

found in their countries of origin. A longer stay in the host country or being a child of immigrant parents is associated with increasing adaption to the new environment, and therefore the prevalence of asthma and allergies over time converge with the prevalence in the non-immigrant host population. Comparisons between populations in their countries of origin and those that emigrated vary depending on their level of development; more developed countries show higher rates of asthma and allergies. **CONCLUSIONS:** Preliminary findings suggest a strong influence of the environment on the development of asthma and allergies. The prevalence of asthma is generally higher in second generation immigrants. With length of stay the prevalence of asthma and allergies increases steadily. Further analysis should assess homogeneity across studies and obtain pooled risk estimates of migration status as a risk factor for asthma and allergies.

PRS16

PREDICTORS OF CIGARETTES SMOKING AMONG ADULTS IN FIVE COUNTRIES: CHINA, JORDAN, INDIA, TAIWAN, AND SAUDI ARABIA

Abughosh S¹, Wu JH¹, Wang X¹, Essien EJ¹, Peters RJ², Almogbel YS¹, Sangsiry SS¹

¹University of Houston, Houston, TX, USA, ²University of Texas Health Science Center at Houston, Houston, TX, USA

OBJECTIVES: Tobacco use remains the leading preventable cause of premature death worldwide. Survey-based smoking related data has been collected from China, Jordan, India, Taiwan, and Saudi Arabia between 2009-2012. Predictors of smoking within each country have been identified and recently published. The objective was to identify and compare smoking predictors that remain significant across countries after combining the data from various countries into one dataset. **METHODS:** Survey questions included socio-demographic characteristics, history of tobacco smoking, and environmental determinants of smoking like family and peer tobacco use. Multivariate logistic regression was constructed to determine predictors of smoking in the past month vs. no smoking. **RESULTS:** A total of 3,658 adults participated in the survey. Forty four percent of the participants had smoked cigarettes in the past month. Females were less likely to smoke (OR=0.30, 95% CI=0.22-0.42), whereas adults older than 25 (OR=1.63, 95% CI=1.16-2.29) or working/studying in medical related field (OR=2.08, 95% CI=1.10-3.95) were more likely to smoke. Compared to China participants, those from India, Saudi Arabia, Taiwan were less likely to smoke (OR=0.13, 95% CI=0.06-0.27 for India, OR=0.005, 95% CI=<.001-0.07 for Saudi Arabia, and OR=0.04, 95% CI=0.002-0.94 for Taiwan) while no significant differences were observed with Jordan participants. Teachers' anti-smoking messages significantly decreased the likelihood of smoking (OR=0.35, 95% CI=0.13-0.90). Social network, on the other hand, significantly increased the likelihood of smoking, especially among siblings (OR=1.70, 95% CI=1.25-2.31) and close friends (OR=1.96, 95% CI=1.34-2.86). Other variables associated with smoking included experiences with dyspepsia, education level, grades, personal feelings in previous week, and other substance use experiences (alcohol/cigar/chewing tobacco). **CONCLUSIONS:** The high smoking prevalence observed documents the magnitude of problem across these five countries. Future research should aim to incorporate the predictors identified above to develop effective interventions.

PRS17

LONG-ACTING MUSCARINIC ANTAGONISTS (LAMA) IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): A RARE EVENTS META ANALYSIS OF CLINICALLY RELEVANT ADVERSE EVENTS

Dranitsaris G¹, Schmitz S², Adunlin G³, Lindner L⁴, Rea R⁵

¹Augmentium Pharma Consulting, Toronto, ON, Canada, ²St. James's Hospital, Dublin, Ireland, ³Florida A&M University, Tallahassee, FL, USA, ⁴Almirall S.A., Barcelona, Spain, ⁵Almirall Canada Limited, Mississauga, ON, Canada

