

# Landmark sterile services department

With the build enabled by business development funds from the city council and fitted out with leased equipment, the new and impressive sterile services department at Liverpool University Hospitals NHS Foundation Trust is an exemplar of best practice and marks both a career high and a swansong for one of its creators.

“I was happy to leave on a high,” says Lynn Brooks, now retired and previously Trust decontamination manager. Outlining the history and equipment selection process for the outstanding facility, Lynn said: “As part of the Merseyside Joint Venture, we were due to become an outsourced service for the Trust’s three hospitals – the Royal Liverpool University Hospital, Liverpool University Dental Hospital and Broadgreen Hospital.

“When the joint venture collapsed there was no provision for the service in the plans for the new Royal Liverpool University Hospital. We had to find a location, funding and select equipment.”

Lynn and Sandra Mallon, sterile services manager, spent a lot of time over a five-year period working with the architect, through numerous design stages seeking to optimise the layout and reduce manual handling as much as possible.

“All the time we were in limbo we were looking at different manufacturers’ equipment and visiting sterile services departments around the country, talking to the teams there and developing our ideas,” says Lynn. “By the time we were ready to go ahead we knew which suppliers and equipment we wanted.”

The Trust’s preference was to build its own department. Based on the costings Lynn and Sandra had done, the Trust looked at various options and applied for funding from the city council, who agreed to build the £6.3 million facility using business development funds. Through a leasing arrangement, the Trust procured £1.5 m worth of equipment, some of which has been tailor-made for the building due to its size.

“We had a project team and a finance team,” said Lynn. “The Trust’s project engineering manager was Peter Leadbetter. We were able to choose the equipment we wanted.”



Sandra Mallon explained: “We’d been through a lot of upheaval in the old department. Each time there’s an upgrade you look to make it better. For the new department, we worked closely with our manual handling team, the Trust’s AP and AE(D).

“We’d had issues in the past. The instrument racks are heavy. Some of the kit is heavy too. We took the staff’s health and safety and wellbeing into consideration.

“In the old department, we had six Dekomed washer-disinfectors. Staff liked the Dekos and we took their views on board. We haven’t had any issues with the machines; they do their job very reliably; they’re not overcomplicated and they’re compatible with many detergents. Also, with the Deko D32 Excels you don’t remove the carriage, just the shelf.

“We went through NHS Supply chain for all the equipment, which speeds up the procurement process. You know what the

price will be. We used a scoring system, looking at all the different manufacturers’ equipment.

We based our machine selection on reliability, ease of use, manual handling and service support to ensure minimum downtime. In the new facility we’ve eliminated about 80% of the manual handling. We also wanted onsite critical spares for simple solutions to support our engineers.”

## Choosing the equipment and locations

The chosen equipment is Veolia for the RO (reverse osmosis) system, Dekomed for the washer-disinfectors, Getinge for the trolley washers and LTE Scientific for the autoclaves, with an automatic loading system from Remeda, which was supplied and installed by LTE Scientific, and transport trolleys from H4 Medical.

Lynn comments: “We had a lot of workshops with our suppliers, looking at what was needed, before we put spade to ground.”

A number of locations were explored, including several at Broadgreen Hospital, where the chosen location was waste ground that was being used as a car park. It was ideally situated for local services – water, high voltage, etc. The decision to locate at Broadgreen was made in August 2017 and work began onsite in January 2018.

“The main contractor, Willmott Dixon, was chosen through a procurement process,” explains Lynn. “Their project manager, Matthew Littlewood took on board the intricacies of a sterile services department very early on. Matthew and his team were excellent – very proactive. When they advised us of any issues, they were already working on a solution.

“The service from Dekomed is great too. The new facility has ten Deko D32 Excels – eight new ones and the two youngest ▶

D32 Excels which we brought over from the old department. Some of the Dekomedes are electric, so if we have a problem with the steam supply, we can at least carry on washing the instruments. It gives us an element of contingency,” Lynn continues.

Aware that the team wanted to reduce manual handling as much as possible, LTE Scientific suggested the Remeda automatic loading system.

Sandra Mallon visited the Remeda factory in Sweden and some hospitals there, to see the system in operation. The system ticked all the boxes and was incorporated into the design.

“The site gave us some particular restraints,” explains Lynn. “The autoclave

solution was basically driven by the width of the building. We felt we would need five 28cu ft sterilisers, but ideally six for the workload. LTE Scientific were able to adapt the design of their machines to provide 42cu ft chambers, which gave us the required capacity.

