



# Exercise-induced bronchoconstriction and bronchodilation: investigating the effects of age, sex, airflow limitation and FEV<sub>1</sub>

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Exercise-induced bronchoconstriction (EIBc) and bronchodilation (EIBd) occur after exercise, and are influenced by increasing age, lower FEV<sub>1</sub> % pred and airflow limitation. Female sex influences EIBc but not EIBd. <https://bit.ly/3nDGrwm>

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## Abstract

Exercise-induced bronchoconstriction (EIBc) is a recognised response to exercise in asthmatic subjects and athletes but is less well understood in an unselected broad population. Exercise-induced bronchodilation (EIBd) has received even less attention. The objective of this study was to investigate the effects of age, sex, forced expiratory volume in 1 s (FEV<sub>1</sub>) and airflow limitation (FEV<sub>1</sub>/forced vital capacity (FVC) <0.7) on the prevalence of EIBc and EIBd.

This was a retrospective study based on incremental cardiopulmonary exercise testing on cycle ergometry to symptom limitation performed between 1988 and 2012. FEV<sub>1</sub> was measured before and 10 min after exercise. EIBc was defined as a percentage fall in FEV<sub>1</sub> post-exercise below the 5th percentile, while EIBd was defined as a percentage increase in FEV<sub>1</sub> above the 95th percentile.

35 258 subjects aged 6–95 years were included in the study (mean age 53 years, 60% male) and 10.3% had airflow limitation (FEV<sub>1</sub>/FVC <0.7). The lowest 5% of subjects demonstrated a ≥7.6% fall in FEV<sub>1</sub> post-exercise (EIBc), while the highest 5% demonstrated a >11% increase in FEV<sub>1</sub> post-exercise (EIBd). The probability of both EIBc and EIBd increased with age and was highest in females across all ages (OR 1.76, 95% CI 1.60–1.94; p<0.0001). The probability of EIBc increased as FEV<sub>1</sub> % pred declined (<40%: OR 4.38, 95% CI 3.04–6.31; p<0.0001), with a >2-fold increased likelihood in females (OR 2.31, 95% CI 1.71–3.11; p<0.0001), with a trend with airflow limitation (p=0.06). The probability of EIBd increased as FEV<sub>1</sub> % pred declined, in the presence of airflow limitation (OR 1.55, 95% CI 1.24–1.95; p=0.0001), but sex had no effect.

EIBc and EIBd can be demonstrated at the population level, and are influenced by age, sex, FEV<sub>1</sub> % pred and airflow limitation.

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