Trial of a very brief pedometer-based intervention (Step it Up) to promote physical activity in preventative health checks.

EHPS/DHP Annual Conference, Aberdeen.
23rd – 27th August 2016

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Toby Prevost, Stephen Sutton
on behalf of the VBI Trial Team
Background: Public Health

- Physical inactivity is the fourth leading risk factor for death worldwide\(^1,2\) and is as important a modifiable risk factor for chronic disease as obesity and tobacco\(^3\).

- The indirect and direct costs of physical inactivity costs $67.5 billion worldwide\(^4\).

- Global PA recommendations for health – 150 minutes of moderate activity each week\(^5\).

- Majority of adults fail to meet recommended physical activity guidelines\(^4\).

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5. WHO. Global recommendations on PA for health. 2015
Background:

Physical Activity interventions

- Physical activity interventions can be effective but many are too long or complex to be scalable to the general population\(^1,2\)
- Pedometer-based interventions can increase physical activity\(^3\)
- Very brief interventions (VBIs, <5 minutes) can reach many adults, are relatively cheap and may have substantial public health impact
- Lack of evidence about effectiveness and cost-effectiveness of VBIs\(^1\)

- Step It Up was selected following extensive development, feasibility and pilot testing\(^4,5\)

- Sally Pears: Behaviour change in primary care: Very brief interventions for physical activity. 11.00 am

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1. Vijay GC et al. Are brief interventions to increase physical activity cost-effective? A systematic review. BJSM 50(7):408-17
2. Wu et al 2011
3. NICE 2013. Physical activity: brief advice for adults in primary care. NICE public health guidance 44
### Step It Up!

#### Your Current Physical Activity Level:

- [ ] You’re already active, well done! Keep up the good work!
- [ ] You could benefit from increasing your physical activity.

### Step Chart

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Mon</th>
<th>Tues</th>
<th>Weds</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
<th>Steps &amp; Miles Walked This Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>This week I want to walk</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
</tr>
<tr>
<td>This week I want to walk</td>
<td>☐ walked</td>
<td>☐ worked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
</tr>
<tr>
<td>This week I want to walk</td>
<td>☐ walked</td>
<td>☐ worked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ worked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
</tr>
<tr>
<td>This week I want to walk</td>
<td>☐ walked</td>
<td>☐ worked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ worked</td>
<td>☐ walked</td>
<td>☐ walked</td>
<td>☐ walked</td>
</tr>
</tbody>
</table>

### Step Tracker

- Closed
  - [ ] Display number of steps
  - [ ] Clip
- Open
  - [ ] Reset button
  - [ ] Table of calorie consumption
Face-to-face discussion:
- Feedback on PA
- PA recommendations
- How to use pedometer
- Steps/day goal
- How to self-monitor

Step It Up Booklet:
- Feedback on PA
- PA recommendations
- How to use pedometer
- Steps/day goal
- How to self-monitor
- Benefits of PA
- Tips for increasing PA
- Local resources info

Pedometer & Step Chart
- 1.1 Goal setting (behaviour)
- 1.4 Action Planning
- 2.2 Feedback on behaviour
- 4.1 Instruction on how to perform the behaviour
- 8.7 Graded tasks
- 2.3 Self-monitoring of behaviour
- 5.1 Information about health consequences
- 5.3 Information about social and environmental consequences
- 5.6 Information about emotional consequences
- 12.5 Adding objects to the environment

Michie et al. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. Ann Behav Med, 46(1), 81-95
The VBI Trial: Aim

• Assessed the effectiveness and cost-effectiveness of Step It Up

• Delivered in NHS Health Checks targeting adults aged 40-74 years:
  • Vascular disease risk assessment
  • Appropriate risk management
Trial design

- Two parallel-group, randomised controlled trial with a 1:1 individual allocation, comparing:
  - *Step It Up* intervention delivered by trained practice nurses and health care assistants
  - NHS Health Check only
- Sample size: 1,007 adults aged 40-74 years and eligible for NHS Health Checks from 23 GP practices in the East of England
- 3 months follow up
- Primary Outcome: Accelerometer counts per minute
Participant recruitment

- Each practice randomly selected a subsample of eligible patients for trial invitation along with NHS Health Check invitation
- Patients expressed interest in trial when arranging appointment

Start of NHS Health Check

Informed consent, short questionnaire, randomisation through web-based program

NHS Health Check followed by *Step It Up*

NHS Health Check only

Three month postal follow-up

- **Accelerometer**: Actigraph
- **Questionnaire**: self-reported physical activity (RPAQ), resource use, recall and self-reported use of behaviour change techniques
The VBI Trial Consort Diagram

Invited: n=6200
Randomised: n=1007

Allocation:
- Control: Intention to treat n=502
- Intervention: Intention to treat n=505

Follow-up:
- Control: Lost to follow up (n=58)
  - Accelerometers not returned (n=10)
  - Health problems (n=8)
  - Not convenient (n=8)
  - No reason given (n=14)
  - Personal problems (n=4)
  - Too busy (n=6)
  - Other (n=6)
- Intervention: Lost to follow up (n=84)
  - Accelerometers not returned (n=23)
  - Health problems (n=11)
  - Not convenient (n=8)
  - No reason given (n=27)
  - Personal problems (n=3)
  - Too busy (n=6)
  - Other (n=6)

