therapy is used, between ~$7.9 and $68.8 million in El Salvador, and between ~$888.8 thousand and $8.6 million in Belize.

CONCLUSIONS: Since the ratio of antiretroviral drug costs to GDP was 0.041% in Brazil in 2000, these three Central American countries may have more difficulty affording antiretroviral therapy unless double combination therapy is used.

SESSION II

METHODOLOGY ISSUES I

HANDLING MISSING DATA IN STOCHASTIC COST-EFFECTIVENESS ANALYSIS: THE IMPACT OF IMPUTATION METHODS ON ESTIMATES OF THE PHYSICAL QUANTITIES OF MEDICAL CARE RESOURCE USE
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OBJECTIVE: An issue that has recently received attention from health economists is how to handle the problem of missing data in stochastic cost-effectiveness analysis. The purpose of this paper is to highlight the impact that different approaches to the imputation of missing data can have on estimates of the physical quantities of medical care resource use.

METHODS: Medical care resource use data were collected prospectively in a 6-month RCT comparing two treatments for a chronic condition that is characterised by acute episodes. Two approaches of the multiple imputation were used to address the problem of missing data. Method A relied on imputing missing data for total costs and then estimating the physical quantities of medical care resource use. Method B relied on imputing missing data for the physical quantities of medical care resource use and then estimating total costs. Results for physician and nurse visits and days in the hospital were reported.

RESULTS: The two multiple imputation approaches produced different estimates of medical care resource use. For method A, the average number of physician and nurse visits and days in the hospital between the two groups were 5.7 vs. 5.3 physician visits, 1.0 vs. 0.9 nurse visits, and 4.0 vs. 4.7 days in the hospital. For method B the average number of physician and nurse visits and days in the hospital between the two groups were 6.0 vs. 6.3 physician visits, 1.2 vs. 1.3 nurse visits, and 4.0 vs. 5.0 days in the hospital.

CONCLUSIONS: Medical care resource use estimates are sensitive to the imputation approach. Method B builds prediction models specifically for the utilisation components under the imputation and results from the imputed datasets are believed to be less biased. It also provides more flexibility for analysing the cost components.

COST-EFFECTIVENESS VS. COST-UTILITY ANALYSIS: DOES ADJUSTING FOR HEALTH-RELATED QUALITY OF LIFE REALLY MATTER?
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The US Public Health Service Panel on Cost-Effectiveness issued a series of recommendations designed to improve the rigor and consistency of cost-effectiveness analyses. While the Panel’s individual recommendations are largely sound, they nevertheless vary in importance. That is, the violation of some recommendations will yield dramatically different cost-effectiveness estimates and resource allocation decisions than the violation of other recommendations.

OBJECTIVE: The Panel has advocated the use of quality-adjusted life-years (QALYs) as the best way to evaluate outcomes in a cost-effectiveness analysis. We consider the importance of this recommendation for cancer prevention, screening, and treatment by studying the empirical relationship between cost/life-year and cost/QALY. In addition, we consider whether adjusting for health-related quality of life (QOL) affects the ultimate resource allocation decision implied by the cost-effectiveness ratio.

METHODS: We identified 198 articles reporting two or more outcome measures for the same intervention: cost/life-year, cost/QALY, total life-years, total QALY’s, incremental life-years, or incremental QALY’s. We calculated a correlation matrix for these outcomes and performed a regression analysis to examine the relationship between cost/life-year and cost/QALY. We also employed various willingness to pay (WTP) thresholds to assess whether the use of cost/life-year would yield different resource allocation decisions than cost/QALY.

RESULTS: The correlation between the total life-years and total QALY’s associated with the intervention is 0.97 (P < 0.0001). The correlation between cost/life-year and cost/QALY is 0.78 (P < 0.0001). Assuming a $50,000 WTP threshold, adjustment for QOL would affect choice in 7% of cases. With a $400,000 threshold, QOL would affect choice in 2% of cases.

CONCLUSION: The outcome measures of life-years and QALY’s are highly correlated with one another. While adjusting for QOL can make an important difference in some economic analyses, it generally does not affect implied resource allocation decisions for cancer prevention, screening, and treatment.

IMPORTANCE OF CONSIDERING SENSITIVITY AND SPECIFICITY OF SCREENING METHODS IN HEALTH ECONOMIC ANALYSES OF DIABETIC NEPHROPATHY SCREENING POLICIES
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OBJECTIVES: Most health economic models assessing policies for screening for diabetic nephropathy assume 100% sensitivity and specificity of screening methods. We tested the impact considering these factors on cost-effectiveness of screening for diabetic nephropathy in type 2 diabetes.

