



# Regional ventilation inhomogeneity in survivors of extremely preterm birth

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## Abstract

**Introduction:** Survivors of extreme prematurity may have disrupted lung development. We hypothesized that the multiple breath washout (MBW) index Scond, which is intended to reflect ventilation inhomogeneity from the conducting airways, could be a sensitive marker of respiratory impairment in this group.

**Methods:** Spirometry, TLco, and MBW were cross-sectionally evaluated at 8 to 14 years of age in children born at <28 weeks between 2004 and 2010 in Udine, Italy. Age-matched controls born at term were also included. Bronchopulmonary dysplasia (BPD) was defined as oxygen-dependence at 36 weeks postmenstrual age. The limits of normal were the 5th percentile of the reference population (Global Lung Initiative) for spirometry and TLco and the 95th percentile of controls for Lung Clearance Index, Scond, and Sacin from MBW.

**Results:** Results were obtained in 47 extremely preterm children (53% boys, mean  $\pm$  standard deviation age  $11.3 \pm 2.0$  years, 40% with BPD) and 60 controls (50% boys,  $11.6 \pm 1.9$  years). There were significant differences between preterm children and controls in all lung function outcomes, except for Sacin. Among children born <28 weeks, Scond tended to be frequently abnormal than FEV<sub>1</sub> z-score (29% vs 14%,  $P = .06$ ). At multivariable linear regression, in the preterm group, current asthma was significantly associated with a higher Scond ( $B = 0.019$ , 95% confidence interval, 0.000-0.038), whereas BPD was not.

**Conclusion:** Almost a third of extremely preterm children at school age showed Scond alterations that affected also children without BPD. Longitudinal studies should clarify the prognostic meaning of Scond abnormalities in this group.