Attendees List:

Dr Harpreet Sood
Associate CCIO, NHS England, University College Hospital
NHS Foundation Trust

Professor Shafi Ahmed
Associate Dean, Bart’s Medical School, Consultant
Coloectal Surgeon, Barts Health NHS Trust

Helen Bingham
Head of Knowledge Services and Technology Enhanced Learning
South, Health Education England

Dr Charles Alessi
Chief Clinical Officer, HIMSS International & Adjunct Research
Professor, Schulich School of Medicine, University of Western
Ontario, Canada

Andrew Hall
Chief Executive, Royal College of Radiologists

Dr Pasquale Berlingieri
Obstetrics & Gynaecology, Director of Screen-Based (Virtual Reality)
Simulation Centre, Royal Free NHS Foundation Trust

Dr Alanna Hare
Royal Brompton & Harefield NHS Foundation Trust – Consultant
Physician, Sleep and Ventilation, Deputy Director of Medical
Education

Huzaifah Jearally
Medical Student, University College London

Vibha Sharma
Regulation Policy Manager, General Medical Council,
GMC Strategy and Policy Directorate

Dr Raj Jena
Cambridge University Hospitals NHS Foundation Trust Honorary
Consultant Clinical Oncologist, University of Cambridge –
Radiation Oncology Consultant, Microsoft Research Cambridge

Professor Aziz Sheikh
LSE-Lancet Commissioner, the LSE-Lancet Commission on The
Future of the NHS, Professor of Primary Care R&D & Director
of the Usher Institute, The University of Edinburgh, Co-Director,
NHS Digital Academy

Dr Naila Siddiqui Kamal
Senior Lecturer, Imperial School of Medicine, Associate Director
of Medical Education, London NorthWest University Healthcare
NHS Trust

Jay Stanley
Medical Student, Barts and The London School of Medicine
and Dentistry

Dr Peter Thomas
Consultant ophthalmologist, Moorfields NHS Foundation Trust
Clinical lead for digital innovation at Moorfields

Dr Matthew Williams
Consultant clinical oncologist, Imperial College Healthcare NHS
Trust, Faculty of Medicine, Department of Surgery & Cancer Honorary
Senior Research Fellow Honorary Clinical Senior Lecturer, Imperial
College London

Dr Ian Chuang
Chief Medical Officer, EMEALAAP Health, Elsevier,
Adjunct Assistant Professor UMKC, Department of Biomedical
and Health Informatics
Introduction

Fifteen leaders from acute NHS trusts, medical schools, public organisations and professional bodies joined Elsevier to discuss and debate how to best harness technology to benefit medical practice and healthcare outcomes, principally:

- Exponential change in health systems
- The digitisation of care delivery
- The generation of real-world evidence from patient datasets

The purpose of this roundtable was to facilitate a dialogue about the challenges and opportunities presented by technology for the NHS through the lens of both the medical professionals of today and the “digital native” doctors of tomorrow, whether they are already in medical school or not.

It is a very timely discussion, considering the digital changes being undertaken by the NHS. This paper aims to relate some of the passionate discussions held that day.

“The most important skills for a good doctor are situational awareness, critical thinking and timely effective decision making. How will digital technologies help in these?”

Dr Naila Siddiqui Kamal

“Technology and digital are no longer seen as a standalone. Instead, they are an integral part of the NHS today.”

Dr Ian Chuang
While going digital is important, we need to develop the leadership and the workforce.

Professor Aziz Sheikh

The needs of today’s doctors and patients exceed what the solutions currently in place can offer.

Now more than ever, doctors face the challenges of a sector which is evolving at an exponential rate. Medical knowledge is increasing exponentially, and best-practice is shifting more rapidly than is possible for them to manage. If we want doctors to be able to manage the changing demands we need to change the ways of working, otherwise another 190,000 clinical workers will be needed by 2027.¹

It is a process already in motion, the NHS has responded to these challenges by making technology and digitisation one of its core priorities, as emphasised by the NHS long-term-plan announced in January 2019 and by the Topol review, published in February 2019. It is crucial that these plans and reviews supporting the integration of technology into the NHS are followed through. How technology is implemented to meet needs of today’s doctors will shape the infrastructure for medicine in the future, therefore understanding how the medical process is evolving beyond the doctors of today is key to success.

