Imaging: A Tale of Two Cities

Healthcare in Britain is divided between the public and the private sector, just as there is rivalry between the North and the South of the country. However, when we looked at the imaging departments of two leading hospitals from either side of these divides, we found more similarities than differences.

Text: Dan Whitaker | Photos: Andrea Artz

GOSH's former chief radiographer Anna Guy with technicians Judith Humphries and Paul Xavier in the DSCT Control Room at GOSH in London.

In the North…

Didsbury was once a medieval village by the bank of the River Mersey. Now its redbrick Victorian villas offer comfortable residences for those working in Manchester – a city famous for its dominant football teams, swaggering pop stars, and a commercial drive that has led to the UK government calling it 'the Northern Powerhouse'.

Also here is Spire Manchester, the flagship facility of Britain's leading private hospital network, purpose-built only last year. Every element of its radiology and physiotherapy department was planned by a local man, Stephen Trimble. Signs of Trimble's local roots include a signed photo of Manchester United FC manager, José Mourinho, on his office wall. He can also remember when his own father used to play football in the fields where the hospital now stands, some years before Stephen set off to obtain his MSc in Advanced Practice (Clinical Radiographic Reporting) from the respected local University of Salford.

Lower doses the main thing

Now, surveying the busily humming department with deserved pride, Stephen's smile lights up most when showing visitors their SOMATOM Drive, the first Dual Source CT (DSCT) scanner of its type in the country, and still the only one in the region. "The main thing with CT imaging is the radiation dose," he explains, "and the minimal dose from the dual source scanner has meant three to four times as many referrals coming through compared to when we had our single source 16-slice machine before."

A coronal MPR and a VRT images show a whole body native scan for a 7-year-old girl who comes for an annual check on her rare genetic vascular calcification. A scan range of 1.355 mm was acquired in 14.7 s using tube voltage of 80 kV and radiation dose of 0.57 mGy.

Stephen Trimble at SPIRE's DSCT, which has increased referrals to the department by three to four times.

"Where once a CT scan would be followed up by an X-ray, multiple DSCT images make this unnecessary, and consultants and radiologists appreciate this," he says, meaning both the private referrals and the 30 percent of his patients who are referred across from the public sector National Health Service (NHS) under contract. Stephen and his staff also enjoy the machine's speed, another contributory factor to maximum daily throughput rising. He confirms that the resulting increase in revenue has easily outweighed initial purchase and higher service costs.

Expanding service to more patients

The new scanner is increasing Spire's range in two ways. Therapeutically, it means more musculoskeletal and neurological cases in addition to the cardiology cases that have been the mainstay. And the sources of patients are also broadening. Stephen mentions a seven-year-old girl that a local NHS hospital now sends to him for an annual check on her rare genetic vascular calcification. Another middle-aged man flies in from the Isle of Man for a cardiac scan and is able to fly back the same day – avoiding a longer, invasive cath lab procedure that he used to endure. Neither would have been patients before the DSCT scanner arrived.

...and in the South

While the young girl that Spire is helping is a rarity there, children are everything at another hospital some three hundred kilometers to the south. London's Great Ormond Street Hospital (GOSH) is the country's leading pediatric institution, itself a flagship of the NHS and possibly the health facility closest to the heart of the British public. GOSH is over 160 years old, a hospital Charles Dickens would have known, and with a tight city center footprint, radiology here takes place in an underground warren of corridors where the weight of the equipment does not challenge the more fragile floors higher up in the building.

If London has to endure the ignominy of losing in football to the smaller city to its north, it retains

Anna Guy, former chief radiographer at London's GOSH has focused on treating children throughout her career.

confidence in its stronger international links. GOSH's former chief radiographer, Anna Guy, is about to follow one of these, after 13 years of experience working across all imaging modalities in the NHS, to move to a post in Australia. Days before her departure, she sits and explains some of the differences when your patients are only a few years old: "For a start, any child under five will be what we call 'non-compliant', probably screaming and struggling – all perfectly understandable in an unknown situation with anxious parents, and all of the adults retreating behind a screen."

