IT Solutions Focus

MODERNISING LABORATORY SERVICES
- THE NEED FOR IT AND HARDWARE INTEGRATION

Tony Tarpey

The Wirral Hospital NHS Trust (WHT) in the northwest of the UK is a busy district general hospital that has one of the country's most advanced IT hospital environments. Pathology is a prime example where the increasing demand for diagnostic testing within current resources has led to the co-development with Olympus of the dataWizard Instrument Management software system. Last year the laboratories at Wirral Hospital processed 1,873,356 laboratory tests

This article looks at the experience of the Department of Clinical Biochemistry at Wirral Hospital as they have sought to modernise laboratory equipment and integrate the new software system. The initial objectives were not only to improve pathology management and quality assurance, but also importantly to ensure a seamless fit into the overall e-health environment of the Trust.

> **WHEN INTEGRATING FAST HIGH CAPACITY ANALYSER PLATFORMS, THERE IS A NEED FOR AN IT SOLUTION THAT IS HIGHLY CONFIGURABLE AND CAN COPE WITH THE SPEED OF RESPONSE REQUIRED TO OPERATE ROBOTICS. THERE WAS NO SINGLE OFF THE SHELF SOLUTION.**

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Rising pathology testing workloads of 10-15% per annum and the increasing need to ensure the hospital is able to meet government targets such as the 4-hour A&E target, have driven the Wirral to develop flexible laboratory services capable of meeting the current and future requirements of the National Health Service (NHS). According to Tony Tarpey, (Service Manager for Biochemistry and Laboratory Information Systems) predicting future demand is a difficult task. "Because of their undoubted clinical utility, some new tests create unavoidable increases in demand - witness the massive growth of urinary albumin testing which we have managed to accommodate as a result of the changes to diabetes management brought about by the National Service Framework for Diabetes (NSFs). Other NSF's for Coronary Heart Disease and Renal Disease have also increased the demand and variety of tests requested as have changes to the delivery of cancer care. All laboratories are being challenged to deliver increased service within current budgets. We have to play our part in ensuring that Wirral Hospital provides excellent patient care by, for example, ensuring that waiting for test results does not delay the treatment, transfer or discharge of patients. The key to our success to date has been intelligently matching supply with demand. This has required widespread and flexible implementation of the best equipment and ensuring that electronic data management provides support to the staff managing the service on a day to day basis and provides information to managers responsible for the service. Wirral Hospital has had more than 15 years experience of electronic requesting and reporting within the hospital and are currently rolling out a remote request system for General Practitioners (GPs). This has been developed by Wirral Health Informatics Service (WHIS) and is seen
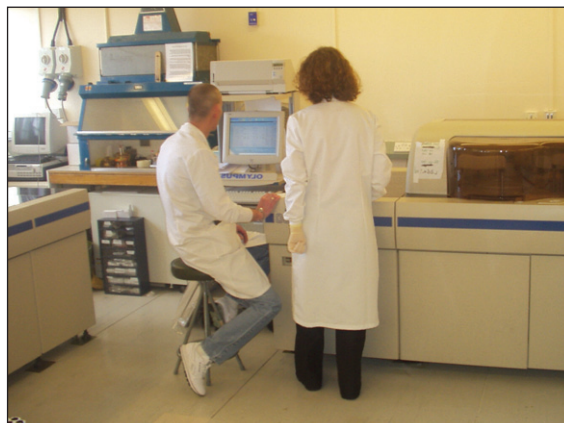

Figure 1. Olympus AU chemistry analysers are used to provide a robust 24/7 testing platform in the Wirral laboratory

Figure 2. Centrifugation is performed separately since built-in centrifugation was felt to be a limiting step in creating a high volume test system

as a way of adding value to the already excellent service provided to Primary Care. Using the system GPs are then able to follow the progress of their test requests on-line and set up a full audit trail. The other major breakthrough we feel we have made with this system is that it simultaneously records requests onto the Hospital Information System (HIS) thus enabling more efficient management if patients have to be hospitalised or visit the out-patient department. Currently we are aware that much duplication requesting takes place and by making results available to the whole Wirral Health community we hope to reduce this unnecessary activity. Reducing duplication of investigations has huge benefits for patients as it requires less attendance at phlebotomy clinics and benefits the hospital by removing the cost of these repeat investigations.

We estimate this could amount to 20-30% of testing that is duplicated because the reports are not available to the appropriate doctor when dealing with a patient. We see our role as not just selling a commodity, a test or report, but providing knowledge that is invaluable to all healthcare providers and the people of Wirral. There is a lot of clinical and professional expertise that underpins the services the laboratory provides and these are not always recognised by those using our service.

