

Next-Gen Tech and Healthcare

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Bradley Howard: Welcome back to Tech Reimagined. To all of our new listeners, welcome, and I hope you enjoy the show. I'm Bradley Howard, your host. We're in Season Three of Tech Reimagined, where we'll be looking into the many ways that technology is influencing the fabric of our society, with some very interesting guests.

And here with us today to untangle some aspects behind the technology in our healthcare system is Dr. Gillian Hallie, an NHS innovator with a track record of enabling transformational change through digital health technology. Welcome, Gillian. Really glad you could join us today. Can you tell us a little bit more about yourself?

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Gillian Halley: Hi, Bradley. Nice to meet you again. I have been working as a frontline doctor for many years, and I trained in children's intensive care in Australia and Canada and then came back to the UK. But always had an interest in medical technology, from when I was a very, very junior doctor, trying to do signal processing of heart rates in pre-term babies, until more recently, trying to do some process improvement stuff with technology and change management.

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Bradley Howard: Well, welcome to the show again. So the topic of today's episode is next-generation technology in healthcare. So let's start with a really difficult question. What areas of healthcare have benefited most from next-generation technology advancements in the last couple of decades?

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Gillian Halley: I think that is a difficult question, and I'm sure if you ask 100 people, you get 100 different answers. But I would start off with my personal experience, and that is in the intensive care environment. And in diseases of childhood, I think we've certainly improved outcome of children and adults who have gone through critical illness and critical care. So that's a combination of surgical techniques and technology around the intensive care, going from the sophistication of the ventilator equipment, the monitoring equipment, the drug infusion pumps, everything, the drugs that we use, and the way that that whole process, from pre to post-operative care has improved.

So as with all technology, it's the people and the process and the platform together, working together. And I think that's where I could see a greater benefit, in that more children survive critical illness. And if you're a parent, then obviously, that's a big plus.

And I think in surgery in general, surgeons have always been innovators, so they're always pushing the boundaries. And the rest of us in that workspace environment around the operation have to support that from happening. So surgeons take risks every day. I would hate to be in their position, most of the time. And if you're a children's heart surgeon and you're working on a heart the size of a Walnut, it's very challenging technical procedures that you're doing, and there's an expectation of survival.

So that benefit of surviving has actually put more pressure back on the surgeons, and you can understand if they're a bit risk-averse, but they generally naturally tend to be innovators. So I think in that space, there's been 3D printing, so you could print a kidney and work out how you practice the operation on that. Or 3D valves, perhaps. Virtual reality. So a surgeon could be in VR and have a fancy holographic 3D of the heart and

lungs and actually see, "This is where the tumor is. I can avoid this vessel." Or it could

be used for training. Could be a patient or a child going into surgery who gets to see the environment. Or the surgeons that get training in a VR setting or ways of simulating operations, simulating resuscitations. So the medical education side, I think.

Also, there's obviously the more buzzy topics, like genomics and gene editing, so personalized medicine. So how much warfarin you take, based on your genes. Or what cancer treatment for prostate cancer, based on your genes. Snipping out bad bits of genes. Some of the drugs for things like spinal muscular atrophy and motor neurone disease have made big differences. Technologies like voice banking for MND.

So there's been lots of interesting technology, and I haven't mentioned AI, which is probably what everybody thinks. But it's not there in the delivery and clinical pathways yet, as much as people think it is. There is potential.

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Bradley Howard: I don't know how I feel about your comment about surgeons have always been innovators. I'm not sure if I find that now more worrying. Heaven forbid I need surgery or anything. Why are surgeons so innovative?

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Gillian Halley: I think because there must be a personality. We call it the God Complex. I don't know if you've heard of that, but there is a type of personality. And also, they have to be good with their hands, and they are actually taking sole responsibility for something. But I think from a historical perspective, do you know why barber poles are red and white?

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Bradley Howard: Didn't surgeons used to be called barbers?

