Project Title

Using Technologies to Transform Laboratory for Better Quality and Care

Project Lead and Members

- Serene Kho Siok Wah

Organisation(s) Involved

National Healthcare Group Diagnostics

Healthcare Family Group(s) Involved in this Project

Allied Health

Applicable Specialty or Discipline

Laboratory Medicine

Aim(s)

To automate manual processes through new analysers / technologies where it improves productivity without incurring additional manpower, and yet keeping the best quality and standards.

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Conclusion

See poster appended/ below

Project Category

Technology

Digitalisation

Care & Process Redesign

Productivity

Keywords

Automatic Electronic Results Transmission, Laboratory Transformation, Sustainable Laboratory Manpower Resource, Clinician Electronic Record System, Patient Empowerment, Reducing Transcription Errors, Critical Results Handling, Turnaround Time, Staff Retention in Laboratory Processes, Medical Technology

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ABSTRACT

Using Technologies to Transform Laboratory for Better Quality and Care

National Healthcare Group
DIAGNOSTICS
Adding years of healthy life

INTRODUCTION

National Healthcare Group Diagnostics (NHGD) NHGD processes more than 5 million tests per year in small footprint laboratories in primary healthcare settings. With the test load increase of average 5% year on year, it is not sustainable to keep increasing the manpower resource to run the tests.

NHGD laboratory transformation starts in 2007 with the introduction of Laboratory Information System (LIS), then gradually linking up different laboratory equipments to LIS for an automatic electronic results transmission and bringing in new technologies / software alongside. The transformation span over past 10 years had expanded our onsite test repertoire from 30% to 95% tests with urgent results available within an hour. Manual processes had been replaced with technologies adoption, negated need for manual result transcription for more than 90% of tests, and any human subjectivity in result interpretation, enhancing our laboratories quality and standards.

METHODOLOGIES

Any manual process is prompt to transcription error and open to subjectivity in lab test processing. With workload increase, it is not sustainable to recruit depend on manpower. The plan was to automate manual processes through new analysers / technologies where it improves productivity without incurring additional manpower, and yet keeping the best quality and standards.

CONCLUSION

With technologies in place, we noted better quality and standards in laboratory:
- Improve patient management especially for critical results handling. Patients with critical results can have results within an hour.
- Tanscription error is negated as results auto transmit to clinicians electronic record system. Both results accuracy and precision of tests are also improved negating human subjectivity in manual method or accuracy.
- Patient were given empowerment and responsibility in some aspects to be part of the quality check to ensure accuracy in their info.

By providing new learning opportunities for staff through new implementations, it has also created a platform for staff to upskill.

RESULTS

Clinical Improvements
- **Improve patient management.** With more tests provided onsite, patients requiring immediate action can be attended with results within an hour within the same day with no repeat technical visit
- Results available within same day also allows clinicians to be inform of critical results during office hours to better manage the patient with readily information

Through KPIs monitoring, it was also noted:
- Laboratory turnaround time within 60 minutes despite workload increase and no increase in lab processing headcount
- Reduction in incident rate from transcription error
- Reduction in critical report handling after office hour – any critical are handled during office hour for immediate actions

Staff Retention
By providing new learning opportunities for staff through new implementations, it has also created a platform for staff to upskill themselves and noticeable reduction in resignations from lack of learning opportunities.

FIGURES/ DIAGRAMS

NHG Diagnostics Laboratory Automation Milestones

2009
- Online ECG
- Clinitek

2010
- Biochem CCK
- PT POCT

2011
- IMH Billing module
- AMKH LIS

2012
- Biochem TPY
- Glu LIS

2013
- Biochem AMK
- PT LIS

2014
- Biochem BBK, YIS
- eInventory
- Stool analyser IMH

2015
- Biochem WDL

2016
- LIS batch upload

2017
- Electronic Thermometer Monitoring System
- Automate stock ordering to warehouse
- Automate urine pregnancy

2018
- Biochem @ HOU

2019
- Preanalytic automation @ IMH
- PTINR analyser with LIS

2020
- Electronic lab manual
- E-learn for lab WIs and quizzes
- Electronic spiro report

2021

2022
- HPV DNA @ IMH
- Self-service Electronic Collection Module