Childhood experiences of parenting and age at menarche, age at menopause and duration of reproductive lifespan: Evidence from the English Longitudinal Study of Ageing

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eTable 1 presents the association between age at menarche (AAM) and parenting measures prior to imputing any missing values in any of the parenting measures (Model 1). It also presents the association with additional adjustments for adult factors, adverse childhood experiences (abuse and parental mental health and addiction problems) and childhood health problems known to affect parenting such as epilepsy, asthma, diabetes, hearing problems, limiting disability, and emotional, nervous, or psychiatric problems (Models 2-4).

eTable 2 presents the association between age at natural menopause (AANM) and parenting measures prior to imputing any missing values in any of the parenting measures (Model 1). It also presents the association with additional adjustments for adult factors, adverse childhood experiences (abuse and parental mental health and addiction problems) and childhood health problems known to affect parenting such as epilepsy, asthma, diabetes, hearing problems, limiting disability, and emotional, nervous, or psychiatric problems (Models 2-4) as well as with and without adjustment for age at first natural birth in a subsample of parous women (Models 5-6).

eTable 3 presents the associations between duration of reproductive lifespan and parenting measures prior to imputing any missing values in any of the parenting measures (Model 1). It also presents the associations with additional adjustments for adult factors, adverse childhood experiences (abuse and parental mental health and addiction problems) and childhood health problems known to affect parenting such as epilepsy, asthma, diabetes, hearing problems, limiting disability, and emotional, nervous, or psychiatric problems (Models 2-4) as well as with and without adjustment for age at first natural birth in a subsample of parous women (Models 5-6).

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e**Table 1. The Associations Between Parenting Measures and Age at Menarche**[a]							
	≤10 years	11 years	12 years	13 years (reference category)	14 years	15 years	≥16 years
Maternal Care Score (range: 0-highest levels of care to 9-lowest levels of care)							
Model 1[b]	1.03 (0.94 to 1.14)	1.01 (0.94 to 1.08)	1.01 (0.94 to 1.08)	1.00	1.00 (0.94 to 1.07)	0.99 (0.92 to 1.07)	1.04 (0.95 to 1.14)
Model 2[c]	1.03 (0.93 to 1.14)	1.01 (0.94 to 1.09)	1.03 (0.96 to 1.10)	1.00	1.02 (0.95 to 1.08)	0.99 (0.92 to 1.07)	1.03 (0.94 to 1.13)
Model 3[d]	1.03 (0.93 to 1.14)	1.01 (0.94 to 1.08)	1.02 (0.95 to 1.09)	1.00	1.01 (0.95 to 1.08)	1.00 (0.92 to 1.08)	1.03 (0.94 to 1.13)
Model 4[e]	1.03 (0.94 to 1.14)	1.01 (0.95 to 1.09)	1.02 (0.95 to 1.09)	1.00	1.02 (0.95 to 1.08)	1.00 (0.93 to 1.08)	1.04 (0.96 to 1.14)
Maternal Overprotection Score (range: 0-lowest levels of overprotection to 12-highest levels of overprotection)							
Model 1[b]	1.07 (0.97 to 1.18)	1.05 (0.98 to 1.12)	1.03 (0.96 to 1.10)	1.00	1.04 (0.98 to 1.11)	1.00 (0.93 to 1.08)	1.11 (1.01 to 1.21)[f]
Model 2[c]	1.08 (0.98 to 1.19)	1.04 (0.97 to 1.11)	1.03 (0.96 to 1.10)	1.00	1.04 (0.98 to 1.11)	0.99 (0.92 to 1.07)	1.10 (1.00 to 1.20)[f]
Model 3[d]	1.08 (0.98 to 1.19)	1.05 (0.98 to 1.12)	1.02 (0.95 to 1.09)	1.00	1.04 (0.98 to 1.11)	1.00 (0.93 to 1.07)	1.11 (1.02 to 1.21)[f]
Model 4[e]	1.08 (0.98 to 1.18)	1.05 (0.99 to 1.12)	1.02 (0.96 to 1.09)	1.00	1.05 (0.98 to 1.11)	0.99 (0.92 to 1.07)	1.13 (1.03 to 1.23)[f]
Paternal Care Score (range: 0-highest levels of care to 9-lowest levels of care)							
Model 1[b]	1.09 (0.98 to 1.21)	1.02 (0.95 to 1.09)	0.99 (0.92 to 1.07)	1.00	0.99 (0.93 to 1.06)	0.97 (0.90 to 1.05)	1.02 (0.93 to 1.13)
Model 2[c]	1.09 (0.98 to 1.21)	1.01 (0.94 to 1.09)	0.99 (0.92 to 1.07)	1.00	1.00 (0.93 to 1.07)	0.96 (0.88 to 1.04)	1.03 (0.93 to 1.14)
Model 3[d]	1.10 (0.99 to 1.22)	1.01 (0.94 to 1.09)	0.99 (0.92 to 1.07)	1.00	0.99 (0.93 to 1.06)	0.97 (0.90 to 1.06)	1.04 (0.94 to 1.14)
Model 4[e]	1.10 (0.99 to 1.21)	1.03 (0.96 to 1.10)	0.99 (0.92 to 1.07)	1.00	1.00 (0.93 to 1.07)	0.98 (0.90 to 1.06)	1.05 (0.95 to 1.15)
Paternal Overprotection Score (range: 0-lowest levels of overprotection to 12-highest levels of overprotection)							
Model 1[b]	1.07 (0.97 to 1.18)	1.04 (0.97 to 1.11)	0.99 (0.92 to 1.06)	1.00	1.02 (0.96 to 1.09)	1.01 (0.94 to 1.09)	1.11 (1.02 to 1.22)[f]
Model 2[c]	1.07 (0.96 to 1.18)	1.01 (0.95 to 1.09)	0.99 (0.92 to 1.07)	1.00	1.02 (0.95 to 1.08)	1.00 (0.93 to 1.08)	1.09 (0.99 to 1.19)
Model 3[d]	1.07 (0.97 to 1.19)	1.03 (0.96 to 1.10)	0.99 (0.92 to 1.06)	1.00	1.02 (0.95 to 1.09)	1.01 (0.94 to 1.09)	1.10 (1.01 to 1.21)[f]
Model 4[e]	1.07 (0.97 to 1.18)	1.03 (0.97 to 1.11)	0.99 (0.92 to 1.06)	1.00	1.02 (0.96 to 1.09)	1.02 (0.94 to 1.09)	1.11 (1.01 to 1.21)[f]

