were however not considered to be able to replace CE except for MFA (24% reported that a threshold of 20% CHD versus 0% for the remaining countries where CE is not formally used, the proportion of experts considering them as relevant was lower except for the BOM: Rol (46%), MCD (46%), QoC (18%), BOM (60%) and MEA (53%). Most reported barriers for use of the alternative methods were: no political interest, unfamiliarity with new methods, lack of knowledge about the data to conduct the evaluation. The method selection was most influenced by the appropriateness to the decision-making question, the country, and the vaccine or disease type assessed.

Creating awareness of the methodological economic evaluation methods may support and facilitate the vaccine reimbursement decision-making process in Europe alongside the current CE analysis.

PIN69

ALLOCATING VACCINE FUNDS FOR PNEUMOCOCCAL VACCINATION OF INFANTS AND OLDER ADULTS: A METHOD FOR STRATEGIC EVALUATION IN THE NETHERLANDS

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OBJECTIVES: Pneumococcal conjugate vaccines are available in the Netherlands against pneumococcal disease in infants and adults. This analysis aimed to identify an optimal vaccination strategy between infants and adults when the budget is constrained. Extensive sensitivity analysis is performed around herd protection on Invasive Pneumococcal Disease (IPD) and Community Acquired Pneumonia (CAP) resulting from infant vaccination.

METHODS: We developed an optimization model linked to a prevalence-based disease management sub-model. This program allows finding an optimal solution given an objective function (minimize costs, maximize quality-adjusted life years) solved by a constrained gradient algorithm. The model is run for different scenarios seeking for minimum indirect effect on IPD and on CAP in the whole model and defines the vaccination strategy which is particularly sensitive given a constrained budget.

RESULTS: With the current disease burden and vaccine coverage rate in the Netherlands and considering an overall VE in adults against CAP of 50% and against IPD of 37% (estimated from randomized clinical trials and meta-analyses), the model shows that vaccinating infants is the optimal strategy that minimizes pneumococcal-related events when compared with adult vaccination. If the objective is to minimize QALY’s lost, vaccinating infants remains the optimal selection as long as the net indirect effect is ≥ 2% on CAP or ≥ 7% on IPD. When the objective is to minimize LYs lost, the minimum indirect effect should be ≥ 3% on CAP or ≥ 2% on IPD. Sensitivity analyses show that even if CAP VE in adults is 3 times higher, the estimated minimum indirect effect needed is still below the one obtained with the first pneumococcal conjugate vaccine.

CONCLUSIONS: The optimal strategy within a constrained budget is to maintain infant vaccination instead of initiating elderly vaccination, given the reported evidence of indirect protection.

PIN70

COST-EFFECTIVENESS ANALYSIS OF A SHINGLES VACCINATION PROGRAM TO PREVENT HERPES ZOSTER AND POST-HERPETIC NEURALGIA IN THE SPANISH SETTING

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OBJECTIVES: A live-attenuated vaccine aimed at preventing herpes zoster (HZ) and shingles-associated pain (PHN) is available in Europe for immunocompetent adults aged ≥50 years. The study objective is to assess the incremental cost-effectiveness ratio (ICER) of a vaccination program for adults aged ≥50 years against HZ and PHN as the strategy of no vaccination. METHODS: A state-transition Markov model has been developed to simulate the natural history of HZ and PHN and the lifetime effects of vaccination. Several health states are defined including good health, HZ, PHN as a result of HZ, HZ death, HZ and PHN health states are divided to reflect pain severity. The Markov cycle was 1 month and lifetime horizon. The HZ vaccine proportion was obtained from Cebrian-Cuenca (2011) and adjusted to reflect the incidence of HZ and PHN in the Spanish population. The vaccine coverage rate estimated was 30%, considering discount rates of 3% for costs and utilities. The strength of the results was confirmed with a probabilistic analysis based on Monte Carlo simulation.

