem from the actions of other human beings. The mere possibility of individuals being subject to arbitrary decisions leaves them in a long-term condition of preparedness for threat – that is to say, long-term stressed by virtue of social unpredictability. Such an account is compatible with those that focus solely on resource scarcity, insofar

as domination is the threat of the removal of means of subsistence (that is, through termination of employment). People's exposure to domination increases as their resource base decreases, meaning that those at the bottom of hierarchies are not just less wealthy than those above them, they are significantly more threatened by the arbitrary decisions made by their superiors. Poverty is a cause of ill health, but it is not the only cause.

Domination does not refer to natural environmental unpredictability or freak accidents in which, without malice aforethought, an individual inflicts harm on another. While UBI might help us to deal with social sources of resolving the consequences of non-human or accidental actions by granting individuals resources by which to repair damage to themselves or their property, the primary source of unpredictability we suggest it mitigates is one in which, by virtue of power imbalances, individuals are subject to social arbitrariness.

Johnson and Johnson's (2019) review of the endocrinological and immunological literature suggests that such a condition both decreases normal immune function and increases autoimmunity, contributing to the physical ill health concomitant to the mental health crisis. This is borne out in the Whitehall II Study of Civil Servants Marmot and Steptoe, 2008, which demonstrates that, as individuals occupy lower positions in the hierarchy, they experience increased stress-related ill health, irrespective of their objective, absolute poverty (Marmot and Steptoe, 2008). Further complicating Richardson et al's (2018) assumptions, Tang et al, (2016). showed that the gradient was compounded by individuals' perceived position in their perceived hierarchy.

While the impact of UBI on health in work is Johnson and Johnson's (2019) novel contribution, its relationship with welfare reform is also apparent. At present, the UK's needs- and means-based system renders individuals subject to decisions that are imposed upon them, apparently arbitrarily, by those above them in the welfare bureaucracy. The reasons for those decisions are seldom justified with regard to the interests of recipients, and their consequences in terms of health are profound, as the United Nation's Special Rapporteur's report on poverty illustrates (Alston, 2018).

In this social context, Johnson and Johnson's (2019) argue that, if sufficiently generous to satisfy basic needs, UBI gives people the ability to resist (that is, by feeling protected from demeaning demands) or leave (that is, by resigning) conditions of domination, thus freeing them from stress. We argue that trials now need to be designed to measure stress as both a psychological and, importantly, biological phenomenon.

Discussion: dealing with methodological deficits

The Whitehall II study provides a methodological blueprint for this purpose. The model emphasises the need to analyse hormonal (particularly cortisol) patterns, as well as ambulatory blood pressure and heart rate, to create a complete overview of physiological stress levels (Marmot and Steptoe, 2008). Present studies of UBI do not follow that model.

In the first instance, some trials, such as that in Finland, focus on self-reported psychological stress. The literature demonstrates that the relationship between this and biological stress is not necessarily straightforward (Epel et al, 2018: 169). For

example, individuals may either not perceive their biological stress response accurately or self-report it differently for a range of social reasons (Simpson et al, 2008). This is indicated by studies that find no significant association between biological stress and mood (Chida and Steptoe, 2009). However, self-reported measures should not be discarded, and play a role in establishing impact on areas such as mental health and quality of life (Lombardo et al, 2018). Rather, a cluster of measures, both psychological (phenomenological) and biological (biomarkers), should be employed. We do not suggest that health outcomes have not been measured. Rather, we simply argue that the studies in which data has been gathered are not representative of the prospective UBI programmes we would encounter in the UK, and that they have failed to measure reliably all of the pathways to health impact. Each measure furthers our understanding of the drivers and markers of stress-related ill health and provides greater potential for predictive modelling of outcomes.

In the second instance, even those trials that do measure biological markers do so inaccurately. This is apparent in Johannes Haushofer and Jeremy Shapiro's (2016) evaluation of a trial of unconditional cash transfers to low-income household units in Kenya. Their research appears to demonstrate that, while there was a substantial impact of the transfers on subjective psychological measures of well-being, there was no overall average reduction in cortisol levels in the single measures taken before and after intervention. However, cortisol levels were significantly lower when transfers were made to the wife rather than the husband, when a lump sum rather than monthly payment was given, and when it was large rather than small (Haushofer and Shapiro, 2018).