Designed for imaging children

Several features of GOSH's SOMATOM Force help especially with children. Its more precise images are no longer blurred by the inevitable crying. But those same unhappy convulsions are themselves lessened, due to soothing colored lights, which GOSH supplements with fish-tank wall, ceiling, and floor images, all of which react interactively to movement. "It's a great talking point, and when the kids see they can change it by waving, then they feel a vital bit of control over the process," Anna says. One of her team smilingly holds up one further ally in the battle for children's equilibrium – a stuffed toy turtle called Charlie.

The faster table speed is another advantage, especially when compared to the half hour combined with anesthetic that an MRI scan might require. Anna recounts that her team "cheered" the first time they saw how rapidly their new CT scanner moved. This is complemented by modulation, which can differentiate automatically between a 3 kg baby and a 9 kg one. Anna admits: "I was dubious about this ability, but it can and that can be very helpful".

Better clarity for smaller patients

Just like at Spire, at GOSH, too, the DSCT scanner's finer imaging has broadened the case mix, as slender blood vessels become more visible, even on neonates weighing less than a kilo, for example. The improved imaging is adding more lung pathologies and oncology cases to a patient roster that still remains more than half chest cases.

Anna tested image clarity herself by conducting a study of 600 chest patients, all weighing under 15 kg, half were scanned in 2016 with the new dual source device, and the other half in 2015 with the previous single source scanner. Without knowing the origin of each scan, two radiologists

rated the DSCT scans as around one point clearer on the accepted five-point clarity scale – equivalent to the difference between a 'poor/fair' and a 'good' image. This powerful evidence is now likely to be published.

Lower doses for little bodies

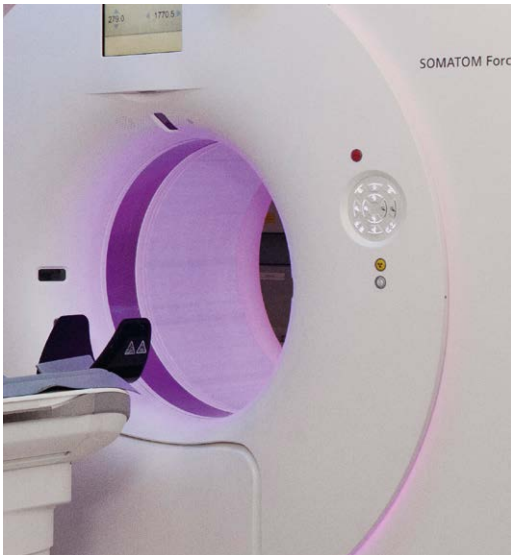
The avoidance of anesthetic can be important. Anna recalls one four-year old with severe pulmonary hypertension who needed a CT scan to plan surgery. "With this condition, children's risk of death from anesthetic rises significantly, so it is to be avoided whenever possible. Due to the SOMATOM Force's high-speed image acquisition, the scan was completed without the need for anesthetic, diagnosis was made, and surgery was successfully planned and carried out. The team were very happy with the resultant images and the CT scan was integral in making decisions about this child."

But overall what matters most at GOSH is the DSCT scanner's reduced radiation dose, often around half that of the previous scanner. "Children inherently have a longer lifetime risk from any radiation," Anna points out. This issue is an important one, not only for GOSH's 2,500 scans per year, with pediatric healthcare demand rising in many countries as fast as that from the elderly.

Despite all of the additional challenges, Anna Guy finds working with children as patients more rewarding. "They are more honest with their emotions, which doesn't make things easy, but when a child leaves the scanner room calmed and with a smile on their face, that is worth a lot." ●

Dan Whitaker is an independent journalist based in London.

The statements by Siemens Healthineers customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.



The Somotom Force at GOSH utilizes interactive lighting to keep it's smaller patients calm during scans.