PMD94

DELAYED ENHANCEMENT CARDIAC MAGNETIC RESONANCE TO REFINE PATIENT SELECTION FOR IMPLANTABLE CARDIOVERTER DEFIBRILLATOR THERAPY IN PRIMARY PREVENTION - AN EXPLORATORY COST-EFFECTIVENESS ANALYSIS

Silva Miguel L[1], Ferreira AM[2]
[1]*CISEP (Research Centre on the Portuguese Economy), Lisbon, Portugal,* [2]*Hospital de Santa Cruz and Hospital da Luz, Carnaxide and Lisbon, Portugal*

OBJECTIVES: The majority of patients who get an implantable cardioverter defibrillator (ICD) for primary prevention of sudden cardiac death (SCD) never need to receive appropriate ICD therapies. Better risk-stratifying tools are thus needed to improve the cost-effectiveness of device implantation. The purpose of this study was to assess the cost-effectiveness of using delayed enhancement cardiac magnetic resonance (CMR) to refine patient selection for ICD therapy in primary prevention. **METHODS:** A Markov model was developed to assess long-term survival, quality-adjusted life years (QALYs), and lifetime costs for a cohort of patients with reduced left ventricular ejection fraction without previous ventricular arrhythmias. Two different strategies were compared: A) implant an ICD in all patients ("ICD for all"); and B) perform CMR and implant an ICD only in patients with delayed enhancement exceeding 5% of myocardial mass ("CMR-guided ICD"). Clinical and economic inputs were derived from European representative literature. **RESULTS:** The "ICD for all" strategy led to a total cost of 68,818€ and 7.0 QALY per patient, implying an incremental cost of 7,372€ and allowing a gain of 0.1 QALY when compared to the strategy "CMR-guided ICD". Consequently, the cost-utility ratio is 77,943€ per QALY. Probabilistic sensitivity analysis showed that, assuming a willingness to pay of 50,000€ per QALY, the "ICD for all" strategy would be cost-effective in 31 % of the simulations. **CONCLUSIONS:** Results suggest that implanting ICD in selected patients allows to use this device in those that benefit most, improving the cost-effectiveness of ICD implantation for the primary prevention of sudden cardiac death.

PMD95

COST-EFFECTIVENESS ANALYSIS OF TESTING FOR BRCA1 AND BRCA2 MUTATIONS IN WOMEN DIAGNOSED WITH OVARIAN CANCER AND THEIR FEMALE FIRST- AND SECOND DEGREE RELATIVES USING A DISCRETE EVENT SIMULATION: A UK HEALTH SERVICE PERSPECTIVE

Eccleston A[1], Bentley A[1], Dyer M[2], Vereecken W[2], George A[3], Rahman N[3]
[1]*Abacus International, Bicester, UK,* [2]*AstraZeneca UK Ltd., Luton, UK,* [3]*Institute of Cancer Research, London, UK*

OBJECTIVES: Mutations in BRCA1 and BRCA2 genes are associated with an increased risk of breast and ovarian cancer. If a BRCA mutation is detected in women with ovarian cancer their unaffected relatives may be offered genetic testing and prophylactic surgery. The long-term cost-effectiveness of providing BRCA testing to women with ovarian cancer and to their unaffected female first-degree relatives in the UK has previously been evaluated using a lifetime Markov model, but the approach had a number of limitations. The current study will employ a hybrid discrete event simulation (DES) structure that addresses some of the Markovian limitations associated with the previous model and will differentiate between BRCA1 and BRCA2 mutations and will consider results for a number of possible UK family pedigrees. **METHODS:** A hybrid DES will be constructed with a lifetime horizon, to evaluate the cost-effectiveness of BRCA testing in women with ovarian cancer and their female first- and second-degree relatives versus no testing. The model will consider the incidence of ovarian and breast cancer, differentiating between those with BRCA1 and BRCA2 mutations, as well as the associated mortality rates. Individuals identified as BRCA1 or BRCA2 positive will be eligible to undergo bilateral mastectomy and bilateral salpingo-oophorectomy, which significantly reduce the risk of both ovarian and breast cancer. **RESULTS:** Results will be presented as an incremental cost-effectiveness ratio expressed as a cost per quality adjusted life year (QALY). These will be compared to the UK cost-effectiveness threshold of £20,000 per QALY gained. A number of sensitivity and subgroup analyses will be presented alongside the base case. **CONCLUSIONS:** We aim to demonstrate that screening patients with ovarian cancer and their first- and second-degree relatives for the BRCA1 and BRCA2 mutation is cost-effective and reduces the incidence of breast and ovarian cancer in the population.

