GETTING TO KNOW JMP® LIFE SCIENCES

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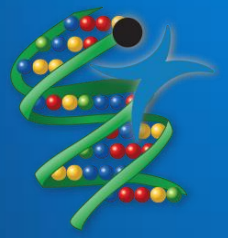
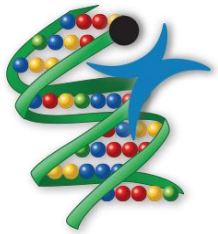
JMP Life Sciences R&D
SAS Institute, Inc.

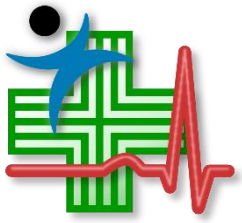


JMP FAMILY OF PRODUCTS

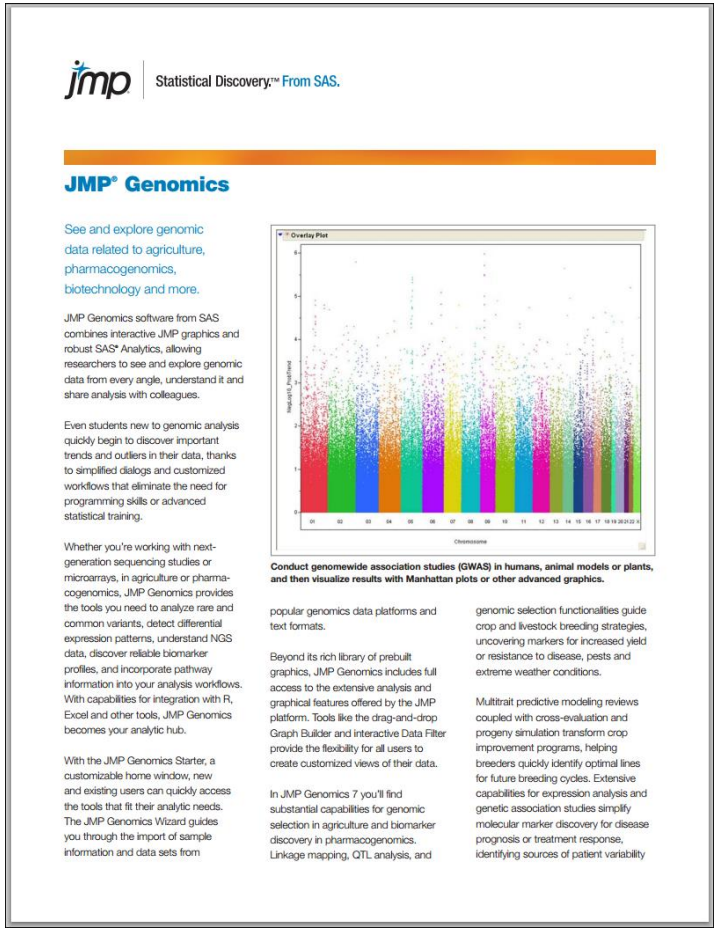
SOFTWARE FOR LIFE SCIENTISTS

- JMP
- JMP Pro
- JMP Genomics
- JMP Clinical
- JMP Add-Ins





- [JMP Clinical Overview Video]
- [JMP Genomics Overview Video]



jmp | Statistical Discovery.™ From SAS.

JMP® Genomics

See and explore genomic data related to agriculture, pharmacogenomics, biotechnology and more.

JMP Genomics software from SAS combines interactive JMP graphics and robust SAS® Analytics, allowing researchers to see and explore genomic data from every angle, understand it and share analysis with colleagues.

Even students new to genomic analysis quickly begin to discover important trends and outliers in their data, thanks to simplified dialogs and customized workflows that eliminate the need for programming skills or advanced statistical training.

Whether you're working with next-generation sequencing studies or microarrays, in agriculture or pharma-cogenomics, JMP Genomics provides the tools you need to analyze rare and common variants, detect differential expression patterns, understand NGS data, discover reliable biomarker profiles, and incorporate pathway information into your analysis workflows. With capabilities for integration with R, Excel and other tools, JMP Genomics becomes your analytic hub.

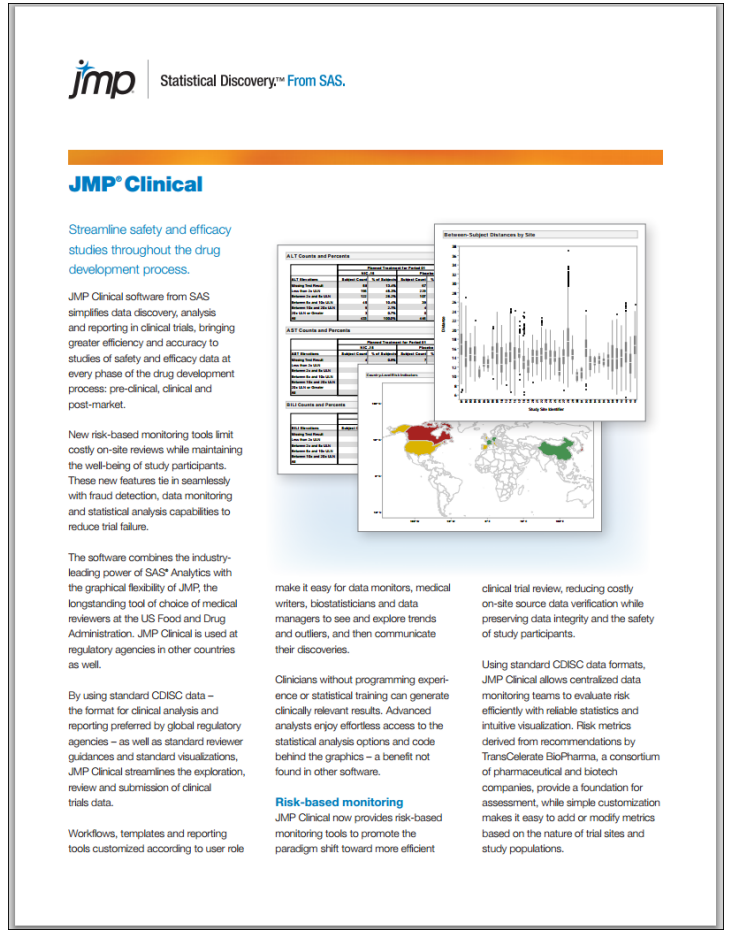
With the JMP Genomics Starter, a customizable home window, new and existing users can quickly access the tools that fit their analytic needs. The JMP Genomics Wizard guides you through the import of sample information and data sets from popular genomics data platforms and text formats.

