



Optimizing Pre-test Operations and Automated Verification Conditions to Reduce Labor Costs and Improve Test Reporting Efficiency

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Purpose : Introduce total laboratory automation has become a significant way to streamline labor and improve test efficiency. We upgraded the automation system to 4 lane tacks and high throughput chemistry analyzer has been integrated. By reviewed the hole process to achieve the benefits of reducing the workforce, improving time efficiency, and streamlining the process through simplifying and improving information systems to eliminate unnecessary transportation and time waste.

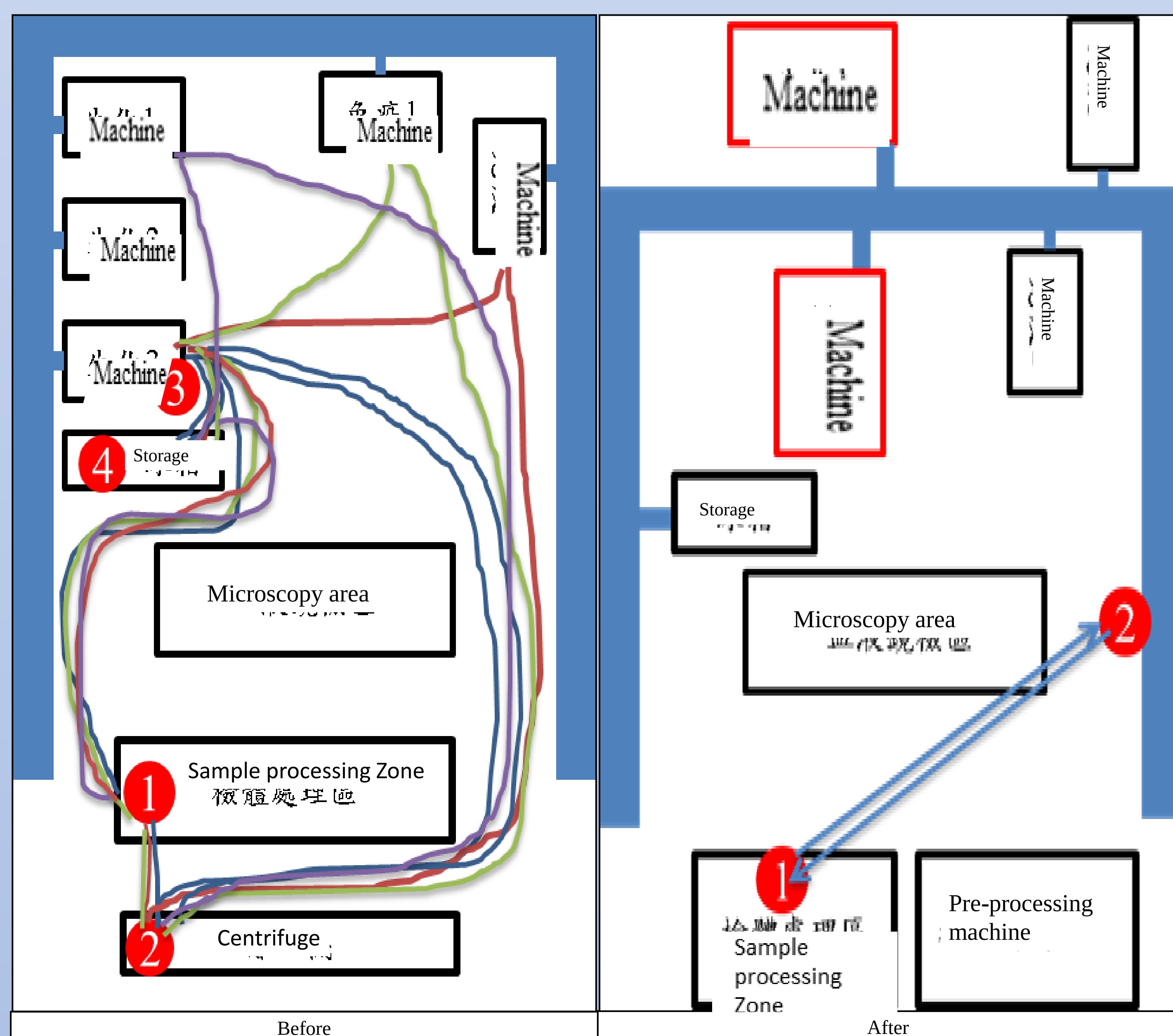
Implementation Method : The high throughput analyzer and TLA have been introduced but to meet the TAT requirements of the emergency department and to handle many routine samples, 5 to 6 employees must be arranged for pre-analytical processing during peak hours. This study chose to optimize the process by sample scheduling and review the rule of auto verification.

