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B4-4:

A Novel Technique for Analysis of Uncontrolled Confounding in Non-experimental Comparative Effectiveness Research

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Background/Aims: Comparative effectiveness research (CER) investigates the effects of treatments and practices, thus requires causal inference. Routine data such as billing, pharmacy or EHR, while often incomplete on important confounding variables, are the usual sources of information for nonexperimental CER. The lack of randomization introduces important considerations regarding uncontrolled confounding, especially in large datasets, which potentially magnify systematic error. Yet, quantitative bias analysis in CER is not common practice. In this paper we formalize and demonstrate easy-to-implement record-level simulation techniques for analysis of uncontrolled confounding in cancer treatment CER. **Methods:** We use recent advancements from the causal theory and risk analysis literature, specifically directed acyclic graphs (DAGs), and Monte-Carlo simulation techniques to introduce a novel form of record-level missing variable imputation that can be implemented during the core data analysis stage, making bias analysis more accessible using standard statistical packages. Further, our methods take into account varying levels of uncontrolled confounding by research center, or other clustering variable that may predict the level of unknown information in the dataset, and are specifically designed for implementation in large datasets, or data from multiple sources. We demonstrate these methods with two example sensitivity analyses of uncontrolled confounding in cancer treatment CER. **Results:** Our methodology highlights the underlying causal model assumed for the main analysis in CER. Our technique uses the observed data lacking important confounding variables and informed estimates of the unmeasured variables to impute missing variables. The new variables now have a joint distribution with the observed data that would have been the case had they been observed fully under the assumed interrelationships. This technique is intuitively in line with the missing data framework and inference using partially observed distributions. **Conclusions:** Sensitivity analysis for uncontrolled confounding is feasible and indispensable for CER. Unlike existing formula-intensive external adjustment techniques, the new technique can be implemented during core data analysis, is not outcome model specific, is at most semi-parametric and requires no esoteric software. Quantitative uncertainty analysis should be routine practice for CER in large observational data sources. Flexible methods accessible to all researchers should be a priority in this growing area of research.
Keywords: Bias analysis; Comparative effectiveness research

PS1-10:

How Can the Same Practice Be Classified as Having 2 and 900 MDs? NAMCS Data Collection in a Changing Ambulatory Care Environment

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Background/Aims: Since 1973, the National Ambulatory Medical Care Survey (NAMCS), administered by the National Center for Health Statistics (NCHS) has been widely used in studies of ambulatory care. With the growth in large multispecialty practices – including many members of the HMORN – there is a need to understand how NAMCS data are collected and whether current processes yield accurate and reliable data. NAMCS collects data from physicians about their practices and abstracts a sample of patient visit records. This study reports on the physician component. **Methods:** In collaboration with NCHS, nine physicians were randomly sampled from a multispecialty clinic using standard NAMCS recruitment procedures; eight physicians were eligible and agreed to participate. Using their standard protocols, three Field Representatives (FRs) conducted NAMCS physician interviews while a trained ethnographer (MH, KR) observed and audio-recorded each interview. Transcripts and field notes were analyzed using a grounded theory approach to identify key themes. **Results:** Data have been collected and analyzed. They are currently undergoing standard confidentiality review by NCHS. However, this process has been delayed due to the government shutdown. We fully anticipate that results will be released in time for presentation at the HMORN conference. **Conclusions:** Though we are precluded from disseminating results at this time, we will provide a full report of our results in our HMORN conference presentation.
Keywords: NAMCS; Survey research methods

PS1-11:

A Comparison of Electronic Medical Records vs. Claims Data for Rheumatoid Arthritis Patients in a Large Healthcare System: An Exploratory Analysis

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Background/Aims: Electronic medical records (EMR) and claims data offer two potential data sources for researchers to examine healthcare utilization patterns and cost of care. In particular, combining the clinical and epidemiological variables typically available in EMR with cost information available in the claims data is not only intuitively sensible but also increasingly more feasible with growing standardization of EMR across healthcare delivery systems. **Methods:** In this study, we compare EMR and claims data within a cohort of rheumatoid arthritis patients who received care from Geisinger Health System and had concurrent Geisinger Health Plan (GHP) coverage. We also develop a cost "imputation" method to obtain GHP claims-based cost estimates within EMR even for those who did not have GHP coverage. **Results:** EMR-based estimated means of total cost of care and utilizations tend to substantially underestimate the total cost of care. In particular, EMR substantially understates emergency department (ED) visits [4% (125 of 3,131) in EMR vs. 11.2% (352 of 3,131) in claims], X-rays [4% (125 of 3,131) vs. 22% (689 of 3,131)], and CT scans [5.1% (160 of 3,131) vs. 7.3% (229 of 3,131)]. Use of biologic agents appear to be slightly higher in EMR than in claims [7.2% (226 of 3,131) vs. 6.7% (210 of 3,131)], although the difference is not statistically significant. The correlation between log-transformed EMR-based cost of care and log-transformed claims-based cost of care was modest (R2 = 0.81). **Conclusions:** The findings confirm that there is significant disagreement between EMR and claims data and suggest that each represent a different set of "reality." The main source of such discrepancies between EMR and claims appears to be missing utilization of certain types of care in EMR. In particular, discrepancies seem greater for the types of services for which patients have more alternative choices in the area. Claims data reflects health plan's coverage decisions and utilization management, while EMR reflects clinicians' decisions and practice patterns. Thus, researchers should carefully consider which "reality" they are interested in capturing in their analysis. Lastly, the fact that both EMR and claims are collected for clinical and administrative purposes, not for research purposes, must be emphasized.
Keywords: Cost of care; Electronic medical records

PS1-34:

Sensitivity of Patient-reported Physician Percentile Rankings to Inter-physician Variability and Patient Sample Size

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Background/Aims: Patient satisfaction is increasingly being recognized as a desirable measure of physician quality and is used for quality-based financial incentives. Patient satisfaction surveys such as the CAHPS, however, typically exhibit 'ceiling effects' where most patients report maximal satisfaction, and so physicians are often ranked based on their percentage of maximum-satisfaction responses ("percentile top box scores," 0-100%) rather than on raw scores. Even so, physicians express concern that low response rates or tight clustering of underlying scores can have unknown effects on rankings and detrimental consequences. This study used simulation to report the effect of inter-physician variability and sample size on survey-based physician rankings. **Methods:** Assuming 9 different underlying