Case Study Report

Healthy Movement, Healthy Places:
Measuring Wellbeing and Quality of Life Impacts in Transport Appraisal

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Abstract

There is increasing recognition that investment in transport and the way we shape our built environment has profound impacts on our health, wellbeing and quality of life. Macro-economic appraisal tools play a major role in transport decision-making and governance in many countries, traditionally focussing largely on the social welfare effects of changes in travel time accessibility. However, the current policy challenges require project appraisal structures that consider the wider social, environmental and health impacts of transport investment.

The Healthy Movement, Healthy Places research explores the evidence between transport and broader health and wellbeing outcomes to further develop transport appraisal and modelling tools. The study evaluates existing appraisal tools and identifies priorities for future research based on evidence in relation to a series of pathways between transport interventions and health outcomes: (A) physical activity, (B) productivity and labour market impacts, (C) connectivity and travel choice, (D) social impacts, (E) accessibility, (F) journey and neighbourhood quality, (G) environmental impacts, (H) road danger (I) personal security.

The causal pathways can be a useful tool when preparing business case narratives for sustainable transport investment. To achieve healthier, more resilient and ultimately more economically sustainable patterns of land use and transport, it is essential to broaden the focus of decision making beyond the traditional scope of travel time savings and productivity improvements. The wellbeing and quality of life perspective offers an additional toolbox to transport practitioners to develop transport strategy and conduct scheme appraisal.

Keywords

Wellbeing, health, transport, governance, project appraisal

1. Background

There is increasing recognition that investment in transport and the way we shape our built environment has profound impacts on our health, wellbeing and quality of life. The current policy challenges of post-Covid economic recovery, rapid decarbonisation and public health require transport investments that consider social, environmental and health impacts as well as economic considerations.

Macro-economic appraisal tools play a varying role in different countries and governance cultures. The UK Treasury has traditionally placed considerable weight on the use of economic appraisal, and there is a long history of using cost-benefit analysis in transport decision-making, focussing largely on the valuation of changes in travel time accessibility. The methods for estimating the value of time saved include revealed willingness to pay for express services, stated preference research, and estimation of workers' productivity.

The over-reliance on narrowly defined forms of economic appraisal has long been criticised by campaigners, and many transport planning practitioners have called for reform[1]. It is reported that the new version of the Welsh transport appraisal guidance (WelTAG) is being drafted with the requirement for scheme promoters to present a business case both with and without journey time impacts[2]. Projects will then need to demonstrate that they offer value for money by aligning with the Welsh Government's strategic objectives.

2. Project context and scope

2.1. Project context

Under UK governance arrangements, England does not have a tier of regional government between national and local government. However, sub-national transport bodies (SNTBs) with differing levels of statutory powers have been created to coordinate transport infrastructure delivery. Midlands Connect is a non-statutory regional transport body that coordinates transport project delivery between local authorities and delivery agencies. Its mission is to research, develop and progress transport projects which will provide the biggest possible environmental, economic and social benefits for the Midlands and the rest of the UK.

Midlands Connect commissioned the Healthy Movement, Healthy Places research to explore the pathways between transport and broader health and wellbeing outcomes to further develop their appraisal and modelling tools. Given the increased focus on Quality of Life and Healthy Places an increased consideration of drawing on insights from health and wellbeing research was seen appropriate to broader the focus of decision making beyond the traditional scope of travel time savings and productivity improvements.

2.2. Project scope

The research was a tailored review that sought to identify key gaps in the evidence base regarding transport and wellbeing impacts. The research was not intended to represent a systematic review of such a wide topic area. Instead, with input from both practitioners and researchers, it collated findings from a number of systematic reviews and other meta-studies in a targeted manner.

The stated aims of the research were to highlight (a) where there are existing tools to include health and wellbeing in transport strategy development and economic appraisal, (b) where there is a good evidence base that could be 'operationalised' to develop tools for use in transport appraisal, and (c) where there are clear priorities for future research in this field.

