rates in elderly steeply increase with age and the transition probabilities for specific health states are age specific, this population should be evaluated as non-homogeneous and over a lifetime with annual vaccinations. This study compares the cost results of flu vaccination between these two different modeling approaches. **METHODS:** Two models were developed to estimate the direct costs of annual flu vaccination compared with no vaccination: 1) a 1-year 65+ group cohort model; and 2) a lifetime multi-age cohort model with target population and clinical pathways stratified in five age cohorts (65–69 years; 70–74 years; 75–79 years; 80–84 years; 85+ years) eligible for annual vaccination. Both models were populated with US specific data. Vaccination coverage and disease management were identical in both models. The decision tree included the following states: natural deaths, infected, and symptomatic states followed by GP visits, hospitalizations (pneumonia, influenza, stroke, myocardial infarction, and congestive heart failure), disease-specific death rates, and recovery in nursing homes. Undiscounted costs per individual per year are compared for vaccinated and unvaccinated groups, using both approaches. **RESULTS:** The cost per individual per year is higher in the 1-year 65+ group cohort model versus the lifetime multi-age cohort model (no vaccination: $205 vs. $139; vaccination: $185 vs. $113) as expected: considering additional age cohorts with decreasing life expectancies in the multi-age cohort lowers the average cost per individual per year. Meanwhile, the selection of model type impacts the estimated incremental cost of vaccinated versus unvaccinated groups ($–20 vs. $–26). **CONCLUSIONS:** In economic assessments, a 1-year 65+ group cohort approach undervalues the impact of heterogeneity in elderly on the benefit of flu vaccination, and therefore, a lifetime multi-age cohort is preferred.

**VA2**

### GATHERING INFORMATION BY COMPARISON OF DIFFERENT DYNAMIC MODELING APPROACHES FOR EPIDEMIC MODELS

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**OBJECTIVES:** Several dynamic approaches can simulate epidemics and vaccination strategies. Generally, the models can be divided into top-down approaches like Markov models and differential equations and bottom-up approaches like cellular automata and agent-based models. Top-down approaches are characterized by cumulative values that are representing groups of people. Bottom-up approaches, in contrast, consider individuals. Both approaches have advantages and disadvantages. Top-down approaches can be analyzed very well with mathematical methods, while bottom-up approaches require comparison of the outcome of simulation runs with different parameter sets. To improve validity of model structures, a method that compares different approaches for epidemic models is introduced. **METHODS:** Statistical calculations and Markov models are static, while other approaches like differential equations or individual-based models are dynamic. In this context, dynamic does not only stand for simulation over time but also for models where the calculation of the next time step or period depends on the current state of the model. Since the transition matrices in Markov models are calculated before execution time, it is not considered to be dynamic. The advantage of dynamic models is that they can produce highly nonlinear behavior that cannot be reached with static calculations. To validate the structure of such nonlinear models, different model types are implemented and compared. Results are compared; sensitivity analysis is done separately. **RESULTS:** Outcome of vaccination against streptococcus pneumoniae was tested. a differential equations model and an agent-based model could reproduce results of published Markov models. As soon as we consider population dynamics, herd immunity, and serotype replacement, the Markov model was not able to fulfill the structural requirements anymore, while dynamic approaches still work. **CONCLUSIONS:** Dynamic models offer more information and opportunities for epidemic simulation. Usage of different approaches provides at least comparable reliability.

**PIN61**

### INFLUENZA RISK AND VACCINATION RATES IN EUROPE: A NATIONWIDE SURVEY OF ADULTS

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**OBJECTIVES:** The aim of the current study was to determine influenza vaccination rates among high- and non-high-risk adults across Europe (UK, France, Germany, Italy, and Spain). **METHODS:** Data from the 2008 EU National Health and Wellness Survey (NHWS) were used. Demographics, comorbidities, and vaccination behavior in the past year were assessed for all respondents. Health-related quality of life (SF-12v2) and resource use (number of emergency room visits, hospitalizations, and physician visits) in the past 6 months were also measured. **RESULTS:** Only 23.7% of respondents received an influenza vaccine in the past year (UK: 25.3%, Germany: 25.2%, France: 20.2%, Italy: 24.8%, Spain: 24.1%). a total of 28,158 respondents (52.6%) were at high risk for influenza complications (i.e., over age 50, had chronic conditions such as asthma, diabetes, COPD, cardiovascular conditions, or HIV/AIDS). Those at high risk reported significantly lower levels of both physical quality of life (mean = 45.88 vs. mean = 52.10) and health utilities (mean = 0.72 vs. mean = 0.73), and significantly higher levels of emergency room visits (mean = 0.21 vs. mean = 0.17), hospitalizations (mean = 0.22 vs. mean = 0.12), and provider visits (mean = 5.96 vs. mean = 4.14) in the past 6 months relative to those not at high risk, all $P < 0.0001$. Despite the significantly worse health profile, only 35.9% of high-risk respondents received the vaccine. High-risk status was the strongest driver of vaccination in the UK (high risk: 42.2% vaccinated vs. non-high risk: 5.4% vaccinated, $\Phi = 0.42$) and the weakest in Germany (high risk: 31.8% vaccinated vs. non-high risk: 16.2% vaccinated, $\Phi = 0.18$). The most common reason for nonvaccination was a belief that the vaccine was unimportant (35.9%). **CONCLUSIONS:** Despite influenza vaccine recommendation guidelines, only a modest percentage of respondents in Europe were vaccinated. Even those at high risk for influenza complications, who reported significantly worse health outcomes than non-high-risk respondents, were vaccinated at less than a 40% rate.

