

Visualizing Clinical Trial Data

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ABSTRACT

Today, all employees at health and life science corporations may need access to view operational data. There may be visualization needs for a business analyst to compare clinical trial spend versus similar past trials; for a clinical research associate to easily see what research sites may need more monitoring; for a data scientist to quickly and easily explore adverse event data for outliers; for a medical writer to have graphical patient profiles; for a CEO to immediately have high-level dashboards of operational performance. In this presentation we will discuss SAS Visual Analytics and demonstrate the benefits of visualization for health and life science organizations.

INTRODUCTION

Health and Life Science companies of all types and sizes generate data each minute, hour, and day. Regardless of how much data an organization has, one of the best ways to discern important relationships is through advanced analysis and high-performance data visualization. If sophisticated analyses can be performed quickly, even immediately, and results can be presented in ways that showcase patterns and allow querying and exploration, people across all levels in an organization can make faster, more effective decisions.

SAS® Visual Analytics is a new business intelligence solution that uses intelligent ways to help business analysts and nontechnical users visualize data, see patterns and trends, and identify opportunities for further analysis.

TECHNOLOGY OVERVIEW

SAS Visual Analytics is an easy to use, web-based solution that leverages the SAS LASR Analytic Server and empowers organizations to explore small to huge volumes of data very quickly. The SAS LASR Analytic Server is an analytic platform that provides a secure, multi-user environment for concurrent access to data that is loaded into memory across a single server or a distributed computing environment. By loading tables into memory for analytic processing, the SAS LASR Analytic Server enables business analysts to explore data and discover relationships in data at the speed of RAM.

SAS VISUAL ANALYTICS HOMEPAGE

Organizations have users performing various roles and performing various different functions using the Business Intelligence environment. This could vary from simple access to existing reports and dashboards to doing analytical analysis and data exploration to data management activities.

SAS Visual Analytics provides a home page, which is a personalized and secured central entry point for all users to use for their daily activities using SAS Visual Analytics. Figure 1 below shows the home page after a user has logged into SAS Visual Analytics.

