

BREAKING STATUS QUO

CONTINUED SUCCESS WITH THE FIRST DxA 5000 SYSTEM IN CANADA

Mackenzie Health's two hospitals – **Mackenzie Richmond Hill Hospital** and **Cortellucci Vaughan Hospital** – each have a full-service emergency department, core services, and specialized services to provide patients in western York Region in Ontario, Canada, with safe quality care. Today, Mackenzie Health serves a community of over 550,000, including Richmond Hill, Vaughan, King, and the surrounding communities.



Cortellucci Vaughan Hospital:

- Opened in 2021
- Specialized services: inpatient integrated stroke care, inpatient mental health care, obstetrics, pediatrics, and Domestic Abuse and Sexual Care Center (DASA)
- Load approximately 590 tubes a day
- The lab results 1.98 million chemistry and immunoassay tests annually



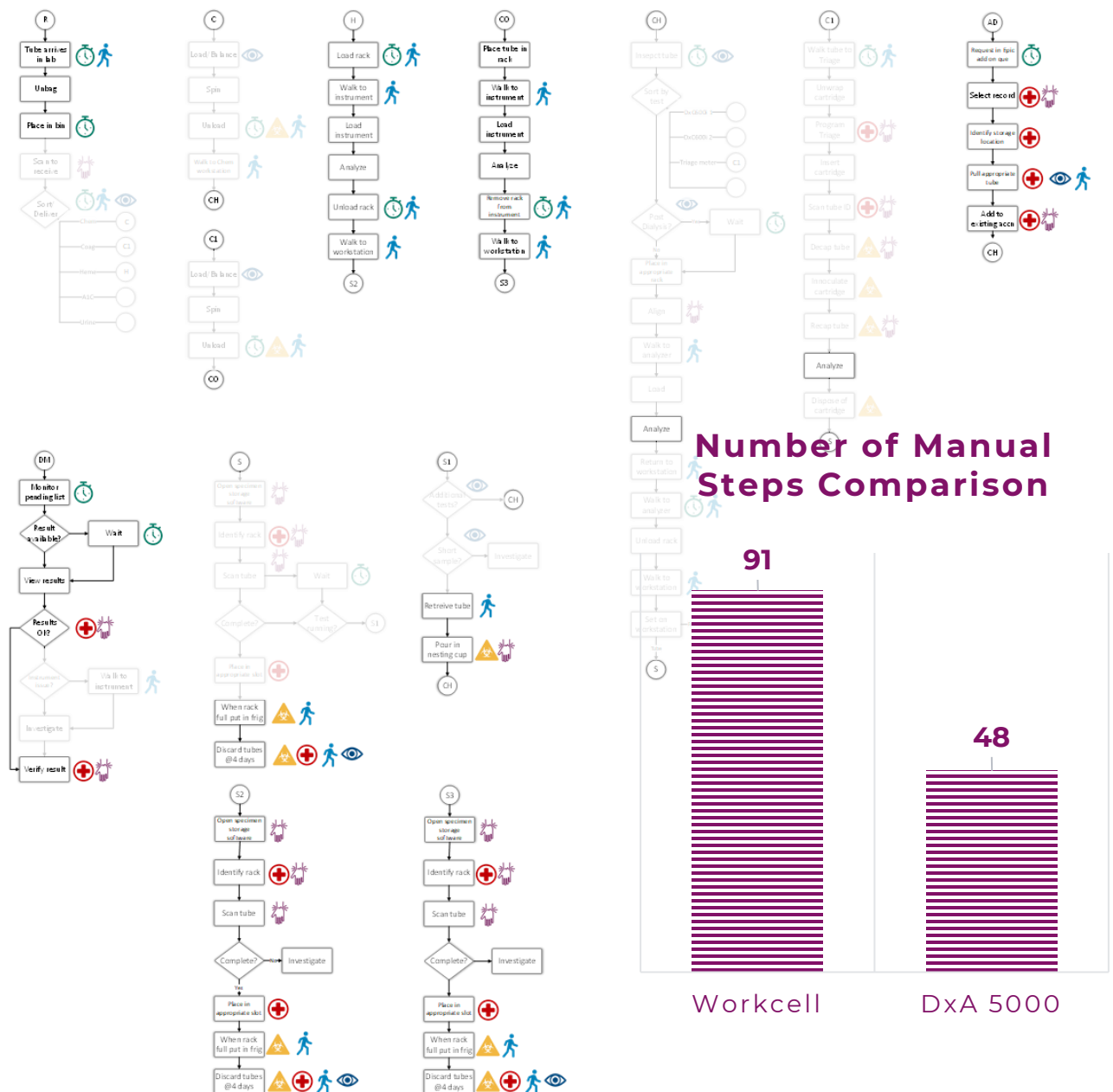
Mackenzie Richmond Hill Hospital:

- Opened in 1963
- Specialized services: chronic kidney disease program, behavioral and sexuality clinic, autism services, outpatient clinics, and rehabilitation
- Load approximately 1,405 tubes a day
- The lab results 2.35 million chemistry and immunoassay tests annually



POST-AUTOMATION EVALUATION AT MACKENZIE RICHMOND HILL HOSPITAL

As a new facility, there was no preprocess evaluation to compare to at Cortellucci Vaughan Hospital. Before implementing the DxA 5000 solution, Mackenzie Richmond Hill Hospital performed its chemistry testing with an integrated workcell solution from Beckman Coulter. The Beckman Coulter team performed a post-installation process evaluation, and the DxA 5000 system at Mackenzie Richmond Hill Hospital **reduced the number of manual process steps from 91 to 48, equating to a 47% reduction in non-value-added process steps.** Below is a depiction of the post-automation rack process changes removing eliminated steps.



POST-AUTOMATION EVALUATION AT MACKENZIE RICHMOND HILL HOSPITAL

“The design of the system has many safeguards to keep staff safe. The system minimizes exposure risks for operators, eliminates the repetitive capping motion on tubes and adjusts the weight of the bins, all reducing the risk of injury.”



Jim Tsourgiannis

Director: Medical Imaging and Laboratory Services, Mackenzie Health

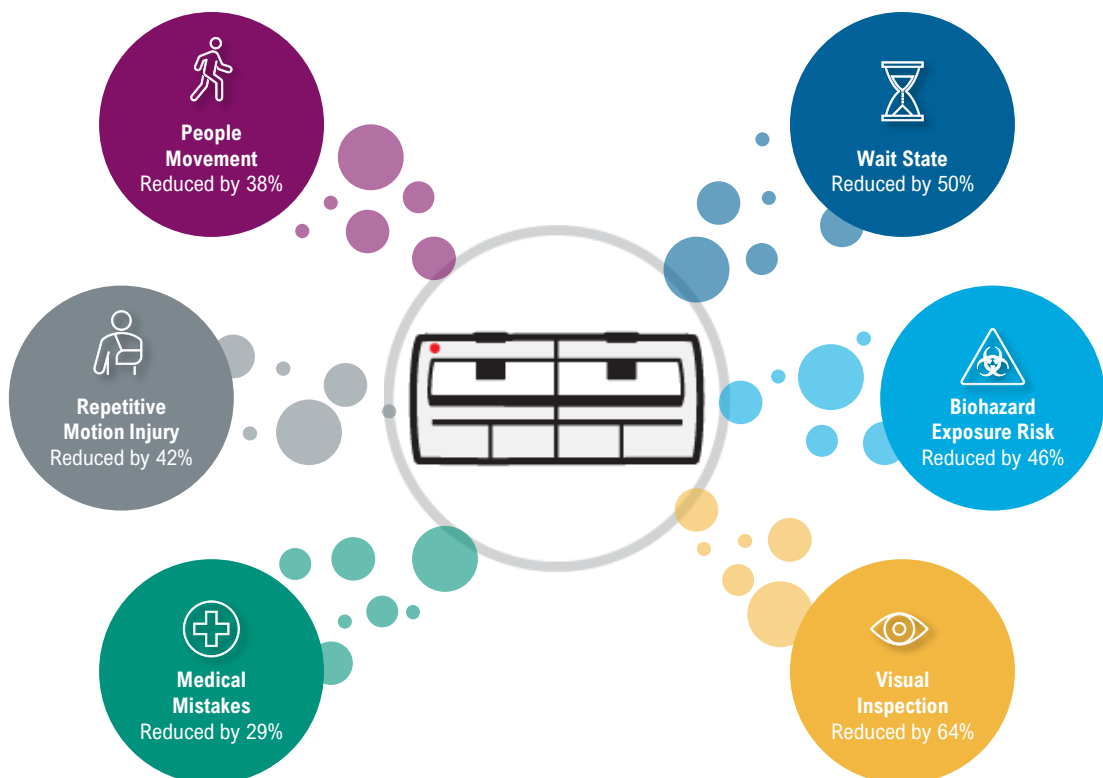
43%

reduction in risk of hazards to patients and laboratory staff



A large benefit of installing automation is to remove potential hazards that can impact laboratory employees and patients. Beckman Coulter evaluates each process step for the potential of six main hazards. By choosing DxA 5000 system, Mackenzie Richmond Hill Hospital saw a reduction of risk associated by these hazards by **43 percent**. 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.

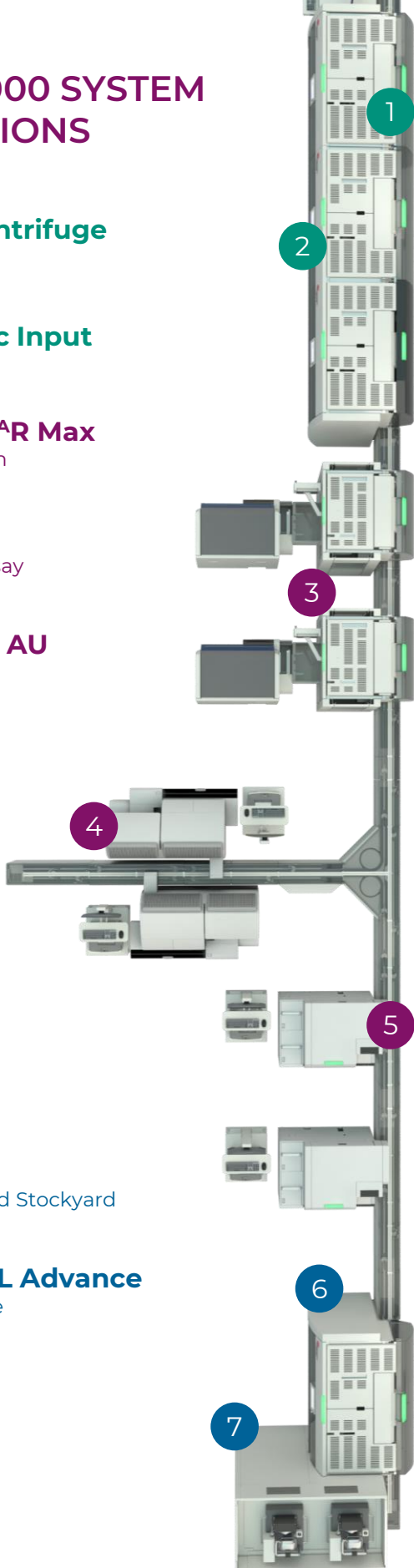
Percentage of step reduction associated with risk, grouped by risk:



MACKENZIE RICHMOND HILL HOSPITAL'S DXA 5000



MACKENZIE CORTELUCCI VAUGHAN HOSPITAL'S DXA 5000



FINAL DXA 5000 SYSTEM CONFIGURATIONS

1

Dual Centrifuge

2

Dynamic Input

3

Stago STAR Max
Coagulation

4

Dxl 800
Immunoassay

5

DxC 700 AU
Chemistry

6

Output

7







ECSD
Refrigerated Stockyard



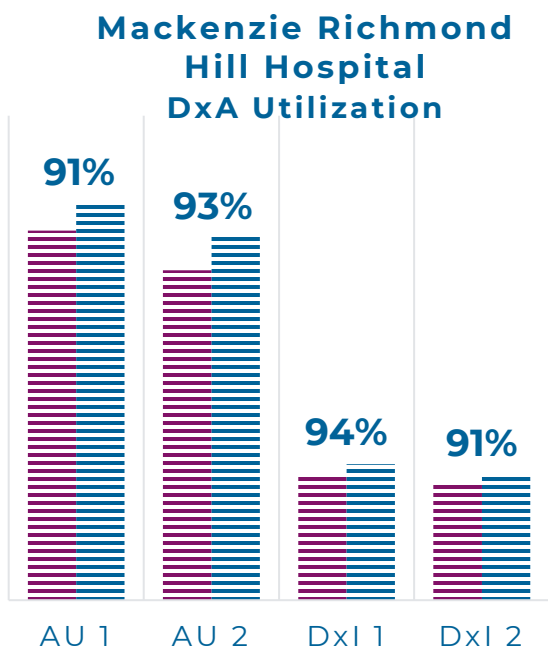
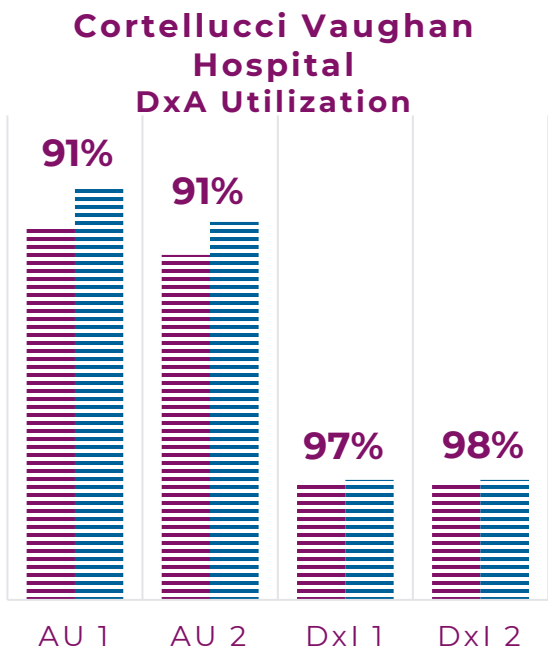
REMISOL Advance
Middleware

QUANTITATIVE RESULTS POST GO-LIVE WITH DxA 5000

After the installation of DxA 5000 automation line, a turnaround time (TAT) evaluation was performed on critical assays correlating to connected instruments, potassium, and high-sensitivity troponin. There is no prior data to compare TATs for Cortellucci Vaughan Hospital, however, they are comparable to that of their sister hospital. **Mackenzie Richmond Hill Hospital decreased in all key categories: mean TAT, 95th percentile, and standard deviation.**

TAT Review (Receive to Result)				
		Cortellucci Vaughan Hospital DxA 5000	Mackenzie Richmond Hill Hospital Workcell	Mackenzie Richmond Hill Hospital DxA 5000
in minutes	TAT K ⁺	27.9	38.4 	28.8
	95 th Percentile	32	74 	37
	SD K ⁺	5.8	18.2 	5.6
	TAT hs-TnI	34.9	44.9 	35.2
	95 th Percentile	38	73 	42
	SD hs-TnI	7.1	20.5 	12.7

The laboratory staff must adopt and consistently use the new solution to achieve stable and predictable turnaround times. In the case of both facilities, the total utilization of the DxA 5000 system was 92% of all samples. Utilization is the difference between **samples introduced to DxA 5000 solution** vs. **total resulted samples for the day**.