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Gillian Halley: Yeah, so the barber surgeons were a thing. So barbers would go into the monasteries and do the tonsures for the monks, so shaving the heads. So the monks could do medicinal medicine, but they couldn't do anything to do with blood, like blood-letting or anything with sharp implements. So the barbers would do that, and then because they were there with their sharp implements, they could launch boils and do all those other little minor surgical procedures. So it wasn't really looked on as a very fancy profession in those days.

But my medical degree in Scotland was NBCHB, which is Bachelor of Medicine and Surgery, or Chirurgie, if you want to call it that. So there was a bit of a battle between the barbers and the surgeons, and then the surgeons eventually pushed the barbers out. So I think looking back to the Enlightenment, one of my favorite times of medicine and changes in medicine, that was quite often led by surgery.

And you'll have heard of body snatching in Edinburgh and in London. So the surgeons in Scotland, certainly, they quite often went to the French or Dutch universities for training, because you needed a passport to go to England in the 17th Century. So it was easier to go to France, and they did a lot more practical surgical techniques. And then when they introduced that into the UK, the surgeons learned by doing, by dissection. I think that naturally drew the more innovative people or made them more innovative, because they were learning by doing, rather than intellectualizing things.

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Bradley Howard: And that's carried on until today?

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Gillian Halley: Well, yeah. I think when I was at medical school, we did have to still do dissections, but nowadays, if you can get a 3D printed organ or actually practice on a simulation ... I've done simulation years ago, in North Carolina, when I was learning to do bronchoscopies, which is putting a scope into the lungs. And we had this very large simulator, which would cough if you didn't put your cocaine in, which was used to stop the coughing. So there's more and more ways of learning that are outside the actual dissecting room, but it's a similar approach. It's doing things with your hands, so it's that creative process.

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Bradley Howard: Sounds like the old board game Operation, but bit more on steroids, if you figure the pun.

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Dr. Gillian Hallie: Yes.

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Bradley Howard: So let's talk a little bit about data. So there was a survey last year, in June 2021, by the Information Commissioner's Office and Harris Interactive. And they found that only 47% of people would allow the NHS (that's the British Health Service) to pass on their data to public sector companies, even if it was to use to improve the delivery of healthcare. And the figure is only 42% for private companies. Do you think, as a medical professional, that there's a chance to shift public perception into trusting health authorities more with our data in the future?

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Gillian Halley: I think data is one of the biggest things we have to tackle in the future, because it's such huge potential: data banks, data analytics. There's certainly a move towards creating those kind of data banks. And why is it? First of all, patients that I've talked to, who have a chronic illness or disability of some sort, they are very keen to share their data. And quite often, the people that are most anxious about it are the ones who don't have that illness. So people living with a health problem quite often do share their data. They share it on social media. They have a Facebook group. They're trying to share it through other ways, outside the medical profession. So it's like, "How do you join that app?" So that's sharing data of people who want to have that data used to improve their disease or the community of people with a specific disease.

And I spoke to one lady who has motor neurone disease, and she'd had it for quite a number of years. And I asked her, "We're looking at a patient health digital passport about data security and sharing your data." And she's like, "Look, when you've got someone coming into your home twice a day to wipe your bum, you really don't care about data access. You want to share your data, because what else can I do to move things?" A lot of people are really keen to move medicine forward and to help sharing the data.

So I think to make that jump, there has to be more explainability, I guess, in what the data is going to do and why is it going to be used? And I think data governance has been a barrier to a lot of change. So during COVID, the HIPAA regulations were lightened up in the States, being able to share data across platforms.

So I don't think it's the people that are barriers. I think it's partly the fear in the sector, the regulations, or over-regulations, perhaps. Not having data in the right place is a risk that all clinicians know, because quite often, you don't have the data. People say, "I've

gone up to the hospital, and they can't find my notes anywhere, the paper records." Or " They haven't got the right information, and why do I have to keep saying my story six times, 10 times? Every time I go, I have to explain it again, because they don't have my notes. They don't have my records." So I think there's a lot of problems with not having data that people just don't realize is there, and it's still there.

So how do we move that? I think empowering people with all that data that you can collect. If there was a route to have that into some big data bank, could that be through a community social enterprise? Is there an intermediary body that could actually champion the use of that data? And certainly during COVID, some of those things were done in the UK system, was to try and have some way of storing and sharing that data responsibly.

