Can clinical outcomes be derived with data analytics?

By Adriano Marcuz, BS, Kristen Benson, BA; Dynela GarciaBaran, MD; Alejandro Ortiz, PhD.

Data analytics for the 21th century relies much more on “Progressive Analytics” than in its predecessor “Statistical Analysis”.  In Progressive Analytics, sometimes referred as “Data Mining”, information is aggregated utilizing powerful applications to assist in the analysis process.  The three most powerful and used software applications are SAS (Statistical Analysis Software by SAS Institute), SPSS (Statistical Package for Social Sciences by IBM) and R (GNU project for statistical analysis).   Healthcare professionals are now increasingly asking the question: What can we do with this wealth of data? How can we perform meaningful analytics on such data to derive insights to improve quality of care and reduce cost?   
The approach described in this project takes advantage of freely analytical resources built into MS Office and Open Office products to generate the analytical data.

The main issues addressed in this presentation are: Programmatically, acquire instrumentation data or self-reporting data into a repository.  Where the analytics application can read the information, perform analytics, generate tabulation output, and if needed also create graphical output.   
MS Office is present in the majority of research environments. Along with the day to day capability to create documents, presentations or spreadsheets, there is a built-in programming function that can be utilized to accomplish very complicated and powerful data analysis. 

An embedded application can be created that is part of the report document underlying structure.  Which is not a visible part of the document, but behind the scenes, in the core of the document, this user created embedded application performs all the analytical work.  When the embedded application activates, by either clicking on a toolbar icon or a pre-defined set of command key strokes the application performs the researcher requested function(s).  Returning output calculations in tabulated form and/or graph(s) to be incorporated into the report.  Taking advantage of this model/concept the researcher is prompted to: choose the data to be analyzed, where the file data to be analyzed is located and the type of analysis to be performed.  The application then, locates, reads the data and performs the desired analysis.  The researcher has the option to verify that the data being process by the application is collected from the proper location.  When the analysis is complete it can be viewed before being embedded into the report document.  The application can be tuned for predictable analytics or statistical analysis.   
  
The methodology presented is extremely versatile and can be easily adapted to other forms of research methodologies that require data analyses. It has the capability to be utilized in such a manner which can be tailored to individual study data.  It can fulfill data analysis needs by providing: Automated data and collection, eliminating manual data transfer, a scientific engine for data analysis and multi-function outputs.  Integrity of the data is maintained through consistent data collection, expeditious data analysis and report creation.