[a]The estimates are relative risk ratios and denote change in the risk of experiencing younger or older age at menarche compared with the reference category per unit change in the predictor variable

[b]Model 1 is estimated only for participants with complete parenting style data (n=2322 for the paternal overprotection model; n=2314 for the maternal overprotection model; n=2344 for the paternal care model; and n=2335 for the maternal care model) prior to imputing any missing values and is adjusted for age and childhood socioeconomic position (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years)

[c]Model 2 is estimated for 2319 participants and is adjusted for age, childhood socioeconomic position (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and in addition adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index, waist circumference, elevated depressive symptoms (≥4 symptoms on the eight-item Center

for Epidemiological Studies-Depression (CES-D) scale), positive affect (categories of a positive affect score obtained using the pleasure questions from the CASP-19 scale), memory (tertiles of the summary score of immediate and delayed 10-word recall), and history of cancer (yes vs. no)

[d]Model 3 is estimated for 2383 participants (the same sample as in the main analyses) and is adjusted for age, childhood socioeconomic position (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and in addition adverse childhood experiences at age ≤15 years (none vs at least one of the following: sexual attack, physical attack, parental mental health and addiction problems, and physically abusive parents)

[e]Model 4 is estimated for 2381 participants and is adjusted for age, childhood socioeconomic position (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and in addition childhood health problems that are known to affect parenting at age ≤15 years (none vs. at least one of the following: epilepsy, asthma, diabetes, hearing problems, limiting disability, and emotional, nervous, or psychiatric problems)

