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 per-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 per-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 €44,558; €28,019 and €9,421 per life year saved. CONCLUSION: The iCER of €28,019 per life year saved was in line with the societal willingness to pay. Based on the most conservative estimates, the iCER fell below €11,266 when including productivity losses.

PIN22
A MULTINATIONAL PHARMAECONOMIC EVALUATION OF DIRECT AND INDIRECT IMMUNITY CONFERRED BY THE SEVEN-VALENT PNEUMOCOCCAL CONJUGATE VACCINE (PCV7)
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OBJECTIVES: 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, $7,250 SFr/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 was adapted to the Belgian situation, reflecting the local screen-

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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.
screening programme is highly cost-effective for further reducing the burden of cervical cancer, pre-cancerous lesions and genital warts in Belgium.

**THE COST-EFFECTIVENESS OF A QUADRIVALENT HUMAN PAPILLOMA VIRUS VACCINE (6, 11, 16, 18) IN NORWAY**

**PIN24**

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**OBJECTIVES:** to assess the cost-effectiveness of alternative quadrivalent human papillomavirus (HPV) vaccination strategies in Norway. **METHODS:** A non-linear, deterministic, age-structured, mathematical model of the transmission dynamics of HPV infection (HPV types 6,11,16,18) and disease development in the population was developed and integrated with an economic model. Inputs for the model were obtained from public data sources, published literature, and clinical trials. We assumed a vaccine coverage rate of 90%. We varied duration of protection from 10 years to lifetime. Current cervical cancer screening practices were assumed to remain unchanged with vaccination.

**RESULTS:** Vaccinating girls before the age of 12 augmented by a female, 12–24-year olds temporary 5-year catch-up program was the most effective strategy examined, reducing the incidence of HPV 6/11/16/18-related genital warts, cervical intraepithelial neoplasia (CIN1,2,3), and cervical cancer by 96%, 94%, and 94%, respectively 100 years following vaccine introduction. Early reductions in disease and associated costs were primarily attributable to prevention of infection with HPV types 6/11. For example, 90% of the costs of HPV disease avoided and 92% of the cases avoided during the first 5 years was attributable to preventing HPV 6/11 infection. However after 35 years, the majority of HPV disease cost avoided was primarily attributable to preventing HPV 16/18 infections. The cost-effectiveness ratio for this strategy when compared with a strategy of vaccinating females before the age of 12 was NOK61,165 per quality adjusted life year (QALY) gained. The following parameters were most influential on the **RESULTS:** degree and duration of vaccine-derived protection, vaccine coverage and costs, and preference weights. **CONCLUSION:** A quadrivalent HPV (6,11,16,18) vaccine national program can reduce the incidence of cervical cancer, CIN (1,2,3), and genital warts and provide survival benefits and quality of life improvements at a cost-effectiveness ratio within the range accepted as cost-effective for a reasonably wide range of model input values.

**A COST-EFFECTIVENESS STUDY OF A UNIVERSAL PNEUMOCOCCAL VACCINATION PROGRAM WITH THE 7-VALENT PNEUMOCOCCAL VACCINE (PCV-7) IN SWEDEN**

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**OBJECTIVES:** Streptococcus pneumoniae is a frequent cause of bacterial meningitis, septicaemia, pneumonia and acute otitis media. These diseases lead to substantial mortality, morbidity and costs. There is 7-valent pneumococcal conjugate vaccine (PCV-7) developed, that has proved to be highly effective against invasive disease, but has also provided significant protection against pneumonia and acute otitis media. The objective of this study was to evaluate the projected health benefits, costs and cost-effectiveness of vaccination with the 7-valent conjugated pneumococcal vaccine compared with no vaccination, in all infants in Sweden. **METHODS:** An economic model (Markov model) was used in order to perform a cost-utility and a cost-effectiveness analysis, comparing a universal pneumococcal vaccination program with a no-vaccination program. The main outcomes were measured by reduction in the disease burden, costs and net costs of vaccination (per individual and a whole birth cohort), incremental cost per Quality adjusted life years (QALY) and life year (LY) gained. **RESULTS:** The results of the current health economic analysis indicate that a universal pneumococcal vaccination program in Sweden could prevent a considerable number of pneumococcal infections- mainly acute otitis media infections- and reduce the related morbidity and mortality. The incremental cost per QALY and LY gained was estimated to range between SEK250,000 and SEK300,000. In case herd immunity was included, the ICER was estimated to range between 100,000 and 150,000 per QALY and LY gained. **CONCLUSION:** The incremental cost per QALY gained advocates that the health benefits of vaccination in Sweden can be achieved within generally accepted levels of cost per QALY. The sensitivity analyses indicate that this conclusion is robust to reasonable changes in the assumptions upon which the analysis was based.

**THE COST-EFFECTIVENESS OF A QUADRIVALENT HUMAN PAPILLOMA VIRUS VACCINE IN HUNGARY**

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**OBJECTIVES:** to assess the cost-effectiveness of alternative quadrivalent human papillomavirus (HPV) vaccination strategies in Hungary. **METHODS:** A non-linear, deterministic, age-structured, mathematical model of the transmission dynamics of HPV infection (6,11,16,18) and disease development in the population was developed and integrated with an economic model. Inputs for the model were obtained from public data sources, published literature, and clinical trials. We assumed a vaccine uptake of 85% for routine vaccination and 10% for catch-up vaccination. We varied duration of protection from 10 years to lifetime. Current cervical cancer screening practices were assumed to remain unchanged with vaccination.

**RESULTS:** Vaccinating females before the age of 12 augmented by a female, 12–24-year olds temporary 5-year catch-up program was the most effective strategy examined, reducing the incidence of HPV 6/11/16/18-related genital warts, cervical intraepithelial neoplasia (CIN), and cervical cancer by 91%, 91%, and 94%, respectively one hundred years following vaccine introduction. The cost-effectiveness ratio for this strategy when compared with a strategy of vaccinating females before the age of 12 was HUF2,501,750 per quality adjusted life year (QALY) gained. The following parameters were most influential on the **RESULTS:** degree and duration of vaccine-derived protection, vaccine coverage and costs, and preference weights. **CONCLUSION:** A quadrivalent HPV vaccination program can reduce the incidence of cervical cancer, CIN, and genital warts and provide survival benefits and quality of life improvements at a cost-effectiveness ratio within the range accepted as cost-effective for a reasonably wide range of model input values.