WHITE PAPER

Fast, Focused Medical Data Review:

Use Cases by a Medical Monitor

revvity signals

Revvity Signals Clinical Data Review solutions provide innovative workflows and advanced analytics designed specifically for medical monitors to focus their medical data review processes, identify risks early and enable patient safety.

Medical monitors once had the nearly impossible task of scanning hundreds to thousands of lines of data in spreadsheets, tables, and listings to identify trends, patterns, and outliers that might represent safety signals. Spreadsheets and PDFs were a starting point for data collection and reporting processes but did nothing to improve data analysis. Even as electronic data capture (EDC) has displaced manual reporting to produce cleaner data, more efficient data collection, and faster access to data, the majority of clinical trials still rely on manual data analysis.

In the days of paper data collection, medical monitors could only explain and document data review findings retroactively. By the time they performed their analysis, it was too late to refine the protocol or educate the project team or investigator on how to perform an assessment or record a result correctly. The risk of losing a years-long study due to a lack of quality data was enormous.

EDC improved data collection and made it more practical for medical monitors to review data in flight. But, the analytical tools that came with early EDC were rudimentary. While EDC could produce multiple, iterative data sets, they were still static listings and not dynamic like visual analytics. Thus, medical monitors could examine data patient by patient in detail within the EDC, but it was still challenging to build a nuanced, trial-wide view.

Visual analytics tools such as TIBCO Spotfire® can help identify finer details as soon as data collection begins. But medical monitors are clinical specialists, not data specialists. Many lack the IT expertise needed to manipulate data visualization tools to extract the level of detail promised by vendors and expected by trial sponsors. What medical monitors needed was a workflow designed specifically for medical review and easily adaptable for different therapeutic areas and protocols.

Medical Data Review Workflow

For medical monitors, the problem with off-the-shelf analytics tools is the lack of tailoring for medical review needs. Medical monitors typically begin by asking clinical questions that are related to core safety domains. These domains are most often specified in medical data review plans and include mandatory monitoring of data such as adverse events, laboratory results, concurrent medications, vital signs, and similar domains. For the most part, domains allow one to identify subject safety concerns or concerns about the investigator. Clinical Data Review is among the newest data visualization tools designed expressly for the medical monitor.

The typical approach begins with a population view of patient data reported to date, then moves to a more detailed analysis of patients who fall outside expected parameters. Both population level and patient-level analyses are extremely difficult to accomplish using numeric or true-false values in the traditional spreadsheet format. These types of analyses are much easier to perform by turning data into graphs and other visual tools. As demonstrated in Figure 1, Revvity Signals Clinical Data Review provides advanced visualizations and data analysis. The medical monitor can navigate from population to patient-level profile data and back as well as latterly across domains, analyze adverse events, and identify safety signals faster (Figure 1).

Figure 1. Patient profile displaying demographics, disposition, dosing, adverse events, and labs in a single view.

One common approach is to review adverse events by system organ class. Bar charts can readily be configured to rank adverse events by organ system in terms of numbers of events and severity. Medical data review is a systematic review for parameters prespecified in the medical data review plan. Data exploration is the use of visual analytics to identify the "unexpected." Depending on the medical data review plan, the reviewer can drill down for more detail based on organ system, severity, concurrent medications, and other criteria as well as different combinations of values in a predetermined order or on an ad hoc basis as appropriate. Developing alerts based on prespecified parameters such as adverse event type or severity or organ class involvement helps the monitor focus on the most critical data points (Figure 2). Improving the efficiency of medical data review can free up more time to look for unusual patterns or trends in data that were not expected.

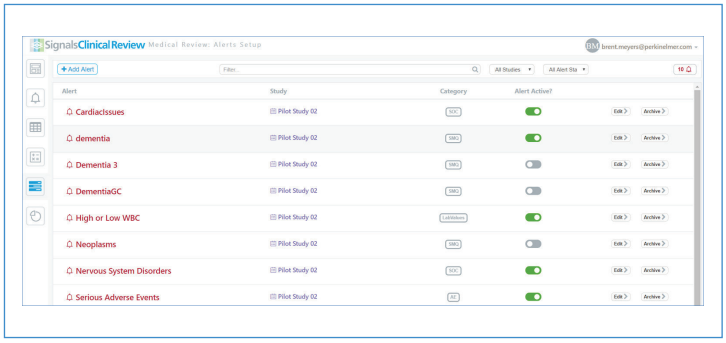


Figure 2. User-defined Alerts to highlight study-specific safety concerns and endpoints.

If the monitoring plan specifies patient-level review of all serious adverse events, tools allow the reviewer to identify specific terms at the population level (Figure 3).

The next step is to analyze each patient and serious adverse event by factors that could be, or appear to be, associated. These potential associations might include adverse events in other organ systems, the timing of adverse events in relation to trial dosing, number and type of adverse events per patient, concomitant medications, laboratory values, baseline demographic, and more.

Figure 3. Navigate from population to patient-level and back, as well as laterally across domains.

