

patients switching from older drug, Oxicam to new drugs, Coxibs. Deterministic model will help the hospital administrator understand pattern of drug use and its effect of financial management; however, clinical outcome should be included for further analysis.

#### NEUROLOGICAL DISORDERS – Clinical Outcomes Studies

##### OUTCOME OF PHARMACIST INTERVENTION IN EDUCATION OF PATIENTS ON DUPLICATE PRESCRIBING HYPNOTIC-SEDATIVES

Chu LL<sup>1</sup>, Lin HC<sup>1</sup>, Huang HY<sup>1</sup>, Chan AL<sup>2</sup>

<sup>1</sup>Chimei Medical Center, Tainan, Taiwan; <sup>2</sup>Chi Mei Medical Center, Tainan, Taiwan

**OBJECTIVES:** The inappropriate uses of hypnotic-sedatives will likely cause drug abuse. It has been known that patients visit different hospitals back and forth to get a duplicate prescription of hypnotic-sedatives. The purpose of this study is to explore the decrease of refill frequency of prescribing sedative-hypnotics and drug cost. **METHODS:** This is a cohort study. Adult patients, who were prescribed two or more than two sedative-hypnotics with same pharmacological mechanism over a week by different physicians, will be retrieved from the claim database of a medical center in southern Taiwan. The retrieved patients were received a questionnaire to evaluate their knowledge about the appropriate use of hypnotic-sedatives before clinical pharmacists provided patients with education for appropriate use of hypnotic-sedatives. The primary outcome was the reduction of total consumption on hypnotic-sedatives and drug cost before and after pharmacist education. **RESULTS:** A total of 100 patients were included in this study. The results showed that about 62.8% of patients with duplicate use of hypnotic-sedatives were female and 59.1% of patients aged  $\geq 50$  years. Their chief complains was insomnia and/or anxiety which cannot be relieved by taking only one hypnotic-sedatives. The most frequently prescribed drugs in their duplicate prescription were zolpidem (30.45%), Fludiazepam (22.34%), Alprazolam (14.9%), Flunitrazepam (8.45%), and Brotizolam (7.93%). The average total consumption on hypnotic-sedatives per day for each patient was decreased from 1.68 to 1.33 tablets. The monthly hypnotic-sedatives costs were reduced from NT\$ 21,000 to NT\$ 15,600. **CONCLUSIONS:** Pharmacist education on the appropriate use of hypnotic-sedatives and lifestyle management is likely to reduce the total consumption on hypnotic-sedatives and save drug costs.

PND1

##### WARFARIN-ASSOCIATED INTRACRANIAL HEMORRHAGE

Yang SC, Lin HL, Chan AL

Chi Mei Medical Center, Tainan, Taiwan

**OBJECTIVES:** To explore the possibility of international normalized ratio (INR), drug-warfarin interactions exaggerated intracerebral hemorrhage. **METHODS:** This is an observational study. Patients who had diagnoses of intracranial hemorrhage (ICH, ICD-9-CM codes 430, 431, 432.0, 432.1, 432.9) from January 2004 to December 2009 were retrieved from the claim database of a medical center in southern Taiwan. We reviewed medical records to identify the possible relationship with suspected risk factors, drug-warfarin interactions and ICH. Patients who were not taking warfarin at the time of hemorrhage and traumatic ICH were excluded. Potential drug interactions were defined according to online drug interaction database of Lexi-Interact<sup>TM</sup>. Data were analyzed by multivariate logistic modeling. **RESULTS:** During the study period, 24 patients were defined as ICH while patients were receiving warfarin. Forty-five percent of patients had an INR value  $>3.0$  at admission to hospital and 25% were exceeded 5.0. The potential drug-warfarin interaction were antiplatelets (41.6%), allopurinol (16.6%), amiodarone (8.3%), NSAID (16.6%), others (16.6%), which may increase the bleeding risk. Five patients of 24 patients were died within 2 weeks. No correlation between the fatal cases and their gender, age, INR value, smoking, alcohol and comorbid diseases was founded. **CONCLUSIONS:** Although no correlation between drug-warfarin interaction, INR and ICH was found in this study, physicians should still need to inform patients, who are taking warfarin, to concern the potential interactions between herbs and over-the-counter medicines.

