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**The short-term and long-term cost-effectiveness of a pedometer-based intervention in primary care: a within trial analysis and beyond-trial modelling**

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**Abstract**

**Background** There is little evidence of the cost-effectiveness of pedometer-based interventions. We examined the short-term and long-term cost-effectiveness of pedometer-based walking intervention in inactive adults.

**Methods** Data were collected as part of a three-arm cluster-randomised trial conducted (2012–14) in seven primary care practices in London to assess the effectiveness of pedometer-based walking interventions (PACE-UP trial). Eligible participants were inactive adults aged 45–75 years, without contraindications to increasing moderate-to-vigorous physical activity. 11 015 people were mailed an invitation. 6399 were non-responders, and 548 individuals who self-reported as being active were excluded. 1023 people were randomised to usual care (control, n=338), postal pedometer (339), and nurse-supported pedometer interventions (346). 956 participants (93%) provided outcome data. Intervention groups received pedometers, 12 week walking programmes, and diaries to record physical activity. The nurse group was also offered three physical activity consultations. A within trial cost-effectiveness analysis was done at 1 year. Additionally, a Markov model, using routine data obtained via reviews of epidemiological and economic literature, was used to extend trial results to a life-time horizon. Cost per change in physical activity (step count, and moderate-to-vigorous physical activity in ≥10 minute bouts) and quality-adjusted life-years (QALYs) for interventions were assessed. Costs (in £2013 prices) are presented from a health-care provider’s perspective and uncertainty as a cost-effectiveness acceptability curve. Ethics approval was provided by London Research Ethics Committee (Hampstead). PACE-UP is registered with Current Controlled Trials, ISRCTN98538934.

**Findings** In the short term, incremental cost per step and cost per min in a 10 min or more bout of moderate-to-vigorous physical activity were £0.19 and £3.61, respectively, for nurse-support. The postal group took a greater number of steps and cost less. In the long term, the postal group dominated both control and nurse groups in that QALY gains (759, 95% CI 400 to 1247) added to increased cost savings (–£11 million, 95% CI –12 to –10), resulting in an incremental net monetary benefit of £26 million (based on a hypothetical cohort of 100 000 people) The postal group had a 50% chance of being cost-effective in terms of QALYs at 1 year and, at a £20 000 per QALY threshold, robustly dominated both nurse and control groups in the long term.

**Interpretation** A pedometer-based intervention delivered by post, compared with current practice, would deliver cost savings in the short term and the most quality of life benefits in the long term.

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**Contributors**

NA, JFR, and SS conducted the economic analysis. TH, DGC, SMK, CRV, SMS, PW, MU, UE, and JF-R conceived and designed the PACE-UP trial. CF was the trial manager. EH, RD, and JS collected the trial data. EL cleaned the data. EL, DGC, SMK, and TH analysed the effectiveness data. LD, MU, TH, and CF contributed to participant handbooks and diaries and to nurse training. NA prepared the abstract with substantial input from TH and JFR. All authors (apart from SMS, who had died before the write-up) reviewed and approved the abstract for publication.

**Declaration of interests**

The authors conduct research in physical activity outside the submitted work. LD received personal fees from 10 Minute CBT during the conduct of this study and outside the submitted work.