RESULTS: A vaccination strategy compared to a no-vaccination resulted in 12.659/QALY and 11.296/QALY under third-party payer perspective and societal perspective respectively for the population aged ≥50 years. ICERs were within the commonly accepted thresholds of 30,000/QALY (36,000/QALY) gained in the UK. Sensitivity analyses showed that the model was most sensitive to discount rates and duration of vaccine protection. The lowest ICER was observed for the 70-74 years age group (6.657/QALY under third-party payer perspective). CONCLUSIONS: In Spain, a shingles vaccination strategy in older population would be a cost-effective alternative in comparison with no vaccination, due to an ICER of 12.659/QALY from the third-party payer perspective.

PIN71

COST-EFFECTIVENESS OF FECAL MICROBIOTA TRANSPLANT IN TREATING CHRONIC DIFFICILE INFECTION IN CANADA

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OBJECTIVES: To estimate the cost-effectiveness of Fecal Microbiota Transplant (FMT) for the treatment of CDI infection for comparison to the current practice comprising of antibiotic treatments. METHODS: We developed a decision analytic model to compare strategies for the management of CDI, by age, gender, and three sources of infection: hospitals, communities, and long-term care facilities (LTCF). We performed validation analyses to demonstrate that the predicted CDI rates were a reasonable representation of the selected actual rates. Mortality rates were stratified by age group (6.657/QALY under third-party payer perspective). The result of the Markov cycle was 1 month and lifetime horizon. The HZ vaccine proportion was obtained from Cebrian-Cuenca (2011) and adjusted to reflect the incidence of HZ and PHN in the Spanish population. The vaccine coverage rate estimated was 30%, considering discount rates of 3% for costs and utilities. The strength of the results was confirmed with a probabilistic analysis based on Monte Carlo simulation.

RESULTS: A vaccination strategy compared to a no-vaccination resulted in 12.659/QALY and 11.296/QALY under third-party payer perspective and societal perspective respectively for the population aged ≥50 years. ICERs were within the commonly accepted thresholds of 30,000/QALY (36,000/QALY) gained in the UK. Sensitivity analyses showed that the model was most sensitive to discount rates and duration of vaccine protection. The lowest ICER was observed for the 70-74 years age group (6.657/QALY under third-party payer perspective). CONCLUSIONS: In Spain, a shingles vaccination strategy in older population would be a cost-effective alternative in comparison with no vaccination, due to an ICER of 12.659/QALY from the third-party payer perspective.

PIN72

THE IMPORTANCE OF SENSITIVITY ANALYSIS IN ASSESSING CLINICAL AND ECONOMIC EFFECTIVENESS OF NATIONAL IMMUNIZATION PROGRAMS: AN EXAMPLE OF SLOVENIA

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OBJECTIVES: To demonstrate the role of sensitivity analysis (SA) in assessing clinical and economic effectiveness of national immunization programs.

METHODS: We applied our recent cost-effectiveness model of pneumococcal vaccination to the local data in Slovenia. The model has a lifetime horizon and is based on validation analyses to demonstrate that the predicted CDI rates were a reasonable representation of the selected actual rates. Mortality rates were stratified by age group (6.657/QALY under third-party payer perspective). The result of the Markov cycle was 1 month and lifetime horizon. The HZ vaccine proportion was obtained from Cebrian-Cuenca (2011) and adjusted to reflect the incidence of HZ and PHN in the Spanish population. The vaccine coverage rate estimated was 30%, considering discount rates of 3% for costs and utilities. The strength of the results was confirmed with a probabilistic analysis based on Monte Carlo simulation.

RESULTS: A vaccination strategy compared to a no-vaccination resulted in 12.659/QALY and 11.296/QALY under third-party payer perspective and societal perspective respectively for the population aged ≥50 years. ICERs were within the commonly accepted thresholds of 30,000/QALY (36,000/QALY) gained in the UK. Sensitivity analyses showed that the model was most sensitive to discount rates and duration of vaccine protection. The lowest ICER was observed for the 70-74 years age group (6.657/QALY under third-party payer perspective). CONCLUSIONS: In Spain, a shingles vaccination strategy in older population would be a cost-effective alternative in comparison with no vaccination, due to an ICER of 12.659/QALY from the third-party payer perspective.