Conduct genomewide association studies (GWAS) in humans, animal models or plants, and then visualize results with Manhattan plots or other advanced graphics.

Beyond its rich library of prebuilt graphics, JMP Genomics includes full access to the extensive analysis and graphical features offered by the JMP platform. Tools like the drag-and-drop Graph Builder and interactive Data Filter provide the flexibility for all users to create customized views of their data.

In JMP Genomics 7 you'll find substantial capabilities for genomic selection in agriculture and biomarker discovery in pharmacogenomics. Linkage mapping, QTL analysis, and genomic selection functionalities guide crop and livestock breeding strategies, uncovering markers for increased yield or resistance to disease, pests and extreme weather conditions.

Multitrait predictive modeling reviews coupled with cross-evaluation and progeny simulation transform crop improvement programs, helping breeders quickly identify optimal lines for future breeding cycles. Extensive capabilities for expression analysis and genetic association studies simplify molecular marker discovery for disease prognosis or treatment response, identifying sources of patient variability



jmp | Statistical Discovery.™ From SAS.

JMP® Clinical

Streamline safety and efficacy studies throughout the drug development process.

JMP Clinical software from SAS simplifies data discovery, analysis and reporting in clinical trials, bringing greater efficiency and accuracy to studies of safety and efficacy data at every phase of the drug development process: pre-clinical, clinical and post-market.

New risk-based monitoring tools limit costly on-site reviews while maintaining the well-being of study participants. These new features tie in seamlessly with fraud detection, data monitoring and statistical analysis capabilities to reduce trial failure.

The software combines the industry-leading power of SAS® Analytics with the graphical flexibility of JMP, the longstanding tool of choice of medical reviewers at the US Food and Drug Administration. JMP Clinical is used at regulatory agencies in other countries as well.

By using standard CDISC data – the format for clinical analysis and reporting preferred by global regulatory agencies – as well as standard reviewer guidances and standard visualizations, JMP Clinical streamlines the exploration, review and submission of clinical trials data.

Workflows, templates and reporting tools customized according to user role make it easy for data monitors, medical writers, biostatisticians and data managers to see and explore trends and outliers, and then communicate their discoveries.

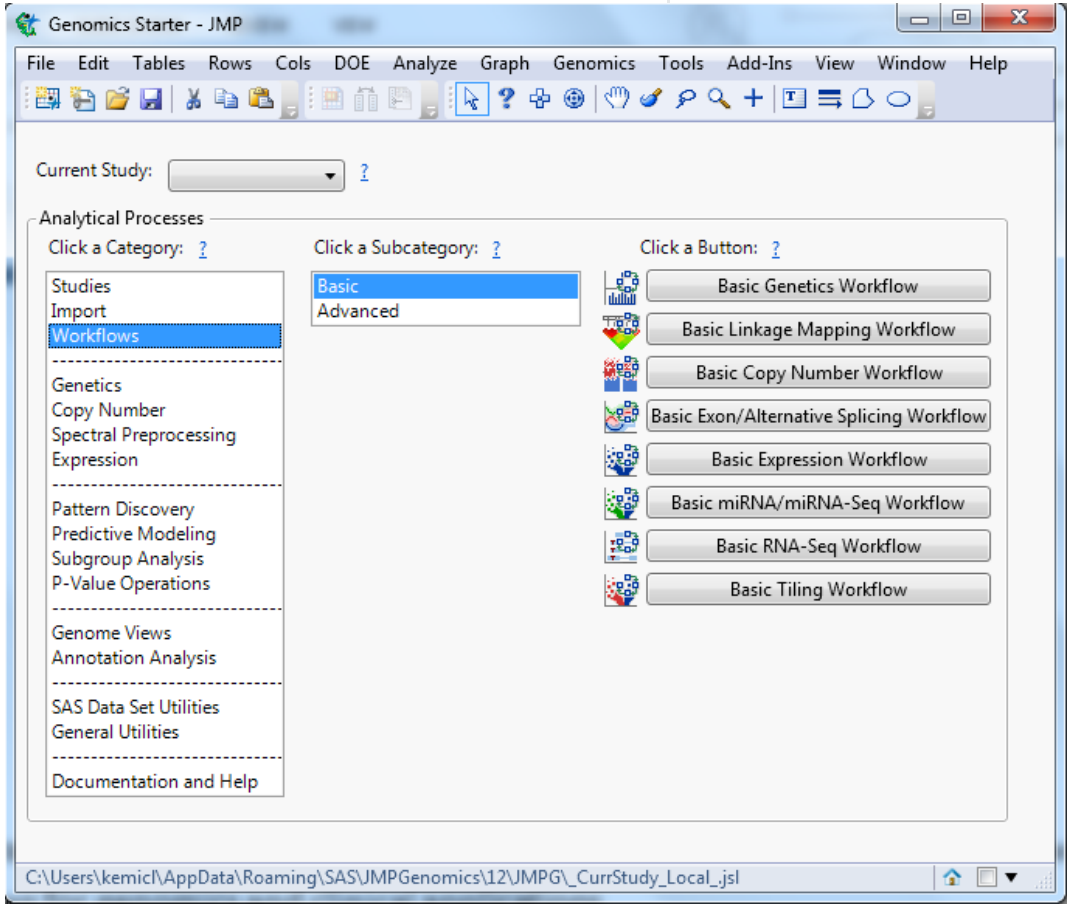
Clinicians without programming experience or statistical training can generate clinically relevant results. Advanced analysts enjoy effortless access to the statistical analysis options and code behind the graphics – a benefit not found in other software.

