and treatment practices and predicted a substantial long-term benefit of prophylactic cervical cancer vaccination. The vaccine may be considered to be cost-effective under a number of assumptions and vaccination age groups.

**PIN18**

**COST-EFFECTIVENESS ANALYSIS OF OSELTAMIVIR FOR INFLUENZA IN JAPAN: MODELING IN THE VIRUS EMERGING RESISTANT TO THE DRUG**

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**OBJECTIVES:** Oseltamivir has been stockpiled for emerging threat by new influenza pandemic. Recent studies report somewhat possibility of the virus emerging resistant to oseltamivir. The purpose of this study is to evaluate the cost-effectiveness of oseltamivir for influenza in Japan with considering the complications and the emergence of oseltamivir-resistant virus. **METHODS:** A cost-effectiveness analysis was performed by decision tree using evidence from the Japanese clinical trial and the NICE, UK, systematic reviews. The decision tree models a patient presenting with influenza likely illness and facing the alternative treatments: rapid diagnostic testing followed by treatment with oseltamivir or a comparator which goes with conventional treatments. The decision tree visualized morbidity and mortality with complications such as ill states needed for antibiotics and hospitalization due to pneumonia. The analysis included assessment of not only direct medical costs but also productivity loss. Costs were derived from published literature and the statistics in DPC (Diagnosis Procedure Combination) system in Japan. **RESULTS:** Considering the productivity loss during influenza and complications, oseltamivir cost JPY150,703, and the comparator, JPY163,415 per QALY. When the prevalence was in the low range of 10% through 40%, the dominance of oseltamivir vanished. The incremental cost-effectiveness ratio (ICER) of oseltamivir versus comparator was JPY398,571 per QALY. Considering the productivity loss, however, the ICER for oseltamivir turned to be negative, simple dominant, JPY1,235,714 per QALY. Regarding the virus emerging resistant to the drug, we found the dominance of oseltamivir vanish if the emerging rate becomes more than 27%. Sensitivity analysis also suggested that the emerging rate of the drug-resistant virus was more sensitive in the influenza peri-season (prevalence: 40–60%). **CONCLUSION:** The use of oseltamivir for influenza was so far recommended as cost-effectiveness in Japan. However, the advantage of oseltamivir is affected by both the prevalence and emerging rate of the oseltamivir-resistant virus.

**PIN19**

**A COST-EFFECTIVENESS ANALYSIS OF A PROPHYLACTIC CERVICAL CANCER VACCINE IN GERMANY: RESULTS FROM A HEALTH ECONOMIC MODEL**

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**OBJECTIVES:** HPV vaccination is recommended in Germany for adolescent girls. The objective of this research was to estimate for Germany, the cost-effectiveness of a candidate prophylactic cervical cancer vaccine with potential cross-protection benefits. **METHODS:** A Markov model based upon the natural history of HPV and cervical cancer was developed to simulate transitions between health states: Normal, HPV, Cervical Intraepithelial Neoplasia (CIN), Cervical Cancer (CC) stages 1 to 4, and death. Using a lifetime simulation of 12-year old girls, the model was adapted for country-specific epidemiological data: age-specific HPV prevalence, HPV type distribution in cervical disease, prevalence of pre-cancerous lesions, and age-specific CC incidence and mortality. Country-specific screening practices and costs were used with a discount rate of 4% on costs, 1.5% on outcomes. Published efficacy rates were used for the candidate vaccine including a potential cross-protection benefit (i.e., additional efficacy against oncogenic HPV types 31 and 45). Sensitivity analyses were performed on costs, discount rates, efficacies, cross-protection, and age at vaccination. **RESULTS:** Reductions in CC and related deaths were predicted to be 81% (80% mortality) following vaccination of 12 year old girls. The corresponding cost per life-year gained ranged from €19,600 to €20,700 respectively, depending upon whether the analysis was conducted from a societal or health-care payer perspective. When considering quality of life benefits, the vaccine showed a cost per quality-adjusted life-year of €14,700 (societal) to €15,500 (payer). Results were most sensitive to assumptions about discount rates and age at vaccination. For cohorts of 18, and 25-year-old women, vaccination has estimated cost per QALYs of €16,100 and €18,800 (societal), and €15,300 and €18,000 (payer), respectively. **CONCLUSION:** Prophylactic vaccination against CC with a candidate HPV 16/18 vaccine is a cost-effective method of reducing precancerous cervical lesions, cervical cancer incidence and mortality in Germany.