OBJECTIVES: Clinical trials have demonstrated that daily LAMA therapy in patients with COPD can improve lung function and quality of life. When LAMAs are clinically indicated, the three oral agents currently available include tiotropium bromide (TIOB), glycopyrronium (GLYCO) and most recently aclidinium bromide (ACLB). Placebo controlled trials have demonstrated efficacy, but safety data from head to head comparative trials are limited. In the absence of such data, mixed treatment comparison (MTC) models are a widely accepted statistical method of generating comparative safety information on clinically relevant but rare adverse events. In this study, an indirect comparison on safety was undertaken between TIOB, GLYCO and ACLB. **METHODS:** A systematic literature review of major English language databases was conducted from January 1992 to December 2013 for randomized placebo controlled trials evaluating at least one of the three agents in COPD. Bayesian MTC models were fitted to assess comparative safety based on major adverse cardiovascular events (MACE), acute urinary retention (AUR), glaucoma and all-cause mortality. Outcomes were adjusted for treatment duration and presented as a relative risk (RR) against ACLB. **RESULTS:** A total of 20 randomized trials met the inclusion criteria. Insufficient trial data were reported to allow an evaluation of AUR and glaucoma. There were no significant differences in the risk of MACE between TIOB vs. ACLB (RR=1.11; 95%CrI: 0.14 to 11.5) as well as GLYCO vs. ACLB (RR=3.5; 95%CrI: 0.34 to 52.7). Similarly, there were no significant differences in the risk of all-cause mortality between TIOB (1.11; 95%CrI: 0.16 to 7.7) and GLYCO (0.84; 95%CrI: 0.08 to 8.3) relative to ACLB. However, the magnitude of the RR for MACE suggests the potential for an increased risk with GLYCO when used as an alternative to ACLB. **CONCLUSIONS:** The risk of MACE and all-cause mortality with ACLB is comparable to both TIOB and GLYCO in patients with COPD.

PRS18

EVALUATION OF PHARMACY QUALITY ALLIANCE (PQA) MEASURES AMONG MEDICAID BENEFICIARIES WITH PERSISTENT ASTHMA

Datar M, Null KD, Banahan BF

University of Mississippi, University, MS, USA

OBJECTIVES: The 'suboptimal asthma control' (SAC) and the 'absence of controller therapy' (ACT) measures endorsed by the Pharmacy Quality Alliance evaluate inappropriate medication taking behavior in patients with asthma. The purpose of this

study was to evaluate these PQA measures and assess predictors of qualifying into these measures among Medicaid beneficiaries from 39 states in the US. **METHODS:** Medicaid beneficiaries from 39 US states aged 5 to 59 years were identified in calendar year 2008. Of these, beneficiaries who filled one or more prescriptions for COPD medications, dornase alfa, or nasal steroid medications were excluded from the analysis. Beneficiaries with at least three canisters of short-acting beta agonists within 90 days were identified as those with SAC. Of the beneficiaries with SAC, those who did not receive asthma controller therapy in the same 90 day period were identified as those with ACT. Predictors of SAC and ACT were identified in 2007. **RESULTS:** A total of 77,783 asthma patients were identified in 2008. On an average, the proportion of patients with SAC and ACT in each state was 36.51% and 54.15% respectively. Higher age (OR:1.023; CI:1.022-1.024), male gender (OR:1.205; CI:1.180-1.230), Caucasian (OR:0.889; CI:0.873-0.906) and African American race (OR:0.799; CI:0.772-0.826), greater number of hospital visits (OR:1.034; CI:1.025-1.042), and greater number of asthma-related office visits (OR:1.194; CI:1.185-1.204) were significant predictors of SAC. Lower age (OR:0.996; CI:0.995-0.998), male gender (OR:1.121; CI:1.085-1.159), Caucasian (OR:1.279; CI:1.241-1.319) and African American race (OR:1.067; CI:1.009-1.128), greater number of emergency room visits (OR:1.021; CI:1.017-1.026), and lower number of asthma-related office visits (OR:0.696; CI:0.686-0.706) were significantly associated with ACT. **CONCLUSIONS:** Patient demographics and resource utilization in the previous year are significant predictors of SAC and ACT. Prescribers and payers should use these to identify patients with persistent asthma most likely to misuse SABA and who need more appropriate use of asthma controller therapy.

