INTRODUCTION

Pathology services globally are undergoing significant transformation in response to consolidation, changing demographics and increased infection control demands notably in relation to the growing challenges of identifying multidrug-resistant microorganisms. Advances in diagnostic laboratory technologies form part of the future direction for configuration of pathology services in England as elsewhere, with an emphasis upon cost-efficiency, quality and innovation; built around a network model and investment in services. The shift from manual to automated operations poses a number of challenges and opportunities for service design and delivery, workforce skill mix and not least to understand the extent to which new technologies are being implemented successfully and as originally planned.

This research focuses on the issues/challenges surrounding the transformation process.

A) What was the impact on staffing and workforce planning?
B) To prove or disprove the claim that the quality of life of patients and productivity of the services would improve as a result of implementing robotics.
C) What were the benefits in terms of patients' treatment, savings and staff development?

METHODS

The research adopted an insider research case study approach, combining qualitative and quantitative methods to investigate service improvements in the diagnostic automation of selected bacteriology laboratory services, including the extent of quality and productivity gains. The case focused on four PHE laboratories that are in various stages of transformation and Figure 2 shows the progress of the four sites.

Sampling/Participant:
• A parallel process operation and not a cross-sectional study.
• 15 semi-structured interviews were conducted with 4 laboratories that are in various stages of transformation and Figure 2 shows the progress of the four sites.
• A transformation model, Fig.5 was constructed as part of this research and a set of recommendations to be published in terms of staffing, preparedness pre-implementation. Staff have gone through a challenging experience especially at the implementation and transition stages. Feeling unsure about their belief that the automation will make them redundant, and it took time to get used to the new environment. I believe many of the negative impacts on staff morale could have been avoided if there were procedures in place to prepare the staff and management to undertake the task. Simply there was not enough time to learn a new skill set to implement and ‘do the day job’. Changing the layout of labs in order to receive the new equipment and work within a different space was unpleasant. The positive outcome is that they have managed the transformation reasonably well and the majority of staff now accept it. It is expected some will resist change but the move to automation to cope with the increase of workload from consolidation or service demands seems to be inevitable. The service does become more stable when the lab moves from the ‘transition’ period to the ‘operation’ stage, and that’s been demonstrated through this case study.

RESULTS

To answer the research questions it was necessary to collect and analyse the quantitative and qualitative data as stated in the method section. As shown in Figure 1 we have selected 4 laboratories that are in various stages of transformation and Figure 2 shows the average staff cost per test for each lab. Lab 1 has £3.18 average staff cost per test, this lab is at the stage of post automation. Lab 3 and Lab 4 show respectively £3.63 and £6.89 staff cost per test and both are in the transition period. Lab 5 shows £3.87 at the operation stage of transformation. In addition, we have measured the productivity indicator (LPI) Lab 1 at 12,376, Lab 3 at 9,289, Lab 4 at 8,311 and Lab 5 at 13,392 and Workload versus the staff cost is shown in the bottom of Fig.3 again Lab 1 shows the most staff cost efficient laboratory.

The qualitative work was completed through 19 semi-structured, 4 unstructured and 4 group interviews, using thematic analysis. The participants responses were coded from questions designed to reflect on their experiences for the whole transformation journey as shown in Fig.4.

The merging key codes were:
1) Staff Related Challenges and Experiences.
2) The Impact of Technology and Innovation on the Transformation of the laboratory service.
3) Qualitative evaluation of patient and organisational benefits due to transformation.

Quality staff expected to see laboratories post automation transformation had reduced staff costs per test, and quality improvements to the diagnostic process. Workforce skill mix staffing possible and absorption of more work without increasing laboratory footprint.

DISCUSSION

When we look at the data beyond the quantitative metrics it is important to consider some findings and observations. We must note that it is fortunate to have a number of labs in the organisation that are at various stages of the transformation process as its allows us to compare the data so that we understand the transformation journey. A transformation model, Fig.5 was constructed as part of this research and a set of recommendations to be published in terms of staffing, preparedness pre-implementation. Staff have gone through a challenging experience especially at the implementation and transition stages. Feeling unsure about their belief that the automation will make them redundant, and it took time to get used to the new environment. I believe many of the negative impacts on staff morale could have been avoided if there were procedures in place to prepare the staff and management to undertake the task. Simply there was not enough time to learn a new skill set to implement and ‘do the day job’. Changing the layout of labs in order to receive the new equipment and work within a different space was unpleasant. The positive outcome is that they have managed the transformation reasonably well and the majority of staff now accept it. It is expected some will resist change but the move to automation to cope with the increase of workload from consolidation or service demands seems to be inevitable.

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CONCLUSION

- To implement the automation does not improve the service alone, you have to change the process so that you can take full advantages of the robotics, it won’t be efficient.
- To prepare and familiarise the staff and management in advance of the transformation as much as possible.
- There is always many stakeholders in such a transformation model in the healthcare environment. Staff, Management and Patient, they have different interests in the outcome of the implementation.
- We are continuing to deal with complex human relationships when introducing automated technology. The lessons learnt from such a complex automation implementation will cover the human factors as a vital component in terms of skills required to run the new N-tech environment.
- We find that initial performance gradually dips in the first stage of the transition period and requires more investment in staff, and no saving. Gradually the performance will improve towards the post automation stage Fig. 6.

The outcome of this research is to produce a transformation model and set of recommendations, this will be valuable not just to my organisation but the wider Pathology community. It is clear appropriate investment prior to and during implementation is necessary to improve staff experience and service performance.

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REFERENCES