1. Scheduling adjustment: The customized test sample pre-processing machine and automated track system were used to design the sample flow movement by automatic sign-off to achieve a simplified, clear, and efficient process.

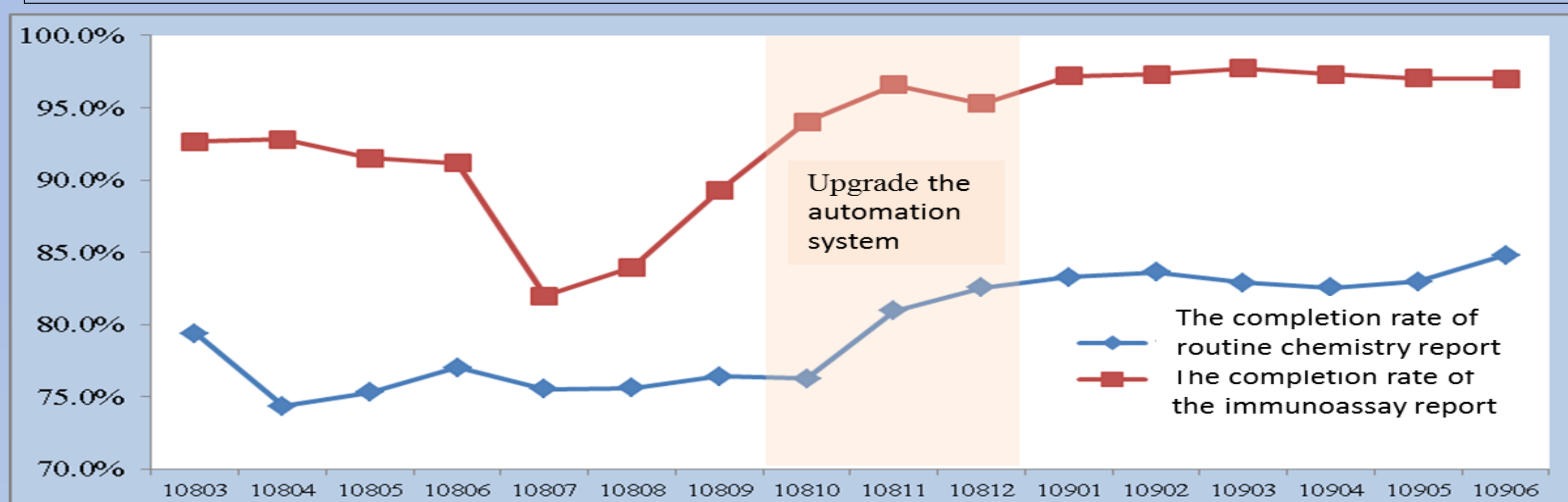
2. Automatic verification of the modified report conditions and validity assessment: The itemized and quantity analysis were conducted according to the conditions set for all the test results blocked by the automated screening. We modified the screening conditions as per the results.



Results 1 : After the upgrade the automation system, stat samples were automatically registered through the track entrance. The samples were completed through the online centrifuge and chemistry analyzers. The samples were directly sent into the refrigerator for storage, with an average completion time of 30 minutes.



Results 2 : This has saved 6,600 minutes and distance of 6,600 meters per month. It saves 0.5-1 manpower per day. Sample Auto-registered saving 6,099 minutes per month which equivalent to 1.5 to 2 manpower per day and improves the accuracy of sample sorting up to 100%.



Results 3 : Due to the improved scheduling and upgrading of chemistry analyzer, the report completion time has been reduced to 8 minutes. The completion rate of routine chemistry report has increased from 77.7% to 83.3%. The completion rate of the immunoassay report has increased from 90.1% to 97.3%.

The rules	Before	Revising the rules	After
Exceed criteria	48.5%	(1) initial risk value	11.7%
Delta check	18%	(2) values between 0.01-0.5 ng/mL and delta check>60%.	5.1%

Results 4 : After a thorough review and selecting items with low reporting rates for automated validation. The data analysis indicates that most of the blocks were meaningless, and there was no difference in the retest values after blocking. Revising the blocking criteria of (1) initial risk value and (2) values between 0.01-0.5 ng/mL and delta check>60%.



Results 5 : After the data analysis of K, the screening criteria for issuing some reports were revised. The emergency time effectiveness was increased from 84.5% to 91% on average.

Conclusions : The laboratory equipment and information operating systems are updated from time to time according to business volume and clinical demand. Our emergency laboratory team has used the automated track upgrade to adjust the scheduling and automatic validation of report screening conditions to establish a clear, efficient process, achieving information streamlining. At the same time, the waste of transportation and time has been eliminated to meet the requirements of different customer groups for test reports, as well as to achieve the benefits of reducing the workforce, improving timeliness, and streamlining essential processes.

