INFECTION—Cost Studies

PIN9
BUDGET IMPACT ANALYSIS OF INTRODUCING ROUTINE VACCINATION WITH A QUADRIVALENT HPV-VACCINE IN NORWAY
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OBJECTIVES: To model the likely impact of introducing routine vaccination with a quadrivalent vaccine against HPV types 6, 11, 16 and 18 for 12 year old girls in Norway on relevant stakeholders’ budgets over each of the first 100 years. METHODS: An excel-based budget impact model was developed, based on the results of a mathematical model of the public health impact of different immunization strategies using the quadrivalent HPV vaccine. Natural disease history parameters were based upon international data. Rates of HPV infection, mortality, cervical cancer screening, treatment practice patterns and costs were based upon Norwegian-specific data. Both routine vaccination of 12 year old girls and the additional effect of including a 5 year catch-up vaccination program of females are modelled. The model evaluates both the direct costs related to the vaccination program, and cost savings due to reduced incidences of HPV-related disease; cervical intraepithelial neoplasia (CIN), invasive cancer and genital warts. The consequence for each stakeholder’s budget is described: The Norwegian Institute of Public Health (NIPH), the Norwegian Labour and Welfare Administration, the four Regional Health Authorities, patients and employers. RESULTS: The results are presented graphically and in tabular form, for the various stakeholders and over time. Direct costs for vaccination for the public payer are considerable, but are somewhat offset by savings for other stakeholders. The effect of the vaccine on HPV 6 and 11 infections provides both earlier cost offsets and increases them substantially. For the first 35 years the vaccine on HPV 6 and 11 infections provides both earlier cost offsets and increases them substantially. For the first 35 years the vaccine on HPV 6 and 11 infections provides both earlier cost offsets and increases them substantially.

THE ECONOMIC IMPACT OF LOWER HIV PREVALENCE ESTIMATES
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OBJECTIVES: The “AIDS epidemic update” (2007) published by the United Nations (UN) and World Health Organization (WHO) recently reported lowered estimates for the number of person infected with HIV worldwide. This study examines the economic impact of these revised figures upon the costs associated with treating patients with antiretroviral (ARV) drugs or opportunistic infection (OI) prophylaxis. METHODS: The annual change in the number of persons infected with HIV in eight regions worldwide was calculated for 2006 and 2007 from the UN report. Average treatment rates were used to determine the number of patients treated with ARV or OI prophylaxis. The difference in the cost for treating these patients was estimated by multiplying the average cost of treatment by the number of patients treated. For ARVs, the average cost estimate for 2006 (USD) included first- and second-line drugs, lab costs, inpatient and outpatient costs and counseling. For OI prophylaxis, only drug and counseling costs were included. Low- and high-cost ranges were used to estimate drug costs. Only counseling, inpatient and outpatient costs varied by region.

COST-EFFECTIVENESS OF QUADRIVALENT HPV VACCINATION IN FINLAND
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OBJECTIVES: To determine costs caused by human papilloma-virus (HPV) and to evaluate the cost-effectiveness of vaccinating 12 year old females with a quadrivalent HPV vaccine in Finland. METHODS: A comprehensive analysis, based on Finnish national health care, social insurance and cancer registries, allowed to evaluate the costs associated with cervical cancers, cervical lesions and genital warts diagnosed between 2001 and 2005 (health care costs, sick-leave compensations, disability pensions, and loss of productivity). An incidence-based model working in discrete time steps was developed to evaluate the effects of HPV vaccine. The model utilised Monte Carlo simulation to produce the outputs. Age-specific cervical cancer incidence rates were derived from population-based cancer registries. The model followed four cohorts of 12 year old females through their lives and the vaccine was assumed to be 100% effective against HPV types 6, 11, 16, 18. The analysis was performed from health care payer and societal perspectives. Sensitivity analyses were carried out to explore the effects of discount rates. RESULTS: Screening and management of HPV related diseases cost annually €50 M in Finland. Treatment of genital warts, cervical dysplasia and cancer costs €37 M. Solely pap screening costs €13 M. Vaccination of 12 year old females against HPV types 6, 11, 16 and 18 would cost €6,957 per additional QALY gained (no discounting) and €11,122/QALY (3.5% discounting for money and 1.5% for health benefits). CONCLUSIONS: Currently HPV causes significant health care costs for Finland. As €50,000/QALY is generally considered to be the threshold of cost-effective treatment in the developed countries, vaccination of 12 year old girls against 6, 11, 16, 18 HPV types would be an effective and economically profitable method to reduce the burden of the HPV related diseases.

COST-EFFECTIVENESS OF CERVARIX™, A PROPHYLACTIC CERVICAL CANCER VACCINE, IN SPAIN
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OBJECTIVES: Vaccination against human papillomavirus (HPV) has been recommended in Spain for girls aged 11–14 years old. Our objective was to estimate the cost-effectiveness of the bivalent HPV-16/18 AS04 adjuvant vaccine, Cervarix™ (GlaxoSmithKline), in the current Spanish setting with cervical cancer
screening. METHODS: A Markov model based on the natural history of HPV and cervical cancer (CC) was developed to simulate transitions between health states (normal, HPV infection, Cervical Intraepithelial Neoplasia (CIN) stages 1–3, CC stages 1–4, and death) in the presence of the current opportunistic screening practices in Spain. The model was calibrated to Spanish epidemiological endpoints: age-specific HPV and CIN prevalence, and age-specific CC incidence and mortality. Spanish data was used to inform observed costs, screening and treatment practices in Spain. Published efficacy rates were used for the HPV-16/18 vaccine including protection against non-vaccine oncogenic HPV types (such as efficacy against HPV-31 and -45). RESULTS: Assuming the screening practices remain unchanged, vaccinating all 12-year old girls would result in 79.1% and 79.5% decreases in the number of CC cases and deaths, respectively. Vaccination would also produce substantial reductions in the number of repeat screening tests due to abnormal cytology and treatments for cervical dysplasia, which would partially offset the cost of the vaccine. The introduction of Cervarix™ in the current screening setting was predicted to result in an incremental cost effectiveness ratio (ICER) of €31,749 per quality adjusted life year (QALY) gained, when discounting at 3% for costs and outcomes. Discounting at 4% for costs and 1.5% for outcomes resulted in an ICER of €14,707 per QALY gained. CONCLUSIONS: Universal vaccination with Cervarix™ for 12-year old girls within the current screening setting in Spain, is predicted to be a cost-effective method of reducing precancerous cervical lesions, cervical cancer incidence and mortality.

