CONCEPTUAL PAPERS & RESEARCH ON METHODS – Cost Methods

**PMPC2** REVIEW OF PHARMAECONOMIC RECOMMENDATIONS FOR THE DEFINITION OF A SOCIETAL PERSPECTIVE
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**OBJECTIVES:** To compare the ways pharmaeconomic (PE) guidelines in European and North American countries define the societal perspective for economic evaluations. METHODS: Full-text country-specific PE guidelines were obtained via the ISPOR website and where possible cross-referenced with Health Technology Assessment (HTA) guidelines. The following countries were selected for comparison: Belgium, Canada, Finland, France, Italy, Norway, The Netherlands, Portugal and Sweden. The cost categories considered for the societal perspective were assessed and compared between country guidelines. RESULTS: PE guidelines from eight of the selected countries identified specific cost categories for the societal perspective. Guidelines agreed that the direct costs associated with this perspective included costs to the health service, costs to other publicly funded services and costs to patients/family. Costs of time lost by family/unpaid carers was considered by 6/8 guidelines, which could be considered either direct or indirect. There were differences in the indirect costs considered; costs of time lost by patients was only considered by 2/8 guidelines. Intangible costs were considered by 4/8 guidelines, although it was generally accepted that these should be accounted for in the outcome measurement rather than through costs. Productivity loss was considered as an indirect cost by nine guidelines; however the preferred method of derivation differed between guidelines: 2/9 guidelines preferred the Friction Cost Method (FCM) and 3/9 guidelines preferred the Human Capital Method (HCM). Moreover, there were differing views regarding the types of productivity loss to include: Portugal recommended considering employee-related lost costs only, whereas Canada also included loss to the employer associated with hiring new staff. CONCLUSIONS: There are subtle differences between the ways the societal perspective is defined by PE guidelines in Europe and North America. This could be considered when designing evidence generation activities to support economic modelling, and may ultimately impact the outcome of HTA decisions.

**PMPC3** REVIEW OF COST EFFECTIVENESS ANALYSES THAT INCORPORATE NUMBER NEEDED TO TREAT/HARM VALUES
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**INTRODUCTION:** Number needed to treat/harm (NNT/NNH) values are universally understood and applied by clinical decision makers. Therefore providing these values alongside cost effectiveness analysis (CEA) results may increase the relevance and clarify clinical implications of CEA to decision makers. **OBJECTIVES:** To review the literature of CEA studies that incorporate NNT/NNH values. **METHODS:** We searched PubMed using the Mesh term “cost-benefit analysis” and “number needed to treat”, “number needed to harm”, “NNT”, “NNH”. We included CEA studies and studies describing relationships between NNT/NNH and quality adjusted life years (QALYs) published in English. RESULTS: There were 102 publications identified. Of these 47 provided both CEA and NNT/NNH results. There were 43 (91.5%) studies published in clinician-focused practice journals, 2 (4.3%) in policy journals, and 2 (4.3%) in economic journals. The CEA incorporated NNT/NNH directly as part of the CEA ratio in 23 (48.9%) studies and CEA was separately stated from NNT/NNH in 46 (94.9%) studies. The CEA was expressed as cost per QALY distinctly from NNT/NNH in 10 (21.3%). The focuses of the articles were disease, treatments in 28 (59.5%) studies, disease prevention in 15 (31.9%), and patient education or disease management in 2 (4.3%) each. Also, there were 4 studies regarding relationships between NNT/NNH and QALYs. CONCLUSIONS: We found that the majority of articles incorporating NNT/NNH into CEA were published in clinical practice journals and most involved comparisons of specific disease treatments. Incorporating NNT/NNH into CEA results may improve relevance to clinical decision-making, but further research is needed regarding how they are being integrated. One alternative may include weighting NNT/NNH values for different outcomes in terms of QALYs.

