# Impact Of Automation in An Immunohematology Reference Laboratory

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## Background/Case Studies:

Automation of critical immunohematology tests is becoming essential in many blood banks. Though tube technique is considered gold standard in the industry, it can be time consuming and have high variability. Automation offers technique standardization and technologist alleviation during heavy workloads. As the field experiences a shortage of medical laboratory scientists, automation c an increase efficiency without compromising quality of results.

## Study Design/Methods:

Productivity in a donor center-based Immunohematology Reference Laboratory (IRL) was examined before and after implementation of an automated gel method. The new platform went live in September 2020 with validation and method comparison studies showing 100% correlation between the automated gel method and established manual methods for ABORh, antibody screen, antibody identification (panels) and crossmatch. Data from 2020 and 2021 was obtained from laboratory information systems for analysis of productivity before and after automating these methods.

## Results/Findings:

After a major staff reduction in July 2020, automation was implemented in September 2020 to support pretransfusion testing. 768 tests (19.1%) were automated within the first month. From January 2020 to December 2021, overall workload remained similar. However, due to automating a portion of testing, the volume was maintained by 33% fewer testing personnel by the end of 2021 compared to early 2020. Laboratory staff managed dramatic fluctuations month to month with the assistance of automation. The average number of tests per FTE increased from around 300 per month in early 2020 to about 500 per month during the second half of 2021, representing a 67% increase across the time period.

**Table 1**

| 2020 | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tests Completed | 3439 | 3939 | 3322 | 2579 | 3312 | 3536 | 4739 | 3846 | 4014 | 5177 | 5085 | 5583 |
| FTEs | 12 | 11 | 10 | 10 | 10 | 10 | 4 | 6 | 6 | 6 | 7 | 7 |
| **Avg. Tests/FTE** | **287** | **358** | **332** | **258** | **331** | **354** | **1185** | **641** | **669** | **863** | **726** | **798** |
| | | | | | | | | | | | | |
| **2021** | **JAN** | **FEB** | **MAR** | **APR** | **MAY** | **JUN** | **JUL** | **AUG** | **SEP** | **OCT** | **NOV** | **DEC** |
| Tests Completed | 4001 | 3066 | 3726 | 3337 | 3430 | 3963 | 3974 | 3640 | 3940 | 3734 | 3397 | 3209 |
| FTEs | 7 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 8 | 8 | 8 | 8 |
| **Avg. Tests/FTE** | **572** | **383** | **466** | **417** | **429** | **495** | **568** | **520** | **493** | **467** | **425** | **401** |

Table 1 exhibits the fluctuation of test volume and FTEs experienced during the two years examined.

## Conclusion:

This study exemplifies the capability of automation to increase staff productivity in an IRL. A similar workload was maintained through the two-year period despite an overall decrease in FTEs. Automating certain tests allowed technologists to dedicate more time to manual complex testing required in an IRL. Automation is a fast-growing focus of many laboratories that offer pretransfusion testing,especially as an approach to help offset staffing shortages. It is a helpful tool to complement manual testing to produce consistent, accurate results and assist in providing safe, effective care for patients needing transfusion.