Case Study

Revolutionizing Hematology Workflow:

Adventist Health's leap into the future with the DxH 900 and Scopio Digital Morphology analyzers

Executive Summary

Adventist Health and Rideout provides general, urgent, stroke, and Level 3 trauma care for a small agricultural community 45 miles north of a metropolitan area. Performing 4.4 billable tests a year, the organization's laboratory sought to overcome challenges related to manual workflow inefficiencies, staffing issues, and physical space constraints. Integrating the DxH 900 hematology analyzers and the small-footprint Scopio Digital Cell Morphology X100 HT system into its workflow helped meet the laboratory's need for standardization and efficiency. With its new workflow, the laboratory maintained its targeted turnaround times while accommodating double the number of manual differential requests.

Laboratory Background

Adventist Health, a faith-based nonprofit healthcare system, serves approximately 80 urban and rural communities across California, Oregon, and Hawaii. Among its 400 healthcare facilities are 28 acute care hospitals, including Adventist Health and Rideout, a Level 3 trauma center located just north of the greater Sacramento community. A certified stroke center and the largest care facility in its urban region, the organization provides various services from oncology to urgent care, with partnership support from UC Davis Health. Its 221 licensed beds, outpatient services, and expanding list

221-bed
Acute care hospital

44
Emergency department beds

21
Physician clinics

1,833
Deliveries

61,771
Emergency room visits

11,741
Acute discharges

127,553
Outpatient visits

1,053
Surgical cases

Source: Adventist Health + Rideout Fact Sheet

Adventist Health + Rideout | Beckman Coulter

Laboratory Background (Continued)

of U.S. News ranked specialties meet the needs of the area's diverse and growing patient population. The laboratory serving Adventist Health and Rideout is CAP-accredited, performing over 4.4 million billable tests annually with 120,000 tests dedicated solely to CBCs and differentials. It is responsible for 90% of the facility's blood draws.

Adventist Health uses a DxH 900 2S Workcell for their CBC analysis.

Before using Scopio Digital Cell morphology, PBS was done with a manual microscope.

Adventist Health and Rideout Challenges

The Adventist Health laboratory faced challenges typical of many clinical laboratories.

Manual Workflow Inefficiencies

An increase in CBC volumes by almost double and a labor-intensive manual process that involved multi-step smear reviews resulted in time delays, limited opportunities for collaboration, and brought attention to competency variabilities among staff members.

Staffing Issues

The laboratory worked to increase productivity and output with its 120 staff members, including 32 medical laboratory scientists and technicians, while navigating a competitive hiring environment and adjusting to impending retirements.

Lack of Automation

The absence of a fully automated chemistry line and blood bank automation challenged workflow efficiency efforts.

Physical Infrastructure

The laboratory was situated within the oldest part of the hospital, with at-capacity space constrictions and infrastructure challenges that narrowed equipment choices.

Solution and Implementation

Adventist Health incorporated DxH 900 hematology analyzers and the Scopio Digital Cell Morphology X100 HT system to address these challenges in its laboratory workflow. The Scopio system offers full-field digital cell morphology analysis, which allows laboratories to view and share digitized samples to improve efficiency and support their workflows and patient care goals. The introduction of these tools brought about several significant improvements and benefits.

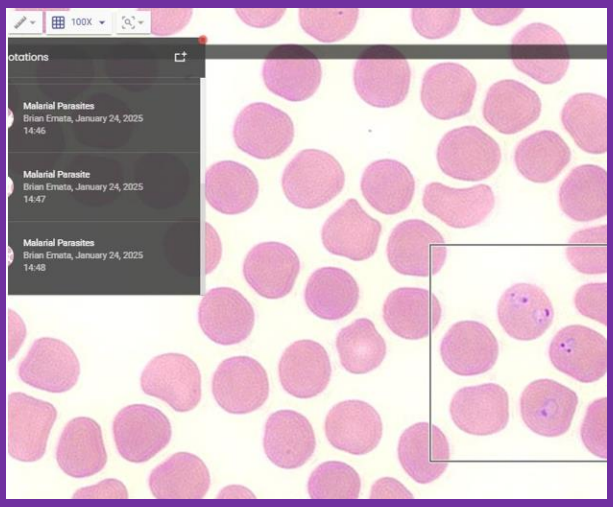
- **Standardization and efficiency:** Despite the significant increase in testing volumes, the need for manual differentials almost doubled between July 2024 and January 2025, the laboratory successfully maintained its targeted turnaround times. This achievement was primarily attributed to the enhanced standardization and efficiency of the new technology. Integrating automated processes, including CBC analysis, slide preparation, and slide staining, meant that more tests could be processed in less time for physicians and patients without compromising the quality or accuracy of the results.
- **Small size and footprint:** The standalone Scopio X100HT system's small size and compact footprint made it an ideal fit within the Adventist Health laboratory's small space constraints and a seamless addition to its workflow.
- **Enhanced collaboration:** The Scopio X100HT's digital capabilities facilitated remote collaboration among staff, supervisors, medical directors, and pathologists, reinforcing diagnostic confidence and decision-making.