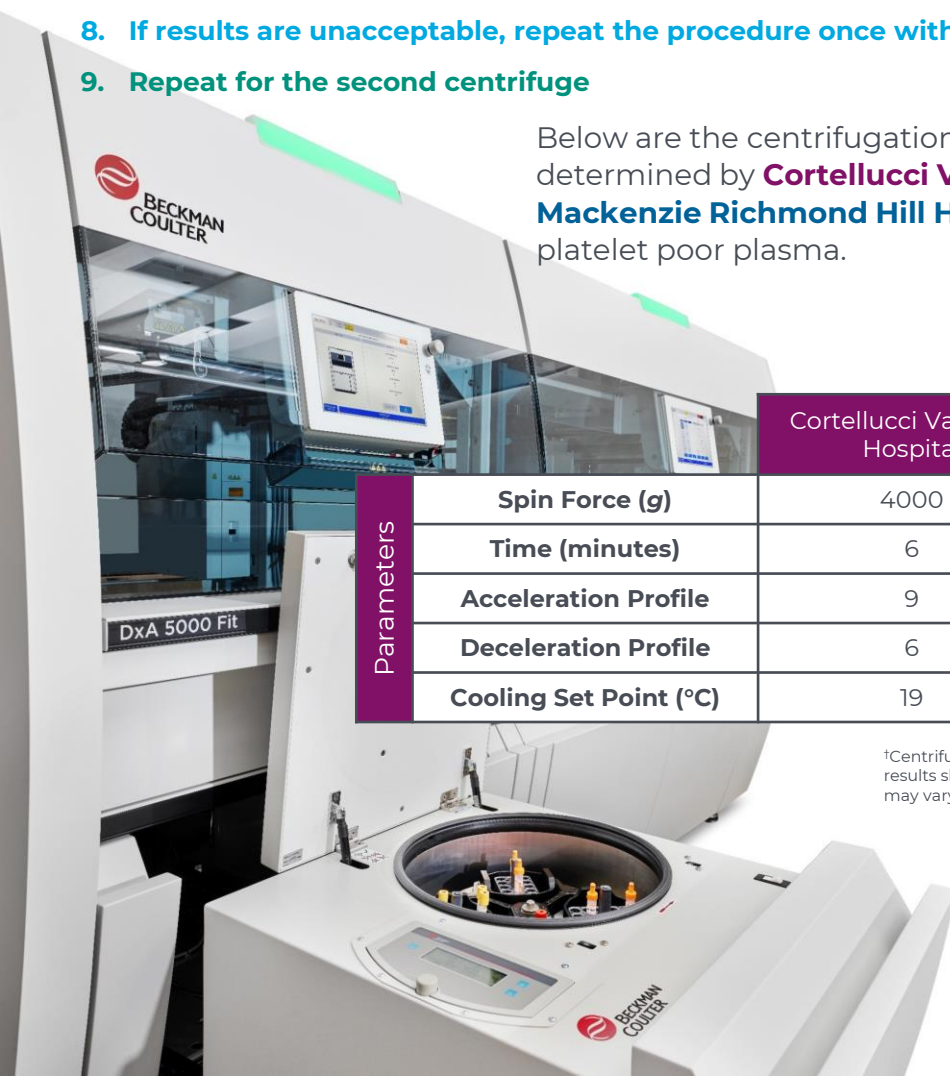


PLATELET POOR PLASMA OBTAINMENT†

Using the universal centrifuge with a 4000g spin, both faculties were able to reduce process time with synchronized, dual centrifuges. Both **Cortellucci Vaughan Hospital** and **Mackenzie Richmond Hill Hospital** were able to independently validate a centrifuge profile that garnered platelet poor plasma for their coagulation testing and each site created and performs this weekly procedure to verify that platelet poor plasma is sustained.

1. Within the centrifuge's GUI, navigate to the subsystem controls and disable one centrifuge
2. Place a blue top tube on to the DxA module (note: a corresponding lavender top tube must be available)
3. Centrifuge the blue top tube and retrieve from the centrifugation drawer
4. Perform platelet testing on the plasma
5. Check LIS to obtain total platelet count
6. If results are acceptable repeat the process with second DxA centrifuge
7. Document results appropriately
8. If results are unacceptable, repeat the procedure once with a new sample
9. Repeat for the second centrifuge

Below are the centrifugation profiles used (as determined by **Cortellucci Vaughan Hospital** and **Mackenzie Richmond Hill Hospital**) to achieve these platelet poor plasma.



	Cortellucci Vaughan Hospital	Mackenzie Richmond Hill Hospital
Spin Force (g)	4000	4000
Time (minutes)	6	6
Acceleration Profile	9	9
Deceleration Profile	6	6
Cooling Set Point (°C)	19	19

†Centrifugation profile requires customer validation, results shown are observed at Mackenzie Health. Results may vary.

