OBJECTIVES: Despite the flexibility of Discrete-Event-Simulation it is rarely used in decision analytic modelling in health care. To illustrate the benefits of applying this modelling approach, treatment allocation strategies for patients with cardiovascular disease are evaluated. This methodological study demonstrates how capacity constraints effect cost-effectiveness and additional parameters for decision-making. METHODS: Cost-effectiveness analysis is usually done for separate patient subgroups assuming unrestricted availability of capacities, or the capacity constraints are incorporated addressing only fixed waiting times. However, in “real-world” application, a successful new treatment given to only one subgroup of patients can influence the whole patient cohort over time. For example, when medical advances reduce the need for repeated interventions and procedures, it increases available capacity. Newly developed drug-eluting stents (DES) show promising reductions in repeated revascularizations in specific cohorts (i.e. diabetics). Treatment allocation strategies or guidelines determine which patients will receive DES versus the alternative bare-metal stents (BMS). A Discrete-Event-Simulation is used to estimate the outcome of treatment allocation strategies for cardiovascular disease including the long-term costs and effects of the procedures, utilization factors and budgetary information. The simulation assumes several capacity restrictions and takes into account daily patient arrivals and how they effect the system as a whole. RESULTS: In the stent simulation, a hypothetical capacity limitation for cardiovascular intervention changes the ranking of efficient treatment strategies in such a way that certain strategies become dominated. Therefore, these treatment options should not be taken into consideration. Furthermore, evaluating treatment strategies has the advantage of generating not only cost-effectiveness outcomes but also utilization and budgetary impact within the same simulation. CONCLUSIONS: Discrete-Event-Simulation provides a wide range of multiple perspective outcomes. In comparison to Markov and Decision-tree models, capacities can be explicitly incorporated. This can change the relative cost-effectiveness results and has significant impact on decision-making.

CLASSIFYING PATIENTS WITH DYSLIPIDEMIA: A LATENT CLASS ANALYSIS

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OBJECTIVE: To identify and characterize subclasses of patients with dyslipidemia in a nationally representative sample using Latent Class Analysis (LCA). METHODS: Dyslipidemia patients were identified from a national database of electronic medical records containing diagnosis, lab and medication information in primary care setting from 1997 to 2004. LCA was applied to patient classification based on patient demographics, biomarker measures (low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), total cholesterol (TC), and triglyceride (TG)), and pre-existing coronary heart disease (CHD), diabetes and hypertension. RESULTS: There were 72,533 patients included in this analysis. All information indices and Lo-Mendell-Rubin test consistently suggested that a 5-class model fit the data best. Patients were classified into one of the five classes with sizes of 17.7%, 9.6%, 29.4%, 32.6% and 10.8%, respectively. Patients in Class 1 were featured with 34.4% of HDL-C and 39.5% of TG abnormalities and high prevalence of CHD (29.6%), diabetes (31.5%), and hypertension (78.2%). Patients in Class 2 shared similar lipid-profile as those in Class 1, but smaller percent of them carried co-morbidities. Classes 3 and 4 were dominated by those with high LDL-C and TC, but higher percent of patients in Class-3 had co-morbidities. Class 5 was characterized by patients with abnormalities for all four biomarkers (80.0% for LDL-C, 76.8% for HDL-C, 99.4% for TC, and 81.4% for TG). Patients in Classes 1 and 3 were more likely on antidyshlpidemics at diagnosis, suggesting that co-morbid CHD, diabetes and hypertension are strong predictors of pharmacotherapy in primary care setting. CONCLUSIONS: LCA appears to offer a useful approach to studying case-mix of patients with dyslipidemia by classifying patients into clinically similar sub-groups, which might provide better insights to understand unmet needs and identify appropriate treatment options. Our findings suggest that co-