

Future-proofing pathology services: use of automation and Lean practices

Recently, Aberdeen Royal Infirmary biochemistry laboratory entered into a managed service contract partnership with Siemens Healthcare Diagnostics in order to meet current and future service needs. This is a story of exceeded expectations.

Like many laboratories around the UK, the biochemistry department at Aberdeen Royal Infirmary, part of NHS Grampian, is facing an increase in sample workload. It also anticipates that these levels will continue to grow while it faces resource shortages due to the retirement of experienced biomedical scientists. In a quest to meet these challenges head on, the department looked to future-proof its service by the use of scalable track-linked analysers and Lean processes embedded into the culture of the laboratory.

Meeting service needs, now and in the future

NHS Grampian serves a population of over 500,000 people and covers 3000 square miles of city, town, village and rural communities. The biochemistry department, based at the Aberdeen Royal Infirmary (ARI) teaching hospital site, analyses 3500 patient samples per day originating from the ARI, other city hospitals and 92 GP practices.

Globally, Aberdeen was one of the first adopters of ADVIA automation, installing a first-generation ADVIA WorkCell solution in 2001. However, even with a high-throughput system, the pressure associated with the rapid processing of a huge afternoon influx of samples from primary care could, at times, be challenging.

With a procurement process in 2007/2008, NHS Grampian conducted detailed evaluations of competitor systems to select a partner that would deliver a sustainable laboratory service to the wider Grampian population, fit for today and for the future.

The Aberdeen procurement sought to refine its progress to date and continue on its path to address key issues common to laboratory services throughout the UK. These included:



Automation in biochemistry has increased quality and service delivery

‘Improving the quality of the service is also achieved through the additional time available for staff training and personal development’

- ensuring fast turnaround times for in-patient requests in the face of increasing workload, to help drive improved patient care
- delivering results on increasing workloads while maintaining cost efficiency
- delivering same-day results to GPs to facilitate improvements in the patient-care pathway
- addressing gaps in recruitment and managing the attrition of skilled staff through retirement
- providing career progression pathways to laboratory staff
- delivering a predictable and consistent service when staff resources fluctuate
- providing a calm working environment in which people want to work, to aid staff retention
- effective resource utilisation (staff, financial information and real estate) to maximise the return on investment,
- evolving accreditation requirements to ensure that service quality is maintained
- continued clinical service development within the confines of existing resources.

Siemens was selected for a long-term Managed Pathology Services (MPS) contract, which included an ADVIA LabCell automation system. The ADVIA LabCell configuration in the biochemistry laboratory connects a combination of high-throughput chemistry systems, the ADVIA Centaur XP and ADVIA 2400 and 1800 systems, and an IMMULITE 2000 immunoassay system for esoteric testing needs.

Flexible solutions fit for purpose, now and in the future

Future-proofing the technology selection during the lifespan of the MPS agreement was a priority. Jim Allison, consultant clinical scientist for biochemistry at Aberdeen Royal Infirmary, explains: “You can’t guarantee that a model that is fit for purpose in year one will still be fit for purpose in seven or eight years time, but our MPS provides flexibility for future developments. Suppliers will always have new technologies, methods and tests. The ethos needs to be a quest for continuous service improvement, and a flexible approach reacting to changes and seeking new innovations to deliver efficiencies is required – you can’t rest on your laurels, it’s a continuous thing.”

Procuring the benefits of automation

Clearly defined objectives were communicated to suppliers during the procurement process. Due diligence and proof of concept were a prerequisite and were instrumental in ensuring the solution chosen met with both laboratory management and staff expectations.

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Jim Allison and his biochemistry team were made aware that the new automation solution from Siemens provided them with the analytical horsepower and efficiencies required in the pre-analytical and analytical phases. The ADVIA LabCell and Siemens analytical instruments had the capacity to deliver the trust’s objectives and provided the foundation for enhancing processes to improve turnaround times and decrease hands-on time.

During the tender process, simulation modelling was performed to provide proof that the analytical engines would deliver on all analytical and process criteria. However, in order to achieve maximum benefit and return on investment with the new system, significant changes to existing procedures and processes accompanied by commitment to Lean and Six Sigma practice were required. The combination of efficient sample accessioning in sample reception, implementation of Lean processes and increased analytical capacity has provided substantial improvements in service delivery and staff satisfaction levels.

“Now that we have consolidated the department on fewer platforms and automated the pre-analytical process, it has relieved the pressure on our staff. Turnaround times have not only been significantly improved, we have saved 15 working hours every day by taking staff away from offline centrifugation. This provides more time for other quality related matters such as service improvement initiatives and greater interaction with our users,” states Jim Allison.

Furthermore, he continues: “Before the automation redesign, we had never been able to review our processes and procedures – we simply didn’t have the time. We were so busy that no one could lift their heads up to look at how processes could be improved or to address any quality issues.”

Practical approach to change management

As staff in the department were about to face significant workplace



Jim Allison, consultant clinical scientist in biochemistry



Biomedical scientist Elaine Jovanic

changes, Jim Allison and his management team involved medical laboratory assistants (MLAs) in Lean training so that they could learn new skills and understand the reasons behind the changes. Post-implementation, Lean training from Siemens complemented the department's in-house training to get the skill base fully up to speed on the new operating procedures.

"It's much more difficult for senior management to recognise the need for particular process changes and appreciate their impact on managing workload. It can't be a top down thing; it is better that people at the actual interface are involved at an early stage to help amend the processes," states Jim Allison.