Within the hospital, we are also looking to improve our services in order to meet the challenges from other departments. The way in which healthcare is being provided is changing rapidly and it is essential that we can respond and support clinicians. We are making requesting relevant investigations simpler and in electronic form, irrespective of who and where the request is made and contributing to standardised protocols and personal order sets in order to ensure best clinical practice. Tony has a

Figure 3. Pre- and post-analytical stages are automated using the OLA2500, which sorts sample tubes according to test requests and decaps and aliquots as required

Figure 4. Colour cap identification is combined with barcoding for both efficient processing and security reasons

Figure 5. Arrowe Park Hospital is one of the UK's leading implementers of healthcare IT solutions

Figure 6. It is vital that the dataWizard software was intuitive for all staff to use.

Figure 7. The features enabled a full audit trail to be put in motion.

unique role having responsibility for both Biochemistry services and Laboratory Information services. "When modernising services in the laboratory we have to ensure that we are able to deliver a workflow that will deliver capacity and flexibility. Laboratory Information Systems find it difficult to provide interfaces that are able to interface effectively with multiple automated and robotic platforms and still have the ability to change the configuration rapidly and cost effectively.

In the Wirral's case a further consideration when implementing a data management solution is the department's strategy to select "best of breed" analysers to the departments wide repertoire of tests rather than rely on a single supplier and the inevitable compromises that would require.

Thus at the same time "customer" demand was being reviewed, the actual pathology testing platform was given a rigorous investigation to ensure it could deliver a robust high capacity 24/7 service. For the main chemistry testing the decision was taken to purchase a bigger Olympus AU5400, an Olympus AU 2700 and an Olympus OLA2500 automated station for pre- and post-analytical phase was also installed. Systems with built-in centrifugation were rejected as it was felt that this would be a limiting step in creating a high volume testing set-up and would be difficult to reconfigure if required at a later date. Due to the best of breed policy, there was also a need to interface with other third party immunoassay and specialist analyser systems and another Olympus 640 at a remote laboratory site.

This presented no problems for the OLA which could run with all the analysers, but looking at control software there was initially a major problem if true high throughput was to be achieved.

"We already had a lot of experience integrating chemistry and haematology testing, but our existing LIS just could not cope with the potential speed of the new set up. Nor did there seem to be an off the shelf solution. Having regarded Olympus as a hardware supplier, we were then delighted when Olympus developed the dataWizard software products. It appeared to meet our three key criteria. Firstly, it offered the major benefit of built-in interfaces for other analysers enabling the mixed platform to be maintained. Secondly, it had the power to handle the speed of the new automation platform. Thirdly, dataWizard's features enable full audit trails to be set in motion, thus helping us meet increasingly stringent reporting requirements required for instance for accreditation."

So Wirral then embarked on a co-development project for dataWizard with Tony Tarpey taking the Wirral lead. Since his actual role is shared between Clinical Biochemistry and LIS as part of Wirral Health Information Systems (WHIS), Tony was in an ideal position to see both sides of the challenge. His starting point was to be able to have phased introduction of the new set-up since he couldn't afford any disruption to existing services during commissioning of the new analytical arrangements.

"It was also vital that dataWizard was intuitive for staff to use and that it fulfilled the same exacting standards that applied throughout the Trust – too often laboratory software systems have been developed in isolation. We were determined to make no allowances for dataWizard and ensure it met our exact demands. This involved a lot of hard work, but the program has proved adaptable and is already proving its value."

Following installation the system now manages test processing 24/7 from sample reception to archiving and reporting across the pathology laboratory's high throughput clinical chemistry and immunochemistry testing platforms. It has also been extended to accept requests from Wirral's satellite facility at the Clatterbridge Centre for Oncology.

Tony concludes "In summary, Olympus dataWizard has provided us with an effective interface between a rock solid analyser platform and e-hospital environment. This has enabled Wirral to face the constantly evolving demands and challenges of not only pathology IT, but also Trust and NHS IT and still maintain a high quality 24/7 service both within the hospital and to GPs.

We have also been able to avoid being forced down the single supplier route and retain our cherished flexibility of choice over testing platforms. We continue to be closely involved in new developments and hope that dataWizard will continue to develop and support staff in the laboratory. An exciting development that we are currently discussing with Olympus is using this software to allow integration between different LIS systems."