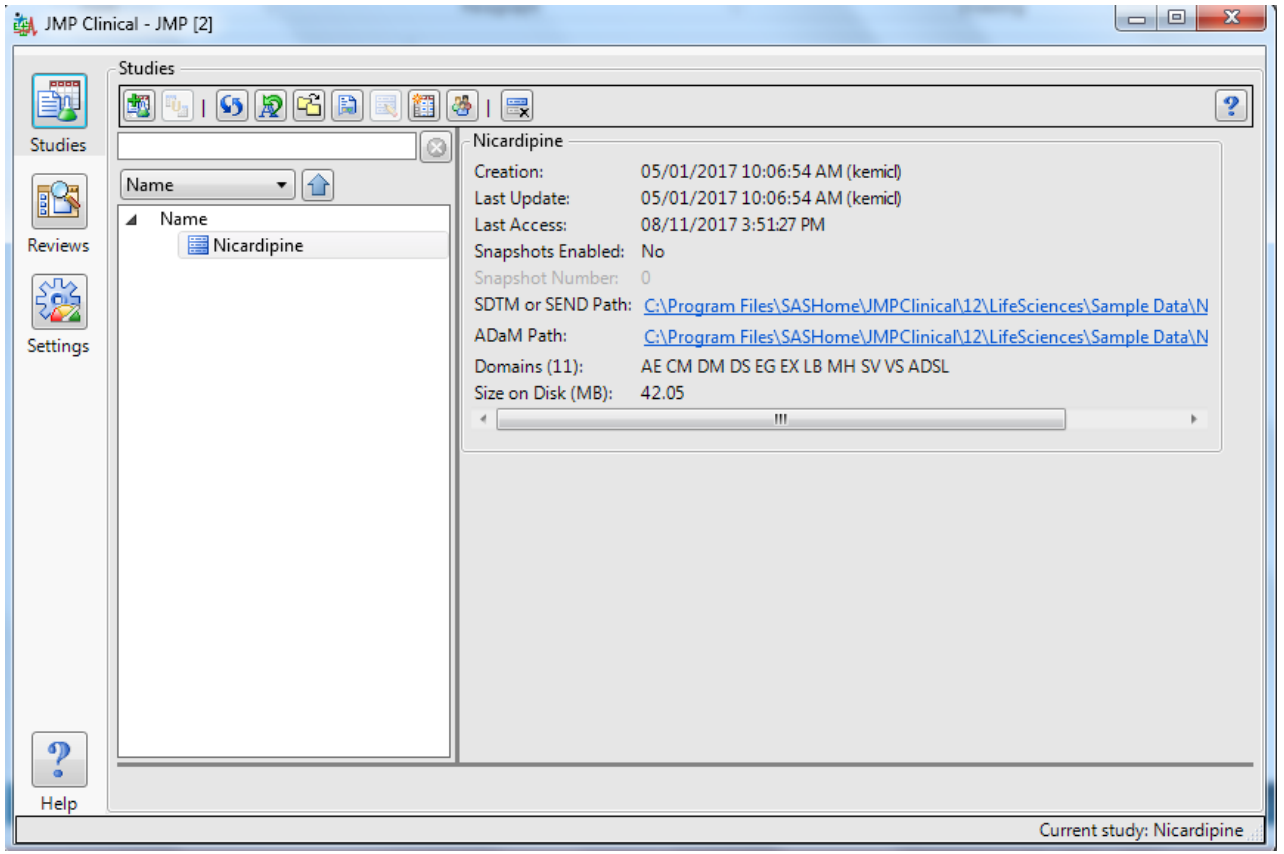
Risk-based monitoring

JMP Clinical now provides risk-based monitoring tools to promote the paradigm shift toward more efficient clinical trial review, reducing costly on-site source data verification while preserving data integrity and the safety of study participants.

Using standard CDISC data formats, JMP Clinical allows centralized data monitoring teams to evaluate risk efficiently with reliable statistics and intuitive visualization. Risk metrics derived from recommendations by TransCelerate BioPharma, a consortium of pharmaceutical and biotech companies, provide a foundation for assessment, while simple customization makes it easy to add or modify metrics based on the nature of trial sites and study populations.