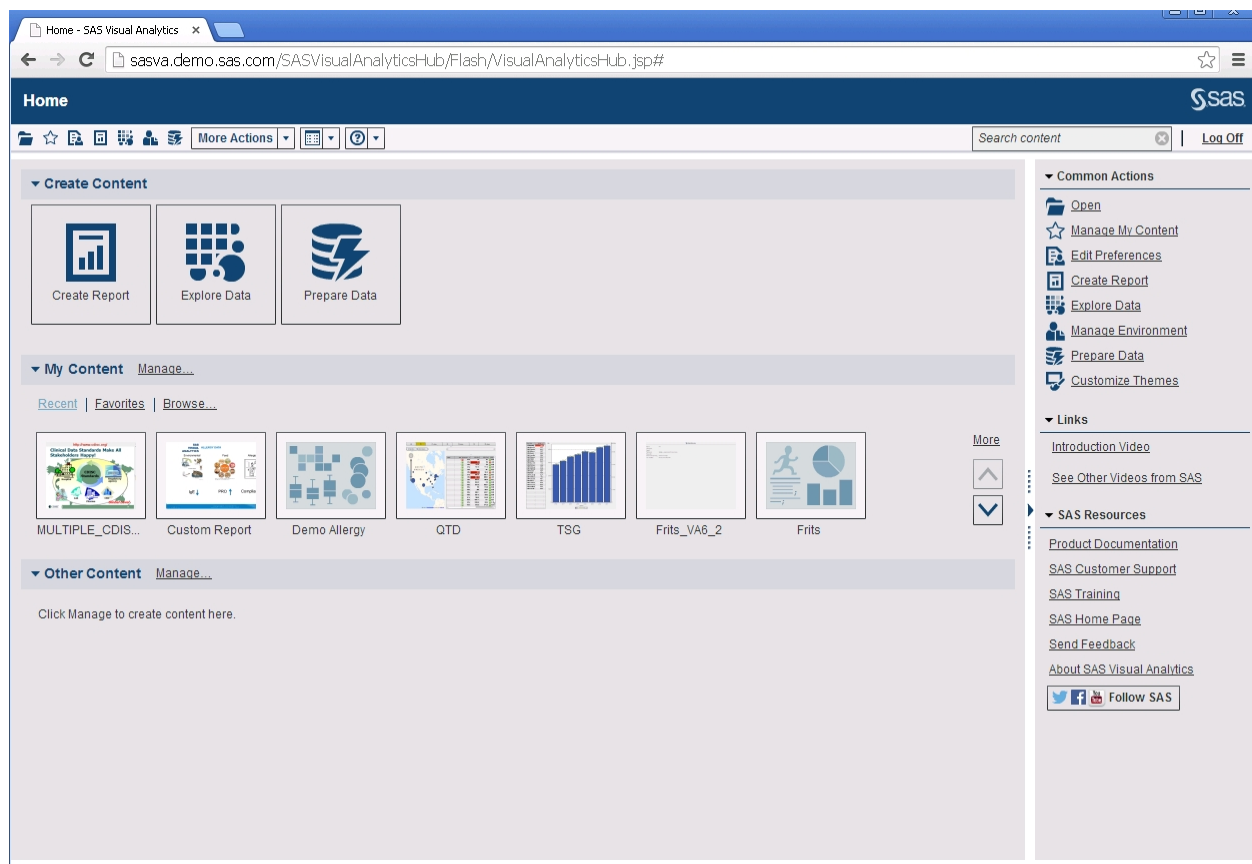


Figure 1. The SAS Visual Analytics Home Page

Some of the key features of the home page include:

- Access to the home page for all users
- View information based on your assigned role and capabilities
- Navigate to varied end-user actions, such as
 - Exploring data
 - Creating reports
 - Viewing reports
- Provide administration tasks
 - Manage data
 - Monitor and administer systems
- Add favorites and use search
- Add comments to encourage collaboration between users

SAS VISUAL ANALYTICS EXPLORER

Visualizing any data can be both fun and challenging. It is much easier to understand information in a visual compared to a large table with lots of rows and columns. A picture is worth a thousand words – especially when you are trying to understand and gain insights from clinical data.

Organizations have realized the importance of analyzing every possible aspect of their data, the need of analytically exploring any size of data and understand the patterns and trends more effectively going beyond tabular reports. Information exploration should be a joyous experience and SAS Visual Analytics Explorer, a component of SAS Visual Analytics, enables you to visually explore data with ease.

Figure 2 is an example of quickly seeing, in a vertical bar graph, the reports of adverse events by body system. We have also quickly added a filter of SERIOUS ADVERSE EVENT (Y/N) in the local filter section of the graph. The SAS

Visual Analytics Explorer will use a built-in “auto-chart” feature that will create what the system deems is the best visualization (or graph) based on the data the user drags into the empty pane. By hovering the mouse over the different bars in the vertical bar chart, we would see the statistics for that bar.