**PIN20**

**COST EFFECTIVENESS ANALYSIS OF BRIVUDINE COMPARED WITH ACICLOVIR FOR THE TREATMENT OF HERPES ZOSTER IN SPAIN**

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**OBJECTIVES:** This study estimates the cost and the effectiveness of brivudine and aciclovir in the treatment of Herpes Zoster (HZ) in Spain focusing on the number of post herpetic neuralgia (PHN) avoided cases. **METHODS:** A cost-effectiveness decision model was built from clinical results obtained in the double-blind controlled trial that compared brivudine and aciclovir. The analytic model estimates the mean cost per patient treated with HZ and the mean cost per PHN avoided case. Time horizon of the study considered HZ acute treatment period (7 days) plus PHN treatment period (between 90 and 180 days). This decision model also considers the incidence rate of HZ in Spain for patients older than 50 years, clinical drug effectiveness, HZ and the mean cost per PHN avoided case. Time horizon of the study considered HZ acute treatment period (7 days) plus PHN treatment period (between 90 and 180 days). This decision model also considers the incidence rate of HZ in Spain for patients older than 50 years, clinical drug effectiveness, HZ and PHN direct medical costs and three PHN treatments options (tramadol, gabapentine and pregabaline). **RESULTS:** It has been estimated that 109,982 patients with HZ would be treated in Spain each year. If all those patients would be treated with brivudine, then 8,976 NPH cases could be avoided if the same number of patients would receive aciclovir. Mean cost per treated patient would be lower with brivudine for all PHN treatment options. Overall, brivudine has a greater effectiveness and a lower cost per treated patient, thus estimated direct medical cost per PHN avoided case would be reduced in 3.3€ when the PHN patient is treated with brivudine, 3.5€ for gabapentine and 7.1€ for pregabaline. **CONCLUSION:** Results from base-case and sensi-
tivity analysis indicate that brivudine is a cost-effective treatment for HZ when it is compared to aciclovir in the Spanish setting.

PIN21
COST-EFFECTIVENESS OF INFLUENZA VACCINATION FOR HEALTHY ADULTS IN THE NETHERLANDS
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OBJECTIVES: In considering the inclusion of healthy adults aged 50–64 in the yearly influenza vaccination scheme, the Dutch ministry of health had issued a study on the balance of costs and effects of vaccination compared to no vaccination, as well as the budget impact. METHODS: An available decision model was adapted to assess the cost-effectiveness of influenza vaccination for healthy adults assuming average influenza epidemic severity. Excess cardiovascular complications leading to hospital admissions were accounted for. Both the peri-season and the summer were used as reference period to estimate the (excess) disease incidence and the influenza related complications. Direct medical costs as well as losses in productivity were accounted for. RESULTS: When using the peri-seasonal period as the reference period, the discounted incremental cost-effectiveness ratio (iCER) was €28,019 per life year saved. For the subgroup analyses 50–54, 55–59 and 60–64 the iCERs were estimated at €44,538; €37,632 and €15,810 per life year saved. The net budget impact following an expansion of the vaccination program with healthy adults 50–64 was estimated at 18 million euros annually. In case the summer would be used as the reference period following an expansion of the vaccination program with healthy adults aged 50–65. Based on the most conservative estimates, the iCER fell below €20,000 per life year gained only for healthy adults aged 60–65. Conclusions: In conclusion the discounted incremental cost-effectiveness ratio only fell below €20,000 per life year gained for healthy adults aged 60–65. The iCER depended on the reference period chosen in the analyses. Subsequent policy implications were considered and estimates, which included taking a conservative approach excluding indirect effects on pneumonia in the US and Latin America. The following disease states were modeled: meningitis, bacteremia, inpatient pneumonia, outpatient pneumonia, and in children only, otitis media (both mild and moderate/severe). Country-specific estimates for population data, incidence rates, serotype coverage and replacement, mortality rates, vaccine efficacy rates, direct medical and non-medical and indirect costs were derived from the literature and previously conducted health economic assessments of PCV7 to populate the economic model. Additionally, an analysis was conducted using recently published US data on reduction of pneumonia hospitalizations and otitis media visits following the availability of PCV7. RESULTS: The societal ICER in the US was $111,266/life year gained (LYG) when only considering direct effects, which decreased to $4,226/ LYG after including indirect effects. Incorporating the new data on otitis media and pneumonia decreased the direct effects only ICER to $13,614/LYG and was cost saving when indirect effects were included. For other countries, the societal ICERs accounting for indirect effects were 21,799 CAD/LYG in Canada, 72,505 SEK/LYG in Switzerland, and $6,971/LYG in Latin America. CONCLUSION: Vaccination with PCV7 is cost-effective in all of the countries studied when accounting for indirect effects among adults. Furthermore, PCV7 is cost saving among the US population when incorporating recent data on pneumonia and otitis media.