JMP LIFE SCIENCES | VERTICAL APPLICATION INTERFACES



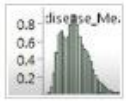


Leverage the JMP Add-In architecture to deliver custom analyses in workflows and reviews for genomics and clinical applications

JMP GENOMICS | ANALYTIC CAPABILITIES

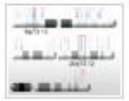
- Integrated solution of SAS and JMP analytics and data visualization
  - The "Mother" of all JMP add-ins
- Analysis Areas
  - Genetic marker data, GWAS, population analysis
  - Genomic Selection and in-silico plant breeding, linkage mapping, QTL
  - Exon/transcript level expression QC and Modeling
  - Next-generation sequencing variant/count analysis
  - Annotation and combined integrative genomic analysis
- Extensive pattern discovery, predictive modeling, and cross validation tools

Explore the Core Capabilities of JMP® Genomics



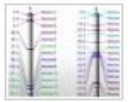
Genomic Selection for Crop Improvement

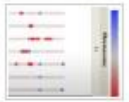

Pharmacogenomics


Expression


Genetics


Next-Gen Sequencing


Linkage Mapping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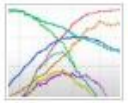
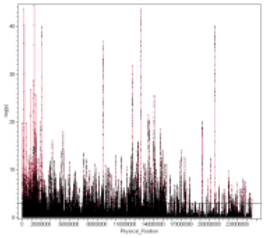
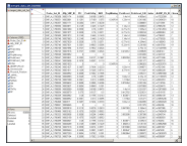

Predictive Modeling

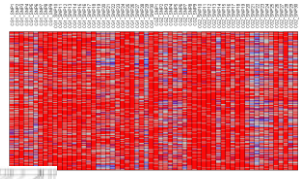
JMP GENOMICS | GENETICS ANALYSIS HIGHLIGHTS

- Extensive quality control and marker utilities
- GWAS, QK Mixed, Multi-marker Models for genetic association modeling analysis
- Linkage Maps and QTL (IM, CIM, MIM) for inbred and outcrossed lines
- Multiallelic and polyploidy analysis support
- Breeding G*E interaction models, genomic selection, cross evaluation, progeny simulation

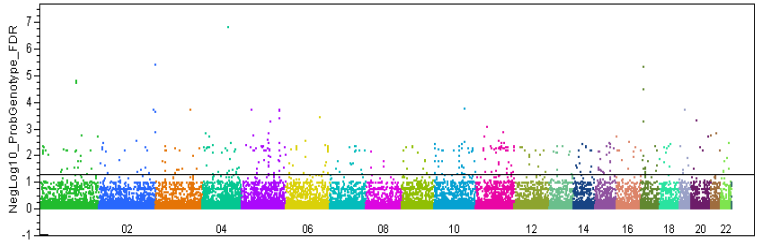
QC markers and samples



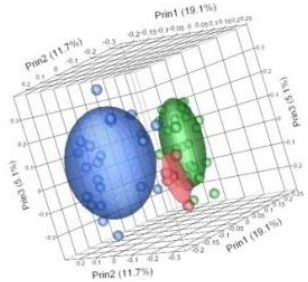




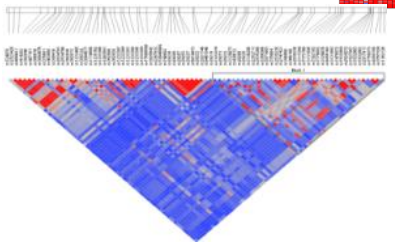
Simple and Complex Association Tests

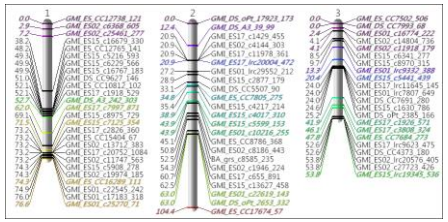


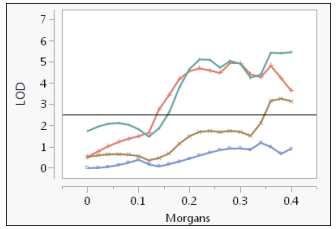
Population Structure Assessment/ Correction



