

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

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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

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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)

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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

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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

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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

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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-

ies involving symptomatic patients defined as modified Medical Research Council (mMRC) score ≥ 2 or COPD assessment test (CAT) score ≥ 10 or presenting common symptoms of COPD were included. Studies focussed on cost of illness and resource use in adult symptomatic COPD patients were included. Studies meeting the eligibility criteria were appraised using Drummond checklist. **RESULTS:** Database searches yielded 4491 references which resulted in 74 relevant studies after two levels of screening. All the included studies were of adequate reporting quality with study objective and competing alternatives being defined clearly. The annual direct per patient costs of COPD ranged from US\$522 in France to US\$4119 in the United States. Physician consultations were the most frequently utilised resource, followed by ER visits and hospitalisations. The composition of direct costs differed between countries, with more than 50% of the direct costs resulting due to inpatient admissions in Canada, Italy, Spain, the UK, and the United States and almost 50% due to regular prescribed medicines in The Netherlands. The mean annual societal costs ranged from US\$1023 in The Netherlands to US\$5646 in the United States. The annual societal costs per patient were higher in patients with severe COPD, higher levels of dyspnoea and symptoms, frequent exacerbations, comorbid conditions, low educational status and former smokers. Economic burden of lost productivity was the highest in the US and the lowest in Italy. Lost productivity accounted for 67% of the total cost of COPD in France. **CONCLUSIONS:** The management of symptomatic COPD is associated with a substantial economic burden, especially in the developed nations of Europe and North America.

PRS27

OUTPATIENT DIRECT COST OF COPD IN A THIRD LEVEL HOSPITAL: PATIENT PERSPECTIVE

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OBJECTIVES: Chronic Obstructive Pulmonary Disease (COPD) is a main worldwide cause of morbidity and mortality. COPD elderly patients spend a large amount of money; elderly population is rapidly increasing due to population aging. COPD prevalence in 40 years or older people is 7.8% in Mexico City. However, there is no information about out-of-pocket expenses of COPD patients in Mexico. The objective is to estimate direct costs of COPD from patient perspective in a third level hospital in Mexico. **METHODS:** A pool was developed from August to November of 2013 in a third level hospital. We included outpatients and inpatients that had been already diagnosed and newly diagnosed with COPD. The diagnosis was carried out by a pulmonologist according to GOLD criteria. We collected information about direct and indirect costs of the patients and the hospital. We estimate median (p25, p75) annual cost of medical consultation, clinical test, travel, gasoline and food from outpatients and stratifying by severity. All costs were transformed in US Dollars of 2103. **RESULTS:** We interviewed 242 outpatients. According to GOLD criteria the patients were classified as: mild (n=18), moderate (n=105), severe (n=80) and very severe (n=39). Median of age was 71.7 years, 141 (58.3%) were men and 133 (54.9%) had social security. Annual total costs for mild, moderate, severe and very severe were \$64.5, \$99.9, \$130.7 and \$138.4, respectively. Median costs from mild to very severe were: medical consultation (\$23.1, \$27.7); Clinical test (\$11.6, \$48.4); travel (\$2.2, \$33.8); gasoline (\$6.9, \$13.9) and food (\$0, \$18.4). **CONCLUSIONS:** According to total cost, severity is positively correlated with the amount of out-of-pocket expenses. The main sources of expenses were medical consultations and clinical test.

PRS28

COST OF ASTHMA IN VIETNAM

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OBJECTIVES: Nowadays, health care costs of asthma are under pressure in all countries due to high prevalence, incidence and the chronic nature of disease. Therefore, conducting cost analysis of economic burden of asthma is necessary, especially in Vietnam. This is also the aim of this study. **METHODS:** The average cost of asthma has been evaluated using pharmacoeconomic method "cost of illness" by following formula: COI = DC + IC in which: COI - cost of illness, DC - direct cost, IC - indirect cost. A tree-decision model has been developed to evaluate the cost of asthma by different classification of the severity of asthma. Based on the perspective of insurance companies only direct medical costs were evaluated in this study. List of medical services and drugs were derived from Guidelines for the diagnosis and management of asthma in Vietnam. The price of drugs and medical services have been averaged from the price-list of some major hospitals in Vietnam. The cost of disease for the whole society of Vietnam has been evaluated based on the cost of disease and the number of patients in Vietnam in 2013. **RESULTS:** The average direct medical cost of asthma has increased by the increasing of asthma severity with 3,410,278; 6,548,156; 8,829,234; 10,746,280 VND in the intermittent, mild, moderate and severe rate of disease severity. In the structure of direct cost, with the increasing of asthma severity the percentage of costs for drugs increases and the one for medical services reduces. The average direct cost of asthma for the whole society of Vietnam resulted in nearly 16,585 billion VND per year. **CONCLUSIONS:** The cost of asthma management increases following the increasing of disease severity. The high economic burden of asthma (16,585 billion VND) should be considered to conduct the relevant health care policies.

