MATHEMATICA Policy Research

PRESENTATIONS

Joint Statistical Meetings (Abstracts)

"Statistics: Global Impact—Past, Present, and Future"

August 2-7, 2014—Boston, MA

Estimating Clustering in Survey Responses Among Primary Care Providers and Practice Staff: Initial Evidence from the Comprehensive Primary Care (CPC) Initiative
Derekh Cornwell and Jared Coopersmith

Reliable survey data on health care providers and staff underpins evaluations of health care interventions. A central component in the design of these surveys is the extent to which providers' and staff survey responses are correlated within medical practices. Failure to account for this clustering can lead to a sample design that is under-powered for the intended analysis. While estimates of clustering for patient outcomes at the practice level are available, analogous estimates for survey-based outcome measures for providers and staff are unavailable.

We address this gap by providing estimates of clustering effects within practices and regions, among 1,300 primary care providers and 1,700 practice staff who completed a survey for the Comprehensive Primary Care initiative, a large-scale health care evaluation sponsored by the Centers for Medicare & Medicaid Services. The estimated intra class correlation coefficients (ICCs) are calculated for selected measures of interest in health care provider surveys, such as job satisfaction and burnout. Incorporating more accurate ICC estimates into future practice-based survey designs will improve precision when determining sample sizes.

The Impact of Mis-specified Prior Distributions in Hospital Profiling Under an Empirical Bayes Framework
Sheng Wang, Alex Bohl, Hali Hambridge, Frank Yoon, and David Jones

Empirical Bayes methods have gained popularity in hospital profiling. The methods offer gains in precision over traditional frequentist methods for estimating risk-adjusted rates, especially for hospitals with small sample sizes. However, an incorrectly specified parametric model for the prior distribution could jeopardize these gains. An outstanding statistical and policy debate is whether underlying hospital quality depends on hospital characteristics, such as teaching status and volume, and how this relationship should be specified in the prior distribution. We evaluate the performance of hospital profiling models based on mis-specified prior distributions on simulated discharge populations. In particular, we simulate discharge populations with patient outcomes and known relationships with hospital characteristics and estimate hospital risk-adjusted rates of patient safety events. We assess and compare the performance of true and mis-specified models under various simulation settings and also provide contextual examples of how mis-specification may affect important policy programs, such as pay-for-performance.

Profiling Providers to Evaluate Health System Change
Frank Yoon

A major cornerstone of health care reform is rapid innovation in health service delivery and payment models that aim to improve the efficiency of patient care for better outcomes and reduced costs. These innovations are typically evaluated in demonstrations, essentially observational studies, in which provider entities implement innovations in one or more sites, such as practices and hospitals. Provider profiling is typically used to compare the performance of these sites on their patient outcomes and overall costs. We discuss the basic components of system dynamics in the evaluation of health system change, connect them to statistical concepts, and motivate the use of provider profiling as a key tool in the framework, including necessary assumptions. We illustrate the use of provider profiling in several leading examples about health system interventions.

Decomposing the Variance of Child Outcomes in Multistage Sample of Head Start Children
Barbara Carlson and John Hall

When designing a sample, precision calculations are commonly used to help determine sample size. These calculations require specifying one or more of the following: type I error, power, population variance, design effects, finite population corrections, R2 for covariates, and the effect size. Sometimes, an earlier study can provide some of these, but often one must rely on educated guesses. Even when other studies are available, it is not straightforward to derive the various components of variance. In this paper, we decompose the variance and design effects for several key child outcomes from two rounds of the Head Start Family and Child Experiences Survey (FACES), in the hope that they can be used to help design samples for similar multistage samples of preschool-age children. This clustered sample involves selecting Head Start programs, then centers, classrooms, and children. Working backwards from the observed total variance for these outcomes, we first factor out the design effect due to unequal weighting, then decompose the design effect due to clustering, factoring out the intracluster correlation coefficient and percent of variance between and within each sampling stage.

Managing Sample Release in Social and Economic Surveys
Frank Potter

Sample surveys are often used in the evaluation of social programs and require specific target minimum numbers of respondents to achieve statistical precision objectives for multiple subpopulations. To achieve the target number of completed interviews with the smallest sample size in each subpopulation, a carefully managed release plan is required for each study subpopulation and we often use random subsamples. The process uses the selection of an "augmented" sample (using implicit stratification) that is substantially larger than is expected to be required (using "pessimistic" response rates). The "augmented" sample is then randomly partitioned into small subsamples using an algorithm that preserves the implicit stratification. The initial sample release for data collection is then based on "optimistic" response rates. Periodic assessments are conducted to determine if additional sample releases are needed and, if so, in which study subpopulation(s). In this paper we will describe the algorithm and provide guidance on how to manage a sample. This random partitioning can also be used to assess experimental data collection procedures.