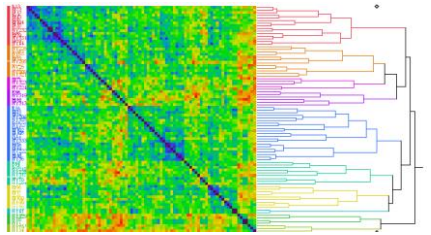
Linkage Map Construction and QTL

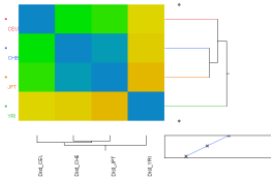






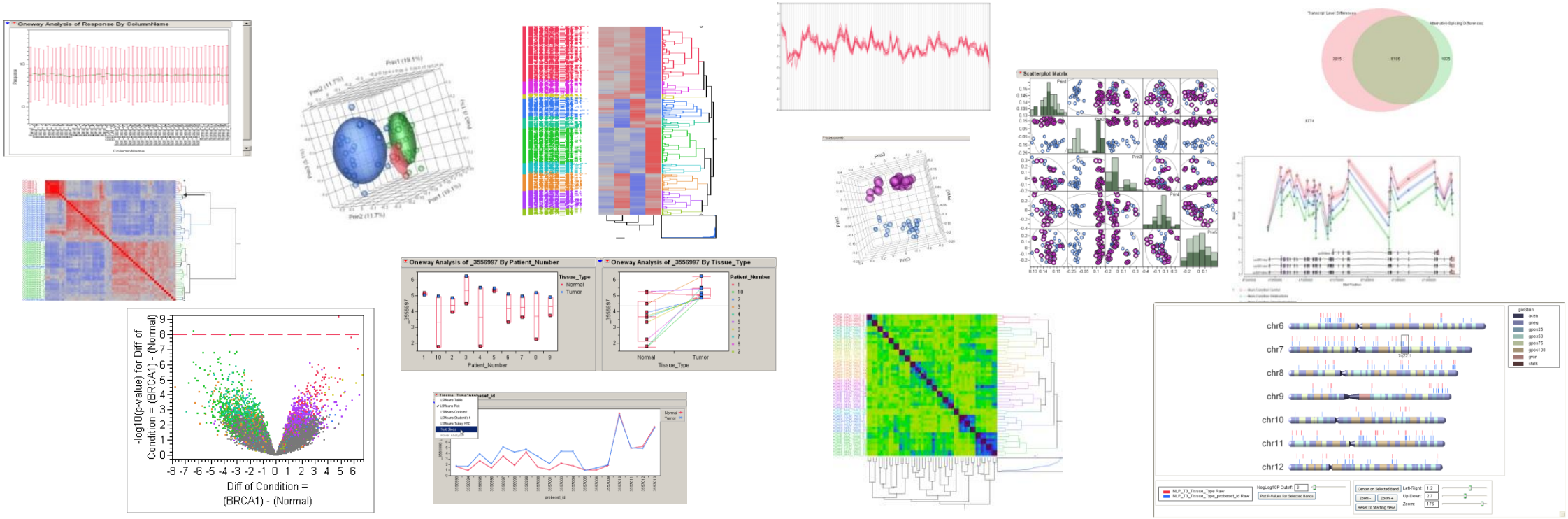
Relationship Matrices Individual and Group



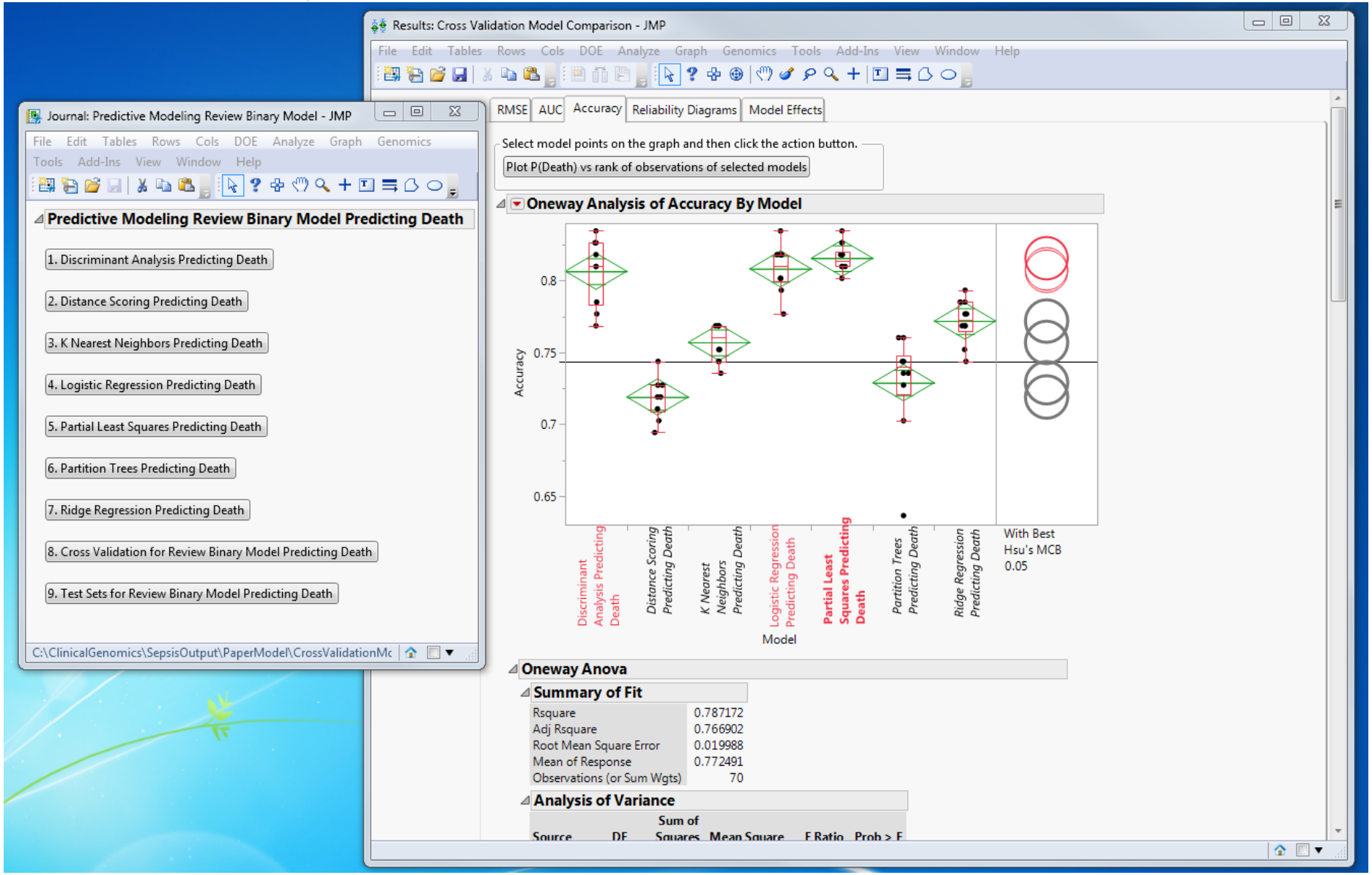


JMP GENOMICS | EXPRESSION ANALYSIS HIGHLIGHTS

- Import, Quality Control, Normalization, and Analysis of Variance
- Microarray expression analysis
- Next-Generation Sequencing Count data analysis
- Statistical capabilities for expression, NGS, methylation, metabolomics, proteomics

