



Walk

Swim

Run



Stretch

Cycle

Dance



Run

Walk

A pilot trial of three very brief interventions for physical activity in primary care

Stretch

Swim

Cycle

Run

Sally Pears

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EHPS Annual Conference, Cyprus 1st-5th September 2015



Move

Cycle

Dance

Move



Background

- Important to reduce public health burden of inactive lifestyles. Need for scalable interventions that are cost-effective
- Very brief interventions (**VBIs: < 5 mins**) in primary care offer an ideal opportunity to deliver very brief physical activity advice to a large proportion of the population.
- Evidence that brief interventions (<30 mins) are potentially effective^{1,2} but uncertainty remains about the potential effectiveness and cost of **VBIs**.

VBI Pilot Trial Aim: to assess the potential effectiveness and cost of three very brief interventions (VBIs) to increase physical activity that could be delivered as part of preventive health checks in primary care.



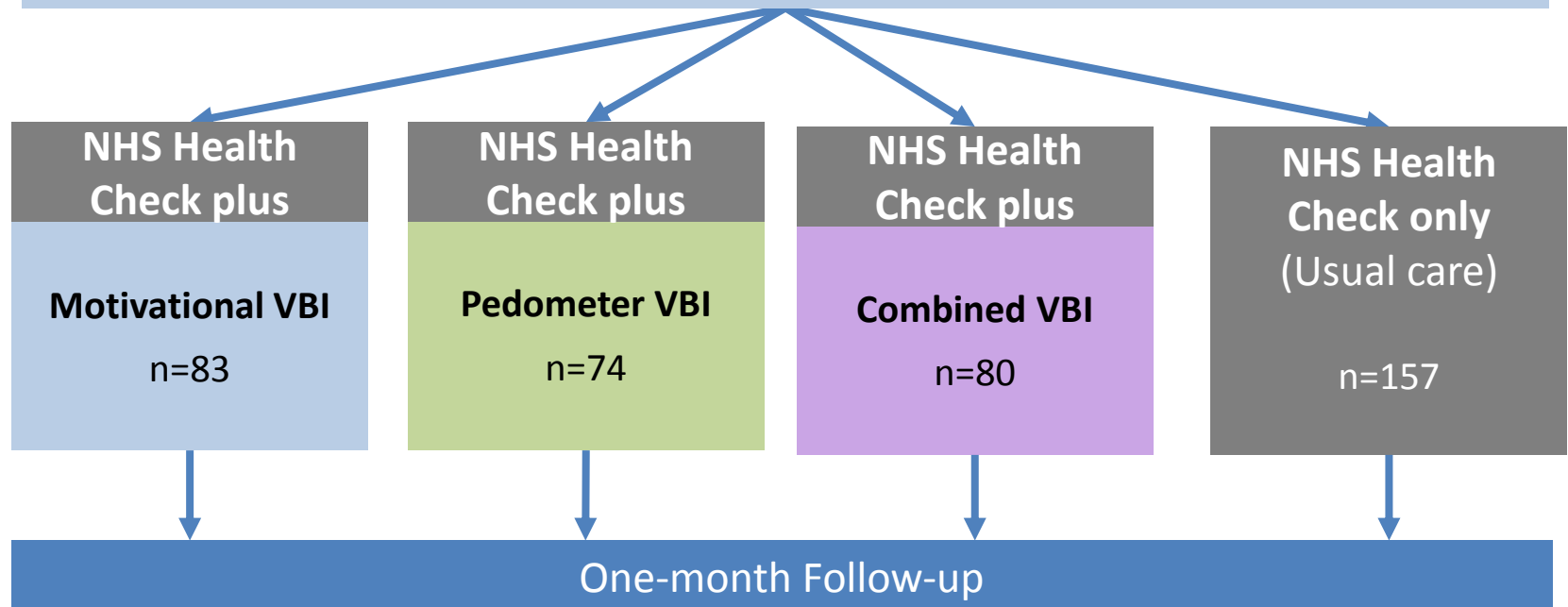
¹ NICE 2013. *Physical activity: brief advice for adults in primary care*. NICE public health guidance 44.

