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PANEL ANALYSIS OF CENSORED MEDICAL COST DATA

Baser O1, Gardiner J, Bradley C, Yuce H, Given C2

1The MEDSTAT Group, Ann Arbor, MI, USA; 2Michigan State University, East Lansing, MI, USA

OBJECTIVES: This paper applies the inverse probability weighted (IPW) least-squares method to estimate the effects of treatment on total medical cost, subject to censoring, in a panel-data setting. Two analyses were performed to examine how patient-and treatment-related variables explain total medical costs for older persons newly diagnosed with lung cancer.

METHODS: IPW pooled ordinary-least squares (POLS) and IPW random effects (RE) models are used. Because total medical cost might not be independent of survival time under administrative censoring, unweighted POLS and RE can not be used with censored data, to assess the effects of certain explanatory variables. Even under the violation of this independency IPW estimation gives consistent asymptotic normal coefficients with easily computable standard errors. A traditional and robust form of the Hausman test can be used to compare weighted and unweighted least squares estimators. RESULTS: The methods are applied to a sample of 201 Medicare beneficiaries diagnosed with lung cancer between 1994 and 1997. Regional stage decreased total cost of care almost 68% according to IPW POLS and 41% according to IPW RE compared to in situ or local stage cancer. A person who received radiation only decreased the total medical cost relative to mean cost for surgery plus adjuvant therapies. The estimates with respect to IPW POLS and IPW RE are 72% and 49%. The Hausman Tests, in comparison between POLS and IPW POLS, RE and IPW RE models suggest that there exist no bias due to censoring. CONCLUSION: Measurement of treatment cost is especially important in the evaluation of medical intervention, in the analysis of clinical trials and in social experiment. Currently, statistical methods that are applicable to administrative data-which is often censored- are under developed. We offered a model which solves possible selection bias due to censoring.

CE3

THE COSTS OF ADJUVANT CHEMOTHERAPY IN EARLY STAGE BREAST CANCER PATIENTS: COMPARISON OF ATTRIBUTABLE COST AND MICROCOSTING APPROACHES

Oestreichner N, Veenstra DL, Linden H, McCune J, Ramsey SD

1University of Washington, Seattle, WA, USA; 2University of Washington, Fred Hutchinson Cancer Research Center, Seattle, WA, USA

The Costs of Adjuvant Chemotherapy in Early Stage Breast Cancer Patients: Comparison of Attributable Cost and Microcosting Approaches. Objective: To evaluate and compare the costs of adjuvant chemotherapy in early stage breast cancer patients utilizing attributable cost and microcosting approaches. METHODS: For the microcosting analysis, we determined utilization based on clinical guidelines using adriamycin and cyclophosphamide as adjuvant chemotherapy. Resource prices were based on reimbursements for drugs and procedures from Regence Blue Shield, a managed-care organization in the Pacific Northwest. The attributable cost approach estimates cancer-related costs as the difference between total costs of female breast cancer patients and costs of age- and gender-matched control subjects without breast cancer. Attributable costs were derived using the Kaplan-Meier Sample Average Estimator. Breast cancer cases were identified from a linked database of Regence Blue Shield claims records and the Surveillance, Epidemiology and End Results (SEER) cancer registry for Western Washington State. We hypothesized that attributable costs would be higher than microcosting because it more extensively accounts for treatment of chemotherapy-associated complications. RESULTS: We identified 1356 breast cancer cases for the analysis. Utilizing the microcosting approach, we estimated that adjuvant chemotherapy costs, including costs of chemotherapy and anti-nausea agents and surgical, laboratory and other procedures, were approximately $4013. Attributable costs of adjuvant chemotherapy were estimated to be $5330 in preliminary analyses. CONCLUSIONS: The integration of managed care claims data with clinical data from the SEER registry offers a unique opportunity to derive potentially more accurate disease burden costs in oncology. The results of our study will be useful for better understanding the differences between costing methods, informing cost-effectiveness models in breast cancer and evaluating the economic burden of the disease.

CE4

AN ACTUARIAL APPROACH TO ESTIMATING THE STREAM OF COSTS ASSOCIATED WITH BREAST AND COLORECTAL CANCER

van der Heijde MK

Milliman USA, Denver, CO, USA

OBJECTIVES: While many cost-effectiveness analysts devote considerable effort to estimating the costs of the intervention, most do not rigorously evaluate the medical cost implications of the disease. Medical cost data is often old, inaccurate, or ignores the cost implications over time. Using actuarial methods, we develop rigorous estimates of the stream of medical costs associated with breast and colorectal cancer. METHODS: Using a 350,000 annual member, 7-year longitudinal claims database, we assessed the full stream of treatment costs following, and leading up to, the diagnosis of cancer. To aid analysts so that they need not add Markov states for each year of the disease in order to capture these costs, we demonstrate how, using life contingencies, this detailed cost stream can be represented as single present value or annualized cost. RESULTS: Many cost-effectiveness analysts do not incorporate the full stream of medical costs associated with a disease. As a result, they typically underestimate medical costs. For example, for preventive interventions, the increased costs prior to formal diagnosis should be considered because preventing the disease may avert some of these costs as well. Further, because the medical costs are inevitably higher in the earlier years of a disease, and because the use of discounting effectively weights early costs more heavily than later costs, the repeated use of a single average annual cost value will underestimate the present value of the stream of costs. CONCLUSIONS: The use of actuarial methods allows for improved estimation of the stream of costs associated with cancer.

HEALTH CARE MODELING

HM1

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