

## Keynote: Leveraging the NHS and the UK's Unique Position

Speaker: Dr. Kristin-Anne Rutter

**DR. KRISTIN-ANNE RUTTER:** Good afternoon. The current election is dominated by talk of the NHS as a problem to be solved. Today I'm going to talk about why it is also a crucial part of the solution to becoming a scientific superpower. As you heard, I trained as a doctor at Cambridge and now work there alongside the NHS for Cambridge and Anglia Ruskin universities with business and local governments to support breakthrough discoveries and the translation into the delivery of high quality care. Our goal is to deliver on the promises of the national life science strategy and to find solutions that we can bring quickly to the whole of the UK.

Cambridge is an exciting, innovative place to be, from small companies like Alston Medical, which is currently testing a lung cancer breath test with the NHS's Royal Papworth Hospital Lung Hospital, to industry giants like GSK, conducting really challenging first-in-human trials with another major NHS hospital, Addenbrooke's. And it's the only place in the world that GSK does these first-in-man trials. AstraZeneca moved into their new global research and development headquarters in the city recently and already have 130 collaborations with Cambridge University and more than 40 with the publicly funded MRC Lab of Molecular Biology, the origin of twelve Nobel prizes.

And the city is due to get a new cancer hospital where both AstraZeneca and Cambridge University will have teams and researchers working inside that hospital on new ideas with their NHS colleagues and the likes of GE and Nvidia - NHS, academia, industry working together on the next generation of health innovations, swapping skills, ideas and resources. I believe that has to be the future.

Besides the day job, I've been co-chairing with the chief executive of the Association of British HealthTech Industries, Peter Ellingworth, one of the four work streams of the Innovation Ecosystem Programme. This is led by Roland Sinker and is currently being conducted by NHS England. In fact, I've spent the morning discussing the review and some of the things I'm going to talk to you about this afternoon with the NHS leadership and I'll share today why that review is happening, its significance and some of the initial thinking.

The panel this morning talked about the importance of industrial strategy. The first UK Life Science Strategy in 2011 started the dialogue about the unique opportunity of the NHS, as have all subsequent iterations of that strategy and reviews. Interestingly enough, none of the ten actions in that 2011 strategy were about how the NHS developed the capabilities to fulfil that unique opportunity. While many of the things in that review have been delivered, the lack of ability to introduce innovations into the core NHS service, coupled with the complexities of navigating the system, the limited mechanisms of procurement and value sharing have continued to be a source of frustration for entrepreneurs and international companies looking to work for the NHS.

So what is the NHS unique position we're seeking to leverage? It is a single public payer and provider system covering 60 million lives. Sounds pretty good, but let's not be complacent about it. United Health Group in the USA covers 30 million lives. The Middle Eastern countries are launching large scale national genomic sequencing programmes very rapidly. The Nordics have

integrated longitudinal healthcare data going back over 20 years. I was using an electronic record when I worked in A&E in Iceland in 2001.

Theoretically, though, there is the possibility to leverage the NHS's scale and integration to do four pretty unique things:

1. The NHS can gather detailed patient data over a long period of time, and that longitudinal data is crucial for understanding changes in trends in health outcomes, disease progression and the effectiveness of treatments. And those insights can fuel new, groundbreaking discoveries.
2. We can use the NHS to significantly reduce the cost and speed of developing new drugs and medical devices through trials that can recruit rapidly across a diverse population, access data from national systems and work closely with regulators and clinicians.
3. The NHS could also provide rapid access to a large market for effective and needed innovations in those crucial early years post launch for innovation.
4. And finally, it should be able to provide a market for innovations focused on prevention and maintaining health, which only a long-term, publicly funded model really allows.

We know it can be done because we've got a track record of creating world-changing innovations. You've heard about many of them today - CT, MRI scanners, hip replacements, the monoclonal antibody technology behind a third of the world's new drugs, IVF, genomic sequencing - all UK innovations that have led the world and where the NHS has played a crucial role.

We did it more recently in Covid, developing the AstraZeneca vaccine, being the first to use the Pfizer vaccine and running the Recovery trial, which became the world's largest randomised clinical trial of COVID treatments, recruiting more than 40,000 individuals and providing evidence not only of the effectiveness of steroids, which saved many lives, but also the lack of effectiveness in treatments such as Trump's favourite hydroxychloroquine. The UK also led the world sequencing Covid for new variants, work supported by Cambridge's Wellcome Sanger Institute.

