population with asthma. RESULTS: We found 18 articles that met the inclusion criteria; three were validation studies and the remaining were observational studies or clinical trials. All three domains of the SGRQ are internally consistent and reliable with ICC of at least 0.70 for individual domains and greater than 0.90 for total score. Convergence and discriminate validity were seen with two of three domains and dyspnea grade, six-minute walk distance, and other HRQoL instruments. Face and content validity were demonstrated. SGRQ was able to discriminate between patients with varying levels of symptoms, FEV1, self-reported healthcare utilization services, asthma control problems, and HRQoL. Responsiveness to change, however, is not well-established for SGRQ despite a reported minimally important difference of 3.9-unit change, which may be due partly to a paucity of studies using SGRQ in this population. CONCLUSIONS: Our findings suggest SGRQ has face, content, and construct validity. It is able to discriminate between different groups of asthma patients, and may be useful in facilitating asthma resource allocation. Further research is needed to determine its responsiveness to change.

**PAS1**

**PROPSION SCORE MATCHING WITH MORE THAN TWO CATEGORIES**

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OBJECTIVE: We applied the extension of propensity score methodology that allows for estimation of average causal effects with multi-valued treatment. METHODS: The methodology requires three steps: 1. Estimating propensity score with multinomial or nested logit 2. Estimating the conditional expectation and 3. estimate average respond treatment by calculating average of conditional expectation averaged over the distribution of the pre-treatment variables. RESULTS: The Market Scan private insurance data base was used in this study which based upon asthma individuals whose health care was provided under a variety of fee-for-service (FFS), fully capitated and partially capitated health plans, including exclusive provider organizations, indemnity plans. Treatment is divided into three categories: a) controller only; b) reliever only; and c) reliever and controller. These three categories is matched with control group using multinominal logit. Pre-period demographic and clinical factors are used as a covariate. Conditional expectations are calculated and applied as a weight to estimate average treatment effect among asthma patients. Reliever and Controller patients have the highest treatment effect whereas controller only patients have the lowest effect. CONCLUSION: Multi-valued treatment is common in pharmaco economical research and extension of propensity score matching to cover multi-valued treatment is straightforward and easy to apply.

**PAS12**

**TREATMENT PERSISTENCE AND COMPLIANCE WITH MEDICATIONS FOR ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

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OBJECTIVE: To assess the patterns of persistence with various classes of inhaled medications (i.e., beta agonist, anticholinergic, and glucocorticoid) medications used to treat asthma and chronic obstructive pulmonary disease (COPD). METHODS: Pharmacy claims data were analyzed for persistence with inhaled treatment (time to discontinuation) using a 60-day gap to define discontinuation. Compliance, defined as the percentage of days with doses available divided by days to last refill, also was assessed. Patients were grouped as naive (no inhaled medication in the previous year) or experienced (previous or current treatment), and by age (18–65, 65+ years). Medications included: ipratropium, ipratropium + salbutamol, formoterol, formoterol + budesonide, salmeterol, salmeterol + fluticasone, and tiotropium. RESULTS: The database included 31,368 patients prescribed one of these medications (4,888 naive, 26,480 experienced). Based on a 60-day lapse in refill, only 15–63% of patients continued on the index drug for more than 6 months, further decreasing to 7–53% at 12 months, and 5–47% at 18 months. At 12 months, patients taking tiotropium had significantly longer persistence rates compared to that for other drugs (53% versus 7–30%, all p < 0.0001), and fewer switches to alternative medications. Naive patients had significantly shorter treatment persistence than experienced patients for all drugs (all p < 0.0001), including tiotropium (27% versus 55%, p < 0.0001). Compliance rates were similar for all drugs (i.e., 76%–94%) but highest for tiotropium. CONCLUSIONS: These data demonstrated that 1) persistence with inhaled treatment for asthma and COPD was low overall (despite the generous 60-day allowance to refill), but patients stayed on treatment with tiotropium significantly longer than with other medications, and 2) patients naive to these classes of inhaled treatment had shorter treatment persistence than experienced patients.

**PAS13**

**ASSOCIATION OF MEDICATION ADHERENCE WITH WORKPLACE PRODUCTIVITY AND HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH ASTHMA**

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Asthma is a chronic inflammatory disorder of the lungs and has a significant impact on morbidity, mortality, and health-related quality of life (HRQL). Asthma also impacts indirect costs resulting from losses in workplace productivity. OBJECTIVE: To examine the association of medication adherence with workplace productivity and HRQL in patients with asthma in a state health insurance program. METHODS: The diagnosis of asthma was identified from medical claims data of state employees between 18 and 65 years of age who obtained healthcare benefits from a state health insurance program from July 2001 through June 2003. A three-part survey was mailed to these patients to measure HRQL, workplace productivity, (absenteeism [time lost from work] and presenteeism [reduced productivity at work]), and self-reported medication adherence. The survey consisted of the St. George's Respiratory Questionnaire, the Workplace Productivity Short Inventory, and the Morisky Adherence Scale. Productivity losses were translated into dollar values by using previously published metrics (employer perspective). The association between self-reported medication adherence and HRQL and productivity was measured using multivariate regression analyses. RESULTS: The response rate was 25.1% (385/1493). The mean HRQL total summary score was 33.2 ± 19.9 units, with the symptoms domain having the worst HRQL scores (49.3 ± 21.4 units), followed by the activity (39.6 ± 26.6) and impacts (24.6 ± 19.1) domains. 39% of the participants reported themselves as “high” adherent, 19% reported themselves as “medium” adherent, and 42% as “low” adherent. Asthma resulted in productivity losses of $597 ± $1024 (absenteeism)