[1] See for example the joint letter issued by the Local Government Technical Advisers Group (LGTAG), Transport Planning Society, Chartered Institution of Highways and Transportation and Royal Town Planning Institute in June 2020

[2] Reported in Local Transport Today issue 849, 11th July 2022, p18-22

2.3. Logic mapping

This report used logic mapping to describe pathways linking transport interventions to health and wellbeing outcomes. The logic maps are displayed as linear processes covering transport policy interventions, their spatial and travel behavioural outputs, the resulting health and wellbeing impacts, and potential valuation methods.

The linkages in the pathways were characterised on a 3-point scale of strength of evidence, created with reference to the standard Maryland Scientific Methods Scale and an alternative 5-point scale derived by the innovation foundation NESTA (Puttick and Ludlow, 2013):

- Probable: confidence in causality through correlation with multiple studies to replicate findings or causal evidence from natural experiments or longitudinal studies with appropriate control groups.
- Plausible: Relationship based on correlation with an appropriate control group, but no causal evidence.
- Aspirational: Evidence from case studies and studies with no control group.

2.4. Transport and health pathways

The authors defined nine different themes to group the evidence on pathways (figure 1). For clarity, note that this report uses the term *accessibility* to refer specifically to access for disabled persons. When referring to the journey time or distance to reach one or more destinations, the term *connectivity* is used.

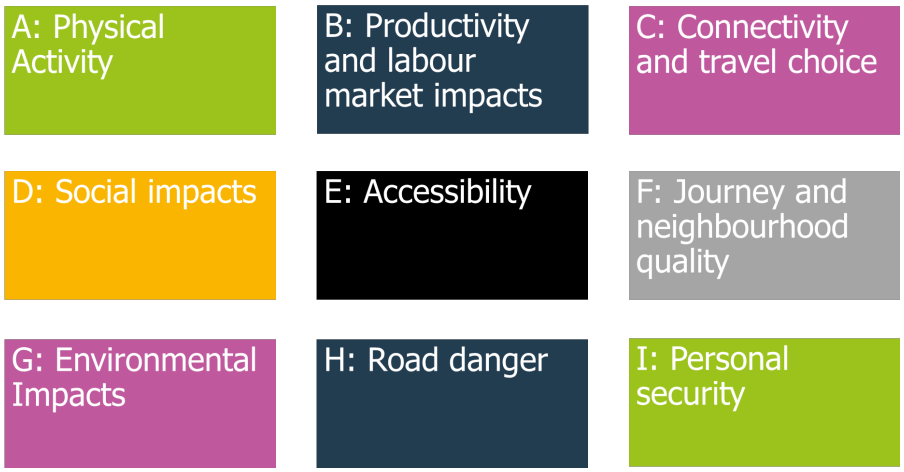

Figure 1: Transport and health pathways

2. Project appraisal using health and wellbeing approaches

2.1 Existing use of health-based appraisal

In project appraisal in the UK, the monetary value of several external impacts of transport are already calculated using the public health metric of Quality Adjusted Life Years (QALYs). These combine the life years of an individual with their health-related quality of life. They can be used to compare different health interventions that extend an individual's life expectancy and/or improve their quality of life over that period. For example, they can be used to compare the benefits of diabetes prevention and diabetes

treatment on an equal footing. One QALY equals one year of life multiplied by a health-related quality of life score between 0 and 1 (whereby negative values are also possible).

Methods for the estimation of health-related quality of life scores clearly have the potential for ethical issues, as well as assuming that respondents have an awareness of a range of different health states with which they may in reality be unfamiliar with (Whitehead and Ali, 2010). Several indirect surveys methods have therefore been developed that use generic preference-based measures, also known as multi-attribute systems, covering aspects of an individual's health.

Economists have long used the concept of the statistical value of a life or Value of a Prevented Fatality (VPF) that seeks to place a monetary value on the human costs (pain, grief and suffering), the loss of output due to injury and medical costs. The UK Treasury has calculated a standard conversion of the VPF to a standard monetary value of a QALY of £60,000 in 2014 prices and values, which can be applied to QALYs gained in project appraisal (Treasury, 2020).

