OBJECTIVES: Personalized medicine is characterized by an increasing number of tests and payer scrutiny over their value. Depending on the use of a test, health care costs and outcomes may change in predictable ways. **METHODS:** We describe six uses of tests, matching each with value hypotheses and a generic decision tree framework that may be used to study test cost-effectiveness. We make distinctions between screening (to identify those in a population likely to have or develop a disease), diagnostic (to diagnose), predictive (to predict response to or toxicity from a particular treatment, often referred to as a companion diagnostic), prognostic (to identify patients at risk for a specific outcome, regardless of the choice of treatment), surveillance (for patients with no sign of disease at completion of treatment to identify those at risk of recurrence), and monitoring (to detect response to treatment or disease progression) tests. We specify how each test is expected to affect health care costs and/or outcomes, followed by the nature and direction of the effects. We also show the importance of properly modeling the distinction between these tests. For example, by identifying earlier or more accurately patients at higher risk, a new screening test may lead to diagnosis at lower levels of disease severity, resulting (from treatment) in improved life expectancy (LE) and/or quality-adjusted LE. Also, by identifying patients at lower risk, a new screening test may reduce costs associated with unnecessary future testing. Comparatively, we find that salient elements of a general model structure for a new screening test include screening compliance and distribution by severity at diagnosis, which are less pertinent to other test uses. **CONCLUSIONS:** Tests may be expected to affect health care costs and outcomes in predictable ways depending on the type of test; we offer model structures that reflect these distinctions.

PRM58

TURNING THE IMPLAUSIBLE TO THE PLAUSIBLE: TOWARDS A BETTER CONTROL OF OVER THE COUNTER DISPENSING OF ANTIBIOTICS IN EGYPT

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As a developing country, Egypt has long suffered negative outcomes from irrational drug dispensing practices. This affected health economics adversely and increased the burden of antibiotic resistance. With limited research data on this specific area in Egypt, it becomes imperative to guide the researchers to potential adverse effects of over-the-counter dispensing on antibiotic resistance prevalence. This research aims to define the flaws in antibiotic dispensing in Egypt and its impact on the access to antibiotics. Spending on pharmaceuticals in Egypt constitutes 34% of the total health care spending. The Ministry of Health and Population has enforced several laws prohibiting over-the-counter dispensing of drugs. However, there is limited evidence on the effectiveness of those regulations on inappropriate dispensing. Literature review revealed that only one report that dates back to 1998 addressed this area of inquiry. Analysis of 1174 dispensed products in 25 different districted pharmacies in Alexandria showed that 60% of medications dispensed were without a prescription or a pharmacist recommendation. Among those products, there were 98 different antibiotic products of which 42% were dispensed without a prescription. Over all, Egypt suffers a high percentage of over-the-counter dispensing of drugs with little studies paying attention to this aspect in terms of antibiotic resistance patterns. Despite enforced laws prohibiting over-the-counter dispensing of drugs, further interventions are required. More strict laws must apply to pharmacists who do not comply with the official regulations of drug dispensing. Further studies should inquire into non-optimal dispensing practices. Educational campaigns for patients to increase their level of awareness are crucial to decrease wasteful drug spending and ensure approximate containment of newly emerging antibiotic resistance in the near future.

PRM59

TRADE-OFF ANALYSIS: AN EXTENSION OF THRESHOLD PRICING ANALYSIS

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BACKGROUND: Investment decisions are made on the basis of whether a new drug is expected to meet certain criteria specified in a target product profile (TPP). Similarly, such decisions assume a target price, which is used in calculations of return-on-investment. Assuming a payer-cost-effectiveness threshold, threshold pricing models are used to estimate the maximum value-based price assuming a new drug achieves its TPP, and to estimate minimum value-based efficacy, safety, and tolerability required to support a target price. To assess the effects of uncertainty, one-way and probabilistic sensitivity analyses may be tailored to apply to threshold pricing models; however, to assess the risk to attaining a target price if a new drug were to fail to achieve a particular criterion, it is essential to understand the relationships among the criteria listed in the TPP. **METHODS:** We describe an extension of threshold pricing analysis to include trade-off assessment. For example, a new drug may be expected to reduce the risk of hospitalization, reduce hospital length of stay, and reduce mortality, each by a certain amount, the combined achievement of which supports a particular value-based priced. Using trade-off analysis, it is possible to estimate the improvement required in one attribute to offset the failure of the new drug to achieve the expected effect in another attribute. In our example, trade-off analysis may suggest that if the new drug were to fail to produce an expected 5% mortality reduction, the new drug will need to quadruple the reduction in hospital length of stay to achieve the same value based price. We present tabular and graphical depictions of how multiple target attribute levels may offset each other in a new drug's ability to achieve a value-based price. **CONCLUSIONS:** Trade-off analyses when applied to a threshold-pricing model can make important contributions to value-based product development.