So I think also, you need to feed back to patients, because quite often, when I've been talking to people about technologies, quite often, the consultants are usually, " Oh, what data do I get?" And " It's my data, and I can write a research paper and an audit or something." And there's an issue around data ownership.

So I think if we keep data ownership with the patient, then there's lots of technology that can help this, quick consents to sharing. I think the dialogue needs to be there, so more two-way dialogues, instead of the medical professional saying, " This data's mine, because it sits in my hospital." But actually be more collaborative and open about: How can we as a community share that data?

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Bradley Howard: You know, it's so interesting because we have different guests from different industries on Tech Reimagined all the time, and we ask about data to each of the guests. And every guest is exactly the same about their particular industry, but it has the same overall theme. So as long as an industry always assures that the data will be kept securely, only used for what it's meant for, that it's going to be relevant to the owner of the data: i. e. the end consumer or user or patient, et cetera, in this case. Then people won't mind. It's just when it's used nefariously that it's more of a challenge there. But it's really interesting how you described that before.

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Gillian Halley: Yeah, we need to explain it to people, as well, because the fear of data sharing is quite often because people think it is about them, rather than understanding what depersonalized data is and anonymized data sets. So I think we need to educate people to understand exactly: What does that mean?

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Bradley Howard: If we were to extrapolate from a few years ago, through COVID, through the other digital transformations that have happened in healthcare, can you see there will be a point in the future where healthcare professionals might be overly reliant on machines and data?

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Gillian Halley: That's an interesting question. I don't think that you can ever take the art out of medicine. So I think that people think that, " Oh, well, you can get AI and machines, robotics, et cetera." You always need people, I think, in the decades to come. So AI, for example, it's being increasingly evidenced that it could be used to improve things like lung cancer detection or breast cancer. So you've got a signal from an image, or you've got a signal from a blood test or something. So you've got an actual signal that you can process. When it comes down to diagnostics, it's a different thing, because you have

signals, but you've got multiple signals, and you've got biological variants, and you've got lots of different contexts that you have to take into account.

And in medicine, well, certainly I know, especially in children's medicine, which is quite often preverbal, you've got a patient that might not be able to talk to you or explain things, but you develop pattern recognition. And at the risk of sounding quite kooky, I have been in situations where I've not known why something is going to go wrong, but I just know it's going to go wrong, like in the ICU.

And I'm looking constantly at numbers in an ICU setting. So I know how many millimoles of potassium is in that fluid. I know exactly what drug has been used and what oxygen saturations have been in the last 12 hours. But for some reason, all of that data is being processed, in a way, in my head, along with the feel of the skin or the slight discoloration or something else. And how do you build that into an algorithm? So you can take some of the signals, but you can't take away some of the pattern recognition that you have.

And I remember doing a locum in a hospital, when I was younger, and I was working holiday times. So I remember being in this ward, so first night, and I walked in, and I saw this baby who was probably about two years old. And she just was in a cot and just looked at me, and I thought, "That child's got meningitis." And we did a lumbar puncture, and she did. And I can't tell you why I knew that. There was something about the pain that was being expressed through nonverbal cues.

So there are things like that, that you just have a sense. And it's quite a fortunate position to be in, because I'm able to do that. My 18-year-old recently had a really bad strep throat, and I was assuming it's viral, because 90-odd percent of them are. But I was able to tell when I thought, "There's a little bit of a risk of septic. Skin was just getting a bit cold." And he got antibiotics and got better, but if I hadn't had that sense, you could get really quite sick with that.

So I think there's always a bit of an art there, which can only be learned. It can't be taught, in a sense, through AI or any other algorithm.

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Bradley Howard: That's an amazing couple of stories to finish this episode on. Thank you so much for joining us, Dr. Gillian.

To all of our listeners, thank you so much for joining. Show us some love if you've enjoyed this episode, and hit that Share button. To keep up to date with the newest Tech Reimagined stories, please don't forget to hit the other button we like: Subscribe. Until next week, from all of us at Tech Reimagined, we wish you an excellent week ahead.