² Vijay GC et al. *Are brief interventions to increase physical activity cost-effective? A systematic review*. *BJSM* [In Press]

Pilot Trial Design

394 participants in 8 primary care practices in England
N=394; age (mean, SD) = 53 (9.1) years; 59% female

- Allocation ratio 1:1:1:2
- Sample-size calculation: powered to give an estimate of *potential effectiveness* based on 95% CI approach (Bayesian inference).



Measures

Potential Effectiveness

- **Objective PA:** average accelerometer counts per day [ActiGraph GT3X+]
- **Self-report PA:** Total physical activity energy expenditure (PAEE) [RPAQ v8]

Cost

- **Per-participant cost:** based on cost of materials and estimated cost of practitioner time

Feasibility* & Acceptability

- **VBI duration** [consultation audio-recordings]
- **VBI fidelity** [consultation audio-recordings]
- **VBI Acceptability** [interviews with participants and practitioners]

***Pilot trial presentation by Wendy Hardeman**

*Parallel session: Fidelity of behaviour change interventions-challenges and future directions
9.20am, Friday 4th Sept, 2015*

Very Brief Interventions (VBIs)

All VBIs: face to face discussion

- Feedback on current physical activity (PA)
- Physical activity recommendations

Motivational VBI

Face-to-Face Discussion

- Benefits of increasing PA
- Importance and confidence
- Making a plan and keeping a diary

Motivational Booklet

- PA recommendations
- Benefits of increasing PA
- Importance and confidence
- Making a plan & keeping a diary
- Tips for increasing PA
- Tips for staying motivated
- Signposting

Pedometer VBI

Face-to-Face Discussion

- 10,000 steps recommendation
- How to use the pedometer
- Daily step goal and self-monitoring

Pedometer Booklet and Step Chart

- PA recommendations
- 10,000 steps recommendation
- How to use the pedometer
- Daily step goal and self-monitoring
- Tips for increasing steps