PIN73

THE PAN-GENOTYPIC COSTS-EFFECTIVENESS OF SOFOBUVIR IN HEPATITIS C VIRUS

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OBJECTIVES: This study assesses the PAN-genotypic costs-effectiveness of sofosbuvir compared with standard of care in the Netherlands. METHODS: A cost-effectiveness model of genotype 1 treated hepatitis C virus (HCV) infection results in chronic liver disease. The prevalence in The Netherlands is estimated at 0.7-1.5% with 50% of patients having HCV genotype 1 (GT1), 10% GT2, 30% GT3 and 10% GT4-5-6. Current standard of care,pan-genotypic, consists of weekly subcutaneous pegylated interferon-alpha (PegIFN-α) plus daily oral ribavirin in GT1, the protease inhibitors telaprevir or boceprevir are added. Sofosbuvir (SOF), a novel Direct Antiviral Agent (DAA), has consistently demonstrated high rates of sustained virological response (SVR) when given with ribavirinaPegIFN-α. This cost-effectiveness evaluation is based on a Markov transition model, that combines efficacy and safety data from published RCTs with SOF and standard of care with continuous probabilistic Monte Carlo simulations by employing parameter values derived from clinical trials and post-marketing surveil-

RESULTS: SA has shown that PHIV-DC vaccine dominated PCV-13 vaccine across the range of parameters, both at current and parity prices, and robustness of the result of domination was further confirmed by more than 99% out of 10,000 Monte Carlo simulations, where PHIV-DC dominated PCV-13. SA when comparing each vaccine with NVS showed that at current prices reduction of CAP, and myringotomy—procedures incidence by 50% in the former and 24% in the latter. If in the current practice, the incremental cost-effectiveness ratio (ICER) from €4,237 per quality-adjusted life year (QALY) to €18,971/QALY for PHIV-DC and from €16,049/QALY to €35,040/QALY for PCV-13. At current prices, vaccination with PHIV-DC dominated NVS when at least 17.5% of patients of sick children would take a paid leave, which – in the Slovenian jurisdiction – constitute direct costs; in comparison, corresponding ICER for vaccination with PCV-13 vs. NVS was €12,306/QALY. CONCLUSIONS: Both base case and SA model findings suggest that Slovenian authorities should favor implementing national immunization program of infants with PHIV-DC as a vaccine of choice.
OBJECTIVES: Since 2009, 12-year-old Dutch teenage girls are vaccinated against human papillomavirus (HPV) infection. The current uptake of HPV vaccination, being approximately 60% nowadays, is however comparatively low. Consequently, a large group of women are still at risk of developing HPV-induced cervical cancer later on in life. Therefore, alternative HPV vaccination scenarios have been proposed, in addition to the current approach, to provide additional protection against cervical cancer.

Here, we assessed the cost-effectiveness of three different vaccination scenarios: (i) increased coverage of the existing programme, (ii) vaccination of girls at an older age, and (iii) replacement of the current programme by an alternative one.

A dynamic model was used to estimate the full health-economic consequences of the existing programme with and without the alternative scenarios. Costs and health effects of the alternative scenarios, expressed as life years (LYs) or quality-adjusted life years (QALYs) gained, were compared with the current programme.

The cost-effectiveness analyses, the robustness of the model-predicted outcomes was evaluated. RESULTS: We found the incremental cost-effectiveness ratio of the existing HPV vaccination programme to be low (<10,000/QALY gained). The cost-effectiveness of alternative programmes highly depends on the coverage at 12 years of age. The cost-effectiveness of girls 24 years of age remained below ≤50,000/QALY if coverage at 12 years of age increased up to 70%. Cost-effectiveness of vaccination boys at 12 years of age becomes uncertain with coverage up to 30%.