RESPIRATORY-RELATED DISORDERS – Cost Studies

PRS19

IMPROVING ADHERENCE TO SEASONAL ALLERGIC RHINITIS (SAR) PRACTICE GUIDELINES: BUDGET IMPACT ANALYSIS FOR AN INTRANASAL FORMULATION OF AZELASTINE HYDROCHLORIDE AND FLUTICASONE PROPIONATE FOR UNITED STATES HEALTH PLANS

Harrow B¹, Hofmeister J¹, Gever LN¹, Lacey MJ², Scheibling CM³, Schneider JE³

¹Meda Pharmaceuticals, Inc., Somerset, NJ, USA, ²JML3 Group, Auburndale, MA, USA, ³Avalon Health Economics, Morristown, NJ, USA

OBJECTIVES: Allergic rhinitis (AR) affects 10-20% of the US population, with treatment costs exceeding \$6 billion annually. US practice guidelines suggest treatment with a combination of intranasal corticosteroids and antihistamines. MP29-02 is intranasal formulation of azelastine hydrochloride and fluticasone propionate in an advanced delivery system indicated for the relief of symptoms of seasonal AR (SAR). Patients treated with MP29-02 experience significantly greater symptom relief in comparison to first-line therapy in trials. **OBJECTIVE:** To use an economic model to calculate the per-member per-month (PMPM) budget impact on a US health insurer of moving MP29-02 from third-tier to second-tier pricing and reimbursement. **METHODS:** Population is SAR sufferers seeking treatment. MP29-02 is assumed to gain market share annually with second-tier pricing. Time horizon is one year and five years. Perspective is a US health plan with 500,000 enrollees. BIA is a pharmacy cost impact model using data from literature and supplied by Meda. Model assumes 10% branded drug price inflation; 80% brand to generic share shift and 50% price reduction; tiered payer rebate percentages and patient copay amounts. **RESULTS:** Estimated treated SAR population ranged from 63,165 at baseline to 68,630 in Year 5. Branded share of fluticasone-based products declined from 17% to 7%. Overall SAR treatment budget declined from \$3.2 million annually at baseline to \$3.1 million in Year 5 reflecting expected shift from branded to generic market share. According to baseline assumptions, marginal change in costs over the one-year time horizon from moving MP29-02 from third-tier to second-tier pricing are \$19,659 (<\$0.01 PMPM). Costs associated with the 5-year horizon, given changes in market shares, are \$97,342 (\$0.01 PMPM). **CONCLUSIONS:** MP29-02 offers an appropriate means of adhering to AR practice guidelines and improving outcomes, and this BIA model shows that the added costs of those benefits are minimal to US payers.

PRS20

THE SHORT-TERM ECONOMIC IMPACT OF CHILDHOOD PREVENTIVE HEALTH PROGRAMS IN MEXICO

Jurado Hernandez VH¹, Sanchez-Casillas JL², Vo P³, Laws AJ⁴, Gooch KL³, Kendall RM⁴

¹Mexico, ²AbbVie Farmacéuticos, S.A. de C.V., Mexico, ³AbbVie, North Chicago, IL, USA, ⁴Oxford Outcomes, Vancouver, BC, Canada

OBJECTIVES: Respiratory syncytial virus (RSV) is a primary cause of lower respiratory tract infection in infants and children and leads to substantial morbidity. Palivizumab is a monoclonal antibody demonstrated to significantly reduce the frequency of hospitalizations for RSV infection in high-risk populations, including preterm infants and children with bronchopulmonary dysplasia and congenital heart disease. National costs of implementing a childhood prophylaxis program have not been well characterized. The objective was to compare the financial impact of implementing a RSV prevention program in high-risk infants using palivizumab, to three established childhood prophylaxis programs in Mexico: 13-valent pneumococcal conjugate vaccine (PCV13); quadrivalent human papillomavirus (HPV) vaccine; and *Bordetella pertussis* (*B. pertussis*) vaccine. **METHODS:** A model was developed to estimate the one-year budget impact of palivizumab for the prevention of severe RSV infection in high-risk populations in Mexico, from the national health care perspective. Model inputs were derived following a literature review on the health care system, and included the epidemiology of severe RSV infection in Mexico and Latin America, with appropriate Mexican resource utilization and cost estimates. **RESULTS:** The cost of prophylaxis with palivizumab was approximately MXN\$283 million. The corresponding costs for PCV13, HPV vaccine, and *B. pertussis* vaccine were estimated at MXN\$1.1 billion; MXN\$579 million; and MXN\$636 million, respectively. Total disease cost estimates were MXN\$878 million for RSV