[f]$P \leq 0.05$

e**Table 2. The Association Between Parenting Measures and Age at Natural Menopause**[a]				
	30 to 39 years (premature menopause)	40 to 44 years (early menopause)	45 to 52 years (reference category)	53 to 60 years
Maternal Care Score				
Model 1[b]	1.15 (0.96 to 1.37)	0.97 (0.88 to 1.07)	1.00	0.99 (0.93 to 1.05)
Model 2[c]	1.15 (0.96 to 1.38)	0.95 (0.86 to 1.06)	1.00	0.98 (0.93 to 1.04)
Model 3[d]	1.15 (0.96 to 1.39)	0.96 (0.86 to 1.06)	1.00	0.99 (0.93 to 1.05)
Model 4[e]	1.14 (0.95 to 1.35)	0.96 (0.86 to 1.06)	1.00	0.99 (0.93 to 1.05)
Model 3[f]	1.14 (0.93 to 1.40)	0.94 (0.84 to 1.05)	1.00	0.99 (0.93 to 1.05)
Model 4[g]	1.14 (0.93 to 1.41)	0.94 (0.84 to 1.05)	1.00	0.99 (0.93 to 1.05)
Maternal Overprotection Score				
Model 1[b]	1.13 (0.93 to 1.37)	0.94 (0.86 to 1.04)	1.00	0.93 (0.88 to 0.99)[h]
Model 2[c]	1.14 (0.94 to 1.38)	0.96 (0.87 to 1.05)	1.00	0.93 (0.88 to 0.99)[h]
Model 3[d]	1.13 (0.93 to 1.37)	0.96 (0.87 to 1.05)	1.00	0.94 (0.89 to 0.99)[h]
Model 4[e]	1.12 (0.93 to 1.37)	0.96 (0.87 to 1.05)	1.00	0.93 (0.88 to 0.99)[h]
Model 3[f]	1.20 (0.96 to 1.50)	0.94 (0.85 to 1.04)	1.00	0.93 (0.87 to 0.99)[h]
Model 4[g]	1.21 (0.97 to 1.52)	0.94 (0.85 to 1.05)	1.00	0.93 (0.87 to 0.99)[h]
Paternal Care Score				
Model 1[b]	1.14 (0.94 to 1.39)	1.04 (0.94 to 1.16)	1.00	1.00 (0.94 to 1.06)
Model 2[c]	1.14 (0.94 to 1.38)	1.03 (0.93 to 1.15)	1.00	1.00 (0.94 to 1.06)
Model 3[d]	1.14 (0.93 to 1.40)	1.04 (0.94 to 1.16)	1.00	1.01 (0.95 to 1.07)
Model 4[e]	1.13 (0.93 to 1.36)	1.04 (0.94 to 1.15)	1.00	1.00 (0.94 to 1.07)
Model 3[f]	1.05 (0.82 to 1.33)	1.01 (0.90 to 1.13)	1.00	1.02 (0.96 to 1.09)
Model 4[g]	1.06 (0.83 to 1.34)	1.01 (0.90 to 1.13)	1.00	1.02 (0.96 to 1.09)
Paternal Overprotection Score				
Model 1[b]	1.18 (0.99 to 1.42)	1.01 (0.92 to 1.12)	1.00	0.94 (0.88 to 0.99)[h]
Model 2[c]	1.18 (0.98 to 1.41)	1.02 (0.92 to 1.12)	1.00	0.94 (0.88 to 0.99)[h]
Model 3[d]	1.18 (0.98 to 1.42)	1.01 (0.92 to 1.11)	1.00	0.94 (0.89 to 0.99)[h]
Model 4[e]	1.17 (0.98 to 1.40)	1.01 (0.92 to 1.11)	1.00	0.94 (0.89 to 0.99)[h]
Model 3[f]	1.10 (0.87 to 1.38)	1.00 (0.90 to 1.11)	1.00	0.93 (0.88 to 0.99)[h]
Model 4[g]	1.11 (0.88 to 1.40)	1.00 (0.90 to 1.11)	1.00	0.93 (0.88 to 0.99)[h]

[a]The estimates are relative risk ratios and denote change in the risk of experiencing premature, early or later natural menopause compared with the reference category per unit change in the predictor variable

[b]Model 1 is estimated only for participants with complete parenting style data (n=1629 for the paternal overprotection model; n=1626 for the maternal overprotection model; n=1645 for the paternal care model; and n=1641 for the maternal care model) prior to imputing any missing values and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, age at menarche (categories) and parity (0, 1, 2, ≥3 natural children)

[c]Model 2 is estimated for 1674 participants (that is the sample used in the main menopause analyses) and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, age at menarche (categories), parity (0, 1, 2, ≥3 natural children) and in addition elevated depressive symptoms (≥4 symptoms on the eight-item Center for Epidemiological Studies-Depression (CES-D) scale), positive affect (categories of a positive affect score obtained using the pleasure questions from the CASP-19 scale) and memory (tertiles of the summary score of immediate and delayed 10-word recall), and history of cancer (yes vs. no)

[d]Model 3 is estimated for 1674 participants (that is the sample used in the main menopause analyses) and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, age at menarche (categories), parity (0, 1, 2, ≥3 natural children) and in addition adverse childhood experiences at age ≤15 years (none vs at least one of the following: sexual attack, physical attack, parental mental health and addiction problems, and physically abusive parents)