PND2

#### NEUROLOGICAL DISORDERS – Cost Studies

##### A RAPID REVIEW OF ECONOMIC EVALUATIONS OF DONEPEZIL, RIVASTIGMINE, GALANTAMINE AND MEMANTINE FOR ALZHEIMER'S DISEASE (AD)

Feng J, Huang R, Pwee K

Ministry of Health, Singapore

**OBJECTIVES:** To review the cost-effectiveness of cholinesterase inhibitors (ChEIs; donepezil, galantamine and rivastigmine) and memantine for treating patients with AD. This review aims to inform policymakers in Singapore on the published cost-effectiveness studies of these drug therapies. **METHODS:** Electronic databases (EMBASE, MEDLINE, NHS EED) were searched from inception to February 2010 for published economic evaluation studies. Additional references were identified through searching bibliographies of included studies and related publications. Review papers of economic evaluations either on individual drugs or more of these drugs were considered. An outline assessment of economic evaluations was undertaken using

PND3

Drummond's checklist. **RESULTS:** A systematic search of the literature identified 32 economic evaluations (2 of all three ChEIs, 11 of donepezil, 5 of rivastigmine, 7 of galantamine, and 7 of memantine). All studies used clinical trial data from single drug comparisons with placebo. Different approaches have been used to model disease progression for evaluating cost-effectiveness of each drug, making comparison between drugs more difficult. Caro et al. (2003) and Green et al. (2005) considered the three ChEIs using a common analytical framework. Most of the studies reported that drugs provided health benefits and cost savings over time, suggesting that their use was cost-effective. However, Green et al. (2005) concluded that treatment with ChEIs may not be cost effective from the UK NHS's perspective. **CONCLUSIONS:** The majority of economic evaluations of ChEIs and memantine reported that these treatments were the dominant strategies compared with no treatment. However, conclusions from the reviews of economic analyses were mixed, and the authors commented that the findings from economic analyses of these four drugs should be interpreted with caution due to the assumptions and methodology used. Comparison between studies is difficult due to difference in study types, geographic locations, perspectives and different assumptions within the models.

#### RESPIRATORY-RELATED DISORDERS – Clinical Outcomes Studies

##### RISK OF SERIOUS ASTHMA EXACERBATIONS ASSOCIATED WITH LONG-ACTING-BETA-AGONISTS AMONG MEDICAID PATIENTS WITH ASTHMA: A RETROSPECTIVE COHORT STUDY

Guo JJ<sup>1</sup>, Tsai K<sup>2</sup>, Kelton CM<sup>3</sup>, Bian B<sup>1</sup>, Wigle P<sup>1</sup>

<sup>1</sup>University of Cincinnati, Cincinnati, OH, USA; <sup>2</sup>Novartis Pharmaceutical Company, East Hanover, NJ, USA; <sup>3</sup>University of Cincinnati College of Business, Cincinnati, OH, USA