We're now doing it with the Galileo trial, looking at the value of very early markers of cancer and with the use of personalised cancer vaccines with Moderna. Couple the NHS with the guidance of NICE and the regulatory expertise of the MHRA, and we have powerful fuel for any industrial strategy.

However, large and small companies I speak to are still frustrated by the challenges. Right now, we are not fully leveraging the NHS. Perhaps part of the answer is our perception that leveraging sounds like exploiting - this is not the case. The fact is, this is good for the NHS, good for patients, because it means they gain early access to cutting edge research and innovations and benefit from better outcomes more quickly. Opal Sandy's recent treatment for deafness using Regeneron's gene therapy is one of numerous examples I could cite.

It's good for treasury because even if we just consider the age profile of our population, it will not be affordable to keep managing diseases the way we do now. And that's before you consider unknown factors such as further pandemics and global events. It's good for staff by making jobs not only easier but more interesting and more space-time for patients that will attract talent. One of our leading cancer doctors, Richard Gilbertson, came back to the UK from the world's biggest children's hospital in the USA because he saw more opportunities for his discoveries to make

impact here through national programmes such as the Tessa Jowell Brain Tumour Mission, which he leads. And ultimately, it's good for us all because the biggest determinant of the health of the nation is economic wellbeing, having the NHS support growth in the UK is good in terms of income, the added economic activity, but also health outcomes.

So what needs to happen? There are some interesting parallels to other significant national assets, such as defence and intelligence. I was listening to Richard Moore, the chief of MI6, last week. He was speaking about the need for and challenge of moving his organisation from a stance of all innovation and technology coming from within - in other words, where Q branch does everything - to one where they effectively team up with agile and creative outside partners, both small entrepreneurs and big tech, because he recognised that where the advances are coming, particularly in AI, are in those industries.

The Innovation Ecosystem Programme I mentioned at the start, that Roland Sinker is leading, is coming from a similar place. So let me tell you more about the work we're doing. It's a promising development because it's been commissioned by the chief executive of NHS England, rather than being imposed on the NHS from outside, that it is being developed alongside all the relevant industrial partners, patient advocacy and regulatory groups. In a nutshell, it is the NHS asking, "How can we be more than the sum of our parts?" and has the very best global entrepreneurs and companies to work with us mirroring the setup in Cambridge. We want to enable the extraordinary people we have in our NHS, life science industry and universities to join forces, making it easier for them to develop and roll out new innovations across the country. Innovations to one day make dementia treatable, obesity curable and to help people cope with multiple complex health problems.

It has work streams that all parties have agreed are crucial and delivering things that have been talked about in previous reviews. For example, an integrated pathway for medtech to learning by doing, trying out new approaches with partners across the UK and finally looking to the future and preparing for the NHS of tomorrow.

As we look to that NHS future, the innovations that are coming are incredibly exciting. From harnessing AI and miniaturisation of diagnostics, to 3D printing of organs, personalised genetic therapies, breath tests for infections and robots to both help our workforce and enhance our function. What these innovations point to is an NHS that could look quite different for future generations. Imagine a service that detects and diagnoses diseases much earlier, or even prevent them altogether. Creating a true health service rather than a reactive sick service. A service where advances in reading your genes and proteins means different patients in this room will receive different personalised treatments for the same problem, speeding up recovery and allowing people to live independently longer. A service where automation, robots and decision support allow staff to spend more time caring for their patients.

To date, the programme has conducted more than 200 interviews, including with patients, working groups, leaders in the field and commissioned multiple thought leadership pieces. This has identified enablers that need to speed up future-proofing:

1. New estate investment. If we build 40 new hospitals, will they be built for robots and a manufacturer of personalised therapies? How can we bring in private capital to support this?
2. Training of a workforce, particularly around the ability to evaluate and develop policy and deploy AI. Training citizens to engage and look after their own health.

3. A regulatory system that is permissive and forward-leaning, but also can reign back if real-world evidence shows that things are not working out.
4. Innovative and value-based financial mechanisms that allow investment in technologies that could help the NHS, coupled with new ways of dealing with industry.
5. Finally, and most importantly in my mind, is data infrastructure. Secure, cyber-resilient, fit-for-AI data infrastructure. I believe we should think about investing in data infrastructure as important for the future of the NHS as investing in new beds, theatres and buildings. We therefore need to make sure that the digitalisation programme, the NHS federated data platforms and the secure data environments have progressed and harmonised to leverage that power of 60 million for new discoveries and trials.