Combined VBI

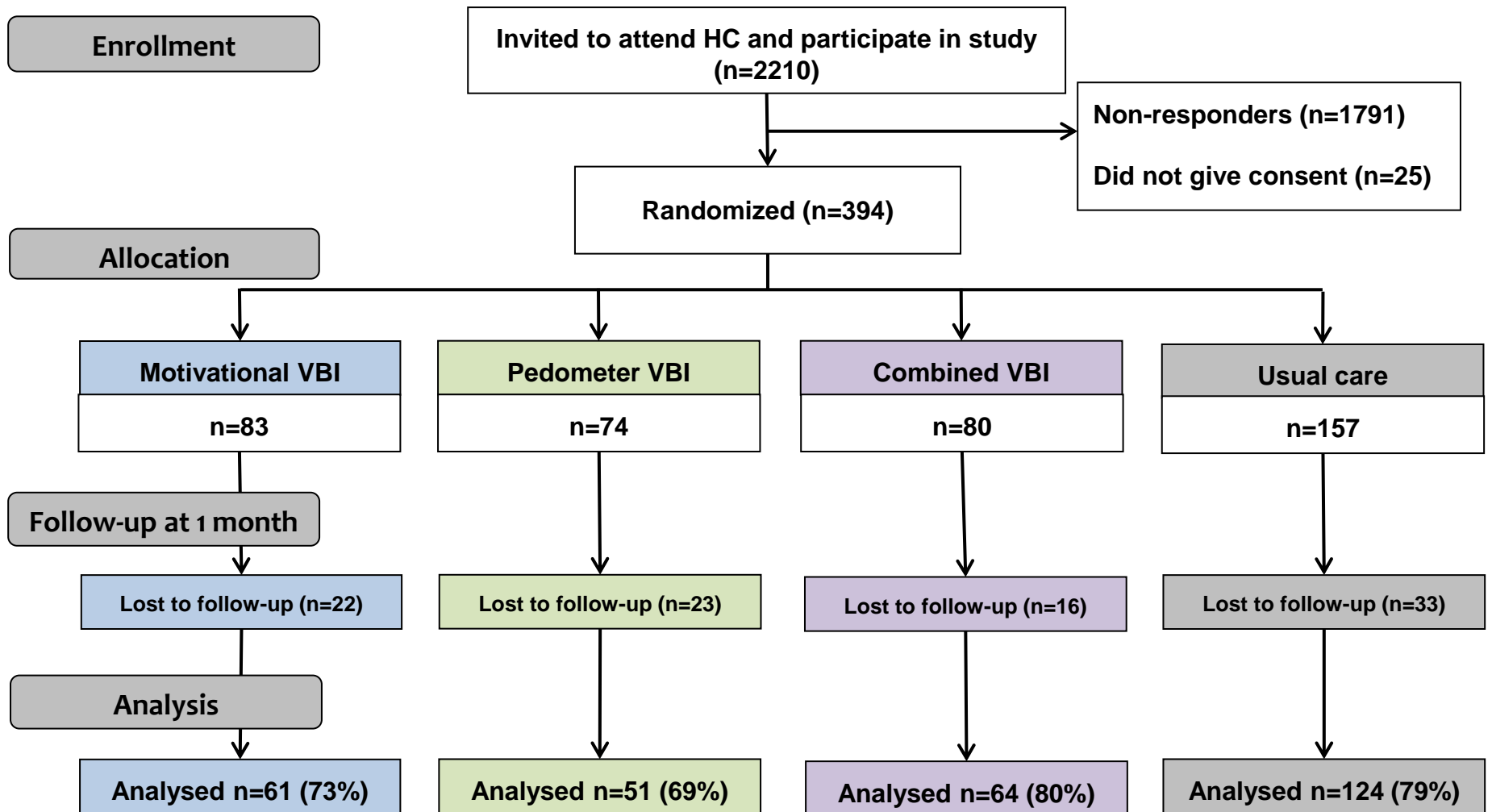
Face-to-Face Discussion

- Combination of Motivational and Pedometer VBIs

Motivational Booklet and Step Chart

- Combination of Motivation and Pedometer VBIs

CONSORT Flow Diagram



Results: Potential Effectiveness

	Usual care n=111	Motivational n=54		Pedometer n=37		Combined N=52	
	Mean (95% CI)	Mean (95% CI)	Comparison of means (95% CI) Relative to usual care	Mean 95% (CI)	Comparison of means (95% CI) Relative to usual care	Mean 95% CI	Comparison of means (95% CI) Relative to usual care
Objective PA Counts per minute (cpm) ¹	636 (597, 674)	656 (600, 712)	+20.3 (-45.0, +85.7)	659 (581, 738)	+23.5 (-51.3, +98.3)	632 (590, 675)	-3.1 (-69.3, +63.1)

- Posterior probability of positive effect was estimated to be **73% for both the Motivational and Pedometer VBIs**, and **46% for the Combined VBI**.
- Means of the other accelerometer-derived measures and self-reported measures of PA were similar for all VBI arms relative to Usual Care.

¹ Values for cpm are means and differences from the control arm mean (with 95% confidence interval) whereas to account for skewed distributions the Time in activity and self-report variables are presented as relative percentage increases or decreases compared to the control arm .

Results: Cost

- All VBIs were of low cost.
- Cost was higher for both the Pedometer and Combined VBI (added cost of the pedometer).

	Motivational	Pedometer	Combined
Estimated cost of practitioner time*	£4.99	£3.67	£7.03
Actual cost of printed materials	£1.84	£1.42	£1.95
Actual cost of pedometer	£0	£12.00	£12.00
Total cost of VBI per participant	£6.83	£17.09	£20.98

* Practitioner time valued at £0.732 per minute, based on the cost of a practice nurse contact at 2013 prices

Feasibility

- **VBI duration:** Only VBI 2 was deliverable within 5 minutes.

Results Summary

Potential Effectiveness^{3,4}

- Similar levels of objectively measured or self-reported PA when comparing each VBI with usual care.
- Probability of a positive effect on PA was higher for the Motivational and Pedometer VBIs.

Cost

- Average cost of the VBIs ranged from £6.83 to £20.98 per patient.

Feasibility

- Pedometer VBI was the only VBI that was deliverable in 5 minutes.



Pedometer VBI was chosen for evaluation in a large-scale RCT.

³ Bravata et al. (2007). *Using pedometers to increase physical activity and improve health: a systematic review. JAMA.* 298:2296–304.

