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Growth pattern in childhood and adult hypertension in a high birth weight population

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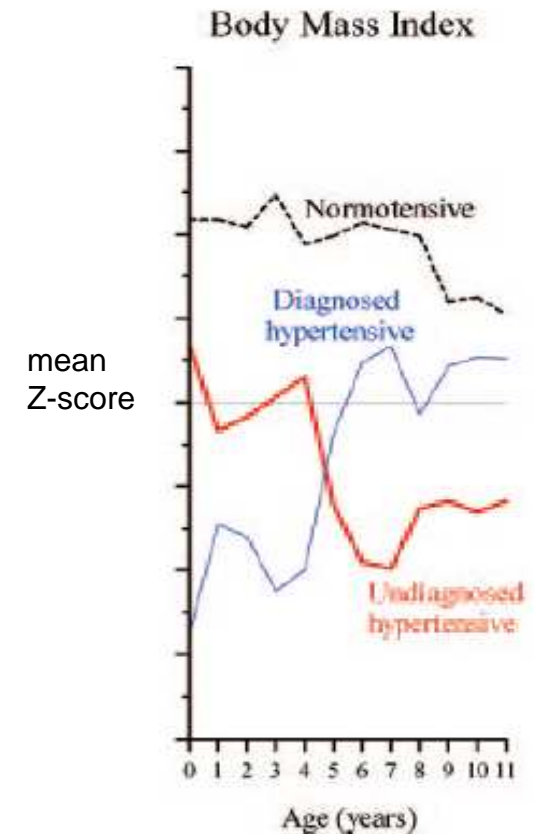
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Background

- Birth weight and childhood growth have been associated with adult hypertension.

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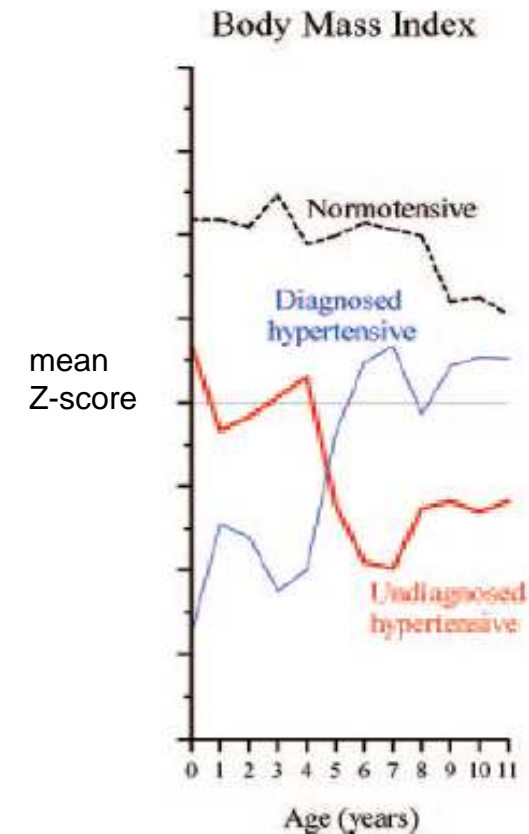
- Birth weight and childhood growth have been associated with adult hypertension.
- A trajectory of low birth weight followed by either rapid or slow childhood growth has been reported.



A cohort of 2003 individuals born in Helsinki 1934-1944, mean BW 3.4kg
Eriksson JG, Hypertension 2007

Background

- Birth weight and childhood growth have been associated with adult hypertension.
- A trajectory of low birth weight followed by either rapid or slow childhood growth has been reported.
- **Does this effect persist in a high birth weight populations?**



A cohort of 2003 individuals born in Helsinki 1934-1944, mean BW 3.4kg
Eriksson JG, Hypertension 2007

The cohort

- 2591 Icelanders born in Reykjavik (1917-1935)
- Height and weight measures at 8-13years
- Recruited into the Icelandic Heart Association Reykjavik longitudinal study in 1967
- Mean age at follow-up: 51y (36-65)
- Genetically homogenic, high birth weight
- Size at birth and hypertension (Gunnarsdottir I et. al, J Hypertens 2002)
 - modest association for girls
 - no association for boys



