BREAKING STATUS QUO

CONTINUED SUCCESS WITH THE FIRST DxA 5000 ANALYZER IN NORTH AMERICA

Butler Memorial Hospital:

- 296-bed hospital employing over 3,000 workers in Butler, Pennsylvania
- Named Best Maternity Hospital in 2020, 2021, and 2022 by Newsweek magazine
- Consistently earned straight “A” Rating in Hospital Safety 2017-2022 by the Leapfrog Group
- Exceptionally busy laboratory, processing six million tests per year, 80 percent being outpatient work

Butler Memorial Hospital faced several challenges plaguing several hospitals due to the COVID-19 pandemic. In addition to their decision and implementation processes, Butler Memorial launched the hospital’s new electronic medical record (EMR) system and lost key lab leaders while undergoing the vendor selection process. To overcome these obstacles while seeking ways to grow their business, Butler Memorial implemented Beckman Coulter’s DxA 5000 analyzer, resulting in remarkable efficiency improvements.

Challenges to Mitigate

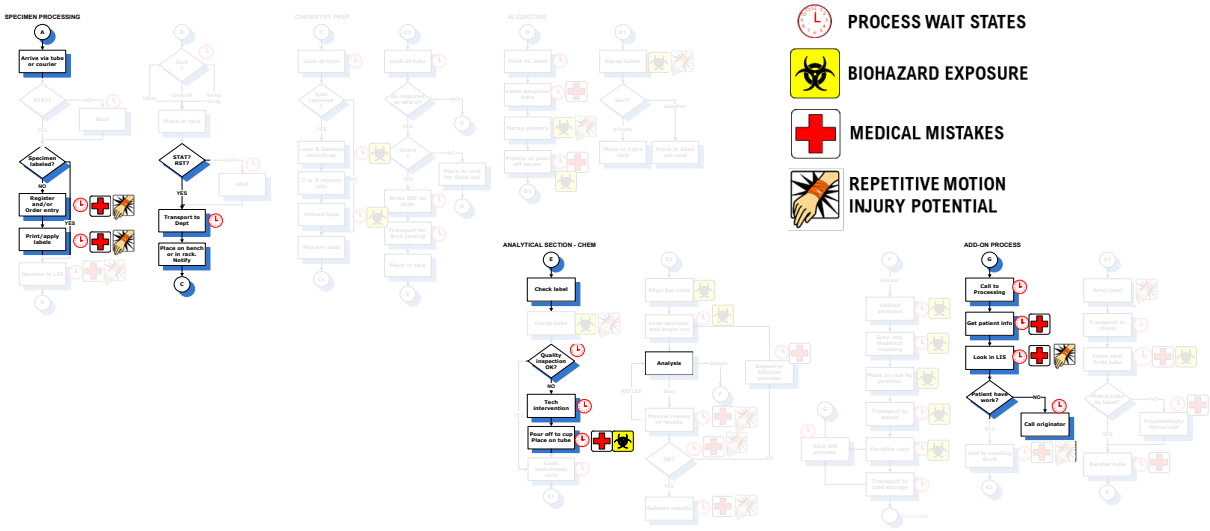
COVID-19 Pandemic

New Electronic Medical Record

Loss of Lab Stakeholders

PRE-AUTOMATION EVALUATION

Before implementing the DxA 5000 solution, Butler Memorial performed their chemistry testing with an integrated workcell solution with no autovalidation in place to manage their immense workload. During Beckman Coulter's onsite evaluation, it was determined that Butler Memorial could **reduce the number of manual process steps from 66 to 17, equating to a 74% reduction in non-value added process steps**, freeing up technologists to focus on more critical functions.

