University Hospital Ulm
Ulm, Germany

Prof. Dr. Dr. Dr. h.c. Max G. Bachem, Director
Kerstin Stöhrer, Technical Supervisor
The University Hospital Ulm was founded in 1982. In 30 years it has built an enviable reputation for delivering consistently high standards of medical care to 46,000 in-patients from across Baden-Wuerttemberg and Bavaria every year – in addition to almost 224,200 out-patients. Initially the hospital had three separate laboratories in an Internal Medicine Clinic, a Surgery Clinic and a Paediatric Hospital. All of these provided basic tests in hematology, hemostaseology and clinical chemistry using a large variety of analytical systems. The first step of reshaping has been a strong consolidation on Roche’s cobas® 6000 analyzer series in all three laboratories. Any specialized testing was conducted in the Internal Medicine Clinic. With the opening of a new Surgery/Dermatology Building connected to the Internal Medicine Clinic, the decision was taken to close the existing Surgery Clinic and undertake all analytics at a central laboratory in the Internal Medicine Clinic.
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- Central laboratory
- 1,250 beds
- 2.8 Mio results per year
The University Hospital Ulm offers a wide range of services covering patient care, teaching and research. Following a period of consolidation, the workload in their main laboratory more than doubled from 3,000 to almost 8,000 reported results per day. With such a significant increase in volume, the laboratory team decided they had to invest in new automation if they were to continue to achieve turnaround time (TAT) targets. As a result, they turned to Roche’s cobas® 8000 analyzer series connected to MODULAR® PRE-ANALYTICS in combination with a Roche PVT cobas p 612 system. This intelligent solution combines processing speed with high quality and accuracy of results and, due to the family concept, the same value level.

As Prof. Bachem, Medical Director, explains, this placed real focus on efficiency and required a new approach:

“The only way we were going to be able to process the increased volume of samples within our central laboratory – and meet our economic objectives – was through increased automation. This meant upgrading our existing cobas® 6000 analyzers, which didn’t have the capacity to deliver results within our stated turnaround times.”

The upgrade to the cobas® 8000 analyzer series was seamless, as Roche worked closely with the University Hospital Ulm to ensure minimum disruption to routine services. Prof. Bachem explains:

“Roche carried out an exceptional job during implementation, with no interruption whatsoever to our daily workload. In fact, if I had to put it in medical terms, I would say the implementation was like surgery on a beating heart.”

Reshaping laboratory services
“With a significant increase in volume, the laboratory team decided they had to invest in new automation if they were to continue to achieve turnaround time targets.”
An intelligent and powerful solution

The cobas® 8000 analyzer series is the latest member of the Roche cobas® modular platform family. It has been designed for high workload laboratories and can cover a throughput range of 3 -15 million tests per year.

One cobas® 8000 analyzer series configuration consists of up to four analytical modules, and is built with a core unit, an optional ISE unit (cobas® ISE module), a high throughput clinical chemistry module (cobas c 702 module), a mid volume throughput clinical chemistry module (cobas c 502 module) and the immunoassay module (cobas e 602 module).

Combinations of those modules offer more than 50 configurations that enable a laboratory to tailor solutions to their specific needs.

In the case of the University Hospital Ulm, this means that the main laboratory is able to generate 8,000 results from 2,220 samples during a normal weekday. 61% of this analysis is routine 38% are STAT samples (with a required turnaround time < 60 minutes) and up to 15 of the samples will be extremely urgent (critical to life with a required turnaround time < 30 minutes).
“Combination of cobas® 8000 modules offer more than 50 configurations that enable a laboratory to tailor solutions to their specific needs.”
Prior to the introduction of the cobas® platform, the laboratory’s wide range of testing would have slowed the rate of sample processing. However, the cobas® 8000 analyzer series allows the team to combine exceptional efficiency with consistently high quality of results.

cobas® 8000 offers high-speed throughput ranging from 170 tests per hour up to 8,400 tests per hour. Two sample probes and four reagent probes ensure fast sample and reagent pipetting that results in significantly improved overall sample availability.

Intelligent sample routing in the Roche 5-position-Rack – with fast transportation and return lines – means that samples always find the fastest way out, via shortcuts that are supported by special switch gates in each module. Crucially for the team at the University Hospital Ulm, this also means that emergency tests can be seamlessly integrated to improve sample turnaround times.

This is all backed up by cobas® e-services, which offer automated reagent, calibrator and control downloads.