Current Study II

- characteristics of participants -

	<i>boys</i>	<i>girls</i>
<i>At birth</i>		
Mean birth weight (kg)	3.8	3.7
low birth weight (<2.5kg)	2%	2%
High birth weight (>4.0kg)	25%	18%

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High birth weight (>4.0kg)	25%	18%
<i>Aged 13</i>		
Mean BMI (kg/m ²)	18.0	18.7
Overweight*	4%	5%
Underweight**	11%	14%

*Cole TJ et al. BMJ (2000), corresponding to adult BMI \geq 25

***Cole TJ et al. BMJ (20??), corresponding to adult BMI<18.5

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<i>Aged 13</i>		
Mean BMI (kg/m ²)	18.0	18.7
Overweight*	4%	5%
Underweight**	11%	14%
<i>At clinical examination</i>		
Normotensive	42%	61%
On hypertensive medication	9%	12%
Diagnosed hypertensive		
stage 1 (140≤syst<160, 90≤diast<100)	29%	20%
stage 2 (syst≥160, diast≥100)	20%	8%

*Cole TJ et al. BMJ (2000), corresponding to adult BMI≥25

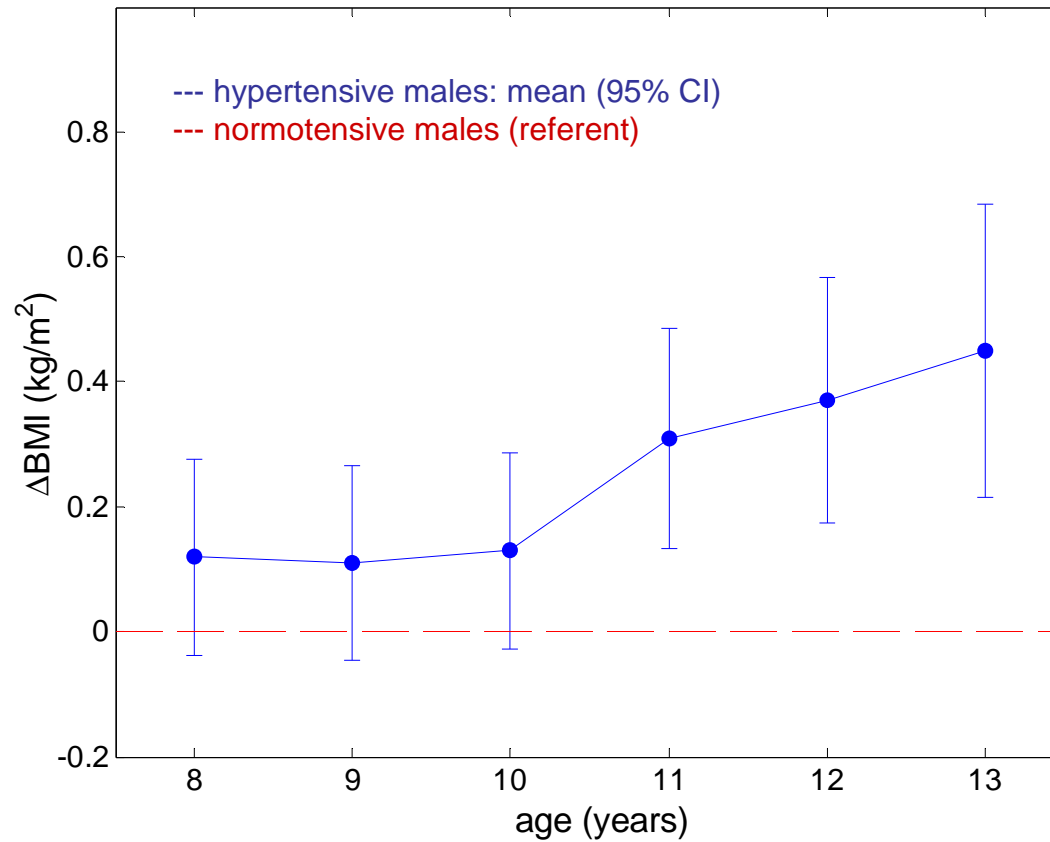
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Results