⁴ Kang et al. (2009). *Effect of pedometer-based physical activity interventions: a meta-analysis. Res Q Exerc Sport.* 80:648–55.

Conclusions

- Very brief interventions for physical activity in primary care are inexpensive and can potentially increase physical activity.
- A large-scale RCT* is assessing the effects on objectively measured physical activity, cost-effectiveness and potential public health impact of the Pedometer intervention.

*Current Controlled Trials ISRCTN 72691150. The full trial protocol can be accessed at:
<http://www.phpc.cam.ac.uk/pcu/files/2011/04/The-VBI-Trial-Protocol-v-4.pdf>

Step  t Up



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Walk

Dance



Run

Stretch



Move!

Step It Up



Face-to-face discussion:

- Feedback on PA
- PA recommendations
- How to use pedometer
- Steps/day goal
- How to self-monitor

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

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

5.1 Information about health consequences

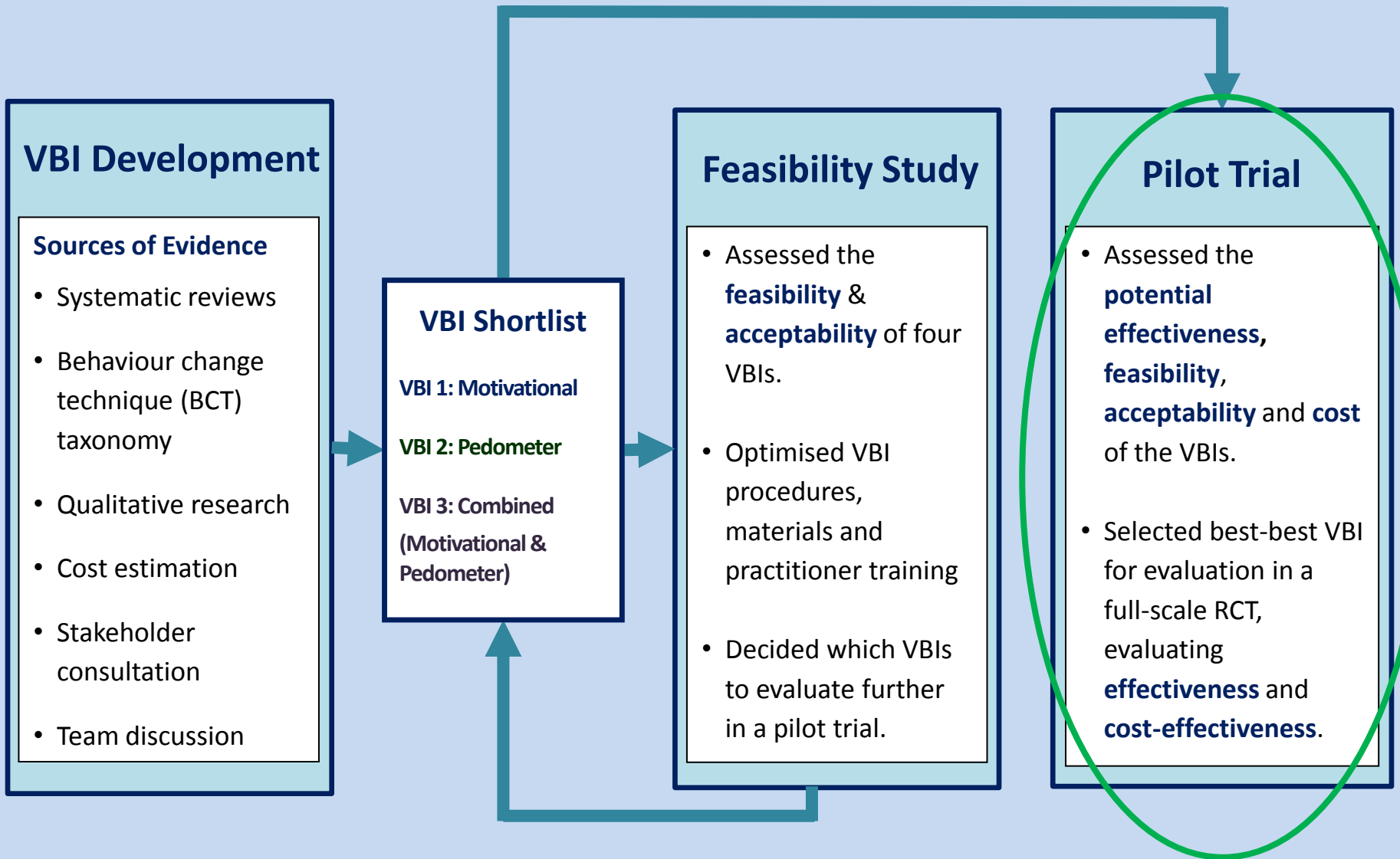
5.3 Information about social and environmental consequences