PRE-ANALYTICAL PROCESS GAINS

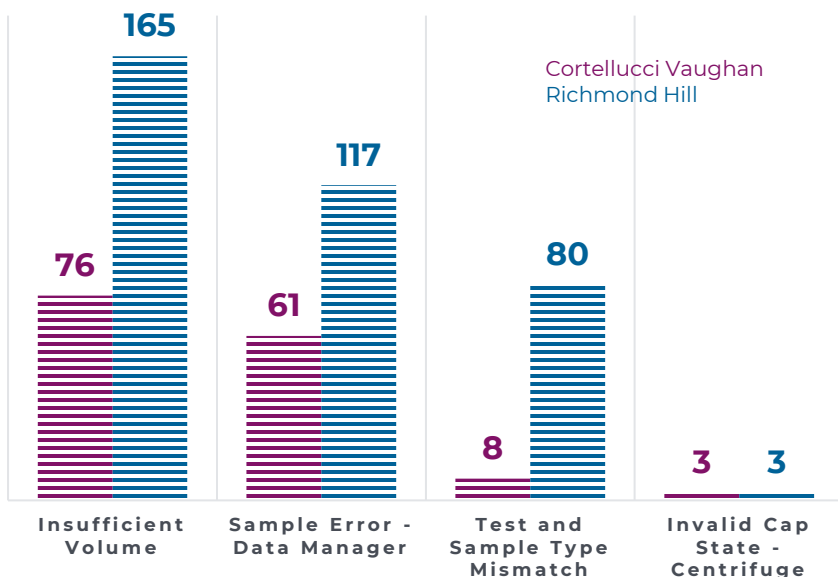
By choosing Beckman Coulter's DxA 5000 system, Mackenzie Health was able to benefit from the industry's most comprehensive specimen check. Once loaded, this 3-second quality check evaluates each sample for nine parameters. This functionality is unique to Beckman Coulter.



1. Read the barcoded label
2. Measure sample tube size
3. Identify container type
4. Identify container cap type
5. Identify container cap color
6. Measure the fill level
7. Measure sample volume
8. Calculate sample weight
9. Conducts pre-spun status check*

During the post-process evaluation, a report is created for Mackenzie Richmond Hill Hospital and Cortellucci Vaughan Hospital that enumerates the number of pre-analytical errors identified by DxA 5000's sample integrity check. These problem samples are sorted into a dedicated inlet drawer for immediate mitigation by laboratorians. Below reveals the number of a select few error types identified across a 13-day period.

DxA 5000 Preanalytical Error Log

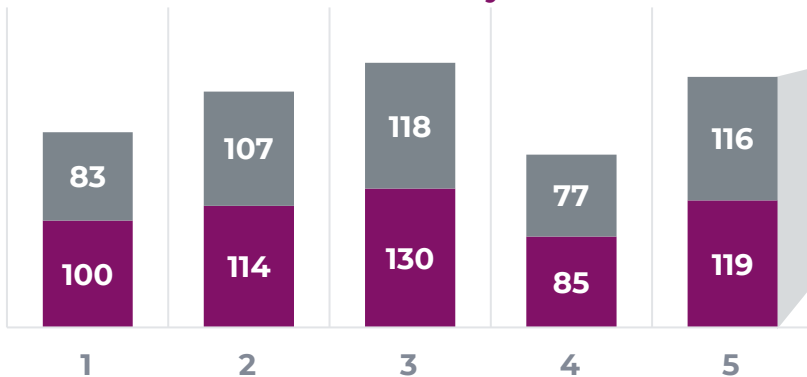


This data demonstrate that between the two systems:

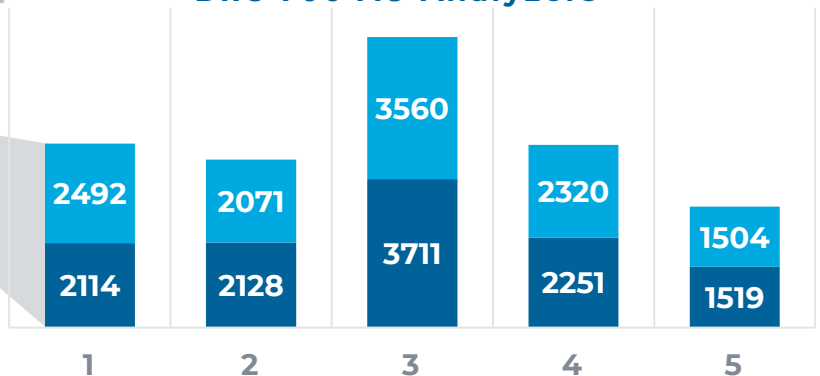
- **241 short samples were identified immediately** vs. when an analyzer flags the sample as QNS—giving the lab the control to prioritize which tests are performed.
- The DxA 5000 system **assessed 88 times that the sample type did not match the barcoded tests** that were ordered, preventing erroneous results from being reported.