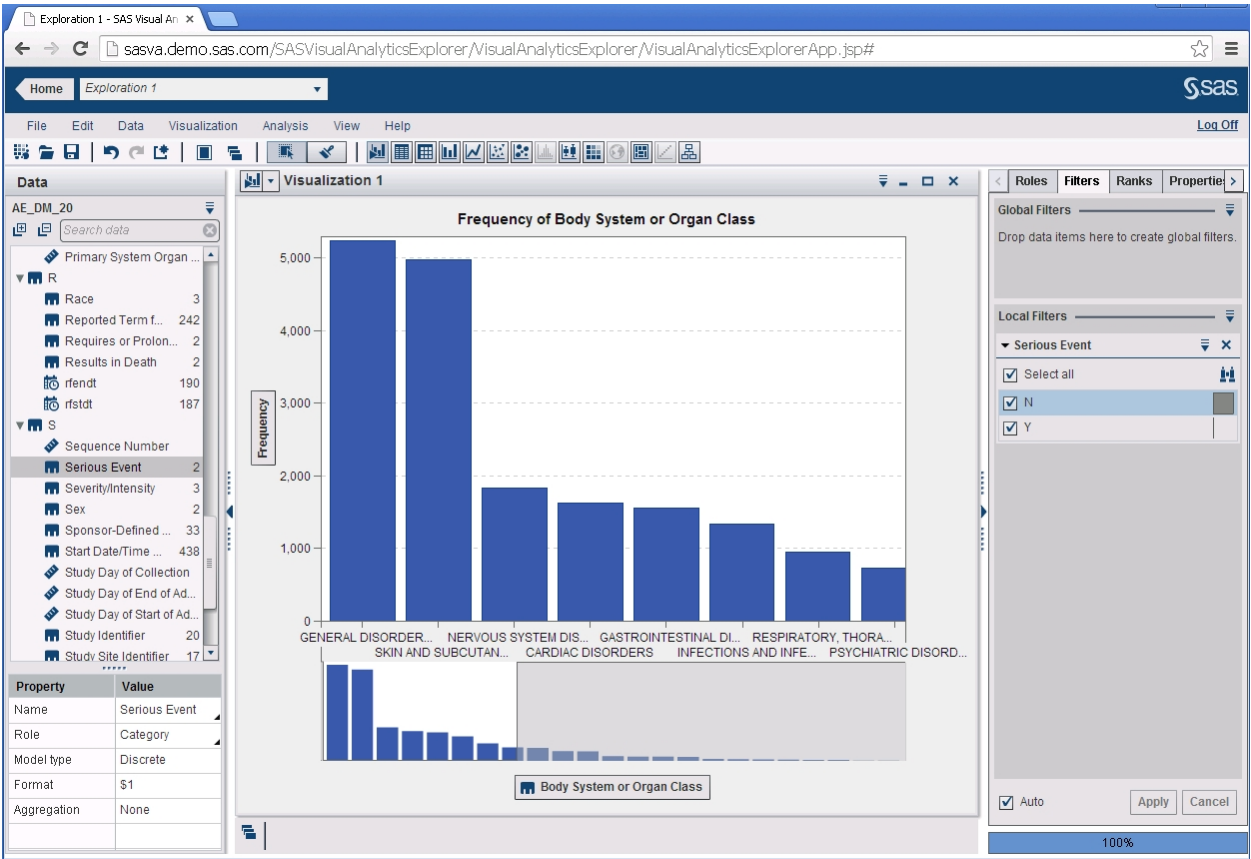


Figure 2. Frequency of Body System and Organ Class Exploration

Next, we can quickly add another visualization to the right of the SOC summary. In this case, we want to see the breakdown of Race by Gender for the subjects. In addition to the visual, we include the table of data below the graph. Figure 3 shows the result.