5.6 Information about emotional consequences

Pedometer & Step Chart

12.5 Adding objects to the environment

VBI Programme Overview



Very Brief Interventions: BCTs³

All VBIs: face to face discussion

1.1 Goal setting (behaviour) 1.4 Action Planning 2.2 Feedback on behaviour

Motivational VBI

Face-to-Face Discussion

Behaviour: PA

- 1.1 Goal setting (behaviour)
- 1.4 Action Planning

Motivational Booklet

Behaviour: PA

- 1.1 Goal setting (behaviour)
- 1.2 Problem solving
- 1.4 Action Planning
- 1.5 Review behaviour goal(s)
- 2.3 Self-monitoring of behaviour
- 3.1 Social support (unspecified)
- 5.1 Information about health consequences
- 5.3 Information about social and environmental consequences
- 5.4 Monitoring of emotional consequences
- 5.6 Information about emotional consequences
- 15.4 Self-talk

Pedometer VBI

Face-to-Face Discussion

Behaviour: PA

- 1.1 Goal setting (behaviour)
 - 1.4 Action Planning
 - 2.3 Self-monitoring of behaviour
 - 8.7 Graded tasks
 - 12.5 Adding objects to the environment
- Behaviour: using the pedometer*
- 4.1 Instruction on how to perform the behaviour

Pedometer Booklet and Step Chart

Behaviour: PA

- 1.1 Goal setting (behaviour)
 - 1.4 Action Planning
 - 2.3 Self-monitoring of behaviour
- Behaviour: using the pedometer*
- 4.1 Instruction on how to perform the behaviour

Combined VBI

Face-to-Face Discussion

Behaviour: PA

- 1.1 Goal setting (behaviour)
 - 1.4 Action Planning
 - 2.3 Self-monitoring of behaviour
 - 8.7 Graded tasks
 - 12.5 Adding objects to the environment
- Behaviour: pedometer use*
- 4.1 Instruction on how to perform the behaviour

Motivational Booklet and Step Chart

Behaviour: PA

- 1.1 Goal setting (behaviour)
 - 1.2 Problem solving
 - 1.4 Action Planning
 - 1.5 Review behaviour goal(s)
 - 2.3 Self-monitoring of behaviour
 - 3.1 Social support (unspecified)
 - 5.1 Information about health consequences
 - 5.3 Information about social and environmental consequences
 - 5.4 Monitoring of emotional consequences
 - 5.6 Information about emotional consequences
 - 15.4 Self-talk
- Behaviour: using the pedometer*
- 4.1 Instruction on how to perform the behaviour

³Numbering refers to BCTTv1: Michie et al. *Ann Behav Med.* 2013;46(1):81-95

TPB Questionnaire Items

The items were constructed according to the recommendations by Ajzen and measured on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Instrumental Attitude: two items (Cronbach's $\alpha=0.49$):

- *'Being more physically active in the next 4 weeks would be good for me'*,
- *'For me, being more physically active in the next 4 weeks would be harmful'*

Affective attitude: two items (Cronbach's $\alpha=0.62$):

- *'For me, being more physically active in the next 4 weeks would be boring'*
- *'For me, being more physically active in the next 4 weeks would be enjoyable'*

Subjective Norm: two items (Cronbach's $\alpha=0.49$):

- *'Most people who are important to me would want me to be more physically active in the next 4 weeks'*
- *'It is expected of me that I will be more physically active in the next 4 weeks'*

