Body: The association between vitamin D deficiency and pulmonary function in adults with asthma remains unclear. The objective was to determine the association between vitamin D deficiency [serum 25(OH)D < 50nmol/L] and pulmonary function in an adult asthma cohort, and to explore possible effect modification by sex and allergic rhinitis. This cross-sectional study included 760 asthmatic adults aged 19-55 years, who participated in the second Nord-Trøndelag Health Study (HUNT2). Lung function measures included percent predicted (pp) FEV₁, ppFVC, and FEV₁/FVC ratio. We used multiple linear regression to calculate point estimates and 95% confidence intervals (CI). Overall, 44% of the asthmatic adults were vitamin D deficient. Vitamin D deficiency was significantly associated with lower ppFEV₁ (-8%, 95% CI: -14% to -3%) and lower FEV₁/FVC ratio (-5%, 95% CI: -9% to -1%) in men after adjustment for potential confounders. When further stratified by allergic rhinitis, the association between serum 25(OH)D and FEV₁/FVC ratio was significant in men without allergic rhinitis (-11%, 95% CI: -22% to -1%), but not in men with allergic rhinitis (-3%, 95% CI: -9% to 2%) (p value for interaction: <0.1). The association in women was not significant overall or by allergic rhinitis. Similar results were found when serum 25(OH)D was analysed as a continuous variable. Vitamin D deficiency was not significantly associated with pulmonary function in most adults with asthma, with the exception of asthmatic men without allergic rhinitis.