

# Data Science and Predictive Analytics



RTI International turns data into actionable insights through a combination of predictive analytics, modeling, and data visualization. Our data scientists use historic and real-time data to make predictions of future events, inform decisions that will lead to optimal outcomes, and classify new observations that can guide actions and target interventions.

## The Business Need

Organizations across industries and governments around the world are increasingly exposed to an unprecedented volume, velocity, and variety of data, leading many to ask:

- What technologies and platforms do we need to manage, process, store, and distribute this data?
- What analyses are possible with the data we have?
- What data could we collect and analyze to fix problems, accomplish objectives, and prevent crises?
- How do we know that our models are “best”? Can they be independently validated, or improved?

## RTI's Analytics Solution

To help our clients turn data into actionable insights, RTI offers the following services designed to provide a comprehensive solution to your data management and reporting needs:

- Digital architecture/infrastructure design consultation
- Data inventory assessment
- Data collection and data cleaning
- Predictive model building/validation/optimization
- Data visualization and rapid prototyping

## RTI Subject Matter Expertise

Leveraging our expertise in statistical, computer, social, life, information, and engineering sciences, RTI researchers and analytic consultants work in integrated, multidisciplinary teams to solve complex problems for diverse clients in such areas as

- Consumer behavior patterns and trends
- Economic development and forecasting
- Fraud detection (insurance and finance)
- Human resources and work force building and retention
- Social media analytics
- Forensics and crime and predictive policing
- Health analytics and informatics, personalized medicine, comparative effectiveness, clinical decision support
- GIS and geospatial analytics
- Disease prediction, prevention, progression, prevalence forecasting
- National security and homeland security
- Genomics/GWAS and metabolomics
- Population dynamics
- Energy, climate change, and the environment

## Project Highlights

**Violent Intent Modeling and Simulation (VIMS):** Developed a decision support tool for intelligence analysts that uses modeling and simulation to interpret the motivations and behaviors of violent groups and identify indicators that could predict when a group will engage in politically motivated violent behavior. (Department of Homeland Security)

**Models of Infectious Disease Agent Study (MIDAS):** Used computational and mathematical models to understand infectious disease dynamics, helping governments prepare for, detect, and respond to infectious disease threats. (National Institute of General Medical Sciences)

- **RTI Synthetic Population:** Created a geospatially explicit database (<http://synthpopviewer.rti.org/>) representing 112M+ U.S. households and 280M+ individuals that matches a set of sociodemographic characteristics from the Census. An enhanced and scalable microsimulation engine can predict the age of individuals and the size and structure of households decades into the future to support agent-based simulations.

**SIMPACT™:** Created a decision support tool that uses predictive analytics to identify the specific life needs most strongly related to employee retention by evaluating the relationships between life needs, job impact, and job satisfaction. (Outgrowth of a U.S. Navy project)

**Omics studies:** Identified patient profiles and predicted outcomes using data from genome-wide scans, metagenomics, proteomics, metabolomics, and next-generation sequencing. (National Institutes of Health)

**Obesity Cost Calculator™:** Created a tool to quantify company medical expenditures and productivity costs attributable to obesity (<http://www.cdc.gov/leanworks/costcalculator/index.html>). An enhanced version of the tool estimates the return on investment of potential weight loss programs. (Centers for Disease Control and Prevention)

**Dashboard 2030:** Developed an online tool for the general public and the business community to track North Carolina's progress in economic development, business climate, and job growth (<https://ncdashboard.rti.org/>). This interactive, map-based tool includes indicators of progress in education and talent supply, competitive business climate, entrepreneurship and innovation, and infrastructure and growth leadership. (NC Chamber Foundation)

**Commercial Health Care Claims Data Analysis and Reporting Services:** Demonstrated that health information technology enables quality, cost-efficiency, and population health improvements. (Rhode Island Beacon Community Program)

**Prediction for Pesticide Surface Water Monitoring:** Extended time series methods to allow prediction of moving averages of surface water pesticide concentrations using infrequently sampled data. (Commercial client)

**MobForest—Model-based Random Forest Analysis:** Created an R software package that implements a random forest method for model-based recursive partitioning to predict which treatment is best for an individual patient. (National Institute on Alcohol Abuse and Alcoholism and ARRA)

### Working with RTI

RTI is a preapproved, federally qualified vendor within the GSA schedule system, and we hold a number of IDIQs. In the commercial sector, RTI offers competitive rates and can work under multiple contract mechanisms. We keep all data and results confidential, and we are experienced in handling restricted data. RTI has systems in place that meet FIPS 140-2 moderate security. We work equally well in the cloud, our own computational environment, or any other network.

### More Information

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