children. Combined therapy of ICS + BD with or without LAs was observed in 70% of privately insured children compared to 44% of social assistance children. Despite apparently better management in the private group, OS use, indicating a severe exacerbation, was 16% in the private compared to 12% in the publicly insured group. While the average annual number of claims were similar in the private and public groups (7.3 vs. 7.1), privately insured children had more ICS claims (3.2 vs. 2.9) and fewer BD claims (2.9 vs. 3.9). CONCLUSIONS: Privately insured children appeared to be better managed than social assistance children. Differences in socioeconomic status and formulary listings may explain observed differences. Policies governing public and private drug plans must ensure adequate access to necessary medications for children with asthma.

**PAS4**

**PATTERNS OF PHARMACOTHERAPY UTILIZATION AMONG CHILDREN AND ADOLESCENTS WITH MULTIPLE ASTHMA-RELATED MORBID EVENTS ENROLLED IN A MEDICAID PROGRAM**

D'Souza AO, Smith M, Roy AN
West Virginia University, Morgantown, WV, USA

**OBJECTIVE:** To describe the asthma-related pharmacotherapy utilization following a first and second morbidity event for asthma among children and adolescents enrolled in Medicaid.

**METHODS:** Medicaid hospitalization and emergency room (ER) claims with a primary ICD-9 CM diagnosis code for asthma dated 2002 were extracted for recipients less than 21 years of age. The corresponding asthma-related prescription claims also were extracted. Recipients with at least two morbidity events (defined as two consecutive ER or hospital visits at least 8 days apart) formed the study cohort. Pharmacotherapy use for each recipient was analyzed for up to a 30-day period following his/her first and second morbidity event. **RESULTS:** A total of 214 recipients were identified as the study cohort consisting mainly of infants less than 6 years of age (50.0%), males (61.7%), and whites (82.2%). The proportion of recipients who filled a prescription for a controller medication following the second event was greater than the proportion following the first event (40.2% versus 34.1%). A greater proportion of recipients used leukotriene modifiers (24.3%) and inhaled corticosteroids (20.1%) than other controller drug classes following the first event, as well as following the second event (25.7% and 21.0%, respectively). Following the first event, 59.6% of recipients who used a leukotriene modifier continued using the same medication after the second event, compared to only 27.9% of recipients who used inhaled corticosteroids. With respect to demographic groups, there was a very low proportion of recipients who were black, who used controller pharmacotherapy following the first (14.7%) and second event (23.5%). **CONCLUSION:** Although there was an increase in the proportion of recipients who utilized controller pharmacotherapy after a second morbidity event, there was a low use of these medications overall. Among demographic groups, blacks had the lowest utilization of controller medications following morbidity events.

**PAS5**

**DRUG COST ANALYSIS OF TREATMENT FOR ASTHMA OUTPATIENTS IN TAIWAN**

Lu CH, Tarn YH

1National Defense Medical Center, Taipei, Taipei, Taiwan; 2Taipei City Hospital, Taipei, Taiwan

**OBJECTIVES:** To investigate the trend of treatment costs for asthmatic outpatients in Taiwan from 1998 to 2002.

**METHODS:** Claimed database from Bureau of National Health Insurance of Taiwan’s whole population were used to compute the total treatment costs and drug related costs on asthmatic outpatients during the year 1998 to 2002. Claims with ICD-9-CM code of asthma were obtained and then sorted per person to calculate the sum of treatment costs per person per year and the ratio of drug costs per total treatment costs. **RESULTS:** The following present the yearly data from 1998 to 2002: 1) mean drug costs per person per year: NTS.1286, 1486, 1873, 1940 and 2114; 2) mean of days per person per year: 26, 29, 36, 40 and 43 days; 3) total treatment costs of asthma : NTS. 4.3 billion, 2.9 billion, 2.4 billion, 2.5 billion and 2.7 billion; and 4) the ratio of drug costs/total costs: 54.92%, 56.48%, 58.15%, 58.52% and 58.84%. **CONCLUSIONS:** Drug therapy for patients with asthma play an important role in asthmatic care. In Taiwan, the study indicated that drug costs per person per year is growing every year. Future research will investigate the appropriateness of these drug therapy and possible drug savings in the future.