**VA4**

### COST-EFFECTIVENESS OF UNIVERSAL HEPATITIS B IMMUNIZATION IN VIETNAM: APPLICATION OF COST-EFFECTIVENESS AFFORDABILITY CURVES IN HEALTH DECISION-MAKING

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**OBJECTIVES:** To perform a cost-effectiveness analysis of newborn universal vaccination against hepatitis B virus (HBV) and to identify the cost-effective affordability levels of the vaccination program in Vietnam. **METHODS:** We simulated a birth cohort using 1,693,000 newborns in 2002. Incremental cost-effective ratios (ICERs) per quality-adjusted-life-year (QALY) gained with universal newborn vaccination against HBV was calculated using a Markov model. Two types of analyses (including and excluding expenditure on the treatment of chronic hepatitis B and its complications) were performed. We used 5000 Monte Carlo simulations to examine the cost-effectiveness acceptability and affordability of the vaccination program from the payer's perspective and to derive a cost-effective affordability curve to assess the program's cost and health effects. All costs were expressed in 2002 US dollars. **RESULTS:** In the base-case scenario, newborn universal vaccination against HBV reduced the carrier rate by 58% at a cost of US$42 per carrier averted. From the payer's perspective, marginal cost per life-year and per QALY gained were US$4.76, much lower than GDP per capita of ~US$440 in 2002. The vaccination could be potentially affordable starting at a relatively low budget of US$1.7 million. Newborn universal vaccination would save US$ 1 billion from the treatment cost of complications due to chronic HBV infections. The probability of vaccination being both cost-effective and affordable is 27% at an annual budget of US$4.1 million at the cost-effectiveness threshold of US$3.9 per QALY. **CONCLUSIONS:** Universal newborn vaccination against HBV is highly cost-effective in Vietnam. In low-income, high-endemic countries, where funds are limited and economic results of vaccination are uncertain, our findings on the cost-effectiveness affordability options would assist decision-makers in making proper health investments in vaccination strategies against HBV.

## POSTER SESSION I

### CANCER – Clinical Outcomes Studies

**PCN1**

### TOLERABILITY OF FIRST-LINE TREATMENTS OF LOCALLY ADVANCED OR METASTATIC NON-SMALL-CELL LUNG CANCER (NSCLC): A SYSTEMATIC REVIEW AND ADJUSTED INDIRECT COMPARISON

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**OBJECTIVES:** Platinum-based chemotherapy is a common first-line treatment of NSCLC; tolerability impacts on choice of regimen. This research compared the tolerability of gefitinib and doublet chemotherapy in this setting in patients with activating epidermal growth factor receptor tyrosine kinase (EGFR-TK) mutations (M+). **METHODS:** Systematic searching of CENTRAL, EMBASE, and MEDLINE for randomized controlled trials (RCTs) comparing ≥2 doublet chemotherapies (carboplatin or cisplatin in combination with either docetaxel, gemcitabine, paclitaxel, pemetrexed, or vinorelbine) for the first-line treatment of advanced NSCLC was completed in May 2009. Data were extracted on the following grades 3/4/5 adverse events (AEs) most commonly reported with doublet chemotherapy or EGFR-TK inhibitors: anemia, diarrhea, fatigue, febrile neutropenia, nausea/vomiting, neutropenia, and rash. We performed a meta-analysis of the available gefitinib versus paclitaxel/carboplatin RCTs in EGFR-TK M+ patients. We then carried out a mixed treatment comparison (MTC) of doublet chemotherapies in unselected advanced NSCLC patients using paclitaxel/carboplatin as a baseline. Treatment effect for the risk of AE occurrence was estimated as an odds ratio (OR > 1.0 favors paclitaxel/carboplatin). **RESULTS:** Three RCTs were identified for gefitinib, of which two were comparisons with paclitaxel/carboplatin. Meta-analysis of these two trials gave the following statistically significant results: anemia—OR 0.12, 95% confidence interval: 0.03–0.47; diarrhea—OR 5.78, 95% CI: 1.01–33.11; neutropenia—OR 0.01, 95% CI: 0.00–0.03. Twenty-nine trials were appropriate for inclusion in the MTC. The alternative doublet chemotherapy regimens did not demonstrate a statistically significant reduction in risk of any of the AEs assessed versus paclitaxel/carboplatin, with the exception of gemcitabine/cisplatin, which had a lower risk of febrile neutropenia (OR 0.39, 95% credible interval: 0.12–0.96). **CONCLUSIONS:** In the absence of RCTs comparing all doublet chemotherapies with gefitinib in EGFR-TK M+ patients with advanced NSCLC, this adjusted indirect comparison suggests that gefitinib may have important tolerability advantages over other first-line treatments in this targeted population.