When restricting the analyses to patients who never had a hospital discharge diagnosis of chronic obstructive pulmonary disease (COPD), the association between hospital-diagnosed asthma within 180 days and rAAA increased with adjusted OR from 2.06 (95% CI: 1.21–3.53; \( P = 0.008 \)) to 2.64 (95% CI: 1.25–5.58; \( P < 0.001 \)).

External adjustment helps to address the missing information on potential confounders. Information regarding cigarette smoking from the DNRP population remains incomplete, which may confound the risk assessment of asthma on AAA. Consequently, the respective observed proportion among AAA patients of smokers with or without use of bronchodilators permitted external adjustment for smoking in the DNRP. This adjustment increased the relative rAAA risk estimate to an adjusted OR of 1.46 (95% CI: 1.31–1.62; \( P < 0.001 \)) from 1.31 (95% CI: 1.18–1.46; \( P = 0.001 \)) associated with bronchodilator use within 90 days of index date (Table 2). This increase in the relative risk results from an observed lower proportion of smokers among users of bronchodilators compared with nonsmokers in the VIVA trial.

### VIVA Screening Trial

The VIVA screening trial contains both AAA (\( n = 619 \)) and non-AAA patients with complete cigarette smoking history. This group differs from the DNRP population, which contains only patients with AAA. The VIVA population enabled testing for potential confounding by cigarette smoking of the association of AAA with asthma or ROPD. Logistic regression analysis demonstrated that use of bronchodilators, including anti-asthmatic medications with \( \beta_2 \)-adrenergic receptor agonists or use of glucocorticoids for inhalation or as tablets, associated with a 45% higher risk of an AAA (OR=1.45 [95% CI: 1.10–1.92]; \( P = 0.009 \); Table 3, model 1). Adjustment for current smoking did not attenuate the risk (OR=1.45 [95% CI: 1.10–1.93]; \( P = 0.009 \); Table 3, model 2). When current smoking was considered together with diabetes mellitus, hypertension, systolic blood pressure, diastolic blood pressure, body mass index, and age, the use of bronchodilators remained an independent and significant risk factor of AAA (OR=1.46 [95% CI: 1.10–1.94]; \( P = 0.010 \); Table 3, model 3). Consideration of current smoking together with former smoking reduced the risk of use of bronchodilators in AAA before (OR=1.14 [95% CI: 1.00–1.85]; \( P = 0.049 \); Table 3, model 4) and after considering other AAA risk factors (OR=1.34 [95% CI: 0.98–1.84]; \( P = 0.069 \)), including diabetes mellitus, hypertension, systolic blood pressure, diastolic blood pressure, body mass index, and age, although the use of bronchodilators still remained an independent and significant risk factor of AAA (Table 3, model 5). In this VIVA population, except for diabetes mellitus, all other potential confounders (smoking, hypertension, blood pressure, body mass index, and age) were independently associated with the risk of AAA (Table 3).