PIN22
A MULTINATIONAL PHARMACOECONOMIC EVALUATION OF DIRECT AND INDIRECT IMMUNITY CONFERRED BY THE SEVEN-VALENT PNEUMOCOCCAL CONJUGATE VACCINE (PCV7)
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OBJECTIVES: Develop a multinational, cross-sectional pneumococcal disease health state model to examine the expected outcomes, costs, and incremental cost-effectiveness ratio (ICER) among children vaccinated with PCV7 and unvaccinated adults. METHODS: A cost-effectiveness analysis was performed to compare costs and outcomes attributable to invasive pneumococcal disease (IPD) and non-IPD for vaccinated and unvaccinated birth cohorts in each country/region studied. The model also accounted for indirect (herd immunity) effects among unvaccinated adults using country/region-specific assumptions and estimates, which included taking a conservative approach excluding indirect effects on pneumonia in the US and Latin America. The following disease states were modeled: meningitis, bacteremia, inpatient pneumonia, outpatient pneumonia, and in children only, otitis media (both mild and moderate/severe). Country-specific estimates for population data, incidence rates, serotype coverage and replacement, mortality rates, vaccine efficacy rates, direct medical and non-medical and indirect costs were derived from the literature and previously conducted health economic assessments of PCV7 to populate the economic model. Additionally, an analysis was conducted using recently published US data on reduction of pneumonia hospitalizations and otitis media visits following the availability of PCV7. RESULTS: The societal ICER in the US was $111,266/life year gained (LYG) when only considering direct effects, which decreased to $4,226/ LYG after including indirect effects. Incorporating the new data on otitis media and pneumonia decreased the direct effects only ICER to $13,614/LYG and was cost saving when indirect effects were included. For other countries, the societal ICERs accounting for indirect effects were 21,799 CAD/LYG in Canada, 72,505 SEK/LYG in Switzerland, and $6,971/LYG in Latin America. CONCLUSION: Vaccination with PCV7 is cost-effective in all of the countries studied when accounting for indirect effects among adults. Furthermore, PCV7 is cost saving among the US population when incorporating recent data on pneumonia and otitis media.

PIN23
COST-EFFECTIVENESS ANALYSIS OF THE IMPLEMENTATION OF A QUADRIVALENT (6,11,16,18 TYPES) HUMAN PAPILLOMAVIRUS VACCINE TO THE EXISTING BELGIAN CERVICAL CANCER SCREENING PROGRAMME
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OBJECTIVES: Introduction of a quadrivalent human papillomavirus (HPV-types 6, 11, 16, 18) vaccine is expected to significantly reduce the burden of cervical cancer (CC), cervical lesions (CIN), genital warts (GW) and other HPV-related diseases. The objective of this study is to assess the health and economic impact in Belgium of implementing a quadrivalent HPV vaccination programme alongside screening practices versus screening alone. METHODS: A Markov model, developed to examine the epidemiological and economic impact of a universal HPV vaccination, was adapted to the Belgian situation, reflecting the local screening and treatment pathways and local epidemiological and cost data. A lifetime horizon was applied. A vaccine that would prevent 100% of HPV 6,11,16, and 18-associated disease, with lifetime efficacy duration, 80% coverage and costing €441.63 prevented 100% of HPV 6,11,16, and 18-associated disease, with significant reduction in the burden of cervical cancer (CC), cervical lesions (CIN), genital warts (GW) and other HPV-related diseases. The objective of this study is to assess the health and economic impact in Belgium of implementing a quadrivalent HPV vaccination programme alongside screening practices versus screening alone. RESULTS: Vaccination with PCV7 is cost-effective in all of the countries studied when accounting for indirect effects among adults. Furthermore, PCV7 is cost saving among the US population when incorporating recent data on pneumonia and otitis media.