Are brief interventions promoting physical activity in primary care cost-effective?

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Introduction

Physical inactivity is associated with significant burden of chronic disease and a significant proportion of healthy life years lost.

Promotion of physical activity not only contributes to well-being, but is also essential for good health.

In England, adults aged 40-74 without pre-existing conditions are invited to receive a free "health check" at their general practice (NHS Health Check).

The majority of people in this age group do not meet the minimum recommended level of physical activity. The health check provides an opportunity to deliver brief interventions to increase physical activity.

Brief interventions involve opportunistic advice, discussion, negotiation or encouragement to promote physical activity, and are delivered by a range of primary care and community care professionals.

The present research aims to estimate the long-term cost and health consequences of brief physical activity interventions in a primary care setting.

Methods

A micro-simulation model of physical activity interventions where a cohort of participants was drawn at random using the UK population distribution of parameters (Source: Health Survey for England).

The model uses mathematical functions to predict disease events which are based on the changes in the values of risk factors (blood pressure, cholesterol levels and HbA1c).

The cost impacts and health outcomes of three brief interventions and usual care were compared.

GP advice on exercise: written physical activity prescriptions plus advice or counselling on physical activity

Implementation intentions: participants form their intentions (goals) into actions i.e. physical activity uptake

Pedometer use: encourage usage of pedometers as a motivational tool to increase physical activity

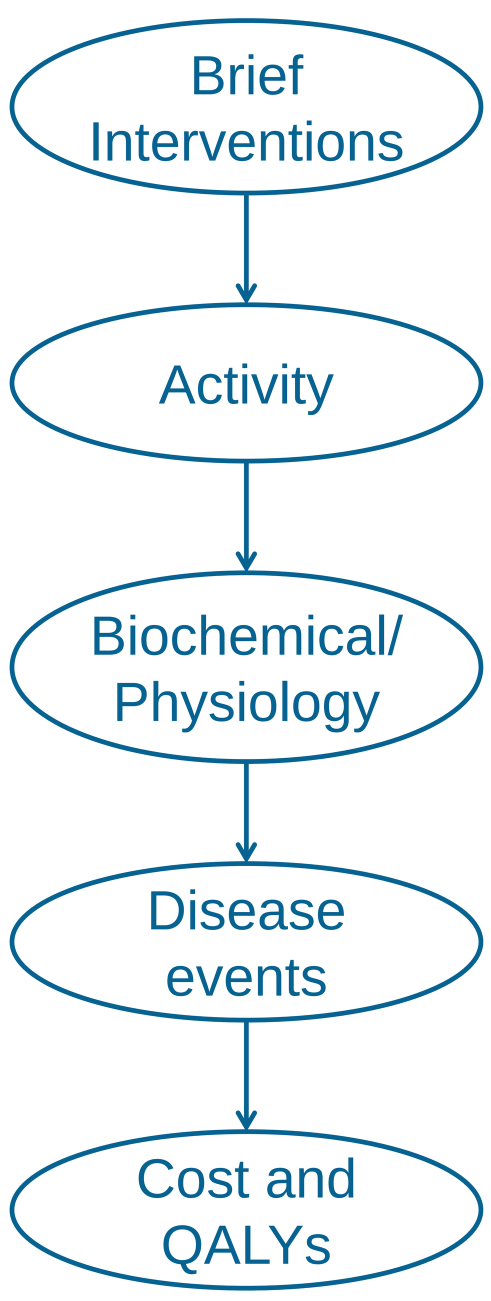

Figure 1. Conceptual structure of the model

The costs of disease treatment and interventions, transitional probabilities and health state utilities were taken from public data sources, and from a review of the literature.

Table 1. Model inputs (Intervention costs and effects)

	Cost of intervention*	Effect of intervention (MET-hour/week)	Source
GP advice	£ 73.21	0.277 (0.165 – 0.388)	Orrow et al., 2012
Implementation Intentions	£ 44.74	0.243 (0.127 – 0.358)	Belanger-Gravel et al., 2013
Pedometers	£ 53.33	7.41 (3.27 – 11.56)	Bravata et al., 2007

* Price year 2011, £

Results

A cohort of 10,000 participants entered the model. The sustainability of intervention health effects over time is evaluated by varying decay rates between 0% (lifelong behaviour change) and 100% (behaviour change reversed after the first year post-intervention) .

