

BACKGROUND

Rapid diagnosis of infection and multi-resistant organisms are essential to reduce morbidity and mortality. However, microbiology culture methods have remained relatively unchanged since the development of solid culture media by Robert Koch in 1881, and manual procedures for confirmation of infection is crucial for patient management. Traditional Microbiology processes and workflows require a major redesign to reduce waste, optimise efficiency and harness new technologies to transform the laboratory.

The Microbiology Laboratory Automation (MLA) system mechanises conventional procedures through the use of robotics and offers consistency in specimen processing, culture incubation and result interpretation. Through this transformation, greater value had been created for patients and clinicians with more rapid resulting, for the hospital as there is more judicious utilisation of limited isolation facilities with better and faster detection of multi-resistant organisms, as well as for our staff as there is enhanced ergonomics and robustness of laboratory safety.

THE TEAM

The MLA team comprised of Microbiology medical technologists, technical assistants, executive assistants, laboratory operations, Laboratory Information System staff, nurses, clinicians, EGIS, IHIS, and medical microbiologists.

AIM

To improve the quality, consistency, productivity, and turnaround time within Microbiology Laboratory by leveraging automation, which mechanises conventional microbiology culture processes through the use of robotics.

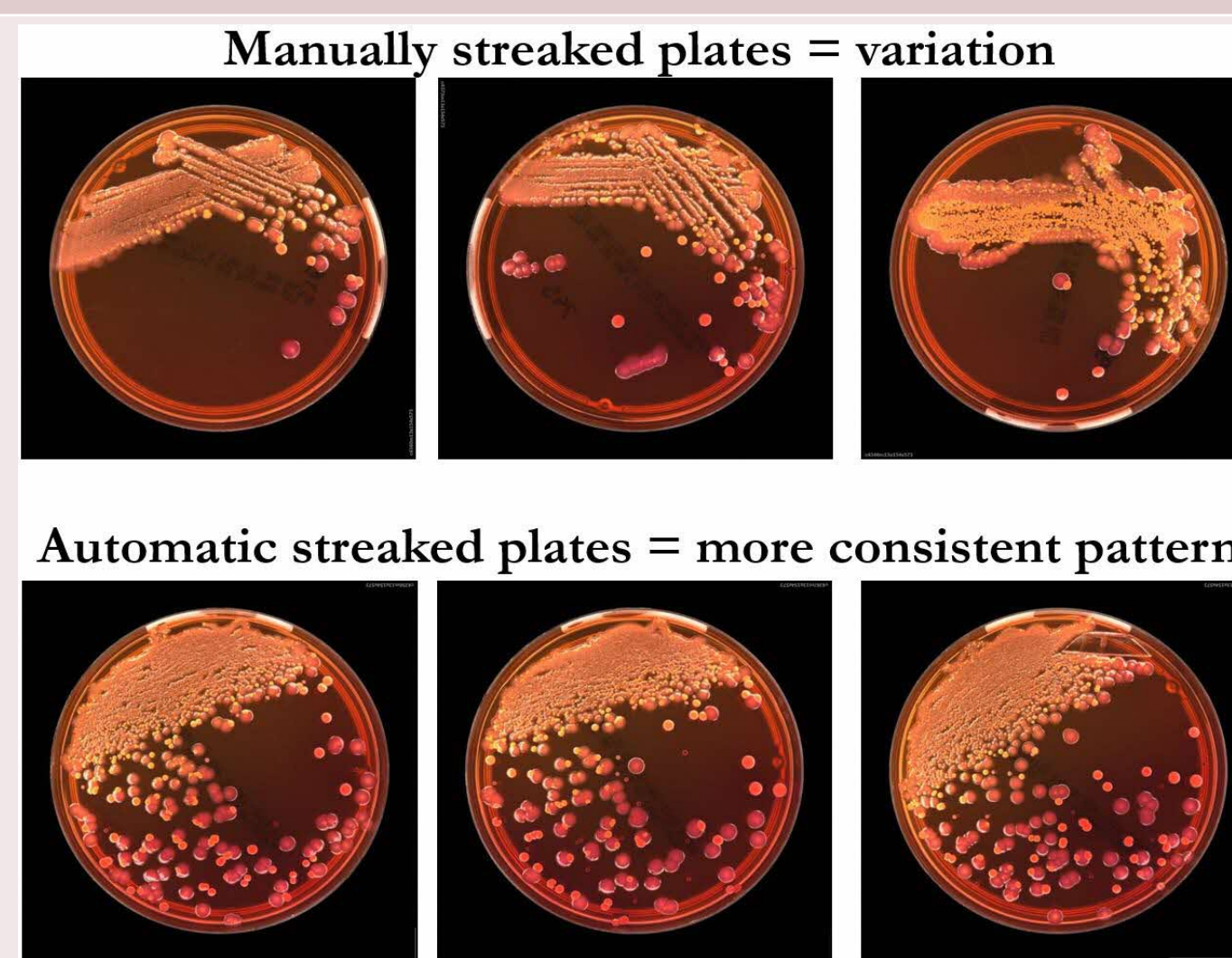
ANALYSIS

Traditional Microbiology Investigations

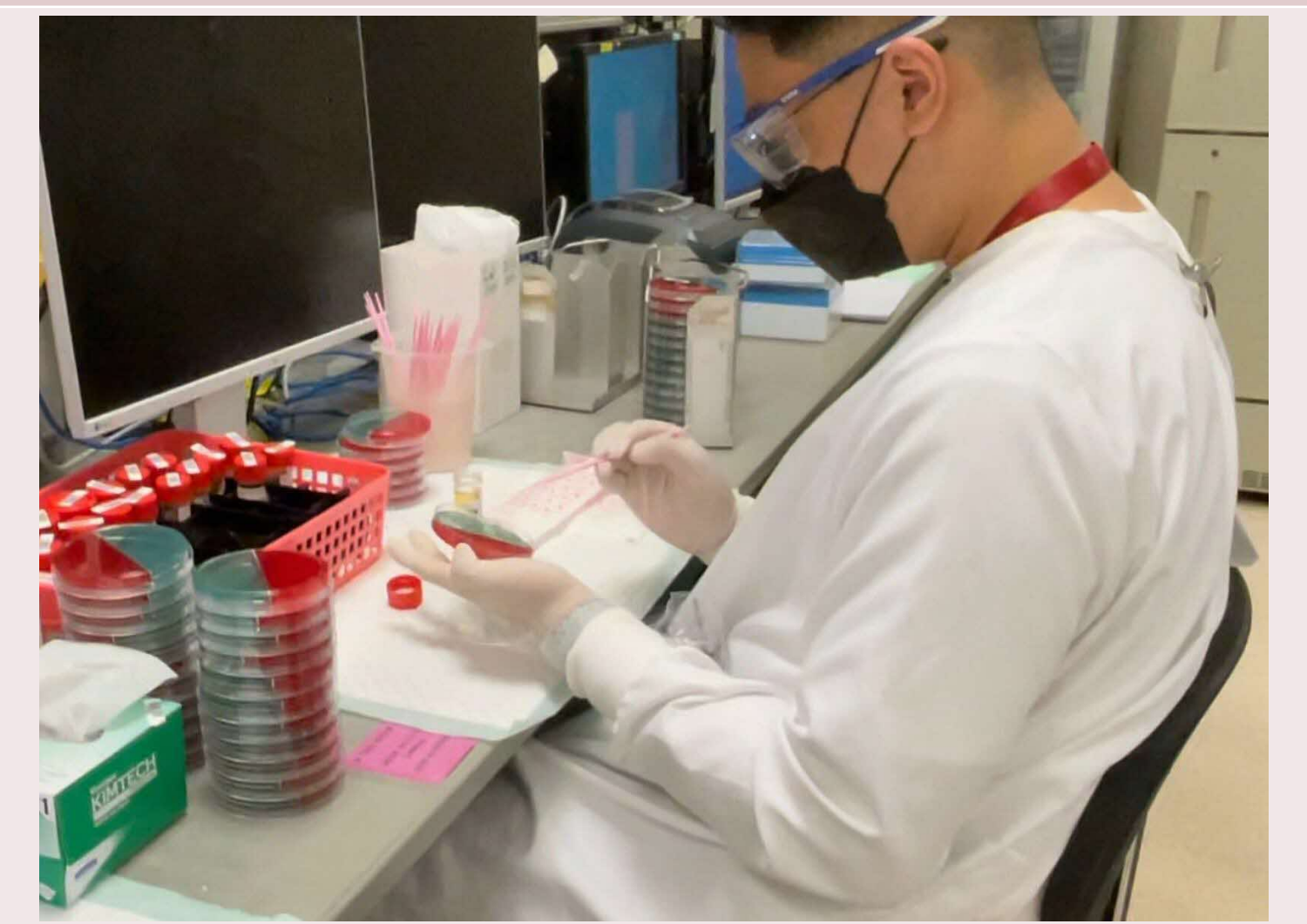
Highly Repetitive, Laborious & Time Consuming



Variable & Inconsistent Manual Processes



Occupational Hazards
(e.g. repetitive strain injury)



