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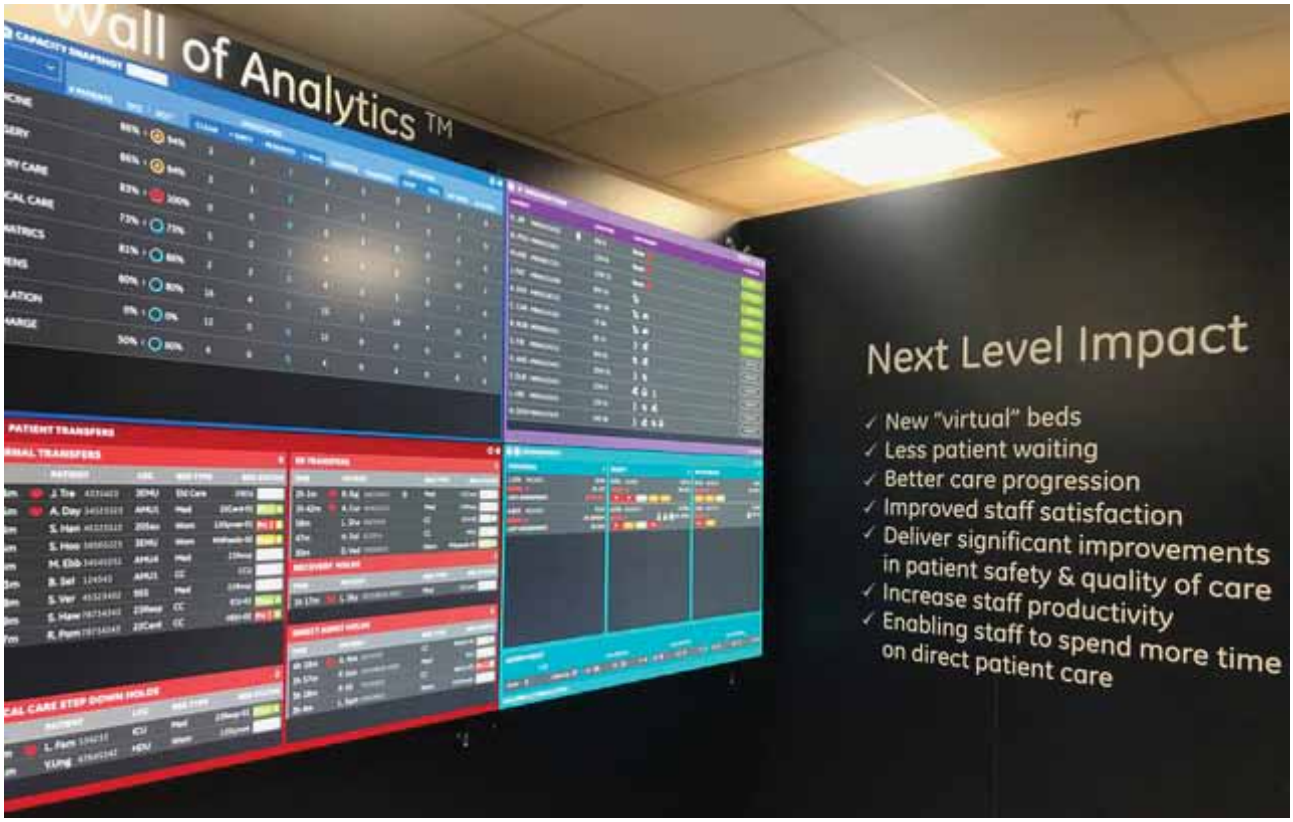
Cover Story:

The Future is Digital

The English Patients: This UK Hospital Is Harnessing AI To Deliver Slicker Service



At Bradford Royal Infirmary, about 20 staff members work out of a centrally located room called the command center, monitoring a "wall of analytics" that helps them manage patient flow and make decisions quickly.

If you watched the opening ceremony of the London Olympic Games in 2012, you will know that British people love their National Health Service (NHS) as much as they cherish Peter Pan, The Beatles and James Bond. The ceremony's climax was an eccentric and poignant dance routine that celebrated the NHS's special place in the nation's heart. At one point, dancers bounced on trampolines made up to look like hospital beds.

Artificial intelligence (AI) is now helping ensure that the NHS gets the best out of those world-famous hospital beds. Hospital staff in the fast-growing northern city of Bradford are using cutting-edge software that generates real-time, 24/7 insights about the hundreds of beds and patients on their wards. Those insights allow them to help prioritize the city's hospital beds for the neediest patients, make faster decisions about care, identify and prioritize the sickest patients, and allocate resources more efficiently. Managing patient flow and care is a vital mission, because 96% of bed capacity at Bradford Royal Infirmary (BRI), the city's main hospital, is used regularly.

