

A Lean Story: Improving Pre-Analytic Lab Workflow for Bone Marrow Specimens at BIDMC

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Introduction

Bone Marrow aspirates and core biopsy specimens are used to diagnose and monitor blood and marrow diseases, including some cancers. Hematopathology, Flow Cytometry, Cytogenetics, and Molecular tests can be carried out on Bone Marrow specimens. These tests play a critical role in assisting physicians with making the most accurate diagnosis.

The Hematology Lab is the central hub to coordinate and process Bone Marrow specimens collected from BIDMC and its network hospitals. However, preparation and coordination of Bone Marrow specimen is not an easy task. It takes 30-40 minutes on average for our well-trained technologists to complete registration and preparation for one Bone Marrow specimen. Without an interface to different Lab Information Systems, the efficiency of specimen handling is gravely impeded by duplicate specimen registrations, handwritten documentations, and manual entries. In addition, a suboptimal workflow makes things worse. It not only causes enormous waste in the lab, but also can expose us to severe consequences such as turnaround time delay, labeling errors, or even specimen loss.

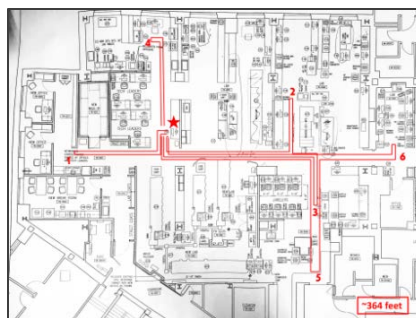
Goal

We are determined to apply the *Lean* concept to identify and reduce waste, streamline and standardize the pre-analytic workflow for all Bone Marrow specimens.

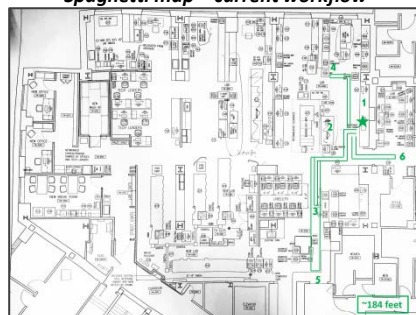
Methods

- Gemba Walk – shadowed, observed and interviewed the frontline technologists; collected baseline cycle time of processing Bone Marrow specimen.
- Process Mapping – Created a flowchart to identify and visually represent all possible steps in the process.
- Spaghetti Diagram – Used flow lines to indicate the movement in the lab.
- Brainstorming – Identified bottlenecks in the process, and generate creative short-term or long-term solutions to mitigate the problems.

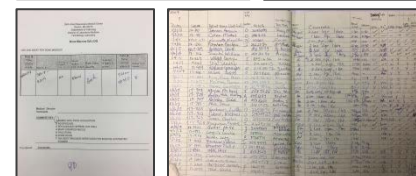
Progress to Date



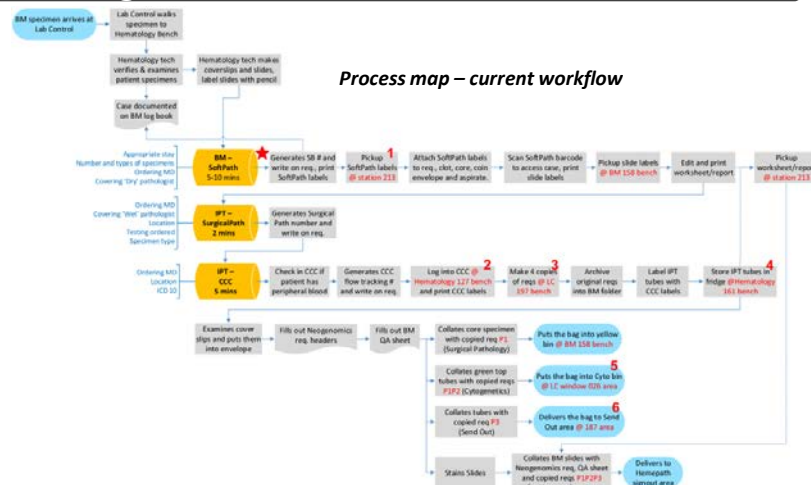
Spaghetti map – current workflow



Spaghetti map – proposed changes



Handwritten labels and documents



Lessons Learned

- SOPs may not reflect what is actually happening in the workflow. Real life observation is crucial to conducting a successful baseline assessment. (“Go to the Gemba”)
- Due to the lack of systematic workflow design, inefficiencies can still exist even in a best case scenario handled by our most well-organized technologists.
- Small, rapid, continuous improvement ideas are particularly important when infrastructure related changes are not achievable in the short-term.

Next Steps

- Relocate Bone Marrow workbench to create a centralized work area and reduce unnecessary movement in the lab.
- Program an electronic spreadsheet to document Bone Marrow case information, generate send out requisitions and QA worksheets automatically using pre-built templates.
- Replace cover slips with glass slides. Labeling accuracy will be improved since labels produced by slide label printer can be applied on glass slides. This will also improve slide staining efficiency since glass slides are compatible with automated slide stainers.

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