



# Higher serum DHEAS concentration is associated with lower plasma LDL cholesterol concentration in children

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## Background

Premature adrenarche is associated with overweight and insulin resistance, but the associations of serum dehydroepiandrosterone sulphate (DHEAS) concentration with other cardiometabolic risk factors and their clustering are uncertain.

## Aims and objective

We studied whether cardiometabolic risk factors and their clustering differ between children with higher and lower serum DHEAS concentration.

## Methods

We studied 432 healthy children (207 girls and 225 boys; age  $7.6 \pm 0.4$  years) participating in the Physical Activity and Nutrition in Children (PANIC) Study. Serum DHEAS concentration was determined by enzyme immunoassay. Children were divided into those with serum DHEAS concentration  $<1.0 \mu\text{mol/l}$  ( $n=354$ ) and  $\geq 1.0 \mu\text{mol/l}$  ( $n=78$ ). Cardiometabolic risk score was calculated summing the Z-scores of waist circumference, fasting serum insulin, fasting plasma glucose, triglycerides and high-density lipoprotein (HDL) cholesterol (multiplied by -1) and the mean of systolic and diastolic blood pressure. Also total cholesterol and low density lipoprotein (LDL) cholesterol were measured from fasting plasma samples. Body fat percentage (BF%) and lean mass in kg (LM) were assessed using dual-energy X-ray absorptiometry. Differences in cardiometabolic risk factors between the DHEAS groups were studied by general linear models adjusted for age and sex and further for BF% and LM.

## Results

Plasma LDL cholesterol was lower in children with higher serum DHEAS than in those with lower DHEAS adjusted for age and sex ( $2.25$  vs  $2.39$  mmol/l,  $P=0.029$ ). Other cardiometabolic risk factors or cardiometabolic risk score did not differ between the DHEAS groups. However, children with higher DHEAS had higher LM than those with lower DHEAS adjusted for age and sex ( $21.18$  vs  $20.46$  kg,  $P=0.008$ ). The difference in LDL cholesterol between the DHEAS groups weakened slightly after further adjustment for LM ( $P=0.040$ ) but remained after additional adjustment for BF% ( $P=0.017$ ).

## Conclusion

Higher serum DHEAS concentration is associated with lower plasma LDL cholesterol concentration in healthy prepubertal children. This relationship may be partly explained by increased skeletal muscle mass.

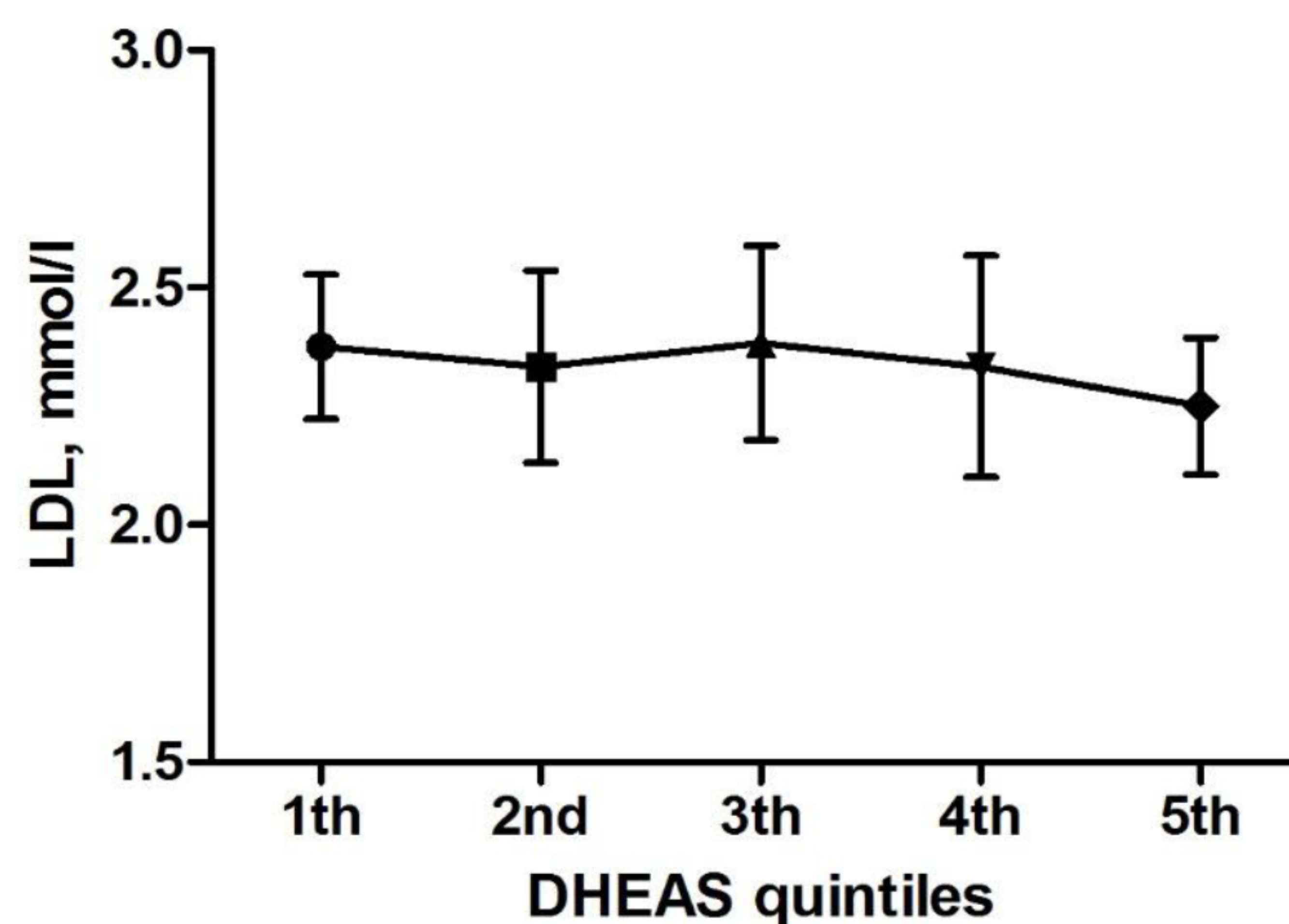
**Table 1.** Clinical characteristics of 432 children. Numbers are means  $\pm$  SD.