Conclusions: From a health-economic perspective, alternative HPV vaccination programmes should be considered in the Netherlands to further reduce the burden of HPV-induced cancer. Until a high coverage among 12-year old girls in reached the addition of older girls to vaccination should be considered in the Netherlands to further reduce the burden of HPV-induced cancer.

PINF1 A SYSTEMATIC REVIEW OF COST-EFFECTIVENESS ANALYSIS OF CD4 CELL COUNT COUNTER VS HIV VIRAL LOAD IN PRIMARILY RESOURCE-LIMITED SETTING
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OBJECTIVES: Utilization of routine viral load (VL) and CD4 cell count coupled to clinical monitoring of HIV patients needs to be carefully deliberated in cost-effectiveness analyses, especially in the resource-limited countries. The aim of this systematic review was to identify all CD4 cell count vs viral load cost-effectiveness studies and compare the cost-effectiveness of these strategies individually and in combination.

METHODS: A literature review was conducted for studies published in English from 2004 to 2014 on Pubmed, Web of Science, Ovid, Google Scholar, with keywords: HIV, viral load, CD4, economic evaluation, and cost analysis. All CMEs were included as well as Levels of Evidence (LOE) by Oxford Center for Evidence-Based Medicine (OCEBM), as well as Drummond scoring criteria.

RESULTS: Thirty English publications were identified, including 14 modeling studies, 7 randomized clinical trials (RCTs), and 5 cohort studies among others. A total of 24 were based on resource-limited settings such as Africa, Latin America, and Asia. Compared with CD4, VL alone had incremental cost-effectiveness ratios (ICERs) ranging from $2520/LY to $3570/life year (LY). The rate of CD4 cell count was 95% in the settings considered to be sensitive to change in health policy if sensitivity analyses were carried out and $57986/QALY (32.667 QALYs) for the combination of VL only to $5768-quality-adjusted life year (QALY). The combination of CD4 and VL, which is recommended in real-life practice, compared to CD4 alone yielded ICER’s ranging from $2956/QALY to $51988/QALY. The cost-effectiveness of this strategy was affected by factors such as the reference threshold for ICER, costs and monitoring regimens of the strategies and antiretroviral treatment.

CONCLUSIONS: From the studies, it is critical to evaluate the cost-effectiveness of CD4 compared with VL, contextually, with the being more appropriate in resource-constrained settings. VL is associated with improved benefit, however when used in combination with CD4, is usually not cost-effective. Compared with clinical monitoring alone CD4 usually produces greater cost-effectiveness.

PINF2 ADDING BECOVIR/EVR YIELDS BETTER COST-SAVING FOR CHRONIC HEPATITIS C GENOTYPE 1 TREATMENT IN THAILAND
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OBJECTIVES: Current Thai guidelines reimburse peginterferon/ribavirin (PR) combination treatment for patients infected with all genotypes of chronic hepatitis C (CHC), based on the results of cost-effectiveness studies. Two trials, SPRINT-2 and RESPOND-2, have demonstrated that treatment with boceprevir (BOC) in addition to PR results in significantly higher sustained virologic response rates than PR alone for 48 weeks, in both treatment naïve and treatment experienced CHC genotype 1 patients. The aim of our analysis was to evaluate the cost-effectiveness of BOC-based treatment compared with PR alone from the perspective of the policy maker in Thailand over a lifetime horizon.

METHODS: A decision analytic model was developed to simulate the treatment strategies described in the BOC label (BOC/PR) and PR alone, and to describe the natural history of CHC to make projections beyond the treatment phase. Separate analyses were conducted based on patients’ treatment history and cirrhosis status. Patient characteristics were obtained from SPRINT-2 and RESPOND-2. Treatment characteristics including efficacy and the rate of side effects were obtained from these single-tablet regimens. Baseline characteristics, costs, and health state utilities were obtained from previously studies. We projected the lifetime cumulative incidence of CHC-related liver complications – decompensation, cirrhosis, hepatocellular carcinoma, liver-transportation, liver related mortality - discounted costs and QALYs associated with each treatment strategy. The incremental cost-effectiveness ratio was also assessed.

