OBJECTIVES: To estimate the annual average per patient cost for diagnosing and treating chronic hepatitis B (CHB) and its complications in three large metropolitan cities in India. **METHODS:** Health resources consumed during the diagnosis and treatment of CHB and its complications were estimated by administering a structured survey to a total of 30 participating physicians from 3 cities (8 hepatologist/gastroenterologist and 2 oncologist treating hepatocellular carcinoma patients per city). Equal number of physicians from private and central government health scheme hospitals (CGHS) participated in the survey. Cost for laboratory tests, imaging, procedures, hospital admissions, physician visits, and drugs received on an inpatient and outpatient basis were estimated using rates provided by private setting centres and CGHS approved rates in the 3 cities. Mean, median, standard deviation, and frequency were used to analyze data. **RESULTS:** Total annual average cost for treating CHB, compensated cirrhosis, decompensated cirrhosis, and hepatocellular carcinoma (HCC) were INR 79,768 (USD 1,269), INR 53,223 (USD 846), INR 3,99,316 (USD 6,355), and INR 5,069,12 (USD 8,067) in a private hospital and INR 49,796 (USD 792), INR 33,976 (USD 538), INR 2,73,564 (USD 4,353), and INR 358,071 (USD 5,698) in a CGHS hospital, respectively. The added inpatient cost of undergoing liver transplant for eligible HCC patients was on an average INR 25,00,000 (USD 39,783). **CONCLUSIONS:** Findings from our study provide an initial understanding of the magnitude of direct medical cost burden that CHB and its complications impose on patients in India. The results highlight the increasing health-care cost related to disease progression which can be potentially reduced by effective prevention strategies, early treatment, and patient education to improve adherence to treatment. Future efforts should focus on conducting large observational studies using patient level data and develop models to support uptake of cost-effective strategies to manage the burden of CHB in India.

PIN36

THE HEALTH AND MEDICAL CARE COSTS FOR HOSPITALIZED ALL-CAUSE PNEUMONIA AMONG CHILDREN <2 YEARS, PRE AND POSTTHE INTRODUCTION OF PREVENAR13 IN SWEDEN

Berglund A[1], Nyman L[2], Dorange A[2]
[1]*Biogen AB, Upplands Vasby, Sweden,* [2]*Pfizer, Sollentuna, Sweden*

OBJECTIVES: The aim of this study was to estimate health and medical care costs for hospitalized pneumonia among children <2 years of age, pre- and post the introduction of Prevenar13 (PCV13) in Sweden. **METHODS:** The incidence of inpatient all-cause pneumonia (ICD-10 J12-J18) by County Council among children <2 years old between 1998 and 2013 was identified using the Swedish National Inpatient Register. The average incidence of pneumonia was calculated among County Councils that were utilizing PCV13 in two periods; the pre PCV period (during 1998-2006) and the post PCV 13 period (during 2011-2013). In a subsequent step, the average incidence per 100 000 by calendar period was multiplied with the expected costs of inpatient pneumonia (34 524 SEK, 3 712 €) **RESULTS:** The mean rates of all-cause pneumonia hospitalizations per 100,000 person years were higher in the pre-PCV13 era compared to after the introduction of PCV13 in Sweden (pre-PCV13; 596.4 and post-PCV13; 455.7 per 100,000 person years, respectively). A difference of almost 5 million SEK (538 000€), in health and medical care costs per 100,000 person years was observed during the pre and post introduction of PCV13 among County Councils that were utilizing PCV13 between 2011 and 2013. **CONCLUSIONS:** Among children < 2 years old, all-cause pneumonia hospitalizations were reduced after introduction of PCV13 vaccination in Sweden. A reduction in the incidence of pneumonia also reduced the health and medical care costs.