**PAS6**

**IMPACT OF ASTHMA KNOWLEDGE ON HEALTH OUTCOMES IN PEDIATRIC PATIENTS**

Suksomboon N, Montakantikul P
Mahidol University, Payathai, Bangkok, Thailand

**OBJECTIVE:** To determine whether asthma knowledge of caregivers could improve health outcomes in pediatric patients.

**METHODS:** The study design was a prospective randomized controlled trial in asthma patients aged less than 12 years-old. The study was carried out in asthma clinic at Queen Sirikit National Institute of Child Health, Bangkok, Thailand between August 2002 and March 2003. Eleven active and 11 control patients were invited to attend a clinic. At the clinic the pharmacists conducted interviews and asked all caregivers to answer a questionnaire containing 18 true-false questions regarding asthma knowledge. After completing the questionnaire, pharmacists provided knowledge of asthma regarding treatment and environmental care to caregivers in the intervention group. During the study period, patients in both groups continued to receive the usual care from their physicians. Patients and caregivers were followed up during the next six months and the same process was repeated. The outcome measure was the rate of hospitalization in asthma patient between groups. **RESULTS:** At baseline there are no significant differences in asthma knowledge between intervention and control group. At the end of study, the intervention group is generally better at answering the asthma questions correctly. The number of hospitalization in the intervention group decreases from 31 to 13 (p < 0.05), whereas there is no statistically significant difference in the control group. **CONCLUSIONS:** The present work suggests that pharmacist’s involvement in asthma clinic has increased caregivers’ knowledge leading to a decrease in the number of hospitalization. However, further training is required for caregivers to optimize their role in helping asthma patients. Further work could be carried out to determine whether the results of this study are reflective of the knowledge in adult patients.

**PAS7**

**DIRECT AND INDIRECT COST OF ASTHMA IN AN EMPLOYER POPULATION**

Atherly A, Nurmagambetov T, Williams S

Centers for Disease Control and Prevention, Atlanta, GA, USA

**OBJECTIVES:** The purpose of this abstract is to examine the direct and indirect costs associated with asthma in an employer population. This work improves on previous studies of employer populations with asthma by incorporating measures of the indi-
rect cost of asthma. METHODS: Data were drawn from the 2001 Medstat-Marketscan claims database. Medstat is a claims-based database with over five-million members, representing an employed population plus dependents. Individuals with asthma were defined as having at least two outpatient or one inpatient event with a primary diagnosis of asthma (ICD-9 code 493). Direct costs include expenditures for outpatient and inpatient services and prescription drugs. Indirect costs include time lost from work, short term disability and workers compensation.

RESULTS: The sample included 31,067 individuals with asthma and 385,883 individuals without. Persons with asthma were significantly more likely to have paid absence from work (16.5% vs. 5.2%), and when absences occur, they were 10.9% longer. Similarly, persons with asthma are more likely to receive disability payments (8.6% vs. 2.0%), although the mean payments are not statistically different. Persons with asthma are also more likely to receive workers compensation payments (5.1% vs. 1.3%) which are significantly more expensive ($7831 vs. $7073). Overall mean expenditures for inpatient and outpatient care were $311, the majority attributable to outpatient care ($207). Inpatient stays were relatively infrequent, although expensive when they occurred with a mean cost of $4736. CONCLUSION: Asthma is a high cost chronic illness in employer populations. Strategies to identify and manage high cost individuals may lead to cost savings. However, asthma is an illness where total indirect costs ($181) are an unusually higher percentage of the total cost of illness, so much of the economic burden of the illness is borne directly by employers. This suggests that employer based asthma programs may be appropriate.