Analysis:
- Control: n=442
  - Insufficient data (n=2)
- Intervention: n=417
  - Insufficient data (n=4)
Baseline characteristics (N=1,007)

<table>
<thead>
<tr>
<th></th>
<th>Control N=502</th>
<th>Intervention N=505</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female</td>
<td>61%</td>
<td>63%</td>
</tr>
<tr>
<td>Age [mean (SD)]</td>
<td>56.5 (9.4)</td>
<td>55.7 (9.6)</td>
</tr>
<tr>
<td>Ethnicity % White</td>
<td>95% (476/502)</td>
<td>96% (484/505)</td>
</tr>
<tr>
<td>Occupational group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Manual</td>
<td>24% (71/295)</td>
<td>27% (84/314)</td>
</tr>
<tr>
<td>% Non-manual</td>
<td>68% (200/295)</td>
<td>65% (203/314)</td>
</tr>
<tr>
<td>% Other</td>
<td>8% (24/295)</td>
<td>9% (27/314)</td>
</tr>
<tr>
<td>Work Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Paid work</td>
<td>61% (286/472)</td>
<td>62% (301/482)</td>
</tr>
<tr>
<td>% Unemployed/homemaker</td>
<td>6% (29/472)</td>
<td>6% (28/482)</td>
</tr>
<tr>
<td>% Full-time student</td>
<td>0% (0/472)</td>
<td>0% (1/482)</td>
</tr>
<tr>
<td>% Retired</td>
<td>32% (152/472)</td>
<td>31% (148/482)</td>
</tr>
<tr>
<td>% Other</td>
<td>1% (4/472)</td>
<td>1% (4/482)</td>
</tr>
</tbody>
</table>

31% reported being inactive or moderately inactive
Primary outcome: Accelerometer counts per minute

Control
Mean (95% CI) = 660 (641, 679)

Intervention
Mean (95% CI) = 668 (648, 689)

Unadjusted difference in means (95% CI): 8.0 (-19.8, 35.9)

Intervention effect (95% CI) adjusted for gender, five-year age group and practice: 8.8 (-18.7, 36.3)  
\( p=0.53 \)

85% (859/1007) followed up with primary outcome
### Secondary outcomes: Accelerometer step counts per day

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>Intervention compared to Control:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=442 (88% response)</td>
<td>N=417 (83% response)</td>
<td>Adjusted difference in means (95% CI)</td>
</tr>
<tr>
<td>Mean (95% CI)</td>
<td>8191 (7911, 8471)</td>
<td>8419 (8110, 8729)</td>
<td>242 (-172, 656) p=0.25</td>
</tr>
<tr>
<td>Step counts per day, adjusted for gender, five-year age group and general practice</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Secondary outcomes:
### Self-reported physical activity (RPAQ)

<table>
<thead>
<tr>
<th>Self-report PA measures (RPAQ)</th>
<th>Control</th>
<th>Intervention</th>
<th>Intervention relative to Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean+ (95% CI)</td>
<td>N</td>
</tr>
<tr>
<td>PAEE Physical activity energy expenditure (kJ/kg/day)</td>
<td>440</td>
<td><strong>28.0</strong> (26.0, 30.0)</td>
<td>418</td>
</tr>
<tr>
<td>Home based PAEE (kJ/kg/day)</td>
<td>439</td>
<td><strong>2.7</strong> (2.5, 2.9)</td>
<td>418</td>
</tr>
<tr>
<td>Work based PAEE (kJ/kg/day)</td>
<td>273</td>
<td><strong>11.8</strong> (10.6, 13.2)</td>
<td>269</td>
</tr>
<tr>
<td>Leisure based PAEE (kJ/kg/day)</td>
<td>440</td>
<td><strong>12.0</strong> (10.7, 13.4)</td>
<td>416</td>
</tr>
<tr>
<td>Commuting PAEE (kJ/kg/day)</td>
<td>266</td>
<td><strong>0.63</strong> (0.50, 0.80)</td>
<td>257</td>
</tr>
<tr>
<td>Screen/TV time (hours/day)</td>
<td>439</td>
<td><strong>2.77</strong> (2.63, 2.90)</td>
<td>418</td>
</tr>
</tbody>
</table>

+ Means are geometric means for skewed PAEE outcomes and compared as percentage increase of the intervention group to the control group.
Conclusions

• This was a high-quality trial: well-balanced sample, 85% retention, no differential dropout, objective PA measure.

• *Step it Up* did not result in significantly higher levels of objective and self-reported physical activity at three months than the NHS Health Check alone.

• Potential explanations: insufficient fidelity of delivery and/or enactment, physically active sample, insufficient intensity.

• Compared to PACE-Lift\(^1\), our participants were younger and more active, and our intervention much less intensive.

• Do our findings support commissioning of a very brief pedometer-based intervention as part of NHS Health Checks?

Acknowledgements: VBI Trial team

Current:
Stephen Sutton: PI, Director
Wendy Hardeman: Deputy Director, visiting scientist
Joanna Mitchell: Trial Coordinator
Miranda Van Emmenis: Trial Assistant
Florence Theil: Trial Assistant
Sally Pears
Ed Wilson
Ann Louise Kinmonth
Simon Griffin

Alumni:
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Simon Cohn (WS2)
Laura Lamming (WS1)
Dan Mason (WS1)
Philip Miles (WS2)
Katie Morton (WS3)
Richard Parker (WS3)

PPI Panel

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