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**Title:** Latitude variation in the prevalence of asthma and allergic rhinitis in Italy: Results from the GEIRD study

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**Body:** BACKGROUND: Earlier studies have pointed out a great variability in the prevalence of asthma and asthma-like symptoms in different geo-climatic areas. AIM: To test the association between latitude and prevalence of asthma and allergic rhinitis in Italian young adults. METHODS: In the frame of Gene-Environment Interaction in Respiratory Diseases study, a postal screening questionnaire on respiratory health and exposure to environmental factors was administered to 18,357 randomly selected subjects aged 20-44 years in 7 centres: 3 in Northern (Torino, Pavia, Verona), 2 in Central (Ancona, Perugia) and 2 in Southern Italy (Salerno, Sassari). RESULTS: 10,494 (57.2%) subjects responded to the questionnaire. The prevalence of self-reported doctor-diagnosed asthma and allergic rhinitis in the lifespan was 10.2% and 26.9%, respectively, and was significantly different across the centres ( $p < 0.05$ ). After adjusting for sex, age, potential risk factors for respiratory diseases and design confounders, the prevalence of asthma (OR: 1.07 per 1° latitude decrease,  $p < 0.001$ ), asthma-like symptoms (wheezing, chest tightness, asthma attacks: OR ranging from 1.04 to 1.06,  $p < 0.05$ ) and allergic rhinitis (OR: 1.03,  $p = 0.04$ ) showed a significant north-to-south trend. Similarly, a 1°C increment in temperature was significantly associated with asthma (OR: 1.10,  $p < 0.001$ ) and asthma-like symptoms (OR from 1.07 to 1.10,  $p < 0.05$ ), but not with allergic rhinitis (OR=1.02,  $p = 0.190$ ). CONCLUSION: The prevalence of asthma and allergic rhinitis increased

moving southwards in Italy, suggesting that prolonged exposure to different geo-climatic conditions may affect the onset of asthma and allergic respiratory diseases.