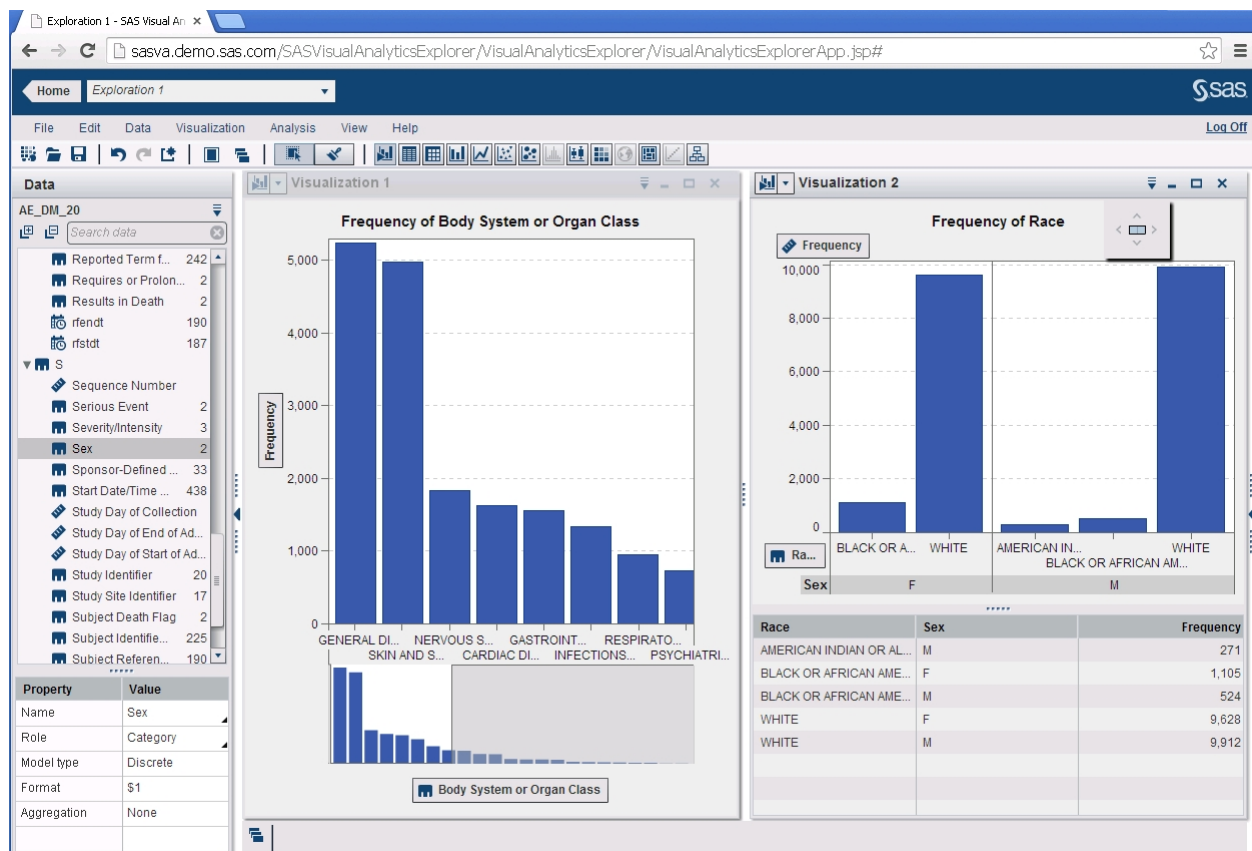


Figure 3. Adding the Frequency of Race by Gender visualization

A common visualization for Adverse Events is a treemap of System Organ Classes OR Preferred Terms. Creating boxes of the frequency or percent of the number of reports (or subjects) with a SOC. The size of the boxes is larger if more frequent, smaller if less frequent. Figure 4 is an AE TreeMap of System Organ Classes.