childhood growth and adult hypertension

Difference in childhood BMI

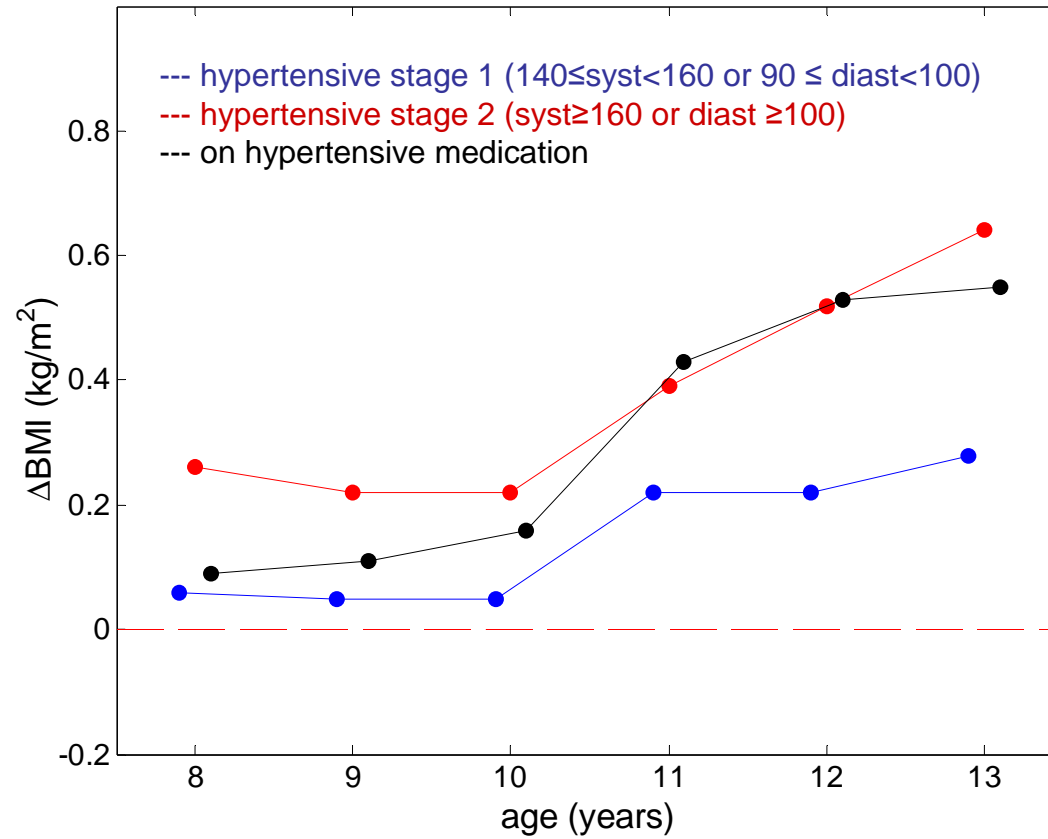
- hypertensive* vs. normotensive **boys** I