First: Patients

It is now an accepted fact that the population is ageing, and therefore the number of people with chronic, complex and multiple morbidities is increasing, resulting in increasingly intricate management, whilst budgets shrink.

But this is not the main change when it comes to patients of the future. There is a growing view of patients not as recipients of care, but as customers: more and more, patients want to be a part of managing their own care. This has been driven by technology, creating an environment where it is easier for people to track their own health, with wearable devices for instance, or simply by researching on their condition online. We can foresee that the ‘clinician knows best’ relationship may give way to a ‘shared decision-making’ process.

However, that is only when the recipient of care is willing to engage. Some people choose to remain passive participants in their own health. This divergence has created a management gap which doctors must learn how to recognise and manage.

The evolving landscape of the patient has turned medical care into an obstacle course for healthcare practitioners to navigate. Instead of denying that the landscape is changing, we must ensure that medical staff are ready to face the challenge.

The new landscape is not tomorrow’s NHS’ problem, it is something that is very much upon us and must be addressed now as over 50% of current NHS employees will still be working in 2032.¹

Very few patients are included in conversations about their own health. We need to ask the patients what they want and take them with the clinicians on this journey, you would be surprised how much they engage with you

Professor Aziz Sheikh

Today’s lifestyle changes and technology advancements have evolved the health industry. However, medical teaching is only just starting to change. Disruptive change in medical education must happen now.

New doctors must be able to filter through the increased overload of medical knowledge that is becoming available. This is a skill that can be taught, however, not by feeding a lot of facts to students. This way of teaching neither encourages critical thinking, nor nourishes their human skills such as bedside manners, when they are both fundamental to practicing medicine. Of course, future doctors will still need the medical expertise, but we are increasingly seeing how technology may help users manage their workload. Students must be empowered to use available resources, to develop their critical thinking and forge their ability to analyse data. A new focus on embedding skills from information sciences must be made a mandatory part of medical training.

Change in medical education is already in motion. In 2017, Prof Shafi Ahmed founded the Bart X programme, which teaches AI, robotics, virtual reality, augmented reality, machine learning, biosensors, intellectual property, and more to students over four months. 120 students were mentored to come up with an idea, pitch it, and take part in a hackathon. This is exactly the kind of disruptive teaching that is needed!

Additionally, encouraging students to embrace their different personalities, ways of thinking, and mechanisms supports the heterogeneity of a student cohort. There are as many types of patients as there are of doctors, and medical education should support each individual student in being themselves rather than stifle their individuality to make them try to fit an outdated mould.

The fundamentals of traditional medical knowledge sources are still relevant in a world of digitised health, but we also need to look at other disciplines for a way to improve the traditional mode of medical education.

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"Medical education must not only equip the doctor of tomorrow with the skills to critically evaluate the increasing volume of data and evidence available, but also retain the social and human factor skills required of a clinician."

Dr Alanna Hare

"The fundamentals of traditional medical knowledge sources are still relevant in a world of digitised health, but we also need to look at other disciplines for a way to improve the traditional mode of medical education."

Professor Shafi Ahmed
Third: The Digital Doctor

The NHS has made strides in digitisation in the past, but they were hindered by system-wide changes often failing or becoming outdated by the time they were implemented. The NHS is now more agile and allows clinics to use different technologies from one another, according to what meets their needs best. They understand that one size does not fit all when it comes to technology.

This new agile approach means having to weight the value of every bit of technology before its implementation. That’s a balance for the NHS to get right; time is of the essence when it comes to alleviating the burden on the NHS. On the other hand, decisions made in a rush could end up only burdening the health system further. It is a fine line, but in the end the success of any technology depends on how it is put in place and used. Providers of technology must do their best to assist the NHS and make decisions easier by:

- Making sure their technology is easy enough for the NHS’ current workforce to integrate it in to their daily routine while keeping their work going. The aim of technology is to simplify care, not make it more stressful for already overworked staff

- Identifying which sources are highly reliable and use the latest evidence-based practice sources. Passive guidelines, such as those provided by NICE, are not regularly updated with the latest evidence-based best practice and they can be too static to overcome the challenges of managing complex patients with multiple morbidities

- Ensuring their technology is here to assist clinicians, not replace them. The human side of decision-making is inherent to medicine, and technology should only be a clinical extension of knowledge that allows doctors to rely on more than just their memory to direct care

Providers and vendors who can demonstrate they can be trusted to manage data and share knowledge from the latest and credible evidence-based sources will have a role in assisting the NHS in delivering upon a digital future.