**OBJECTIVES:** Concerns have been raised that the use of long-acting-beta-agonists (LABAs) may be associated with an increased risk of serious exacerbations (SAEs). We proposed to examine the association between LABAs and SAEs among patients with asthma in a large Medicaid population. **METHODS:** A total of 1,117,850 patients with asthma were selected for this study using a multi-state Medicaid claims database. The study period was January 1, 2002 to December 31, 2007. SAEs included any primary asthma diagnosis for either hospitalization, emergency room visits, or intubation. Major asthma medications included in the analysis were inhaled corticosteroids (ICS), LABAs, ICS/LABA combinations, short-acting-beta-agonists, leukotriene modifiers, and methylxanthines. Asthma severity levels were defined by patient's treatment regimens based on the national asthma guideline. Cox proportional hazard regression was conducted to assess the risk of SAEs associated with the use of LABAs, ICS/LABA combinations, and other covariates. **RESULTS:** Based on the first 6 months of wash-out period, we identified 550,392 patients with newly diagnosed and 567,458 patients with preexisting asthma. A total of 197,283 (35.8%) newly diagnosed and 242,207 (42.7%) preexisting patients had at least one SAE during the study period. After controlling for covariates, the risk of SAEs was relatively low among newly diagnosed patients taking salmeterol (hazard ratio [HR] = 0.93, 95% confidence intervals [CI] 0.89–0.97), formoterol (HR = 0.88, 0.83–0.94), and ICS/LABA combination (HR = 0.88, 0.87–0.90). Meanwhile, the risk of SAEs was mixed among pre-existing asthmatic patients taking salmeterol (HR = 1.03, 1.01–1.04), formoterol (HR = 0.94, 0.90–0.97), and ICS/LABA combination (HR = 1.01, 1.00–1.02). Other key risk factors ( $P < 0.0001$ ) were associated with African-American, severe or moderate asthma, use of oral steroids, alcohol or substance disorder, depressive disorder, pregnant women, obesity, and upper respiratory tract infection. **CONCLUSIONS:** The risk of SAEs should be considered when treating patients with asthma, especially for patients with key comorbidities as well as African-American patients and pregnant women.

PRSI

PR54

##### ASSESSMENT OF KNOWLEDGE ABOUT TUBERCULOSIS AMONG TB PATIENTS IN NORTH EAST LIBYA

Solliman M<sup>1</sup>, Ahmad Hassali MA<sup>1</sup>, Al-Haddad M<sup>1</sup>, Hadidin M<sup>2</sup>

<sup>1</sup>Universiti Sains Malaysia, Penang, Penang, Malaysia, <sup>2</sup>Alfath Medical Sciences University, Tripoli, Libya

**OBJECTIVES:** To evaluate the knowledge toward the etiology and treatment of Tuberculosis (TB) among TB patients in North Eastern Libya. **METHODS:** Face to face interview with all TB Patients in 2009 was conducted at Kuwaifa and Shahat Chest Hospitals in North Eastern Libya. Questionnaire included questions related to the knowledge about transmission, diagnosis; risk factors, treatment and prevention of TB. A total of 140 patients participated in this study. Knowledge scores ranged from zero (minimum score) to 23 (maximum score). All data was analyzed using SPSS version 15.00. Inferential statistics were used as whenever appropriate.  $P$ -value of less than 0.05 was considered significant. **RESULTS:** Majority of the respondents were Libyans ( $n = 92, 65.7\%$ ). Fifty-five (39.3%) of the respondents were males, and up to 90 subjects (64.3%) were urban residents. Almost all of the respondents have heard about TB. Nearly ( $n = 70, 50.0\%$ ) shared a thought that the main source of their knowledge regarding TB were health workers, followed by television ( $n = 63, 45.0\%$ ), and family members ( $n = 34, 24.3\%$ ). Libyans have significantly better knowledge ( $12.26 \pm 3.33$ ) than non Libyans ( $7.85 \pm 4.83, t = 30.12, P < 0.001$ ). In addition those respondents with tertiary educations scored significantly higher knowledge score ( $15.7 \pm 4.2$ ) compared to those of intermediate ( $15.3 \pm 3.8$ ) and illiterate ( $9.4 \pm 3.5$ ), [ $F = 30.12, P =$

0.001]. Moreover, respondents from urban areas were found to have better knowledge ( $12.06 \pm 3.82$ ) than rural residents ( $8.38 \pm 4.92$ ,  $t = 20.0$ ), ( $P < 0.001$ ). While, in term of level of income those with high income ( $12.37 \pm 3.79$ ) have significantly better knowledge than low income ( $8.00 \pm 4.85$ ), [ $F = 5.5$ ,  $P < 0.001$ ]. **CONCLUSIONS:** The level of knowledge about TB among TB patients was a low. Therefore, there is a need for massive health education campaign to be undertaken by policymakers in order to improve TB patients' knowledge toward TB.