“We did some work with LTE Scientific on the autoclave control panels and the main display system. They were able to build these to suit our requirements. As much as possible, we wanted to be paperless and to stop a non-sterile load being released. We completed the system by using NeQis monitoring. This gave us electronic, mechanical and operator confirmations of the cycles.



The ten Dekomed DEKO D32 Excel washer-disinfectors. The pass-through hatches can be replaced with further washer-disinfectors for future-proofing



Robbie Cormie (left), Trust decontamination manager; Sandra Mallon, sterile services manager; and Debbie Evans, quality manager

“There was no skimping on the design of the facilities, but we did not go overboard with the costs either.”

All the equipment suppliers provided schedules and the installation was completed on time. The whole project worked very efficiently.

“The RO system from Veolia has one of the longest ring mains for a sterile services department,” says Lynn. “The rooftop plant room for the RO and boilers has sound insulation. There’s also acoustic insulation around the loading bay so that we do not disturb nearby residents.

“The department has its own standby generator to allow us to keep operating in the event of a power failure. Before we were due to open, we did a full load test on the department and a black start. The generator carried the load.

“I moved to the new facility as it was nearing completion, in January 2019, while we were doing the commissioning and making final preparations.”

As preparations were gathering pace for the new department to become operational, sterile services at Royal Liverpool University Hospital were hit with a major problem. The RO plant became an issue and no spare parts were available.

“We were just finishing air balancing and the clinical clean at the Broadgreen facility, and IT were completing the connections,” says Lynn. “We had to start processing start away. But we had no racking for storage, no lockers for staff.”

A call for help went out to H4 Medical. “They dismantled and brought over their own warehouse racking and installed it in a couple of days. They also adapted some of the old racking from the Royal to help keep costs down.

“H4 Medical had designed the trolleys to our specification. They’re fully adaptable. You can adjust the shelves. The wheels were specified to suit the work that the trolleys do. Now H4 Medical come in and maintain them as well,” comments Lynn.

Still an active member of IDSc and chair of the North West Branch, Lynn added: “I’ve been in the NHS for 38 years and it’s the best scheme I’ve ever been involved in. It was hard work, but I was really pleased with it. Architects, builders, suppliers, equipment – you couldn’t have asked for more. Any teething problems were insignificant. It was all down to the cooperation of everybody working well together.”

### Logistics of the project

With the department next to housing, residents were involved at every stage of the project. This included letter drops, workshops and invitations to look around once completed, enabling residents to see for themselves the important work that takes



The Dekomed DEKO D32 Excels hold 20 Din trays

place. Some elements of the design, such as exterior lighting, were changed to minimise the impact on the community. Properties adjoining the facility have new fences and the area is better maintained than previously.

A specific restriction in the planning permission did not allow a vehicle to start after 10pm. This was overcome with the donation of an electric vehicle by Veolia. The department now has two vehicles to transport the instruments to and from the hospitals it supports.

A tour of the facility begins in the rooftop plantroom, which along with the boiler and steam generating equipment includes the Veolia RO system.

Veolia Water Technologies UK's OSIRIS reverse osmosis system uses the latest high efficiency RO technologies to provide biopure water to the current decontamination guidelines. Ideal for endoscopy and sterile service departments, the system produces water that is low in conductivity, bacteria and endotoxins to ensure optimum cleanliness for surgical instruments.

Skid-mounted for easy installation, it has automated disinfection and programmable alarms to monitor water quality and RO system performance. OSIRIS is designed to meet both the Health Technical Memorandum (HTM) 01-01: Decontamination of surgical instruments and HTM 01-06: Management and decontamination of flexible endoscopes.

On the ground floor, the receiving area has ten Franke Deko D32 Excel washer-disinfectors. Two were just six-years old, relocated from Royal Liverpool University Hospital, in addition to eight new machines.

"Four of the new machines are electric, giving the department the capacity to run these in the event of the loss of steam," says



The spacious receiving area



There are three Getinge trolley washers

sterile services manager, Sandra Mallon. "The cycle time for the steam washer-disinfectors is around 40 minutes and for the electric it's around 50. One of the machines is dedicated to low temperature use for the da Vinci SI. Instruments from the da Vinci XI can go through at any temperature. Anything else which requires low temperature we can support as a preference to hand washing."