* syst \geq 140 or diast \geq 90 or use of hypertensive medication

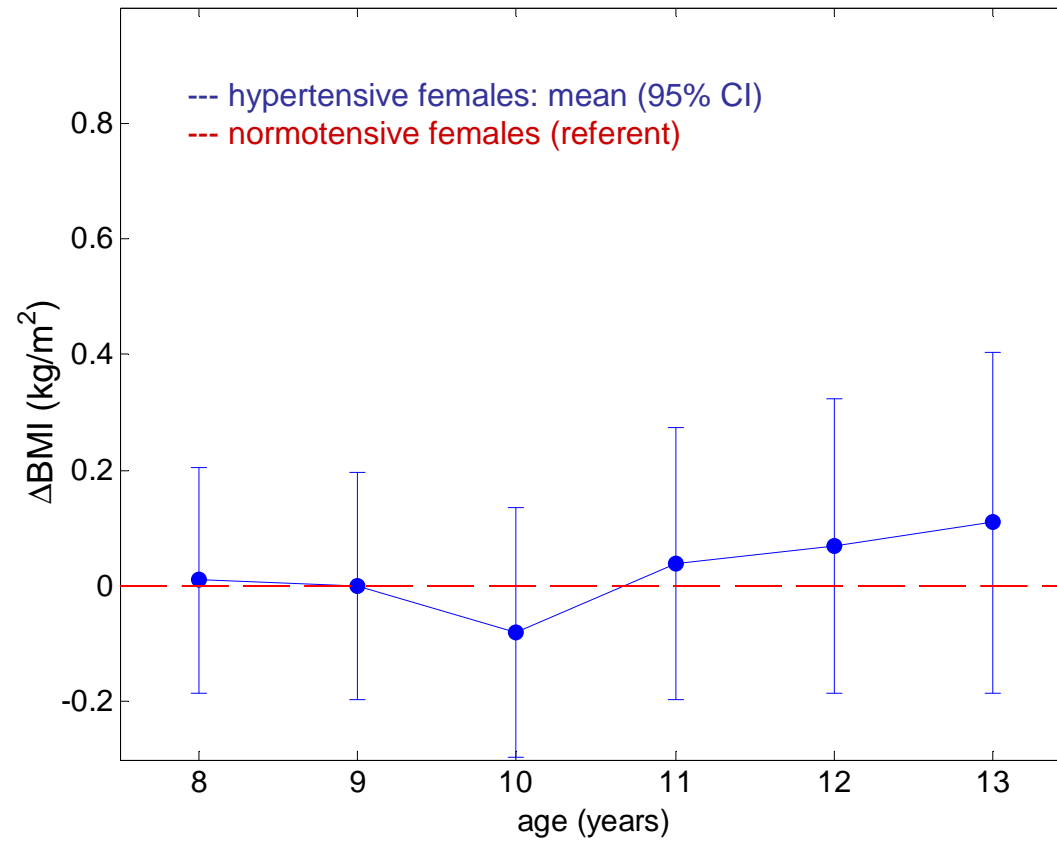
Difference in childhood BMI

- hypertensive vs. normotensive boys II



Difference in childhood BMI

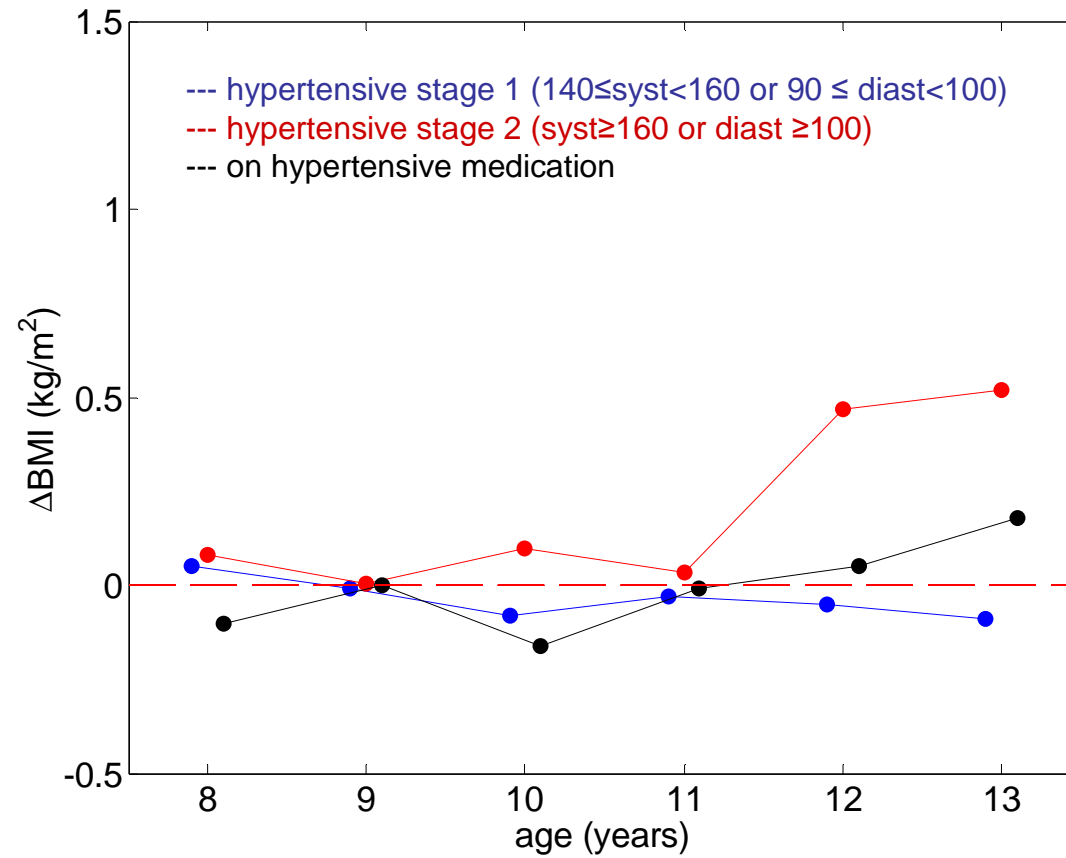
- hypertensive* vs. normotensive **girls I**