Case Study No. 1

A 27-year-old male presented to the Emergency Department with generalized body aches, headache, fever, and abdominal pain. The patient recently returned from a trip to Amsterdam. The Patient stated that he began to develop a headache 4 days ago, and his symptoms have progressively worsened.

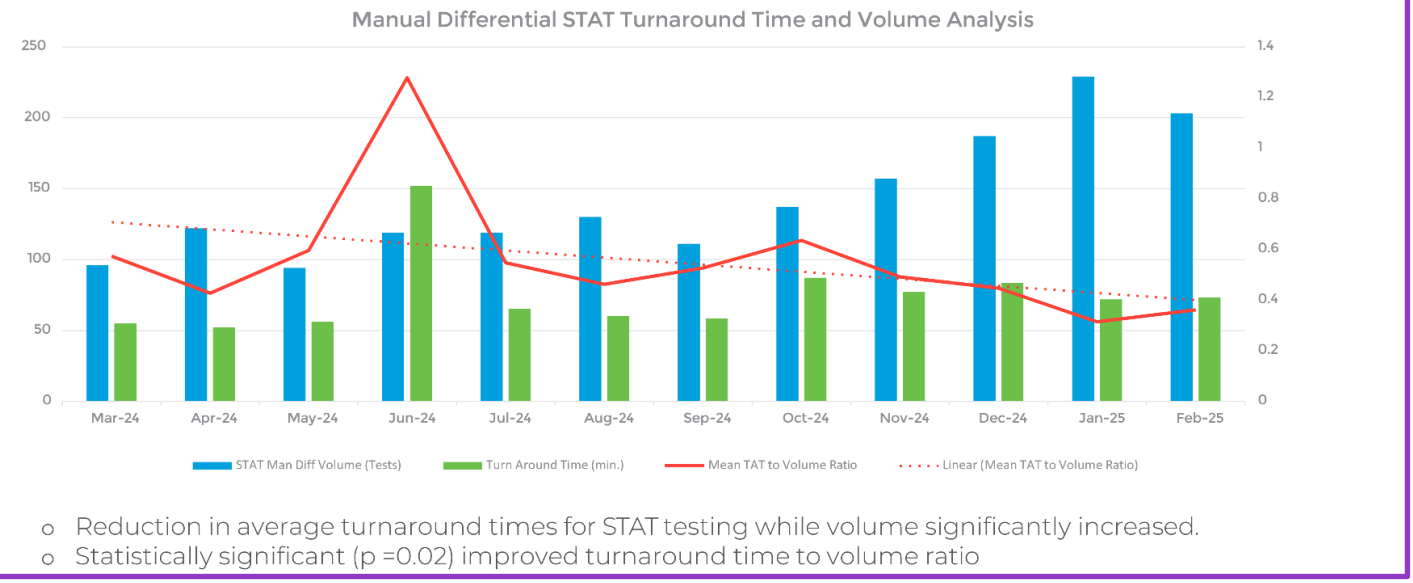
CBC results are as follows:
WBC 5.4, RBC 5.0, HGB 16.5, HCT 48.4, MCV H 96.8, MCH 33.0, MCHC 34.1, RDW 13.7, PLT L 46, MPV 9.8

The lab reported a possible blood parasite and held it for pathology review. The patient was reevaluated and stated that he was feeling better after receiving medications. Subsequent smear pathology reports were consistent with a malarial infection.