PRM60

OPERATIONALISING MULTIPLE CRITERIA DECISION ANALYSIS FOR HEALTH TECHNOLOGY ASSESSMENT

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OBJECTIVES: To discuss the different methods of multi criteria decision analysis (MCDA) that could be used in health technology assessment (HTA) and their relative merits. **METHODS:** The current practice of health technology appraisals is based on the incremental cost-effectiveness ratio (ICER) i.e. the incremental cost per quality adjusted life year (QALY) gained by recipients of treatment. Even though other factors (e.g. severity, life saving, etc) are considered along with ICERs, there is concern that its approach may fail to capture other important sources of value. MCDA is aimed at supporting decision makers faced with evaluating alternatives taking into account multiple, and often conflictive, criteria in an explicit manner. This paper addresses a number of important questions to identify the most appropriate MCDA method that might be used to support decision making. For example, what criteria should be incorporated? Whose weights should be used and how to elicit them? How to incorporate uncertainty into the MCDA process? How do we consider the value of displaced technologies? What should the 'basic' cost-effectiveness threshold be? How do we estimate it? This paper will discuss these questions, outline and assess methodological issues that would be raised by the use of MCDA in health technology assessment (HTA). **RESULTS:** A potential MCDA approach for HTA is to calculate "weighted" QALYs from the QALY weights which reflect the broader value of the product's benefits and compare against the updated "basic threshold" value. **CONCLUSIONS:** There are general practical issues that might arise from using this MCDA approach in the HTA process and further research needs to be performed to address the issues identified in order to ensure the success of this MCDA technique in the appraisal process.

PRM61

IF YOU HAVE 2 WATCHES THEN WHAT TIME IS IT ? SELECTING A DEFINITIVE SOCIAL VALUE SET FOR MEASURING HEALTH GAINS

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Regulatory authorities in many countries require that societal preferences are used when health (dis)benefits are reported in terms of quality-adjusted life-years (QALYs). In the United Kingdom the NICE reference case, as set out in its published technical guidance, cites EQ-5D as the requisite health-related quality of life (HrQoL) system and Time Trade-Off (TTO) as the preferred method for eliciting societal values. This stipulation is simple to assert, but virtually impossible to justify and/or operationalise in practice. Nevertheless this has been the UK default position for many years and has established a de facto national "norm". These issues, however, are global in nature and common to economic evaluation of healthcare in all countries. The UK "preference" for TTO is no more than that, for no scientific case has been made for rejecting Standard Gamble (SG), commonly acknowledged to yield systematically different estimates of utility. Both methods cannot be correct - one (at least) must be in error. It is patently absurd to consider them as commensurable equivalents in QALY calculations. In principle, a similar difficulty arises as new value sets are published, as will be the case in respect of the 5-level version of EQ-5D. Cost-utility analysis reported in the literature reveals a 10-fold difference in incremental benefits (change from baseline) when EQ-5D/HUI/SF-6D are used to compute QALYs, sufficient to reverse the location of an ICER with respect to any threshold. The central issue is that of updating the choice of a definitive value set for reference case analysis. This paper argues for a decision-centric approach in which a new metric may only be adopted if its use in measuring incremental effectiveness yields results that are consistent with those based on the existing reference standard. The argument is exemplified through the analysis of EQ-5D in published studies.

PRM62

VISUAL ASSESSMENT OF FIT OF EQUATIONS TO PREDICT TIME-TO-EVENT OUTCOMES

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Graphical tests are very useful for assessing the fit of statistical models. In linear regression models, for instance, a plot of predicted means against observed values can reveal systematic over- or under-prediction. Similar graphical tests are not necessarily straightforward for other types of regression models like those based on parametric survival distributions (e.g., to predict life-expectancy, time to progression of disease), particularly when multiple predictors are included in the model. The first complicating issue is censoring, which makes a scatter plot of individual observed and predicted values difficult to interpret. A better approach is to plot the empirical distributions (i.e., Kaplan-Meier curves) derived from the observed and predicted values, which inherently accounts for censoring in observed times. The second and more intricate issue is the definition of the predicted values. In linear regression models, predictions represent the mean of the underlying normal distribution that produced the observation. Since the normal distribution is symmetric, it is reasonable to expect half of the observations to fall below their means, and the rest to fall above. Parametric survival distributions are highly skewed, however, so that the mean would generally be expected to exceed most observed values. Similar problems arise if one uses the median (or any one particular percentile) as a reference, or plots the overall predicted curve at the mean predicted value of the regression parameter (i.e., the scale of the distribution). An accurate depiction of the overall predicted curve can be obtained instead by generating multiple random event times from each individual's predicted distribution, and using these to derive the overall predicted curve. The approach will be illus-