INTERVENTION AND IMPLEMENTATION

Installation of
MLA System

Lab User
Training

Eswab
Implementation

IT Connectivity
& Cybersecurity

Process
Redesign

Evaluation &
'Live' Testing

MRSA & VRE
Screen Go 'Live'

Process
Review

Urine Culture
Go 'Live'

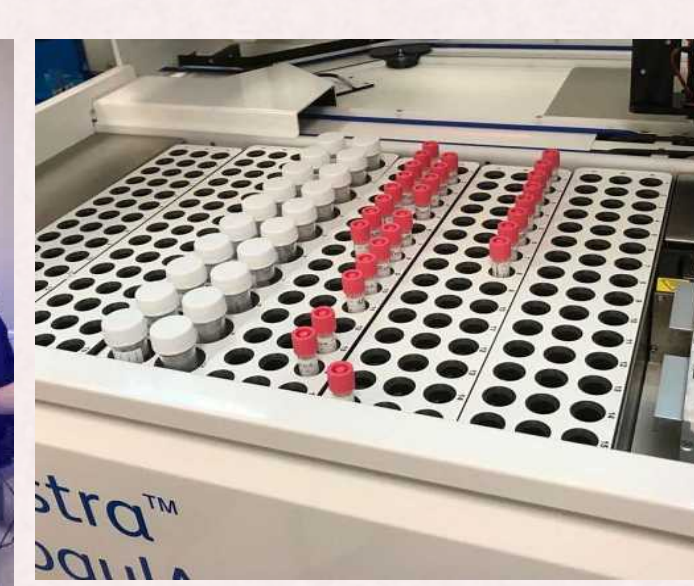


Collaboration with

- MMD
- Nursing
