Seamless **Systems**

Peter Ketelaar at PRA International and Trish Meek at Thermo Fisher Scientific argue that the use of LIMS can help CROs meet regulatory guidelines, improve productivity and minimise costs, resulting in operational excellence

Pharmaceutical, biotechnology and medical device companies are increasingly outsourcing to specialised contract research organisations (CROs) in order to remain competitive in an increasingly complex global environment. A recent research study published by Business Insights Ltd entitled 'The CRO Market Outlook: Emerging Markets, Leading Players and Future Trends' projects an annual growth rate of 14 to 16 per cent for the CRO market, reaching a value of $24 billion by 2010. CROs have been established as full service providers offering focused and expertise-rich solutions for a range of activities, from research and development (R&D) to clinical trials and manufacturing, through to marketing. This substantial growth is driven by the capability of CROs to achieve optimum cost efficiency, manage peak workload, increase global reach and reduce time-to-market for pharmaceutical companies seeking to maintain their competitive position. In addition, outsourcing takes the burden of non-core activities and transactional tasks off sponsor companies and allows them to focus on their core competencies. However, despite strong growth, the global CRO market continues to face a number of challenges.

In order to bolster their pipelines, pharmaceutical companies are looking beyond traditional small molecules to biopharmaceuticals, using biomarkers to better characterise the effectiveness of their therapies in the clinic, and personalised medicine. One way that pharmaceutical companies are able to remain agile is through outsourcing to CROs. Outsourcing allows pharmaceutical companies to take advantage of CROs' specialised expertise while experiencing an improved return-on-investment, not only in financial terms, but also in time savings.

CHALLENGES FACING CROs

The most important challenges facing CROs are strict regulatory requirements and pharmaceutical consolidation. Worldwide regulatory bodies increasingly require more detailed safety control of drug candidates to ensure the safety of final products and avoid potential product recalls. In order to comply with these regulations, CROs must generate more carefully designed studies, which can only be achieved using scientific teams with great expertise in specific therapeutic areas.

One of the ways to address these challenges and succeed in the competitive CRO market is to implement market-specific, high-performance laboratory information management systems (LIMS) with expandable capacity and quicker delivery speed. CROs must continuously upgrade their technological capabilities and utilise the latest LIMS solutions to help them integrate data in order to speed the drug development process and to connect seamlessly with sponsors.

CRO REQUIREMENTS

CROs have special considerations when it comes to LIMS implementations. They need to deploy LIMS that contain built-in capabilities and targeted analytical tools to help them serve the varying needs of their pharmaceutical sponsors. The LIMS of choice must be capable of gathering, analysing and storing large volumes of data for both standard and complex studies. Data must be reviewed, summarised and presented in compatible report formats to facilitate seamless communication and data transfer between CROs and their customers, as well as rapid review and approval. Secure bi-directional transmission of information, between the sponsor company and the CRO, is also of paramount importance.

Investing in a LIMS to manage the entire production process from sample receipt through to analytical report provides a number of benefits, including improvements in sample throughput, more efficient use of laboratory equipment and limited downtime for instruments. The primary process of sample analysis can be run more efficiently, while also achieving faster and more reliable quality control. In addition, powerful LIMS solutions are specifically designed to comply with Good Laboratory Practices (GLP) and 21 CFR Part 11 regulations.

LIMS solutions can also integrate data from many different laboratory instruments, enabling collaborative research. The LIMS will facilitate better

decisions more quickly, increase productivity, lower operating costs and improve quality and customer service, all the while encouraging compliance with strict regulatory requirements.

CROs need LIMS to help them gather, analyse and store data on behalf of their pharmaceutical sponsors. Because data is delivered from the CRO to its sponsors, and ultimately to the US Food and Drug Administration (FDA), it is critical that shared reports are in the same format and follow the standards laid down by the FDA. In that way, new drug entities can progress faster through the approval process, accelerating time-to-market. Speed of data capture and transmission is also extremely important. By speeding up data collection and thus data availability, CROs can contribute to a shortened drug development process and thereby increase their customers' productivity.

USING INFORMATICS TO REDUCE TIME-TO-MARKET

The informatics infrastructure of the CROs being considered is an important selection criterion for any pharmaceutical company. The delivery of data reports from the CRO to its sponsor company needs to be completed as quickly and seamlessly as possible in order to meet compliance requirements and help accelerate time-to-market. Data reports produced by the CRO on new drug entities are subsequently used by the sponsor company to submit a new drug application for approval to the ultimate decision maker, the FDA.

