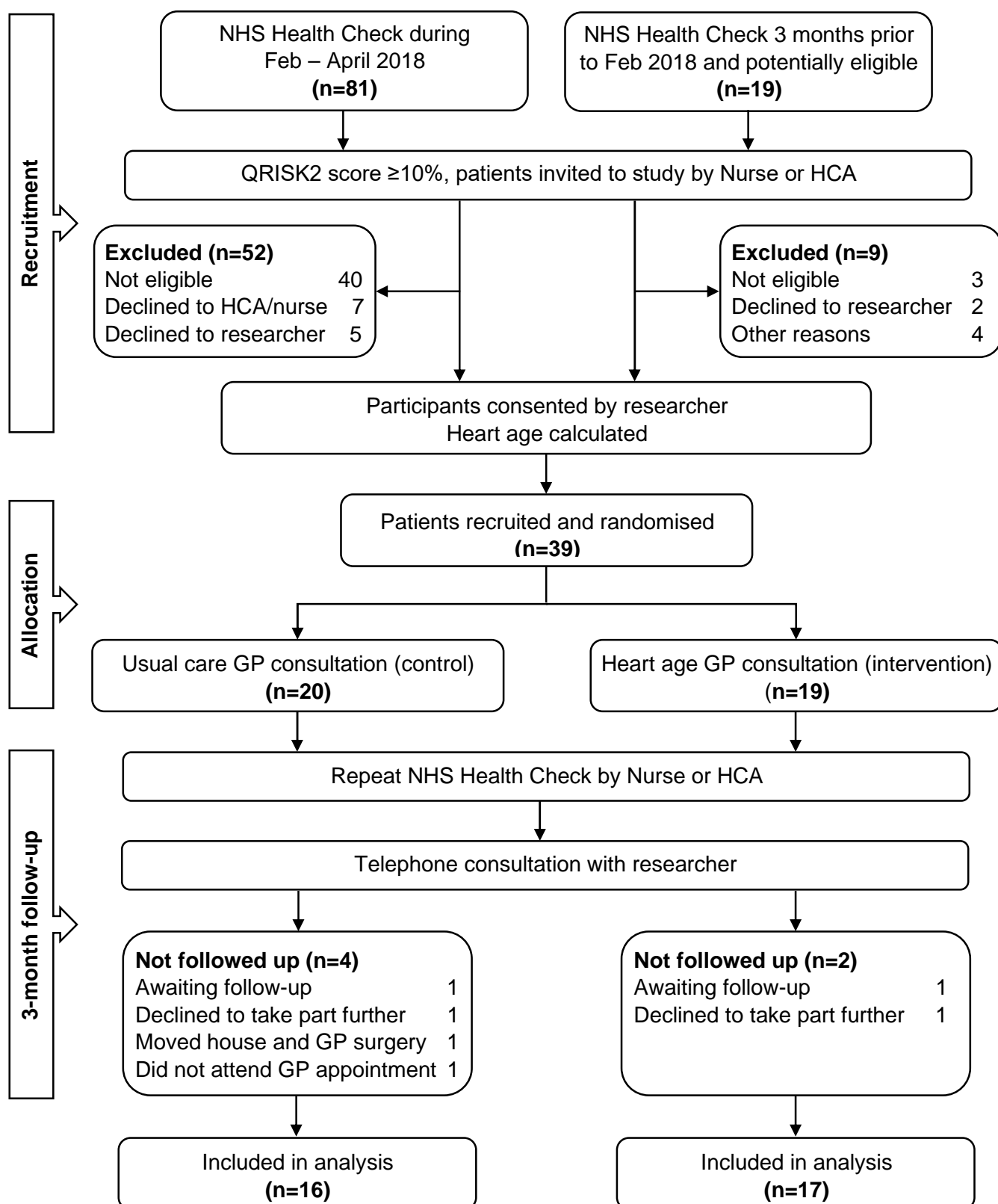# The effect of using the heart age tool to communicate cardiovascular disease risk to primary care patients in the UK: a randomised feasibility study