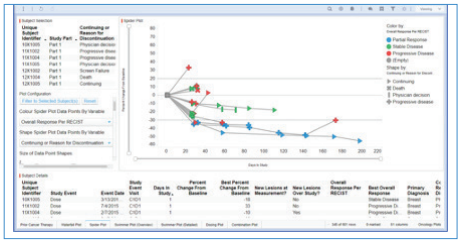
If there does appear to be a temporal association between dosing and adverse event, the next step could be to drill down to laboratory results. Assuming the patient did have laboratory results reported, the medical monitor can look at global values for all laboratory results or focus on a specific value such as a renal panel or liver panel.

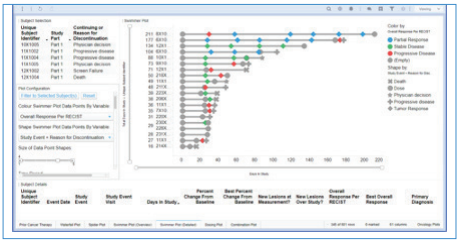
Vital signs may also be important for adverse events such as syncope. If a patient with syncope was also prescribed a new anti-hypertensive agent, there is an immediate medical question. Why a new anti-hypertensive agent? Was it prescribed before or after the recorded syncope event? Are there any anomalies in vital signs or laboratory results? Depending on the detail available, the questions might be answerable during review, or they might be recorded as an observation and followed up either directly or by way of the CRA. The tool can easily mark the event as in progress and bring it up the next time the file is opened for review.

CONFIGURED TO YOUR USE-CASE

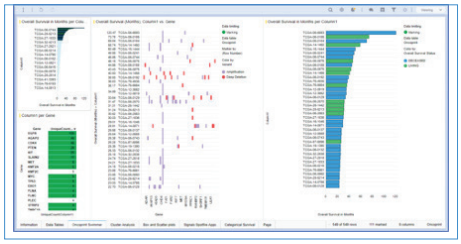
With expertise across therapeutic areas, Revvity Signals Clinical Data review tools are tailored to your therapeutic area or specific study.

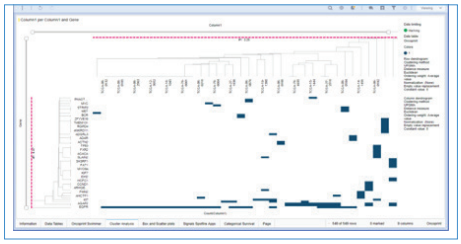
Oncology Solid Tumor: Waterfall, Spider, Swimmer, and Prior Treatment Analysis



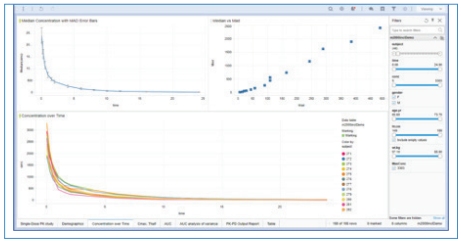


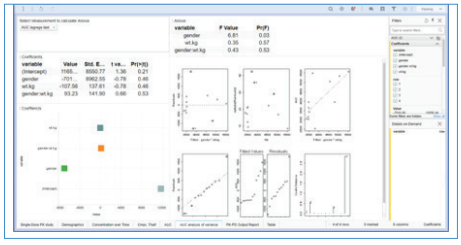
Oncology Biomarker: Onco-print



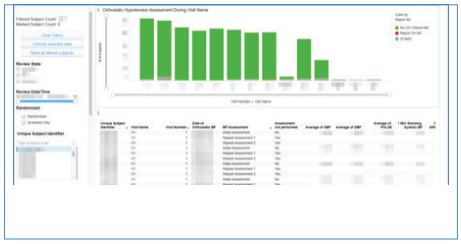


Pharmacokinetics: Cmax, Thalf, AUC, Anova and Concentration Analysis





Osteoarthritis: Nerve Conduction, Orthostatic Hypotension, and WOMAC Analysis



Best Practices To Help Facilitate Medical Monitoring

One solution that is stand-alone, purpose-built for fast and agile medical data analysis, and review that provides:

- Clinical data review tool built for speed and agility that can be tailored to your specific therapy
- Alerts to quickly focus on what is most important
- Workflows with population-to-subject to line-listing drill-down capability
- Line Listing Review to track review process and record comments
- Collaboration to track data reviewed and keep a record of actions or requests

Your Starting Point

It is just as easy to begin medical data review by looking for specific signals such as cardiovascular events or drug-induced liver injury (DILI) that are based on laboratory values or some other specified domain.

For a trial protocol that specifies monitoring for DILI, laboratory values are the most direct starting point. A patient with elevated ALT and elevated bilirubin is a potential candidate for DILI and needs additional investigation. The out-of-range laboratory values could be associated with trial dosing, concomitant medication, even a preexisting condition. The ability to quickly turn multiple data points into actionable information is the hallmark of effective data visualization.

Conclusion

Incorporating a data visualization workflow dedicated to medical data review reinforces adherence to medical data review and automatically documents the extent to which the review was actually conducted. Sponsors no longer wonder if graphic renditions of trial data bring useful information to trial analysis, and medical monitors no longer worry if they have missed required analyses or have forgotten queries that were never answered. The right data visualization tool can help medical monitors to tailor and improve their data review processes and enhance their ability to identify safety signals both quickly and surely. That's where Revvity Signals Clinical Data Analytics tools excel. With their TIBCO Spotfire® platform powering your clinical trial, Revvity Signals provides a single integrated data analysis and visualization solution that supports both clinical data review and medical data review.

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