PIN37

HEALTH-ECONOMIC EVALUATION OF CLOSTRIDIUM DIFFICILE INFECTION (CDI) AND EPIDEMIOLOGY IN ENGLAND AND MERSEYSIDE

Nakamura CA[1], Roberts P[2], Beadsworth M[2], O'Brien S[1], Pirmohamed M[1], Hughes D[3], Miyajima F[1]
[1]*University of Liverpool, Liverpool, UK,* [2]*Royal Liverpool and Broadgreen Univeristy Hospitals Trust, Liverpool, UK,* [3]*Bangor University, Bangor, UK*

OBJECTIVES: The aim of this study was (1) to assess the epidemiologic profile of CDI in England and Merseyside in the last decade and (2) to estimate the costs associated with CDI episodes through successive seasons (2008-2012) in a large hospital setting (Royal Liverpool & Broadgreen University Hospitals). **METHODS:** (1) National figures for incidence and CDI-associated deaths were obtained from the Office for National Statistics and the Public Health England. (2) Clinical and epidemiological information was obtained from 397 consecutive CDI and antibiotic-associated diarrhoea (AAD) patients assessed by medical staff and recruited by a prospective study. Costs were obtained through the determination of hospital stay and the most relevant Healthcare-Resource-Group (HRG) recorded for the disease period until their discharge/death. Generalised linear models with gamma distribution were employed for the multivariate analysis. **RESULTS:** A CDI epidemic season was evident between 2005 and 2010, reaching its peak during the 2007/2008 season following by an endemic phase (2011/2012 onwards). Between 2009-2013 when national figures became available, Northern and Western regions displayed the highest incidence and death rates. Within Merseyside, Liverpool had the highest incidence of all. Significantly higher incidence rates of CDI were generally correlated with index-of-multiple-deprivation (IMD), which was particularly higher in Merseyside than the national average. Mean costs for cases were significantly higher (£14,424.07) than controls (£3467.25). Pre-test costs and low Albumin levels were statistically significant predictor of CDI costs. **CONCLUSIONS:** CDI was indeed associated with increased overall hospitalisation costs. However, the extent to which CDI per se prolongs hospitalisation remains an objective as comorbidities and underlying conditions (denoted by pre-test costs) were the strongest predictors. Further work is being conducted to disentangle the impact of other significant contributing factors, and the use of HRGs will be compared to Patient-Level-Information-and-Costs-System (PLICS) using a replication set of patients.

PIN38

ASSESSMENT OF DIRECT COST FOR TREATMENT OF INFLUENZA AND ARI FOR OUTPATIENT IN UKRAINE

Leleka M, Zalis'ka O
Danylo Halytsky Lviv National Medical University, Lviv, Ukraine

OBJECTIVES: According to World Health Organization, influenza and acute respiratory infections (ARI) affect more than 30% of the population each year. In Ukraine the burden of costs for medicines are mainly paid by patients out of pocket. **METHODS:** We analyzed the statistics of the Ministry of Health of Ukraine, the incidence of influenza and ARI, the Protocol for diagnosis and treatment of novel influenza A (H1 / N1) (CA) in adults in Ukraine and used the pharmacoeconomic method «Cost of illness». **RESULTS:** We received that number of outpatients were in 2009-2010 (Nov- May, Pandemic) - 7,753,635 sick persons, 2010-2011 (Oct 2010 - Apr. 2011) - 7,502,008, 2011-2012 - 5,584,518, 2012-2013 – 6,200,000, 2013-2014 – 6,015,000, respectively. Based on these data, we found that in 2014 the number of cases decreased by almost 1, 5 million compared with 2010. Now we compared the direct costs on outpatient treatment in 2014 and 2010. The direct cost per patient of influenza and ARI in 2010 amounted to 80,39 UAH. We estimated the total costs were 60386423 UAH. Direct costs for outpatient costs consist of expenses for medicines and doctor's consultations. The direct cost per patient of influenza and ARI in 2014 totaled 221,07 UAH. Cost of Illness was 1329751087 UAH. This situation is connected with the rising prices of drugs through the exchange rate in Ukraine in 2014. Financing of medicines by 90% are of own patient funds. In Ukraine established the some groups which drugs are dispensed free of charge or concessional. They represent the range of 10% of all patients. **CONCLUSIONS:** High costs for treatment of influenza and ARI should reimburse by state and it's need the monitoring the incidence and to evaluate indirect costs.

