

Supplementary tables.

Table S1: Mean BMI (kg/m<sup>2</sup>)<sup>1</sup> and prevalence of overweight and obesity 7y to 50y in individuals included<sup>2</sup> and not included<sup>3</sup> in the analytical sample<sup>4</sup>.

	Included <sup>2</sup>			Not included <sup>3</sup>		
	Mean BMI (SD)	Overweight N (%)	Obese N (%)	Mean BMI (SD)	Overweight N (%)	Obese N (%)
7y	16.2 (1.77)	708 (10.1)	170(2.43)	16.2 (1.76)	700 (11.2)	148 (2.36)
11y	17.1 (2.59)	506 (7.38)	103 (1.50)	17.1 (2.52)	439 (7.78)	71 (1.26)
16y	21.1 (2.83)	615 (9.89)	104 (1.67)	21.1(2.90)	499 (10.4)	88 (1.83)
23y	22.2 (3.09)	1184 (13.8)	217 (2.97)	22.4 (3.16)	681 (13.7)	119 (2.39)
33y	25.0 (4.50)	2294 (31.2)	791 (10.8)	25.0 (4.62)	1222 (33.3)	481(13.1)
45y	27.4 (5.11)	2974 (40.5)	1778 (24.2)	27.5 (4.9)	844 (42.8)	485 (24.6)
50y	27.2 (5.27)	2806 (38.8)	1717 (23.7)	27.4 (5.23)	348 (39.6)	213 (24.2)

<sup>1</sup>BMIs were age-standardised

<sup>2</sup> N for those included in the analytical sample varied from 6,218 at 16y to 7,350 at 33y.

<sup>3</sup>N for those not included in the analytical sample varied from 6274 at 7y to 879 at 50y.

<sup>4</sup>Table based on observed data

Table S2: Sample characteristics, in the total sample and in those with poor physical functioning<sup>1,2</sup>

	Males		Females	
	Total sample	Poor Functioning	Total sample	Poor Functioning
Social class at birth:				
Professional/ managerial	812 (20.0)	40 (10.2)	852 (19.5)	53 (11.0)
Skilled non-manual	437 (10.8)	30 (7.61)	437 (10.0)	39 (8.11)
Skilled manual	1936 (47.7)	204 (51.8)	2095 (47.9)	252 (52.4)
Semiskilled/unskilled	872 (21.5)	120 (30.5)	990 (22.6)	137 (28.5)
Social class in adulthood:				
Professional/ managerial	1941 (50.2)	110 (41.8)	1754 (45.2)	102 (36.8)
Skilled non-manual	390 (10.1)	17(6.46)	1192 (30.7)	78 (28.2)
Skilled manual	1149 (29.7)	96 (36.5)	266 (6.86)	28 (10.1)
Semiskilled/unskilled	390 (10.1)	40 (15.2)	666( 17.2)	69 (24.9)
Adult educational attainment:				
No qualifications	833(20.0)	164 (40.2)	739 (16.4)	160 (32.5)
O-levels	1974 (47.3)	167 (40.9)	2250 (50.0)	242(49.2)
A-levels; sub-degree	499(12.0)	42 (10.3)	625 (13.9)	47(9.55)
Degree or higher	867(20.8)	35 (8.58)	887 (19.7)	43(8.74)
Physical activity frequency (42y):				
<2-3 times/month	1278 (33.1)	174 (48.2)	1437 (33.7)	199 (43.9)
1/week	809 (21.0)	51 (14.1)	734 (17.2)	66 (14.6)
2-3 times/week	837 (21.7)	56 (15.5)	909 (21.3)	66 (14.6)
>3 times/week	938 (24.3)	80 (22.2)	1187 (27.8)	122 (26.9)
Smoking (42y):				
Never	2032 (52.7)	150 (41.7)	2355 (55.2)	190 (41.9)
Ex-smoker	957 (24.8)	80 (22.2)	924 (21.7)	93 (20.5)
Current smoker	867 (22.5)	130 (36.1)	988 (23.2)	170 (37.5)

<sup>1</sup>Table based on observed data.

<sup>2</sup> Participants with SF-36 PF scores in the lowest gender-specific 10<sup>th</sup> centile ( $\leq 60$  for males;  $\leq 55$  for females;) were classified as having poor PF.

