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SURROGATE SURVIVAL ENDPOINTS: ARE THEY SUFFICIENT TO SUPPORT ACCESS?

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Immuno-oncology therapies (IOs) have revolutionised metastatic cancer management over the last decade. These are now being investigated in earlier stages of cancer, where surrogate survival endpoints such as relapse-free survival (RFS), disease-free survival (DFS), and pathological complete response (pCR) are needed to bridge the evidence gap prior to maturation of overall survival (OS) data. This research assesses surrogate survival endpoints in supporting access/reimbursement in early-stage cancers. Publicly accessible assessments of early-stage cancer therapies by seven HTA-bodies (HAS, G-BA, Medicinrådet, NICE, SMC, PBAC, CADTH) up to May 2021 were extracted. 52 assessments of 11 drug:indication pairings were identified, which utilised four surrogate primary endpoints (RFS, DFS, invasive DFS, pCR). 30 were fully reimbursed, 11 restricted reimbursement, 11 not reimbursed. Payer support was defined as being considered clinically/patient-relevant and/or a valid surrogate to OS. RFS was the best-supported surrogate endpoint by HTA bodies (7/7), followed by DFS (5/7) and IDFS (5/7), while pCR (2/7) was least well-supported. NICE and SMC were the most supporting of access using surrogate endpoints, followed by G-BA, while CADTH was least supporting. Assessments were most positive where the magnitude of the surrogate benefit were greater/showed a superior benefit-risk and where early data showed a likely long-term OS benefit. However, some assessments from NICE/G-BA were conditional and contingent on more mature follow-up data being provided, and PBAC imposed a flow-on restriction limiting retreatment with IOs as later line(s) of therapy. Several IOs already approved and reimbursed in the metastatic setting are being investigated in the early-stage setting using surrogate survival endpoints. These surrogate endpoints have been widely utilised for regulatory approval, and as shown here, HTA bodies are supportive of some surrogate endpoints based on their patient relevance and/or their validated OS correlation.

Methods for Decision Modelling and Economic Evaluation

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THE EARLY LESSONS OF COVID-19: THE NEED FOR A BROADER HEALTH-ECONOMIC PERSPECTIVE

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Objectives: The current COVID-19 pandemic caused ~20,000 deaths and ~50,000 hospital admissions in the Netherlands. Efforts to manage this communicable disease and its impact on the health-care system without prior development of specific vaccines have put a strain on the fiscal budget. This study aims to indicatively quantify the impact of COVID-19 on the Dutch government's fiscal position, simultaneously indicating the value of preventive vaccines from a payer perspective. ***Methods:*** Dutch COVID-19 specific population data on laboratory-confirmed infections, hospital admissions and mortality, was collected from the domestic start of the COVID-19 pandemic on 27 February 2020 until the first administered vaccine on 6 January 2021. A fiscal health modelling approach was used to estimate the loss in tax revenues. Occurred productivity losses were added as an indicator for the future burden on the social security system. Tax revenue losses were caused by premature mortality, whereas the productivity losses occurred through mortality as well as morbidity. Outcomes were expressed in total monetary impact (€, 2020). ***Results:*** The impact of the pandemic in the analysed time-period was estimated to amount to a total of €920.7 million. Tax loss due to premature mortality amounted to €58.8 million with 50% attributed to patients >60 years. Productivity loss due to morbidity summed up to €862 million with 46% due to patients 40-59 years. ***Conclusions:*** The fiscal impact of the current pandemic highlights the importance of a broader approach to health-economic analysis. A fiscal health framework, optimally linked to a disease simulation model, is a better instrument to inform decision-making in the context of communicable diseases. The reported fiscal estimates also highlight the benefit of investments in communicable disease prevention such as anticipative development of vaccines. In the decision-making process around pandemic preparedness measures, investment funding and real-options can consequently be informed by a fiscal health framework.

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COST-EFFECTIVENESS ANALYSIS OF PHARMACOKINETIC-GUIDED PROPHYLAXIS VERSUS STANDARD PROPHYLAXIS IN ADULT PATIENTS WITH SEVERE HEMOPHILIA A IN CHINA