FURTHER INFORMATICS REQUIREMENTS

It is certainly to the benefit of pharmaceutical and biotechnology companies to choose a CRO that uses the same informatics solution that they do. Pharmaceutical companies can create their studies as they do today, and then send the completed study design to the CRO to be imported into their system. This ensures that the CRO will follow the study design as closely as possible. Such collaboration will also ensure commonality in the accepted level of process validity required for a GLP study in terms of regulatory compliance or the 21 CFR Part 11 compliance standards, instituted by the FDA to allow pharmaceutical companies to present their documents to the FDA in electronic form in place of paper. To comply with this rule, security of electronic records needs to be ensured in order to allow for electronic signatures to be treated with the same level of importance as handwritten signatures.

Bioanalytical laboratories share common needs for data management. These include a variety of required components, as outlined below.

GLP Compliance

When it comes to computerised systems, the principles of GLP also demand the existence of relevant validation documentation. This is because a validated system ensures accurate results and prevents fraud, as well as failure of the system. Validation costs vary enormously, even within the same industry, ranging from five per cent of the total project cost for a multi-site, worldwide, industry standard Enterprise Resource Planning (ERP) central server deployment, to up to 75 per cent of the total project cost for a

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bespoke customised system. In general, validation costs are higher when it comes to the implementation of one-off systems, new technology or complex applications. On the contrary, validation costs are lower for multiple rollouts of the same system, or when application specific purpose-built solutions are employed that have been specifically designed to meet industry standard GLP requirements. In conclusion, best validation practice constitutes spending between 15 and 25 per cent of the overall project cost.

PK/TK Analysis

Regulations have not changed dramatically over the past few years. However, the trend of trying to get more information out of Phase I trials in order to kill the compound as soon as possible (killing fields principle) has resulted in the growth of pharmacodynamic or biomarker assays in early phase development. In a typical bioanalytical study supporting a clinical first-in-humans study, data are obtained to elucidate the pharmacokinetic (pk) profile of a specific compound in the interest of future patients. It is of utmost importance that all pk data become available prior to the next dosing group. In order to fulfil this requirement, a fast and robust analytical method is needed, capable of providing an accurate report of the results from approximately 200 samples within 48 hours in a GLP compliant setting. Data are evaluated with quality control (QC) samples. The reporting of scientific results subjected to GLP compliance has become much easier and faster, since the implementation of purpose-built LIMS has allowed scientists to produce reports that follow a consistent format across all types of techniques. As a result, true data consolidation across different studies and projects is facilitated. Study results are organised in a unique document management system for extra convenience and efficiency.

Using a LIMS that is able to manage the whole primary process, from sample receipt to report writing, has been proven to save significant time for laboratory technicians, project managers and others involved in bioanalytical laboratories. Changing from an outdated LIMS to an up-to-date and purpose-built system can improve productivity, including up to 10 to 15 per cent time savings.

The compatibility of data between CRO and sponsor is important. When data reports are produced by CROs which follow the same format as the one implemented by their customers in house, seamless communication and data transfer between the two partners is ensured. Pharmaceutical sponsors design their studies in the LIMS, the CRO opens the studies, fills in the data and sends the studies back to the sponsors.

Investing in a state-of-the-art LIMS to manage the primary production process, from sample receipt through to analytical report, is thus imperative for bioanalytical laboratories. A powerful, fully integrated LIMS helps scientists manage their vast workload and provides a platform to support growth and achieve the ambitious objective for optimum operational excellence. Further immediate benefits include improvements in sample throughput, more efficient use of laboratory equipment and limited downtime for instruments.

CONCLUSION

Implementing a market-specific LIMS solution provides many immediate benefits to CROs. LIMS help CROs to address the challenges of stringent regulatory scrutiny and pharmaceutical consolidation while improving laboratory productivity and minimising costs through flawless transmission of data between themselves and their many pharmaceutical sponsors. Purpose-built LIMS enable the CRO market to meet its aggressive business and technology requirements by equipping laboratories with a scalable, easy-to-configure automation solution that provides a competitive advantage and superior customer service.

Note

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