

Optimizing Biospecimen Workflows: Development of a Functional Clinical Trial Kit Inventory System Utilizing Enterprise Laboratory Information Management System (LIMS) LabVantage

Kelsey Weren MS, Jose Salcedo, Jonathan Alonso, Carlene Daniel, Ankeeta Joshi & Bhavana Pothuri MD

Background

Clinical trial sponsors provide protocol and visit-specific **biospecimen collection kits** that are non-interchangeable and have varying shelf lives, making inventory upkeep challenging. Before 2018, the Clinical Trials Office at NYU Langone Health (NYULH) Perlmutter Cancer Center (PCC) lacked a functional system for managing clinical trial kit inventories.

Unreliable Excel spreadsheets were used to track quantities, expiration dates, and locations. Limited staffing and inaccurate inventories delayed the time from kit expiration to destruction to over 6 months, resulting in expired kits taking up already limited shelf space. An overall deficit in storage space increased the time from kit receipt from the vendor to unpacking and storage to over 12 months. Large quantities of kits were crammed into 500 square feet (sf) of shelving in a 200sf room. Not only did this create hazardous storage conditions, but it resulted in over-ordering of supplies that could not be located -- further perpetuating space problems, major delays when locating kits, and consequential hold-ups in trial activations.

Goals

By designing a user-friendly inventory program within **LabVantage**, an enterprise laboratory information management system (LIMS), we aimed to decrease the time from kit delivery to storage to <7 days, decrease the time from kit expiration to destruction to <30 days, reduce the occurrence of misplaced supplies and downstream trial activation delays, and increase overall inventory accuracy. We also aimed to establish a new operational process for transporting and storing supplies at an off-site facility with appropriate space and storage organization.

Solutions and Methods

Development of a clinical trial inventory system using LIMS LabVantage began in 2017. Requirements included:

- Ability to classify kits by protocol, cohort, and visit
- Create a one-to-many relationship between kits and time points
- Notification of low quantities/ expiration in real-time and record locations

Establishing an off-site high-density storage facility was dependent on having an accurate inventory system, obtaining space from NYULH Real Estate Development and Facilities (RED+F), establishing workflows for transporting supplies to the laboratory, and investing in laboratory research assistants (LRAs) to support expansion.

SPACE

A 1300sf off-site facility 8 city blocks from the research laboratory was designed to house 2400sf of shelf space.

ORGANIZATION

Shelving in the form of 11 Metro qwikTRAK high-density units provided 3300sf of new shelf space

STAFFING

1-2 LRAs hired to support off-site facilities and coordinate weekly transport with courier services

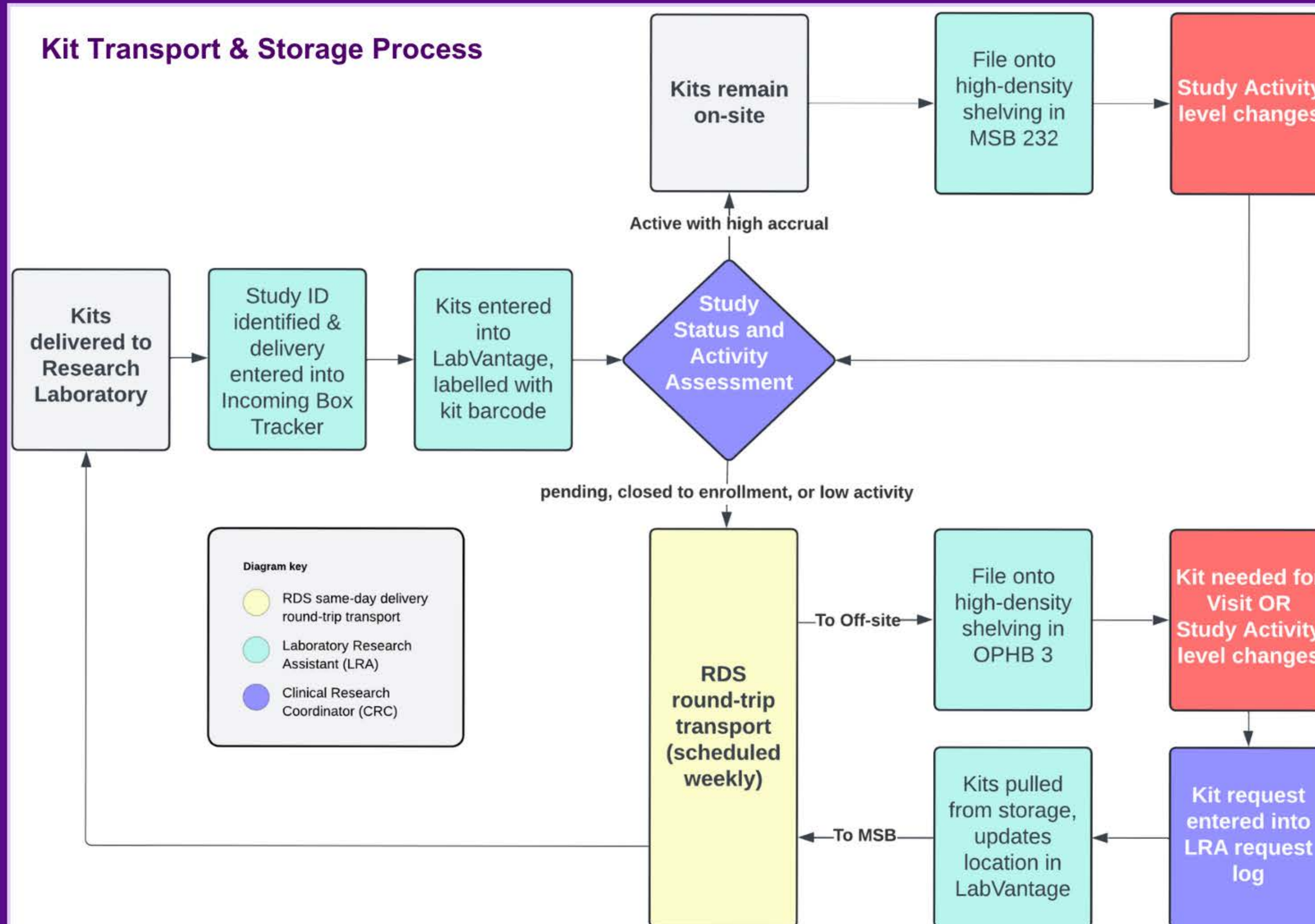
Outcomes

In 2018, we implemented an enterprise LIMS LabVantage clinical trial kit inventory system.

The new software now maintains accurate inventories for over 250 protocols – monitoring over 3,000 kits. A sophisticated inventory program in combination with high-density storage, proper staffing, and efficient workflows made establishing an off-site storage facility feasible.

- ★ Decreased the median time from kit delivery to storage from >12 months to 7 days (range: 0-14)
- ★ Decreased the median time from kit expiration to destruction from >6 months to 20 days (range: 1-30)
- ★ Increased storage space by 536%, from 550sf to 3500sf of high-density shelving
- ★ Reduced delays in trial activation due to misplaced supplies.

Kit Transport & Storage Process



High-Density Storage



Lessons Learned & Future Directions

Comprehensive maintenance of supplies with adequate storage space is crucial for the proper conduct of a large portfolio of trials at an institution. A functional inventory system is a valuable tool for efficient study management.

Establishing a custom clinical trial management system facilitated a downstream project that included a novel integration between Epic electronic medical record (EMR) and LIMS LabVantage to track patients' blood draw appointments.