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Measuring intra-subject changes in respiratory mechanics by oscillometry: impedance *versus* admittance

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To the Editor:

Recent state-of-the-art reviews [1, 2] and research [3] have pointed out the potential interest of oscillometry for noninvasively characterising lung mechanics from the relationship between oscillatory pressure (P) and flow (V') at different frequencies. Two magnitudes have usually represented this relationship: resistance (R) and reactance (X), which are the real and imaginary parts of respiratory impedance ($Z=R+j\cdot X$). Clinical [1, 2] and modelling data [4] show that both R and X depend on the interaction between resistances and compliances of central and peripheral airways and lung tissues. Even at the low oscillometry frequency of 5 Hz (which is a critical reference frequency for clinical studies [1, 2]), a simple interpretation of R and X is not possible [4]. Interestingly, the same pathophysiological information is contained in Z and in its reciprocal: admittance (Y; $Y=1/Z$). The real and imaginary parts of Y ($Y=G+j\cdot B$; where G is conductance and B susceptance) are univocally equivalent to R and X: $G=R/(R^2+X^2)$, $B=-X/(R^2+X^2)$, and, therefore, changes in R and X are paralleled by changes in G and B. Although Y is currently not so familiar as Z, it should be mentioned that both are conceptually similar (*i.e.*, V'/P instead of P/V'). In particular, G has an interpretation as simple as that of R: G is the component of flow in phase with pressure. Given that almost all the oscillometry literature is referred to Z, why focus here on Y?