While this may seem to challenge the justification for including biological measures of stress in trials of UBI, there are two significant drivers for these results.

First, interventions at an overall, average level failed to challenge the underlying structural reasons for stress within the communities. Payments to women that were intended to challenge control of wealth by men may have been balanced out by its entrenchment within the group in which transfers were made to men. Indeed, the control of wealth by one head of a household runs counter to the principles of Universal Basic Income, in which self-determination and financial security is guaranteed by payment to each and every citizen.

Second, as Haushofer and Shapiro acknowledge, cortisol levels vary substantially across the day, rising sharply in the morning (the cortisol awakening response) and declining across the day, as well as being affected by 'food and drink, alcohol and nicotine, medications, and strenuous physical exercise' (Haushofer and Shapiro, 2018: 11). While the authors obtained a 'clean' average through Ordinary Least Squares (OLS) regression to control for the influence of the above factors, this ignored several key factors.

Unfortunately, overall levels of cortisol are a poor predictor of disease risk. Rather, it is patterns across the day (and between days) that are an indicator of both future likelihood of ill health and hierarchically-driven stress. Cortisol awakening response (cortisol level on waking followed by a rise that reaches a peak after 30 minutes) was correlated in Whitehall II both with subjective stress levels and lower socioeconomic position (and, interestingly, gender), which correlated with poorer health outcomes in general (Marmot and Steptoe, 2008). A more recent study has suggested that a 'flatter slope' of decline in cortisol across the day, rather than heightened cortisol awakening response, is associated specifically with cardiovascular mortality (Kumari et al, 2011). Biological measures should not, though, be limited solely to cortisol. Others employed by Whitehall II – such as ambulatory blood pressure and markers

of chronic inflammation, like C-reactive protein, fibrinogen and interleukin 6 (IL-6) (Marmot and Steptoe, 2008) – are also strong candidates for inclusion in pilots.

UBI's core value in this context lies in promoting autonomy for each citizen and by challenging hierarchies associated with the health gradient in whatever form they are constituted (households, organisations, classes). This prospective benefit applies even to those relatively removed from absolute poverty. Haushofer and Shapiro's (2016; 2018) interventions targeted only a random selection of 'poor' households, with 'spillover' effects on some neighbouring households. Rather than promoting a flattening of hierarchy and individual autonomy, the intervention may simply have reshaped particular relationships and entrenched relative poverty among those not selected. Ultimately, the study measured only effects on those raised out of absolute poverty (and those at the sharp end of this dynamic who were not selected for payment), rather than others in hierarchies associated with poorer health outcomes, but not in absolute poverty.

Haushofer and Shapiro's (2016; 2018) study is a step forward and a serious attempt to demonstrate the influence that something approximating UBI might have on biological markers of stress. The differences between group designs, notably the impact of gender, point to areas for follow up.

However, a different approach is required if we are to build upon the evidence of previous studies and develop a trial aimed specifically at measuring public health impact. First and foremost, any trial of UBI must be concerned with payments to individuals. Second, we must follow Whitehall II and recent studies that have built on its findings and measure biological stress more effectively (Marmot and Steptoe, 2008). This includes through measurement of diurnal patterns of cortisol, as well as other indicators such as ambulatory blood pressure, heart rate and markers of chronic inflammation. This more holistic and contextualised approach should be supported by psychological, self-reported measures.

After more than 30 years, Whitehall II's data continues to reveal relationships between stress and health that suggest parameters for trials of UBI (see Marmot and Steptoe, 2008). Given that a UK Parliament lasts five years, any trial must be conducted within a period not longer than two to three years, so as to enable introduction and evaluation of the pilot. In that regard, it is not feasible to measure health outcomes themselves. Accordingly, while Kumari et al's study helpfully demonstrated the relationship between flatter slopes in decline of cortisol across the day and increased risk of cardiovascular deaths, the fact that it depended upon a six-year follow up means that trials of UBI must instead focus on measuring the physiological processes that lead to the outcomes (Kumari et al, 2011). Put simply, a Government simply could not plan a trial outside a single Parliament, since it would be possible that, even if successful, it would be dispensed with by a successor for ideological, rather than practical reasons.