Figure 1: Flow of participants through study


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┌──────────────────────────┐   ┌──────────────────────────┐
│ NHS Health Check during  │   │ NHS Health Check 3 months│
│   Feb – April 2018       │   │ prior to Feb 2018 and    │
│        (n=81)            │   │ potentially eligible     │
│                          │   │        (n=19)            │
└──────────────────────────┘   └──────────────────────────┘
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Recruitment

QRISK2 score ≥10%, patients invited to study by Nurse or HCA

Excluded (n=52)
Not eligible   40
Declined to HCA/nurse   7
Declined to researcher   5

Excluded (n=9)
Not eligible   3
Declined to researcher   2
Other reasons   4

Participants consented by researcher
Heart age calculated

Patients recruited and randomised
(n=39)

Allocation

Usual care GP consultation (control)
(n=20)

Heart age GP consultation (intervention)
(n**=19)**

Repeat NHS Health Check by Nurse or HCA

Telephone consultation with researcher

3-month follow-up

Not followed up (n=4)
Awaiting follow-up   1
Declined to take part further   1
Moved house and GP surgery   1
Did not attend GP appointment   1

Not followed up (n=2)
Awaiting follow-up   1
Declined to take part further   1

Included in analysis
(n=16)

Included in analysis
(n=17)

Table 1: Baseline characteristics of participants

	Usual Care group (n=20)	Heart Age group (n=19)
Age	63.6 (8.0)	64.8 (6.8)
Sex		
Male	13 (65)	10 (53)
Female	7 (35)	9 (47)
Employment status		
Employed	4 (20)	5 (27)
Unemployed	2 (10)	1 (5)
Retired	14 (70)	13 (68)
IMD group		
1 – 3	5 (25)	5 (26)
4 – 5	15 (75)	14 (74)
Waist circumference (cm)	97.9 (9.0)	96.8 (12.7)
Height (m)	1.69 (0.1)	1.69 (0.1)
Weight (kg)	81.9 (13.2)	81.9 (17.5)
BMI (kg/m²)	28.7 (4.1)	28.4 (4.3)
*Alcohol (units/week)	0 (10)	0 (2)
Smoking status		
Current smoker	7 (35)	6 (32)
Ex-smoker	5 (25)	2 (10)
Never smoked	8 (40)	11 (58)
GPPAQ		
Moderately active or active	16 (80)	14 (74)
Moderately inactive or inactive	4 (20)	5 (26)
≥ 5 Fruit and Veg / day		
Yes	10 (53)	9 (47)
No	9 (47)	10 (53)
Family history of CVD		
Yes	9 (45)	10 (53)
No	11 (55)	9 (47)
Systolic BP (mmHg)	141 (14.9)	139 (13.6)
Diastolic BP (mmHg)	85 (6.8)	82 (10.5)
Total cholesterol (mmol/L)	5.5 (1.0)	5.7 (1.6)
HDL cholesterol (mmol/L)	1.3 (0.4)	1.3 (0.4)
TC:HDL ratio	4.5 (1.6)	4.5 (1.4)
*Triglycerides (mmol/L)	1.7 (2.1)	2.2 (1.1)
*HbA1c (mmol/mol)	39 (5.0)	38 (4.5)
Co-morbidities		
0	11 (55)	12 (63)
≥ 1	9 (45)	7 (37)
QRISK2 score	18.5 (6.1)	18.9 (6.8)
Heart age (years)	79 (12)	79 (11)

Values are mean (SD) or n (%). *Values are median (IQR) where data are not normally distributed

Table 2: Acceptability of heart age to GPs (n=8)

How much do you agree that heart age was helpful in…	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Your communication of CVD risk to patients				5	3
Patients' understanding of CVD risk			1	3	4
Motivating patients towards healthy behaviour change			2	2	4
Your discussion about starting a statin			1	4	3
Completing the consultation within 10 minutes		2	2	1	3