ECONOMIC ANALYSIS OF MICAFUNGIN VERSUS LIPOSOMAL AMPHOTERICIN B FOR TREATMENT OF CANDIDAEMIA AND INVASIVE CANDIDIASIS IN ITALY

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OBJECTIVES: To investigate the economic impact of introducing micafungin (MICA) for the treatment of systemic candida infections (SCIs) (including invasive candidiasis and candidaemia) in Italy, a health economic analysis was performed comparing MICA with liposomal amphotericin B (L-AMB). METHODS: The model was based on data from a phase III, randomised, double-blind trial comparing MICA with L-AMB. The model entailed a period of 14–20 weeks from initiation of treatment and was analysed from an Italian hospital perspective. The analysis included hospitalisation and primary medication costs. Unit costs of these resources were taken from Italian costing sources. As the price for MICA was not available at the time of analysis, the price per recommended daily dose (RDD) of MICA (100 mg) was assumed to be equal to the price per RDD of caspofungin (50 mg). The model endpoint was defined as the percentage of patients predicted to achieve complete or partial clinical and mycological response after initial treatment, and be alive after the 12-week follow-up period. The model was analysed using cohort and second-order Monte Carlo (MC) simulation. RESULTS: The analysis of this model shows that with MICA 52.9% of patients were predicted to have treatment success and survive 12 weeks after end of treatment compared with 49.1% for L-AMB. MICA was predicted to be less expensive than L-AMB costing €28,668 and €40,760 per patient, respectively. Because of lower simulated costs and the higher effectiveness of MICA (cost-effectiveness [C/E] ratio = €54,215) compared with L-AMB (C/E ratio = €83,035), MICA dominates L-AMB. The results of the MC simulation and sensitivity analyses showed that MICA remained the most cost-effective option. CONCLUSIONS: The lower costs and higher effectiveness predicted for MICA versus L-AMB in this analysis indicate that in Italy, MICA is more cost-effective for the treatment of SCIs when compared with L-AMB.

USING A DECISION SIMULATION MODEL TO EVALUATE THE COST-EFFECTIVENESS OF THE TREATMENT OF NUCLEOSIDE-NAÏVE HBE-ANTIGEN NEGATIVE CHB PATIENTS IN ITALY WITH ENTECAVIR AND TENOFOVIR

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OBJECTIVES: To simulate the treatment of nucleoside-naïve HBe antigen negative CHB patients with entecavir or tenofovir in the absence of head-to-head data for cost effectiveness comparison. METHODS: A hypothetical cohort of 1000 received treatment with entecavir 0.5 mg or tenofovir 300 mg daily for 48 weeks. A patient level simulation model was developed to estimate HBV DNA distributions, assuming a parametric distribution for baseline viral load (VL) and mean drop at 48 weeks, based on summary statistics from two RCTs; BMS AI-463027 (entecavir) and GS 174-0102 (tenofovir). Efficacy outcomes were calibrated to the end points from both trials. Liver complications over 10 years were projected using relative risks for CHB progression for five HBV DNA categories (R.E.V.E.A.L.-HBV epidemiology study). The Italian payer perspective was applied. Direct medical costs: drug acquisition, associated physician visits, clinical monitoring, liver event management. All model inputs estimated from published data. Discount rate: 3%. RESULTS: A simulation based on baseline VL from the tenofovir trial, entecavir was superior to tenofovir in mean serum HBV DNA reduction at 48 weeks, with drops of 5.0 vs 4.57 log10 copies/mL, leading to 97.8% and 91.1% of patients reaching undetectable VL respectively. For 1000 patients, the projected number of HCC and DC events within 10 years were 36 and 5, and 71 and 13, for entecavir and tenofovir respectively. Entecavir therapy was dominant, demonstrating €934 saving in discounted lifetime medical costs and QALY gain of 0.62 per patient. These estimates dropped to €773 and 0.58 QALY respectively in a sensitivity analysis to using the mean entecavir baseline VL, resulting in 90.1% and 82% of entecavir and tenofovir patients reaching undetectable VL at 48 weeks respectively. CONCLUSIONS: In absence of head-to-head data between the two agents, entecavir was projected to be a clinically and economically attractive alternative to tenofovir in this patient population.

COST-EFFECTIVENESS OF PALIVIZUMAB IN THE PROPHYLAXIS OF SEVERE BRONCHIOLITIS CAUSED BY RSV: RESULTS OF A DECISION MODEL WITH LOCAL DATA

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OBJECTIVES: Viral bronchiolitis is the most frequent cause of infection of the lower respiratory tract among children younger than 12 months old, with frequent hospitalizations and rare deaths. Palivizumab, a high cost drug, is approved for VSR prophylaxis. Our objective was to assess the cost-effectiveness of palivizumab in the prophylaxis of RSV bronchiolitis in high