DxA supported by clinical informatics to improve efficiency and quality.

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• Why are we here?
• What is the purpose of what we do?

**Right test**

**Right result**

**Right time**

• How do we achieve this?
Laboratory Processes and IT

- Laboratories are more reliant on IT to achieve our goals than ever before.

- IT is central to what we do

- It is the backbone and brain of any pathology services
Layers of Pathology touched by IT

- Staffing
- Interfaces
- Pre-analytics
- Result processing
- Reagents
- Management data
- AI
- PATIENTS

DxA

Always should be at the centre

Reducing manual work
Current situation:

- Use of Auto receiving of requests
  - Automation receives the orders when sample arrives in lab.
- Demand management
  - Reducing unnecessary tests
- Intelligent requesting
  - Algorithm’s to reflex add on tests
- Improving workflow and lean working
  - Impact of DXA 5000
Auto-Receipting

Could You Do This?

LIS

ORDER

AUTOMATION

LAB

RACK WITH GP SAMPLES

AUTO RECEIVING
Demand Management

- Over requesting of haematinics?
- Many B12/Folate results are normal (>90%)

How do you stop the trend?
Anaemia Screen example

• GP’s tend to request B12/Fol/ Ferritin just in case Patient is anaemic – stops them being re-bled.

• Could we use GP requesting system (ICE) along with Remisol and the lab automation to help with more intelligent requesting?

• Look at MCV and HB results and reflex to B12/Folate or Ferritin if required?

• If we did that could we reduce unnecessary testing, reduce cost and improve the yield in terms of picking up abnormal values?
GP suspects patient is anaemic:

Take 2 blood samples

Process FBC

Serum sample sorted on track

Depending on Hb and MCV reflex to add tests

Haematinic results go back if needed

pale
fatigued
poor concentration
weak
Different systems linking together to facilitate intelligent requesting?

- GP requesting system
- Analysers (DXH + DXI)
- LIMS/Remisol – Reflex tests
- Automation
- Right test done when needed
Does it work? Demand management

- 27.4% reduction in B12/Folate tests
- 21.5% reduction in Ferritin tests
Picking up abnormal Ferritins

- With the GP requesting Ferritins only approximately 20% were abnormal.

- Whereas, for the Ferritins added by the algorithm – 80% are abnormal.
Other examples

Intelligent requesting applied
Future state

- How do we intend to use IT to enable efficiency and improve quality?
- EQC and Moving averages
- Dashboards
- Potential for sample delivery management
- Multidisciplinary workforce
IQA and moving averages

- Timing is a problem?
- How often do we run a QC sample?
Moving average

- The use of patient data to provide real time quality control.
- Every sample is an opportunity to check for analyser drift.
- Since the mean value of results can be stable from batch to batch.
- Any drift could be an analyser problem
- Early warning for the laboratory staff.
IQC and the DxA?

- Controls could be stored in the refrigerated storage unit.
- The system can be programmed to retrieve the QC samples at different time intervals and move them to the appropriate analysers.
- If the QC sample needs to be at room temperature the system can hold the sample at RT until ready for sampling.
Dashboards

- Data can be taken from the DxA software to monitor progress and TAT’s
- To monitor workload and outstanding work – picking up tests that are going to breach TAT’s
- Monitor workflow and efficiency.
- Help lab staff to react faster to problems

Right Test  Right Result  Right Time
Dashboards – Live Performance
DxA at Chester
Potential Benefits of DxA

- Smaller footprint for the pre-analytical phase
- Faster sample processing/throughput
- Improved - Intelligent sample sorting
  - Prioritisation of STAT samples
  - Dynamic communication with analyser
  - Improved flow of samples
- Reduces pre analytical errors
  - Cap colour recognition
  - Volume determination / Short Draw
  - Spin status
Initial Impact: *Quotes from Staff*

- “the system is much faster, samples just disappear quickly from the inlet“
- “impressive to watch it at work”
- “outstanding work at the end of the day is much lower”
Impact of DXA on Workflow

50.7% decrease in work processed after 17:30

Number of U&E profiles resulted during time period
Source: Countess of Chester LIMS (MediTech)
22.4% decrease in TAT for Potassium

Average TAT from track input to sample result during time period
Source: Countess of Chester LIMS (MediTech)
Turnaround Times

Troponin I

Average TAT from track input to sample result during time period
Source: Countess of Chester LIMS (MediTech) and TAT analysis of DxA from Beckman Coulter

41.1% TAT improvement for TnI
Future State

- Samples arriving within racks to go directly onto the DxA (Hospital and GP samples)
- Biochemistry, Haematology, Immunology, Microbiology.
- Auto – receiving of the requests
Adding to the system

- Haematology analysers:
  - DxH 900
Multi disciplinary laboratory worker

- Train staff to work within all the Blood Sciences disciplines - develop a team of multidisciplinary workers.

- IT and Technology are removing the traditional boundaries – the DxA is a good example of this.

- Re-skill staff and develop a flexible workforce to complement recent advances could lead to potential reduction in staff costs.
Conclusions / Summary

- The DxA represents a step change in terms of efficiency within the lab at Chester.
- Quality is improved by reducing pre-analytical errors e.g. labelling errors
- We have seen significant improvements to efficiency and workflow.
- In addition we have been able to improve demand management.
- As Haematology and Biochemistry systems converge, supported by common software solutions, we have been able to develop a more flexible workforce
Any Questions?

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