- Infection Control
- Clinicians

Collaboration with

- DLM
- BD
- LIS
- EGIS
- IHIS



End 2019

Nov 2020

Dec 2020

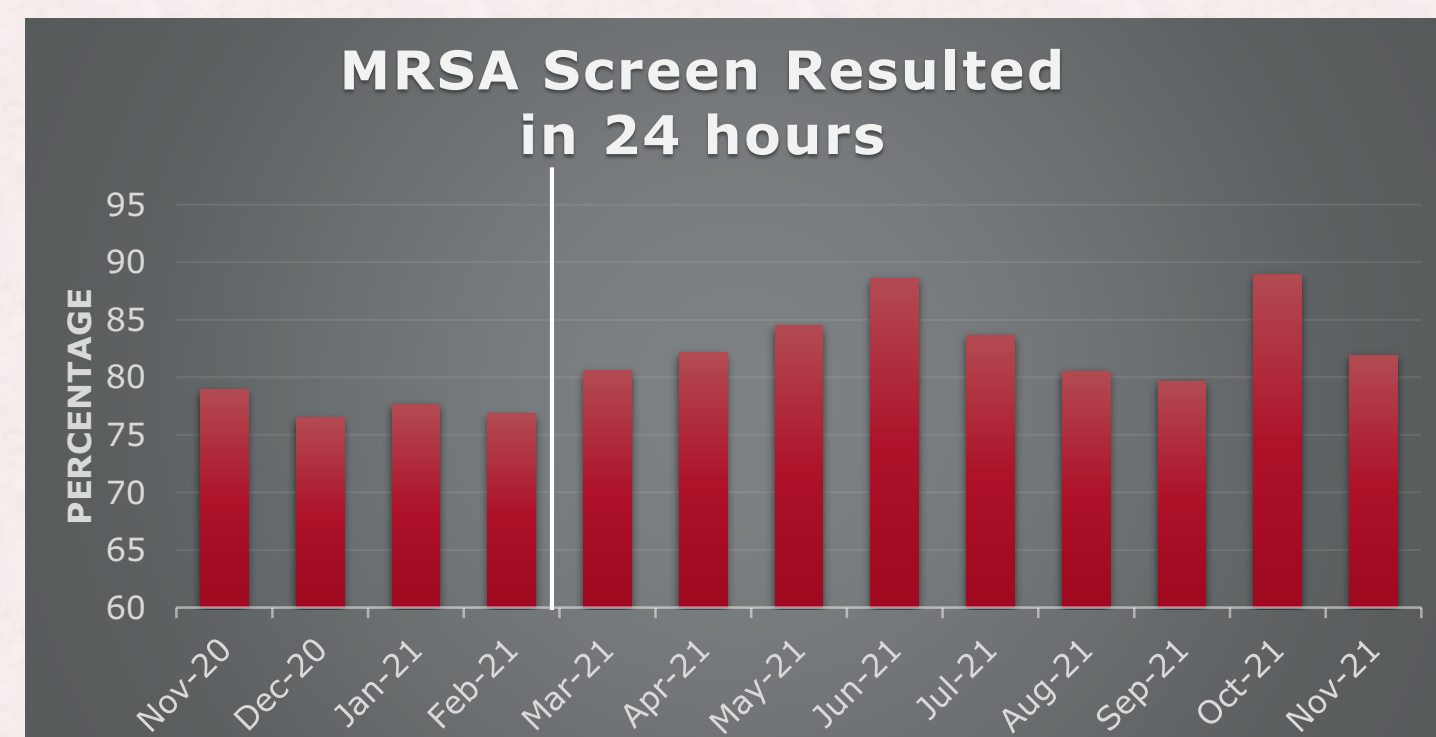
Feb 2021

May 2022

RESULTS

MRSA Screen

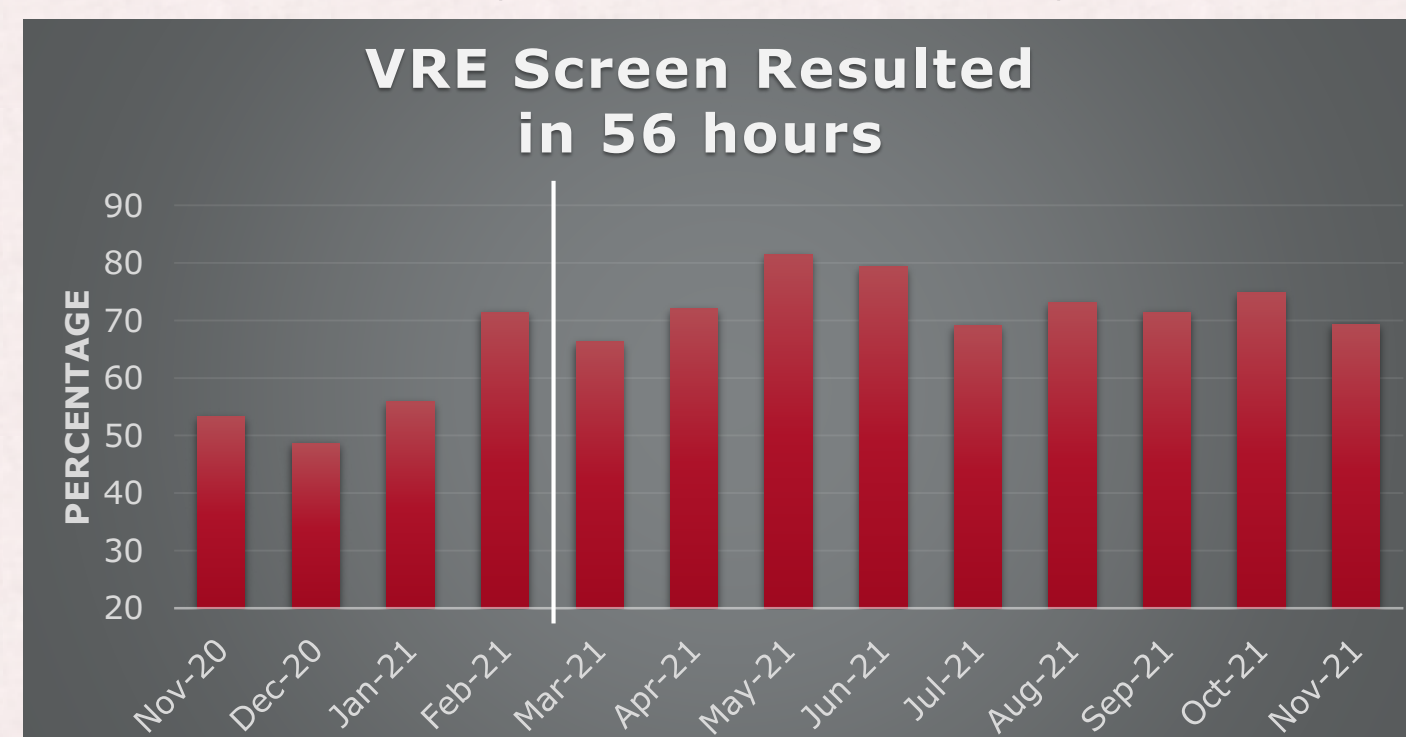
- ↑ 20% increase in workload
- ↑ 5.7% more samples resulted within 24 hours (77.7% vs.. 83.4%)