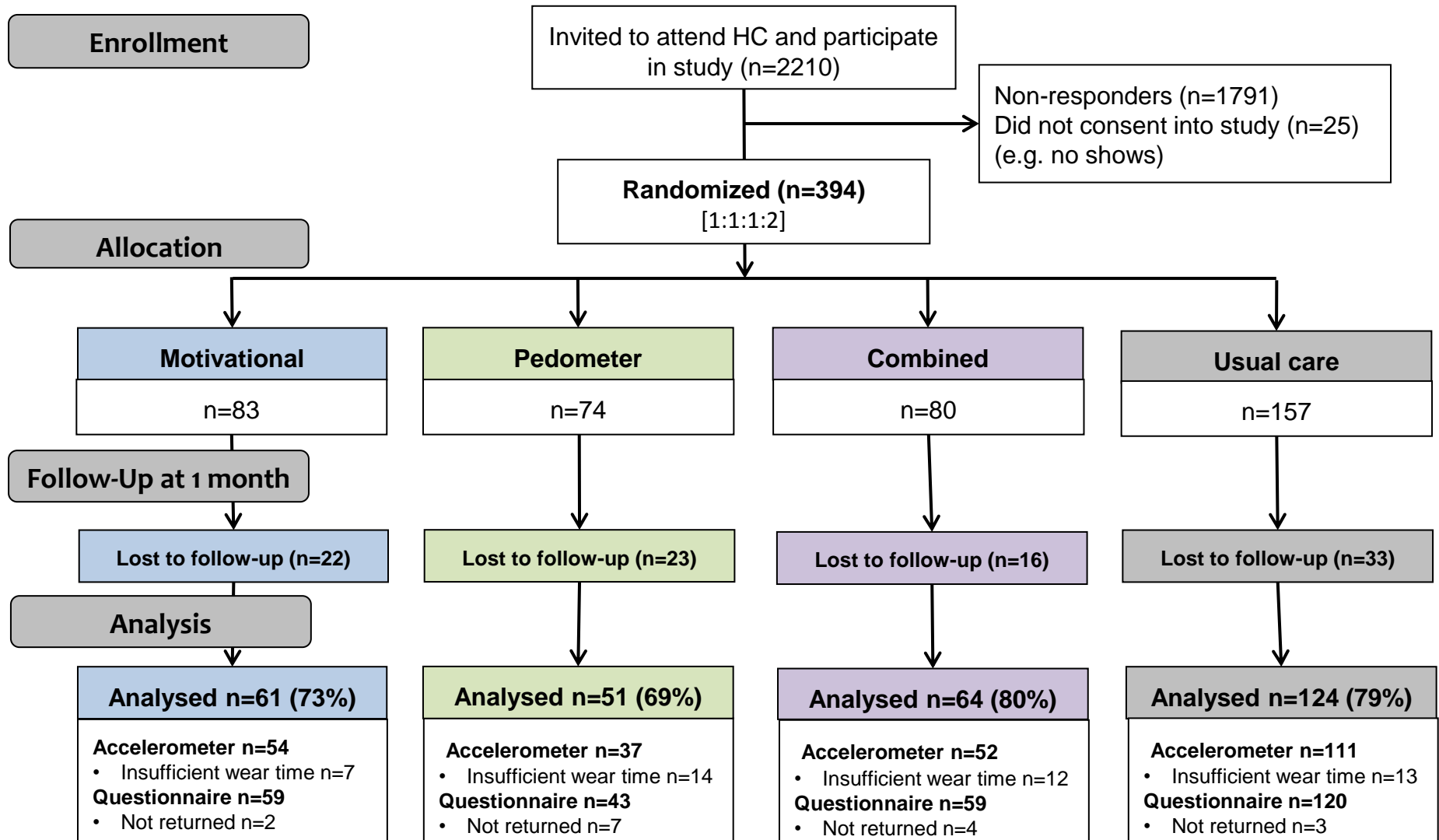
Perceived behavioral control: two items (Cronbach's $\alpha=0.54$):

- *'It would be difficult for me to be more physically active in the next 4 weeks even if I wanted to'*
- *'I am confident I could be more physically active in the next 4 weeks, if I wanted to'*

Behavioral intention: two items (Cronbach's $\alpha=0.88$):

- *'It is likely that I will be more physically active in the next 4 weeks'*
- *'I intend to be more physically active in the next 4 weeks'*