Table 3: Acceptability of heart age to patients (n=17)

How much do you agree with the following statements about heart age?	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Useful			12%	29%	59%
Understandable			6%	65%	29%
Trustworthy			41%	35%	24%
Motivating			12%	47%	41%
Important in helping you decide about reducing your risk of CVD		6%	6%	29%	59%

Table 4: Characteristics of participants followed up and not followed up

	Followed up (n=33)	Not followed up (n=6)
Age mean (sd)	65.9 (5.7)	54.5 (8.4)
Sex n (%)		
Male	19 (58)	4 (67)
Female	14 (42)	2 (33)
Employment status n (%)		
Employed	6 (18)	3 (50)
Unemployed	1 (3)	2 (33)
Retired	26 (79)	1 (17)
IMD group		
1 – 3	10 (30)	0
4 – 5	23 (70)	6 (100)
Waist circumference (cm) mean (sd)	96.6 (11.0)	101.3 (9.6)
Height (m) mean (sd)	1.68 (0.09)	1.73 (0.05)
Weight (kg) mean (sd)	80.7 (14.6)	88.5 (18.5)
BMI (kg/m²) mean (sd)	28.4 (3.8)	29.5 (5.8)
*Alcohol (units/week) median (IQR)	0 (2.5)	5 (11.5)
Smoking status n (%)		
Current smoker	9 (27)	4 (67)
Ex-smoker	7 (21)	0
Never smoked	17 (52)	2 (33)
GPPAQ mean (sd)		
Moderately active or active	26 (79)	4 (67)
Moderately inactive or inactive	7 (21)	2 (33)
≥ 5 Fruit and Veg / day n (%)		
Yes	15 (47)	4 (67)
No	17 (53)	2 (33)
Family history of CVD n (%)		
Yes	14 (42)	4 (67)
No	19 (58)	2 (33)
Systolic BP (mmHg) mean (sd)	140 (14.3)	138 (13.8)
Diastolic BP (mmHg) mean (sd)	83 (8.3)	90 (9.3)
Total cholesterol (mmol/L) mean (sd)	5.5 (1.3)	6.0 (0.8)
HDL cholesterol (mmol/L) mean (sd)	1.4 (0.4)	1.1 (0.3)
TC:HDL ratio mean (sd)	4.3 (1.3)	5.6 (1.6)
*Triglycerides (mmol/L) median (IQR)	1.9 (0.9)	3.2 (2.7)
*HbA1c (mmol/mol) median (IQR)	38 (3.0)	40 (5.5)
Co-morbidities n (%)		
0	19 (58)	4 (67)
≥ 1	14 (42)	2 (33)
QRISK2 score median (IQR)	19.1 (6.6)	15.6 (5.2)
Heart age (years) median (IQR)	80 (12)	74 (13)

Table 5: Message delivered to participants in heart age consultations (n=16)

Message delivered to participants	n (%)
Heart age stated separately	11 (69)
Heart age stated separately or as part of meaning	16 (100)
One part of heart age meaning	14 (88)
Both parts of heart age meaning	11 (69)
Full standardised message	6 (38)

