

**Supplemental table 1** Associations between age at menarche and prevalence of chronic LBP in HUNT2 in cross-sectional analysis, in broad intervals of age

	Age 20-39 years	Age 40-49 years	Age 50-69 years
	RR (95% CI)*	RR (95% CI)*	RR (95% CI)*
Number of women included	10 298	6508	8145
Age at menarche (year)			
≤ 11	1.54 (1.34 to 1.77)	1.36 (1.19 to 1.56)	1.18 (1.05 to 1.33)
12	1.16 (1.03 to 1.32)	1.14 (1.02 to 1.29)	1.12 (1.02 to 1.23)
13	1.09 (0.96 to 1.22)	1.11 (0.99 to 1.24)	1.06 (0.97 to 1.15)
14	1.00 (reference)	1.00 (reference)	1.00 (reference)
15	1.09 (0.93 to 1.29)	1.12 (0.98 to 1.28)	0.98 (0.89 to 1.08)
16	1.36 (1.07 to 1.74)	1.02 (0.80 to 1.30)	0.93 (0.78 to 1.09)
≥ 17	1.48 (0.97 to 2.26)	1.75 (1.22 to 2.51)	1.11 (0.85 to 1.45)
P for categorical effect	< 0.001	< 0.001	0.013
P for linear trend	< 0.001	0.009	< 0.001
P for quadratic effect <sup>†</sup>	< 0.001	0.001	0.21

\*Adjustment for age, BMI, physical activity, education, smoking, nulliparity and age at first delivery.

<sup>†</sup>In model also including linear effect.

BMI, body mass index; HUNT, Trøndelag Health Study; LBP, low back pain; RR, relative risk.

**Supplemental table 2** Associations between age at menarche and risk of chronic LBP in prospective analysis in HUNT3, in broad intervals of age in HUNT2

	Age 20-39 years	Age 40-49 years	Age 50-69 years
	RR (95% CI)*	RR (95% CI)*	RR (95% CI)*
Number of women included	4254	3144	3456
Age at menarche (year)			
≤ 11	1.34 (1.06 to 1.68)	1.33 (1.05 to 1.68)	1.30 (1.00 to 1.69)
12	1.15 (0.95 to 1.38)	0.99 (0.80 to 1.21)	1.24 (1.02 to 1.51)
13	1.01 (0.85 to 1.21)	1.01 (0.84 to 1.22)	1.03 (0.86 to 1.24)
14	1.00 (reference)	1.00 (reference)	1.00 (reference)
15	1.20 (0.96 to 1.51)	0.96 (0.76 to 1.21)	0.95 (0.77 to 1.18)
16	1.13 (0.75 to 1.71)	0.79 (0.51 to 1.21)	1.08 (0.78 to 1.49)
≥ 17	1.60 (0.94 to 2.75)	1.16 (0.53 to 2.53)	1.54 (0.97 to 2.46)
P for categorical effect	0.10	0.19	0.08
P for linear trend	0.46	0.048	0.06
P for quadratic effect†	0.002	0.32	0.019

\*Adjustment for age, BMI, physical activity, education, smoking, nulliparity and age at first delivery.

†In model also including linear effect.

BMI, body mass index; HUNT, Trøndelag Health Study; LBP, low back pain; RR, relative risk.

**Supplemental table 3** Associations between age at menarche and prevalence of chronic LBP in HUNT2 in cross-sectional analysis, by duration of education

	Education ≤ 9 years	Education 10-12 years	Education ≥ 13 years
	RR (95% CI)*	RR (95% CI)*	RR (95% CI)*
Number of women included	7597	11 361	5993
Age at menarche (year)			
≤ 11	1.16 (1.03 to 1.31)	1.56 (1.40 to 1.73)	1.22 (1.02 to 1.45)
12	1.13 (1.03 to 1.24)	1.16 (1.05 to 1.28)	1.10 (0.94 to 1.29)
13	1.06 (0.97 to 1.16)	1.10 (1.01 to 1.21)	1.04 (0.90 to 1.21)
14	1.00 (reference)	1.00 (reference)	1.00 (reference)
15	0.99 (0.89 to 1.10)	1.12 (1.00 to 1.26)	1.01 (0.84 to 1.22)
16	0.95 (0.80 to 1.13)	1.00 (0.80 to 1.24)	1.32 (1.01 to 1.73)
≥ 17	1.42 (1.10 to 1.84)	1.30 (0.95 to 1.77)	0.99 (0.56 to 1.75)
P for categorical effect	0.008	< 0.001	0.21
P for linear trend	0.006	< 0.001	0.19
P for quadratic effect <sup>†</sup>	0.06	< 0.001	0.048

\*Adjustment for age, BMI, physical activity, education, smoking, nulliparity and age at first delivery.

<sup>†</sup>In model also including linear effect.

BMI, body mass index; HUNT, Trøndelag Health Study; LBP, low back pain; RR, relative risk.