CONSORT Flow Diagram



Results: Participants

- 394 participants recruited and randomised between April 2013 and Feb 2014
- Demographics show participants were comparable across arms

	Total Sample n=394	Usual Care n=157	Motivational n=83	Pedometer n=74	Combined n=80
Age in years Mean(SD)	52.9 (9.1)	53.9 (10.1)	52.1 (8.1)	53.3 (8.4)	51.3 (8.4)
Gender % female (n)	59 (232)	59 (92)	54 (45)	61 (45)	62 (50)
Ethnicity % white (n)	92 (372)	94 (147)	92 (76)	97 (72)	96 (77)
Employment Status % employed (n)	72 (281)	68 (106) ¹	70 (58)	79 (56) ¹	76 (61)

¹ Missing values for employment status reduced the denominator to 71 in the Pedometer arm and 156 in the Control arm.

Results: Objective Physical Activity

	Usual care n=111	Motivational n=54		Pedometer n=37		Combined N=52	
	Mean (95% CI)	Mean (95% CI)	Comparison of means (95% CI) ² (Relative to Control)	Mean 95% (CI)	Comparison of means (95% CI) ² (Relative to Control)	Mean 95% CI	Comparison of means (95% CI) ² (Relative to Control)
Counts per minute (cpm) ¹	636 (597, 674)	656 (600, 712)	+20.3 (-45.0, +85.7)	659 (581, 738)	+23.5 (-51.3, +98.3)	632 (590, 675)	-3.1 (-69.3, +63.1)
Step counts ¹	7944 (7370, 8518)	7971 (7252, 8691)	+27 (-894, +949)	7844 (6921, 8766)	-101 (-1155, +954)	8162 (7464, 8859)	+218 (-716, +1151)
Time in MVPA (min/day)	73.1 (67.0, 79.8)	75.0 (67.7, 83.0)	+2.6% (-10.7%, 17.9%)	74.7 (64.2, 86.8)	+2.2% (-12.8%, +19.8%)	75.8 (68.6, 83.8)	+3.8% (-9.8%, +19.5%)
Time in sedentary/light activity (min/day)	809.5 (790.8, 828.7)	809.9 (798.6, 821.5)	-1.1% (-3.9%, +1.7%)	800.6 (780.2, 821.7)	-0.7% (-3.9%, +2.6%)	804.2 (775.7, 833.6)	-0.1% (-2.9%, +2.9%)

¹ Values for these variables are means and differences from the control arm mean (with 95% confidence interval) whereas to account for skewed distributions the Time in activity variables are presented as relative percentage increases or decreases compared to the control arm .

² Comparisons are presented unadjusted. Conclusions were unchanged on adjustment for age.

- Posterior probability of positive effect was estimated to be **73% for both the Motivational and Pedometer VBIs**, and **46% for the Combined VBI**.

Results: Self-report Physical Activity

	Usual care n=120 ²	Motivational n=59 ²		Pedometer n=43 ²		Combined N=59 ²	
	Mean (95% CI)	Mean (95% CI)	Comparison of means (95% CI) ³ (Relative to Control)	Mean 95% (CI)	Comparison of means (95% CI) ³ (Relative to Control)	Mean 95% CI	Comparison of means (95% CI) ³ (Relative to Control)
Total PAEE (kJ/kg/day)	32.2 (28.2, 36.9)	39.2 (31.5, 48.9)	+21.7% (-2.9%, +52.5%)	32.2 (26.7, 38.8)	-0.2% (-22.4%, +28.4%)	33.0 (28.3, 38.5)	+2.4% (-18.3%, +28.3%)
Home-based PAEE (kJ/kg/day)	2.3 (1.9, 2.8)	2.1 (1.6, 2.8)	-9.5% (-33.6%, +23.3%)	2.1 (1.6, 2.8)	-7.2% (-34.4%, +31.1%)	2.8 (2.2, 3.5)	+19.7% (-12.1%, +63.2%)
Work-based PAEE (kJ/kg/day)	18.2 (15.6, 21.1)	21.2 (16.9, 26.4)	+16.6% (-9.0%, +49.4%)	18.4 (14.6, 23.1)	+1.1% (-22.7%, +32.2%)	17.9 (14.9, 21.5)	-1.3% (-23.0%, +26.5%)
Leisure-based PAEE (kJ/kg/day)	11.0 (8.6, 14.0)	16.5 (12.4, 21.8)	+50.3% (+2.1%, +121.2%)	8.7 (5.8, 13.2)	-20.3% (-48.3%, +22.8%)	11.0 (8.4, 14.4)	+0.7% (-31.6%, 48.2%)
Commuting PAEE (kJ/kg/day)	0.3 (0.2, 0.6)	0.4 (0.2, 0.9)	+29.8% (-43.2%, +196.8%)	0.3 (0.1, 0.7)	-8.5% (-62.8%, +125.2%)	0.6 (0.3, 1.2)	78.4% (-21.5%, +305.5%)
Screen/TV time (hours/day)¹	3.04 (2.77, 3.31)	2.71 (2.35, 3.08)	-0.32 (-0.77, +0.12)	2.72 (2.32, 3.13)	-0.31 (-0.81, +0.19)	3.11 (2.75, 3.47)	+0.07 (-0.37, +0.52)