Patients at BRI may well catch a glimpse of the system in action. Around 20 staff members work from a new, centrally located room in the hospital called a command center, which officially opened Nov. 12. They monitor a 'wall of analytics:' Eight high-definition TV screens which constantly update with real-time data about the 800 beds across the hospitals that are part of the Bradford Teaching Hospitals NHS Foundation Trust. BRI alone sees around 125,000 emergency department (A&E) attendances per year, but the trust

serves approximately 1.1 million people in the West Yorkshire region.

If you think a command center sounds like those banks of desks that manage moon missions and airport runways, you are on the right track. "It's the same concept of mission control at NASA or air traffic control, but applied to hospitals," says Gerald Dunstan, partner, GE Healthcare Partners, which designs, builds and activates the command centers. "Bradford is getting real-time insight on patient flow and can make better decisions over what actions need to be taken."

Dunstan explains what is going on behind the scenes. Like any large healthcare operation, there are multiple streams of real-time data from the various departments and wards within the Bradford trust. At any one time, this might include paramedics alerting the site team from inbound ambulances, a general practitioner referring a patient to BRI's nephrology department, or the hospital's hematology ward relaying updates about the availability of en suite rooms.

These data streams used to live in not-so-splendid isolation from each other, making it difficult for hospital staff to get an overview of their patient population together with a snapshot of bed availability. It prevented them from allocating beds efficiently and identifying which patients need extra attention based on clinical need. In the past, staff would phone around wards to find out about patient comings and goings, and then produce a rough estimate of bed availability. "It was a manual effort that needed lots of calls," says Dunstan. Very often, bed allocation was a case of first come, first served, says Dr. Brad Wilson, the command center's medical director. "We didn't have the visibility to improve overall patient flow."

Those days of hanging on the telephone are over, because command centers consolidate those disparate data streams, offering staff an overview of bed supply and demand just by glimpsing at the screens. "The command center gives us cross-system visibility to make smarter decisions," says Wilson. The system, which can also be displayed on staff's tablets and mobile phones, allow users to quickly drill down to obtain more information about bed supply and demand. For example, the bed might be set up for a male patient in a negative pressure room, which lowers the risk of cross-contamination. Staff could quickly earmark that bed for an incoming cardiac patient, who is at high risk of infection.

The software is not just a hyper-efficient ward organizer and bed allocator. It also avoids potential bottlenecks, helps caregivers prioritize and focus on the sickest patients in the Trust right now, and preserves scarce hospital resources by using predictive analytics to generate insights from the mountains of data, or as Dunstan puts it, "add actionable intelligence." For example, it could predict that special handling is required for incoming patients based on an analysis of their symptoms, which would allow nurses on the ward to make up an appropriate bed. The software could also alert staff to patients who haven't filled out a consent form for surgery, thus averting the wasted time of a cancelled operation. Whatever the case, staff can get ahead of the game in terms of patient flow and resource allocation. Dunstan says greater situational awareness and slicker patient flow are boons for the hospital's A&E ward, which sees up to 400 patients per day.

The NASA-style command center is one small step on NHS's digital journey, but one giant leap for Bradford. It is the first hospital outside North America to receive such a nerve center. In 2016, the Johns Hopkins Hospital in Baltimore, Maryland, launched GE Healthcare's first center, and over the next 18 months it improved access for very sick patients by 78% and reduced emergency department patient waiting by 35%, even as inpatient occupancy grew by 8%. Humber River Hospital in Toronto, Canada and OHSU Health in Portland, Oregon, have also opened command centers and seen similar results.

It is early days for Bradford's own command center, but BRI is already seeing faster ambulance transfer times, fewer delays to patient consultations, patients returning home quicker, and fewer cancelled operations. Dunstan and Wilson are hoping to see an especially steep reduction in the time that medically fit patients spend in hospital. This would be good news, since this time is a huge strain on any hospital's administrative capacity and resources, says Wilson. "It's actually bad to have people in hospital who don't need to be there — they are at greater risk of all kinds of things: infection, delirium or malnutrition."

Wilson, an American who moved to northern England 22 years ago, is proud of reducing the number of patients that stay 21 days or longer at Bradford's hospitals by 40% in recent years. "It used to be in the hundreds," he says. "But right now [early November], we've only got 54 such patients." He is looking forward to Bradford's AI-enhanced future. "We had been on this digital journey for years and not understanding our own data," he explains. "Now it's finally pulled together in a meaningful and actionable way." ■

*Article previously published on GE reports by Chris Noon