**PR55****EVALUATING SAFETY OUTCOMES OF LONG-ACTING BETA AGONISTS (LABAS) IN PATIENTS WITH ASTHMA**

Bian B<sup>1</sup>, Guo J<sup>1</sup>, Kelton CM<sup>2</sup>, Wigle P<sup>1</sup>

<sup>1</sup>University of Cincinnati, Cincinnati, OH, USA, <sup>2</sup>University of Cincinnati College of Business, Cincinnati, OH, USA

**OBJECTIVES:** The use of long-acting beta agonists (LABAs) has raised safety concerns, especially the potential for severe asthma exacerbations (SAEs). The purpose of this review was to review the published safety outcomes researches about LABA therapy and compare disease epidemiologic trends. **METHODS:** A systematic literature review was conducted with the specific focus on safety outcomes research from clinical trials, meta-analyses, and post-marketing studies. Patients with asthma were reviewed and compared between races, and between age groups. SAEs were defined as either asthma-related death, hospitalization or emergency room visits. Seven major studies were identified and reviewed. Annual mortality rate and SAE trends for asthmatic patients and subgroup of African American patients were compared. **RESULTS:** The prevalence of asthma increased from 5% in 1992 to 7.8% in 2006, while mortality rate decreased from 1.7 per 100,000 in 1999 to 1.2 per 100,000 in 2006. Multiple clinical trial data showed that LABA monotherapy may be associated with increased risk of asthma exacerbation or asthma related death. On the other hand, meta-analyses showed that the use of LABA with ICS may be associated with positive outcomes including symptoms reduction, quality of life improvement, reduced rate of exacerbations and severe exacerbation. Due to the limited data, the relationship between LABAs and an increased risk of severe asthma exacerbation is unclear, especially in pediatric and African American patients. Due to safety concerns, the US FDA made several label changes to warn the public about LABA therapy and has requested more assessments of LABA use in asthma patients. **CONCLUSIONS:** The safety outcomes of the use of LABAs for the asthma treatment remain controversial. More well-design research is required to assess the risk of SAEs related to LABA therapy in different populations.

**RESPIRATORY-RELATED DISORDERS – Cost Studies****BURDEN OF SMOKING RELATED MAJOR DISEASES IN INDIA: ESTIMATION OF DIRECT OUT-OF-POCKET COST**

Kochhar P<sup>1</sup>, Arora M<sup>2</sup>, Menon S<sup>1</sup>, Selvaraj S<sup>2</sup>

<sup>1</sup>Pfizer India, Mumbai, India, <sup>2</sup>PHFI, New Delhi, India

**OBJECTIVES:** To estimate the direct out-of-pocket medical costs of treating major diseases attributable to smoking in India. **METHODS:** Indian data on burden of smoking related illnesses was compiled on lines of the BENESCO (Benefits of smoking cessation on outcomes) model by secondary analysis of existing datasets from census and National Sample Survey (NSS), 2004. The prevalence of smoking (cigarettes and bidis) was estimated by adjusting census projected population data with smoking rate found in the National Family & Health Survey-3 (NFHS-3), 2005-2006. Data on age and gender-wise disease prevalence and unit cost of treatment of diseases was obtained from NSS. A prevalence-based, disease-specific approach was used to estimate the direct medical costs of treating cancer and other tumors, bronchial asthma, tuberculosis, respiratory diseases, hypertension and coronary heart disease attributable to smoking. **RESULTS:** Analysis of data from NFHS-3 estimated that there were 98.2 million male and 4 million female smokers in India between 15 to 49 years of age. A total of 1.1 million hospitalizations and 90.5 million outpatient visits for 6 major diseases among adults were attributed to smoking annually. The total annual direct out-of-pocket medical cost for treating 6 major diseases was found to be Indian National Rupees 198 billion (US\$ 4.4b). The total cost attributable to smoking was estimated to be INR 46 billion (US\$ 1b) (i.e., 23% of the total); INR 33.8 billion (US\$ 761m) for outpatient care and INR 12.3 billion (US\$ 276m) for inpatient care. The total annual smoking attributable cost of treatment was highest for heart disease at INR 14.5 billion (US\$ 327m) followed by bronchial asthma INR 8.8 billion (US\$ 199m) and hypertension INR 8.6 billion (US\$ 195m). **CONCLUSIONS:** The smoking epidemic in India is a major preventable public health problem. The direct out-of-pocket medical costs of treating major diseases attributable to smoking are high.

