Faced by an increased geographic catchment and changing patient profile, Southampton University Hospital’s Cardiology Unit were challenged to find solutions that would meet the immediate needs of the department and also “future-proof” their major investment in a new department. Southampton University Hospital is in the county of Hampshire, on the south coast of England. However, historically, this county was part of the larger region known as Wessex. As Dr Iain Simpson, Consultant Cardiologist and Clinical Services Director of the regional cardio-thoracic unit for Wessex points out, “This gives Southampton General’s Cardiology Department a catchment area of some 2.5 million people, although the congenital cardiac service works, on a supra region basis, extending offshore to the Channel Islands too”. Being the regional centre, there are aspects of cardiac speciality care, such as surgery, angioplasty, or percutaneous coronary interventions and congenital heart disease that the hospital covers, which have been devolved from other hospitals in the region. It follows on logically that, from the paediatric patients seen, there is an increase in adult congenital heart disease monitoring that is required, also as Linda Drummond, Clinical Echo specialist at the hospital highlights, “The fact that GPs can now refer patients directly to the Cardiology Department has seen the volume of echocardiograms we perform increase dramatically”.

“The number of patients and their varied profile, placed an obligation upon us as a hospital, to become one of only a few centres in the UK that deals with the cardiovascular issues from the foetus, right through to geriatrics” added Dr Simpson.

Despite having four Philips SONOS 5500s, plus three other machines, the regional demands compelled Southampton University Hospital’s Cardiology Department to look at additional and contemporary ultrasound acquisitions.

### Long-term Approach

Addressing the consequences of the life-long imaging for congenital cardiac patients in Wessex

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**UNIQUE advantage**

Because the image quality is better, the radiologist’s work is easier and faster too. This helps them keep up with the increased patient numbers. A large part of this has to do with UNIQUE – Philips-exclusive, uniform image-processing for both CR and DR.

“UNIQUE gives a much better image quality and consistent image impression,” says Dr. Zatteri.

Some young radiologists were not that impressed at first though. They thought the depth of contrast had suffered, but as they got used to the different appearance, they noticed the richness of details through the fine grey scale. A work station with the UNIQUE means they apply it to images from other sources, such as their mobile X-ray unit, too. “UNIQUE lets us see details that otherwise would be impossible to see, especially under extreme conditions,” he adds, listing suboptimal projections or exposure errors as the two cases that benefit most.

“Continuing to work with Philips has meant we could stay in touch with the past,” says Dr. Zatteri, because they can use UNIQUE also to process old images in the archive, for which they still have the raw data. Since UNIQUE delivers the same impression for CR and DR images, this is a significant benefit for their many oncology outpatients, where image comparison is very important to judge the effectiveness of cancer treatment. And with the advanced, digital X-ray solution from the people they trust, they have a solid foundation for the future, to achieve even better patient care.

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PCR is the most practical and cost-effective solution for special cases.
Building for the future

The pressures placed upon Southampton University Hospital's infrastructure by the volume of patients, has lead them to a development programme, manifesting itself in a new 52 million pound capital expansion, or the North Wing as it is known. This development was originally based around the needs of cardiac surgery and an angioplasty business case, although the building has taken shape, these needs have evolved to encompass all the current aspects of the existing cardiology unit, effectively doubling the new department's size. Once again Dr Simpson explains, "Originally, when the building was conceived, we were rather under-provided for in cardiac surgery for those people who had coronary artery disease, rather than other cardiological aspects. Although, both nationally and internationally, there has been a noted downturn in the need for cardiac surgery, we are now seeing that the growth in new development is in areas such as electrophysiology, stress-echo, contrast studies and 3D. "Historically, Philips has developed a reputation within the department for quality, robust and cutting-edge equipment. "You'll find that the basic imaging package, around which everything else revolves, is recognized by most cardiologists as being quality, so there was a natural tendency to gravitate towards Philips when we looked at new technology. Obviously we went to tender, as finance is a constant component of any purchasing and the Philips systems proved to be very good value for money, complying with our finance department's model for best value," stated Dr Simpson.

Redefining cardiological practises

Having taken delivery of their consignment of six iE33s throughout 2005, Southampton University Hospital's Cardiology team had time to reflect upon their purchasing decision and the impact their acquisitions have made, following immediate and extensive practical use. "Whilst it's always nice to have new technology, it's fundamental that the basics are well catered for: you need good imaging, good colour flow representation, good Doppler and the Philips systems have won us on these. For us though, the 3D echo is the big step forward. It comes back to what we are asking the biggest developing demand on our service, namely, congenital heart disease," asserted Dr Simpson.

Where 3D cardiac structures and functions are fundamental in diagnosis and monitoring changes, especially where someone has previously undergone surgery, the spatial complexity can be such that cardiologists need to see the actual structures, rather than make interpretational assumptions. On this topic Dr Simpson postulates, "Having worked in 2 dimensions, I can interpret in my mind what the 3D images would be. This technology however, takes mental visualisation experience and puts it in the public domain". He expands upon this issue further "Congenital disease can frequently leave spatial relationships distorted, so it's hard to conceive what's going on, especially when encountering a new, or post operative scenario".

For approximately 10 years Southampton University Hospital have worked with 3D reconstruction of images, "But if it takes 3 to 4 hours to construct an image, that in the end doesn't have the resolution of the initial 2D images, it's an interesting academic exercise, but of no practical use" said Dr Simpson, concluding with "The combination of high-resolution images in 3D, in real-time provided by the iE33, has just radically changed matters for the better".

Day to day operability

On the practicalities of using the iE33s, getting familiar with the new methodology requires training, learning how to cut the heart in the varied image planes, plus the user interface associated with image acquisition needs to be learned, for example, but system familiarity and clinical support speeds matters along. "Particularly when you are starting down the road with a new technology, support is essential. Philips Support Team provide impressive clinical support and can speak to very experienced echo people here at the hospital, at a similar level, which is important," confirmed Dr Simpson.

Whilst on the subject of usage, Southampton University Hospital had noticed that as patient profile's changed clinically, there was a mourned-change in the physical profile too, not all patients being ideal candidates for scanning, pointed out Linda Drummond. This also correlated with the frequency of repetitive stress and back injuries being reported by those performing the scans. Whilst it is too early to give a categorical statistic supporting improvement, the impression of the staff offered by Ms Drummond is that the ergonomics and multi-flexibility of the iE33 is making a significant difference in alleviating this annoying and painful problem.

To give some form of quantification Ms Drummond stated, "We perform between nineteen and twenty thousand scans here each year, a huge workload with relatively few staff. Some scans will be performed in less than ideal situations; patients we need to visit off site, patients in awkward positions, patients on beds. iE33's manoeuvrability and adjustable ergonomics enable scanning of even those who are less echogenic (not easily examined), to be performed relatively comfortably, for both sonographer and patient."

Southampton University Hospital's case is an ongoing story of development, refinement and achievement, but one where there is flexibility in the current solution to address the changing demands and profiles of the future…so, watch this space.