A DYAD APPROACH TO QUALITY OF LIFE MEASUREMENT IN CHILDREN WITH ASTHMA
Mirabelli C, Cousins M, Boydell K, Unger WJ
The Hospital for Sick Children, Toronto, ON, Canada

OBJECTIVES: The assessment of health-related quality of life (HRQOL) is an essential component of evaluations of health status, physical functioning, response to treatment and disease progression. The measurement of HRQOL in children with asthma often relies on parents as proxy respondents. Yet, several studies have shown poor to moderate correlations between parent and child responses, questioning the validity of the parent proxy response. This pilot study tests a dyad approach, where parent and child are interviewed together. It was hypothesized that the dyad interview, by bringing parent and child perspectives together, would create a more detailed and accurate picture of HRQOL in children with asthma. METHODS: Children clinically diagnosed with asthma aged 8 to 15 and their primary caregivers were recruited from the Hospital for Sick Children Asthma Clinic. Sixteen parent and child dyads consented and were administered the Health Utilities Index Mark II & III (HUI II/III), the Pediatric Asthma Quality of Life Questionnaire (PAQLQ), and the Pediatric Quality of Life Inventory (PedsQL). A qualitative approach was used wherein parents and children were encouraged to discuss each question together. Interviews were audiotaped and transcripts were analyzed thematically. RESULTS: Consistent with Grounded Theory methodology, observations were indexed according to a priori and a posteriori categories and subcategories. Theoretical saturation was achieved. The data showed that parents were a valuable resource in overcoming problems associated with inaccurate recall, respondent bias, frustration, psychic discomfort, anxiety and comprehension. CONCLUSIONS: A dyad approach provided children with access to their parent as an important information resource, as an enabler and as an extension of the child’s cognitive skills. Pilot data suggested that the dyad is more likely to capture multi-factorial aspects of pediatric HRQOL than independent assessments of parent or child.

CHOOSING AMONG DIFFERENT TYPES OF MATCHING TECHNIQUES
Baser O
Medstat, Inc, Ann Arbor, MI, USA

OBJECTIVE: The diversity of procedure in pharmaceutical research requires a guideline to choose appropriate matching method. Coherent guidelines for practice are absent. In this paper we evaluate the several matching techniques and provide a guideline to choose the best. METHODS: We proposed the following ways to check for the balance: 1) Two sample t-statistic between the mean of the treatment group for each explanatory variables with the mean of these variables in the control group; 2) The mean difference as a percentage of the average standard deviations; 3) Percent reduction bias in means of explanatory variables after matching and initially; 4) Compare treatment and control density estimates for the explanatory variables; and 5) Compare the density estimates of the propensity scores of control units with that of the treated units. RESULTS: Medstat Market Scan data used to provide empirical examples. We examined 2 to 1 matching, nearest neighborhood matching (NNM) with replacement, NNM without replacement, MM matching (MM), MM with calibers, stratification method, kernel matching and radius matching. Comparing techniques according to the above criteria yield that 2 to 1 and NNM without replacement provides the worst balance. The difference between the control and treatment variables was significant. To choose among the rest, we estimated the average treatment effect according to each matching procedures and calculated the deviation from the mean of estimated average treatment effect. MM with calibers where calibers is selected as a quarter of standard deviation of estimated propensity score provides least deviation, there this procedure was superior to the others. CONCLUSION: Sensitivity analysis of the matching techniques is especially important since none of the proposed methods in literature is a priori superior to the others. The joint consideration offers a way to assess the robustness of the estimates.

CARDIOVASCULAR DISEASE—Angina/Ischemia

COMPARISON OF ALTERNATIVE STRATEGIES FOR THE DIAGNOSIS OF ACUTE CARDIAC ISCHEMIA IN EMERGENCY DEPARTMENTS: STANDARD OF CARE VERSUS BMIPP
Wu EQ1, Birnbaum H1, Cremieux P1, Carpenter S1, Borisy N1, Babich JW2, Senik G2
1Analysis Group, Inc, Boston, MA, USA; 2Molecular Insight Pharmaceuticals, Cambridge, MA, USA; 1Mt Auburn Hospital, Cambridge, MA, USA

OBJECTIVES: This study compared diagnostic accuracy, time spent in the emergency department/ chest pain observation unit (“ED/CPU”), medical costs, and litigation risk of alternative diagnostic strategies for acute cardiac ischemia (ACI) in ED/CPU. Rest single photon emission computed tomography (SPECT) with an innovative cardiac imaging agent, BMIPP, was compared to pre-admission standard of care in ED/CPU. METHODS: A decision tree model was constructed for alternative diagnostic strategies based on comprehensive literature review and expert panel input. Pre-admission standard of care is a complex scheme involving enzyme tests, ECG, X-ray, and SPECT with other common cardiac imaging agents. Model para-