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Difference in childhood BMI

- hypertensive vs. normotensive **girls II**



Childhood growth vs hypertension, **boys**

BMI-velocity (Δ BMI/year) between 8-13 years of age

<i>ΔBMI (8-13 years)</i>	<i>Unadjusted</i>
<i>Quintiles (median Δkg/m²year)</i>	<i>OR</i>
	<i>(95% CI)</i>
Q1 (0.2)	1.00
Q2 (0.3)	1.0 (0.7, 1.4)
Q3 (0.4)	1.0 (0.7, 1.5)
Q4 (0.5)	1.2 (0.8, 1.7)
Q5 (0.8)	2.1 (1.4, 3.2)
<i>P (χ^2 type III)</i>	0.002

Childhood growth vs hypertension, **boys**

BMI-velocity (Δ BMI/year) between 8-13 years of age

<i>ΔBMI (8-13 years)</i> <i>Quintiles (median Δkg/m²year)</i>	<i>Unadjusted</i> <i>OR</i> <i>(95% CI)</i>	<i>Adjusted*</i> <i>OR</i> <i>(95% CI)</i>
Q1 (0.2)	1.00	1.00
Q2 (0.3)	1.0 (0.7, 1.4)	1.1 (0.7, 1.7)
Q3 (0.4)	1.0 (0.7, 1.5)	1.1 (0.7, 1.7)
Q4 (0.5)	1.2 (0.8, 1.7)	1.3 (0.8, 2.0)
Q5 (0.8)	2.1 (1.4, 3.2)	2.2 (1.4, 3.5)
<i>P (χ^2 type III)</i>	0.002	0.009

*Adjusted for BMI at 8y, birth weight, birth year, age at clinical examination and history of familial hypertension

Childhood growth vs hypertension, **girls**

BMI-velocity (Δ BMI/year) between 8-13 years of age

<i>ΔBMI (8-13 years) Quintiles (median Δkg/m²year)</i>	<i>Unadjusted OR* (95% CI)</i>	<i>Adjusted OR* (95% CI)</i>
Q1 (0.2)	1.00	1.00
Q2 (0.4)	0.9 (0.6, 1.4)	1.0 (0.6, 1.6)
Q3 (0.5)	0.9 (0.6, 1.3)	0.8 (0.5, 1.3)
Q4 (0.7)	1.1 (0.7, 1.7)	1.2 (0.7, 2.0)
Q5 (1.0)	0.8 (0.5, 1.3)	0.9 (0.5, 1.4)
<i>P (χ^2 type III)</i>	0.65	0.53

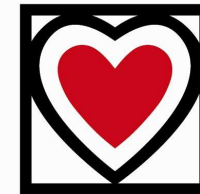
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Conclusion

- Compared to normotensive males, hypertensive males have higher childhood BMI
- For boys, accelerated growth is associated with increased risk of adult hypertension
- The effect appears to be independent of birth weight
- These effects are not observed in girls

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