**Supplemental table 4** Associations between age at menarche and risk of chronic LBP in prospective analysis in HUNT3, by duration of education recorded in HUNT2

	Education ≤ 9 years	Education 10-12 years	Education ≥ 13 years
	RR (95% CI)*	RR (95% CI)*	RR (95% CI)*
Number of women included	2957	4997	2900
Age at menarche (year)			
≤ 11	1.31 (0.98 to 1.74)	1.28 (1.05 to 1.56)	1.36 (1.04 to 1.79)
12	1.08 (0.88 to 1.33)	1.15 (0.98 to 1.34)	1.05 (0.81 to 1.35)
13	1.10 (0.91 to 1.32)	1.01 (0.87 to 1.17)	0.92 (0.72 to 1.16)
14	1.00 (reference)	1.00 (reference)	1.00 (reference)
15	1.13 (0.91 to 1.39)	1.05 (0.86 to 1.27)	0.77 (0.56 to 1.06)
16	0.95 (0.65 to 1.37)	1.14 (0.83 to 1.57)	0.87 (0.50 to 1.50)
≥ 17	1.75 (1.07 to 2.85)	0.95 (0.50 to 1.79)	1.87 (1.06 to 3.29)
P for categorical effect	0.29	0.21	0.012
P for linear trend	0.61	0.06	0.031
P for quadratic effect <sup>†</sup>	0.08	0.06	0.015

\*Adjustment for age, BMI, physical activity, education, smoking, nulliparity and age at first delivery.

<sup>†</sup>In model also including linear effect.

BMI, body mass index; HUNT, Trøndelag Health Study; LBP, low back pain; RR, relative risk.

**Supplemental table 5** Associations between age at menarche and prevalence of chronic LBP in cross-sectional analysis in HUNT2, with and without adjustment for HADS

	With standard adjustment*	With standard adjustment* among individuals with known HADS score	With standard adjustment*and adjustment for HADS score
	RR (95% CI)	RR (95% CI)	RR (95% CI)
Number of women included	24 951	21 773	21 773
Age at menarche (year)			
≤ 11	1.33 (1.24 to 1.43)	1.31 (1.21 to 1.42)	1.27 (1.18 to 1.37)
12	1.13 (1.06 to 1.21)	1.13 (1.05 to 1.21)	1.12 (1.05 to 1.19)
13	1.07 (0.91 to 1.14)	1.07 (1.00 to 1.14)	1.07 (1.00 to 1.14)
14	1.00 (reference)	1.00 (reference)	1.00 (reference)
15	1.04 (0.97 to 1.12)	1.05 (0.97 to 1.13)	1.02 (0.95 to 1.10)
16	1.02 (0.91 to 1.15)	1.07 (0.94 to 1.21)	1.05 (0.92 to 1.19)
≥ 17	1.31 (1.08 to 1.59)	1.34 (1.08 to 1.65)	1.28 (1.04 to 1.57)
P for categorical effect	< 0.001	< 0.001	< 0.001
P for linear trend	< 0.001	< 0.001	< 0.001
P for quadratic effect <sup>†</sup>	< 0.001	< 0.001	< 0.001

\*Adjustment for age, BMI, physical activity, education, smoking, nulliparity and age at first delivery.

<sup>†</sup>In model also including linear effect.

BMI, body mass index; HADS, Hospital Anxiety and Depression Scale; HUNT, Trøndelag Health Study; LBP, low back pain; RR, relative risk.

**Supplemental table 6** Associations between age at menarche and risk of chronic LBP in prospective analysis in HUNT3, with and without adjustment for HADS

	With standard adjustment*	With standard adjustment* among individuals with known HADS score	With standard adjustment* and adjustment for HADS score
	RR (95% CI)	RR (95% CI)	RR (95% CI)
Number of women included	10 854	9666	9666
Age at menarche (year)			
≤ 11	1.32 (1.15 to 1.52)	1.37 (1.18 to 1.59)	1.36 (1.17 to 1.57)
12	1.12 (1.00 to 1.25)	1.16 (1.03 to 1.31)	1.15 (1.02 to 1.30)
13	1.01 (0.91 to 1.13)	1.04 (0.92 to 1.16)	1.04 (0.93 to 1.16)
14	1.00 (reference)	1.00 (reference)	1.00 (reference)
15	1.02 (0.90 to 1.16)	1.05 (0.92 to 1.21)	1.04 (0.91 to 1.20)
16	1.01 (0.81 to 1.25)	1.07 (0.85 to 1.36)	1.07 (0.84 to 1.35)
≥ 17	1.43 (1.04 to 1.98)	1.31 (0.89 to 1.92)	1.25 (0.85 to 1.83)
P for categorical effect	0.002	0.002	0.003
P for linear trend	0.008	0.004	0.003
P for quadratic effect <sup>†</sup>	< 0.001	0.001	0.001

\*Adjustment for age, BMI, physical activity, education, smoking, nulliparity and age at first delivery.

<sup>†</sup>In model also including linear effect.

BMI, body mass index; HADS, Hospital Anxiety and Depression Scale; HUNT, Trøndelag Health Study; LBP, low back pain; RR, relative risk.