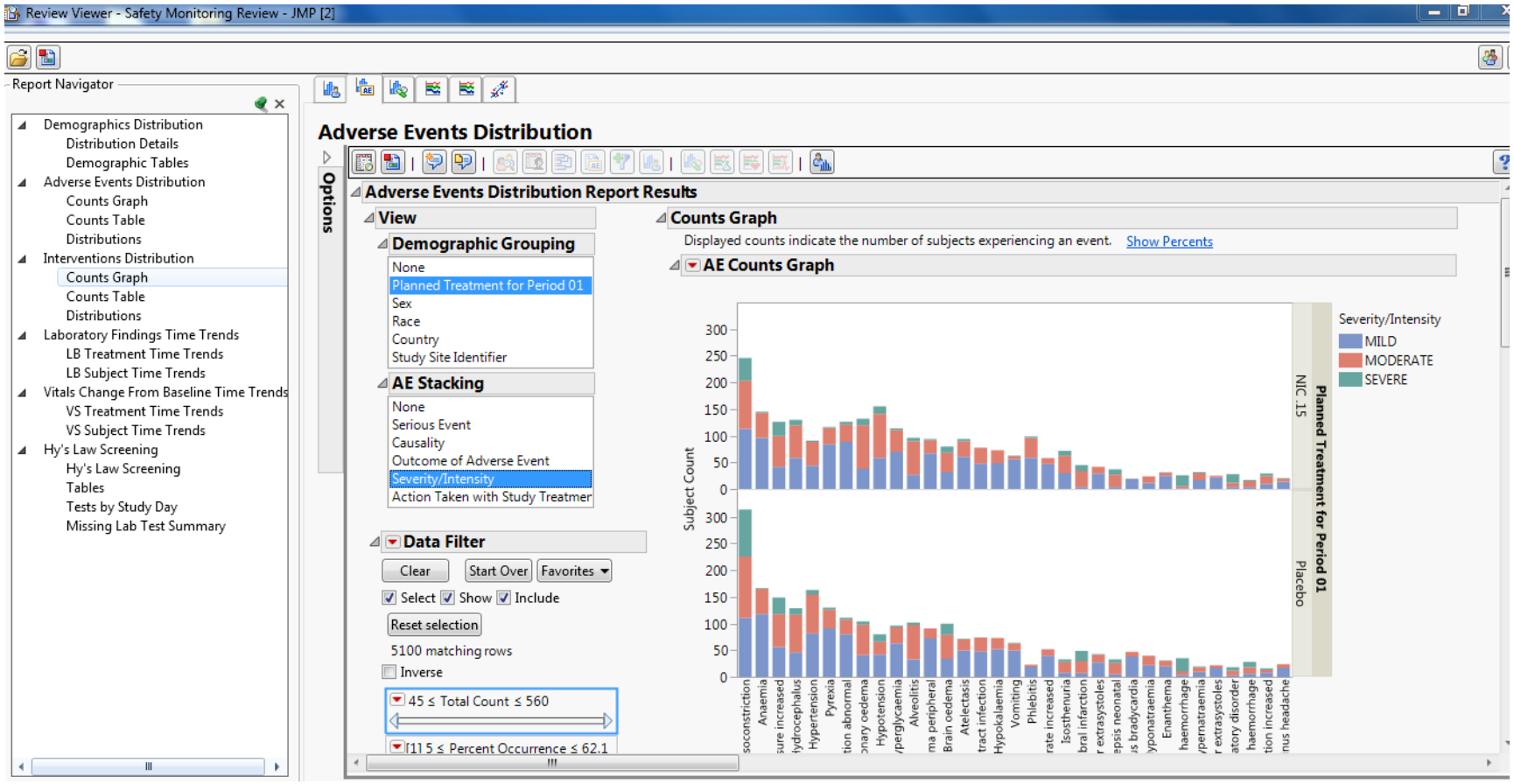


JMP GENOMICS | EXAMPLE ANALYSIS WORKFLOW (JMP JOURNAL)



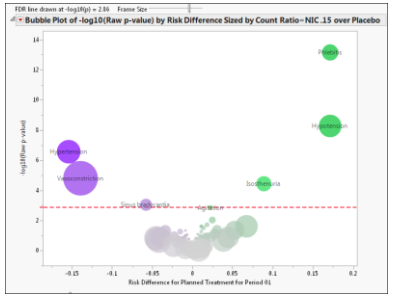
- JMP/SAS integrated solution targeted for Clinical Trial analysis
  - Data monitoring for operational site quality, medical safety monitoring and early efficacy
- Customized to automate report analyses using CDISC standard
  - (SDTM/ADaM/SEND) data structure
- Build role-based clinical trial analysis (shareable) reviews
- User Configurations to enable collaborative clinical trial analysis