Table S3: Odds ratio (OR (95% CI) of poor physical functioning<sup>1</sup> at 50y by age of overweight/obesity onset<sup>2</sup>

Age of overweight/ obesity onset	Males (n=4173)			Females (n=4501)		
	N(%)	Unadjusted	Adjusted <sup>3</sup>	N(%)	Unadjusted	Adjusted <sup>3</sup>
Never	739 (17.7)	Ref	Ref	1408 (31.3)	Ref	Ref
Childhood only	42 (1.01)	0.69(0.25,1.86)	0.89(0.17,4.60)	115 (2.55)	0.73 (0.38,1.40)	0.98(0.38,2.50)
Mid-adulthood	1001 (24.0)	1.18(0.92,1.52)	1.21(0.82,1.79)	1059 (23.5)	1.91(1.56,2.34)	1.76 (1.30,2.39)
Young adulthood	1594 (38.2)	1.42(1.14,1.77)	1.37(0.98,1.93)	990 (22.0)	2.42(1.98,2.96)	1.97(1.47,2.65)
Childhood/adolescence	797 (19.1)	1.41(1.10,1.80)	1.67(1.14,2.45)	929(20.6)	2.39(1.95,2.92)	2.05(1.52,2.77)

<sup>1</sup>Participants with SF-36 PF scores in the lowest gender-specific 10<sup>th</sup> centile were classified as having poor PF.

<sup>2</sup> Age of overweight/obesity onset was grouped as: i) never overweight/obese ii) overweight/obese in childhood/adolescence only (7y or 11y or 16y) and not thereafter, iii) overweight/obese in childhood/adolescence through to adulthood (7y or 11y or 16y through to 23y or 33y or 45y or 50y), iv) young adulthood onset (first overweight/obese at 23y or 33y) and v) mid-adult onset (first overweight/obese at 45y or 50y).

<sup>3</sup>Adjusted for breastfed status, social class at birth and 50y, physical disability at 7y, physical activity at 42y, smoking at 42y, and educational qualifications at 50y.

Table S4: Odds ratios (95% CI) of poor physical functioning<sup>1</sup> at 50y, per standard deviation increase in birthweight, in BMI and in overweight and obese (vs normal BMI) at ages 7y to 50y.

	Males		Females	
	Unadjusted	Adjusted <sup>2</sup>	Unadjusted	Adjusted <sup>2</sup>
<i>Birthweight</i>	0.91 (0.78,1.06)	0.98 (0.84,1.15)	0.88 (0.76,1.02)	0.95 (0.81,1.11)
7y BMI	1.05(0.98,1.13)	1.06 (0.99,1.15)	1.10 (1.02,1.18)	1.09 (1.02,1.17)
Normal	Ref	Ref	Ref	Ref
Overweight	1.06 (0.81,1.40)	1.09 (0.83,1.44)	1.12 (0.87,1.45)	1.12 (0.86,1.45)
Obese	1.60 (0.93,2.76)	1.77(0.99,3.14)	1.67 (1.09,2.56)	1.70 (1.10,2.63)
11y BMI	1.15 (1.07,1.23)	1.15 (1.07,1.24)	1.18 (1.11,1.26)	1.16 (1.09,1.24)
Normal	Ref	Ref	Ref	Ref
Overweight	1.46 (1.10,1.94)	1.46(1.09,1.95)	1.55 (1.23,1.95)	1.54 (1.21,1.95)
Obese	2.28 (1.37,3.78)	2.18(1.30,3.67)	1.78 (1.09,2.91)	1.58 (0.95,2.62)
16y BMI	1.09 (1.01,1.17)	1.09 (1.01,1.17)	1.25 (1.17,1.34)	1.22 (1.14,1.30)
Normal	Ref	Ref	Ref	Ref
Overweight	1.49(1.12,1.98)	1.46(1.09,1.95)	1.68 (1.36,2.07)	1.55(1.25,1.93)
Obese	1.76(0.98,3.14)	1.57(0.87,2.86)	2.74(1.62,4.65)	2.33(1.35,4.01)
23y BMI	1.22 (1.14,1.31)	1.17 (1.09,1.25)	1.47 (1.37,1.57)	1.37 (1.28,1.47)
Normal	Ref	Ref	Ref	Ref
Overweight	1.58 (1.31,1.90)	1.42(1.17,1.72)	2.15(1.75,2.65)	1.83 (1.48, 2.27)
Obese	2.59 (1.72,3.91)	2.27(1.49,3.46)	3.91(2.73,5.61)	3.30(2.27,4.79)
33y BMI	1.27 (1.18,1.36)	1.24 (1.15,1.33)	1.47 (1.37,1.57)	1.40 (1.31,1.50)
Normal	Ref	Ref	Ref	Ref
Overweight	1.33(1.12,1.57)	1.26 (1.06, 1.49)	1.56 (1.32-1.84)	1.45 (1.22, 1.71)
Obese	2.29(1.82,2.89)	2.13 (1.67, 2.70)	3.07(2.51,3.75)	2.68 (2.18, 3.30)
45y BMI	1.36 (1.26,1.45)	1.34 (1.24,1.43)	1.62 (1.52,1.73)	1.58 (1.47,1.69)
Normal	Ref	Ref	Ref	Ref
Overweight	1.17 (0.97,1.42)	1.22(1.00,1.49)	1.46(1.23,1.73)	1.40(1.18,1.67)
Obese	2.03(1.66,2.50)	1.96(1.59,2.43)	3.01(2.54,3.57)	2.78 (2.33,3.32)
50y BMI	1.40 (1.30,1.50)	1.37 (1.28,1.48)	1.71 (1.60,1.83)	1.65 (1.54,1.77)
Normal	Ref	Ref	Ref	Ref
Overweight	1.16(0.97,1.39)	1.15(0.96, 1.39)	1.53 (1.29,1.82)	1.43(1.20,1.70)