[e]Model 4 is estimated for 1673 participants and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, age at menarche (categories), parity (0, 1, 2, ≥3 natural children) and in addition childhood health problems that are known to affect parenting at age ≤15 years (none vs. at least one of the following epilepsy, asthma, diabetes, hearing problems, limiting disability, and emotional, nervous, or psychiatric problems)

[f]Model 5 is estimated only for parous participants (n=1414). It is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, age at menarche (categories) and parity (1, 2, ≥3 natural children)

[g]Model 6 is estimated only for parous participants (n=1414). It is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, age at menarche (categories), parity (1, 2, ≥3 natural children) and in addition age at first birth (<20, 20-24, 25-29, ≥30 years)

[h]$P \leq 0.05$

e**Table 3. The Association Between Parenting Measures and Duration of Reproductive Lifespan**[a]				
	≤33 years	34 to 36 years	37 to 39 years (reference category)	≥40 years
Maternal Care Score				
Model 1[b]	1.00 (0.92 to 1.08)	0.99 (0.92 to 1.07)	1.00	0.99 (0.93 to 1.06)
Model 2[c]	0.98 (0.90 to 1.06)	1.00 (0.93 to 1.09)	1.00	0.99 (0.93 to 1.06)
Model 3[d]	0.98 (0.91 to 1.06)	0.99 (0.92 to 1.07)	1.00	0.99 (0.92 to 1.06)
Model 4[e]	0.99 (0.92 to 1.08)	1.00 (0.93 to 1.08)	1.00	1.00 (0.93 to 1.06)
Model 3[f]	0.97 (0.89 to 1.06)	1.00 (0.92 to 1.09)	1.00	0.98 (0.91 to 1.06)
Model 4[g]	0.97 (0.89 to 1.06)	1.00 (0.92 to 1.09)	1.00	0.98 (0.91 to 1.05)
Maternal Overprotection Score				
Model 1[b]	1.02 (0.94 to 1.10)	1.08 (1.00 to 1.16)	1.00	0.99 (0.93 to 1.06)
Model 2[c]	1.02 (0.95 to 1.10)	1.08 (1.01 to 1.17)[h]	1.00	1.00 (0.93 to 1.06)
Model 3[d]	1.03 (0.95 to 1.11)	1.07 (1.00 to 1.16)	1.00	0.99 (0.93 to 1.06)
Model 4[e]	1.03 (0.96 to 1.11)	1.08 (1.01 to 1.16)[h]	1.00	1.00 (0.94 to 1.07)
Model 3[f]	1.04 (0.95 to 1.13)	1.11 (1.02 to 1.20)[h]	1.00	0.99 (0.92 to 1.06)
Model 4[g]	1.04 (0.95 to 1.13)	1.10 (1.02 to 1.20)[h]	1.00	0.99 (0.92 to 1.06)
Paternal Care Score				
Model 1[b]	1.06 (0.97 to 1.15)	0.99 (0.91 to 1.08)	1.00	1.03 (0.96 to 1.11)
Model 2[c]	1.03 (0.95 to 1.12)	1.00 (0.92 to 1.09)	1.00	1.02 (0.95 to 1.10)
Model 3[d]	1.04 (0.96 to 1.14)	0.99 (0.91 to 1.07)	1.00	1.02 (0.94 to 1.10)
Model 4[e]	1.06 (0.97 to 1.15)	1.00 (0.92 to 1.08)	1.00	1.03 (0.96 to 1.11)
Model 3[f]	1.01 (0.92 to 1.11)	0.99 (0.90 to 1.08)	1.00	1.02 (0.95 to 1.11)
Model 4[g]	1.01 (0.92 to 1.11)	0.98 (0.90 to 1.08)	1.00	1.02 (0.94 to 1.10)
Paternal Overprotection Score				
Model 1[b]	1.10 (1.02 to 1.19)[h]	1.10 (1.02 to 1.19)[h]	1.00	1.03 (0.96 to 1.10)
Model 2[c]	1.09 (1.01 to 1.18)[h]	1.12 (1.03 to 1.19)[i]	1.00	1.03 (0.96 to 1.10)
Model 3[d]	1.09 (1.02 to 1.18)[h]	1.10 (1.01 to 1.18)[h]	1.00	1.03 (0.96 to 1.09)
Model 4[e]	1.10 (1.01 to 1.19)[h]	1.10 (1.02 to 1.19)[h]	1.00	1.03 (0.96 to 1.10)
Model 3[f]	1.08 (0.99 to 1.18)	1.11 (1.02 to 1.20)[h]	1.00	1.02 (0.95 to 1.10)
Model 4[g]	1.08 (0.99 to 1.18)	1.11 (1.02 to 1.20)[h]	1.00	1.02 (0.95 to 1.10)