infection, MXN\$123 million for pneumococcal diseases, MXN\$199 million for HPV, and MXN\$258 million for *B. pertussis*. Cost offsets in Year 1 after adoption of the immunization program totaled MXN\$23 million for RSV infection, MXN\$38 million for pneumococcal diseases, MXN\$133 million for HPV, and MXN\$206 million for *B. pertussis*. **CONCLUSIONS:** This model suggests that targeting RSV prophylaxis to high-risk populations can lead to substantial cost offsets, which are consistent with or improve on the budget impact of other preventive health programs for childhood diseases in Mexico.

PRS21

HEALTH CARE RESOURCE UTILIZATION AND REHOSPITALIZATION COSTS OF NEBULIZED ARFORMOTEROL FOR THE TREATMENT OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Bollu V¹, Carlton R², Clark RS³

¹Sunovion Pharmaceuticals Inc., Marlborough, MA, USA, ²Xcenda, LLC, Palm Harbor, FL, USA, ³Xcenda, Palm Harbor, FL, USA

OBJECTIVES: Arformoterol tartrate inhalation solution (arformoterol) is a long-acting beta₂ agonist indicated for long-term maintenance treatment of bronchoconstriction in patients with chronic obstructive pulmonary disease (COPD). Nebulized albuterol (albuterol) is a short acting beta-agonist indicated as rescue medication for acute COPD exacerbations, but often patients receive it in place of maintenance treatment. This analysis estimated total medical, pharmacy and rehospitalization costs for nebulized arformoterol compared with albuterol nebulized solution for the management of COPD in hospitalized patients. **METHODS:** An economic model was built comparing health care resource utilization and rehospitalization costs for arformoterol and albuterol from the hospital perspective. Pharmacy costs were calculated on a cost per hospital stay basis and were determined by the number of doses, frequency of administration, and hospital length of stay (LOS). Pharmacy costs were based on publically available wholesale acquisition costs. Medical costs included COPD exacerbation hospitalization costs, rehospitalization costs, and respiratory therapy costs. Cost of COPD-related inpatient hospitalizations were calculated as the cost per day times the mean LOS. Rehospitalization costs were calculated using rehospitalization rates at 30, 90, and 180 days. Respiratory therapy costs were based on the number of daily sessions for administration and the hourly rate of respiratory therapy. **RESULTS:** Mean LOS was 4.4 days for arformoterol vs. 5.2 days for albuterol. Arformoterol had lower rates of rehospitalization at 30, 90 and 180 days post-discharge, respectively (8.7% vs. 11.9%, 15.4% vs. 26.8% and 31.7% vs. 38.2%). Total medical and pharmacy costs per treated patient for arformoterol were \$6,953 vs. \$8,456 for albuterol, resulting in a savings of \$1,503 per patient. Arformoterol yielded net savings of \$338, \$1,025, and \$847 over albuterol in rehospitalization cost per treated patient at 30, 90 and 180 days, respectively. **CONCLUSIONS:** Total costs of arformoterol were less than albuterol nebulized solution due to lower hospitalization and rehospitalization costs.

PRS22

ECONOMIC BURDEN ASSOCIATED TO TOBACCO IN THE BRAZILIAN POPULATION

Ferreira CN, Rufino CS, Manfrim DF

Pfizer, Inc., São Paulo, Brazil

OBJECTIVES: To estimate the economic burden of lost productivity and health care resource use associated to tobacco in the Brazilian population among smoking and non-smoking/ex-smoking employees. **METHODS:** A structured search was performed on MEDLINE database (via PubMed) using the Mesh Database terms in accordance with the following terms ("Costs and Cost Analysis" [Mesh] AND ("Smoking" [Mesh]) AND ("absenteeism" [Mesh]) AND ("presenteeism" [Mesh])), as well as the cost of absence days due to health events retrieved from national labor legislations; and average wage was retrieved from the Brazilian Institute for Geography and Statistics (IBGE) 2.013. **RESULTS:** The disease costs related to tobacco are Cardiovascular disease (CVD) BRL 27,845.32; stroke BRL 20,591.24; Chronic obstructive pulmonary disease (COPD) BRL 21,328.59; pneumonia BRL 1,111.82; lung cancer BRL 67,225.83; other cancers BRL 85,524.46. When comparing the productivity and absence days, the smokers lose 62.1% more days than nonsmokers and 41.34% than ex-smokers, which corresponds to BRL 1,326.62 in terms of annual monetary average cost. Additionally, it was found that the life expectancy of male smokers corresponds to 75.30 years; for females, it already was 79.77 years. That means a loss of 5.03 and 4.5 years, respectively, when compared to the expected useful lives of the nonsmoking population. **CONCLUSIONS:** Therefore, smoking employees can cost, on unproductive days, almost 3 times more than non-smokers and 2 times more than ex-smokers, besides the cost related to the treatment of stroke, COPD and CVD, and others.