QALY-based (or compatible) valuation approaches are already used in many of the pathways. The health impacts of increased physical activity can be valued using the statistical value of a life or QALYs. Accessibility impacts can theoretically be converted to QALYs through direct use of multi-attribute scales, although in practice the regulatory governance for these improvements does not require this. The impacts of crimes to the person are valued using QALY-based costs of physical and emotional injuries. The established method for valuing road danger reduction benefits uses the statistical value of a life and the damage costs approach for assessing air quality impacts is morbidity-based, both of which are compatible methods.

One example of health appraisal that is frequently applied in the transport sector is the calculation of the physical activity benefits of increased levels of walking and cycling. The HEAT tool developed by the World Health Organisation provides a robust and user-friendly calculation method that can be applied internationally. In the UK, the Active Modes Appraisal Toolkit has been developed to further reflect the health benefits to different age cohorts (Department for Transport, 2019). Using data from the National Travel Survey (NTS), this tool converts changes in the time spent walking and cycling into metabotically equivalent tasks (METs) and calculates the resulting reduction in mortality rates.

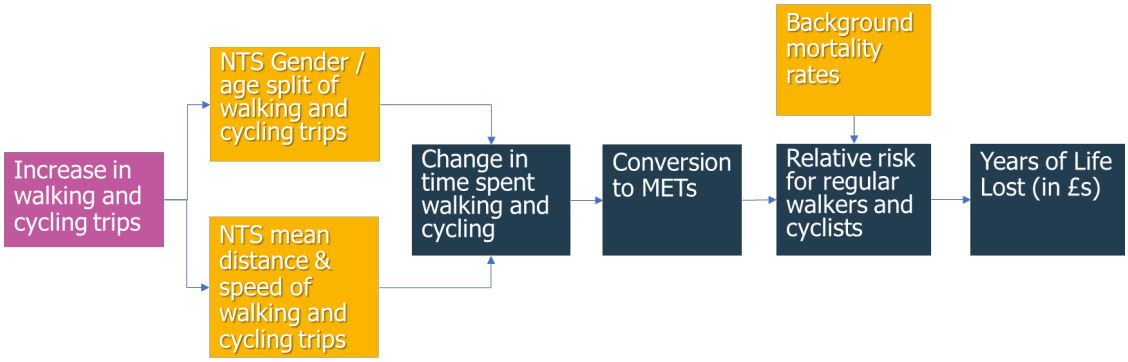

Figure 2: Structure of the UK Active Modes Appraisal Tool

2.2. New wellbeing approaches

Defining wellbeing as a concept distinct from overall health is not easy. Indeed, the holistic definition of health used by the World Health Organisation (WHO) actually refers to a state of *physical, mental and social wellbeing*.

However, subjective wellbeing is measured using people's self-reported assessment of their own wellbeing. The UK Office of National Statistics has adopted the use of four validated questions in several questionnaires to provide a clear multi-dimensional benchmark of subjective wellbeing. The four questions (ONS4), all of which use a 0-10 scale, are as follows:

- overall, how satisfied are you with your life nowadays? (evaluative measure of experience)
- overall, how happy did you feel yesterday? (positive affect)
- overall, how anxious did you feel yesterday? (negative affect)
- overall, to what extent do you feel the things you do in your life are worthwhile? (Eudemonic)

There has been some criticism of over-reliance on measures of life satisfaction and happiness at the expense of factors such as sense of competence, autonomy and vitality (Marsh *et al.*, 2020; Ruggeri *et al.*, 2020). Yet the ONS4 have the benefit of consistency and replicability that are crucial if subjective wellbeing is to be considered alongside objective measures of physical health and external factors.

The UK's Treasury has now recommended the use of a monetary value of wellbeing (WELLBY), giving a greater weight to mental health, social relations, and the environment. The purpose of a WELLBY is to go beyond QALYs, which measure the absence of negative outcomes, to a measure of positive wellbeing outcomes. The draft guidance provides clear criteria for where the use of WELLBYs should be considered, such as the lack of functioning competitive markets or suitable real-world trade-offs to generate values. Wellbeing effects are expressed on a 0 to 10 scale and a one-point change in life satisfaction for one year is a WELLBY, converted to a standard monetary value of £13,000 in 2019 prices and values (Treasury, 2021).