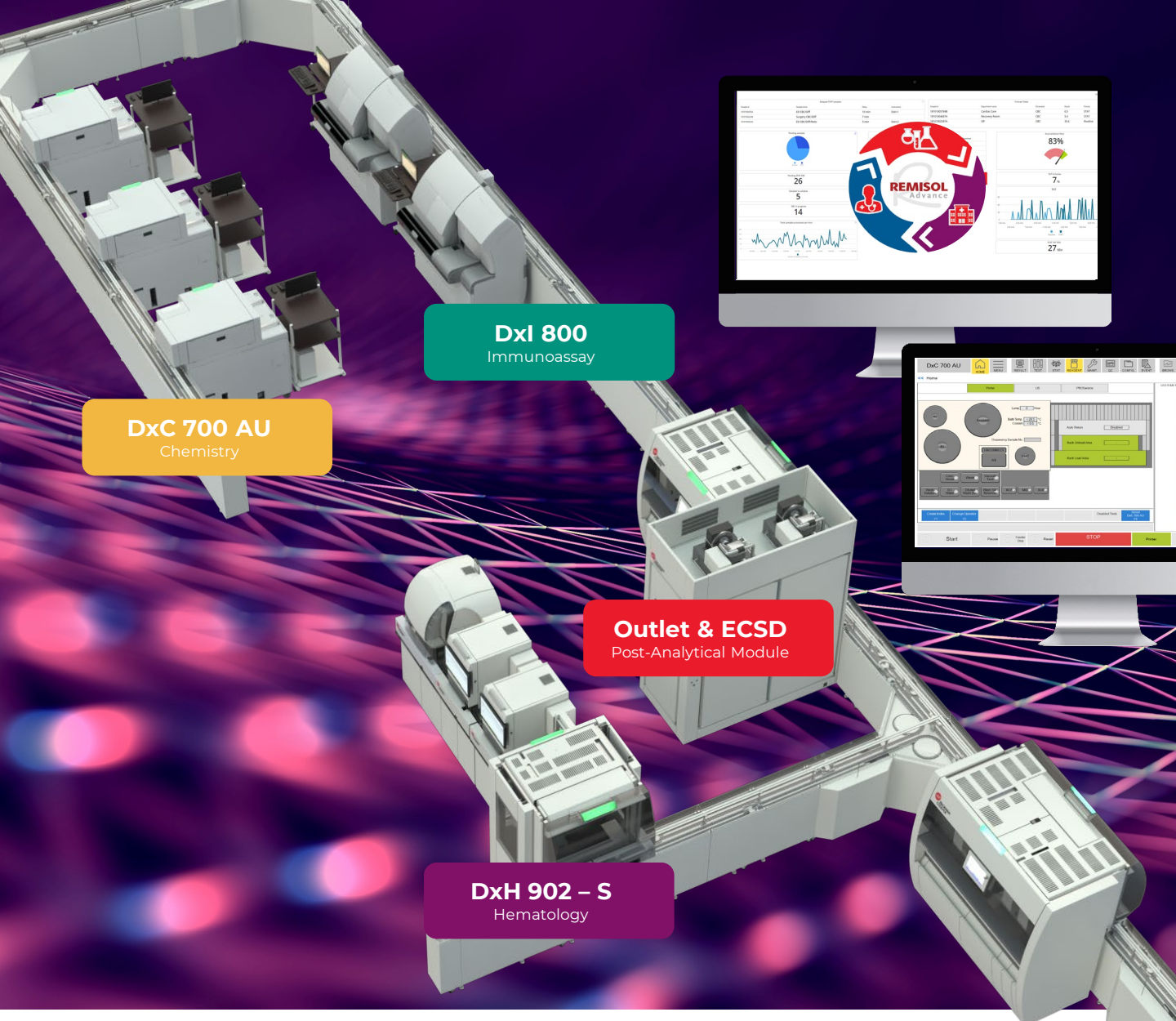


A good portion of process steps demonstrated an increased risk of hazards, including employee exposure to biohazardous material and medical errors. These medical errors are clerical errors such as: mislabeling a sample, inputting results under the wrong patient identification number, etc. The number of hazards in their non-automated process was over **3.3 million opportunities for employees to either make medical errors or be at risk of biohazard exposure in one year**. These steps did not consider other process hazards related to the patient and employee: sample wait steps, repetitive motion injuries, unnecessary employee motion, and so on. After this evaluation, it became evident that automation was crucial for Butler Memorial's continued success.

Pre-Automation Number of Potential Annual Hazards

	Hazards/Tube	Tubes/Day	Annual Total
Biohazard Exposure	9	696	**1,566,000**
Medical Error	10	696	**1,740,000**

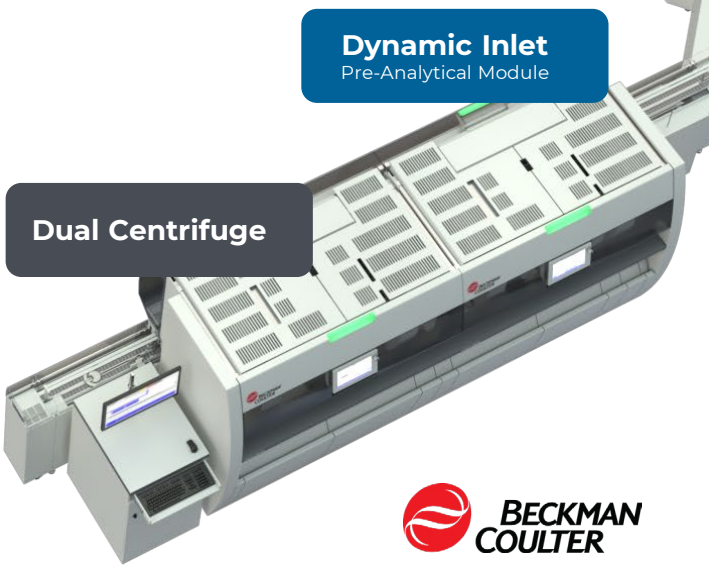
BECKMAN COULTER



DxA 5000 ANALYZER

Butler Memorial's DxA 5000 analyzer configuration includes:

- Dynamic Inlet (Pre-analytical Sample Check)
- Dual centrifuge module
- Three DxC 700 AU (chemistry) systems
- Two DxI 800 (immunoassay) systems
- DxH 902 - S (hematology) system
- Combined outlet and 13K ECSD (environmentally-controlled storage device).
- All integrated with premier informatics products, REMISOL Advance and DxONE Command Central software

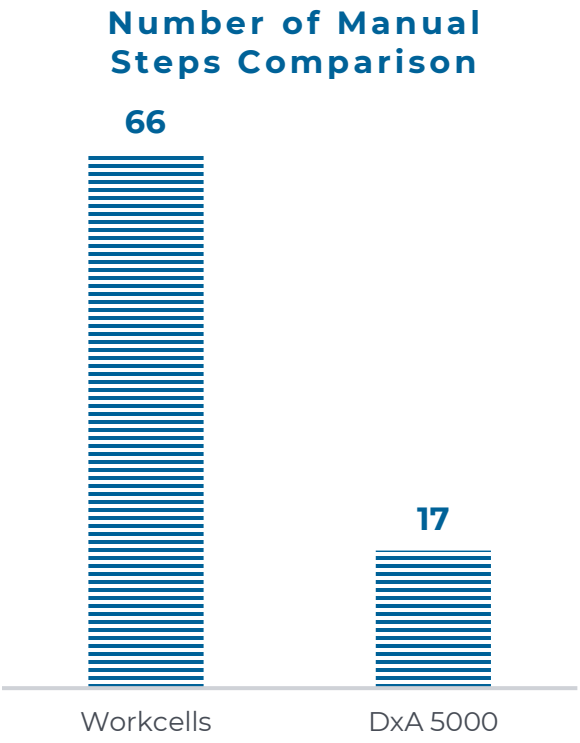


BECKMAN COULTER

QUANTITATIVE RESULTS

After installation, it was important for Butler Memorial and Beckman Coulter to evaluate the DxA 5000 analyzer's performance to ensure the hospital could reap the benefits of automation by ensuring the system was working as expected. After a detailed process evaluation, there were several noteworthy gains.

1. Achieved a **74% reduction in manual process steps**
2. Significantly **reduced and sustained turnaround times**. See chart for potassium, high-sensitivity troponin and CBCs
3. Attained measurable **workload balancing** among connected analyzers



Butler Memorial saw a reduced standard deviation and turnaround time for every test evaluated. An important note is that during the implementation of the DxA 5000 solution, Butler Memorial converted from a conventional troponin-I assay to the more clinically impactful high-sensitivity troponin-I assay. Even though this more sensitive assay has a longer onboard run time, **Butler observed more than a four-minute reduction in the mean troponin turnaround time and a standard deviation decrease of 67.3 percent**. Also, Butler no longer needed to differentiate between STAT and routine (outpatient) potassium results because the DxA 5000 analyzer's sophisticated routing techniques managed a consistent TAT for all.

Turnaround Times Comparison (Receive to Result)*

		Workcell	DxA 5000	
in minutes	**TAT K^+**	32.8 (STAT), 121.9 (Routine)	24.1	↓
	SD K^+	12.1 (STAT), 58.9 (Routine)	7.9	
	TAT TnI	32.7	28.3 (hs-TnI)	↓
	SD TnI	15.5	5.1	
	STAT CBC	14.28 (STAT), 102.78 (Routine)	8.8	↓
	SD CBC	9.12 (STAT), 67.47 (Routine)	9.0	

BECKMAN COULTER

*As observed at Butler Memorial. Results may vary.

