'Making the invisible visible' at advanced digital hospital

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In September 2018, the new £200 m Chase Farm Hospital near Enfield opened to become what its operator, the Royal Free London NHS Foundation Trust, believes is the NHS's most advanced digital hospital. The process – from business case, to designed, built, and operational hospital in just four years – is believed to be unprecedented. One of the key elements of the new hospital's digital infrastructure is an Ascom digital patient call system which is already helping nurses and clinicians deliver better care and significant operational efficiencies. Fiona Morcom, the Trust's Clinical Implementation lead for the project, and Andy Dargue, IT Infrastructure Project manager, explain how a successful patient response system that works flexibly across all clinical areas was developed and implemented.

Nurse call systems with buzzers and lights have been around for years, usually managed by estates teams, but many are no longer fit for purpose. We needed something that would both change the way we worked and delivered care, and allow us to leverage the solution for other clinical and communication needs. The third floor of the new 23,000 m² Chase Farm Hospital features a 50-bed surgical ward, with 42 side rooms and two four-bedded bays. On the second floor are eight operating theatres and a day surgery unit, and at ground floor level, an Urgent Care Centre and busy radiology department. The new hospital's ground and first floors also house multiple outpatient clinics, some offering minor procedures, and the lower ground floor a busy endoscopy unit. The hospital's highly efficient, future-proofed design – with digital technology harnessed in many areas – is a real 'sea change' from the

cramped, outdated Victorian premises we moved over from at the end of summer 2018.

While in the 'old' Chase Farm most inpatients were in four-bedded bays, running a ward safely with most patients hidden from sight inside (single) rooms at the new hospital meant we needed a digital solution that would optimise our view. Our chief executive and director of Nursing, Natalie Forrest – who has an extensive nursing background herself, and is thus fully familiar with the practical challenges nurses face day to day – described the Ascom system as 'making the invisible, visible'. This was an apt description, because on initially viewing the long third floor corridor along which the 42 side rooms and two four-bedded bays are located, we had concerns over how nursing and clinical teams would be able to keep a proper eye on patients. Moving into the 21st century 'digital world'

also afforded us the opportunity to look at the wider potential role of a digital system – in improving both our flexibility and operational effectiveness.

A trawl of the market
We scoured the market for the most modern and advanced patient response call solution, and the supplier that offered us what we needed was Ascom, a rapidly growing digital communications provider. Ascom – with whose earlier nurse call equipment we had good experience at the 'old' Chase Farm Hospital – was keen to support our vision. Its team was equally committed to working closely with our lead and clinical teams to provide a tailored, fully integrated solution. As a result, we now have a highly sophisticated Ascom Telligence patient response system that directly connects patients with their nurse via the company's Myco 2 and Myco 3 smartphones, which the nurses and certain clinicians carry. The Myco 3 devices feature larger screens, and are thus better suited, for example, to viewing ward audits and patient vital signs data. The Ascom system also enables nurses, and, for example, doctors and consultants, to instantly connect with or summon colleagues from both within and outside the hospital.

Appointment of a clinical lead
The appointment of a clinical lead (Fiona Morcom) on the Trust side to interface with the clinical teams and the enablers – IT, Estates, and the solution provider – was a key step in enabling programme coordination, as well as an interface with the clinical teams to translate what was needed into what could be delivered. Early collaborative working meant that the team engaged in the project grew, so that traditional working boundaries were broken down. The Trust IT team had expanded considerably to support the

Pictured in front of the main entrance at the new Chase Farm Hospital are (left to right): Fiona Morcom, James Webb, Susan Lau, Natalie Forrest, and Mark Bateman.

The Ascom view

Ascom says of the project: "The new Chase Farm Hospital has a range of interoperable technology built in 'from the ground up' in its third-floor 50-bedded surgical ward. The new hospital also has eight theatres, day surgery, endoscopy, clinics, and an urgent care centre across five floors. The global Healthcare Information and Management Systems Society (HIMSS) recently assessed CFH as having achieved stage 6 in the Electronic Medical Record Adoption Model (EMRAM), one of just three hospitals in the UK to reach this level of 'paperless' maturity. The model has just eight stages, from 0-7.