WORKLOAD BALANCE

The DxA 5000 automation and REMISOL Advance middleware’s sophisticated tube routing can allocate samples in the most granular fashion; dividing testing volume at the test code level. Balancing the patient volume between like-instruments ensures better turnaround times and reduces hardware wear and tear. Below are examples displaying that the two hospital’s solutions are successfully sharing volume between the Dxl 800 analyzers (immunoassay) at **Cortellucci Vaughan Hospital** and DxC 700 AU analyzers (chemistry) at **Mackenzie Richmond Hill Hospital** across a 5-day period.



**Mackenzie Richmond Hill Hospital
DxC 700 AU Analyzers**

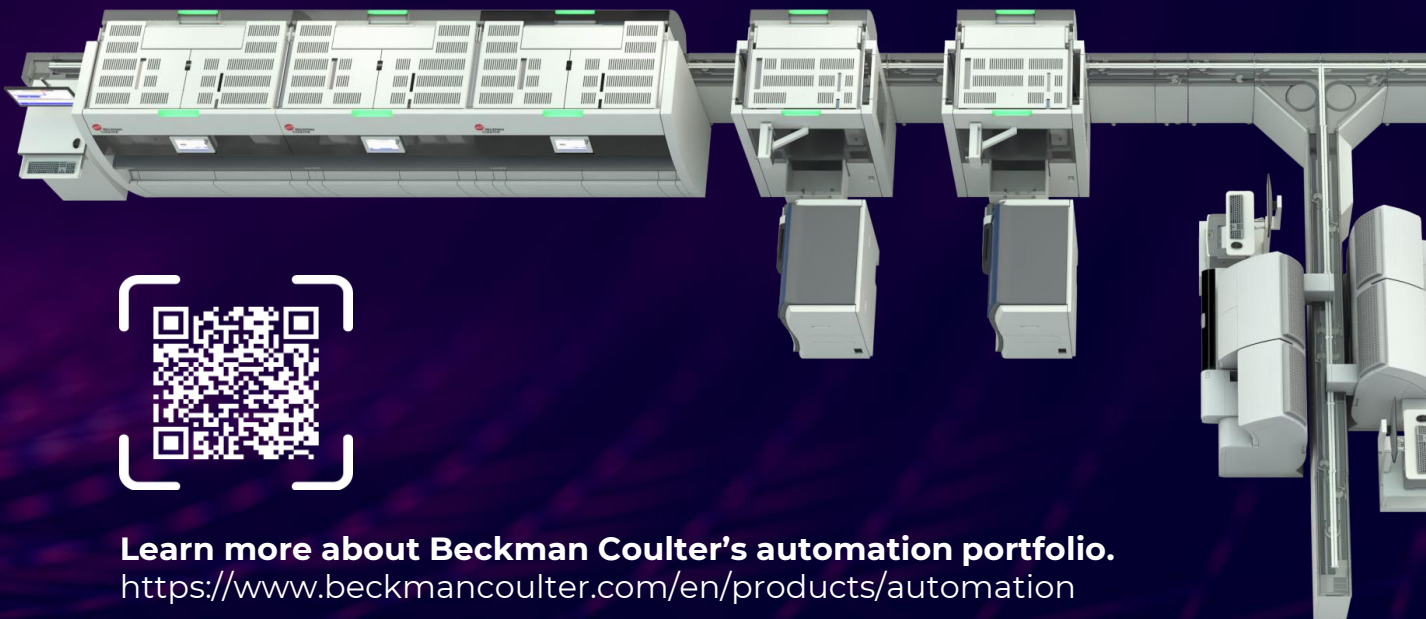




“Introducing an automated system required training our staff getting them comfortable with a new way of doing their day-to-day tasks. Working with the Beckman Coulter team and seeing their employees’ willingness to learn and help Mackenzie Health succeed established a collaborative and positive partnership.”

Jim Tsourgiannis

Director: Medical Imaging and Laboratory Services, Mackenzie Health



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

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