JMP CLINICAL REVIEWS

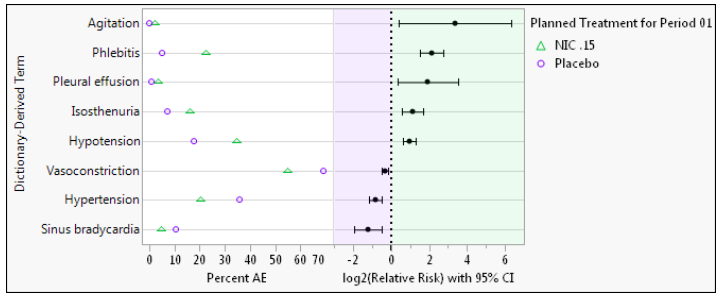


- JMP Clinical “Review”: Collection of customized reports for an analysis role
- Create and visualize data summaries
- Dynamically filter and interact with analysis reports
- Drill down actions into related subject analyses including patient profiles

JMP CLINICAL | ANALYSIS AREAS

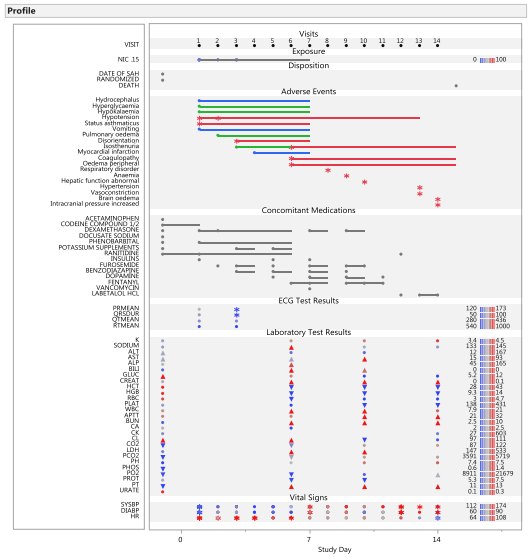


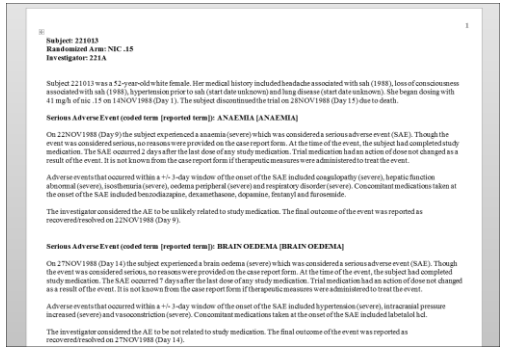
- Data Management
  - Data snapshot comparisons, notes and review status, data quality



- Medical safety monitoring and efficacy review
  - Adverse events, concomitant medications, laboratories, etc..

- Data integrity, risk-based monitoring, and centralized statistical monitoring
  - RBM, site-level analyses, data anomalies, fraud detection



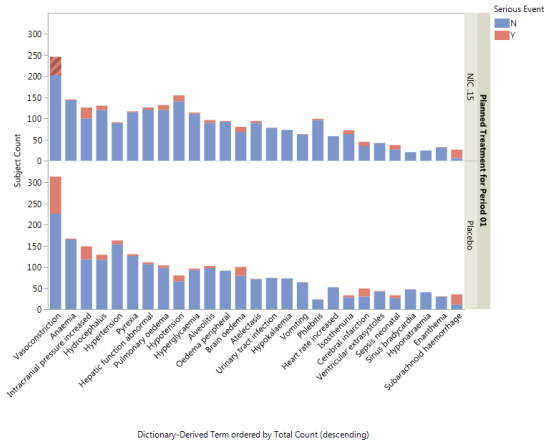


- Patient Profiles and automated patient AE narratives
  - Templates for data and layout for medical writers

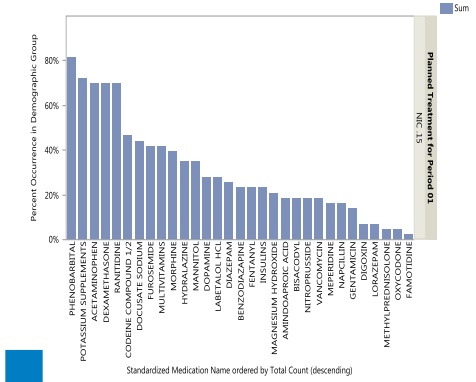
- Biometric analysis of safety and efficacy signals
  - Time-to-Event, Incidence, and ANOVA models

TYPICAL MEDICAL MONITORING REVIEW

What count/percent of subjects on drug had a serious adverse event?

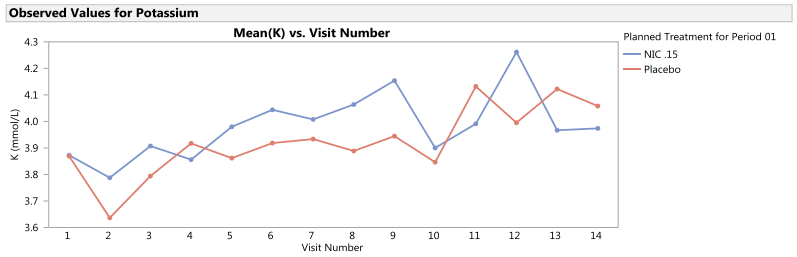


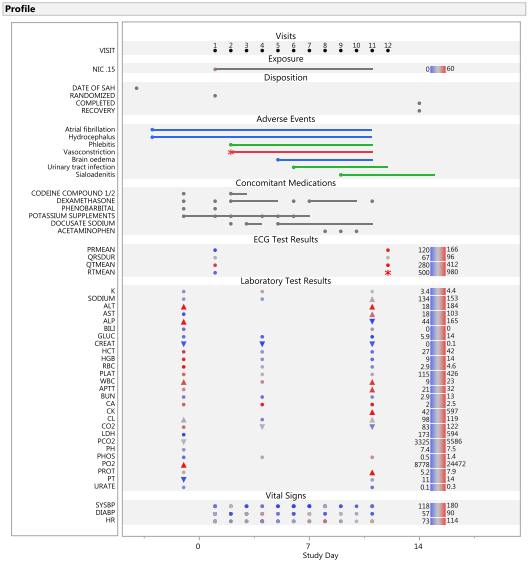
What medications were those subjects taking?



