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DIRECT EFFECT OF BIRTH WEIGHT ON CHILDHOOD BLOOD PRESSURE: A CAUSAL MEDIATION ANALYSIS.

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Background: Numerous studies have shown a negative association between birth weight (BW) and blood pressure (BP) later in life. To estimate the direct effect of BW on BP, it is conventional to condition on current weight (CW). However, such conditioning can induce collider stratification bias in the estimate of the direct effect. Objective: To bound the potential bias due to U, an unmeasured common cause of CW and BP, on the estimate of the (controlled) direct effect of BW on BP. Methods: Data from a school based study in Switzerland were used (N = 4,005; 2,010 B/1,995 G; mean age: 12.3 yr [range: 10.1-14.9]). Measured common causes of BW-BP (SES, smoking, body weight, and hypertension status of the mother) and CW-BP (breastfeeding and child's physical activity and diet) were identified with DAGs. Linear regression models were fitted to estimate the association between BW and BP. Sensitivity analyses were conducted to assess the potential effect of U on the association between BW and BP. U was assumed 1) to be a binary variable that affected BP by the same magnitude in low BW and in normal BW children and 2) to have a different prevalence in low BW children and in normal BW children for a given CW. Results: A small negative association was observed between BW and BP [beta: -0.3 mmHg/kg (95% CI: -0.9 to 0.3)]. The association was strengthened upon conditioning for CW [beta: -1.5 mmHg/kg (95% CI: -2.1 to -0.9)]. Upon further conditioning on common causes of BW-BP and CW-BP, the association did not change substantially [beta: -1.4 mmHg/kg (95% CI: -2.0 to -0.8)]. The negative association could be explained by U only if U was strongly associated with BP and if there was a large difference in the prevalence of U between low BW and normal BW children. Conclusion: The observed negative association between BW and BP upon adjustment for CW was not easily explained by an unmeasured common cause of CW and BP.