PRS23

ECONOMIC IMPACT OF ALBERTA'S PCV7 CHILDHOOD IMMUNIZATION PROGRAM (2003-2008)

Waye A¹, Chuck A¹, Jacobs P¹, Tyrrell G², Kellner J³

¹Institute of Health Economics, Edmonton, AB, Canada, ²University of Alberta, Edmonton, AB, Canada, ³University of Calgary, Calgary, AB, Canada

OBJECTIVES: Acute respiratory tract infections caused by *Streptococcus pneumoniae* (SP) are a leading cause of morbidity and mortality in young children and the elderly. In 2002, Alberta introduced a pneumococcal universal immunization program for children, using Prevnar 7 (PCV7). In this study, we assess the economic impact of PCV7 on the Alberta health care system. **METHODS:** Using active surveillance data from Alberta, we examine the net costs averted as a result of a decline in PCV7 serotypes, accounting for the increase in costs due to serotype replacement. We also calculate the magnitude of herd immunity in terms of costs averted. **RESULTS:** We find that following the introduction of PCV7 (2003-2008), the number of cases of invasive disease caused by vaccine serotypes declined significantly across all ages. Specifically, by 2008, there was considerable evidence of herd immunity as the incidence rates had declined nearly 100% across all ages. However, non-PCV7 cases, on the other hand, increased. Assuming serotype replacement is a result of

the introduction of PCV7, net costs averted are in the range of \$5 million as a result of the implementation of PCV7 universal vaccination in Alberta. Over the time period, direct protection resulted in net cost savings of \$2.6 million, and indirect benefits \$2.4 million; the indirect benefits derived by elderly populations were more than one third of the total benefits derived across the population. **CONCLUSIONS:** This study is unique in that it uses validated surveillance data from Alberta to retrospectively assess the economic benefit of a public health policy, and describes the distribution of benefits across different segments of the population. From 2003 to 2008, the cumulative cost impact of introducing PCV7 in the childhood immunization program to the Alberta health system is approximately \$5 million, half of which were a result of herd immunity.

PRS24

COST COMPARISONS WHEN PATIENTS ARE CENSORED

Roberts M¹, Borrego M², Mapel D¹, Raisch DW², Georgopoulos LL², van der Goes D³

¹LCF Research, Albuquerque, NM, USA, ²University of New Mexico College of Pharmacy, Albuquerque, NM, USA, ³University of New Mexico, Albuquerque, NM, USA

