



The Power of Process™ in Action

St. Mary's Hospital Achieves Outstanding Results By Implementing Preanalytical Automation

Hospital Profile:

- St. Mary's Hospital Laboratories
Montreal, Quebec
- 414-bed, acute-care hospital
- 1,650,000 Reportable Results/Year
- Process Solution:
Modular Automation with Power Processor

Historically, St. Mary's Hospital Laboratories in Montreal, Quebec, a 414-bed, acute-care hospital, has had the reputation of running an efficient lab. However, over the past few years, several major socioeconomic events occurred that forced it to seriously reevaluate the institution's operational structure, including:

- 1993: the Quebec government targeted laboratories for a 10% budget reduction.
- 1995: the Quebec government was also in the process of closing several hospitals in the Montreal region.
- Trends pointed to the regionalization of laboratory services. Because St. Mary's was located only a few blocks away from two major tertiary care university hospitals, it realized this could seriously jeopardize its existence.

REENGINEERING WORKFLOW

Traditional Lab Structure September 1996	Computerized Core Lab March 1998
<ul style="list-style-type: none"> • 910,000 reportable results • 350-400 patients per day • 72,393 worked hours • Lab area: 7,500 sq. ft. • Cost/reportable: \$3.22 	<ul style="list-style-type: none"> • 1,650,000 reportable results • 700-750 patients per day • 61,000 worked hours • Lab area: 6,000 sq. ft. • Cost/reportable: \$1.72

- Biochemistry
- Hematology
- Blood Bank
- Microbiology

Reengineering to an Open Lab Structure

The idea of using preanalytical automation was not brought up right away. The lab's initial solution was to reengineer its existing workflow so tasks were no longer broken down by discipline, but rather routed according to whether the testing process was automated or manual. To accommodate this restructuring to an open lab, a common reception and processing area was set up to process all specimens.

This process took approximately nine months and required some physical renovations.

Computerization

The laboratory information system (LIS) was then designed to provide a seamless process in line with automation. To date, 75% of all specimens have bar codes at the point of collection. Once the analysis is completed, if no reflex testing is required, results are electronically validated and automatically reported to the point of origin.



Results

The opening of the core lab in September 1996 coincided with the closure of seven hospitals in Montreal, one of which was a 250-bed, acute-care hospital located approximately three miles away. The repercussions of these closures led to a dramatic increase in test volume. After 18 months of utilizing the core lab, it seemed this lab's solution had worked. The volume of reportable tests had increased by 85%, the staff had decreased by 16%, the number of patients had almost doubled, and the lab space had decreased by 20%. Another result of these combined factors was that the cost per reportable test decreased by 53%.

It seems this lab's solution had worked:

- *Volume increased 85%*
- *Staff decreased 16%*
- *Patients served almost doubled*
- *Lab spaced decreased by 20%*
- *Cost per reportable test decreased by 53%*

The Move to Preanalytical Automation

By the end of the first quarter of 1998, the daily volume of specimens in the lab was 1,900. By the end of the second quarter, its daily volume had increased to 2,200 specimens. For the first time in three years, the staff in the core lab had to be increased by approximately two FTEs on the day shift. The fact that it needed a staff increase to accommodate this small change in volume signaled to lab management that an optimum level of efficiency had been reached with its existing process. The time had come to take the plunge into front-end automation.

That opportunity materialized when St. Mary's lab was chosen as a beta testing

site for Beckman Coulter's new generation of front-end automation system—the Power Processor—which consisted of a linear track system, an inlet unit, a centrifuge, a decapper and an outlet unit.

Improving Services: Studying TAT

Once the lab's front-end automation system was installed, it designed a protocol to measure TAT with and without automation. To reflect the impact of automation on TAT, the time was measured from the moment the specimen was received in the laboratory to the time of validation of test results. These two times

were electronically monitored by the LIS. The study was conducted during peak time in the lab, which is between 8:30 a.m. and noon, over a period of two consecutive days. Results were as follows:

- STAT chemistry TAT improved by 28% and the longest STAT biochemistry response (mean + 2SD) went from 81 to 37 minutes.
- Immunoassay TAT improved by 47%.
- TAT for samples not processed on the automated system also improved: routine hematology by 36% and STAT hematology by 29%. The longest STAT hematology response was reduced from 47 to 29 minutes.
- In terms of productivity, 4th quarter results indicated that productivity improved by 30%.

Conclusion

Essentially, front-end automation standardized and eliminated the non-value-added steps of the analytical process: receiving specimens, sorting to work areas, centrifugation, decapping and manually loading the racks.

Incorporating a preanalytical automation system has improved the lab's service to physicians by improving laboratory TAT as a whole and by standardizing the precision of sample processing to reduce the variation in TAT. At its current volume, this lab has reduced its FTEs by two in the specimen processing area and does not expect to have to add more people as the specimen volume increases. St. Mary's lab estimates that the lab will break even in three years because of the expenses saved in labor.



Automated sample preparation helped improve turnaround and increase productivity, according to Ralph Dadoun.

