WHITE PAPER

An introduction to eClinical Technologies
**eClinical** is a term used to refer to the electronic applications which are used in the Clinical Research. This term is very commonly used within the biopharmaceutical industry.

Originally, "eClinical" is used to refer to any technology application used for clinical trials, such as EDC (Electronic Data Capture), electronic patient diaries, IVR systems, IWR systems, ePRO and other common types of electronic solutions widely used in clinical trials.

eClinical applications are web-based tools to capture clinical trials live data for faster and better execution. These software applications are server-based applications, meaning no software application installed on desktop.

Nowadays, various eClinical forums have been started where a group of people meet and discuss about all aspects of eClinical trials.

**Purpose behind eClinical technologies**

Clinical trials are being influenced by a number of factors like increasing competition, high costs of drug development and more stringent regulatory environment etc. As a result, pharmaceutical companies are faced with the tremendous challenge of conducting clinical trials. To overcome these, eClinical technologies came to picture.

**Advantages of eClinical**

- eClinical provides to perform successful trials with quality data and shorter timelines, with reduced costs.
- eClinical enables to both internal users such as CDM team and external users such as sites and CROs and Sponsor representatives.
- eClinical provides us efficient planning, execution and tracking of clinical trails data from different geographical areas.
- eClinical improves relationships with other than internal departments like clinical investigators, site coordinators and medical affairs.
- eClinical facilitates compliance with regulatory guidelines for electronic records. The application used for eclinical trials consists of audit trail, security, access and authorization features with the compliance of 21 CFR Part 11.
- The collection of data from the investigational center will be directly captured into the study eCRF will give significant advantage in terms of time from data generation to date cleaning and database lock.

Utilization of eClinical tools reduces the work load and the responsibilities

- CRAs and data managers shared similar stakes in the clinical trial process, but traditionally the role of a CRA and a data manager were demarcated.
- This may in turn lead to the evolution of the traditional roles to the next level. Increasingly it will become a rule for both CRAs and data managers to be well versed with both ICH GCP as well standard data management practices like GCDMP.
The personnel working on such combined roles will be helping the site to fill the CRF in the protocol defined manner, communicate with them and provide clean data. This will ensure that the data is being cleaned almost simultaneously with visit schedules.

**CRA** – An individual is largely responsible for the site initiation, recruitment of the patients, overseeing site compliance with regulatory requirements, and performing source data verification. Additionally, with the remainder of his time and energy he liaises with the data manager to resolve any data issues.

**Data Manager** – An individual who “kicks” in at the protocol and CRF finalization stage and is responsible for annotating the CRF, creating the database structures, drafting an edit check plan, running edits, creating queries and managing them.

The data manager’s responsibility is until the database “lock”, after which statistician moves ahead with the analysis of the data. Over the years, the CRA and data manager established their work processes with the CRA largely managing the site and the data manager managing the data.

This earlier structure is now being challenged because of the implementation of EDC. It has created a convergence in the traditional role of a CRA, data manager and even the project manager.

As the clinical trials progress on the EDC platform, a merged role will start to appear over the years. Presently, even though many CROs and pharmaceutical companies have implemented EDC, they still subscribe to the traditional structure by having both data managers and CRAs on a trial.

However, the roles of an “EDC empowered” CRA and data manager have been changed as compared to the traditional roles. The main reason for this change is that the EDC offers real-time access to data to all stakeholders of a clinical study team.

The CRA can review the data by logging into EDC even before reaching the site and is then better prepared to handle the data issues. By remotely monitoring, how “clean” the data is are, the CRA can now decide how frequently each site is to be visited and also determine what kind of training will be required at each site. With EDC, the CRA is almost completely eliminated from the process of query management. The satisfactory resolution of the queries is completely managed between the data manager and the site personnel; the CRA is only required to change the status of the page to “locked” once he deems it to be clean.

On one hand EDC has increased the CRA’s understanding of the data manager’s profile because they share a common system, and on the other hand it has lessened their burden of resolving data issues.

The corollary of a common system can also be extended to data manager having an increased familiarity of the CRA’s day-to-day activities. Not only can a data manager can keep a close watch on which pages are getting locked, but also advise the CRAs on the sites requiring maximum attention and keep them abreast with the status of the recruitment process.

The automated edit checks incorporated in the EDC has minimized the data manager’s grind in the process of discrepancy resolution. The instructions given by the EDC system are accurate to the extent that sites can rectify the errors by themselves.

Data managers can now concentrate their efforts in understanding data trends, ensuring medical coding, and organizing reconciliation with external data. Any key inputs by analyzing such data and reporting to the CRA can make a big difference towards cleaning the database faster.
Different eClinical tools used for Clinical Research

**e-PRO (Electronic Patient Reported Outcome)**

What is a patient reported outcome?

A patient reported outcome, or PRO, is “...any report coming directly from patients (i.e., study subjects) about a health condition and its treatment... Without the interpretation by the clinician” (FDA 2006)

PROs can be generic, condition-specific or treatment-specific; they are used across many therapeutic areas. PROs are available in multiple languages and contain accepted standardized questions collected globally.

Historically, PRO responses were completed by the patient on paper and sent to the clinical data management department for double key entry. This process was lengthy and time consuming, as you can imagine, especially when forms for entry were shipped from thousands of miles away. How do we reduce the time to database lock?

Hence now a day’s ePRO is a patient-reported outcome that is collected by electronic methods. The two main methods currently used for ePRO are computers (Pen Tablet) and telephone / mobile systems

**IVRS (Interactive Voice Response Systems) and IWRS (Interactive Web Response Systems)**

IVRS (Interactive Voice Response Systems) and IWRS (Interactive Web Response Systems) both the tools processes are controlled by a central computer. IVRS is accessed via telephone and IWRS via web interfaces. Both the tools are very useful in Global trials for register new patients, randomize patients, obtain double blind medication, blinding, to unblind patients in Medical emergency etc... Now a days most of the protocol uses IXRS (Interactive phone and web Response System) depending on the site convenient their might use the appropriate system.

**Fax**

Software scans faxed patient forms and faxes back a report, eliminating the need for data entry at the clinic level.

- Limitations:
  - Confidentiality
  - Maintenance and monitoring
  - Availability of clerical staff to verify submissions
  - Slow turnaround time

**Image Recognition Technology**

Image-recognition systems, including optical character recognition and optical mark recognition, provide a means of capturing data from printed sources.

Data on paper chart > Scan > OMR/OCR software > EMR
**Optical character recognition**
Translation of printed text on each page to electronic text documents. OCR software converts scanned image to machine-readable and editable text, less costly and faster compared to manual keying in.

**Optical mark reader**
Scanning preprinted paper forms to convert marks in checkboxes, text printed in block form, and barcodes into machine readable text.

Questionnaire format commonly used in post-marketing trials fast and time saving.

**Conclusion**
Implementation of eClinical technology in a study helps us in many ways such as real-time data access, clean data at any given point of time, immediate resolution to queries, locking patient data when clean.

Additionally, the LPLV-DBL timelines can be significantly reduced (i.e.) from conventional 8 to 10 weeks for paper studies to three to four weeks for an EDC. These 3 to 4 weeks can further be reduced to a week or even less than that by adopting one of the strategies, such as “Lock as You Go”.