↑ Improved Laboratory Productivity Index from 94.7 to 108.7

VRE Screen

- ↑ 3.5% increase in workload
- ↑ 20% more samples resulted within 56 hours (52.6% vs.. 73.0%)

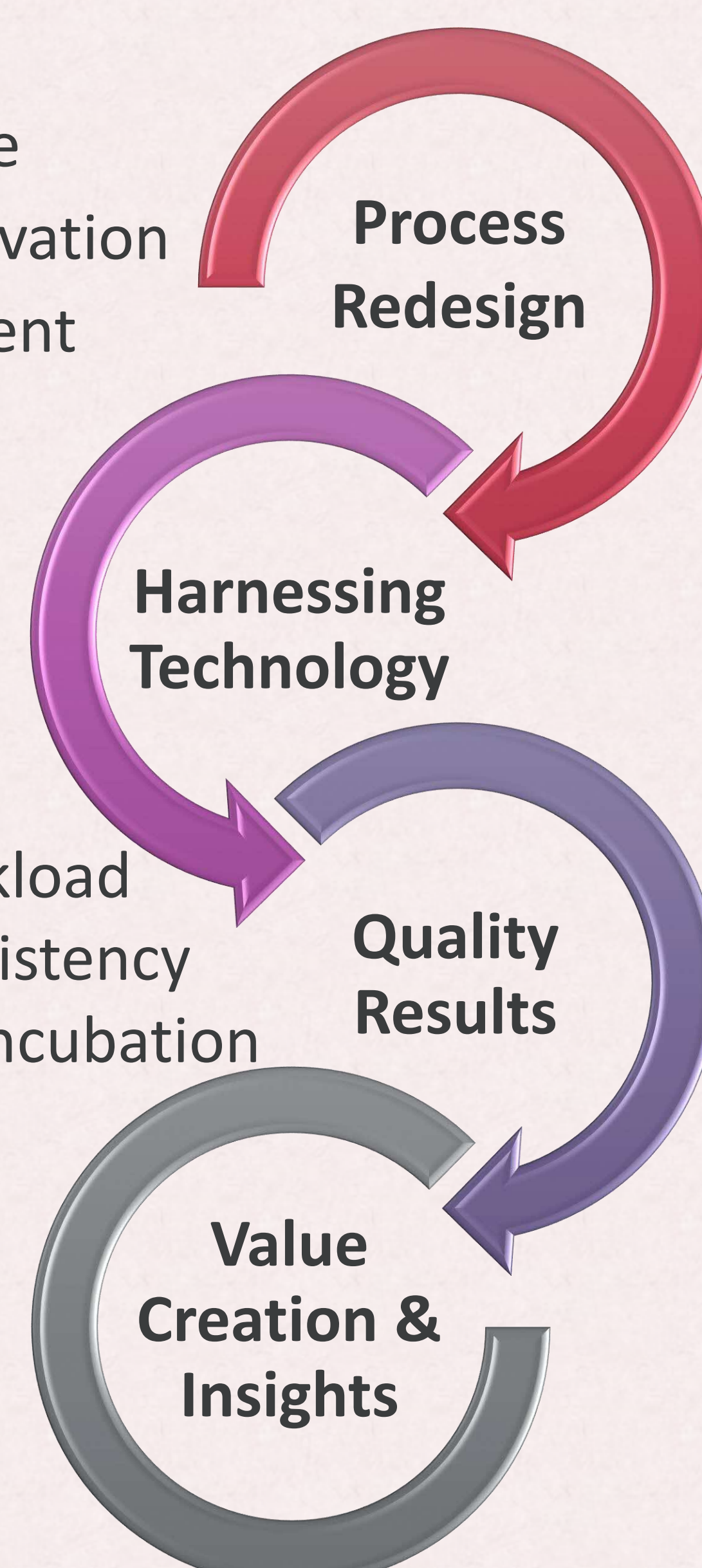


TRANSFORMATION IMPACT

- Reducing waste
- Workflow innovation
- Staff engagement

- Faster sample throughput
- Increased workload
- Improved consistency
- Standardised incubation

- Patients & clinicians: Faster results
- Hospital: Judicious use of isolation facilities
- Cluster: Capacity building
- Staff: Better ergonomics & staff engagement



LESSONS LEARNT

The value of consistent, regular communication and engagement was crucial for the project.

Increased engagement with innovation and collaboration within the department have other intangible benefits such as improved team dynamics, upskilling of laboratory staff and synergies with other departments.

Overall, this worthwhile and enriching journey together has resulted in a stronger, more cohesive Microbiology team and made a positive impact on the quality and robustness of our clinical results, which adds value to patients, clinicians and the organisation.