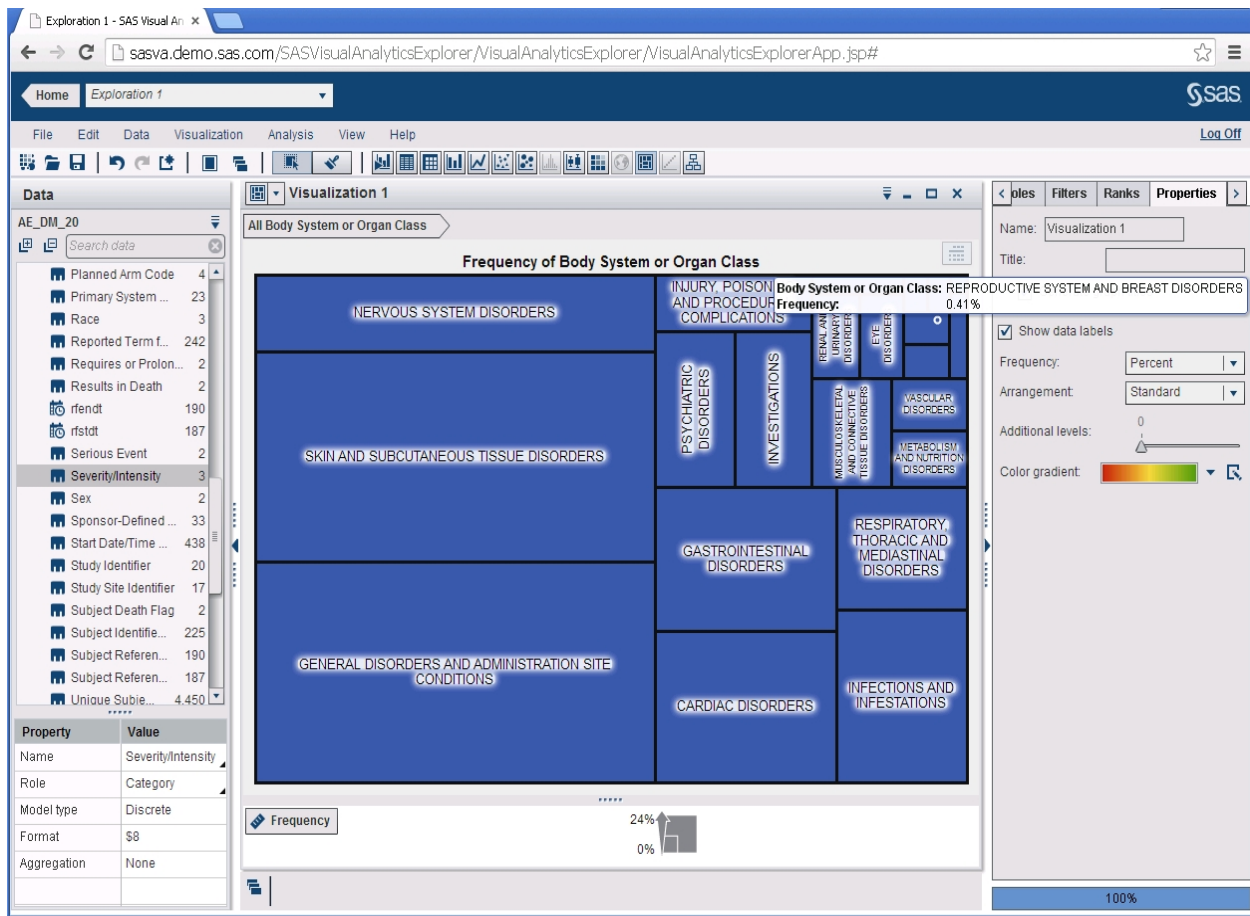


Figure 4. Treemap of Body Systems

SAS VISUAL ANALYTICS DESIGNER

SAS Visual Analytics Designer is a component of SAS Visual Analytics that brings together classic reporting and highly visual dashboards into a single report. The SAS Visual Analytics Designer enables users to create reports from various report objects such as graphs, tables, gauges, prompts, and geo maps. Users can also add text and images to reports. A single report can use multiple data sources. Figure 5 contains a screen grab of some of the objects available to the users for creating reports.

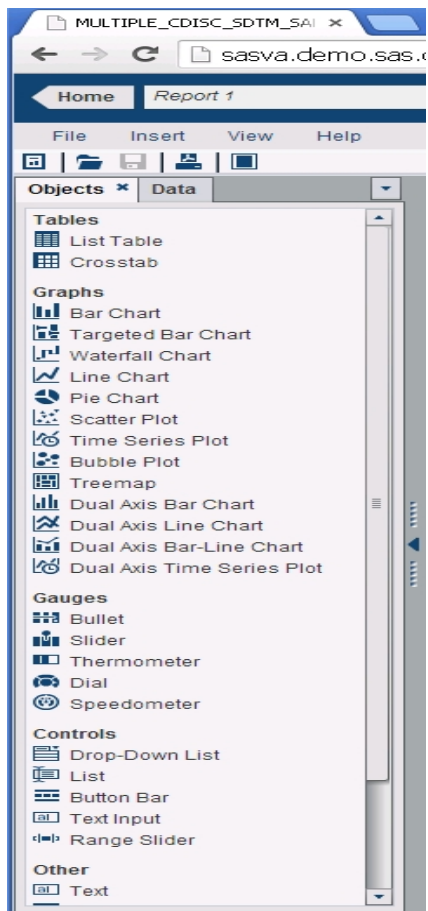


Figure 5. Example of objects users can select for reports

Users can set various types of interactions across the report objects in a WYSIWYG design format, derive new data items, create hierarchies, add comments, and export data. Reports created in SAS Visual Analytics Designer (or exported from the SAS Visual Analytics Explorer) are readily available for users to access via a web browser or on supported mobile devices.

Figure 6 shows the Summary of Demographic Characteristics for a set of CDISC Pilot data.

