The Role of Interactive Response Technology (IRT) in Clinical Trial Supply

Increasingly elaborate international clinical trials demand a smart, streamlined approach from supply partners and better collaboration with sponsors. In this environment, interactive response technology (IRT) systems are gaining recognition as a powerful, practical tool for accelerating a product's progress to launch and simplifying trial management.

IRT systems provide clinical trials with essential software services such as subject enrolment, inventory management, and study drug dispensing. The system is used to manage patient interactions and drug supplies during clinical trials and perform a range of functions for sponsors, drug depots, and investigative sites.

Despite the promises of IRT, the selection of a vendor is often considered late on in the planning of a clinical trial, which leaves sponsors at great risk of spending money on wasted drug and unplanned resupply shipments.

Here, Dave Holly, senior manager of IRT Development & Operations and Melissa Peirsel, Manager of IRT Services at Sharp Services explore the benefits of including IRT professionals earlier in trial planning.

Maximise Your Supply Chain Efficiency

From a global perspective, the most challenging aspect is to manage the distribution of materials between contract partners, sponsors and logistics businesses involved in import and export.

IRT systems can manage this complexity by configuring additional material types into study design and then setting parameters to limit where and how the materials are used.

However, simply adding IRT to a trial does not guarantee an efficient supply chain solution. Depending upon the complexity, number of kit types, regions, countries, and dosing schedules, the resulting supply chain solution may function, but questions will remain around its efficiency and cost-effectiveness. What the IRT system must be able to do is help reduce waste, limit resupply shipments, and prevent site stock-outs.

Earlier Consultation with IRT Specialist

One of the challenges any IRT system faces is that suppliers are often brought into the start-up phase much later than manufacturing or packaging. IRT is at the intersection of drug assignments, inventory, and resupply management, which provides professionals in the field with a very specific skill set resulting from clinical trial experiences. The IRT team is often the bridge between the supply team and clinical operations (clinops) team, helping them find the optimal balance between their needs. By bringing the IRT team into the planning process earlier, solution providers are in a better position to support the complex trial designs, using their experience and lessons learned to avoid the common pitfalls, as well as suggesting possible solutions and workarounds that have been used successfully in studies of a similar type.

One of the most expedient ways to achieve a successful supply chain solution is to leverage the real-world experience and advice of IRT professionals.

IRT providers get to observe, first-hand, the many use case scenarios that result when sites are randomising and dispensing study medications to trial subjects. These observational insights can prove very useful, especially when deciding how a drug will be manufactured and packaged. The advice provided by IRT vendors may prove especially useful to the small to medium-sized pharmaceutical companies that may not have in-house supply chain staff.

How Much Drug to Put in One Package?

Early in the trial planning phase, a packaging company may suggest that money can be saved by putting more drug in one package. If a subject is to use one blister card per week for the duration of a 10-week study, putting all 10 cards into one package may look like a logical solution. IRT systems can be configured to import the kit list and dispense a 10-pack at randomisation. On the surface, this also appears to be beneficial for the IRT system by eliminating the need for extra dosing visits over the 10 weeks.

However, experience reveals that trial subjects are only human and can potentially misplace or lose their clinical trial kits. Healthcare workers equally may accidentally damage drugs, forget to refrigerate medications, or have other mishaps over the course of the trial. These 'human-nature' factors can result in the 10-pack solution costing more money, rather than saving it. Bulk packaging sometimes results in more shipments and more drug being wasted.

It is important to consider how much drug would be wasted if a site, or subject, lost a 10-pack of blister cards and a replacement kit was needed. With all drug boxed in packs of 10, the subject must be issued another 10-pack kit. This means trial sites must have several 10-pack kits in reserve (buffer stock) for emergency resupplies. If the replacement pack is needed towards the end of the trial, most of the replacement kit will be wasted. This potentially adds additional cost if many of the 10-pack kits are left over and must be returned to the depot.

This is where experience in IRT planning can make a significant positive impact on the trial, advising, for example, that dispensing one or two blister cards over several trial visits is more cost-effective. The loss of a single blister card is much easier to replace than the 10-pack of blister cards and costs significantly less. Even though more IRT dispensing visits are required, there is a significant cost saving in kit replacement needs. While recommended for most similar dispensing scenarios, this planning is particularly essential for trials involving expensive drugs, or drugs in limited supplies.

How Much Drug to Manufacture or Package?

Establishing the optimal amount of drug to manufacture and package for a new trial can be very challenging. Some clients decide to package only enough for the enrolment phase of their trial. However, without considering IRT and drug usage, the stock could quickly drop by half just by supplying sites with initial inventories.

Discussing drug requirements with IRT professionals at an early phase brings supply chain staff together with the clinical team so that drug usage expectations can be discussed. If half of the packaged drug will be delivered to the sites upon study startup, then the inventory may not cover the expected resupply projections. Once this expectation is known, it may lead to an increase of the initial supply amount.