	DHEAS <1 $\mu\text{mol/l}$ ( $n=354$ )	DHEAS $\geq 1 \mu\text{mol/l}$ ( $n=78$ )	P-value <sup>a</sup>
Age, years	$7.6 \pm 0.4$	$7.7 \pm 0.4$	NS
Number of girls (%)	169 (48)	38 (49)	NS <sup>b</sup>
Body height, cm	$128.3 \pm 5.5$	$130.3 \pm 5.28$	0.005
Body weight, kg	$26.42 \pm 4.50$	$27.96 \pm 5.41$	0.038
BMI-SDS <sup>c</sup>	$-0.24 \pm 1.04$	$-0.09 \pm 1.14$	NS
Body fat percentage	$19.4 \pm 7.4$	$20.5 \pm 9.2$	NS
Body lean mass, kg	$20.5 \pm 2.5$	$21.2 \pm 2.2$	0.015
Waist circumference, cm	$56.2 \pm 5.2$	$57.3 \pm 6.0$	NS
DHEAS $\mu\text{mol/l}$	$0.49 \pm 0.24$	$1.54 \pm 0.87$	$<0.001$
Fasting serum insulin, mU/l	$4.49 \pm 2.37$	$4.37 \pm 2.34$	NS
Fasting plasma glucose, mmol/l	$4.81 \pm 0.36$	$4.80 \pm 0.37$	NS
Fasting plasma total cholesterol, mmol/l	$4.30 \pm 0.62$	$4.18 \pm 0.52$	NS
Fasting plasma LDL cholesterol, mmol/l	$2.39 \pm 0.51$	$2.25 \pm 0.46$	0.035
Fasting plasma HDL cholesterol, mmol/l	$1.60 \pm 0.31$	$1.65 \pm 2.28$	NS
Fasting plasma triglycerides, mmol/l	$0.61 \pm 0.25$	$0.57 \pm 0.22$	NS
Systolic blood pressure, mmHg	$100 \pm 7$	$101 \pm 8$	NS
Diastolic blood pressure, mmHg	$62 \pm 7$	$61 \pm 8$	NS
Cardiometabolic risk score	$0.01 \pm 3.51$	$-0.33 \pm 3.66$	NS

<sup>a</sup>Mann Whitney U -test

<sup>b</sup>Pearson Chi square -test

<sup>c</sup>BMI-SDS= body mass index standard deviation score (Saari et al. 2011)



**Figure 1.** Median plasma LDL concentration (IQR) in children belonging to quintiles based on serum DHEAS concentration.

1. Saari A et al. New Finnish growth references for children and adolescents aged 0-20 years: Length/height-for age, weight-for-length/height, and body mass index-for-age. *Ann Med* 2011;43:235-48