Obese	2.18(1.79,2.64)	2.02 (1.65,2.46)	3.40(2.87,4.02)	3.06(2.57,3.64)
-------	-----------------	------------------	-----------------	-----------------

<sup>1</sup>Participants with SF-36 PF scores in the lowest gender-specific 25<sup>th</sup>centile ( $\leq 85$  for males;  $\leq 80$  for females) were classified as having poor PF.

<sup>2</sup>Adjusted for breastfed status, social class at birth and 50Y, physical disability at age 7y, physical activity at 42y; smoking status at 42y, and educational qualifications at 50Y.

Table S5: Odds ratio (95% CI) of poor PF<sup>1</sup> per standard deviation increase in BMI over specified age intervals, adjusted for “baseline” BMI.

BMI change between	Males		Females	
	Unadjusted	Adjusted <sup>2</sup>	Unadjusted	Adjusted <sup>2</sup>
Birth-7y	0.94 (0.87,1.01)	0.96 (0.90,1.02)	0.90 (0.84,0.96)	0.93 (0.88,0.98)
7-11y	1.19 (1.08,1.30)	1.18 (1.07,1.29)	1.21 (1.11,1.33)	1.18 (1.07,1.30)
11-16y	0.96 (0.85,1.07)	0.96 (0.85,1.07)	1.25 (1.13,1.38)	1.21 (1.09,1.34)
16-23y	1.29 (1.17,1.42)	1.20 (1.09,1.33)	1.52 (1.38,1.68)	1.39 (1.26,1.54)
23-33y	1.20 (1.08,1.33)	1.21 (1.09,1.34)	1.26 (1.15,1.39)	1.27 (1.15,1.40)
33-45y	1.34 (1.19,1.50)	1.35 (1.20,1.51)	1.62 (1.46,1.81)	1.63 (1.46,1.82)
45-50y	1.29 (1.14,1.47)	1.28 (1.13,1.45)	1.58 (1.36,1.84)	1.48 (1.27,1.72)

<sup>1</sup>Participants with SF-36 PF scores in the lowest gender-specific 25<sup>th</sup> centile were classified as having poor PF.

<sup>2</sup>Adjusted for breastfed status, social class at birth and 50y, physical disability at 7y, physical activity at 42y; smoking status at 42y, educational qualifications at 50y.

Table S6: Odds ratio (OR (95% CI) of poor physical functioning<sup>1</sup> at 50y by age of obesity onset<sup>2</sup>

Age of obesity onset	N (%)	Males		Females		
		Unadjusted	Adjusted <sup>3</sup>	N (%)	Unadjusted	Adjusted <sup>3</sup>
Never	2761 (66.2)	Ref	Ref	3061 (68.0)	Ref	Ref
Childhood only	40 (0.97)	0.54 (0.18,1.62)	0.56 (0.18,1.69)	39 (0.86)	0.81 (0.31,2.12)	0.77(0.28,2.07)
Mid adulthood	865 (20.7)	2.83(1.82,4.41)	1.46(1.22,1.77)	850 (18.9)	3.20(2.22,4.63)	2.03(1.71,2.42)
Young adulthood	413 (9.89)	2.22 (1.73,2.84)	2.05 (1.59,2.63)	419 (9.31)	3.23(2.59,4.02)	2.83(2.25,3.56)
Childhood or adolescence	94 (2.25)	1.60 (1.33,1.93)	2.73 (1.72,4.33)	132 (2.93)	2.12(1.79,2.52)	2.88(1.97,4.20)

<sup>1</sup>Participants with SF-36 PF scores in the lowest gender-specific 25<sup>th</sup> centile were classified as having poor PF.

<sup>2</sup>Age of obesity onset was grouped as: i) never obese, ii) obese in childhood/adolescence only (7y or 11y or 16y) and not thereafter, iii) obese in childhood/adolescence through to adulthood (7y or 11y or 16y through to 23y or 33y or 45y or 50y), iv) young adulthood onset (first obese at 23y or 33y), and v) mid-adult onset (first obese at 45y or 50y).

<sup>3</sup>Adjusted for breastfed status, social class at birth and 50y, physical disability at 7y, physical activity at 42y, smoking at 42y, and educational qualifications at 50y.