Manual Differential Workflow Improvement

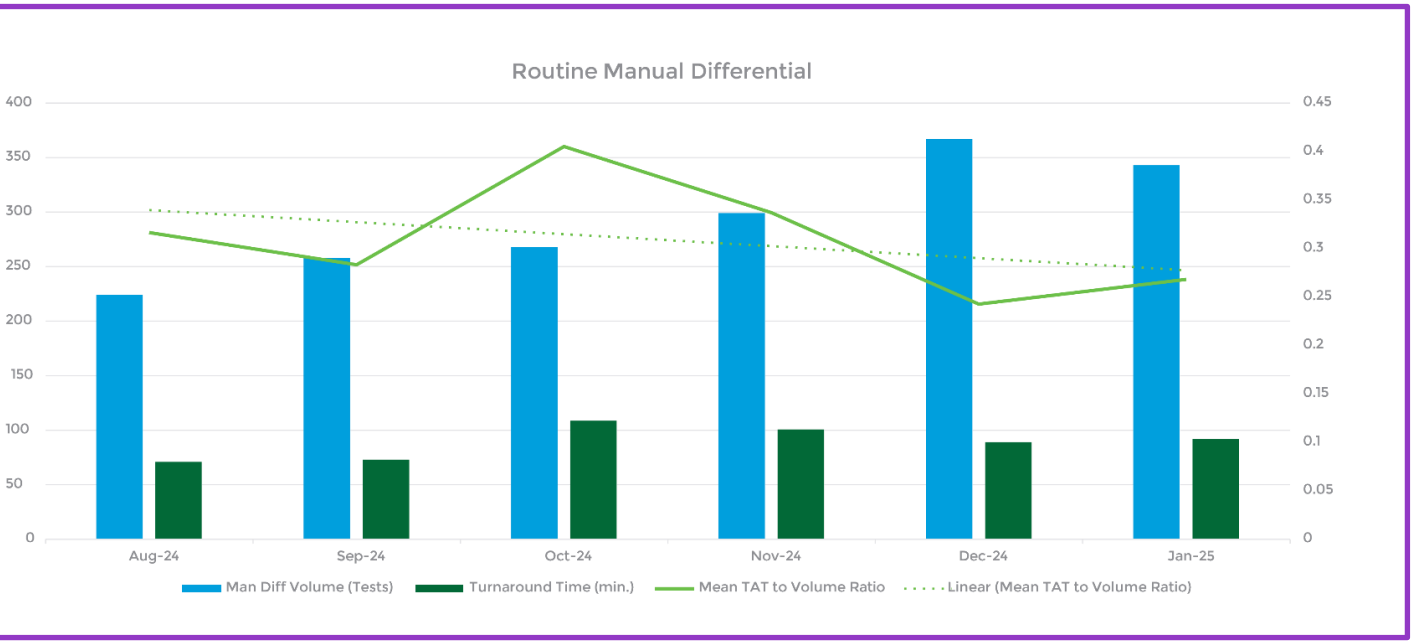
Figure 1



- Reduction in average turnaround times for STAT testing while volume significantly increased.
- Statistically significant (p =0.02) improved turnaround time to volume ratio

In Figure 1, the laboratory's STAT priority data indicated that while manual differentials increased, the associated turnaround times did not rise at the same rate. This efficiency is evidenced by a decreasing trend in the ratio of turnaround time to volume, as depicted by the red trend line in the data analysis. This trend demonstrates that the laboratory could process a higher volume of tests without a proportional increase in time, showcasing a direct improvement in workflow efficiency.

Figure 2



In Figure 2, a similar observation was seen with routine priority manual differentials. Volumes for manual differentials increased from August 2024 to January 2025, while turnaround times did not increase significantly. The Ratio of turnaround time to volume decreased after Scopio installation in October 2024, indicating increased workflow efficiencies and capacity. This is displayed in the downward trendline.

- **Facilitating training among new hires:** The ability to store and access digital images promotes training, standardization, and proficiency throughout all processes, and strengthens quality and consistency in test results.

Outcome

The transition to digital cell morphology significantly reduced turnaround times and increased workload capacity, without necessitating additional staff. The improved diagnostic confidence and collaboration among team members led to better patient outcomes and satisfaction. Furthermore, establishing a digital case library provided valuable resources for ongoing education and quality assurance.

Conclusion

The integration of DxH 900 and Scopio Digital Cell Morphology technology has revolutionized the workflow at Adventist Health's laboratory, overcoming significant challenges and setting a new standard for quality and efficiency in hematology testing. This case study underscores the transformative potential of combining advanced technology with skilled laboratory professionals to deliver exceptional healthcare outcomes.

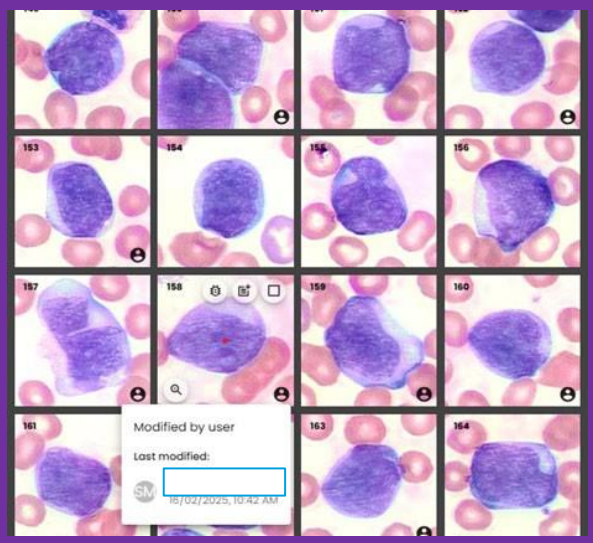
Case Study No. 2

Patient was a healthy 21-year-old female who presented to the emergency room ER for evaluation of right chest pain.

Patient reported some difficulty breathing, denied fevers, chills, cough, nausea or vomiting.

CBC preliminarily reported leukocytosis with 86% blasts consistent with high likelihood of leukemia and referred for pathologist consult.

Emergency department physician notes indicated provider awareness of patient's peripheral acute leukemia with plan to transfer to tertiary care center. Note also indicates oncology consultation.



> The automated, standardized benefits of the Scopio system takes operator-to-operator variabilities and nuances out of the equation during collaboration. Everyone is looking at the same thing on the same system, which focuses the discussion and makes it easier to find.

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