For selected subjects, what is the complete patient **profile** or **narrative**?

Did those subjects have abnormal change from baseline lab results?





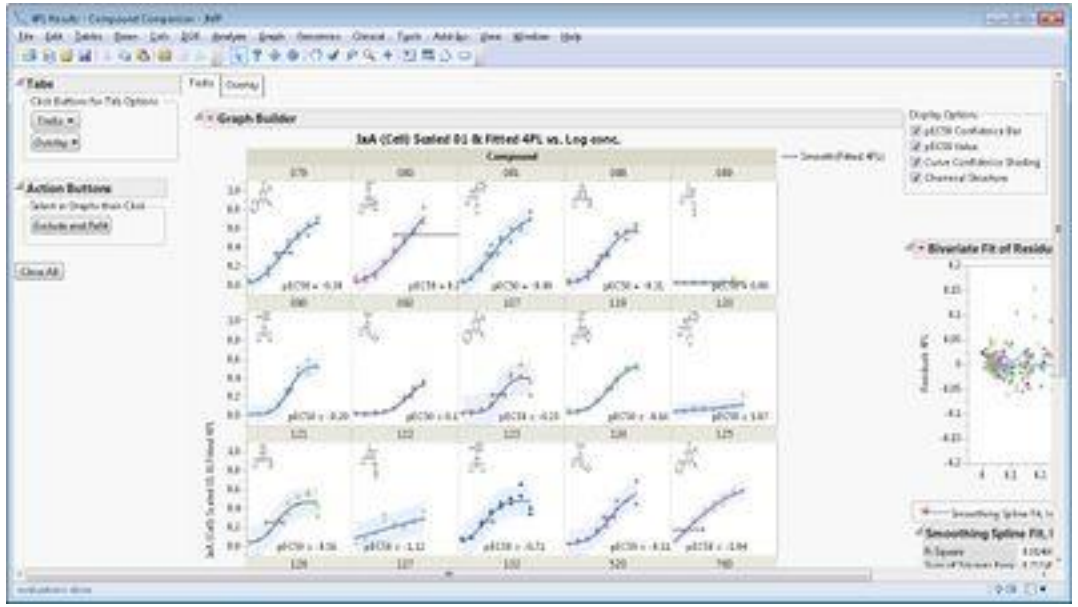
JMP ADDINS | APPLICATIONS FOR LIFE SCIENCES

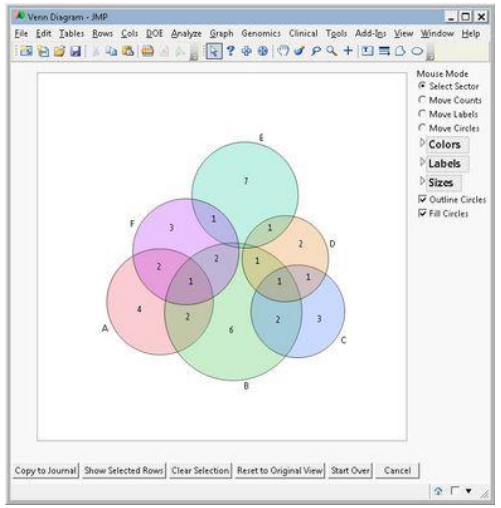
- BIOM File Format Importer for Metagenomics
- Next-Gen Sequence R Integration Importer
- Outcrossed Linkage Map Analyses

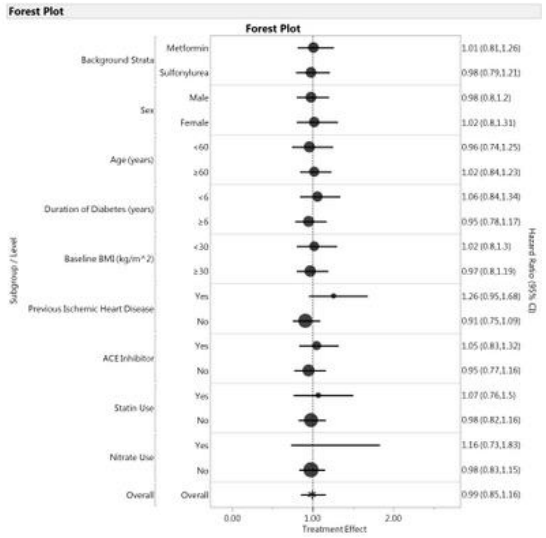
- Method Comparison Studies
- Bioassay Nonlinear Analysis
- Calibration Curves
- Multidimensional Scaling (R or SAS Integration)

- Venn Diagrams
- Partial Correlation Diagrams
- Forest Plots

- Local Control Treatment Effects
- CDISC Data Conversion
- Convert ISO8601 Character Date Numeric







LIVE DEMO

JMP Life Sciences

(left-to-right top-down)

Tzu-Ming
Geoffrey Mann
Tom Pedersen
Richard Zink
Russ Wolfinger
Susan Shao
Kelci Miclaus
John Cromer
Drew Foglia
Anisa Scott
Laura Archer
Lili Li
Wenjun Bao
Sarah Mikol
Adam Morris
Luciano Silva