A SYSTEMATIC ANALYSIS OF CONCOMITANT MORBIDITY AND MORTALITY IN DIABETES

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OBJECTIVES: This study was designed to enhance our understanding of the burden of diabetes in the US.

METHODS: We analyzed age-specific odds ratios, relative mortality rates ratios (RMRR), changes in RMRR, prevalence, case-fatality and health care utilization associated with combinations of 1, 2, 3, 4, and 5 concomitant diseases in diabetes, such as cardiovascular, cerebrovascular, cancers, infectious, respiratory and central nervous system disorders. Combinations of multivariate linear and logistic regression models, standard SAS procedures and original linear true basic models were applied to a data bank system containing data in relational and SAS formats drawn from the 1991-1996 Multiple Causes of Death Files, 1996 Medical Expenditure Panel Survey, and 1987 National Medical Expenditure Survey.

RESULTS: From 1991 to 1996, the proportion of deaths among diabetes patients ≥65 years grew 8.3%. The age group “25-29” was characterized by an estimated 61% increase in the relative mortality rate ratio of 1.5. Respiratory conditions were associated with an estimated 23.5% of deaths among diabetes patients, compared to 23% for cerebrovascular disease. Primary causes of death in diabetes patients increased for ischemic heart disease (estimated 69% growth), atherosclerosis (43%), all respiratory conditions, including COPD (33%), breast cancer (33%), septicemia (26%) and acute cerebrovascular disease (11%). This resulted in premature diabetic mortality cost estimated at $3.2 billion in 1996. The estimated annual direct cost of treating high-risk diabetes patients reached $36 billion, 54% of which was paid by Medicare and Other Federal Programs.

CONCLUSIONS: Based on the estimated increases in case-fatality and mortality rates within employable age groups, treatment of diabetes with concomitant cardiovascular, respiratory, breast cancer, cerebrovascular and infectious diseases did not improve in the early 1990s. Much opportunity remains for improving mortality in diabetes.

Published utility estimates can vary over a wide range even for the same level of disease severity. As a result, cost-utility analysts seeking secondary utilities have difficulty choosing appropriate weights for QALYs.

OBJECTIVES: We performed two meta-analyses to derive pooled utilities for AIDS, symptomatic HIV, and asymptomatic HIV and minor, moderate, and major stroke. In addition, we sought to assess the relative importance of study design characteristics in predicting utility.

METHODS: We identified 26 articles reporting 75 unique utilities for HIV/AIDS and 20 articles reporting 53 utilities for stroke. Multiple utility estimates often appeared in the same article so that data were nested. Consequently, we used a Hierarchical Linear Model to perform each meta-analysis. Lacking the variance, studies were weighted by sample size.

RESULTS: For HIV/AIDS, disease stage (P = 0.016) and respondents (P = 0.014) were significant predictors of utility while elicitation method (P < 0.1) was marginally significant and scale bounds were not. Pooled utility estimates are 0.71 for AIDS, 0.82 for symptomatic HIV, and 0.93 for asymptomatic HIV when the time tradeoff method is used in patients and the scale is death to perfect health. For stroke, severity of stroke (P < 0.0001) and scale bounds (P = 0.0015) were significant predictors of utility, while the elicitation method and respondents were not. Pooled utility estimates are 0.52 for major stroke, 0.68 for moderate stroke, and 0.87 for minor stroke when the time tradeoff method is used in community members and the scale is death to perfect health.

CONCLUSION: Because the pooled utility estimates reported here are based on a comprehensive review of the literature, they should be of great use to researchers performing cost-utility analyses of interventions for HIV/AIDS as well as those designed to prevent or treat stroke, or where stroke is a possible side effect of therapy.

VALUE OF INFORMATION ANALYSIS OF THE DECISION BETWEEN CIPROFLOXACIN VS. TRIMETHOPRIM SULPHAMETHOXAZOLE FOR EMPirical TREATMENT OF WOMEN WITH PYELONEPHRITIS

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At the 2001 ISPOR Annual Meeting we presented a stochastic decision analysis of treatment of pyelonephritis with ciprofloxacin or trimethoprim sulphamethoxazole (TMP/SMX) based on an RCT.

