INTERVENTION BRIEFING
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TRUUD

Evidence used in the HAUS model

The issue

The Health Appraisal of Urban Systems model (HAUS) demonstrates the health impacts of a wide range of characteristics of the urban environment to inform planners, investors and developers at the earliest stage of planning new places to live and work.

Covering six themes: building design, natural environment, community infrastructure, socio-economics, transport, and climate change it provides more than 200 environment-health impact pathways, each representing a causal path from a specific change to the environment to a health outcome. For decision-makers to use evidence from HAUS with confidence, they need to understand the evidence behind these impact pathways are and how HAUS assesses and communicates the quality of evidence.

Here we explain how the treatment of this evidence meets the minimum standard of quality required by the Ministry of Housing, Communities and Local Government (MHCLG) Appraisal Guide. We cover the methods used to identify the evidence on unit costs and health impact pathways, and how evidence quality is assessed and communicated to the user.

Evidence on the relationships between urban environments and health

How was evidence identified? Each impact pathway in HAUS includes an estimate of the effect of a characteristic of the urban environment on a health outcome. The impact pathways are derived from published systematic reviews of epidemiological evidence investigating the relationships between urban environments and health [1].

How was the strength of evidence assessed? In the systematic reviews, each study was assessed using the Quality Assessment Tool for Quantitative Studies by the Effective Public Health Practice Project (EHPPP). Using this process, each study is rated as strong, moderate or weak based on ratings against six domains of study design and reporting.

Developing the impact pathways

How were the impact pathways identified? Single pairings of links that demonstrated a measurable change to risk of illness from characteristics of the urban environment were identified from the reviews. Overlapping pairings were combined where possible. All of the impact pathways include detail of the specific characteristic of the environment and the mechanism which results in a health change, the direction of change, the population affected, the specific health outcome which is the result, and information on the evidence which informs the pathway.

How is a measurable change in health assessed? In the majority of impact pathways, the size and scale of the effect of the environment on health outcomes are recorded as either a Risk Ratio (the risk of a group exposed to a risk factor compared with the risk of an unexposed group) or an Odds Ratio (the probability of an outcome occurring against the probability of it not occurring). In 21 pathways where this data

1 (1) Ige et al. 2019 The relationship between buildings and health: a systematic review Journal of Public Health, 41(2), e121–e132; (2) Ige et al. 2020 Designing healthier neighbourhoods: a systematic review of the impact of the neighbourhood design on health and wellbeing, Cities & Health, 6(5), 1004-1019; (3) Ige-Elegbede et al 2023 A systematic review of the impacts of extreme heat on health and wellbeing in the United Kingdom, Cities & Health, 8(3), 432–446. Evidence from the 2019 and 2020 reviews was updated for inclusion in HAUS, with additional searches on flooding impacts in 2022.

UKPRP Prevention Research Partnership
Joint action for a healthier, fairer future

Local authority partners
GMCA Greater Manchester Combined Authority
Bristol City Council

University consortium
University of Bath
University of Bristol
Manchester 1824 The University of Manchester
University of Reading
University of Stirling
UWE Bristol University of the West of England

was unavailable, an alternative measure for observing changes in risk was used such as a percentage change in risk between two groups.

What criteria were applied when selecting evidence? Where multiple evidence on the same impact pathway was available, the effect size was selected from the most appropriate source rather than taking an average of effect sizes. Appropriateness was determined through an assessment of the following criteria:

Criteria	How evidence was prioritised or excluded
Applicability	Applicability to the UK urban context, for example whether environmental conditions, housing quality and populations from the base study were similar to those typically found in UK residential areas.
Geography	1) UK Studies, 2) North West Europe, 3) South or South East Europe, 4) Europe, 5) Rest of the world. Higher income countries preferred over lower- or middle-income countries.
Study design	1) Randomised controlled trials, 2) case control & before and after studies, 3) cross-sectional and quasi-experimental studies.
Overlap of symptoms	On the clearest indicator of a specific illness rather than symptoms that could indicate a broader range of illnesses.
Statistical significance	Excluded where no statistically significant association between exposure and health outcome was identified

How is the strength of evidence communicated? Each impact pathway includes details on several factors on the relevant source studies to help the user understand the evidence behind the outputs in HAUS. This includes the assessment of methodological quality in the systematic reviews, the parameters and population demographics from the source studies, details of the specific environmental change and health outcome, and the size and scale of the effect. Future additions to the HAUS model could include options to select pathways based on robustness, and/or indications of the strength of evidence alongside results outputs.

Evidence on unit costs of illness

How was the evidence identified? Changes in health status are valued in HAUS using a societal cost approach to describe the effect of ill health across the community or society and the agencies within it that bear that cost. It comprises direct costs (health and social care), indirect costs (lost productivity and informal care), and disutility costs (the pain and suffering associated with disease and premature mortality). A library of unit cost values relating to the societal cost of illness per case was derived from primary studies using a systematic review approach [2] Gaps in the evidence on the disutility cost of depression and pain were completed by additional primary research.

How was the strength of evidence assessed? Study quality was assessed using a checklist based on the Consolidated Health Economic Evaluation Reporting Standards (CHEERS). Additional criteria were added to investigate how studies reported incremental effects of illness severity and demographics, and to assess specific methodological issues relating to stated preference studies used to estimate disutility costs. All studies were graded for strength and robustness based on an assessment against these criteria.

Evidence from this review on unit costs was converted for use in the HAUS model using benefit transfer methods, such as conversion to GBP at 2022 rates, adjusting for inflation and purchasing power parity. Gaps in the evidence on some health outcomes were addressed by use of proxy values where necessary. The HAUS model includes information on the unit used, the range of uncertainty for each cost and whether a proxy value has been applied. If it is useful for future users, further information from the evidence assessment, such as strength of evidence ratings, can be added.

About Truud

'Tackling the Root causes Upstream of Unhealthy Urban Development' (TRUUD) is a 5-year, £6.7m research project that aims to design policy interventions to support the development of healthier urban environments. Our research seeks to promote a fundamental shift in thinking about how to prioritise healthy urban development. We are funded by the UK Prevention Research Partnership.

Contact the authors

Dr Eleanor Eaton and Dr Geoff Bates at the University of Bath via truud-policy@bristol.ac.uk

2 Eaton, 2023, Economic valuation of the societal cost of non-communicable disease related to urban housing developments in the UK, Chapter 2 and Appendix 2. Strength of evidence for all studies is available in Appendix 3 of the same resource.