**PMPC4** THE DERIVATION OF TRICARE SPECIFIC CONSUMER PRICE INDICES FOR PRESCRIPTION DRUGS
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**OBJECTIVES:** One of the core issues in pharmaceutical utilization management is the dearth of accurate price benchmarks available to establish pharmacy-pricing performance. This paucity of appropriate benchmarks is further complicated for organizations, such as TRICARE, who have reason to believe that their demographics and medical disease profiles yield above average prescription drug market baskets. Thus, to obtain an accurate assessment of organizational performance, organization-specific indices need to be developed. METHODS: A unique approach to developing organization-specific benchmarks is underway in a joint venture between the TRICARE Pharmacy and Operations Department (POD) and the University of New Mexico College of Pharmacy, Albuquerque, NM, USA. RESULTS: We are developing a consumer price index based on our organization's specific market basket. The basic premise is that a market basket index is a measure of the consumer price level of a basket of goods or services over time. Initially, we have approached the development of the TRICARE Consumer Price Index (CPI-TR) through the concept of developing a CPI specific to the organization with at least 100,000 lives. We used 2001-02 data and the Consumer Price Index (CPI) for the year 2001 to establish a baseline index. It was our goal to develop a consumer price index that would specifically address the price of pharmaceuticals to TRICARE subscribers. Phase 1 of the project was to develop a detailed market basket to be used as the basis for the index. Phase 2 was to run an economic change model to determine a monthly change for the index. CONCLUSIONS: We have developed a novel and unique method for developing organization-specific CPIs. This method employs the concept of a health care consumer price index. The TRICARE CPI will be developed using specific pharmaceuticals consumed by TRICARE subscribers. This method can be applied to any organization with extensive data regarding the costs and frequencies of the organization's marketed basket of pharmaceuticals. This methodology has been applied in Phase I and is currently being applied in Phase II. The resulting CPIs will be used to assess the effectiveness of economic evaluations and to set the cost of pharmaceuticals to TRICARE subscribers.

**PMPC5** VALIDATING A WEB-BASED INCREMENTAL COST-EFFECTIVENESS SOFTWARE PROGRAM THAT USES A MARKOV TRANSITION MATRIX ANALYSIS MODEL
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**OBJECTIVES:** Commercial software can be expensive when conducting pharmaco-economic analyses. We developed a free web-based software program, which incorporates Markov transition probabilities to compare the cost-effectiveness of any two treatments. The web-based software program was based on the model described in a decision modeling for health economic evaluation textbook, edited by A. Briggs. This Markov web-based software program calculates the incremental cost-effectiveness based on Markov matrices using multi-state transition probabilities, along with corresponding Markov state costs and utilities and graphically displays the results, using JavaScript algorithms and is available free at www.healthstrategy.com. The variable inputs for two treatment options include state transition probabilities, number of cycles, cost per state, and utility per state. The software creates a plot of incremental costs versus incremental utilities in cost-effectiveness quadrants; and with death as an absorbing state, also graphs life expectancy curves for two treatment comparisons. The objective of this study was to validate this free web-based software. METHODS: The Excel spreadsheet structure and data downloaded from the web for the specific example described in the modeling textbook were used as the reference case. RESULTS: For the example used, considering four transition states for each therapy option, and 20 cycles with no discounting, the MS Excel spreadsheet model versus the web-based JavaScipt program showed as follows: average incremental US dollar costs: ($67701 vs. $67833), average incremental utility: (5.89 vs. 5.90) and average incremental cost-effectiveness ratio:($11500 vs. $11494). CONCLUSIONS: This free web-based Markov matrix JavaScript program gives similar results as the MS Excel spreadsheet model. With this free software, the user can input their own parameters, and generate incremental costs, incremental utilities, life expectancy curves, and incremental cost effectiveness ratios. This free web-based software has potential benefit as an educational tool for students and health professionals interested in exploring these analytical approaches.

**PMPC6** USE OF CLINICAL SIMULATION CENTERS TO CONDUCT PATIENT-CENTERED TIME-AND-MOTION SIMULATIONS AS A BASIS FOR ECONOMIC ANALYSIS
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**BACKGROUND:** Patient-centered professional practice and technology assessment research performed in health professional schools’ clinical simulation centers is a novel concept. Opportunities can be created for multidisciplinary collaboration relative to evaluation of medication regimen and device complexity. Micro-level costs can then be assessed and economic analysis conducted in a more precise fashion than in traditional clinical trials or database outcomes analysis. **METHODS:** One university’s pharmacy and nursing schools’ clinical simulation centers were used in two separate projects to conduct time-and-motion and activity-based costing analyses specific to...
work-related activities consisting of nurse, pharmacist, and/or patient medication dispensing, preparation, administration and/or storage. Projects consisted of time and cost differences related to 1) three proton pump inhibitor dosage forms and seven administration methods, and 2) seven recombinant human growth hormone administration methods. Performance-based time and cost data were then used to determine personnel/patient opportunity time and supply costs associated with different forms of medications and delivery devices. Simulations were developed and used to hold independent variables constant so only observed differences between medications and/or administration methods were assessed. Statistical and micro-economic cost analyses were conducted specific to each type of medication and/or device. RESULTS: Processes and results show two detailed examples as case studies of how simulation-based research may be used to assess health care processes at the micro level. The advantages of isolating and decoupling factors from the day-to-day complexities of patient care processes as demon-