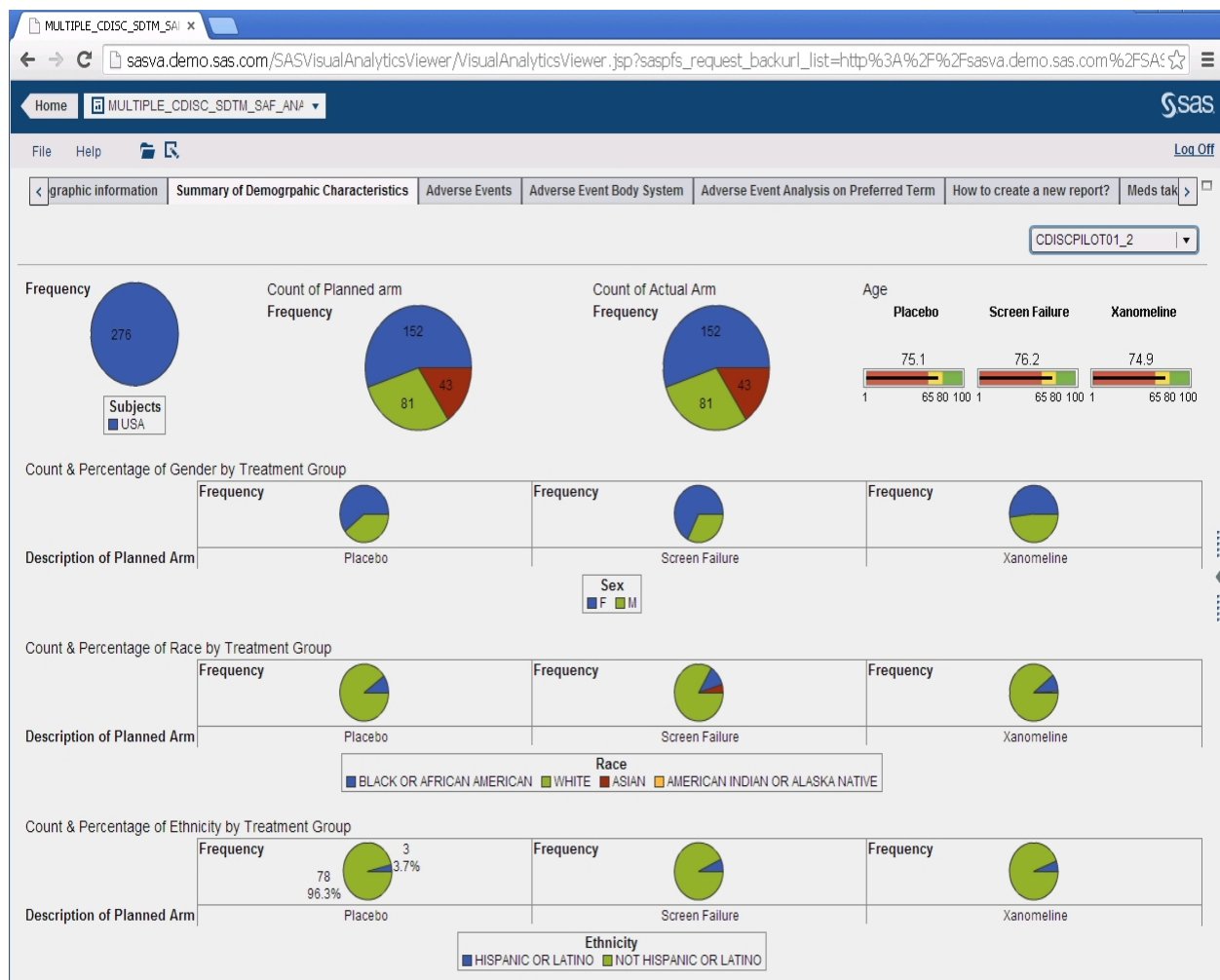


Figure 6. Demographic Summary

Figure 7 is an Adverse Event Visualization of Preferred Terms that are “Probably” related to Study Drug.

