

College of Public Health News

March 13, 2018

Georgia Southern University

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Georgia Southern Studies Reduced Sample Sizes

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Survival data are time-to-event data, such as time to death, time to appearance of a tumor, or time to recurrence of a disease. Accelerated failure time (AFT) models provide a linear relationship between the log of the failure time and covariates that affect the expected time to failure by contracting or expanding the time scale. The AFT model has intensive application in the field of social, medical, behavioral, and public health sciences. In this article we propose a more efficient sampling method of recruiting subjects for survival analysis. We propose using a Moving Extreme Ranked Set Sampling (MERSS) or an Extreme Ranked Set Sampling (ERSS) scheme with ranking based on an easy-to-evaluate baseline auxiliary variable known to be associated

with survival time. This article demonstrates that these approaches provide a more powerful testing procedure, as well as a more efficient estimate of hazard ratio, than that based on simple random sampling (SRS). Theoretical derivation and simulation studies are provided. The Iowa 65+ Rural Health Study data are used to illustrate the methods developed in this article.

[“Reducing sample size needed for accelerated failure time model using more efficient sampling methods,”](#) was recently published in the Journal of Statistical Theory and Practice.

Dr. Hani Samawi, professor of biostatistics at the Jiann-Ping Hsu College of Public Health Georgia Southern University (JPHCOPH) was the lead author. Dr. Amal Helu, University of Jordan, and Drs. Haresh Rochani, JinJing Yin, Lili Yu, and Robert Vogel, professors of biostatistics at the JPHCOPH were co-authors.

Georgia Southern Examines Quantiles Estimation

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The study considers the problem of estimating a quantile function based on different stratified sampling mechanism. First, we develop an estimate for population quantiles based on stratified simple random sampling (SSRS) and extend the discussion for stratified ranked set sampling (SRSS). Furthermore, the asymptotic behavior of the proposed estimators are presented. In addition, we derive an analytical expression for the optimal allocation under both sampling schemes. Simulation studies are designed to examine the performance of the proposed estimators under varying distributional assumptions. The efficiency of the proposed estimates is further illustrated by analyzing a real data set from CHNS.

[“On Quantiles Estimation Based on Different Stratified Sampling with Optimal Allocation,”](#) was recently published in *Communications in Statistics – Theory and Methods*.

Jiann-Ping Hsu College of Public Health at Georgia Southern University Biostatistics faculty, Drs. Hani Samawi (lead author), Jingjing Yin, and Haresh Rochani worked with Dr. Arpita Chatterjee, Georgia Southern University Mathematics Department on this study.

Georgia Southern Conducts an Analysis of Food Service Risk Classification and Violation Frequency

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Though local health department performance of restaurant inspections plays an important role in preventing foodborne illness, restaurant inspection quality and uniformity often varies across local health department jurisdictions and among employees. In 2012, the Cincinnati Health Department initiated a food safety staff quality improvement initiative. This initiative, part of a Food and Drug Administration national training standards grant initiative, featured standardized training and food safety workforce practices, defined food safety program data collection standards, and refined reporting protocols. The aim of this article was to explore the relationship between the Ohio food safety code violations incurred and the risk classifications to which a Cincinnati

food service operation belongs (ranked I–IV based upon potential threat to public safety). A random intercept model was selected to quantify the difference in odds between risk classification categories of incurring violations. Additionally, longitudinal data analysis tracked violation trends across the three years of the study. Main findings were 1) the odds of receiving a food safety violation increased with each year and 2) food establishments categorized as risk class IV had a higher odds of receiving a food safety violation compared with the other risk classifications.

“Conducting research on a multi-disciplinary team was every bit as exciting and challenging as I had hoped it would be. Having that diversity in the group not only enhanced the resulting manuscript, it required that I learn how to direct and integrate every collaborator’s input into an overarching vision of how the project ought to be progressing. Through the patient guidance of professors around me, I gained valuable experience not merely on how to contribute, but on how to lead,” said Mr. Patrick Chang, alumni.

“[Analysis of Food Service Operation Risk Classification and Associated Food Safety Violation Frequency](#),” was recently published in the *Journal of Environmental Health*.

Dr. William Mase served as Principal Investigator on the grant and corresponding author for the manuscript. The Jiann-Ping Hsu College of Public Health faculty research team mentored Mr. Patrick Chang, alumni, as he took the primary leadership role in this analysis of data within the larger study. This interdisciplinary team worked closely with Mr. Chang as he completed his Masters of Public Health in Biostatistics at the Jiann-Ping Hsu College of Public Health Georgia Southern University. Dr. Haresh Rochani, biostatistics, Dr. William A. Mase and Dr. Jeffrey A. Jones, health policy and management, Dr. Asli Aslan, environmental health sciences, co-authored the study.

Georgia Southern Examines a Simpler Approach for Mediation Analysis

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Mediation is a hypothesized causal chain among three variables. Mediation analysis for continuous response variables is well developed in the literature, and it can be shown that the indirect effect is equal to the total effect minus the direct effect. However, mediation analysis for categorical responses is still not fully developed. The purpose of this article is to propose a simpler method of analysing the mediation effect among three variables when the dependent and mediator variables are both dichotomous. We propose using the latent variable technique which in turn will adjust for the necessary condition that indirect effect is equal to the total effect minus the direct effect. An intensive simulation study is conducted to compare the proposed method with other

methods in the literature. Our theoretical derivation and simulation study show that the proposed approach is simpler to use and at least as good as other approaches provided in the literature. We illustrate our approach to test for the potential mediators on the relationship between depression and obesity among children and adolescents compared to the method in Winship and Mare using National children health survey data 2011–2012.

“[A simpler approach for mediation analysis for dichotomous mediators in logistic regression](#),” was recently published in the *Journal of Statistical Computation and Simulation*.

Jiann-Ping Hsu College of Public Health Georgia Southern University biostatistics faculty, Dr. Hani Samawi, lead author, Dr. Jingxian Cai, Dr. Daniel F. Linder (former), Dr. Haresh Rochani, and Dr. Jingjing Yin worked collaboratively on this study.