OBJECTIVE: Using the same dataset, the purpose of this study is to analyze the value of funding research to reduce the uncertainty around the decision about which drug to prescribe.
METHODS: We used a non-parametric approach employing Monte Carlo simulation to determine the expected value of perfect information (EVPI) for the full model and for a particular model parameter (probability of resistance). We incorporated empiric distributions of the net benefits associated with each treatment for patients found to have sensitive and resistant bacteria (4 distributions for each model) created from 1,000 bootstrap replications of the mean cost and effect. The bootstrap replicates involved resampling from original cost and effect data about 210 patients of whom 47 had bacteria resistant to TMP/SMX. In the base case the net benefits were constructed from the mean cost and effect pairs by re-scaling the effects into a monetary value assuming a societal willingness-to-pay $200 to prevent one failure of treatment for pylonephritis. The model for the population assumed an incidence of 0.4% per annum for pylonephritis in the US and UK and that the decision would be valid for 10 years.

RESULTS: Ciprofloxacin is the a priori choice because it is associated with the maximum net benefit for each diagnostic scenario for each diagnostic setting in the model. Nonetheless, there is still residual uncertainty and the EVPI for the decision is $2.18 m for the US and £1.65 m in the UK. However, the partial evaluation revealed that the EVPI for the prevalence of resistance is only $3,048 in the US and £1,876 in the UK.

CONCLUSIONS: Uncertainty about the prevalence of resistance makes a minor contribution to the overall EVPI for the decision.

COST-EFFECTIVENESS OF NEW RAPID SCREENING TECHNOLOGIES FOR GONORRHEA IN URBAN EMERGENCY ROOM DEPARTMENTS
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OBJECTIVES: The prevalence of Neisseria gonorrhoeae (GC) among adolescents and young women attending urban emergency rooms (ER) ranges from 3% to 10% but screening has historically not been feasible in this setting. Our objective was to assess the cost-effectiveness of newer technologies that bypass the need for a pelvic exam and reduce loss to follow-up.

METHODS: We developed a state-transition Markov model of the natural history of GC and simulated screening, diagnosis, and treatment in a cohort of 10,000 15-year-old U.S. women. Adopting a societal perspective, we compared no screening to selective age-based screening using either the: 1) ligase chain reaction (LCR) on a urine sample; or 2) rapid immunochromotographic assay (RIA) on a clinician-collected vaginal sample. We assumed 80% of LCR screen-positive women would be treated (20% loss to follow-up) and 100% of RIA screen-positive women would receive immediate treatment. We assumed a peak GC prevalence of 6%. Clinical outcomes included cases of GC, pelvic inflammatory disease (PID), major PID sequelae, and quality-adjusted life expectancy (QALE). Economic outcomes included incremental cost-effectiveness ratios (cost per quality-adjusted life year saved). Data were obtained from population-based studies, national databases and published literature.

RESULTS: Compared to no screening, screening women aged 15 to 24 with RIA was more effective and cost-effective (i.e., dominated) than LCR and cost $1,850 per QALY. Provided the RIA assay (base case $20) was less than $100, the cost-effectiveness ratio for screening with the rapid test was less than $10,000 per QALY. Results were stable despite varying the prevalence of GC, direct medical costs, and quality of life weights over a wide plausible range.

CONCLUSIONS: Screening for GC within an urban-ER setting using the new RIA test facilitates rapid screening and treatment and has a cost-effectiveness ratio that is more attractive than many current preventive health interventions.

THE COST OF ANTIRETROVIRAL THERAPY IN THREE CENTRAL AMERICAN COUNTRIES
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OBJECTIVE: Brazil's universal access to HIV treatment and drug price reductions have affordably treated large segments of the country's HIV-infected population. Several countries in Central America have large HIV-infected populations without access to care. This analysis examines the feasibility of applying Brazil's universal access to treatment and drug price reductions given the economic conditions in three Central American countries: Guatemala (n = 71,050), El Salvador (n = 19,400), and Belize (n = 2,400).

METHODS: Each country's HIV population not currently receiving antiretroviral therapy was estimated. For each population, the cost of two-drug and three-drug combination antiretroviral therapy was estimated by applying 2000 Brazilian prices (in U.S. dollars). The ratio of drug costs to gross domestic product was determined to measure each country's relative ability to pay for the cost of treatment. The Brazilian rate of cost savings from averted hospitalizations was subtracted from each country's drug cost estimates to determine total cost of treatment.

RESULTS: In Guatemala, the drug costs for treating the HIV population ranges between $54.2 (0.117% of GDP) and $335.1 (0.725%) million depending on whether double or triple combination therapy is used. The costs range between $14.8 (0.062%) and $91.5 (0.381%) million in El Salvador, and between $1.8 (0.232%) and $11.3 (1.433%) in Belize. Potential hospitalization costs averted were $80.5 million in Guatemala, $22.0 million in El Salvador, and $2.7 million in Belize. Given these costs averted, the total cost of treatment ranges between $28.5 (cost savings) and $252.4 million in Guatemala depending on whether double or triple combination therapy is used.