A final secure data environment lead for the East of England - it's a project that has the potential to allow researchers in academia and industry secure, controlled access to the region's data from hospitals, GP surgeries, local authorities, medical schools and social care systems. Finding new treatments can be a numbers game. The more data you look at, the easier it is to spot problems, clues that can solve health problems that so far have eluded medicine. The first question researchers using the Eastern secure data environment are looking at is why so many people with heart failure end up back in hospital within six months.

But besides those enablers, we also need a change in belief and culture and a different dialogue with the public around the NHS. And here I'm going to echo some of Andrew's comments from earlier. We need to explain that deploying and rolling out innovations is not a side activity detracting from patient care. It is the future of patient care - that the risk of doing nothing with our NHS is far greater than the risk of trying something new that might not work. Innovation is hard. It doesn't always succeed. That doesn't make failures a waste of public money.

I am not optimistic that these changes can be brought about rapidly and uniformly in an NHS battling with waiting lists and often demoralised workforce, crumbling buildings and fragmented IT. At the same time, we need to make progress quickly. I already hear from industry that they are not looking to bring products to the UK and that is bad for all of us. That is why the innovation programme will look creatively at new capabilities in the space between research and care delivery, creating alignment across industry, regulators, government and the NHS on priority areas. Building on the life science missions and then creating scaled-up programmes as we have with genomics, that build the UK's status as an innovative science superpower and make us a wealthier nation.

Given the election period, saying more about the ideas would not be appropriate. But watch this space and I leave you with three thoughts:

1. Invest in data. It's the foundation of new discoveries. And no data, no AI.
2. Like MI6, the NHS has to find a way to work more effectively with innovators and the private sector.
3. And finally, don't forget the critical role the NHS can and must have in creating a UK science superpower.

**MODERATOR:** Thank you, Kristin. And as before, I'll go through the questions raised by the audience on Slido. So we've got a few here and we've got a few minutes to take us through to the afternoon break. I'm sure people want to know the answers to these questions. They've been upvoted by many as well. So first question: Suggestions and vision are powerful. How can we remove the barriers to achieving them? What are limiting steps, practical solutions?

**DR. KRISTIN-ANNE RUTTER:** Well, I think I would start right at that belief about what the NHS is for and with, and that's our knowledge of the public, because as long as we say that everything, apart from focusing on the waitlists and the time in A&E and the elective recovery, then you're not going to liberate the NHS to do some of these things. And everybody within the NHS will believe that if they're not focused on the patient right in front of them, then they're not doing their job. And everybody I work with in the NHS is really motivated to do their job well. So we have to have a new dialogue of how we think about the NHS and value this activity, truly.

And because otherwise, I'd say, why aren't these enablers in place? What's the why? Why we haven't invested in data, why we don't need innovation? I think it's that belief about what the NHS is about. I think then, secondly, the enablers are clear. Some of them, like the MedTech pathway, some of them, like investments in data with NHSX, are already in train, we're building for it. We have to keep doing those things and we have to find the funding in order to invest in them. And both governments have highlighted that investment in data and digital. So would like to see that continue.

And then I think, finally, we do need to recognise that this space between research and delivery of care, is a new specialty, that innovation and trialling, bringing new things forward, requires a different set of skills, a different set of contracting, a different attention. So it's actually recognising this role that the NHS has in this space of, whether you call it translation or innovation, as part of the UK economy.

**MODERATOR:** Thank you. You're quite blessed in this area, actually, at Cambridge Biomedical Campus. But how important do you think the co-location of science research with NHS facilities is?

**DR. KRISTIN-ANNE RUTTER:** I think it's crucial. We had, interestingly enough, someone come over from Australia to talk about whether they should, as a medical school and as a science space, pull out from the hospitals, their research people and concentrate them all in a new cluster. And I think we would say exactly the opposite, that actually having the researchers, the academics, the industry close together is important for the cross-fertilisation of ideas. Also, the cross-fertilisation of people, number of people who have joint positions in the different places, and that just makes things much easier. And it's hard to pass your jobs that you have to drive between or even cycle between if you're in Cambridge. So I do think co-location helps. It's not essential but it does certainly help.

**MODERATOR:** Okay. And then final question is from Alex Oliveira at Dominus Capital Advisors. How can the NHS leverage technology to unify data sets and improve efficiency, perhaps in collaboration with universities or supercluster partnerships?

**DR. KRISTIN-ANNE RUTTER:** I think it has to do this, it started to do this but I think it's a neglected area and I think it probably needs a - it needs again that dialogue with why it's important to do it. There's a lot of worry and skepticism about data with the public, probably some in this room as well. I think protections are in place and the legislation is good now.

**MODERATOR:** Thank you, Kristin. That concludes our session.