The reverse scenario – packaging too much drug for study startup – can result in drug expiring before it can be used. This too will become more visible through IRT with the scheduling of subjects and the resupply model being used to optimise supply. Projections for enrolment and subject dosing visits may reveal that the initial drug inventory will expire before all subjects have completed the study. Two or more smaller manufacturing runs at key milestones will prevent site stock-outs.

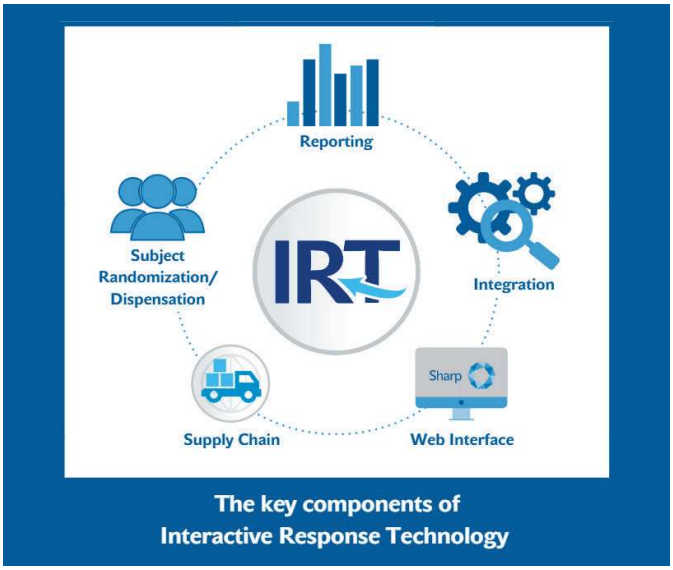
IRT software is often an underused resource in the initiation stage of packaging and distribution planning. Many of the variable factors in a clinical trial can be configured and managed using IRT, such as:

- **Shipping size:** Configure the ability to ship in certain sizes. For example, If the elected shipper can support 15 kits, then the IRT system could be configured to send in multiples of 15. This reduces the overall cost of shipping by always sending the maximum amount the shipper and later resupply needs.
- **Site storage limitations:** Some IRT systems can be configured with site storage limitations and set up to alert the clinical operations team when that limitation is reached. This parameter setting could also be used to limit the amount of controlled drug on site.
- **Shipping groups:** IRT systems can be configured based on the supply manager and clinops demands.
- **Top-up:** This allows the ability to configure the "top-up" to the supply levels of all material types in a shipping group. Although a shipment is not required today, it will be in the future.
- **Blinding:** IRT systems can be set up to allow shipping groups to support the complexities of blinding such as when a study that has, for example, four different kit types and two of these must always be shipped together to maintain the blinding.

What Dose Levels to Manufacture?

For dose escalation and titration studies, deciding what combinations of dosing quantities may also require investigation into actual drug usage and dispensation. For example, a protocol using four dosing levels of 10mg, 15mg, 20mg, and 25mg vials may require manufacturing one vial type of each dose level. Sponsors will need to explore whether it is necessary to manufacture all four vial dosing sizes, or if there is a more cost-effective solution.

Once again, IRT can present the opportunity to bring manufacturing, packaging, and the clinical teams together to collaborate on the best dispensing and resupply patterns, balancing the needs of trial subjects with the availability of inventory and capacity of the clinical sites. For example, limitations on storage space – especially for refrigerated medications – maintaining an inventory of 25mg vials may compromise its ability to store other dose amounts. This can lead to shortages if emergency kit replacements are needed. The discussion may result in a decision to pack just 10mg and 15mg vials and allow the IRT system to select the correct combination of vials to dispense, i.e. 20mg subjects can receive two 10mg vials, and 25mg subjects can receive one 10mg bottle and one 15mg bottle. This adjustment also provides the sites with inventory that can be used for all subjects, including any replacements. All subjects can use one or both dosing sizes, but a 25mg vial could only be used by subjects requiring the 25mg dose.



The key components of Interactive Response Technology

Collaborating for Success

Approaches to information-sharing vary significantly among clinical trial sponsors, with some being very open and others failing to disclose key details until much later in the planning process. Clearly, the more information that can be shared in the early planning phase, the more comprehensive the support will be from IRT specialists. Blinded studies need careful planning so as not to compromise the integrity of the blinding for users of IRT. Similarly, with kit and subject randomisations in the clinical trial, IRT specialists can build in safeguards to the process, predicting pitfalls and risks and avoiding mis-dispensations.

Summary

As IRT systems bring together clinical sites, study medications and subjects, very often IRT specialists bring clarity and visibility in planning for actual trial needs. Including IRT professionals earlier in the planning phase of clinical trials may result in a better understanding of supply chain needs, increasing the efficiency of inventory management and therefore bringing cost savings over the course of the trial.

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