**PR56****THE EFFECT OF UNCONTROLLED ASTHMA ON HEALTH-RELATED QUALITY OF LIFE AND RESOURCE USE IN JAPAN AND THE UNITED STATES**

DiBonaventura MD<sup>1</sup>, Arakawa I<sup>2</sup>, Fukuda T<sup>3</sup>, Nagae T<sup>4</sup>, Wagner JS<sup>1</sup>, Stankus A<sup>5</sup>

<sup>1</sup>Kantar Health, New York, NY, USA; <sup>2</sup>GlaxoSmithKline K.K., Tokyo, Japan; <sup>3</sup>Tokyo University, Tokyo, Japan; <sup>4</sup>York Pharma KK, Tokyo, Japan; <sup>5</sup>Kantar Health, Princeton, NJ, USA

**OBJECTIVES:** The aim of the current study was to determine the burden of illness associated with uncontrolled asthma in both the United States and Japan. **METHODS:** Data were obtained from the 2009 US and 2008 Japan National Health and Wellness

Surveys (NHWS), cross-sectional Internet-based surveys of adults. Only patients who were diagnosed with asthma were included in the analyses. Using the Asthma Control Test (ACT), each asthma patient was categorized as having controlled or uncontrolled asthma and these groups were compared on health-related quality of life (mental component summary (MCS) and physical component summary (PCS) scores of the SF-12v2), the number of emergency room (ER) visits, and the number of hospitalizations controlling for demographics (country, age, gender, ethnicity, income, education) and patient characteristics (BMI and Charlson comorbidity index) in multiple regression and generalized linear models. **RESULTS:** In Japan, 648 patients (3.2%) were diagnosed with asthma while 6481 patients (8.5%) were diagnosed with asthma in the United States. Even after adjusting for demographics and patient characteristics, those with uncontrolled asthma reported significantly lower levels of MCS scores ( $M_{adj} = 42.5$  vs.  $45.9$ ,  $P < 0.0001$ ). However, not only were PCS scores significantly lower among uncontrolled asthma patients ( $M_{adj} = 41.7$  vs.  $47.4$ ,  $P < 0.0001$ ), but the differences between controlled and uncontrolled patients was significantly greater in the United States ( $b = 4.4$ ,  $P < 0.0001$ ). The number of hospitalizations ( $M_{adj} = 0.61$  vs.  $0.23$ ,  $P < 0.0001$ ) and ER visits ( $M_{adj} = 0.51$  vs.  $0.24$ ,  $P < 0.0001$ ) were both significantly higher for those with uncontrolled asthma. The effect on ER visits was significantly stronger in the United States than in Japan ( $b = 8.2$ ,  $P < 0.01$ ). **CONCLUSIONS:** Although the prevalence of asthma in the United States and uncontrolled asthma was greater than that of Japan, uncontrolled asthma patients in both countries exhibited a significantly worse health outcome profile.