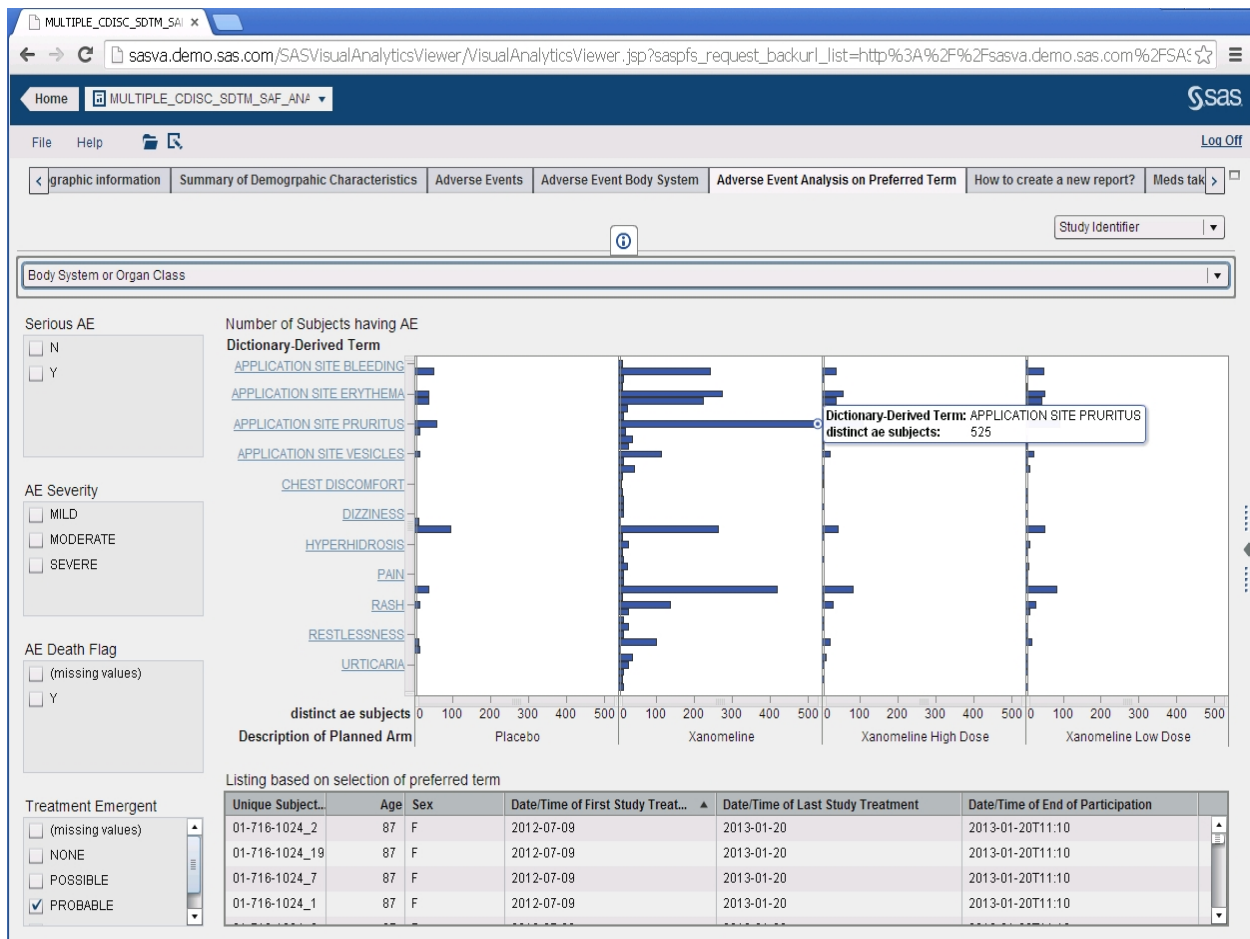


Figure 7. Preferred terms with treatment emergent as “PROBABLE.”

Patient Profiles are also important when running clinical trials. Medical Writers use profiles to help craft narratives on patients who discontinued due to AE, patients who die, etc. Figure 8 depicts a patient profile created off standard SDTM data in Visual Analytics.

