

BENJAMIN A. CARPER

Summary of Professional Experience

Benjamin Carper is a research statistician in RTI International Environmental and Health Sciences Division. He has more than 7 years of experience in analyzing data, writing reports, and leading tasks from a variety of different scientific and financial disciplines, including terrorism risk assessment, travel surveys, financial credit risk modeling, and infectious disease outbreak modeling. Additional scientific disciplines include adverse health outcome prediction, environmental pollutant impact studies, biological and chemical agent exposure and treatment efficacy modeling, and genetic clustering. Mr. Carper has experience with using many statistical methods, including survival analysis, multivariate regression, nonlinear and mixed models, machine learning, classification algorithms, text analysis, risk assessment, meta-analysis, pattern recognition, and power analysis. He also has extensive experience in data simulation and analysis and in combining data from multiple sources.

Education

MS, Statistics, Brigham Young University, Provo, UT, 2008.

BS, Mathematics, University of North Carolina at Greensboro, Greensboro, NC, 2006. Graduated magna cum laude.

Selected Project Experience

Early Detection of Infectious Diseases (2013 to 2015)—*Statistician/Task Leader*. The purpose of this project for the U.S. Defense Threat Reduction Agency (DTRA) was to develop a model that could use Internet search query data with known disease outbreaks to better identify simulated outbreaks. The project combined WebMD SymptomChecker data with influenza season data from the Centers for Disease Control and Prevention to create models that could identify simulated outbreaks of varying length and intensity. As the task leader of this project, was primarily responsible for developing the predictive models and generating simulated WebMD search queries for simulated outbreaks. Helped write the final report and presented the final results to DTRA.

Outdoor Exposure Modeling (2013 to 2015)—*Statistician*. Many factors affect the behavior of intentional release of biological contaminants. The purpose of this project for the National Ground Intelligence Center (NGIC) was to gather large amounts of data regarding the many potential parameters of outdoor dispersion from various sources, and then create valid statistical summaries. Was solely responsible for developing the valid statistical summaries. Developed automated methods for performing meta-analysis and generating summary tables and figures to help non-statisticians use the collected data. Presented the summarization tools at a conference sponsored by NGIC.

Clinical Predictive Analytics (2013 to 2015)—*Statistical Programmer*. The predictive analytics program uses time-resolved hospital patient monitoring data to try and predict whether adverse medical events will occur in the near future. As a statistical programmer, helped develop new codes and algorithms to process millions of records faster and make predictive modeling more efficient. Developed a method to automate optimal model selection by using non-standard selection criteria while accounting for cross-validation.

National Highway Travel Survey (2012 to 2015)—*Statistician/Task Leader*. The U.S. Federal Highway Administration periodically performs the National Highway Travel Survey to provide information to assist transportation planners and policy makers who need comprehensive data on travel and transportation patterns in the United States. In preparation for the next National Highway Travel Survey, helped develop new data collection methodologies and simulate the impact of multiple survey sampling and weighting schemes. Helped to simulate the impact of including Internet opt-in survey data with traditionally collected survey data. Was also primarily responsible for performing large-scale simulations of the national survey and the optional state add-on samples for a variety of sampling schemes.

Bioterrorism Risk Assessment (2008 to 2015)—*Statistician/Task Leader*. The purpose of the Bioterrorism Risk Assessment for the U.S. Department of Homeland Security (DHS) was to assess the risk of a variety of potential biological agents in terms of their ease of access, appeal, and potential impact. As the task leader for this project, was responsible for joining the data that characterized attack likelihoods with attack outcome models, and then combining the data to calculate the final risk. Was also responsible for generating all summary figures and tables. Helped conduct sensitivity studies such as the dose-response sensitivity study, which assessed the impact of different dose-response models on the overall risk. Helped improve process efficiency and statistical methodology. Helped write the biennial reports. On many occasions, presented results and methods to DHS and other interested stakeholders.

Integrated Terrorism Risk Assessment (2008 to 2015)—*Statistician/Task Leader*. The purpose of the Integrated Terrorism Risk Assessment for DHS was to compare the risk of terrorism attacks across all chemical, biological, radiological, and nuclear terrorism attacks. As the task leader for this project, was responsible for joining the data that characterized attack likelihoods with attack outcome models, and then combining the data to calculate the final risk. Was also responsible for generating all summary figures and tables. Helped conduct sensitivity studies, improve process efficiency and statistical methodology, and write the biennial reports. On many occasions, presented results and methods to DHS and other interested stakeholders.

