eSource to SDTM: End-to-end Automation

The data generated during the development of new medicines come in a wide range of formats and may be generated from a variety of sources. Collecting, verifying and merging this data into a standardised format which is accurate and has the continuity to submit to regulatory authorities for approval requires deep understanding, expertise and flexibility.

The vast amounts of data collected during clinical trials must all be organised and formatted into a standard structure. The Clinical Data Interchange Standards Consortium (CDISC) developed the Study Data Tabulation Model (SDTM) to guide the organisation, structure and format of clinical data. SDTM supports the exchange of the data, promotes the equal interpretation and reusability of the data, and enhances the collaborations between different organisations. The processes that CDISC implemented brought clarity to clinical research by developing standard models.

The challenge for drug developers and clinical research organisations undertaking the trials is ensuring that the necessary information can be transformed into the accurate SDTM format. Clinical trials have become increasingly complex, involving combined study designs, a larger number of sites across a wider range of countries, and a greater variety of investigational technologies. This means that the data capture, transfer and handling need to be extremely flexible, while also taking into account the need to accelerate the time to market and budgetary restrictions. The earlier the eventual requirements of the SDTM are considered when planning and designing a clinical study, the more efficient and effective the development of the final clinical database is likely to be.

A major advancement in this process has been the integration of eSource systems that capture source data electronically, and have largely replaced the use of paper case report forms (CRF). An eSource system is far more than a digital replacement for a paper source. With an appropriate eSource solution in place, electronically captured data can be shared in real time from the capture device to the eSource database, and transferred subsequently into the clinical SDTM database, dissolving the boundary between source and CRF. However, eSource systems must be seen as part of a larger entity that integrates data capture, site automation, sample management, data flow facilitation, data visualisation and data management.

Efficiently integrating an eSource system into the workflow requires a thorough knowledge of the technical specifications and system. An integrated eSource system also has the effect of changing how staff within a company work, as it requires previously discrete departments to work differently and more closely together, creating the need for inter-departmental roles. Streamlining the internal company structure and communication facilitates the setting-up of an eSource system aimed at producing a high quality SDTM. Certain tasks in an organisation may also have to be performed differently to fit in with the eSource workflow and SDTM compliance and to enhance efficiency and avoid unnecessary or duplicate work.

It is vital that the people working at the clinical sites are aware of the needs of the data management (DM) staff, so good interaction between the various departments is key. Working closely together will ensure that clinical sites set up a study-specific eSource system that can capture all data needed for the analysis in the correct format to allow a direct data transfer to the DM department.

This setup virtually bypasses the CRF, making the process fast, efficient and error-proof. It is important that the correct forms, codes and text values are used in the eSource system to create the ideal data tabulation model. The eSource design team at the clinical site should therefore collaborate closely with the DM team to review the forms at an early stage to make sure that the necessary information is captured, and that eSource specifications allow the clinical data to be converted to the SDTM format easily where necessary.

Besides the seamless integration of processes and people, another key to creating clinical databases is to use a metadata-driven approach. This method uses tools linked to the metadata repository and allows the automation of the SDTM workflow with an end goal of creating a clinical database that is SDTM-compliant, while simultaneously optimising time and costs.

These tools include the ability to automate the CRF annotations, the mapping of the electronic data to SDTM, the set-up of trial-specific metadata, and the uploading and mapping of external data from providers such as laboratories. Together they can enable end-to-end automation of the SDTM workflow and assure compliance with SDTM. The tools can be further linked to standard client - or in-house - libraries of annotations/mappings and configured to fetch and suggest annotations/mappings at form- and item-level based on therapeutic area and (e)Source system being used. The existing annotations/mappings can then be copied from the standard libraries to the trial level, thereby optimising time and costs.

Conclusion

Implementing an eSource solution can enable an efficient process to allow end-to-end automation from electronic capturing of the data at the clinical site to a high quality, submission ready SDTM database. Whatever the route taken to achieve a high quality SDTM database, there is an inevitable structural and functional impact on workflows. There will also be trade-offs in task assignment, task execution, trial management and cooperation among different departments, but there will also be direct advantages in terms of increased speed and efficiency, as well as database consistency.

The end result may be the creation of a high quality SDTM-compliant database, but the way in which this is achieved is

equally important, and the focus must always be on optimisation and efficiency at operational level.

At SGS, we have been using an eSource system at our Clinical Pharmacology Unit in Antwerp for some time, which has been highly efficient. However, with technical advancements, the current system has reached its technical limits, so the challenge is to combine the skills, knowledge and experience from the current system to move to a next-generation eSource platform, to ensure that the needs of current and future trials can be met as they continue to become more complex and require the handling of more data.

Annelies Van Zeveren

Annelies Van Zeveren holds a master's degree in biotechnology and a PhD in veterinary science from Ghent University. She joined SGS Clinical Research in 2008 where she first worked as Clinical Data Manager, then later on as Project Manager. In 2015, she became the Project Director of Biometrics and Medical Affairs.