PIN39

POTENTIAL HEALTH AND ECONOMIC IMPACT OF INTRODUCING A DENGUE VACCINE IN MALAYSIA: ASSESSMENT USING DYNAMIC TRANSMISSION MODELLING

Yeo HY[1], Shafie AA[1], Coudeville L[2], Steinberg LD[3], Gill BS[4], Jahis R[4]
[1]*Universiti Sains Malaysia, Penang, Malaysia,* [2]*Sanofi Pasteur, Lyon, France,* [3]*Sanofi Pasteur, Petaling Jaya, Malaysia,* [4]*Ministry of Health Malaysia, Wilayah Persekutuan Putrajaya, Malaysia*

OBJECTIVES: Malaysia is experiencing an escalation of dengue epidemic activity. The candidate vaccine currently at the most advanced stage of development has demonstrated its efficacy in two large scale efficacy studies. This study aims to estimate the potential health and economic impact of the vaccine in Malaysia under different vaccination strategies. **METHODS:** A dengue dynamic transmission mathematical model was employed to evaluate the impact of dengue vaccination program on the incidence, mortality and economic burden of the disease. The model was calibrated and validated with Malaysia specific epidemiological data and vaccine efficacy data from phase-III efficacy studies. The impact was evaluated over a 10-year period from provider perspective. Two vaccination strategies, targeted-hotspots (THS, covered population in 6 selected hotspot districts) and nationwide (NW, covered the whole Malaysian population), were simulated. Both strategies comprised of routinely vaccinated children aged 13 and a catch-up cohort from ages 14 to 30 who were vaccinated over a 1 year duration. Probabilistic and univariate sensitivity analyses on key parameters were conducted to examine uncertainty in the model. All costs were expressed in 2013 USD. **RESULTS:** The cost per dengue case from provider perspective was USD999.02. The model predicted that dengue vaccination under the THS strategy would prevent 448,124 [95%CI: 292,875; 632,375] dengue cases, 509 [95%CI: 335; 707] dengue-related deaths, 11,785 [95%CI: 7,888; 16,329] life years lost and 16,751 [95%CI: 11,128; 23,281] DALYs. Nationwide vaccination would prevent 1,060,222 [95%CI: 694,181; 1,490,929] dengue cases, 1,202 [95%CI: 797; 1,672] dengue-related deaths, 27,834 [95%CI: 18,756; 38,501] life years lost and 39,584 [95%CI: 26,464; 54,968] DALYs. The total dengue treatment cost saved for THS and NW vaccination strategy were USD163,859,846 [95%CI: 109,093,124; 235,805,776] and USD386,962,641 [95%CI: 257,410,189; 557,347,377] respectively. **CONCLUSIONS:** We conclude that dengue vaccination would significantly reduce the disease and economic burden in Malaysia, especially if it is introduced during current dengue epidemic.

PIN40

ECONOMIC ANALYSIS OF OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY (OPAT): A SYSTEMATIC REVIEW

Psaltikidis EM[1], Silva E[2], Bustorff-Silva JM[1], Moretti ML[3], Resende MR[3]
[1]*Clinical Hospital of State University of Campinas, Campinas, Brazil,* [2]*University of Brasilia, Brasilia, Brazil,* [3]*Faculty of Medical Sciences, State University of Campinas, Campinas, Brazil*

OBJECTIVES: Outpatient parenteral antimicrobial therapy (OPAT) is a strategic delivery modality of care however cost-analysis should support decision-making. This study was performed in order to analyze the economic studies related to OPAT **METHODS:** a systematic review was performed with the following search terms: outpatient (Population), anti-infective agents, infusion therapy or home care (Intervention), inpatient (Comparator), complications related to infection, cure, readmission, catheter infection, death (Outcome), and economic analysis (Study design). Publications were searched from health sciences databases (MEDLINE, Embase, The Cochrane Library, Lilacs, Bireme, Medscape, Trip database, Web of Science), health technology evaluation sites and gray literature (dissertation abstracts), independently of publication´s year or idiom. Three different reviewers evaluated the manuscripts in a systematic progressive process beginning from title followed by abstract and complete reading for quality of evidence. **RESULTS:** 655 publications were identified according to PICOS proposed. Of this, 9 studies developed in eight different countries, from 2001 to 2014, were included for analysis. OPAT regimen was based on infusion center at five (combined with home care in three) and home care exclusively in four studies. The perspective of cost analysis was of the hospital by seven sites, health care system in one, hospital combined to health care system in one and payer by the other one. The type of analysis was cost-consequence in

four, cost-effectiveness in two, cost benefit in one, cost-utility in one and general cost in one. All studies demonstrated satisfactory economic results comparing OPAT to inpatient care however fragile methodology was observed in the majority of study. **CONCLUSIONS:** in this review OPAT was a strategy that saved resources with favorable outcome in terms of related infection and complications.