PMD96

IDENTIFYING THE MOST COST-EFFECTIVE WAY OF DIAGNOSING ASTHMA IN ADULTS USING MULTIPLE TESTS – A COST-UTILITY ANALYSIS FROM THE NICE ASTHMA GUIDELINE

Haines A[1], Davies E[1], Higgins B[2], Menzies-Gow A[3], Thomas M[4], Masoli M[5], Gaillard E[6]
[1]*National Clinical Guideline Centre, London, UK,* [2]*Newcastle upon Tyne Hospitals NHS Trust, Newcastle, UK,* [3]*Royal Brompton and Harefield NHS Foundation Trust, London, UK,* [4]*University of Southampton, Southampton, UK,* [5]*Plymouth Hospitals NHS Trust, Plymouth, UK,* [6]*University of Leicester, Leicester, UK*

OBJECTIVES: To develop an economic model to inform recommendations on the optimal diagnostic pathway for the recent clinical guideline on the diagnosis and monitoring of asthma, commissioned by the National Institute for Health and Care Excellence (NICE). **METHODS:** A de-novo economic model evaluated current practice alongside six diagnostic pathways comprising of the following tests: spirometry, bronchodilator reversibility (BDR), peak expiratory flow (PEF), fractional exhaled nitric oxide (FeNO) and methacholine/histamine challenge testing (MCT). A model was developed using a decision tree to identify what proportion of individuals would receive a correct (true positive, true negative) or incorrect (false positive, false negative) diagnosis, utilising diagnostic accuracy data in adults from systematic reviews conducted for each test. These proportions fed into one of four Markov models, depending on the diagnosis, which calculated final health and cost outcomes. The model explored the impact of alternative false diagnoses, such as chronic obstructive pulmonary disease, and applied modelling techniques to account for the effect of conditional dependence on diagnostic accuracies. **RESULTS:** The most cost-effective strategy at a £20,000 per/QALY threshold consisted of all individuals undergoing spirometry, BDR and FeNO testing. Where diagnostic uncertainty remained, individuals would then undergo PEF and finally MCT testing. This strategy dominated other strategies that did not utilise MCT, producing higher health outcomes at a lower cost to the health service. Two strategies that made more individuals undergo MCT were not cost-effective at the threshold with incremental cost-effectiveness ratios of £20,276 and £32,565 per/QALY respectively. Although assumptions were made relating to conditional dependence and the consequences of false diagnoses, the model's results were found to be robust to significant changes in these and other uncertain parameters. **CONCLUSIONS:** These findings highlight the need for thorough objective testing for diagnosing asthma as doing so has the potential to improve health outcomes whilst reducing costs to the health service.

PMD97

RISK FACTORS FOR DEVELOPING DIABETES AS A DETERMINANT OF THE COST-EFFECTIVENESS OF USING CORONARY CALCIUM SCORE TO GUIDE PRIMARY PREVENTION WITH STATINS

Silva Miguel L[1], Ferreira AM[2]
[1]*CISEP (Research Centre on the Portuguese Economy), Lisbon, Portugal,* [2]*Hospital de Santa Cruz and Hospital da Luz, Carnaxide and Lisbon, Portugal*

OBJECTIVES: The determination of coronary calcium score allows to identify individuals for which primary prevention with statins may be unnecessary. In this study it is shown that the presence of risk factors for developing diabetes interacts with the benefits of this identification. **METHODS:** A Markov model was used to estimate the evolution of two cohorts with elevated C-reactive protein and low LDL cholesterol: one without risk factors for developing diabetes and another with those risk factors. The progression of both cohorts was simulated assuming four alternative strategies: "no treatment", "treat if score>100", "treat if score>0" and "treat all". **RESULTS:** For individuals without risk factors for diabetes, the "treat all" strategy is the most expensive but allows to achieve better clinical outcomes, with a cost per QALY of 24,164€ vs. the strategy "treat if score>0". For those with risk factors for diabetes, the strategy "treat all" remains the most expensive, but the decrease in coronary events does not compensate the increase in diabetes incidence, whereby the strategy "treat all" is dominated by "treat if score> 0". The cost per QALY of this latter strategy in comparison to "treat if score>100" is 36,034€. Deterministic and probabilistic sensitivity analysis show that results are robust. **CONCLUSIONS:** The presence of risk factors for diabetes affects the cost-effectiveness of using coronary calcium score as a guide to implement primary prevention in this population.