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Objectives: The objective of the study was to assess the cost-effectiveness of pharmacokinetic (PK)-guided prophylaxis with recombinant human coagulation factor VIII (FVIII) against standard prophylaxis in Chinese adult patients with severe hemophilia A. ***Methods:*** A Discrete Event Simulation (DES) model was developed to evaluate the cost-effectiveness of PK-guided individualized prophylaxis versus standard prophylaxis from the healthcare system perspective which simulated 10,000 patients over a 1-year time horizon. Standard prophylaxis FVIII dose was 30 IU/kg by intravenous injection. PK-guided prophylaxis dosage was adjusted for each patient to maintain the FVIII trough level at 1-5 IU/dL to reduce the risk of bleeding. Dosing interval for both approaches was set to be 48h. Population characteristics, clinical data and utilities were collected from published literature and expert survey. The health outcomes included Annual Joint Bleed Rate (AJBR) and Quality-Adjusted Life Years (QALYs). Model considered the prophylaxis drug costs and bleeding treatment costs in the evaluation. Incremental Cost Effectiveness Ratio (ICER) was estimated to support decision. Probabilistic sensitivity analysis was automatically incorporated throughout DES. ***Results:*** A total of 94.3% of patients receiving PK-guided individualized prophylaxis achieved the goal of maintaining the trough concentration at a level of 1 to 5 IU/dL compared with 62.7% on standard prophylaxis. AJBR in PK-guided and standard prophylaxis were 1.527 vs 1.601 and QALYs gained were 0.8384 vs 0.8383 respectively. The average FVIII dose for prophylaxis in PK-guided prophylaxis was 28 IU/kg. Prophylaxis drug costs and bleeding treatment costs in PK-guided prophylaxis (RMB 999,034; RMB 30,557) were both lower than those in standard prophylaxis (RMB 1,072,828; RMB 31,948). A total average savings of RMB 75,185 was obtained by the PK-guided approach. ***Conclusions:*** PK-guided individualized prophylaxis is a dominant treatment compared with standard prophylaxis for adult patients with severe hemophilia A in China, with slightly higher QALYs but lower total costs.

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EXCESS ANNUAL HOSPITAL COSTS DUE TO CARDIOVASCULAR EVENTS IN A CONTEMPORARY UK POPULATION TO INFORM HEALTH TECHNOLOGY ASSESSMENTS

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Objectives: Impacts of cardiovascular disease (CVD) events on hospital cost in contemporary populations are required to support health technology assessments. We developed models of annual hospital costs associated with a range of events of interest in CVD using the individual participant data from UK Biobank. ***Methods:*** All hospital admissions of the 502,493 participants in UK Biobank were costed using the UK Healthcare Resource Groups reference costs (2019 UK£). Separate annual hospital costs models were indicated for participants with (n= 444,177) and without history of CVD (n= 57,556). We compared one- and two-part generalized linear regression models (GLMs) (part 1: logistic regression for probability of incurring cost, part 2-GLM with Gaussian, Poisson or Gamma distributions using identity, log or squared root links for costs, conditional on incurring any), adjusting for participants' characteristics at entry (socio-demographic, clinical, prior diseases) and time-updated adverse events (myocardial infarction, stroke, coronary revascularization, cancer, diabetes, vascular death and non-vascular death) (p-value <0.01 in stepwise covariate selection). Standard errors were adjusted for clustering of annual periods by participant. Selected models were used to estimate the events' impacts on annual hospital costs. ***Results:*** For both participants with or without prior CVD, the two-part model with gamma distribution and identity link provided the best fit in modelling annual hospital costs. Overall, adverse events were associated with higher cost in participant with prior CVD than without prior CVD. In both populations, the highest excess costs were associated with years of incident cancer [mean and 95% confidence intervals for participants without and with prior CVD: 6095(5999-6191), 6232(5962, 6502)], coronary revascularization [6077(5920, 6234), 6693(6464, 6922)], stroke [5366(5129, 5603), 5856(5478,6234)], and non-vascular death [5317(5117, 5517), 6056(5652, 6460)]. ***Conclusions:*** These models could inform costs in health technology assessments in cardiovascular disease, such as cost-effectiveness analysis of interventions to reduce cardiovascular disease risks.

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EARLY HEALTH TECHNOLOGY ASSESSMENT TO GUIDE INTRODUCTION OF NOVEL TECHNOLOGY INTO THE MARKET: THE VOSTARS SYSTEM CASE STUDY

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Objectives: The aim of the study is to show potential approaches and usefulness of early Health Technology Assessment exemplifying the case study of the Video and Optical See-Through Augmented Reality Surgical System (VOSTARS), an advanced navigation tool for non-endoscopic surgeries, recently developed, also thanks to funding from H2020 programme. ***Methods:*** Surgeons in potential fields of application were surveyed about current practice, potential application of the system, perceived usefulness, intention to use, organizational issues, etc.. Those data, data from in vitro and in vivo tests and inputs from literature were used to inform early evaluation of different HTA dimensions comprising also cost-effectiveness (CEA) and budget impact analysis (BIA). ***Results:*** A total of 99 surgeons were surveyed. About