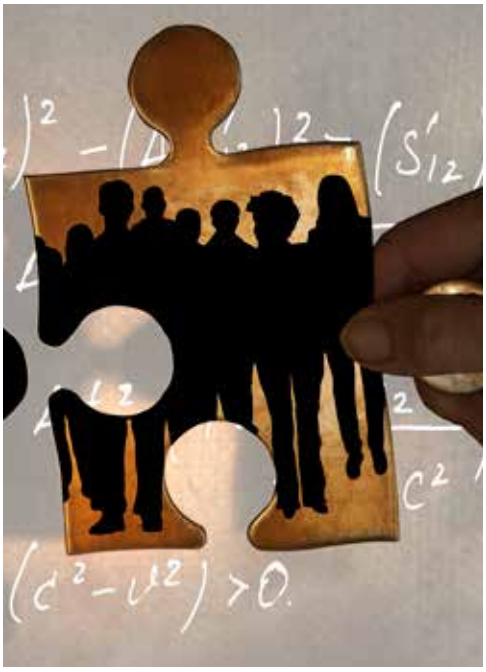
Center of Excellence for Complex Data Analysis

Advancing the state of statistical science

As part of efforts to advance the state of statistical science, RTI International has established the Center of Excellence for Complex Data Analysis (CoDA). Building on our core expertise in statistics, the CoDA Center brings together international experts to develop advanced statistical methods and address critical issues in the analysis of complex data.



Across the public and private sectors, the need to analyze complex data sets continues to grow. Government agencies, private businesses, and other organizations are seeking reliable insights to inform policies, programs, and critical decisions—based on analyses of complex data from Medicare and Medicaid records, surveys and censuses, clinical trials, Internet search records, genomic studies, social media activity, and other sources.

To glean these insights, today's statisticians are faced with the task of analyzing data that may have one or more levels of complexity, including

- Unequal probability samples
- Correlated (clustered) observations
- Missing data
- Measurement errors
- Nonprobability samples
- Massive data sets.

The challenges associated with analyzing complex data demand new statistical methods and tools and a cadre of statisticians trained to employ these methods.

To address these challenges, RTI has established the CoDA Center to serve as a focal point for methodological research with the goal of advancing the state of the art in complex data analytics.

Areas of Focus

The CoDA Center is initially focusing on advanced statistical methods for analyzing complex survey data that appropriately take into account the survey design, nonresponse and measurement errors.

These include areas of significant research strength at RTI—multilevel modeling, longitudinal data analysis, structural equation modeling, latent class analysis, and nonresponse modeling.

Over time the focus will broaden beyond survey data to include other types of complex data, such as epidemiological data, nonprobability samples, and massive data sets.

Opportunities to Collaborate

The CoDA Center welcomes visiting experts in data analysis from academia, national laboratories, and other government and private research centers. During their tenure with the Center, these experts support methodological research projects and collaborate with




RTI experts in statistics, survey design, and a wide variety of application areas, including health, education, environment, criminal justice, and economics. They also develop and provide training courses in analysis methods and contribute to publications in peer-reviewed statistics and other scientific journals.

This collaborative approach is a hallmark of the Center's goal to address the needs of researchers who analyze complex data sets. The Center seeks to develop long-term, productive relationships with leaders in the field of applied statistical methodology to develop better solutions needed by researchers at RTI and beyond.

Why RTI?

For more than 50 years, statistics research has been one of RTI's primary specialties. We are home to more than 250 statisticians, biostatisticians, epidemiologists, and other data analysts who support wide-ranging research programs in both laboratory and social sciences. Because these research projects demand complex statistical analyses of highly complex data, we frequently encounter the need to develop cutting-edge analytical methods.

For example, RTI researchers want to apply multi-level models to data collection for the National Survey of Child and Adolescent Well-being, a large and complex panel survey of abused and neglected children conducted by RTI for the U.S. Department of Health and Human Services. Important issues arise in the analyses because of the complexities of these data, many of which are not handled thoroughly or appropriately in existing software packages. Yet, important national policy issues depend upon the proper analysis of these data.

RTI has a history of meeting similar challenges through development of novel methods and analytical tools, including SUDAAN®, an internationally recognized statistical software package that specializes in providing efficient and accurate analysis of data from complex surveys and other cluster-correlated studies.

Our expertise spans survey statistics—including applied and theoretical sampling, assessment of and compensation for nonresponse bias, evaluation and reduction of measurement errors, variance estimation, and small area estimation—as well as data analysis methodology, including structural equation modeling, latent class analysis, longitudinal analysis, scale and index development, and predictive modeling.

The CoDA Center is led by senior leaders in statistics and data analysis at RTI. RTI Distinguished Fellow Paul Biemer, PhD, serves as acting director. Roy Whitmore, PhD, is the associate director, and John Hajdin, MBA, serves as assistant director.

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