"Central to the new hospital's success is a sophisticated nurse call system – based around our Telligence patient response system – co-designed by nurses at the CFH with us at Ascom, and integrated with our Myco smartphones, which connect nurses and clinicians equipped with handsets with patients, colleagues, and other technology, across the hospital. Other staff, such as porters, domestic, housekeeping, and security personnel, carry our I62 handsets." James Webb at Ascom, one of those that I met at the new hospital, added: "This means that, for example, if a nurse needs a porter to take a patient to theatre, or bring them back from 'Recovery' post-procedure, they can call the porter directly, and the nearest available one will then arrive promptly." Fiona Morcom noted that this was in stark contrast to the more 'traditional' scenario of having to locate a free porter while the nurse stays with the patient.

Enthusiastic response

Ascom says nurses and doctors more accustomed to using 'traditional' nurse call equipment at the original, Victorian-built Chase Farm Hospital – located a short distance from its modern replacement – have welcomed the time and labour-saving, and the enhanced efficiency benefits, of the Ascom patient response system. Alongside the many other practical benefits cited by Fiona Morcom and Andy Dargue, the nurses say one of the biggest benefits is that patients are more 'visible' – thanks to the system's speech software, and the ability to monitor integrated medical devices (such as the GE and Philips patient monitors located by the bedside, which display elements such as heart rate and oxygen saturations) from anywhere in the hospital. For example, should a nurse have a concern over, say, the rising blood pressure of a particular patient, they can either text or call a relevant clinician via their Myco device – who may be anywhere in the hospital at the time. The clinician can then not only talk to them direct, but can also, if they wish, view the patient's latest 'observations' via their own Myco, and decide what – if any – action needs taking.

Ascom UK worked hard to ensure that its nurse call system was fully interoperable with technology from other suppliers at CFH, including GE Healthcare, Philips Healthcare, Cerner, and various app providers. Ascom UK managing director, Paul Lawrence said: "We are very proud to have worked closely with clinical staff at Chase Farm Hospital on this project, which is an exemplar for the rest of the NHS. It has proved that the greatest success in IT comes from asking clinicians what they need to do their job better, and then ensuring that you do whatever it takes to fully integrate it across the workplace."

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wider Global Digital Exemplar project which The Royal Free London group had been selected for, and a dedicated member of the IT team was able to support the development and delivery of the nurse call system.

Offsite visits to existing hospitals using the system helped, with lessons learned, and potential pitfalls identified. (In fact, Fiona Morcom and a number of project team colleagues visited several Ascom hospital installation sites in the US, including the Smith Care Center, Plymouth Harbour, in Florida, and Ascom's R&D facility in Bradenton near Sarasota (in the same US State). Their subsequent feedback, and clear identification of the features and workflow functions the clinical team at the new hospital would require, informed the design of the patient response system.

The process

Working as part of the redevelopment team to build and equip the UK's first paperless hospital meant every day was a challenge. Change was the order of the day for us, but for clinical teams it was still 'business as usual'. Delivering a 'solution' without understanding the problem can miss the mark, so we went back to basics. 'Selling the concept' to busy clinical teams of a call system in their pocket was a first step. We started by process mapping while observing clinical teams

in their day-to-day work; this enabled us to demonstrate time wasted in daily workflows. Freeing up this time allows more time to be spent on direct clinical care, and improves efficiency; it also reduces the frustration which can mount through a working day when time is wasted.

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The new £200 m Chase Farm Hospital near Enfield is believed by the Royal Free London NHS Foundation Trust to be the NHS's 'most advanced digital hospital'.

Crucially, spending time across different working environments helped us to understand the different functionality needed, and how we could adapt the way in which the system works. While traditional nurse call systems have a 'one-size-fits-all' approach, we were able to carefully tailor our solution to the requirements of each area and its specific needs and challenges.

Multidisciplinary involvement

Close working with the clinical teams, multidisciplinary involvement from the Trust's IT Department and Estates team (the latter led on the project by the Trust's then Programme manager, Mark Bateman, who is now head of Estates and Facilities), the main contractor on the ProCure21 hospital build project, IHP, and external building services and electrical teams, made for some complex meetings. Inevitably, there were times when some part of the discussion around the table was not universally understood, but staying engaged and respectful about the challenges posed by areas outside our normal scope of experience was essential to keep things running smoothly.

