WHITE PAPER

Ensuring Patient Centricity in Oncology Trial Sample Management

By Hope Meely and Mark Melton, Slope

SlopeClinical.com

SLOPE

Ensuring Patient Centricity in Oncology Trial Sample Management

By Hope Meely and Mark Melton, Slope

Oncology clinical trial participants are required to contribute various biological samples — such as blood, saliva, and tissue — to demonstrate how a study drug could potentially affect their disease.

Collecting, shipping, storing, monitoring, and recording data on these samples is a complex undertaking with significant ethical implications. The collection process can be difficult for patients, especially when it involves highly invasive procedures, such as multiple blood draws, biopsies, or spinal taps. Not only is valuable data lost when samples are mismanaged, but participants may be asked to provide more material; this creates undue physical burdens on persons already dealing with a severe disease. Sample mismanagement can result in a participant being excluded from a trial entirely — and even prevented from enrolling in other trials that could have used the same sample.

One of the goals of a clinical trial is to enroll eligible participants as quickly as possible to test the safety and efficacy of a study drug. With oncology studies, the timeline is even more crucial, as many of these participants have reached the end of their available treatment options. Participants in oncology trials must meet certain inclusion criteria to enroll, particularly for precision medicine. This can involve collecting samples to demonstrate cellular or molecular targets; processing them in a lab; and reporting the data to the sponsor and/or the site with a rapid turnaround time to determine patient eligibility. For this reason, pharmaceutical companies investigating oncology drugs must strategize their sample management processes as early as possible to consider the burden to the patient while still meeting study objectives.

Each Phase Brings Unique Challenges

As a clinical development program progresses, the challenges that come with managing samples and their data evolve with each study phase.

Phase 1

Phase 1 trials involve relatively small participant populations, but the sampling tends to be very intricate and frequent. Due to the nature of disease severity, many oncology studies are first-in-human or trying to get accelerated approval designation; this requires the sponsor to negotiate regulatory submission timelines based on their expected Phase 1 data collection. During Phase 1, samples are used to prove the mechanism of action of the study drug, and its safety through various dose levels. This data provides valuable insights that can drive internal decisions, such as opening up further areas of exploration; providing necessary information to escalate the study; and developing subsequent phases. In addition to insights, the sample data is also critical to the treating physicians, as it's a critical component to making patient treatment decisions quickly.

> **If a sponsor doesn't have control over its samples, it doesn't control the data. Decision-making is delayed, which delays drug development.**

These elements highlight the importance of sample management in oncology trials; if a sponsor doesn't have control over its samples, it doesn't control the data. Decision-making is delayed, which delays drug development. This is especially important during Phase 1 trials, wherein companies need safety information quickly to avoid wasting resources pursuing a harmful or ineffective drug.

Phases 2 and 3

As the study drugs advance into Phases 2 and 3, sampling tends to narrow as the complex biomarker testing schedule decreases, requiring fewer overall collections per subject. However, in contrast, the number of participants increases dramatically, resulting in volume complexity. Although sample collection and data management appear to simplify as the study progresses, the amount of data increases significantly. Phases 2 and 3 move quickly as investigators work to test efficacy across larger patient populations. Large studies also amass an enormous amount of participant data, creating more room for error in sample and data management.

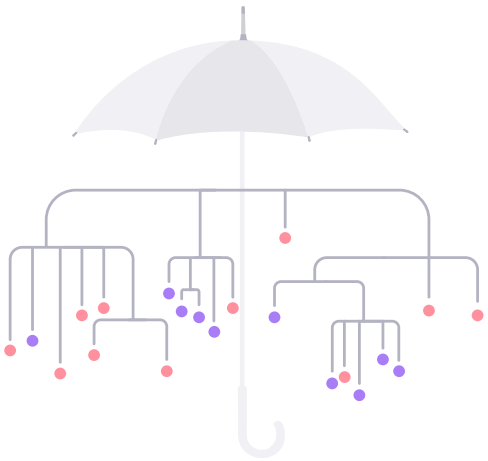
Sample Kit Management Requires Dexterity

Managing lab kit inventory is crucial to beginning a clinical trial because sites must have kits on hand before they can perform a sample collection. In addition, the kits are the primary organizing mechanism for sample management. A single kit serves as a unit for a specific visit or collection, and this identifier stays with the sample throughout its entire lifecycle. If a site has to create their own visit-specific kits using supplies they have on hand, they run the risk of downstream issues with sample processing.

Umbrella study designs necessitate complex lab kits.

Umbrella Studies and the Increasing Complexity of Kitting Logistics

Increasingly, many oncology trials are umbrella studies with multiple cohorts running in tandem with sub-studies, all operating under an overarching protocol. As each cohort reaches an inflection point, its data must be examined before the study can progress. These umbrella studies are effective but highly complicated.



Umbrella studies and other innovative study designs necessitate complex lab kits. As the testing procedures evolve throughout the life of a study, so does the design of the lab kits. Kits become more complex and specific to accommodate the intricacies of the trial. For example, each research visit on a singular trial may require different types of material, or multiple types of material, each with their own viability windows and processing, storage, and shipment needs. A single kit may include a variety of samples, such as tissue, blood, or urine, each with unique storage requirements. Additionally, these samples are often sent to separate labs for processing, adding another layer of logistical complexity.

In the past, sites commonly sourced their own sample collection materials. However, due to the increase in oncology trial complexity, study sponsors and companies usually provide kits to sites rather than expecting them to manage kitting logistics in-house. Even when kits are provided, however, sites have myriad duties to perform. They must collect and provide the biospecimen data to the labs (usually via a requisition form), coordinate shipments to specialized or centralized labs under specific conditions, and resolve any biospecimen data discrepancies on the requisition form.