¹ Values for this variable are means and differences from the control arm mean (with 95% confidence interval) whereas to account for skewed distributions the other variables are presented as relative percentage increases or decreases compared to the control arm.

² Denominators (N) differed for Work based PAEE (79, 44, 35, 44) and Commuting PAEE (77, 44, 34, 45).

³ Comparisons are presented unadjusted. Conclusions were unchanged on adjustment for age.

PAEE: physical activity energy expenditure

Results: Beliefs about increasing PA

	Usual care n=115	Motivational n=56		Pedometer n=42		Combined N=57	
	Mean (95% CI)	Mean (95% CI)	Comparison of means (95% CI) ⁴ (Relative to Control)	Mean 95% (CI)	Comparison of means (95% CI) ⁴ (Relative to Control)	Mean 95% CI	Comparison of means (95% CI) ⁴ (Relative to Control)
Instrumental Attitude (Alpha=0.49) ³	4.15 (0.75)	4.32 (0.79)	+0.17 (-0.07, 0.41)	4.23 (0.86)	+0.07 (-0.19, 0.34)	4.51 (0.55)	+0.36 (0.12, 0.59)
Affective Attitude (Alpha=0.62) ³	3.73 (0.87) ¹	4.01 (0.82)	+0.28 (0.03, 0.53)	3.89 (0.76)	+0.16 (-0.12, 0.44)	4.10 (0.54) ¹	+0.37 (0.11, 0.62)
Subjective norm (Alpha=0.49) ³	3.07 (0.83)	3.31 (1.05) ²	+0.24 (-0.05, 0.52)	3.21 (0.79)	+0.14 (-0.16, 0.45)	3.26 (0.83)	+0.19 (-0.08, 0.47)
Perceived behavioural control (Alpha=0.54) ³	3.42 (0.90)	3.71 (0.94)	+0.29 (-0.01, 0.58)	3.36 (0.94)	-0.06 (-0.39, 0.27)	3.81 (0.91) ¹	+0.40 (0.10, 0.69)
Behavioural Intention (Alpha=0.88) ³	3.46 (0.89) ¹	3.82 (0.90)	+0.36 (0.08, 0.64)	3.68 (0.86) ¹	+0.22 (-0.09, 0.54)	3.86 (0.82) ¹	+0.40 (0.12, 0.68)

¹ Sample size is one fewer than indicated.

² Sample size is two fewer than indicated.

³ A Cronbach's alpha coefficient below 0.7 indicates low internal consistency of the two-item scale.

⁴ Comparisons are presented unadjusted. Conclusions were unchanged on adjustment for age.

Results: Feasibility and Acceptability

Feasibility

	Motivational	Pedometer	Combined
N (useable recordings)	11	13	16
Mean Fidelity	62%	72%	74%
Mean VBI Duration	6m 48s	5m 00s	9m 35s

- All VBIs delivered with moderate to good fidelity.
- Only VBI 2 was deliverable within 5 minutes.

Acceptability

- All VBIs acceptable to patients and practitioners.
- Pedometer VBI was most acceptable to participants and practitioners.