the direct treatment of respiratory infections, but also for the treatment of co-morbid medical conditions of respiratory infections patients. These costs also vary considerably by type of respiratory infection. The study also shows that respiratory infections impose substantial indirect costs on employers from work loss associated with these infections.

**OBJECTIVES:** To examine the relationship between self-reported health status, prophylactic medication utilization, and health care service utilization in older adults with asthma. **METHODS:** Design: A prospective longitudinal cohort study was conducted over a 2-year post-enrollment period in a population of managed care enrolled asthmatic older adults. Participants: A total of 129 Medicare-HMO enrolled older adults with asthma using inhaled corticosteroid therapy as prophylaxis were available for complete follow up. **Measurements:** We measured self-reported health perception, falls, lifestyle, depressive symptomatology, and pre-enrollment health care service use using a comprehensive risk screen. We used the medication possession ratio and total annual health care charges as measures of post-enrollment inhaled corticosteroid and health care service use. **RESULTS:** After adjusting for the effects of other variables we found that depressive symptomatology (DS) at baseline and increased comorbidity severity (using the Charlson comorbidity index) were associated with significant reductions in prophylactic medication possession (27% with DS, and 6% with unit increase in Charlson’s index, p < 0.05). Additionally we found, after adjusting for the effects of baseline health status, a 10% increase in prophylactic medication possession was associated with a 5% decrease in total annual health care charges in this population (p < 0.05). **CONCLUSIONS:** There seem to be strong associations between poor health status at time of enrollment, decreased post-enrollment prophylactic medication use and increased post-enrollment health care service utilization in older adults with asthma.

**OBJECTIVES:** The purpose of this study is to adapt a previously validated questionnaire to a pharmacy claims database and examine its construct validity in measuring severity of illness in chronic respiratory disease (CRD). **METHODS:** The authors modified an asthma severity of illness questionnaire (13 items, total score range 0–28) based upon symptoms, medication use, hospitalization information and intubation history to a scale that is more conducive to retrospective data analysis. The adapted CRD scale (CRDS) was based on pharmacy claims data and hospitalization history (11 items, total score range 0–18). The CRDS was compared to utility as measured by a general health visual analogue scale and quality of life (QoL) as measured by the Physical Component Scale (PCS), Physical Function (PF) and General Health (GH) domains of the SF-36. Panel data analysis was performed on pharmacy claims and survey data from the Kaiser Permanente/USC Consultation Study. QoL and utility were regressed on the CRDS, along with covariates. A non-chronic disease score was used to control for chronic disease while avoiding significant multicollinearity. The analysis was limited to 126 patients with CRD followed over 3 years. The Hausman specification test was used to determine the appropriateness of the random-effects model formulation. **RESULTS:** The Hausman specification test suggested the use of the fixed-effects formulation for utility (m = 8.2, p > m = 0.0420). The CRDS was negative and significant (−1.79, p < 0.0286). The Hausman test suggested a fixed-effects formulation for PCS (p > m = 0.0333) and random-effects for GH (p > m = 0.0628) and PF (p > m = 0.1495). The CRDS was significant and negative for all three QoL domains: (PCS: −0.68, p < 0.0085; PF: −0.97, p < 0.0130; GH: −0.065, p < 0.0077). **CONCLUSION:** The adaptation of the asthma severity of illness questionnaire appears to be a valid measure of chronic respiratory disease in a pharmacy claims database.

**OBJECTIVES:** Adult patients with moderate to severe asthma could potentially avoid utilizing excessive health care resources by reducing the need for management of severe adverse effects associated with albuterol. This modeled analysis was performed from a managed care payer perspective to determine if nebulized levalbuterol is associated with a lower cost per decreased use of rescue inhaler, as compared with nebulized racemic albuterol over a four week period. **METHODS:** Cost data was obtained from a public hospital, an HMO, and the Red Book. Costs were measured in 2000 US dollars. Probabilities were derived from a clinical controlled trial and the National Center for Health Statistics. The primary out-
VALIDATION OF A RATING INSTRUMENT ASSESSING THE INHALATION SKILLS OF CHILDREN WITH ASTHMA

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OBJECTIVES: Despite their complexity appropriate use of asthma inhaled medicines is crucial to ensure optimal drug delivery to the airways. We describe the validation of an instrument to assess inhalation skills in children. METHODS: The instrument includes a breakdown of the steps necessary for appropriate inhalation. We videotaped 25 children taking a placebo inhaler (metered dose inhaler (MDI), MDI with AeroChamber® (MDI-AE®), and Diskus®). A gold standard (GS) was developed by agreement of two asthma experts watching the videotaped demonstrations. Twenty-one raters scored the randomly ordered demonstrations twice within a 2-week interval (sessions 1 and 2). Intra-class correlation coefficients (ICCs) were calculated to assess validity (comparing GS to raters’ scores), interrater reliability, and test-retest reliability for each step of the inhalation. RESULTS: ICCs varied considerably by both, the device and the step. In session 1, a small proportion of raters agreed on the GS on whether patients actuated the MDI and inhaled simultaneously (9.5%, ICCs 0.62 to 0.74) and whether patients hold their breath (19%, ICCs 0.62 to 1.00). A better agreement was observed for the MDI-AE® where actuation (43%, ICCs 0.43 to 0.56) and inhalation (57%, ICCs 0.43) are two separate steps. The best interrater agreement was on the shaking of the MDI (ICC = 0.83) and the MDI-AE® (ICC = 0.74). Agreement for the Diskus® was poor for all steps. Results for session 2 were similar. The best intra-rater agreement was for the Diskus® (ICCs = 1 for 5 steps), though only a small proportion of raters agreed on these steps (5% to 21%). CONCLUSIONS: There was large variability within and between raters’ scores. Some steps were better assessed than others. These results suggest that in addition to a detailed instrument, training of raters is crucial to obtain a valid assessment of the childrens’ inhalation technique.