OBJECTIVES: In pharmaceutical comparative effectiveness studies, patients frequently discontinue drug treatments soon after initiation, potentially biasing estimated costs attributed to treatments. A partitioned data structure may facilitate estimating costs in the presence of censoring. We compared health care utilization costs for two chronic obstructive pulmonary disease (COPD) treatments over a one-year period using intent-to-treat (ITT) and as protocol (AP) approaches. **METHODS:** Claims data from two managed care health plans from July 2004 through September 2013 was used to compare annual health care costs for COPD patients treated with 1) inhaled corticosteroid (ICS)/long-acting beta-agonist (LABA) or long-acting muscarinic antagonist (LAMA) (non-triple) therapy, or 2) concurrent ICS/LABA+LAMA (triple) therapy. Post-treatment costs were aggregated by 4-week periods. Costs were estimated for ITT and AP treatment groups, using actual and weighted cost methods. Patients were censored for health plan disenrollment (possible after 6 months post-index). In the AP analysis, patients were additionally censored for discontinuation of treatment. Weights were the inverse probability of remaining uncensored. **RESULTS:** Study subjects numbered 5,475; 484 triple, 4,991 non-triple. Few patients disenrolled (n=139) by one-year post-index. ITT cost estimates were similar for actual and weighted cost methods. ITT actual mean total costs were significantly higher for triple therapy patients (P=0.01): \$20,013 (standard deviation [SD], \$12,865) for triple, and \$18,468 (SD, \$11,619) for non-triple. Censoring was heavy in the AP analysis. Probability for remaining uncensored during the 13th four-week period was 28.5% for triple patients and 22% for non-triple patients. AP actual mean total costs were considerably lower than ITT costs: \$12,586 (SD, \$9,991) for triple therapy, \$8,688 (SD, \$7,896) for ICS/LABA or LAMA. AP weighted mean total costs were \$19,133 for triple therapy and \$16,814 for non-triple. **CONCLUSIONS:** The weighted method allowed censored individuals to contribute cost information. AP analysis costs were lower than ITT costs, highlighting the impact of therapy discontinuation on analyses.

PRS25

HOSPITALIZATION COST OF INPATIENTS WITH COPD AND THEIR COMPLICATION STUDY IN CHINA

Du F¹, Zhang J², Ding H¹, Ye J¹, Gao S³

¹Beijing Brainpower Pharma Consulting Co. Ltd., Beijing, China, ²China Health Insurance Research Association, Beijing, China, ³Beijing Brainpower Pharma Consulting Co. Ltd, Beijing, China

OBJECTIVES: The prevalence of COPD is higher and increases every year in China. To estimate hospital inpatient costs, LOS and complication among patients with osteoporosis fractures in China. **METHODS:** Data were extracted by the discharge diagnosis of COPD from the China Health Insurance Research Association claim database which includes a nationwide, cross-sectional sampling of inpatients' visits in 2011. Several complications were chosen from reference to our objective complication, the inpatients' visits with these complication were chosen by their diagnosis and drug used because the records were not integrity. The descriptive analysis of LOS, total medical costs and other parameters were calculated. Continuous variables were examined by student's t test for we showed all results with mean value and standard deviation. The statistical software was SPSS. **RESULTS:** The analysis included 8667 hospitalizations (Male: 62.71%, Age: 72.08±74 years). Overall LOS and costs were 16.17±25.70 days and 7949.59±11782.33 RMB. Sample of hospitalization with complication of heart failure was most (2503), followed by atrial fibrillation (AF), diabetes mellitus (DM), hypertension, osteoporosis, ischemic heart disease(IHD). While, patients with osteoporosis had the most hospitalization cost (17352.85±29584.08 RMB), followed by IHD (17140.08±25472.15 RMB), anxiety-depression (16399.81±22671.54 RMB), DM (13709.27±22288.66 RMB) and hypertension (13564.59±20725.80 RMB). For hospitalization cost, Men's was more than women's (8366.42±11034.93 vs. 7248.65±12913.71 RMB p<0.05), employee's was more than residents' (9126.86±13026.41 vs. 4887.81±6753.29 RMB p<0.001), inpatients' (age over than 80) was the most (9697.75±12238.17, RMB p<0.001), east's was the most (10853.62±14751.43 RMB p<0.001), prefecture-level city's was the most (8039.55±14584.93 RMB 0.05<p<0.1). **CONCLUSIONS:** Heart failure was a common complication among COPD patients, and osteoporosis increased the hospitalization cost for COPD patients which might be for the surgery. Hospitalization cost varied significantly among different patients and area, expect different level of city. The relationship between cost and complication should be studied further in future.

PRS26

SYSTEMATIC REVIEW OF ECONOMIC BURDEN IN SYMPTOMATIC CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS

Srivastava K¹, Thakur D¹, Sharma S¹, Puneekar YS²

¹HERON Health Pvt. Ltd., Chandigarh, India, ²GlaxoSmithKline, Uxbridge, UK

OBJECTIVES: To systematically assess the global economic burden associated with symptomatic COPD. **METHODS:** A systematic search of Embase®, MEDLINE®, EconLit® and LILACS® was conducted for last 10 years along with search of conference proceedings for last 3 years. Non-randomised trials and observational stud-