**PR59****DRUG UTILIZATION EVALUATION OF COMBINED INHALER THERAPIES AMONG PATIENTS WITH AIRWAY DISEASES IN A 2000-BED MEDICAL CENTER IN TAIWAN**

Lin HW<sup>1</sup>, Yu IW<sup>2</sup>, Cheng WE<sup>2</sup>

<sup>1</sup>China Medical University, Taichung, Taiwan; <sup>2</sup>China Medical University Hospital, Taichung, Taiwan

**OBJECTIVES:** Appropriate use of combined inhalation therapies for airway disease patients is likely to reduce the undesirable health utilization, improve patients' health-related quality of life, smooth the decline of pulmonary function and prevent the mortality. A secondary data analysis was performed to describe the utilization of two types of combined inhaler therapies among the patients diagnosed with airway diseases for quality improvement of medical care. **METHODS:** The claimed administration data with visits using two types of combined inhalers (four various dosages and dosage forms of Seretide and one Symbicort turbulaler) and the corresponding visits' diseases and demographic information from the 2000-bed medical center affiliated to a medical university in Taiwan were retrieved and analyzed. There were up to five diagnoses listed in the data set. The descriptive analysis was performed to examine the trends of different types of combined inhalers being prescribed for patients diagnosed with corresponding airway diseases (i.e., ICD9: 491, 492, 493, 494, 496, 518) in the year of 2009. **RESULTS:** Of 2495 patients being prescribed with the combined inhaler therapies (accounted for 9273 total visits), male was dominated (57.7% vs. 42.3%), average age was 56.7 ( $\pm 22.1$ ) year-old and more than 80% were prescribed by the pulmonary physicians. Less than 2% had experience of switching inhalers within 1 year. Only 55.4% were prescribed with coded airway diseases (asthma and COPD accounted for 25.2% and 21.96%, respectively). Further, 50.6% of them were prescribed with inhalers once or twice within 1 year. These prescribing patterns might encounter the "drug choice problems." **CONCLUSIONS:** The prescribing patterns of combined inhaler therapies seem problematic in this health setting and need to be examined persistently and periodically. To ensure appropriate usages of these inhalers, it is necessary to further study the contributing factors and to investigate the possible resolutions to improve the quality of medical care.

**RESPIRATORY-RELATED DISORDERS – Health Care Use & Policy Studies****PR510****RACE AND ETHNICITY IN EMERGENCY ROOM AND NON-URGENT CARE VISITS AMONG LATINO CHILDREN SUFFERING FROM ASTHMA**

Chang J<sup>1</sup>, Patel I<sup>1</sup>, Ortega A<sup>2</sup>, Park YS<sup>1</sup>, Balkrishnan R<sup>1</sup>

<sup>1</sup>University of Michigan, Ann Arbor, MI, USA; <sup>2</sup>University of California, Los Angeles, CA, USA

**OBJECTIVES:** To identify differences in health-care utilization by race and Latino ethnicity among children with asthma and determine the relative contribution of predisposing, enabling, and unobserved factors in explaining these differences. **METHODS:** The California Health Interview Survey (CHIS) is a non-institutionalized household survey of California residents conducted bi-annually since 2001. Cross-sectional survey data were analyzed to identify differences by race and Latino ethnicity among children with asthma. After adjustment for sample weights and design effects, over 400,000 samples in the 2007 CHIS were calculated for children with asthma. Disparities in health-care utilization across all race/ethnicity categories were analyzed using multivariate logistic regression and negative binomial regression analysis. **RESULTS:** Mexican children with asthma are over 100% more likely to have an emergency room (ER) visit in the previous year ( $P < 0.04$ ) and 58% less likely to have a doctor visit ( $P < 0.049$ ) compared to White children with asthma after controlling for confounding variables. Among ethnicity groups, Latino ethnicity is 72% more likely to have an ER visit in the previous year and 38% less likely to have a doctor visit compared to non-Latino ethnicity. Negative binomial regression results show that