The Deko D32s Excels hold 20 Din trays. The machines are designed and constructed to exceed the standard performance and design requirements stated in ISO/DIS 15883-1 Washer-disinfectors - Parts 1 and 2: and IEC 61010-2-45. They guarantee process results throughout with a Class C independent, full process verification recording system. Water pressure for

washing is via a high-powered circulation pump. Pipework and the number of loading shelves fitted with rotating spray arms are calculated to have the maximum soil removal efficacy. Washing spray patterns delivered through five rotating spray arms are purpose-designed racks to guarantee contact with all surfaces and crevices of instruments with the most intricate design.

The machines offer a selection of disinfection temperatures and cycle times to secure the microbial killing impact. The unit's touch screen technology displays a range of information throughout the cycle, together with service actions and routine checks. Cycles can be altered to meet almost any special requirement.

For future proofing, there is an allowance to increase capacity. The space for the ►

pass-through hatches can be converted to accommodate further washer-disinfectors.

Once the cycle is complete, the pass-through machine is unloaded into the Class 8 cleanroom, where the instruments are checked and wrapped ready for despatch to the sterilisers.

The department has three Getinge 9100 trolley washers. These have been validated to take stainless steel trolleys or a full load of containers and trays. They are also validated for instruments, providing a fallback in the event of any issues.

Outlining the autoclave installation and associated work, John Lees, managing director of LTE Scientific, comments: “We were approached to design a system for the new centre being planned at Broadgreen Hospital.

“There were some space limitations on site in that the available width for the steriliser installation would not have been enough to provide the necessary capacity. We worked with the architects to agree an increase in depth for the sterilisers. This meant that we could provide four 42cu ft sterilisers, which were effectively the equivalent of two 21ft3 chamber end-to-end, giving a total processing capacity of 168ft3 or nearly 5100 litres.

“In order to minimise staff intervention and maximise time efficiencies, we were also asked to provide a specific loading and unloading system for the installation. This comprised of a semi-automatic loading arrangement along with a fully automatic unloading system.

“For the semi-automatic loading system, the loading racks come from the packing room, through our transfer hatches, and onto transfer trolleys. The racks are then loaded onto fixed loading tables.

“When a cycle is started the door of the steriliser opens and the loading table automatically lifts the racks and transfers



The LTE Scientific 42cu ft sterilisers were sized to suit the width of the building

them into the chamber. The unloading side of the installation consists of a fully automatic unloader and eight double rack cooling stations.”

John adds: “At the end of the cycle, the built-in NeQis system compares the machine data to ensure a successful cycle and then releases the product. Once the operator acknowledges the product release, the automatic unloader travels to the relevant steriliser, unloads the racks and delivers to a free cooling station before returning to its rest/hold position. The cooled racks are then unloaded manually as required.

“I believe that the system has delivered the staff and time efficiencies it was designed to achieve. I also understand that the Trust has been very pleased with the cycle times – under

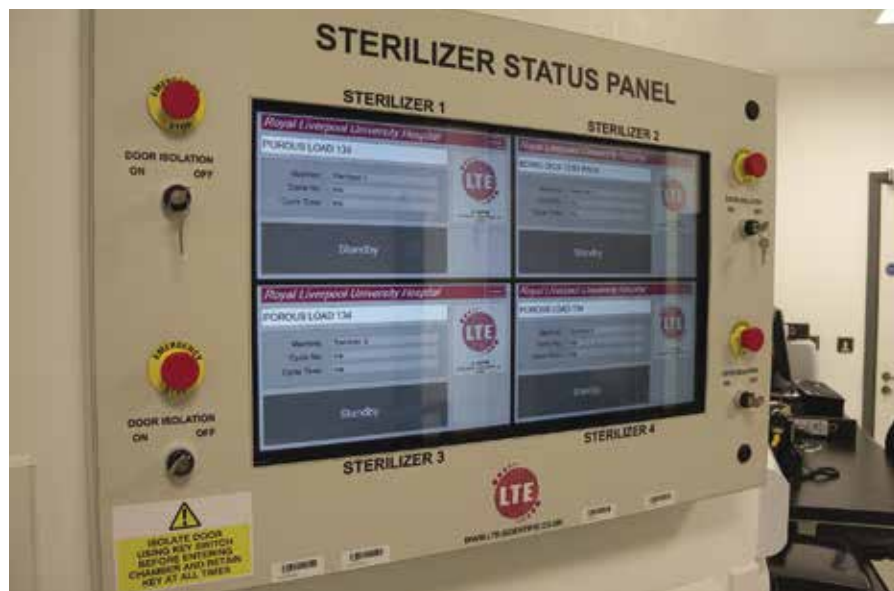
one hour including the extended drying.”

