

Towards cost-effectiveness analysis of the health and wellbeing benefits of urban green space: a mapping review

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Introduction

Urban green spaces (UGS) are thought to impact on health and wellbeing via a range of causal pathways and the ecosystem services they provide have been studied across the social scientific and scientific disciplines. Cost-effectiveness analysis (CEA) as practiced in the health and public health sector can help to determine if provision or interventional use of urban green spaces can contribute to population health in a cost effective manner. This mapping review aims to characterise the study designs, independent variables, outcomes and outcome measures reported in existing literature, to gauge the feasibility of performing a cost effectiveness analysis, and guide future research.

Methods

- Key health, medical, psychological and social science databases were searched from 1990 to April 2010
- Studies of any design which attempted to value the health and wellbeing effects of UGS were included.
- Citations were screened by title and abstract by one reviewer (SH).
- A 10% sample of articles excluded on the basis on title were double checked by a co-author.
- Articles were included if they a) involved use of or exposure to urban green spaces and b) attempted to value physical health, mental health, or social wellbeing.
- All study designs were eligible for inclusion except reviews.
- Studies were coded by design (ref CRD, CEBM).
- Research topics found in the literature were coded using a grounded theory approach, and were then fitted to a theoretical health pathway (defined a priori).
- Outcomes were coded as either health behaviours (factors linked to long term health outcomes), or health outcomes (measures of health such as health related quality of life, mortality, cardiovascular fitness etc).
- The methods of measurement were recorded and listed as either "named outcome measure", or "other outcome measure".

Results – Study design

- 2884 titles were retrieved
- 189 citations were included.

Study designs:

- Most common study design was cross sectional regression analysis (Figure 1).
- There were only 2 randomised controlled trials, and one natural experiment (scored as non-randomised).
- 61 studies used economic methods of valuation. Most of these were hedonic pricing studies, with one limited cost-effectiveness analysis.
- Approximately three quarters of the non-economic literature used quantitative methods and one quarter qualitative methods.

Figure 1. Summary of quantitative study designs.

Reference	Data from	Primary or secondary?	Descriptive or analytic?	Study type	Study design	Reference	Data from	Primary or secondary?	Descriptive or analytic?	Study type	Study design
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Key to shading, by column

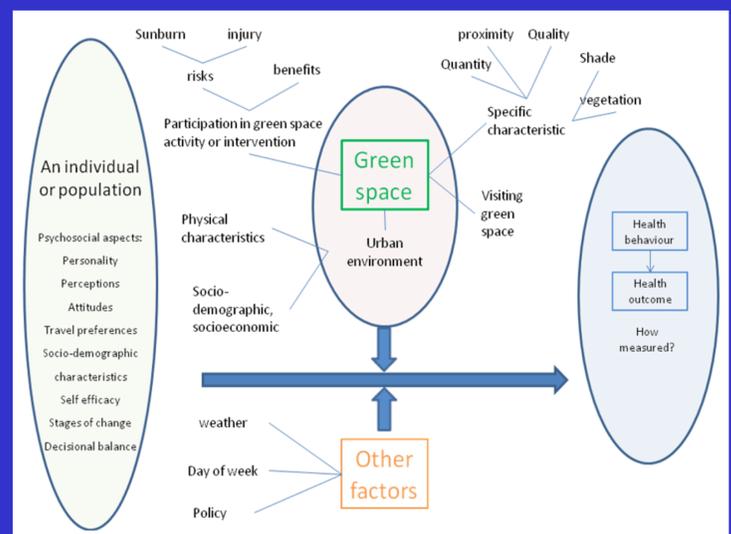
Data from: □ individuals, □ population data, □ environment.
Primary or secondary: □ primary, □ secondary.
Descriptive or analytic: □ analytic, □ descriptive.
Study type: □ experimental, □ observational, □ survey.
Study design: □ RCT, □ pilot study or non-randomised study, □ case-control or cohort study, □ cross sectional study.
All fields: ■ Not reported

Results – Research topics

Research topics in non-economic literature:

- Studies considered many putative independent variables, including psychological, socio economic, environmental and interventional variables. (Figure 2).
- Settings and populations varied widely (Figure 2).

Figure 2. Summary of research topics found in qualitative studies, fitted to theoretical health pathway.



Results - Outcomes

Outcomes and outcome measures:

- Health behaviours included physical activity, visit frequency, nutrition and social interaction.
- Health outcomes included general health, mental health, quality of life, wellbeing, mortality, obesity, cardiovascular and fitness indices .
- Physical activity was the most studied behaviour, health and mental health the most studied outcomes.
- Named outcome measures were used less often than study-specific measures such as questionnaires and pre-existing data.
- SF-36 used five times, SF-20 once, and EQ-5D once.

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Conclusions

- Outcome measures were generally not compatible with CEA.
- Few randomised studies have been performed and available evidence would not allow a traditional CEA.
- Existing trials have limited external validity according to criteria normally used in health contexts.
- Current evidence may better lend itself to logic modelling, as the causal pathways are long and complex and green space is likely to act at both the individual and population level.
- This is a mapping review. Limitations of this study type should be borne in mind: limited search strategy; sole reviewer data extraction; use of abstracts not full text; no quality assessment.
- Future research should carefully choose study design, outcomes and outcome measures to contribute to logic models, evidence synthesis and CEA.