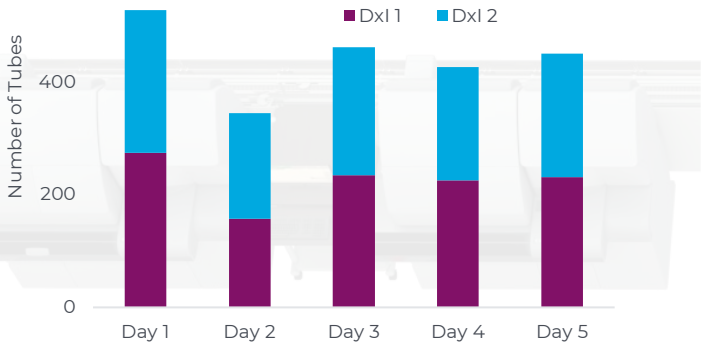
QUANTITATIVE RESULTS – WORKLOAD BALANCE*

During the post-install assessment, the team evaluated the automation utilization versus the samples' frontloading and measured workload balance per instrument. The laboratory staff introduced 92 percent of their samples through the DxA 5000 system, demonstrating a high adoption rate and trust in the automation.

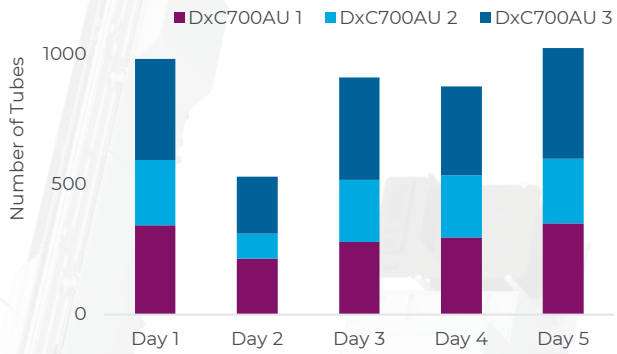
Analytics determined that DxA 5000 system properly routed samples and evenly distributed the workload among instruments. Balancing the workload ensured better TATs, reduced wear and tear on instrumentation, etc. Based upon the collected data below, the immunoassay instruments, DxI 800, consistently received similar work volumes.

The team assessed and evaluated the three DxC 700 AU chemistry units. On day two, the number of tubes received by DxC 700 AU #2 was lower than the other two instruments. However, further investigation demonstrated that the DxA 5000 system's sophisticated routing techniques divided the workload at the test per analyzer level and distributed the workload evenly in the most granular fashion.

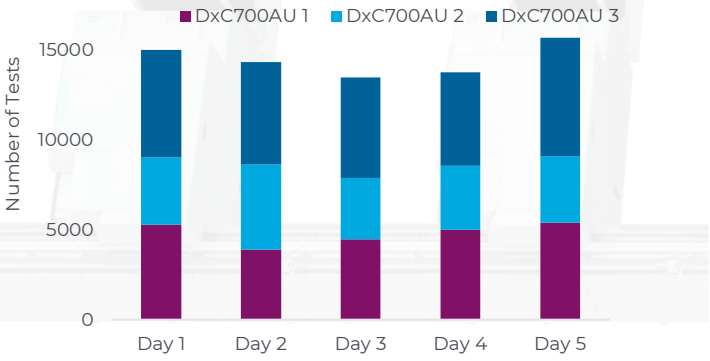
Weekday Tube Distribution – DxI 800



Weekday Tube Distribution – DxC 700 AU



Weekday Test Distribution – DxC 700 AU



*As observed at Butler Memorial. Results may vary.

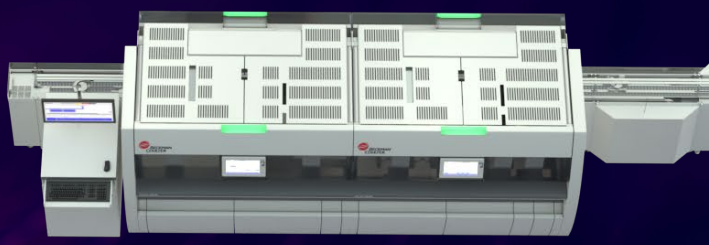
IN CONCLUSION

The DxA 5000 analyzer helped the laboratory provide its clinicians with sustained TAT reductions.

The DxA 5000 analyzer allowed Butler Memorial's laboratory to grow while allowing the lab's medical technologists to focus on more complex tasks profitably.

With the addition of the DxA 5000 analyzer, the Butler Memorial laboratory fostered a culture of excellence with a foundation rooted in continuous process improvement.

Learn more about Beckman Coulter's automation portfolio
https://www.beckmancoulter.com/en/products/automation



REMISOL Advance is a trademark or registered trademark of Normand-Info SAS in the United States and other countries. Used under license.

© 2023 Beckman Coulter, Inc. All rights reserved. Beckman Coulter, the stylized logo, and the Beckman Coulter product and service marks mentioned herein are trademarks or registered trademarks of Beckman Coulter, Inc. in the United States and other countries. 2023-11294

BECKMAN COULTER