PIN41

COST ANALYSIS OF THE CHRONIC HCV-RELATED CIRRHOSIS IN BULGARIA

Dimitrova M[1], Petrova G[2], Genov J[3], Pavlov K[3], Mitov K[2], Savova A[2]
[1]*Medical University-Sofia, Faculty of Pharmacy, Sofia, Bulgaria,* [2]*Medical University Sofia, Faculty of Pharmacy, Sofia, Bulgaria,* [3]*University Hospital "Queen Joanna-ISUL, Sofia, Bulgaria*

OBJECTIVES: HCV infection is a leading cause of chronic liver disease with long-term complications - extensive fibrosis, cirrhosis and hepatocellular carcinoma. The objective of this study is to perform analysis of the cost of therapy of patients with chronic HCV - related cirrhosis in Bulgaria. **METHODS:** It is a combined prospective and retrospective, real life observational study of 301 patients with chronic HCV infection and cirrhosis monitored in the University Hospital "Queen Joanna-ISUL" for 3-year period (2012-2014). Data on demographic, clinical characteristics and healthcare resources utilization (hospitalizations, highly-specialized interventions, pharmacotherapy) was collected. Micro-costing approach was applied to evaluate the total medical costs. The points of view are that of the National Health Insurance Fund (NHIF), hospital and the patients. Collected cost data are from the NHIF and hospitals tariffs, patients, and from the positive dug list for medicines prices. Statistical processing was through descriptive statistics and Chi-squared test. **RESULTS:** 76% of patients were male. 93% were diagnosed in grade A and B according to Child-Pugh classification. 97% reported complications, and almost all developed esophageal varices. 847 hospitalizations were recorded for 3 years period with average length of stay 17 days. The mortality rate of 7% was extremely high. The total direct medical costs for the observed cohort of patients for 3-year period accounted for 1,2 million BGN (0.6 million EURO) and average cost per patient per year is 1343 BGN (671 Euro). The proportion of cost paid by the NHIF is 2/3 to 1/3 for the hospital and the patients. A statistically significant correlation between the age, follow-up, number of hospitalizations and the Child-Pugh stage was found. **CONCLUSIONS:** HCV-related cirrhosis is resource demanding and implicit high direct medical costs as it is related with lots of hospitalizations and leads to complications acquiring additional treatment.

PIN42

THE COST OF TREATING RECURRENT CLOSTRIDIUM DIFFICILE INFECTION IN PATIENTS ATTENDING INFECTIOUS DISEASE CLINICS AT FOUR HOSPITALS IN SWEDEN

Jensen AV[1], Fraenkel CJ[2], Åkesson P[2], Noren T[3], Rundlöf Nygren P[4], Lennebratt D[4], Hagberg L[5]
[1]*MSD, Stockholm, Sweden,* [2]*Skåne University Hospital, Lund, Sweden,* [3]*Örebro University Hospital, Örebro, Sweden,* [4]*Uppsala University Hospital, Uppsala, Sweden,* [5]*Sahlgrenska University Hospital, Gothenburg, Sweden*

OBJECTIVES: The aim of this study is to investigate the cost of treating recurrent Clostridium difficile infection in patients attending infectious disease clinics at 4 hospitals in Sweden. **METHODS:** Following approval by the Central Ethical Review Board in Stockholm patient records of 120 patients were used to record the resources used to treat the latest recurrent infection. Recurrence was defined as a new toxin-positive Clostridium difficile infection within 12 weeks of the previous Clostridium difficile infection. The sample included 47 patients not hospitalized and 73 hospitalized patients. All resources used were itemized and a point estimate of the associated costs calculated using the average of two or more pricelists from county councils in Sweden. **RESULTS:** This study shows that the treatment costs at the four participating infectious disease clinics in Sweden for treating a single event of recurrent Clostridium difficile infection ranged from SEK 921 to SEK 278323. Median cost for non-hospitalized patients was SEK 5397 and for hospitalized patients SEK 68078. We found that the 10% of the patients with the highest resource use accounted for MSEK 2,38, or nearly 40% of the accumulated resource use of MSEK 6,25 used to treat the 120 studied patients. **CONCLUSIONS:** Significant costs are associated with treatment of recurrent Clostridium difficile infections, especially when hospitalization is needed. Minimizing the need for hospitalization during treatment is the single most important objective when minimizing the economic burden of recurrent Clostridium difficile infection.