Maintaining uninterrupted service

The actual implementation stages of the track and new analysers can be a difficult time for staff because of the disruption caused. Jim Allison states: "The project management experience that Siemens brought in was very helpful during this stage. We staggered the work in the main area by splitting two-thirds of the room off, and refurbished that area first. During this time we didn't have a track or sample managers so we had to frontload all the analysers. This was a very intense six weeks for staff.

"We asked everyone in the department for input on how best to manage this time and a lot of the ideas were generated by staff members themselves. For example, the system

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knows where a sample is on the track at any point in time and knows where to send them next. When we were frontloading the analysers during the implementation period and they were being handled manually, we needed a robust system in place to avoid mix ups. The team came up with a colour-code system and this made things run very smoothly."

He continues: "In advance, we notified all our users and explained the situation, stating that there may be some increased turnaround times and possibly delays. Actually, there were no significant problems and there was no noticeable difference in the service – this was a good reward for the team efforts."

Multiskilled support staff facilitates service delivery

Cross training to enable multitasking was considered vital. Staff previously tasked only with data entry were trained on handling samples and making decisions on sample acceptance criteria, while MLAs got up to speed with keyboard skills for data entry. By cross training staff, the department felt it was not subject to the same detrimental and often unexpected impact of staff shortages that had been experienced previously.

Jim Allison states: "Before our redesign, absence of data-entry staff would create huge bottlenecks in our processing of the workload. Now, everyone can cover for absences so we



Ian Rothnie, laboratory manager

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AT A GLANCE:

ABERDEEN ROYAL INFIRMARY BIOCHEMISTRY DEPARTMENT

- increased quality and service delivery
- improving turnaround times with the capacity to process samples received from GP practices on the same day (60% of total workload) while maintaining in-patient turnaround times
- simplified testing and reduction in hands-on time by reducing workstations from six to four
- improved efficiency and impact of resource shortfall through a multiskilled workforce
- freeing MLA staff time by saving 15 working hours every day through the automation of pre-analytical processes
- commitment to continual improvement through Lean and Six Sigma.

‘Interaction between the laboratory and clinicians is vital for the effective diagnosis needed for world-class patient care’

don't suffer to the same extent and are able to keep the sample receipt process running smoothly. We can't escape the nationwide retirement trend of biomedical scientists and the barriers to finding new and experienced replacements. However, our workflow redesign and the multitasking of staff roles within the laboratory means that we can cope better during the long hiatus between losing staff, advertising the post and getting a trainee in to reach registration level."

He continues: "The most noticeable thing about the ADVIA LabCell automation system we now have is that its sheer analytical power helps us cope with unexpected events, such as staff vacancies and unscheduled maintenance or breakdowns, enabling us to recover from these events much more quickly."

Increased capacity and less chaos

The redesign of processes within the department and the workforce role reprofiling has also led to a much more tranquil laboratory atmosphere and an increased sample capacity.

Jim Allison states: "Before, the

laboratory ran at or near full capacity, analysing 450 core chemistry specimens per hour and 450 immunoassay samples per hour. Now, the capacity for core chemistry has doubled and immunoassay sample testing has increased to 650 samples per hour. This means that few samples are carried over each day and that the workflow is ready for anticipated increases over the next five years."

Continually improving diagnostic service

Quality in the laboratory is always an important issue. Beyond the anticipated benefits are the softer aspects of return on investment. This includes time for staff to focus on quality related issues. The interaction between the laboratory and clinicians is a vital component for the effective diagnosis needed for world-class patient care.

"The process efficiencies have translated into more time for staff to do other quality related issues and help the service continually improve. Quality has become a very important issue in laboratories, so improving comments on reports and having more time to liaise

with clinicians is part of expanding the scope of work and enhancing the quality we provide," states Jim Allison.

Improving the quality of the service is also achieved through the additional time available for staff training and personal development. Overall, these factors have helped to maintain an ethos of continuous service improvement within the biochemistry department and to generate a feel-good factor.

Working in partnership

Aberdeen Royal Infirmary has demonstrated its partnership approach in achieving outcomes. By entering a partnership with Siemens and embracing process advancements through revised automation and commitment to Lean and Six Sigma, it has embedded a culture of processes improvement that will future-proof its service.

By encouraging partnership within the department, all levels of staff are working to the same aims and jointly are generating success. "In times of change, you can't just dictate from the top down – it needs to be a team effort to achieve departmental success and gain the best from your workforce," states Jim Allison.

He concludes: "Overall, the automation redesign has exceeded expectations. The relationship with Siemens enables workforce reprofiling, gives us faster turnaround times, on-site engineering support and the analytical horsepower to achieve our objectives. In the true spirit of Lean we are also in great shape to adopt future innovation and process improvements to meet the evolving diagnostic needs of the community."

SIEMENS HEALTHCARE DIAGNOSTICS: AN OVERVIEW

Siemens Healthcare Diagnostics is the largest clinical diagnostics company in the world, serving a critical role in the healthcare continuum. It offers products and services designed for efficient delivery of patient test results used for diagnosing medical conditions, monitoring patient therapy and providing quality healthcare.

Built on a rich history of innovation from Diagnostic Products Corporation, Bayer HealthCare Diagnostics and Dade Behring, it offers comprehensive solutions designed to improve clinical outcomes, streamline workflow and enhance the operational efficiency of clinical laboratories. In the UK, Siemens is the market leader in the provision of Managed Pathology Services as well as other value-added programmes targeting business process efficiency.

Siemens' broad portfolio of innovative products includes a variety of diagnostic systems – integrated chemistry, immunoassay, routine chemistry, automation, haematology, microbiology, diabetes, urinalysis, blood gas monitoring and molecular testing.

Siemens' Global Compliance Programme ensures its employees conduct business with the utmost integrity and in strict adherence to the laws and regulations of every place they operate, regardless of the business outcome.

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