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Features & Arts

Can the data guru who won Vote Leave save the NHS?

With waiting lists at record highs, hospitals are using artificial intelligence to beat bed-blocking. *Harry de Quetteville* meets the scientist behind the strategy

The figures are shocking. A&E targets missed by a mile with 12-hour waits to be admitted to hospital not uncommon. Ambulance response times are the longest on record, with average waits of more than an hour for heart attack and stroke patients in March. On top of that, more than 150,000 cancer patients are forced to wait more than 14 days to see a consultant.

As for those needing non-urgent hospital care, recent statistics showed a record 6.2 million people on waiting lists – up 80,000 from the start of the year – with 37 per cent of patients hanging around longer than 18 weeks to start non-urgent treatment, against a target of just eight per cent.

Six million people are waiting for operations such as hip and knee replacements and cataract removals –

yet another new record high. Of these, almost 24,000 have been waiting for more than two years; some as many as four and a half.

But physicist Marc Warner hopes he may have part of the answer. At the end of last month, software made by his artificial intelligence company, Faculty, was introduced into 100 NHS hospital trusts after a series of “impressive” forecasts. Warner – as well as the NHS, and all its patients – is hoping that the might of AI can make the health service more efficient.

Faculty already has a powerful track record, its first successes in a different arena. In 2016, with just a handful of staff, its technology was able to improve on polls that were constantly misreading the public mood and helped propel Vote Leave to referendum triumph. Then, in early

2020, at the outbreak of the pandemic, with ministers and officials “resigned” to a herd immunity strategy, Warner showed the NHS was about to be overwhelmed and persuaded the PM to change course.

Now he is turning to the future. “We’re looking at how this technology could be used to help with the cancer backlog,” he says, referencing one Faculty project that aims to improve breast cancer screening. “In the crudest terms, in the NHS a patient journey is a complicated supply chain. You want to make sure it is maximally efficient, so you’ve not got staff and patients waiting around and screening facilities being under-utilised. Then you can help deliver better care for patients without having to spend more money.”

In a second project at Kettering General Hospital, Faculty has worked

on perhaps the most fundamental conundrum facing doctors and nurses of all: bed management. Too often, says Warner, deciding where to put new admissions is viewed like a game of Tetris, the celebrated computer puzzle, slotting patients into spaces.

“Actually,” he says, “it is more like chess,” with every move having a cascading impact on future options. “You are having to plan several moves ahead. When even Grandmasters cannot see all of the possible moves, computers are just clearly best suited to this task.”

In Kettering, Faculty took five years of anonymised data from the patient admission system and up to two years’ worth of so-called “patient flow data” to build a “virtual hospital”. It then looked at two approaches to bed management: the first was a “greedy allocation” –

putting patients in the “best bed” at the point of admission; the second factored in predicted arrivals in the next couple of hours.

Critically, the project allowed staff on the ground to visualise the likely flow of patients and see for themselves current occupancy rates and forecasted demand. The system was then able to make suggestions to those staff as to the best use of resources.

It is, perhaps, an unglamorous deployment of AI, which many companies are already using in healthcare itself – in image analysis, for example. “But almost nobody has looked at the nuts and bolts issue of optimising the resources we have to ensure good treatment for one person without prejudicing outcomes for others, which is what we always have for the NHS – knock-on effects,” says Warner.

Shockingly, the Kettering project faced major challenges simply because the hospital did not have useful data to hand. “With Kettering General Hospital, there is no centralised patient flow information,” admits the NHS. Rather, it is split by speciality. By the NHS’s own admission then, one hand cannot currently see what the other is doing. No wonder the hospital is bidding for funding permanently to implement the Faculty algorithm, hoping to plug it into “real-time patient data”, as well as patient flow forecasts, to “operationalise the AI-driven bed allocation system”.

Such confused and competing hospital data streams is a throwback to the most intense moment of Warner’s work with the NHS, at the outset of the pandemic. He has described the then system, which required manual copying and pasting of thousands of Excel spreadsheets at NHS headquarters in Elephant and Castle, central London, as “completely dysfunctional in a fast-moving crisis”. But as at Kettering, his team then managed to build a model to help predict patient traffic. And what the predictions revealed was horrifying. “It simply hadn’t been absorbed that the trajectory was going to break through the NHS in a matter of days,” he says, of those days in March 2020. “As I spoke to more people I recognised it really wasn’t being thought through fully. And that’s when I sounded the alarm.”

That involved pleading with his old chum from Vote Leave, Dominic Cummings, who agreed with his warnings and who, on March 14 2020, put Warner in front of the PM to explain just how close to catastrophe Britain was. Lockdown was announced a little over a week later. “That was a very weird time,” says Warner. “Not a particularly pleasant time, either.”

It has been said that the whole episode made him furious. Yet so mild-mannered is Warner that the idea seems almost absurd. In smart-casual



Problem solver: Marc Warner (below) hopes his system will do for hospital waiting times what it did for Vote Leave

tech-dress, with thick-framed glasses, high hair waved like the 1980s pop star Rick Astley, to whom he bears a passing resemblance, he has the calm assurance of a man with the right figures always to hand. It is hard to imagine him overawed, even while being rushed into an emergency meeting in Downing Street.

Raised in Bedford, Warner, now 36, was encouraged in science by his grandparents, studied physics at Imperial College London, then began to investigate AI during a research fellowship at Harvard. He began working on data science problems and in 2015 set up Faculty (then known as ASI) with two friends, Andrew Brookes and Angie Ma, with the aim of solving business problems just too complex or diffuse for the human mind to crack. With more than 100 staff, it now advises clients from Siemens to the Natural History Museum.

Its relentless pursuit of “optimisation” has even allowed easyJet to “figure out how to get the right number of bacon sandwiches on to every flight”.

It’s all part of what he calls “the intelligence layer” – AI software that can handle the grunt work of number crunching so allowing people to get on with more creative tasks. “AI is probably the most important technology of our time, but it isn’t magic.”

Rather it is a tool best suited to “operational questions, like is it more sensible to send a patient to this hospital or that to get a test done?”

A recent National Audit Office report makes clear just how significant simple efficiencies could be. If the NHS’s elective activity is just 10 per cent greater, it says, waiting lists will be 5 million lower than they otherwise would be in just three years.

For Warner, every small decision adds up to such big possibilities. “It might just be, should we schedule this appointment at three o’clock or four o’clock? Should we open this ward for Covid or keep it for elective care?” The data, he says, holds all the answers.