There were also some technical challenges to enable a system originally developed for US use, designed to work across a 'flat' network, to communicate across the multi- sub-netted network environment at the new Chase Farm

A Myco 3 handset. Alerts can be sent via the Telligence hardware directly to staff responsible for particular patients via their Myco 2/3 handsets, and users can also access data on the devices while on the move.

The chief executive's view

The project to implement and install the Ascom system was led, and indeed championed by, the Chase Farm Hospital chief executive and director of Nursing, Natalie Forrest. She said: "Crucially, the technology development work was done by clinicians, instead of to clinicians. It meant that we had genuine engagement with nurses and other stakeholders as we carefully planned the hospital from the start – taking in the views of estates, IT, domestic staff, porters, 'admin', and allied health and medical staff.

"With 42 single rooms we faced the challenge of making the 'invisible' patient visible, and addressing our nurses' key concern: that they might miss a serious clinical issue while attending to other tasks away from the patient. The nurse call system linked to smartphones ensures that they can contact anyone, including patients, directly, and know what's going on in their clinical area, even when they are elsewhere."

She added: "The hospital was delivered on target and within budget – a tremendous achievement, of which the entire team is very proud."

Hospital, without introducing issues. Working with the Redevelopment Team and the external suppliers, we were able to redesign the solution to meet the requirements, while also future-proofing the installation – from both a network and a nurse call perspective. This effectively resulted in a new 'European' configuration being developed. The system leverages the hospital's existing physical and wireless infrastructure, allowing the handsets to be used anywhere within the Trust.

Interoperability

As a hospital using multi-vendor equipment, we also needed to ensure that our nurse call system was fully interoperable with technology from other suppliers at Chase Farm, including GE Healthcare, Philips Healthcare, and various 'app' providers. This ensured that alerts can be sent via the Telligence hardware directly to staff responsible for particular

patients via their Myco handsets, and, crucially, also allows them to access data while on the move. Working smarter, not harder, with digital integration has meant we have moved into a larger space with an increased inpatient flow, while maintaining the same staffing numbers. (In fact, Fiona Morcom explained – when I met her, along with the hospital's chief executive, Natalie Forrest, and a number of other key project team members in late July – original predictions were that to deliver the same level of care to patients in the new 50-bed inpatient ward, an additional 12 nursing staff would be needed).

Hardware

Looking at the hardware deployed, Ascom Myco 2 handsets are held by nurses, medical, and AHP staff, as well as our concierge staff, who greet all visitors and patients, and can rapidly direct them to where they need to be. They are effectively internal telephone extensions, making it a simple matter for staff to keep in touch with each other. Ascom's i62 handsets, meanwhile, are held by domestic, housekeeping, and security

Tricia Lenoir, a Recovery Sister at the new Chase Farm Hospital, making use of one of the new Myco handsets.

staff, and porters. Nurse call panels assigned to individual areas link all handsets, and allow role-specific tasks to be entered, so that individuals can be messaged directly and directed to where they are needed. 'Domestic workflow' buttons at bedheads in clinical areas are also linked to these handsets, so porters, domestics, or housekeepers, can be contacted directly at the press of a single button. Emergency buttons or pulls are located throughout, and, as with the entire system, are fully configurable, so users of a range of handsets across the whole site can be made aware instantly of an issue. Dome lights above the door of each inpatient room are linked to the system. An emergency pull by a nurse or doctor will generate a flashing 'red', with the nurse call software simultaneously immediately alerting all relevant staff via their handsets. The overdoor lights also signal, via a colour-coded system, if a porter or domestic is required, and are used to show 'staff presence'.

Rapid visibility

One of the overdoor lights' key benefits on a long 50-bed ward on a single corridor is that a nurse can see immediately such a light is illuminated,

Nurses at Chase Farm Hospital have responded enthusiastically to the Ascom system's installation; it is speeding response times and enhancing efficiency.