PIN43

THE DEVIL IS NOT SO BLACK AS HE IS PAINTED – THE FUTURE OF IMMUNIZATION IN POLAND

Borowiack F[1], Garbacka M[1], Borowiack M[1], Zapalska A[1], Wepsiec K[2], Tronczynska D[2], Ksiazek A[2], Van Bellinghen L[3], Van Vlaenderen I[3], Schecroun N[4]
[1]*NUEVO HTA CLP, Cracow, Poland,* [2]*GSK Services Sp. z o. o., Warsaw, Poland,* [3]*CHESS in Health, Ternat, Belgium,* [4]*Keyrus Biopharma c/o GSK Vaccines, Wavre, Belgium*

OBJECTIVES: Considering the burden of meningococcal and pneumococcal disease in 0-5 years old children in Poland, we aimed at determining which vaccine(s) to prioritize for a Universal Mass Vaccination (UMV) program to reduce the burden by 15% at the lowest annual budget. **METHODS:** A Pediatric Expert Group on the Immunization Program in Poland defined pneumococcal vaccines as a priority based on epidemiological data (high frequency with growing antibiotic resistance) but the need for prevention against meningococcal disease was also highlighted. A vaccine portfolio management model was adapted to the Polish situation, considering pneumococcal and meningococcal (type B and C) vaccines. This optimization model determines the optimal combination of vaccines to achieve a targeted public health objective at the lowest annual vaccination budget. Disease incidences, treatment pathways, vaccine efficacies, and maximal achievable UMV coverages were derived from published sources and expert opinion. The public health goal was to reach a 15% reduction over 5 years in disease cases, hospital occupancy or deaths related to both pneumococcal and meningococcal disease combined. **RESULTS:** Using pneumococcal vaccine only enables to achieve the targeted 15% reduction in cases, hospital occupancy or deaths at annual coverage of respectively 76.9%, 81.0%, 57.1%, and at the lowest annual vaccination budget of respectively €26, €27 and €19 million. If meningococcal type B vaccine were prioritized in a UMV program, pneumococcal vaccine should still be added to achieve the public health objective. In such scenario, the annual vaccination budget would amount to €57, €59 and €48 million, at the maximum achievable coverage of 60% for meningococcal vaccine and pneumococcal coverage of 76.8%, 80.8% and 47.9%. **CONCLUSIONS:** Pneumococcal vaccine on its own can achieve the targeted 15% reduction in disease burden at the lowest vaccination budget. Vaccination against pneumococcal disease should therefore be prioritized in a UMV program in Poland.

PIN44

PHARMACOECONOMIC EVALUATION OF THE INTRODUCTION OF ROUTINE VARICELLA VACCINATION IN CHILDREN IN THE UNITED KINGDOM

Holl K[1], Hunjan M[2], Sauboin C[1]
[1]*GSK Vaccines, Wavre, Belgium,* [2]*GSK UK, Uxbridge, UK*