PRS29

ASSESSING THE HEALTH CARE BURDEN OF ASTHMA PATIENTS IN THE UNITED STATES MEDICARE POPULATION

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OBJECTIVES: To assess the economic burden and health care utilizations of asthma patients in the U.S. Medicare population. **METHODS:** A retrospective analysis was conducted using national Medicare data (01JAN2008-31DEC2010). All Medicare beneficiaries diagnosed with asthma were identified using International Classification of

Disease, 9th Revision, Clinical Modification (ICD-9-CM) code 493.xx. The first asthma diagnosis date was designated as the index date. Patients were required to have 12 months continuous enrollment pre- and post-index date. Comorbid conditions were examined for the baseline period. Study outcomes including treatment patterns within 60 days after the index date, health care utilization and costs in the Medicare research identifiable file during the follow-up period were measured. **RESULTS:** A total of 63,012 patients were identified for study, of which the majority was White (84.7%), male (68.2%) and resided in the Southern U.S. region (38.3%). The mean age of patients was 76 years. The Charlson Comorbidity Index score was 2.39, and common comorbidities included chronic obstructive pulmonary disease (42.9%), diabetes (33.2%) and tumor (30.2%). Patients were more often prescribed albuterol sulfate (19.1%), hydrocodone bitartrate/acetaminophen (14.4%) and furosemide (13.1%). Health care utilizations included Medicare carrier use (99.0%), Durable Medical Equipment (DME, 51.7%), Home Health Agency (HHA, 22.3%), outpatient visits (81.6%) and inpatient (40.8%), Skilled Nursing Facility (SNF, 12.6%) and hospice admissions (5.0%) and prescription drug (part D event) claims (57.3%). Patient expenditures were calculated at \$5,431 for Carrier, \$726 for DME, \$1,401 for HHA, \$15,211 for outpatient, \$9,162 for inpatient, \$2,354 for SNF, \$464 for hospice, \$2,192 for pharmacy and \$36,941 for total costs. **CONCLUSIONS:** U.S. Medicare patients diagnosed with asthma were more often prescribed albuterol sulfate, experienced a high percentage of Medicare carrier service use and outpatient visits, as well as frequent comorbidities, which translated into high total health care expenses as evidenced by this study.

PRS30

CLINICAL AND ECONOMIC BURDEN OF ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN THE UK: IMPACT OF CRITICAL INHALER ERRORS WITH INHALED CORTICOSTEROID + LONG-ACTING BETA AGONIST FIXED-DOSE COMBINATIONS

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OBJECTIVES: Global clinical guidelines recommend fixed-dose combinations (FDCs) of inhaled corticosteroids (ICS) and long-acting beta agonists (LABA), delivered via an inhaler, as a treatment for moderate to severe persistent asthma and chronic obstructive pulmonary disease (COPD). Poor inhalation technique—measured as the occurrence of critical inhaler errors—is common with existing inhalers, and may contribute to the economic burden of disease management by increasing health care resource use. We have developed an economic model to evaluate the clinical and economic burden of asthma and COPD in the UK, and assess the impact of poor inhalation technique with ICS + LABA FDCs on costs and resource use. **METHODS:** The eligible adult patient population was based on current confirmed asthma and COPD diagnosis rates in the UK, with the proportion of patients receiving FDCs based on available market research data. Costs of inhalers, scheduled care and unscheduled health care events were taken from publicly available sources in the UK. Frequency of poor inhalation technique—measured through the occurrence of critical inhaler errors—and the associated increased risk of unscheduled health care events were taken from a large (n = 1,664) cross-sectional, observational study in Italy. **RESULTS:** The model estimated that 1.3 million adults with persistent asthma and COPD receive an ICS + LABA FDC in the UK, annually; of which, 366,000 demonstrate poor inhalation technique. Total direct costs were estimated to be £875 million, with costs of unscheduled health care events accounting for £137 million. Poor inhalation technique with ICS + LABA FDCs was estimated to be responsible for 11.8% of unscheduled health care costs, equating to £16.2 million annually. **CONCLUSIONS:** The clinical and economic burden associated with poor inhalation technique in asthma and COPD is considerable in the UK. Novel inhalers, which improve inhalation technique, may offer clinical and economic benefits in the management of asthma and COPD.

PRS31

WITHDRAWN