MATHEMATICA
Policy Research

About US

Advanced Analytics

Mathematica Policy Research offers a full suite of advanced analytics services that maximize the power of data and provide the best solutions to today's most pressing program and policy issues. Backed by decades of experience in rigorous research and data collection, we bring together state-of-the-art data science methodologies with program and policy expertise to meet the operational and strategic goals of our clients.

Our data analytics services provide clients with high quality, actionable information to support effective decision making. We can leverage advanced analytics to address a wide range of organizational goals, including identifying program and policy issues, predicting impacts, managing costs, visualizing results on dashboards and web applications, detecting improper payments, supporting operational decision making, and maintaining program integrity.

Our deep bench of data scientists, systems experts, statisticians, and program and policy experts design solutions with our clients' best interests in mind.

SELECTED OFFERINGS

- Predictive analytics
- Bayesian methods
- Microsimulation and modeling
- Automated data quality assessment
- Natural language processing
- Machine learning
- Network analysis
- Geospatial statistics
- Business intelligence
- Data visualization
- Data mining
- Data integration
- Quality measures development

DATA SCIENCE AND STATISTICS

Data science plays an increasingly important role in policy research, program evaluation, and decision making processes as advances in technology, data collection, and analytic methods transform social programs dedicated to improving public well-being. Building on our leadership in the collection, processing, maintenance, and analysis of primary, secondary, and administrative data, our data science and statistics capabilities help clients develop measures, manage performance, assess quality, predict the impact of policy changes, identify ways to reduce costs, maximize allocation of finite human resources, monitor critical processes, and make data-driven decisions with confidence. We can pair predictive analytics with rapid cycle evaluation within an operational environment to enable a cycle of continuous performance improvement.

We offer expertise in advanced analytic methodologies that include data mining, predictive analytics, natural language processing, machine learning, geospatial statistics, and network analysis.

PROGRAM AND POLICY EXPERTS

In the case of public policy and its impacts on societal well-being, collaboration between researchers, public policy experts, data experts, and data scientists is essential to successful outcomes. Mathematica's program and policy experts include nationally acclaimed researchers and former program administrators who understand the daily operational challenges facing many organizations. On the basis of their practical knowledge, we create cutting-edge analytic tools designed to help clients achieve their goals.

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Mathematica helps agencies advance their mission through rapid-cycle experimentation and evaluation, microsimulation models that predict the impacts of policy changes, and the development of performance measures that can improve services and outcomes.

DATA VISUALIZATION

Program administrators need timely and accurate data to make informed decisions. Mathematica enables this requirement through data visualization. Data visualization translates complex ideas and concepts into a simple visual context and is often the most efficient way to quickly discover actionable information buried in enormous databases. When used effectively, data visualization can convey patterns, trends, and relationships in data at a glance that might otherwise go undetected. Our experts work closely with a wide range of clients to develop innovative visualizations, including interactive dashboards, scorecards, network maps, and representations of performance indicators; our data visualization experts can simplify even the most complex analytics. We specialize in designing interactive visualizations and dashboards as well as figures and graphics fit to print that communicate policy-related information effectively to a variety of audiences. Our visual tools help our clients tunnel in to the right level of detail at the right time.

SYSTEMS AND TECHNOLOGY

Mathematica's systems and technology staff are critical to the development of our successful analytics solutions. With decades of experience, **they know the strengths and vulnerabilities of agency data and systems**. When combined with our state-of-the-art IT capabilities, this knowledge yields efficient and effective solutions. Whether we're identifying project objectives, developing business requirements, writing specifications, or creating and executing sophisticated models, we develop end-to-end solution architectures tailored to the unique requirements of each client.

For more information, please contact: John Schmitt, Director of Data Analytics Phone: (202) 484-5269. Email: jschmitt@mathematica-mpr.com. Web: mathematica-mpr.com/our-focus-areas/data-analytics.

SELECTED PROJECTS

Prediction of Service Super-Utilization	Prediction on Impacts of Medical Intervention	Document Prioritization for What Works Clearinghouse	Data Quality Issue Prioritization for MACBIS Data Quality and Analytics	Surveillance of Child Abuse and Neglect and Related Factors
Mathematica has worked with the Casey Family Programs on implementing predictive analytic methods to identify the characteristics of cases that have higher probabilities of becoming high-level users of child welfare, health, and other services.	Mathematica worked with Harvard University and the Centers for Disease Control and Prevention to implement a large cluster randomized trial in Botswana. The study tested the hypothesis that implementing an enhanced combination prevention package would impact the HIV epidemic by significantly reducing HIV incidence in a defined geographic area over a period of three years. The team consisted of medical doctors, statisticians, epidemiologists, and virologists.	For the Department of Education's What Works Clearinghouse project, our data scientists used natural language processing and machine learning approaches to prioritize documents for a more cost-effective reviewing process and to classify survey responses from large-scale longitudinal surveys.	Mathematica supported the Centers for Medicare & Medicaid Services to apply unsupervised learning approaches (including a two-stage hierarchical clustering) against Medicaid data to group measures that share similar data elements and similar levels of quality deviations into the same clusters. Such clusters help stakeholders detect and prioritize severe data quality issues from thousands of quality issues with mixed level of severities and results from various different data elements.	Mathematica supports two agencies—the Office of Planning, Research and Evaluation and the Children's Bureau within the Administration for Children & Families—in leveraging advanced modeling to develop design options for studies designed to yield information that improves the accurate, ongoing surveillance of (1) child abuse and neglect and (2) related risk factors for child abuse and neglect.

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