OBJECTIVES: Varicella is a common childhood disease caused by varicella-zoster virus (VZV). Annually it affects around 651,000 individuals with 42% consulting general practitioners and 0.5% being hospitalized with recent trend of increase in the United Kingdom (UK). This poses significant public health concern due to high infection rates and associated economic burden. In countries with routine varicella vaccination significant reduction in varicella burden was observed. This study assesses the cost-effectiveness of introducing varicella vaccination as an addition to the current childhood immunization schedule of mumps, measles and rubella (MMR) vaccine in the UK. **METHODS:** An age-structured dynamic transmission model was fitted to VZV seroprevalence in the non-vaccinated population in the UK. The model simulated the evolution of varicella and herpes zoster with and without vaccination with a lifetime horizon. The vaccination strategy considered coverage and age at dose 1 (90%;1year) and 2 (80%;3years), and catch up at 12 years with 20% coverage. Costs and effects are discounted at 3.5%. **RESULTS:** The Incremental Cost Effectiveness Ratio at 5 and 15 years post introduction of vaccination with high coverage were £6,012(95%CI:-370;13,221)/Quality-Adjusted Life-Year (QALY) and £6,431(95%CI:337;13,188)/QALY, respectively. There were significant savings for outpatient and hospitalization costs: £22,274,734 and £5,178,472 by year 5; £82,954,153 and £17,470,473 by year 15, respectively. Varicella cases avoided following 5 and 15 years post implementation of vaccination were 399,604 (57.7%) and 655,232 (94.8%), respectively. **CONCLUSIONS:** Implementing varicella vaccination in the UK will reduce the disease burden both in terms of varicella cases and associated costs, and is likely to be cost-effective. However, high vaccination coverage is required to achieve high impact of vaccination. Depending on the evolution of the UK vaccination schedule, vaccination with either monovalent varicella vaccine or combination MMR+Varicella vaccine could be a suitable option for implementation of varicella vaccination as part of a national immunization program.

PIN45

THE PUBLIC HEALTH IMPACT AND COST-EFFECTIVENESS OF PNEUMOCOCCAL CONJUGATE VACCINATION IN ESTONIA

Posiuniene I[1], Saar I[2], Van de Velde N[3]
[1]*GSK Nordic, Vilnius, Lithuania,* [2]*GSK Estonia, Tallinn, Estonia,* [3]*GSK Vaccines, Wavre, Belgium*

OBJECTIVES: Estonia is now considering adding a pneumococcal conjugate vaccine (PCV) in its national immunization program to help reduce the burden of invasive pneumococcal diseases, pneumonia and acute otitis media (AOM). In this cost-effectiveness analysis (CEA), we estimate the vaccine price under which vaccinating with the pneumococcal non-typeable Haemophilus influenzae protein D conjugate vaccine (PHiD-CV) is considered cost-effective compared to no vaccination. **METHODS:** A static cohort model (Knerer et al. 2012) has been adapted for Estonia using local serotype distribution, disease incidence and direct medical costs. Vaccine efficacy assumptions come from large PCV randomized controlled trials. Base case parameters have been validated by an expert panel and other scenarios were explored in extensive sensitivity analyses. CEA perspective is a modified healthcare payer (only including parents' sick leave costs). The cohort is vaccinated at 2, 4 and 12 months with 95% coverage and followed over a lifetime (5% annual discount). **RESULTS:** Under base case assumptions, vaccinating a cohort of 14,021 infants in Estonia with PHiD-CV would prevent 3927 AOM-related outpatient visits, 248 myringotomies, 93 cases of pneumonia, 8 cases of meningitis and 3 deaths over the cohort's lifetime. Total effectiveness results translate into 533 quality-adjusted life years (QALYs) gained and €706,242 saved in treatment costs (undiscounted). With a Gross Domestic Product (GDP) per capita of €14,860 in Estonia (2014), the program would then be considered highly cost-effective (discounted incremental cost-effectiveness ratio (ICER) < 1 GDP/capita) if the vaccine price is below €28.69/dose (€51.38 and €74.08/dose for 2 and 3 GDP/capita, respectively). Reducing base case net herd protection by half, discounting at 3% and accounting only for direct medical costs would result in highly cost-effective thresholds of €21.47, €56.20 and €25.63/dose, respectively. **CONCLUSIONS:** Our model predicts that PCV vaccination would be highly cost-effective under €28.69/dose and cost-effective until €74.08/dose in Estonia.

PIN46

COST-EFFECTIVENESS ANALYSIS OF HERPES ZOSTER VACCINATION IN HONG KONG

Lee C, You J
The Chinese University of Hong Kong, Shatin, Hong Kong

OBJECTIVES: Herpes zoster (HZ), caused by reactivation of varicella zoster virus, is characterized by dermatome-based rash and severe pain. Post-herpetic neuralgia may occur following HZ. The risk of HZ increases with older age and reduced immunity. HZ vaccine has been first approved for adults aged 60 years and