[a]The estimates are relative risk ratios and denote change in the risk of having shorter or longer reproductive lifespan compared with the reference category per unit change in the predictor variable

[b]Model 1 is estimated only for participants with complete parenting style data (n=1629 for the paternal overprotection model; n=1626 for the maternal overprotection model; n=1645 for the paternal care model; and n=1641 for the maternal care model) prior to imputing any missing values and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, and parity (0, 1, 2, ≥3 natural children)

[c]Model 2 is estimated for 1674 participants (that is the sample used in the main menopause analyses) and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, parity (0, 1, 2, ≥3 natural children) and in addition elevated depressive symptoms (≥4 symptoms on the eight-item Center for Epidemiological Studies-Depression (CES-D) scale), positive affect (categories of a positive affect score obtained using the pleasure questions from the CASP-19 scale) and memory (tertiles of the summary score of immediate and delayed 10-word recall), and history of cancer (yes vs. no)

[d]Model 3 is estimated for 1674 participants (that is the sample used in the main menopause analyses) and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, parity (0, 1, 2, ≥3 natural children) and in addition adverse childhood experiences at age ≤15 years (none vs at least one of the following: sexual attack, physical attack, parental mental health and addiction problems, and physically abusive parents)

[e]Model 4 is estimated for 1673 participants and is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, parity (0, 1, 2, ≥3 natural children) and in addition childhood health problems that are known to affect parenting at age ≤15 years (none vs. at least one of the following epilepsy, asthma, diabetes, hearing problems, limiting disability, and emotional, nervous, or psychiatric problems)

[f]Model 5 is estimated only for parous participants (n=1414). It is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, and parity (1, 2, ≥3 natural children)

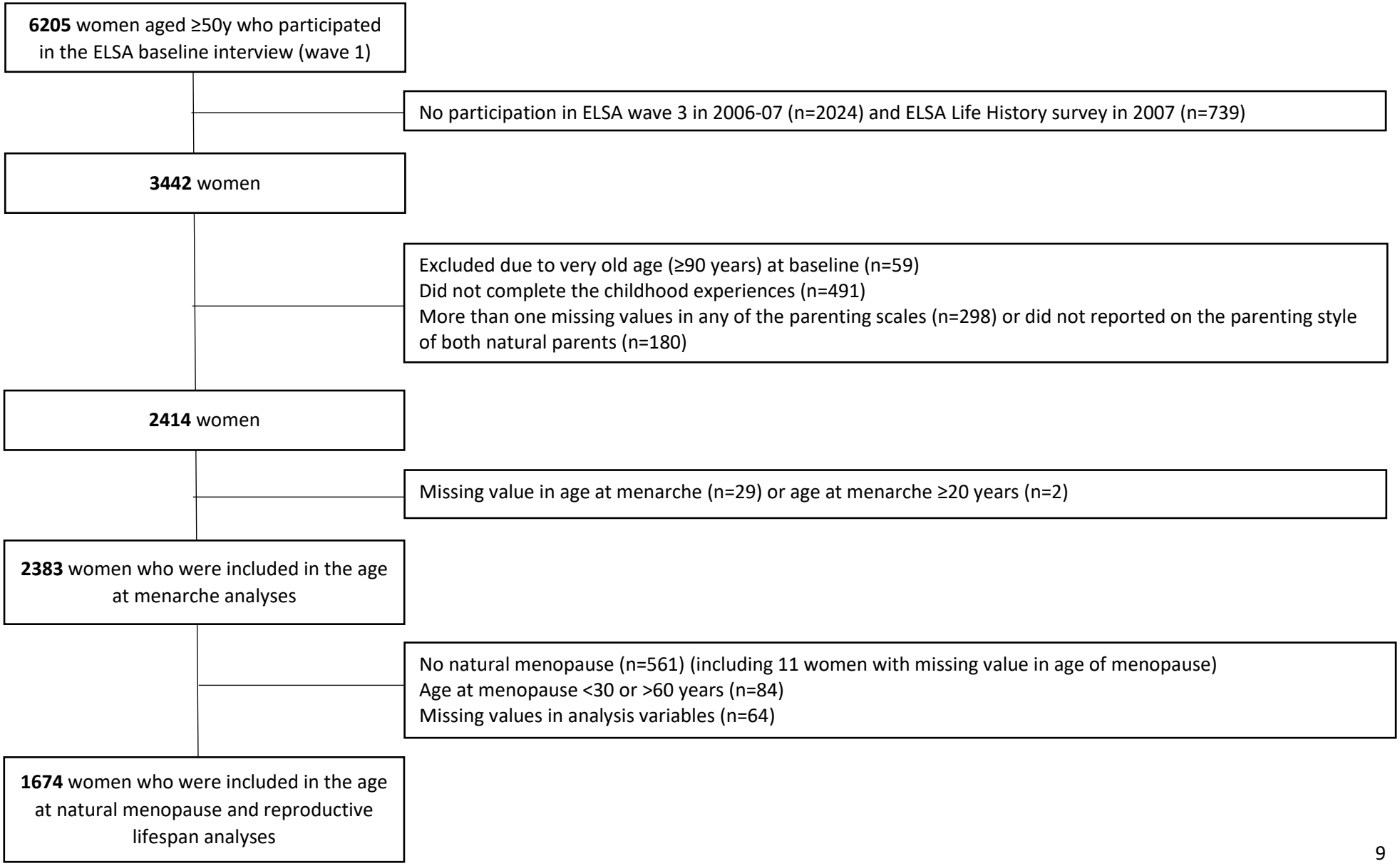
[g]Model 6 is estimated only for parous participants (n=1414). It is adjusted for age, childhood (i.e. number of books in the household at age 10 years and father's or main carer's occupational class at age 14 years) and adult socioeconomic position (i.e. education and total net household wealth), marital status, smoking, body mass index and waist circumference, parity (1, 2, ≥3 natural children) and in addition age at first birth (<20, 20-24, 25-29, ≥30 years)

