

CATHOLIC Medical CENTER



Lean Laboratory Design

Case Study: Catholic Medical Center, Manchester New Hampshire

A Unique Opportunity

In October 2008 Leica was presented with the opportunity to partner with Catholic Medical Center (CMC) in order to build and equip a Lean Pathology Laboratory from scratch.

CMC is a 330-bed, full-service healthcare facility located in New Hampshire's largest city, Manchester. It is host to 25 subspecialties, the largest of which is the New England Heart Institute, one of the premier cardiac treatment facilities in New England. The hospital has an estimated 110,000 patients per year and the Obstetrics facility, aptly named The Mom's Place, averages over 900 births per year.

CMC's goal was to incorporate LEAN principles into the facility design, the processes, the equipment, the consumables and staffing decisions.

The laboratory wanted to be paperless, work in small batches for a continuous flow and implement visual management to manage the productivity.

The Core team members at CMC – consisting of the medical director, laboratory director, laboratory manager, pathology supervisor and laboratory information system analysts, as well as the architect – diligently researched all available vendor options and benchmarked existing LEAN laboratories.

A key factor early in the planning was to incorporate the vendors they would be purchasing the majority of their equipment and supplies from as partners in the project.

As Leica Microsystems became the “vendor of choice”, project management was placed into the hands of Katja Lehmann (Leica Microsystems) and Stephen Feher (pathology supervisor at CMC), who got on board 12 months before the laboratory was scheduled to open.

Weekly meetings were conducted to formulate preliminary workflows and work schedules and review the physical layout and projected equipment placement.

Living up to Life

Leica

MICROSYSTEMS

The Lean Principles behind the final Laboratory Design

The final design agreed upon incorporated the fact that the laboratory would work in a continuous flow with specimens being accessioned and processed every 2hrs, keeping the cases together.

This allowed for less counterspace as sorting and unsorting steps became obsolete and no large batches of specimen had to be accommodated waiting for the next process steps.

The placement and type of equipment chosen would minimize the travel time of the specimens as well as the hand-offs between the process steps (e.g. H&E stainer workstation with built-in oven and coverslipper attached)

All tools (consumables, printers, etc.) would be placed at Point of Use to avoid searching.

As a truly paperless laboratory the requisition forms are being scanned at accessioning and then reside on a server where they can be accessed by the pathologists when they write their reports. The grossing stations were equipped with Dragon Voice recognition, which enables the pathologists to write their own reports which include photomicrographs.

To ensure patient safety the laboratory decided to implement a barcoded specimen tracking system at every work station.

At the sign out station a window opens to the back aisle of the laboratory where the pathologists are picking up their slides to be read.

Lean Process Design

As the team began to track the types of specimens that were being sent out, preliminary processing schedules were formulated based on expected processing times and the benchmarked times recorded by other institutions for the other tasks associated with a fully functioning pathology lab.

A schedule was formulated to load and unload the tissue processor retorts every 1.5 – 2 hrs during lab opening hours (9:00 AM – 6:00 PM) in order to level load the downstream process and achieve a continuous flow of specimens throughout the laboratory.

Completion of the project was a full six to eight months away but a preliminary workflow and staffing projection based on workload and workflow began to take shape.

