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### ***Hot from the hypertensive press***

*Short analysis of clinical studies that may change our practices in the field of hypertension*  
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### **Exposure to natural environments may help maintain normal blood pressure in children, while built environment may increase blood pressure!**

Dzhambov AM et al. investigated the influence of natural environment and built environment on childhood blood pressure in Austrian and Italian mountain valleys.

In 2004/2005, 1251 school children (8-12 years old) were sampled for a cross-sectional survey. Children's mothers completed a questionnaire. The outcomes of interest were systolic and diastolic blood pressure measured with a calibrated oscillometric device. Indicators of land cover assigned to the residential and school coordinates within 100 and 1000 m included normalized difference vegetation index (NDVI), tree canopy cover, and a broader naturalness indicator titled distance to nature (D2N). The presence of a home garden was also measured via self-report. Imperviousness density served as a proxy for the built environment. Residential air pollution (NO<sub>2</sub>) and noise (Lden) from traffic were calculated using bespoke modelling. NO<sub>2</sub>, Lden, physical activity, and body mass index (BMI) were treated as mediating pathways. Higher NDVI and tree cover levels in residential and school surroundings and home gardens were consistently associated with lower blood pressure. The built environment was associated with higher blood pressure. Counterintuitive inverse associations between NO<sub>2</sub> and Lden and BP were also found. Structural equation modelling showed that higher levels of greenspace and presence of a home garden were weakly associated with more outdoor play spaces, and in turn with lower BMI, and ultimately with lower blood pressure.

The authors conclude that exposure to natural environments may help maintain normal blood pressure in children, while built environment may increase children's blood pressure. Outdoor play and less adiposity in greener areas may mediate some of these associations. Evidence on air pollution and noise remains controversial and difficult to explain.

(Environ Res. 2022 Mar;204(Pt A):111925)<sup>1</sup>

### **Comment**

Early life environments may influence children's blood pressure, but evidence on the combined effects of natural and built environment exposures is scarce. The present study investigates the associations of natural and built environment indicators, traffic noise, and air pollution with blood pressure in children living in Alpine valleys. This study confirms that exposure to natural environments might help maintain normal blood pressure in children, while built environment increase childhood blood pressure. A possible explanation for this association is the outdoor play and less adiposity in greener areas. More difficult to explain remains the inverse association between air pollution and noise with blood pressure.

The environments where this study was located is similar to the geographical area of Switzerland and therefore the results may be easily translated to our reality in Switzerland.

This data are also important because, childhood blood pressure is predictive for adulthood blood pressure, known as "tracking of blood pressure". Data from diverse populations show that the evidence for blood pressure tracking from childhood into adulthood is strong. Childhood blood pressure is associated with blood pressure in later life.<sup>2</sup> Therefore it is obviously that early intervention in childhood is important as a preventive tool to avoid high blood pressure later in life.

What can we do in daily clinical practice?



From a public health perspective, promotion of green areas and outdoor activities for children should be an important component in every community of Switzerland, involving local authorities and schools. From a preventive family perspective, paediatricians should encourage each family for regular outdoor activities with their children.

<sup>1</sup>Dzhambov AM, Lercher P, Markevych I, Browning MHEM, Rüdissler J. Natural and built environments and blood pressure of Alpine schoolchildren. *Environ Res* 2022;204(Pt A):111925.

<sup>2</sup>Chen x, Wang Y. Tracking of blood pressure from childhood to adulthood: a systematic review and meta-regression analysis. *Circulation* 2008;117(25):3171-80.

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