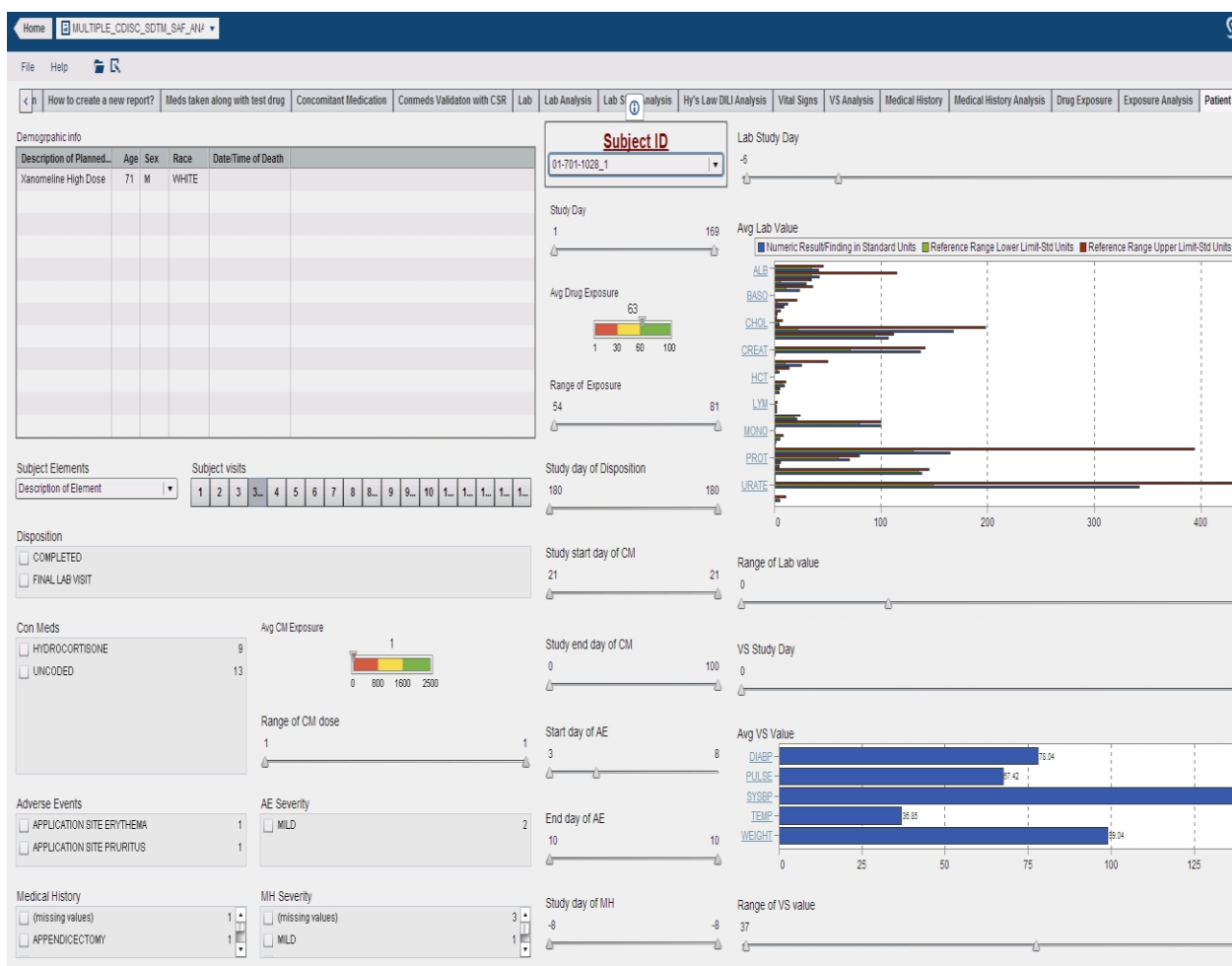


Figure 8. Patient Profile

SUMMARY

SAS Visual Analytics is a unique Business Intelligence offering from SAS that provides analysis at the speed of RAM. Powered by the SAS Visual Analytics LASR Server and a highly visual, interactive and self-service environment, users can enhance the analytic power of their clinical study data, explore new data sources, investigate them, create visualizations to uncover relevant patterns, and then easily share those visualizations in reports via the web and mobile devices.

REFERENCES

Chitale, Anand and Redpath, Christopher. 2013. "Whirlwind Tour Around SAS® Visual Analytics." *Proceedings of the SAS Global Forum 2013 Conference*. Cary, NC: SAS Institute Inc.

ACKNOWLEDGMENTS

First and foremost, Anand Chitale and Christopher Redpath for their excellent overview of VA in the "Whirlwind Tour Around SAS® Visual Analytics" which I used for a lot of this paper. I would also like to thank all of the members of the SAS HLS HAP team, specifically Pritesh Desai who created the SDTM VA reporting represented in this paper.

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