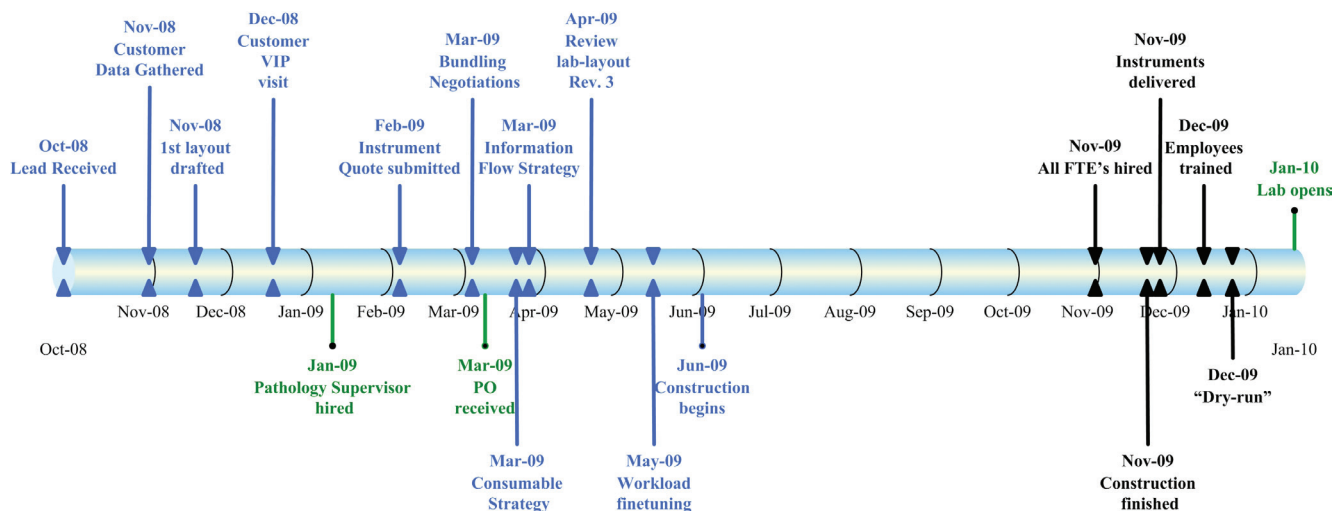
Hiring the Right People to work in a Lean environment

The next step was interviewing staff and including the concept of Lean staffing and workflow in the hiring process. A large part of staff selection would be their reaction and acceptance of a new way of practicing pathology: as a lab without a third shift or weekend work that was capable of producing as much or more than traditional pathology labs.

Once the staff was hired, the laboratory built a “mock” environment in a part of the clinical laboratory to train the new hires on the Standard Operating Procedures.



The Management Team at CMC.



Laboratory Design Timeline.

The Opening

When the laboratory opened in January 2010 all the hard labor, preparation and diligence paid off and CMC was already able to expand their services.

The partnership with Leica Microsystems is still strong and every time parameters change (e.g. workload growth, newer equipment availability) both sides sit together to find the leanest solution to implement these changes.

What are the benefits of designing a laboratory with Lean Principles in mind?

No matter if you are planning to design or re-design a laboratory, in today's economy you will be faced with plenty of challenges but also with the opportunity to execute it in a LEAN fashion, according to workflow.

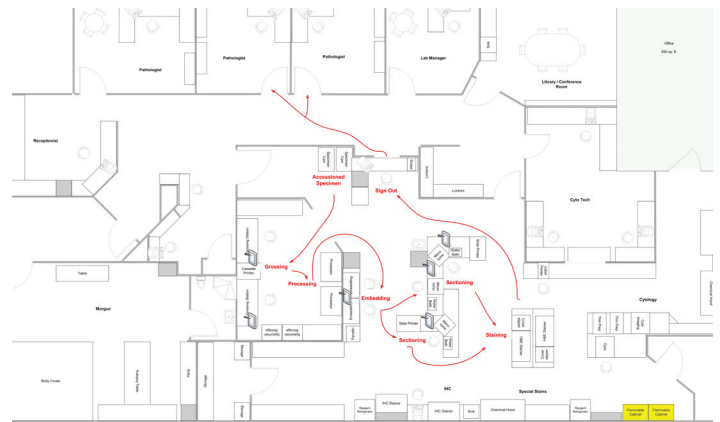
The latter will have an impact on your laboratories performance in terms of speed, efficiency, safety and environmental impact.

Faster Turn Around Time, eliminating multiple data entry points, paper trails, reducing the number of hand offs and decreasing cycle time.

Cost Reduction, through a smarter Inventory Management System (Kanban, FIFO) to manage replenishment cycles and reduce disposal of expired consumables. Also decreased consumable costs through Reagent Management Systems, eliminating the cost of buying and disposing of hazardous waste (xylene-free). Further reductions come from the use of consumables appropriate for the procedure and instrument (e.g. biopsy cassettes to eliminate the carry over from sponges, ActivFlo™ cassettes for better fluid exchange).

Safer Work Environment, decreasing repetitive motion steps, exposure to hazardous chemicals (Xylene-free work) and finally a less stressful work environment will reduce errors and accidents.

Green Initiatives, such as the recycling of alcohol, formalin, etc will help save consumable costs as well as minimize waste disposal costs.



CMC Histology Laboratory Layout.



Histotechnologists at CMC.



Opening ceremony for the Histology Laboratory at CMC.