

R. Clifton Bailey Statistics Seminar Series

Transportation Without Representation Is Travesty

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Abstract: High-quality surveys, epidemiological and clinical studies are internally valid, supporting proper inferences for the sample at hand. Using probability-based sampling from an explicit frame, traditional surveys directly address external validity and can generalize/transport within-sample estimates to a target population. The sample is 'representative' in that weights are available to dock it to the frame-defined reference. Analytical epidemiology and clinical trials are paying increasing attention to external validity, and the burgeoning of web-based enrollment in studies and surveys with its potentially high and unknown selection and other effects have amplified the importance and challenges of dealing with transportability. Furthermore, while it is readily apparent that organic (big) data arrive unaccompanied by an explicit sampling plan, similar but less obvious reference population issues operate in well-designed studies. For example, transportability is associated with choice of weights in fitting a statistical model.

I discuss and provide examples of these issues, the most central being whether conditional effects in the sample (the 'study population') can be transported to a desired target population or populations. The principal point is that the fundamentals still apply, that one needs to pay careful attention to the sampling plan, to 'how did I get to see these data?', including taking into account informative sample size. The challenges are such that statisticians, epidemiologists and survey researchers should collaborate on clarifying goals, calling for the design of transportable

studies, and developing analytic approaches. Increased cross-fertilization among the domains will benefit science and policy.