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| **Intra-breath oscillometry impedance trajectories differ with wheeze status in preschoolers.**  |
| Matthew D Wong1,2, Tamara Blake2, Syeda Farah Zahir3, Sadasivam Suresh1,2, Zoltan Hantos2,4, Keith Grimwood5,6, Stephen B Lambert7,8, Robert S Ware5, Peter D Sly2 |
| *1Respiratory and Sleep Medicine, Queensland Children’s Hospital, QLD, Australia.**2Child Health Research Centre, The University of Queensland, QLD, Australia**3 Centre for Health Services Research, The University of Queensland, QLD, Australia**4 Anesthesiology and Intensive Therapy, Semmelweis University, Hungary**5 School of Medicine and Dentistry, and Menzies Health Institute Queensland, Griffith University, QLD, Australia**6 Infectious Disease and Paediatrics, Gold Coast Health, QLD, Australia.**7 The University of Queensland Centre for Clinical Research, QLD, Australia.**8 National Centre for Immunisation Research and Surveillance, NSW Australia.* |
| **Introduction/Aim:** Longitudinal intra-breath oscillometry (IB-OSC) may distinguish abnormal lung function trajectories in preschool children with a history of wheezing. **Methods:** Children 3-7 years old from a prospective, longitudinal, community-based cohort performed annual IB-OSC using a single 10 Hz sinusoid while clinically asymptomatic. Linear mixed-effects models were developed to explore the effects of wheezing phenotypes, growth, and sex on seven IB-OSC outcome variables over time: resistance at end-expiration (ReE), resistance at end-inspiration (ReI), the tidal change in resistance (∆R=ReE-ReI), reactance at end-expiration (XeE), reactance at end-inspiration (XeI), the tidal change in reactance (∆X=XeE-XeI), and ∆X normalised by tidal volume (∆X/VT).

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| Table 1. Association of height and wheezing history with intra-breath impedance (n=375 observations) |
|  |  | Mean difference (95%CI) | *p-*value |
| ReE† | Ht (cm) | -0.088 (-0.100 to -0.076) | **<0.001** |
| TWz§ PWz§ | +0.414 (-0.096 to +0.924)+0.586 (-0.075 to +1.258) | 0.1180.088 |
| ReI† | Ht (cm) | -0.098 (-0.110 to -0.086) | **<0.001** |
| TWz§ PWz§ | +0.249 (-0.179 to +0.676)+0.412 (-0.140 to +0.965) | 0.2610.151 |
| ΔR† | Ht (cm) | +0.010 (+0.001 to +0.019) | **0.035** |
| TWz§ PWz§ | +0.109 (-0.145 to +0.363)+0.179 (-0.147 to +0.506) | 0.4050.288 |
| XeE† | Ht (cm) | +0.034 (+0.024 to +0.044) | **<0.001** |
| TWz§ PWz§ | -0.245 (-0.580 to +0.090)-0.669 (-1.102 to -0.237) | 0.159**0.004** |
| XeI† | Ht (cm) | +0.050 (+0.041 to +0.059) | **<0.001** |
| TWz§ PWz§ | -0.006 (-0.248 to +0.236)-0.222 (-0.534 to +0.090) | 0.9620.170 |
| ΔX† | Ht (cm) | -0.011 (-0.021 to 0.000) | **0.046** |
| TWz§ PWz§ | -0.329 (-0.569 to -0.089)-0.465 (-0.772 to -0.159) | **0.009****0.004** |
|  | Ht (cm) | +0.078 (+0.050 to +0.107) | **<0.001** |
| TWz§ PWz§ | +0.484 (-0.250 to +1.216)+1.433 (+0.492 to +2.374) | 0.203**0.004** |
| † hPa∙s∙L-1; ‡ hPa∙s∙L-2; § Reference category is never wheezed group; Ht, height; PWz, persistent wheeze; TWz, transient wheeze. |

**Results:** 85 children produced 375 acceptable IB-OSC measurements and were categorised into three wheeze groups: never (n=36), transient (n=35), or persistent (n=14). After adjusting for height, children with persistent wheezing had worsening trajectories for XeE, ∆X, and ∆X/VT (Table 1). Height, but not sex, had a significant effect on all IB-OSC variables when adjusted for the effect of preschool wheezing. **Conclusion:** IB-OSC reactance outcomes may allow abnormal lung function to be identified early in asymptomatic children with a history of persistent wheezing.**Grant Support:** NHMRC, Hungarian Scientific Research Fund, and ERS Clinical Research Collaboration Award.**Key Words:** children, intra-breath, oscillometry, preschool, wheeze. |