

WHITE PAPER

Constraints in Clinical Trial Supply Chain Management

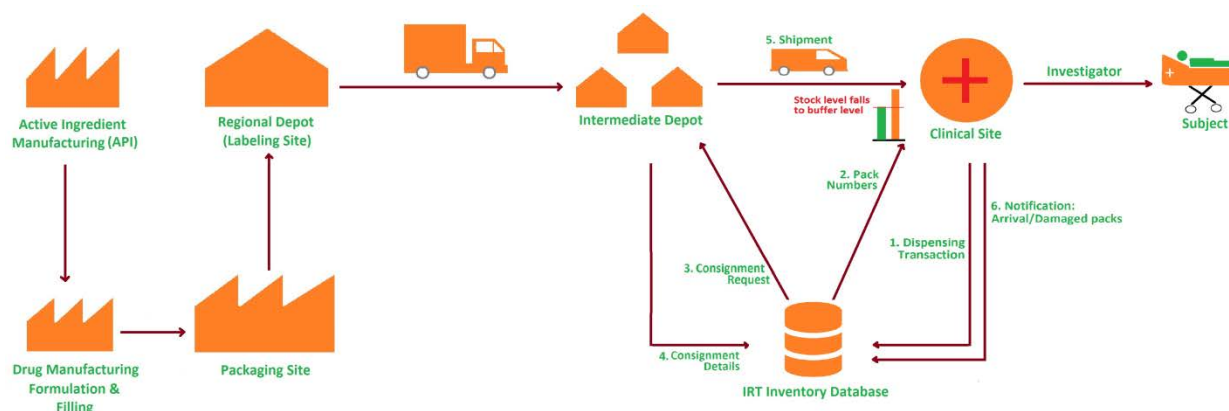
Clinical studies are seriously important and an expensive part of the drug development process as it is composed of the planning and scheduling of all transactions, operations and organizations during a study, beginning with active ingredient manufacturing, followed by drug manufacturing, packaging, labeling and distribution to depot and thus to the clinical sites, and ending with dispensing the drugs to subjects at each clinical site located in different geographic zones.

Not only is subject enrollment highly variable, but uncertainties also arise in manufacturing and shipment lead times, failure in process and in production supplies. Furthermore, the life of a clinical trial materials supply chain, which is in the range of 1-2 years, is significantly shorter than that of a commercial supply chain, which usually goes beyond 10 years. As a result, the strategies used to buffer the uncertainties in commercial supply chains become inefficient as probable values cannot be efficiently used as targets.

Constraints like expiration dating, bulk availability and country specific labeling must be taken into consideration. In addition, trial designs (e.g., stratification, randomization and titration), subject enrollment, dropouts, and drug distribution are factors that generate significant uncertainty in the forecast of material needs. Recruitment rates substantially impact supply forecasting for global trials, since supplies bound for one country cannot be redeployed to another without relabeling to accommodate language and regulatory differences. This overall concern in the demand forecast leads to some risk of being unable to supply the right drug to the right subject at the right time. Missing the delivery of trial dosage to subjects can significantly delay completion of the trial and hence delay the time to market which in turn can mean significant loss of revenue. In order to reduce this risk, different techniques can be used, like enhanced overage, increased shipment frequency, dynamic supply rules (e.g., shipping IMP to site after subject has been randomized), and frequent real-time inventory tracking.

Accurate tracking of clinical supplies throughout the supply chain is essential in order to:

- cut the clinical trial costs by minimizing wasted medication (Forecast & Optimization)
- ensure the availability of correct drug for subjects during dispensing visits (Drug Dispensing Visits)
- trigger alerts to sites of potential delays to medication shipments, thereby avoiding subject loss through lack of medication during subject visits (Late Medication Arrival Alert)
- account for used/unused medication at the end of a clinical trial (Drug Accountability)
- monitor medication expiry dates and extend dating (Update or extend Expiry Dates)
- remove inventory where appropriate (Manage Quarantine Medication)
- tracking down medication in the event of a product recall



Interactive Response Technology (IRT) can address most of the challenges by tracking all the stages of the clinical material supply management accurately and thus optimizing the clinical trial supply chain.

Through the use of Interactive Response Technology system (IRT), all doctors administering clinical trial drugs to subjects are required to interact with a system for instructions on which of the subject kits on site are to be administered to the subject. Through this technology, both real-time inventory information is maintained and automated shipments to replenish site-level inventory are triggered. IRT provides full visibility of released finished subject kits held with Sponsor or third party depots. In addition, the site's confirmation of receipt of specific kit numbers to the IRT provides real-time visibility of what has been received. Allocation of specific kit numbers to subjects allow for stock subtractions to be made and an accurate inventory of all medication remaining at each site to be maintained. This enhanced visibility means that sites can be supplied with minimum stock levels and resupplied on a just-in-time basis. Systems such as this can greatly reduce the waste of medication caused by overstocking of sites. In addition, integration of IRT with distributor shipping systems enables the entire shipment ordering and verification process to be automated.