The Committee on Gay and Lesbian Concerns in Statistics
Christopher H. Johnson (CDC), Diane Herz, and Arthur B. Kenickell (Federal Reserve Board)

The Committee on Gay and Lesbian Concerns in Statistics was established by the American Statistical Association in 1992 to explore and address issues related to sexual orientation. Reflecting the concerns of a broad range of statisticians, the Committee was founded by a group of gay, lesbian, bisexual and straight statisticians. Since its founding, the Committee has sponsored and organized many sessions at the Joint Statistical Meetings, such as panels on best practices in measuring sexual orientation in surveys. The Committee works to support research on statistical issues of concern to lesbian, gay, bisexual and transgender (LGBT) individuals, as well as the larger statistics profession, and to eliminate discrimination in employment and education. It encourages research on LGBT populations' characteristics and needs, helping the statistical community keep up with social changes. The Committee serves as a resource about statistical issues related to LGBT populations to researchers, the media, and others. It provides information on LGBT data collection strategies, including sampling rare and hard-to-reach populations and minimizing measurement error in standardized questionnaires.

Associations Between Objectively Measured and Self-Reported Physical Activity Outcomes: Findings from the Randomized Experiment of Playworks
Nicholas K. Beyler, Susanne James-Burdumy, Martha Bleeker, Jane Fortson, and Kelley Borradaile

Self-reports of physical activity are often prone to considerable measurement error and biases. Measurements of physical activity obtained from monitoring devices, such as accelerometers, tend to provide more objective (unbiased) measurements of physical activity. In this presentation, we investigate the associations between objective measurements of physical activity and self-reported physical activity outcomes in a student survey. Data were collected from students that participated in the Randomized Experiment of Playworks Study.

Parent Reports of Physical Activity and Screen Time Behaviors in a Recent National Survey of the Military Population
Charlotte Cabili

This presentation discusses the methods and findings from a 2012 survey administered to parents of children and adolescents ages 2 to 18 who are eligible for health care coverage through the U.S. military health system (MHS). Focusing on recommended physical activity behaviors, such as 60 minutes a day of moderate to vigorous physical activity and less than two hours of daily screen time, this presentation discusses how the prevalence of children's behaviors compare to national guideline recommendations and data from national surveys. Further, we discuss population characteristics and methodological factors that may contribute to similarities and differences between MHS children and adolescents and those sampled in nationally surveys. One key methodological factor is how the physical activity is being reported-by parents or by the children and adolescents themselves.

Challenges of and Solutions to Collecting Physical Activity Data in Urban Elementary Schools and Afterschool Settings Using the System for Observing Play and Leisure Activity (SOPLAY)
Kelley Borradaile, Martha Bleeker, William Reeves, Brittany Vas, and Nicholas K. Beyler

This presentation focuses on the collection of physical activity data during recess in 29 schools and physical activity breaks in 23 afterschool settings. We will discuss the challenges of using the System for Observing Play and Leisure Activity (SOPLAY) in these different settings and the methods we used to improve our data collection procedures. The specific challenges associated with obtaining an accurate representation of the intensity and variety of activities taking place included: high concentrations of students; small, varied, and geographically dispersed observation spaces; schedule changes; and difficulties defining observation zones.

Using Response Rates to Adjust a Dual Sample Design
Eric Grau

When face-to-face interviews are required in a probability sample, sampling statisticians often construct a clustered sample to minimize the cost of data collection. In this type of sample design, the primary sampling units are geographic clusters, allowing interviewers to visit areas that are close together, reducing traveling costs. However, in some subpopulations, the number of cases in the primary sampling units is sometimes too small to provide enough sample cases for analysis. In several projects at Mathematica, we have resolved this issue by implementing a dual sample design, where the sample design consists of a clustered component (with face-to-face nonresponse follow-up) and an unclustered component (with no face-to-face follow-up). In this paper, we discuss a sample where budget realities during data collection made the original sample design too costly to implement. In this case, the proportion of the design within each component had to be constantly adjusted during data collection. We discuss how data collection reports were used to anticipate final response rates within various subpopulations, and how the sample design was adjusted accordingly.