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and identify, via the colour, whether a scenario is routine or 'emergency'. Unlike a 'traditional' nurse call system, however, alerts within the room are silent, meaning much less disturbance to patients. The Telligence system's ability to send alerts or texts direct to a staff member's handset, meanwhile, means a need for just two display consoles within the 50-bed ward. These nurse panels do, however, enable nurses to identify, at glance, and keep an eye on, patients that may need additional monitoring, and also to 'drill down', for example if they need specific audit or 'call trend' information. Within the background of the Telligence software, the Unite Analyze 'package' enables the production of regular scheduled reports around call response times, allowing staff to recognise peak times or bottlenecks and plan staffing accordingly.

Training

Supported by both our Trust lead and suppliers' training teams, challenges were apparent. A 'demo' system cannot give the same effect as a fully operational system *in situ*, no matter how good the set-up. 'Training fatigue' was beginning to show within a staff group who had been on the receiving end of a great deal of training and preparation for the move to the new hospital. We had anticipated this, however, and in the first week after we moved in, in September 2018, and before we had patients, we trained intensively, practising scenarios and ironing out any issues. Once the staff could see the system in their own clinical areas, they could make sense of how it would work.

Delivering efficiencies in practice

Key to our investment in the new system was, of course, that it would deliver efficiencies in practice, which it certainly has. Among these have been:
- Integration of medical devices means we can 'monitor' patients closely who may not be in direct line of sight, but also reduces the stressful noise and alert fatigue associated with multiple alarms. This improves both the patient and the staff experience.
- 'Safety huddles – the handsets improve situational awareness for the whole team by informing them about important changes to an expected plan – alerts about, for example, the condition of a patient recently admitted, can now be delivered instantly via group texting on the Mycos. This saves up to 45 minutes a day, by effectively replacing physical safety huddles – where all staff need to be got together – with 'virtual' huddles, which take about 30 seconds. Shared information is recorded for use at any time.
- Audits – nurses are saving up to 30 minutes a day each on audits,

The workflow buttons can be assigned whatever workflow functions the hospital or other healthcare site wishes.

previously undertaken manually, but now done digitally via the 'Perfect Ward' smartphone app. Nurses can view and send audits at the touch of a button.
- Theatre recovery throughput – saving up to 15 minutes per patient (average 30 procedures a day) in moving through recovery and back to the wards, thanks to more efficient and effective communications.
- Bed turnaround time – up to 40 minutes per bed saved using the domestic clinical workflow button, which helps to ensure that domestic staff are quickly available.
- Time previously wasted in routine communications between theatres,

The system of overdoor lights at the new Chase Farm Hospital has proven especially beneficial, given that the 50-bedded inpatient ward is on a long corridor, with 42 individual *en-suite* rooms.

A nurse call console showing that a patient has requested a drink, and the associated 'wait time'.

'Recovery', and the ward, has been dramatically reduced, with 'Coordinators' for each area calling directly to each other to facilitate patient flow.

Conclusions

This has been a useful learning experience for us on the Project and Redevelopment team. Our key message would be to have a vision, and decide what outcomes you need, in terms of improved care, safety, and staff utilisation – and to work back from that. Equally, make the system you specify 'future-proof' – technology should be scalable and replaceable, without having to 'rip out' your interoperable system. Always have a clinician in charge of the project, and be prepared to work across many boundaries, including all the key stakeholders early on. These will include IT, Networks, Estates, Security, 'Admin', and Portering personnel. Staff engagement needs to be real, across the multidisciplinary team, not a token effort. Train your staff in using the technology, and check if they need more training after you 'go live'. Keep the 'tech' simple and user-friendly. Our staff use smartphones that are intuitive to use – just like their own mobiles outside work.

Going paperless isn't about imposing a system on clinicians. It's about finding out how they want to work, and choosing the best technology to fit. We will continue to review the efficacy of the technology and the organisation of clinical workflows to ensure that we are making the best use of it. Staff and patient feedback continue to be crucial, and we will be looking at what further training people need to use technology in the best way to make their job easier. We will share information from teams in different clinical areas, so that we can find smarter, more advanced ways for everyone to work. **hej**

Key Chase Farm project players

- Main contractor: IHP.
- Lead architects – IBI.
- Architects – AD Architects.
- M&E consultants – Troup Bywaters + Anders.
- Electrical contractors – W Portsmouth.
- Mechanical contractors – Norstead.
- Structural consultants – Thomasons.
- Cost advisors — Turner & Townsend.
- Trust supervisors – Currie & Brown.

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