METHODS: A Markov model simulated the progression of patients from no renal disease, to microalbuminuria (MAU), to gross proteinuria, and eventually to renal failure. Data were derived from published sources. Costs and life expectancy (LE) (discounted at 3% per annum) and incremental costs/life year gained (ICLYG) were calculated for a MAU screening program (treating with ACE inhibitors if detected) versus no screening assuming 100% sensitivity and specificity of the screening method (scenario 1), and were compared to those calculated with more realistic values of sensitivity 71% and specificity 98% (scenario 2). A US Medicare perspective was taken.

RESULTS: Costs and LE in a typical type 2 population for scenario 1 were: $7,047 and 12.70 years in the screened population, and $11,465 and 12.43 years in the unscreened population, with screening reducing overall costs and increasing life expectancy. For scenario 2, costs and LE in the screened population were $7,303 and 12.66 years, (and remained unchanged in the unscreened population). Sensitivity analysis of the sensitivity of screening showed that at sensitivities below 50%, LE and costs exponentially approached those of the no screening strategy.

CONCLUSIONS: While affecting the absolute values for costs and LE, more realistic assumptions about the sensitivity and specificity of screening methods for nephropathy had little impact on the relative results, with a nephropathy screening program dominant to no screening under both sets of assumption. If sensitivity of a nephropathy screening test is <50%, sensitivity should be incorporated in future nephropathy health economic models assessing screening intervention policies.

THE DANGER OF IGNORING POPULATION HETEROGENEITY WHEN MARKOV MODELS ARE USED FOR COST EFFECTIVENESS ANALYSIS

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OBJECTIVES: To determine the impact of ignoring population heterogeneity when Markov models are used to estimate cost effectiveness ratios.

METHODS: We constructed a simple Markov model with three health states: healthy, sick, and dead. We modeled heterogeneity by assuming that there are two risk groups (high- and low-risk) differentiated by their probability of getting sick. We used the Markov model to estimate the incremental cost effectiveness ratio (ICER) of a medical intervention that reduces the probability of becoming sick among high-risk individuals but cannot be targeted to a single risk group. We used two methods to estimate the ICER for the intervention: 1. pooling the two risk groups together into a single homogeneous population; and 2. analyzing the two heterogeneous groups separately.

RESULTS: We prove algebraically that the pooled model always overestimates the number of quality adjusted life years of survival (QALYs) gained as a result of a medical intervention. The pooled model may overestimate or underestimate the incremental costs depending on the relationships between several parameter values. Thus, the pooled model may overestimate or underestimate the ICER of an intervention. If all costs vary directly in the amount of time spent in each health state, then both methods always yield the same ICER. These results can be extended to Markov models with more than three health states.

CONCLUSIONS: Ignoring heterogeneity may lead to erroneous ICER estimates when Markov models are used to represent disease progression. Since the sign of the error depends on several parameters it may be difficult to interpret comparisons of the results of modeling studies. These problems may not be alleviated by selecting conservative parameter estimates. The simplifying assumption of combining heterogeneous population groups should thus be avoided. Policy makers should be aware of these results when interpreting ICERs estimated using Markov models.

HEALTH POLICY—COMPLIANCE ISSUES

SUB-OPTIMAL STATIN COMPLIANCE IN PRIMARY AND SECONDARY PREVENTION POPULATIONS: SHOULD WE TARGET PATIENTS WITH THE MOST TO GAIN?

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OBJECTIVE: The number needed to treat to achieve the mortality benefit of HMG-CoA reductase inhibitors (statins) is substantially lower for secondary prevention populations when compared to primary prevention populations. To determine whether patients with “most to gain” are more compliant, we compared statin compliance in primary and secondary prevention populations in a midwestern managed care organization.

METHODS: Non-Medicaid MCO enrollees who filled ≥2 statin prescriptions from January 1998 to November 2001 were included. Administrative data classified patients as secondary prevention (diagnosis of AMI or had undergone PTCA or CABG) or primary prevention (all others). Compliance was assessed by quantifying the number of days without medication (cumulative multiple refill-interval gap [CMG]) for 2 periods: 1) while actively taking statin (until last filled prescription ends), and 2)