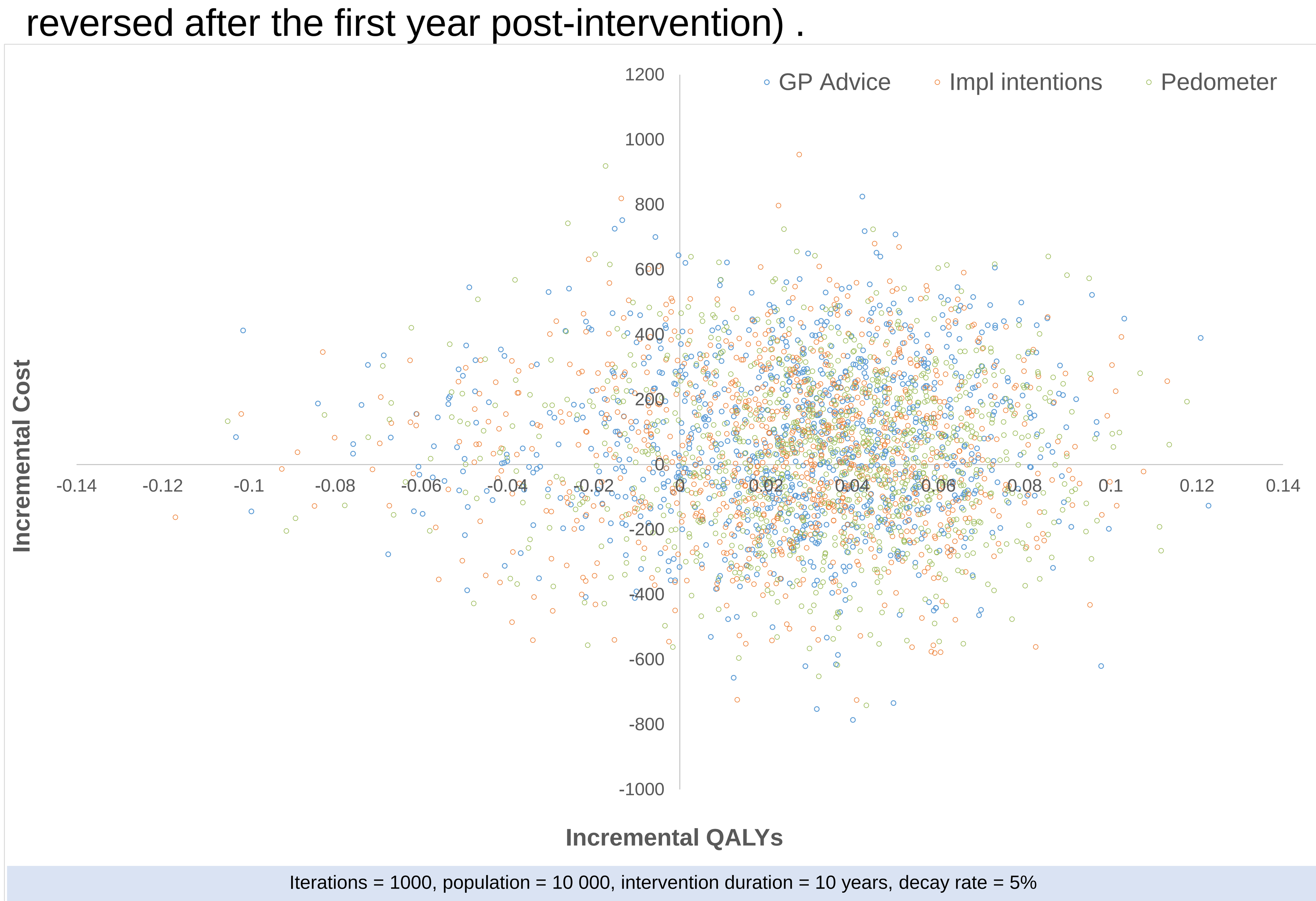

Figure 2. Incremental cost-effectiveness scatter plot (all versus 'none')

Not surprisingly, the incremental cost-effectiveness ratio increases with faster "decay rate". The Pedometer intervention appears to have the highest net benefit.

Table 2. Cost-effectiveness of brief interventions

Interventions	Total Cost*	QALYs gained*	Net benefit at £20,000	Net benefit at £30,000
None	£4,731 (4320 – 5184)	7.5084 (7.43 – 7.56)	£ 145,441	£ 220,526
GP advice	£4,799 (4418 – 5270)	7.5091 (7.43 – 7.56)	£ 145,378	£ 220,469
Implementation intentions	£4,734 (4379 – 5238)	7.5087 (7.43 – 7.57)	£ 145,444	£ 220,534
Pedometers	£4,711 (4368 – 5211)	7.5150 (7.44 – 7.57)	£ 145,511	£ 220,631

* Costs and QALYs are discounted at 3.5%; price year 2011 £; decay rate 5%. Figures are mean (95% interval).

Conclusions

A single brief intervention leads to virtually no difference in cost or outcome between any of the comparators; although point estimate results suggest that the use of pedometers could be the most cost-effective brief intervention. Future work will explore the impact of different "decay rates", and the effectiveness of repeated interventions and optimal time interval for repeats.

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