Quality and safety are of paramount importance too. Contact-free ultrasonic mixing and disposable tips help to minimize the potential for carryover and reduce water consumption. In addition, Roche’s unique reagent cassettes combine simplicity with Hitachi reliability to ensure genuine confidence in results.
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Automated from the very beginning

At the same time as upgrading processing power, Prof. Bachem and the team also wanted to improve sample management. For this reason, they decided to take advantage of the flexibility of the cobas® platform and integrate the MODULAR® PRE-ANALYTICS EVO (MPA) system. Prof. Bachem explains:

“We had always completed all pre-analytical steps manually - including scanning incoming samples, decapping, aliquotting, distribution and transport to the analyzers. However, this was very time intensive and could often lead to quality issues.”

With the MPA system in place, all pre-analytical steps (including transportation to connected analyzers) are now automated. It means everything works smoothly with a lower risk of infection or sample contamination due to human error. The MPA system is a true workhorse too, capable of handling up to 400 primary samples (and 800 aliquots) per hour. As a result it has more than enough capacity to cope during the laboratory’s peak times between 9 and 10 am when 420 samples arrive through the doors.

With such an increase in the pre-analytical workload, Prof. Bachem and his team decided to install a cobas p 471/612 combination in a room next to the cobas® 8000 analyzer series as single point of entry to manage the total workload including Coagulation, Hematology and special diagnostics etc. The cobas p 471/612 is situated next to the pneumatic delivery system hub, which delivers patient samples/tubes from all over the hospital. Samples can be easily transferred onto the pre-analytics which means they do not have to be carried through the entire laboratory. Then, once the samples have been processed and results obtained, the cobas p 612 completes the final sorting of all samples into dedicated archive racks.
“Because the team is no longer occupied with manual tasks they can turn their attention to more important duties. This includes supervising and controlling the system, checking any problematic tests and communicating critical results.”
While the senior laboratory team understood the benefits of automation from the outset, some employees were not so sure. Kerstin Stöhrer, Laboratory Chief Technician, explains:

“Initially our technicians were worried that the introduction of these powerful analyzers would mean that their jobs would become obsolete. However, once the new system was in place, they quickly understood the importance of automation and learned to turn the situation to their advantage.”

“We’ve also been able to transfer five of our technicians to expanding areas of the hospital like molecular genetics, LC-MS, autoimmune diagnostics and specialized coagulation testing.”

According to Prof. Bachem, these benefits are being felt right across the hospital: “Our technicians have real confidence in the quality of the analyzers we are using. They know that we can manage a 24-hour workload with only two people (in shifts) - ensuring that our test menu of about 80 chemistry analytes and almost 50 immunologic analytes is available at all times.

The team has been able to reduce the number of analytical systems they use from 24 to 15 which has also allowed them to streamline their training process. In addition they have been able to reduce the number of Full-Time Equivalents (FTEs) required to manage the routine workload. Today they can run the routine area with only two FTEs 24 hours a day, seven days a week.

This all results in a more relaxed – and productive – working atmosphere and has reminded technicians about the important role they play within the hospital. Miss. Stöhrer continues:

“Because the team is no longer occupied with manual tasks, like carrying samples around the laboratory or trying to locate individual tubes, they can turn their attention to more important duties. This includes supervising and controlling the systems, checking any problematic tests and communicating critical results. They can also focus on finalizing and releasing test reports which is of real benefit for our clinicians.”
“Once samples have been processed and results obtained, the cobas p 612 completes the final sorting of all samples into dedicated archive racks.”
While it has been able to enhance its traditional services, the University Hospital Ulm has also started working more closely with pharmaceutical companies, processing samples for various clinical studies. There are currently over 200 ongoing studies and, in order to participate, the laboratory must meet very strict criteria.

Following the successful introduction of the cobas® 8000 analyzer series, they are confident that this is an area they can continue to build upon for future services.

In fact, as Prof. Bachem explains, the University Hospital Ulm is also 100% focused on further improving services for the local population:

“Every department within the hospital is being shaped with a view to shortening length of stay for our patients (which currently stands at 6.9 days on average) and reducing additional costs from delays of diagnosis and prolonged treatments.”

With a diagnostic platform that is guaranteed to deliver short turnaround times and high quality results, Prof. Bachem is confident that his team can deliver time and time again - ensuring the ongoing financial success and growing medical reputation of the clinic.
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