Without reliable data management, we could end up with “artificial stupidity” rather than “artificial intelligence”

Professor Aziz Sheikh
The future of medical education will make increasing use of exciting and transformative technology, but widespread adoption of new innovation must always be backed by solid evidence and consideration of users' wellbeing.

Jay Stanley

Striving for more: What the future of medicine looks like

We're only in the first fifth of the 21st century, but already the medical challenges that will mark this century are emerging. We need to face these challenges head-on, and we will only be able to do that by:

- Investing in digital medicine, genomics, and AI, defined as “new means of addressing the big healthcare challenges of the 21st century” in the Topol Review

- Filtering the amount of data available in a smart, accessible, and efficient way and integrating real-world data in decision-making to turn toward practice-based care in a world where evidence-based medicine is too selective to account for the variation of the real-world population

- Driving continuous improvement in care pathways with an automated feedback loop made of both evidence-based knowledge and real-world data.

- Giving doctors confidence that the information they are using is accurate and reliable, whilst accepting that technology, like all of medical practice, has an associated level of risk.

- Defining the role and responsibility of the machine as part of care protocols to determine, who is accountable when the machine contradicts the doctor’s instinct?

Our stand is that technology is not here to replace doctors. On the contrary, it is there to help them be more human when it comes to care, by spending more time with patients.

The Government needs to help with intelligence resourcing, we are not currently equipped to train the doctors of the future.

Professor Shafi Ahmed
Conclusion

The challenges doctors and medical students are facing, the strain the NHS is under, the growing expectations of patients... These are all reasons why new technologies and digitisation are a change both inevitable and welcomed.

Technology will provide new opportunities for:

- **Medical students to improve their skills**
- **Doctors to stay on top of the ever-changing medical knowledge**
- **Patients to take an active role in their health journey**

It is essential that change is made now to face the challenges that are only starting to arise before the whole health system is overwhelmed. We welcome the recent moves to a more digitised NHS, such as the long-term plan and the Topol Review, but this is not enough, plans need to be actioned. There is a need for a change in curriculums in medical schools, and a thorough implementation of technology into medical care.

The change needs to happen today, not tomorrow.
Doctors of today and tomorrow want different things to the doctors of the past. Doctors now want job flexibility, they want to go travelling, to have second and third careers... We need to consider what the individuals want and design the job to them

Professor Shafi Ahmed

We are teaching them static medical knowledge, when we should also be looking at using key skills from digital sciences, which can respond better to changing information sources over time

Dr Raj Jena

The significance of including basic understandings in disruptive change and technologies should be covered in modern undergraduate curriculum to prepare the future clinicians

Dr Nalia Siddiqui Kamal

Digitisation of health has potential to increase the risk of further loss of the human factors in critical thinking and patient interaction

Andrew Hall

Change is hard, we need to prepare for the future. We may need to redesign the job descriptions across healthcare roles

Ian Chuang

The way medicine is taught is fundamentally broken

Dr Charles Alessi
Will we need to clear every algorithm or mark certain vendors as trusted sources and assume every algorithm coming from them is cleared?

Dr Harpreet Sood

What we need to understand, is that we are not ‘the keeper of knowledge’, we must be willing to go back to the evidence or literature to validate our thinking

Dr Ian Chuang

Embedding technology in the curriculum is fantastic, it should not be just an elective module

Prof Shafi Ahmed

AI in health has an incredible potential, but key challenge is that it has so far been very difficult to evaluate impact in a robust way

Prof Aziz Sheik

Medical education needs to evolve and be engaging for new doctors in a data-driven world. Embracing technology will be at the heart of this.

Huzaifah Jearally

Only a portion of medicine is evidence-based, the rest is an art form

Dr Pasquale Berlingieri