The pathways research explored potential applications of WELLBYs to several areas of transport appraisal. The report identifies two areas where a wellbeing approach to appraisal could be operationalised relatively quickly.

3. Potential applications to transport appraisal

3.1. Case study: Re-entry into the labour market

The What Works for Wellbeing review into unemployment and (re)employment states that there is strong evidence that being in employment is associated with higher overall wellbeing (Gedikli *et al.*, 2017). It concludes that unemployment has a negative effect on wellbeing when controlling for confounding factors. The effect of unemployment increases over time and there is not a normalisation effect as people adapt. The wellbeing impact affects not only the unemployed person but their family or spouse. Longitudinal studies show that re-employment results in higher wellbeing.

Thus, the wellbeing approach is valid in situations where transport represents a particularly severe barrier to entering the labour market. For example, this is the case where both affordable housing and entry-level employment are located in areas of high car dependency and/or high public transport fares thus effectively excluding jobseekers without access to a car from the job market. Interventions to provide affordable access to employment, or better still to encourage employers to locate in more accessible locations, can help to break through a cycle of long-term unemployment.

Long-term mental and physical benefits are also linked to job quality, whereby attributes associated with improved wellbeing include job security, autonomy, variety in work, and a good work-life balance (Clark *et al.*, 2018). However, economists argue that these effects are already somewhat captured in willingness to incur greater time and cost to access jobs with better pay and/or job quality.

3.2. Case study: Reducing loneliness

The association between social isolation and health outcomes has long been recognised. Social networks are acknowledged as a health-determining factor in their own right and cannot be explained by biological, health or personality variables (House, Landis and Umberson, 1988). One US study with a representative national sample finds that social isolation as a predictor of mortality is as great as well-documented clinical risk factors such as smoking and obesity (Pantell *et al.*, 2013).

A recent analysis for the Department for Digital, Culture, Media & Sport (DCMS) estimates that the wellbeing impact of moderate to severe loneliness equates to an impact of at least 0.7 life satisfaction units (Peytrignet, Garforth-Bles and Keohane, 2020).

Interventions to combat loneliness can include transport interventions (community transport, concessionary fares), as well as placed-based interventions (retention of local facilities, neighbourhood walkability). However, the strength of evidence is still relatively weak. The UK Department for Transport has recently allocated nearly £5 million for pilot projects to understand how transport can be used to alleviate loneliness. The projects will be evaluated to develop an evidence base for how transport policies can reduce the number of people feeling lonely.

3.3. Other research method issues

Many of the pathways leading to health-promoting outcomes such as increased physical activity or social cohesion feature concepts around the confidence to make trips independently as a mediating factor. There is a need to recognise that providing users with greater confidence to travel is complex and there may be multiple barriers to overcome, and thus research needs to include a combination of social and physical environment variables. Research into the quality of transport focuses heavily on commuting trips. Greater focus should be placed on non-commuting, and especially on structured research on the conditions under which children and adults in need of care can travel independently.

As with many areas of social sciences research, there is an over-reliance on cross-sectional models. Stronger evidence can be derived from longitudinal data and natural experiments with control samples. Researchers should make use of existing longitudinal panel survey data wherever possible, potentially adding in more enhanced spatial and neighbourhood environmental variables about participants' home locations. Opportunities for quasi-random natural experiments should be used more frequently, e.g. sample frameworks of people who express an interest to move house, take a job or send their children to school in a specific are.

3.4. Conclusions

The logic mapping pathways can be a useful tool when preparing business case narratives for sustainable transport investment. In order to achieve healthier, more resilient and ultimately more economically sustainable patterns of land use and transport, it is essential to broaden the focus of decision making beyond the traditional scope of travel time savings and productivity improvements.

The wellbeing and quality of life perspective offers an additional toolbox to transport practitioners to develop transport strategy and conduct scheme appraisal. The report describes how project appraisal using subjective wellbeing metrics could be operationalised for re-entry into the labour market and reducing loneliness, two policy areas where there is already strong evidence of the health and wellbeing impacts. More robust evidence linking transport and land use planning interventions to these policy outcomes is emerging. There is a reasonable degree of consensus on recommendations for improved research methods in the transport and health field.

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