In this political context, Webber and colleagues make a compelling case for public health modelling and its power in leveraging policy change (Webber et al, 2014). Statistical modelling is an essential means by which to fill the evidence gap by simulating the medium- and long-term impact of interventions if scaled up to a population level. At present, the design of trials is depriving modelling of accurate data by which to scale the impacts of interventions. Modelling can perform sensitivity analysis, account for poor quality data based on qualitative assumption, and provide evidence for, and inform the development of, a larger trial. However, because the trials developed thus

far have not been designed with impact on health in mind, let alone to have that impact studied effectively, even the data that does exist may prove insufficient to enable scaling. It is only by designing trials with health in mind, and then measuring impact on health accurately, that modelling can provide us with the population-level data by which to establish benefit to society as a whole, and to produce the evidential basis for legislation. A Government committed to that policy would have every incentive to invest in means of measuring impact as reliably and comprehensively as possible. The measures we have outlined above take us toward a blueprint for such efforts.

Given that [Hassard et al, \(2014\)](#) and [Kalia \(2002\)](#) both highlight the enormous impact of stress on economic activity and outcomes, such measures would enable accurate assessment of the economic benefit of improved national health through the introduction of UBI. This is an approach that is consistent with the UK Government's prevention agenda ([Department of Health and Social Care, 2019](#)).

Conclusion

Webber and colleagues highlight the opportunity of political realignment and the need for fiscal prudence to reshape our policies to make a transformative, cumulative impact on health. If societies are to achieve this, UBI ought to be considered seriously as a means of reducing social inequalities, improving health, reducing the burden on the NHS and improving productivity.

Currently, debate has been informed by partial evidence of the social and economic benefit against what would be a very large spending commitment. The trial of guaranteed payments to unemployed people in Finland had the effect of clouding the policy debate about UBI. UBI is not only different in its structure but also has very likely population-level benefits not measured, or at least valued, in the Finnish context. Other trials have had broader objectives but provided payments in a manner that might have embedded particular forms of social hierarchy and stress that UBI generally seeks to reduce or eliminate. Where systems closer to UBI have been trialled, they have failed to measure effectively the likely mechanisms of impact on population-level health and well-being.

Labour's commitment to UBI at the 2019 election and interest in the policy at city level indicates that adoption of large-scale pilots is increasingly possible. However, reporting of previous attempts and public scepticism about its feasibility mean that it is more important than ever that trials be designed appropriately. If not, potentially transformative interventions that meet [Webber and colleagues' \(2018\)](#) criteria may be overlooked in favour of less effective alternatives.

To achieve appropriate designs, collaborative work must take place between policy makers, social, political and economic theorists, epidemiologists, biomedical scientists and psychologists, to ensure observation of all key factors associated with the social health gradient. To support policy development, statistical modelling must be accounted for in this design to extrapolate short- to medium-term data to long-term population-level outcomes across social strata.

This will require substantial investment of resources from Government and/or major research funders and would therefore face its own challenges. However, a comprehensive trial design is the only way that an accurate cost-benefit analysis of a UBI policy can be facilitated prior to national introduction. Indeed, such approaches should be considered for other 'upstream' interventions, given that UK Government spending on

'preventive' care in 2017 accounted for just 5% of its total health expenditure ([Office for National Statistics, 2019](#)).

Without evidence of substantial economic benefit that is possible with a comprehensive trial and statistical modelling, it is unlikely that such significant interventions will be deemed viable, by government or the public. Such a project could provide a platform to pioneer this interdisciplinary approach resulting in the kind of joined-up evidence and policy that is so often sought but found just out of reach in practice.

Research ethics

The authors of this paper have declared that research ethics approval was not required since the paper does not present or draw directly on data/findings from empirical research.

Contributors

EJ and MJ conceived and drafted this analysis. LW provided comment, feedback and specific input with regard to modelling and upstream interventions.

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Conflict of interest

The authors declare that there is no conflict of interest.

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