Table 6: Change in characteristics from baseline to 3 months follow-up

Characteristic	All (n = 29–33)	Usual Care group (n = 14–16)	Heart age group (n = 15–17)
Waist circumference (cm)	-1.63 ± 5.85 (-3.82 to 0.55)	-1.21 ± 7.45 (-5.52 to 3.09)	-2.0 ± 4.22 (-4.25 to 0.25)
Weight (kg)	-1.70 ± 2.28 (-2.51 to -0.89)	-1.42 ± 2.34 (-2.66 to -0.17)	-1.96 ± 2.27 (-3.13 to -0.79)
BMI (kg/m²)	-0.55 ± 0.83 (-0.84 to -0.25)	-0.49 ± 0.81 (-0.92 to -0.06)	-0.61 ± 0.87 (-1.05 to -0.16)
Systolic BP (mmHg)	-8.5 ± 15.2 (-14.0 to -3.01)	-9.88 ± 17.2 (-19.0 to -0.71)	-7.13 ± 13.4 (-14.3 to 0.03)
Diastolic BP (mmHg)	-2.41 ± 8.80 (-5.58 to 0.77)	-4.44 ± 10.4 (-9.99 to 1.11)	-0.38 ± 6.53 (-3.86 to 3.11)
Active or moderately active (%)	7.5	1.3	13.5
≥ 5 fruit and veg / day (%)	10.6	3.62	17.3
TC:HDL ratio (mmol/L)	-0.45 ± 1.10 (-0.84 to -0.06)	-0.25 ± 0.95 (-0.76 to 0.26)	-0.64 ± 1.22 (-1.27 to -0.01)
Triglycerides (mmol/L)	-0.22 ± 1.16 (-0.69 to 0.24)	0.01 ± 1.22 (-0.73 to 0.74)	-0.45 ± 1.09 (-1.12 to 0.21)
HbA1c (mmol/mol)	0.55 ± 1.65 (-0.06 to 1.15)	-0.07 ± 1.1 (-0.68 to 0.54)	1.13 ± 1.89 (0.12 to 2.13)
QRISK2 score	-2.03 ± 3.52 (-3.28 to -0.78)	-1.51 ± 3.06 (-3.14 to 0.12)	-2.53 ± 3.93 (-4.55 to -0.51)
Heart age (years)	-1.7 ± 4.38 (-3.25 to -0.15)	-1.25 ± 4.09 (-3.43 to 0.93)	-2.12 ± 4.72 (-4.54 to 0.31)

Values are mean ± SD (95% CI) unless stated otherwise.

*Values are median (IQR) where data are not normally distributed.

Table 7: Change in risk factors between usual care and heart age groups

Characteristic	Mean difference (95% CI) or difference in proportions
Waist circumference (cm)	0.87 (-3.56 to 5.29)
Weight (kg)	0.54 (-1.10 to 2.18)
BMI (kg/m²)	0.12 (-0.48 to 0.71)
Systolic BP (mmHg)	-2.75 (-13.9 to 8.39)
Diastolic BP (mmHg)	-4.06 (-10.3 to 2.22)
Active or moderately active (%)	12.2
≥ 5 fruit and veg / day (%)	13.7
TC:HDL ratio (mmol/L)	0.39 (-0.39 to 1.17)
QRISK2 score	1.02 (-1.49 to 3.54)
Heart age (years)	0.87 (-2.28 to 4.01)

Table 8: Number and type of lifestyle changes made

Lifestyle changes made	Usual care group (n=16)	Heart age group (n=17)
Nil	4 (25)	6 (35)
Diet alone	8 (50)	3 (18)
Alcohol alone	2 (13)	0
Physical activity alone	1 (6)	3 (18)
Diet and physical activity	0	4 (23)
Diet and smoking	1 (6)	1 (6)

Values are n (%).

Table 9: Type of dietary changes made (n=17)

Change made	n (%)
Smaller portions	3 (6.8)
White-->Brown	3 (6.8)
Less red meat	3 (6.8)
Fewer sugary treats	5 (11.4)
Fewer starchy carbohydrates	7 (15.9)
More fruit and/or veg	9 (20.5)
Less added sugar	3 (6.8)
More fish or chicken	3 (6.8)
Less butter or cheese	3 (6.8)
Other	5 (11.4)

Table 10: Use of statin medication

	Usual care group (n=16)	Heart age group (n=17)
On statin at baseline	1 (6)	2 (12)
Started statin at GP appointment	3 (19)	4 (23)
Started statin at follow-up	1 (6)	2 (12)
Statin declined	11 (69)	8 (47)
Statin not indicated	0	1 (6)