> **Mid-study changes create more complications for sample collection kit design, as each change can affect the contents of the kits, or the types of kits required. Umbrella trials also complicate kitting logistics, as each cohort may have unique sampling needs that vary by visit.**

Meanwhile, sites often conduct multiple oncology studies and have limited lab kit storage capacity. Likewise, the utilization of adaptive study designs necessitates mid-study protocol changes reacting to data, and oncology trials typically involve significantly more amendments than other studies. Mid-study changes create more complications for sample collection kit design, as each change can affect the contents of the kits, or the types of kits required. Umbrella trials also complicate kitting logistics, as each cohort may have unique sampling needs that vary by visit.

With these challenges, sample kit inventory management can quickly overtax sites. As trials move into Phases 2 and 3 and the volume of lab kits increases, sites need streamlined systems that make it easier to procure the right kit for the right patient at the right time.

Sample Management Begins Before Enrollment

Sample management is more complex than merely drawing blood, running centrifuges, and storing samples in a freezer. Every sample has specific needs and a unique journey; some have narrow stability windows and must be processed quickly, while others may require complex assays to prove the mechanism of action and demonstrate that the selected target is engaged and responding by producing disease regression. Some samples can be processed on-site — such as in a hospital lab — but most must be shipped to central labs and/or specialty labs.

Next, lab technicians must identify the samples and whom they belong to (using pseudo-anonymized data), check the biospecimen metadata on the requisition form, confirm sample integrity, and perform timely processing to ensure sample stability is met. This process typically takes one to two weeks to complete after sample shipments are received. But if anything is physically wrong with the sample, processing may come to a halt. Similarly, problems with the sample's data can cause delays and impact the critical reporting of lab results. Although important in every type of clinical trial, the traceability of a sample's status is even more critical in precision medicine studies where companion diagnostic testing gates a patient's enrollment to the trial, and perhaps even the treatment regimen to which they are assigned. This testing involves a complex procedure that often has a very quick turnaround time due to the short screening window associated with oncology studies, and any delay in this testing causes significant enrollment issues.

All sample testing involves complex processes, but human tissue requires specialized equipment and expertise. Thus, many sites are unequipped to test tissue in-house. In many cases, sites may send tissue samples to a central or third-party lab with histology services. These labs take the sample and embed it, and/or cut slides. This process adds to the overall sample testing turnaround time, introducing an additional layer of risk to the process.

How To Successfully Manage Sample Data

When most people think of sample collection data, they think of assays — the test results from the sample that involve statisticians, scientists, and analytical tools to interpret. However, sample data begins with tracking the sample through its complex journey from the clinic to the lab and tracing it back to the individual participant.

> **With a streamlined solution, sponsors can leverage real-time visibility to biospecimen data to reconcile data more quickly and safeguard data integrity.**

Research site compliance with ensuring biospecimens and their associated data are collected is necessary for regulatory requirements, but the tools that sponsors use for compliance have the potential to either slow down or accelerate study timelines. With a streamlined solution, sponsors can leverage real-time visibility to biospecimen data to reconcile data more quickly and safeguard data integrity. Quality data accelerates study timelines and enables sponsors access to make crucial decisions throughout the trial.

Managing Sample Data with Slope

Slope's clinical trial execution platform captures the entire sample journey from its state as a lab kit until it reaches its final destination at a lab or storage facility. The platform facilitates sample tracking with a digital solution that gives sponsors and other study stakeholders immediate access to biospecimen data and insights. The platform tracks the entire biospecimen life cycle by facilitating chain-of-custody tracking and data reconciliation across every trial stage. It collects site data and integrates with other vendors — such as labs and couriers — to provide real-time oversight and accountability. Sponsors can use Slope's real-time data to make critical decisions while ensuring compliance. Slope operates on a centralized software platform that can be used by sites, sponsors, CROs, and labs, creating a single source of truth for the biospecimen data.

Effective sample collection and data management respect patients' dignity by treating their samples with the same level of care as the people themselves. When patient centricity and proactive sample management converge, the result is a streamlined solution that benefits everyone.

ABOUT THE AUTHORS

Hope Meely is the Chief Clinical Officer at Slope. Hope has spent the entirety of her 25+ year clinical research career supporting several sponsors and CROs in leading clinical operations teams in the execution of their clinical trial programs. Most recently, she spent 3 years in a growing biotech leading operations for a robust early phase oncology pipeline. She is passionate about making clinical trial operations easier for research sites, sponsors and other collaborators.

Mark Melton is the Vice President of Scientific Operations and Development at Slope. Mark has been in the research and clinical industry for 13 years, starting as a Biochemist and Molecular Biologist in academia. His initial focus on precision medicine trials led him to become an SME on Biomarkers and PK operations, data management, bio-specimen tracking, and lab vendor oversight. Mark has a long history of building teams and processes from the ground up and leading large global operation and data management teams.

ABOUT SLOPE

Slope is a global provider of biospecimen lifecycle software, data, and services for clinical trials. With a focus on tech-enabling the full biospecimen lifecycle, Slope offers expertise that empowers sponsors to make informed decisions using high-quality, real-time sample data. Slope has supported thousands of the most complex, sample-intensive trials worldwide and has been adopted by 79% of NCI-designated cancer centers.

For more information, visit SlopeClinical.com

Request a demo of Slope's Biospecimen Lifecycle Software

SlopeClinical.com/request-demo