CONCLUSIONS: Demonstrate a technique to characterize the economic burden of illness over time, correcting for censoring bias and controlling for differences in baseline characteristics between comparison groups. A sample of patients with diagnosis of disease A in 2004–2008 were extracted from MarketScan® databases and followed to death, disenrollment, or December 31, 2008 (cases). The first diagnosis date was the index date. Enrollees without disease A were extracted as controls. Their index dates were assigned based on the distribution of index dates of cases. METHODS: First, Kaplan-Meier estimates for the probability of remaining in the data were calculated by month and disease status. Failure event was death or disenrollment. Censoring event was termination of MarketScan contract or end of study period. Next, total health care costs were estimated using generalized linear models (GLM) on the sub-

CONCEPTUAL PAPERS & RESEARCH ON METHODS – Databases & Management Methods

The percentage of patients ascribed comorbidities will vary significantly depending on the number of observation months. Obviously, the incidence rate for new events/diagnoses contributes to the increase over time. However, researchers must be careful since some comorbidities may not be associated with frequent enough physician office visits to accurately detect existing comorbidities when the number of observation months is short.

DATA SCAFFOLDING: A PRAGMATIC APPROACH TO STRUCTURING A LITERATURE REVIEW SPREADSHEET TO MAXIMIZE INFORMATION, CONSISTENCY, AND EASE OF USE AND REVIEW – DATABASES & MANAGEMENT METHODS

Thomson Reuters, Cambridge, MA, USA; Thomson Reuters, Washington, DC, USA

OBJECTIVES: Demonstrate a technique to characterize the economic burden of illness over time, correcting for censoring bias and controlling for differences in baseline characteristics between comparison groups. A sample of patients with diagnosis of disease A in 2004–2008 were extracted from MarketScan® databases and followed to death, disenrollment, or December 31, 2008 (cases). The first diagnosis date was the index date. Enrollees without disease A were extracted as controls. Their index dates were assigned based on the distribution of index dates of cases. METHODS: First, Kaplan-Meier estimates for the probability of remaining in the data were calculated by month and disease status. Failure event was death or disenrollment. Censoring event was termination of MarketScan contract or end of study period. Next, total health care costs were estimated using generalized linear models (GLM) on the sub-

ECONOMIZING TIME-PROFILED ECONOMIC BURDEN OF ILLNESS

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OBJECTIVES: Researchers frequently use claims data to create comorbidity measures. The objective of this project was to examine how the number of months of observation data and the type of claims data can affect identification of comorbidities. METHODS: Inpatient (IP) and outpatient (OT) claims data were used to identify comorbidities for beneficiaries enrolled in a state Medicaid program. Beneficiaries were included if they were enrolled continuously for a 24-month period between January 2002 and December 2004. Data were used to identify the first month in which an ICD-9 code appeared for each of the 17 comorbidities included in the Charlson Comorbidity Index. The D’Hoore scoring system was used to identify ICD-9 codes associated with each comorbidity. Results from the IP and OT claims were combined to create overall comorbidity measures. RESULTS: The study included a total of 618,337 unique patients. The OT claims could identify almost all comorbidities (low of 88.0% for myocardial infarctions, high of 99.3% for diabetes). IP claims were much less likely to identify comorbidities (low of 11.5% for coronary artery disease, high of 99.5% for diabetic event). At 12 months, less than half of the beneficiaries with comorbid events during the 24-month period had been identified for dementia (43.9%), cerebrovascular disease (45.6%), peripheral vascular disease (45.6%), and myocardial infarction (48.4%). In contrast, 78.1% of patients with diabetes, hypertension and 69.0% of patients with chronic pulmonary disease events had been identified at 12 months. CONCLUSIONS: The percentage of patients ascribed comorbidities will vary significantly depending on the number of observation months. Obviously, the