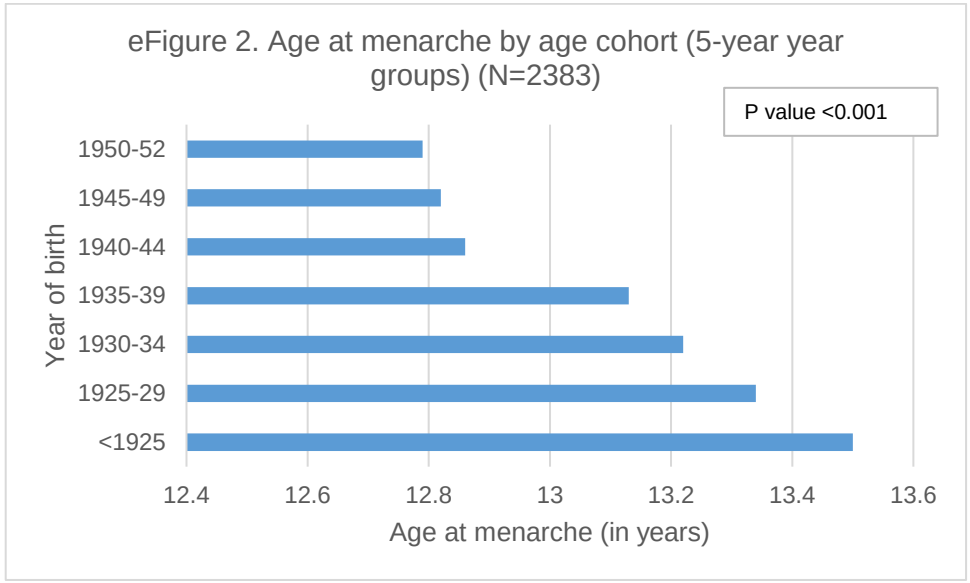
[h]$P \leq 0.05$

[i]$P \leq 0.01$

eTable 4. The mean ages at menarche (n=2,383) and natural menopause (n=1674) by birth cohort (5-year birth year groups)				
Birth cohort	Mean age at menarche	N	Mean age at natural menopause	N
<1925	13.50	193	49.12	147
1925-29	13.34	267	50.05	195
1930-34	13.22	301	49.85	212
1935-39	13.13	416	49.74	306
1940-44	12.86	438	50.54	295
1945-49	12.82	549	51.26	376
1950-52	12.79	219	50.82	143

eFigure 1. The sample selection flowchart




eFigure 2. Age at menarche by age cohort (5-year year groups) (N=2383)
P value <0.001
Year of birth
1950-52
1945-49
1940-44
1935-39
1930-34
1925-29
<1925
12.4
12.6
12.8
13
13.2
13.4
13.6
Age at menarche (in years)