Statistical Support for Miscellaneous Studies (2008 to 2015)—*Statistician/Task Leader*. Battelle's Biomedical Research Center performs many animal exposures studies and analyses for a wide variety of clients, including the National Institute of Allergy and Infectious Disease. Performed statistical analysis on treatment efficacy studies, disease and chemical exposure studies, and assay qualification and validation studies. Performed power analyses, developed protocols, provided dosing guidance performed analyses, wrote reports, managed other statisticians on larger studies, and developed new algorithms for various studies. From 2013 to 2015, served on the Institutional Animal Care and Use Committee (IACUC).

Biodiversity and Environmental Pollutant Analysis (2008 to 2015)—*Statistician/Task Leader*. Provided support to various biodiversity and environmental pollutant efforts for the U.S. Environmental Protection Agency's Office of Water. Helped summarize influent and effluent data, applied biodiversity methods to new sets of data, and helped to convert and improve current algorithms into a different programming language.

Credit Risk Modeling with Call Center Data (2012)—*Statistician and Primary Programmer*. The purpose of this project for TransUnion was to attempt to pair bank call center data (transcripts of phone calls) with the TransUnion credit score database to predict individuals at risk for default and to identify individuals with the potential to be new accounts. As the primary programmer for this project, developed the methods for combining the data from various entities and helped develop the methods used to extract useful information from the call center data.

Adverse Event Monitoring (2012)—*Statistician*. The purpose of this project for PepsiCo was to use its call center and e-mail data to characterize the multiple facets of consumer interaction. The method would

then be developed to help monitor for future consumer concerns before large issues occur. As the statistician for this project, helped to process the text data from calls and e-mails to perform a cluster analysis and help identify the primary reasons of concern from consumers. Presented final results to the client.

Unknown Chemical Compound Classification (2012)—*Statistician*. This project combined data on known compounds from a variety of sources to develop a model for classifying the toxicity of unknown compounds. Was responsible for developing the classification models from the various data sets and for performing some of the data collection. Helped perform an independent verification of Pacific Northwest National Laboratory's Visual Integration for Bayesian Evaluation (VIBE) algorithm.

Pattern Recognition in Random Data (2010)—*Statistician*. For this project, generated random binary data from a series of microchips. Used standards and a test established by the National Institute of Standards and Technology (NIST) and some newly devised tests to assess deficiencies in randomness. Was responsible for developing the algorithms that would apply the NIST and the newly devised tests to the generated data. Was also tasked with performing the final analysis and summarizing the results.

Yucca Mountain Project (2007)—*Statistician*. Yucca Mountain was the selected location for the U.S. nuclear waste repository. The purpose of this project for the U.S. Department of Energy was to assess the long-term environmental impacts of the site, including seismic events and other natural disasters. Helped perform simulations of long-term impacts from geological events and complete an independent verification of various calculations used during the project.

Professional Experience

2015 to date	RTI International, Research Triangle Park, NC. <u>Research Statistician</u> . Manages data, creates data analysis plans, develops analytical data sets, performs analyses in SAS, writes reports, and creates tables.
2008 to 2015	Battelle Memorial Institute, Columbus, OH. <u>Statistician 3</u> (2012 to 2015). Managed other statisticians when performing analyses. Helped develop new algorithms and methods on multiple projects. Presented projects and results to clients. <u>Statistician 2</u> (2008 to 2012). Supported other statisticians when conducting statistical analyses and writing reports.
2006 to 2008	Sandia National Laboratories, Las Vegas, NV. <u>Total System Performance Assessment Analyst</u> (Graduate Internship). Performed simulations to model the long-term effects of seismic and other geological events, and then analyzed the results. Helped perform independent verifications of project calculations made in proprietary software.

Honors and Awards

Phi Beta Kappa, University of North Carolina at Greensboro, 2006

Computer Skills

R, SAS, Stata, SQL, Shell (Linux)

Familiarity with Microsoft Windows and Linux operating systems

Languages

Portuguese (fluent)

Country Experience

São Paulo, Brazil, 2001 to 2003

Peer-Reviewed Journal Articles

Stark, G. V., Long, J. P., Ortiz, D. I., Gainey, M., Carper, B. A., Feng, J., et al. (2013). Clinical profiles associated with influenza disease in the ferret model. *PLoS One* 8(3): e58337.
doi:10.1371/journal.pone.0058337

Presentations and Proceedings

Jackson, S. H., Hendley, P., Mosquin, P. L., Aldworth, J., & Carper, B. A. (2016, August). *Simple approach for assessing the potential implications of high fractions of samples with non-detectable residues from surface water monitoring programs*. Presented at American Chemical Society Meetings, Philadelphia, PA.