Heat labile instruments, such as da Vinci scopes, are processed in a Sterrad 100 NX, which was transferred from the old department. The machine is in regular operation as the Trust’s use of these instruments increases.

Sandra adds: “To ensure safe transport, everything is double bagged in see-through parcels, then heat sealed on one of our Astrapak’s.”

**Training and validation**

Two engineers, from local contractor Avrenim, are based within the department. Dean Haddassi and Aaron Rice completed their training with the equipment suppliers enabling them to handle regular maintenance



The main steriliser display panel



The Veolia RO system

and any troubleshooting that may arise.

Dekomed is responsible for the weekly, quarterly and annual validations of the washer-disinfectors for one year. Getinge handles the quarterly and annual validation of the trolley washers. LTE Scientific undertakes the quarterlies and annual validation of the autoclaves.

“We’re a complete, offsite service to the three hospitals,” explains Sandra. “The logistics, the amount of trolleys we had to purchase and move around, was all new to us. We purchased 65 ISO2s and ten ISO1s trolleys from H4 Medical.”

Mark Harris, managing director of H4 Medical, comments: “The trolleys are designed to support single location racking. This limits the chance of damage. When a tray comes out of the autoclave it’s placed onto the rack. The rack and tray go into the trolley. The trays sit individually. The trolley goes to the hospital and into the prep room, where it’s taken off the rack. So, the only time you touch the tray is when opening it in the prep room.

“We’d been working with the Trust’s supplies department for some time on a modular system steel trolley. The trolleys are multi-functional. The frame and rails can be removed and used as bulk carriers or you can fit a larger tray.

“We always walk the route the trolleys will take, to see what they have to go through. This ensures that the right wheels are fitted. The trolleys are secured within the vehicles. We delivered training, advising how to strap them.

“The trolleys are individually numbered. We undertake yearly maintenance and service, giving a report on individual trolleys.”

### The story so far

Bringing the story up to date, Sandra Mallon comments: “We’ve only had a few minor teething problems and a couple of user issues. It was just the equipment that was new to us.

“Staff numbers have remained the same. All the staff moved over to Broadgreen Hospital. We’re open 24/7 from Monday until 6pm on Saturday. Sundays are emergencies only. Our busy session starts at 5pm, once theatre lists have finished. Over 12 months we’ve processed 155,000 trays and 200,000 supplementaries from 26 theatres. There are 150 chairs at the Dental Hospital, so the volume from there is huge.”

Sandra adds: “All the suppliers have been very supportive. They’ve stuck with us and resolved any issues. Dekomed and their manager, Steve Townsend, are very approachable, always here when they say they will be. There’s never any delay.

“With the sterilisers being a new model, LTE Scientific were very keen. Their managing director, John Lees, and the



A processed load leaves a steriliser on the Remeda automatic unloading system



One of 75 purpose-built trolleys supplied by H4 Medical with single location racking

team were very hands on. They were here within an hour if there was an issue. The engineers who have been on site have been very good. Equally with Remeda.”

Dr Tony Kerry, the Trust’s AE(D), who worked very closely with the team and the suppliers throughout the scheme, comments:

“Despite the collapse of Carillion midway through the contract to build the new Royal Liverpool University Hospital, the

hospital management had the foresight to plan ahead and the consequence of that was the creation of a new state-of-the-art decontamination unit at the Broadgreen Hospital site to serve a number of hospitals in the area.

“The large spacious building is built to the current design standards with clean room technology where instrumentation is examined and prepared. The registration of the unit with a notified body completes the project and the unit now supplies a number of hospitals in the area.

“The project is a testament to the Trust who provided the capital and allowed the decontamination lead, sterile services manager, AE(D) and microbiologist to design a unit that will serve the community for years to come.”

Lynn’s successor as Trust decontamination lead, Robbie Cormie, said: “Lynn and I worked together for one month in a handover period. It’s all thanks to the dedication of Lynn and the team at Liverpool that enabled it to come to fruition.

“Here, we are in an NHS Trust which is investing by keeping its sterile services in house. Everybody involved in the project has done a fantastic job, without any shortcuts to get this department where it is.” **CSJ**

\*On 1st October 2019, Royal Liverpool and Broadgreen University Hospitals NHS Trust and Aintree University Hospital NHS Foundation Trust formally merged to create Liverpool University Hospitals NHS Foundation Trust.