

Fortunato Lombardo, MD  
Department of Paediatric Sciences  
University of Messina

Dario Iafusco, MD  
Department of Paediatrics  
Second University of Naples

Guiseppe Salzano, MD  
Department of Paediatric Sciences  
University of Messina

Alessia Piscopo, MD  
Department of Paediatrics  
Second University of Naples

Giuseppe Saitta, MD  
Department of Paediatric Sciences  
University of Messina

Francesca Pisani, MD  
Department of Paediatrics  
Second University of Naples

Filippo De Luca, MD  
Department of Paediatric Sciences  
University of Messina  
Messina, Italy

Francesco Prisco, MD  
Department of Paediatrics  
Second University of Naples  
Naples, Italy  
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## Pre-hypertension and hypertension among adolescents of Switzerland

To the Editor:

McNiece et al<sup>1</sup> showed a high prevalence of pre-hypertension and hypertension in American adolescents aged 11 to 17 years. To provide insight on this issue in another population, we provide similar analysis from a recent school-based survey in Switzerland.<sup>2</sup>

We examined 5207 schoolchildren in the 6th grade of the canton of Vaud in 2005/2006 (2621 boys, 2586 girls; mean  $\pm$  SD age: 12.3  $\pm$  0.5 years). The prevalence of excess body weight ("at risk of overweight" or "overweight") was 14.3%. At visit 1, blood pressure (BP) was measured 3 times with a clinically validated oscillometric device, and the average of the final 2 of 3 readings was considered. BP was assessed on up to 2 additional visits if age-, sex-, and height-specific BP was  $\geq$ 95th percentile.<sup>3</sup> We defined pre-hypertension and hypertension in the same way as McNiece et al.<sup>1</sup> Figures from the latter study are provided for comparison (n = 6790, in Houston area; mean  $\pm$  SD age: 12.7  $\pm$  1.2 years).

The prevalence of pre-hypertension and hypertension are presented in the Table. By visit 3, 2.2% had hypertension.

A major limitation in both surveys<sup>1,2</sup> is that repeated BP measurements were performed only among participants with BP in the hypertensive range at visit 1. Had we also measured BP on several visits in the other children, it is possible that a proportion of children with pre-hypertension on visit 1 would have shifted into the normal BP category on visit 3, as shown in adults.<sup>4</sup> Hence, prevalence of pre-hypertension is probably overestimated in both surveys.

Our findings in a different population of children confirm that BP decreases over subsequent visits, which stresses the need for measuring BP over several visits to detect false-positive cases of hypertension.<sup>5</sup> Further studies should examine the predictive value of pre-hypertension in children.

Amaud Chiolero, MD, MSc  
Fred Paccaud, MD, MSc  
Pascal Bovet, MD, MPH  
Institute of Social and Preventive Medicine (IUMSP)  
University Hospital Center  
University of Lausanne  
Lausanne, Switzerland  
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**Table. Prevalence (%) of pre-hypertension and hypertension in adolescents in Switzerland (Vaud Canton) and in America (Houston area<sup>1</sup>)**

	Visit 1		Visit 2		Visit 3	
	Switzerland	USA	Switzerland	USA	Switzerland	USA
Normal blood pressure	75.3	81.1	—	—	—	—
Pre-hypertension	13.3	9.5	—	—	—	—
Hypertension	11.4	9.4	3.8	—	2.2	3.2
Stage 1	10.1	8.4	3.3	—	1.7	2.6
Stage 2	1.3	1	0.5	—	0.4	0.6

BP is based on mean of final 2 of 3 readings (Vaud) and final 3 of 4 readings (Houston). BP categories: (1) Normal blood pressure: BP <90th percentile for age, height and sex; (2) Pre-hypertension: BP  $\geq$ 90th but <95th percentile or BP  $\geq$ 120/80 mm Hg; (3) Stage 1 hypertension: BP  $\geq$ 95th but  $\leq$ 99th percentile + 5 mm Hg; (4) Stage 2 hypertension: BP >99th percentile + 5 mm Hg.

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