RESULTS: For treatment naïve and treatment experienced patients, BOC/PR treatment is projected to be more cost-effective than PR for 4 months of treatment before switching to placebo. PR costs and QALYs are 12%, 2%, and 47-51%. BOC/PR is projected to be less expensive and result in increases of 0.13-2.62 QALYs for all non-cirrhotic patients and cirrhotic treatment-experienced patients. Cirrhotic treatment naïve patients was the only subgroup in which cost-effectiveness was not demonstrated.

CONCLUSIONS: In the Thai setting, BOC/PR is projected to be cost-savings against PR alone in the majority of CHC genotype 1 patients, regardless of treatment history.

PINF7 A COST-EFFECTIVENESS EVALUATION FOR A NEW THERAPY IN HIV TREATMENT
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OBJECTIVES: Economic evaluation of Stribild in Turkey, which is a single tablet regimen indicated for the treatment of HIV-1 infection in adults aged 18 years and over, with antiretroviral treatment naive or are infected with HIV-1 without known mutations associated with resistance to any of the three antiretroviral agents in it.

METHODS: STRIBILD™ was compared with various treatment options; tenofovir DF + emtricitabine + efavirenz (TDF/TFD/EVF), tenofovir DF + emtricitabine + rilpivirine (TDF/TFD+RP), tenofovir DF + emtricitabine + darunavir (TDF/TFD+DRV+ril), tenofovir DF + emtricitabine + raltegravir (TDF/TFD+RAL), lamivudine + zidovudine + efavirenz (3TC/AZT/EVF), lamivudine + zidovudine + rilpivirine (3TC/AZT+RP), lamivudine + zidovudine + efavirenz (3TC/AZT+EFV).

The adherence rates were calculated from the increase in CD4 cell count and the risk of hospitalization as the effectiveness values. The data were taken from patient files from Hatay University that consists of 252 patients and 12 year follow-ups with an outpatient clinic, interventions, laboratory and imaging tests, medication usage, side effects, comorbidity’s diseases and their treatments and complications. The costs of treatment of diseases were calculated by cost of disease methodology. Average annual cost per patient is calculated for health care technologies. Health technology effectiveness values are found from the literature review. Incremental cost-effectiveness ratios (ICER) were used for the comparison.

The current diagnostic scheme, according to the National Program, “Replacement”—the current diagnostic scheme and Xpert/Rif test only. Inputs’s from the country report and Russian epidemiologic database were examined: “Base”—the current diagnostic scheme, according the National Program, “Addition”—the current diagnostic scheme and Xpert/Rif test only. Using “Addition” is especially effective for diagnostic TB cases.

TABLE 1

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Cost per Year</th>
<th>Cost per Successfull Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>€23080</td>
<td>€89640</td>
</tr>
<tr>
<td>Addition</td>
<td>€23955</td>
<td>€93200</td>
</tr>
</tbody>
</table>

Conclusions: It is important to evaluate the cost-effectiveness of two scenario’s for the diagnosis of TB among PLWH depending on CD 4- count and their influence to treatment of TB. A determination of the optimal model was designed for three TB possible searching scenarios in three hypothetical cohorts of 1000 PLWH with different CD 4- count (<200, 200-499, >500). The following scenarios were examined: “Base”—the current diagnostic scheme, according the National Program; “Addition”—the current diagnostic scheme and Xpert/Rif test only. Using “Addition” is especially effective for diagnostic TB cases. In terms of major public health problem globally. In this study, the replacement of combination treatment strategies, has higher compliance rates, better outcomes and lower health care costs.