PMD98

EXAMINING THE ECONOMIC IMPACT OF LABORATORY DEVELOPED TESTING IN FLOW CYTOMETRY IMMUNOPHENOTYPING FOR HEMATOLOGIC MALIGNANCIES: AN ANALYSIS OF HEALTH RESOURCE UTILIZATION

Smallwood C[1], Galama L[1], Apoll L[1], Heinrich K[2], Buchanan S[3], Demers J[3]
[1]*Becton, Dickinson and Company, Mississauga, ON, Canada,* [2]*Becton, Dickinson and Company, Franklin Lakes, NJ, USA,* [3]*St. Michael's Hospital, Toronto, ON, Canada*

OBJECTIVES: Each year approximately 900,000 new cases of hematological malignancies are diagnosed globally. Diagnosis is comprised of multiple modalities, including flow cytometry. Current laboratory developed testing (LDT) for flow cytometry is non-standardized and error prone. Insufficient research has been published evaluating the cost and errors in this space. Manual work, including steps such as antibody selection, compensation, and pipetting have been identified as potential sources of error in flow cytometry. The aim of this study is to quantify the time and associated economic impact of manual work in a flow cytometry process for hematological malignancies. **METHODS:** An observational study was conducted at a public Canadian acute care clinical laboratory in collaboration with a lean specialist team for the purposes of workflow analysis. The results of this pilot were used to inform this extended costing analysis. Evaluation of the instrument, reagent, and sample preparation was performed. Total opportunities for error in the workflow were identified (defined as steps involving manual efforts) and manual labor time was then used to estimate indirect costs. **RESULTS:** A total of 37 steps were involved in instrument set-up, 81 steps for manual reagent and sample preparation, each of these steps containing multiple opportunities for error. At a 550 bed institution performing 591 leukemia and lymphoma tests annually, it was estimated that a total of 365 hours of manual labor by a skilled medical lab technologist incurred indirect costs of $18,250. **CONCLUSIONS:** Based on this case study, manual work resulted in substantial cost to the laboratory in indirect costs. This suggests that in addition to reducing the potential for error, minimizing unnecessary manual steps in the flow cytometry workflow could also reduce laboratory indirect costs and improve efficiency. Future research is warranted to quantify the frequency of errors in manual steps in LDT for flow cytometry.

PMD99

ECONOMICAL AND ORGANIZATIONAL IMPACT OF ADOPTING DIFFERENT IN SITU HYBRIDIZATION TECHNOLOGIES TO ASSESS HER2 GENE AMPLIFICATION IN BREAST CANCER

Paolini D[1], Rossoni R[1], Guardione D[1], Arena V[2]
[1]*Roche Diagnostics S.p.A., Monza, Italy,* [2]*Policlinico Universitario, Rome, Italy*

OBJECTIVES: Human epidermal growth factor receptor 2 (HER2) status identification is established by immunohistochemistry and in situ hybridisation (ISH). Silver in situ hybridisation (SISH) is an alternative technique to the fluorescence in situ hybridization (FISH). Both methods are recommended by American Society of Clinical Oncology (ASCO)/College of American Pathologists (CAP) 2013 guidelines. The primary aim of this analysis is to evaluate the economical and organizational impact by adopting FISH or SISH test for HER2 testing. **METHODS:** We conducted an analysis to evaluate costs, times (laboratory personnel working hours) and laboratory-space to process a sample using the manual method (FISH) compared to the automated system (SISH). The analysis was performed from the pathology laboratory's perspective. We analysed the complete workflow (laboratory personnel and medical resource used) to perform the two tests (FISH and SISH) during pathol-