The role of knowledge specialists

Preparation the healthcare workforce to deliver the digital future

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Clinical Librarians, 6 June 2019
The Topol Review

The questions:

1. How are technological developments likely to change the roles and functions of clinical staff in all professions over the next two decades?
2. What are the implications of these changes for the skills required?
3. What does this mean for the selection, curricula, education, training and development of current and future NHS staff?
The Topol Review

The Review has been predicated on the following pre-suppositions:

1. Patients are at the centre of new technologies
2. Improve the accuracy of diagnoses and treatments, the efficiency of care, and workflow
3. Patients empowered to take greater charge of their care using digital tools
4. ‘Gift of time’ in the patient-clinician relationship
5. Education and training of the clinician workforce and the public
The Topol Review: 3 Principles

1. Citizens, patients and carers

2. **Evidence**: The adoption of digital healthcare technologies should be grounded in compelling real world evidence of clinical efficacy and cost-effectiveness, followed by practical knowledge transfer throughout the NHS.

   The workforce needs expertise, standards and guidance to evaluate technology applications.

   A fit-for-purpose, legal and ethical governance framework that patients, public and staff can trust is required.

3. The gift of time
Ethical considerations

There are important legal and ethical implications arising from the use of advanced digital and genomic technologies in healthcare

- Patient safety
- Data governance
- Respect for human dignity
- Health inequalities
- Patients and carers
- Healthcare professionals
- Health system
- Widening Digital Participation
Themes

- Genomics
- Digital medicine
- Artificial intelligence and robotics
- Organisational development
Top technologies

Arrow heat map represents the perceived magnitude of impact on current models of care and, by inference, on the proportion of workforce affected.

- **Telemedicine**
- **Smartphone apps**
- **Sensors and wearables for diagnostics and remote monitoring**
- **Reading the genome**
- **Speech recognition and natural language processing (NLP)**
- **Virtual and augmented reality**
- **Automated image interpretation using AI**
- **Interventional and rehabilitative robotics**
- **Predictive analytics using AI**
- **Writing the genome**
Use case: Telemedicine – Virtual fracture clinics

Case: Fracture clinics at Brighton & Sussex University Hospital

Large and increasing demand on traditional and outdated fracture clinics services. New patients are not seeing the right consultant for their injury.

Solution

Introduced a virtual fracture clinic for acute fracture and soft tissue injuries. This includes a telephone consultation (combining an orthopaedic review and specialist therapist input) and self-management through use of online resources.

Outcome

The virtual fracture clinic model is able to monitor and meet adherence to fracture clinic guidelines. In 2017, over 50% of the 8,000+ new patient fracture clinic appointments were via the virtual fracture clinic and discharged after receiving virtual care. This represents a saving for the CCG of over £700,000.
7.3.1 Telemedicine (Example 1 in Figure 1 – Chapter 3): Brighton and Sussex University Hospital Trust Virtual Fracture Clinics

Virtual fracture clinics, as described in Chapter 3, have been shown to be effective, improving several key clinical performance parameters and potentially providing substantial cost-savings for local Clinical Commissioning Groups (CCGs). If these clinics were introduced nationally, they could potentially deliver very large savings for the NHS.

<table>
<thead>
<tr>
<th>Annually, there are approximately</th>
<th>At least</th>
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<tr>
<td>7.6 million trauma and orthopaedic outpatient appointments</td>
<td>50%</td>
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<tr>
<td>Could be virtual</td>
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Virtual fracture clinic appointments reduce the total number of appointments needed by 15%.

If scaled up, this would equate to a time saving approximating 570,000 15-minute outpatient appointments.

Equivalent annually to approximately 142,000 hours of outpatient clinic time.

80 healthcare professionals’ time back for clinical care.
Recommendations
The Review Board

The citizen and the patient

- engaging and educating the public about genomics and digital healthcare technologies (P1)
- work with patient and carer organisations to support patient education (P2)
- needs-based targeted education and support through existing patient support provision (HI1)
Digital medicine

The citizen and the patient
• NHS online content should be a vital trusted source of health information and resourced appropriately (DM1)
• expand research and development programmes, working with patients to co-create digital technologies (DM2)

Healthcare professionals
• invest in existing workforce to develop specialist digital skills, including the assessment and commissioning of digital technologies (DM3)

Health system
• develop and commission courses to increase the number of specialists in the evaluation and regulation of digital technologies (DM5)
The NHS should create or increase the numbers of clinician, scientist, technologist and knowledge specialist posts with dedicated, accredited time, with the opportunity of working in partnership with academia and/or the health tech industry to design, implement and use digital, AI and robotics technologies. (DM4/AIR5)
Organisational development

Health System

• assign board-level responsibility for the safe and effective adoption of digital healthcare technologies at scale (OD4)
• NHS boards should take responsibility for knowledge management to enable staff to learn from experience: both successes and failures (OD5)
• strengthen systems to disseminate lessons from early adoption and share examples (OD6)

“An open and inclusive innovation culture, prioritising people, an agile workforce, leadership, governance and investment.”
Organisational development: effective KM

Effective knowledge management is essential to enable the spread and adoption of innovation, with lessons from early adoption shared widely (OD6): an innovation culture is dependent on a learning culture.

The NHS must build a reputation as a learning organisation that values and enables the transfer of learning about successes and failures (OD5).

This can only happen with the creation of new senior knowledge management roles.
“Today, we need to prepare students for jobs that have not yet been created, to use technologies that have not yet been invented, and to solve problems that we do not yet know will arise”

Andreas Schleicher
Director for Education and Skills, OECD
Meeting the needs of the current workforce

The current workforce delivering care will need to know for whom, where, when and how digital technologies are able to improve the care pathway and health outcomes.

They will also need to be fully cognisant of information and clinical governance issues, and be aware of any ethical implications.

The strategy should include prioritising time and space to learn, and appropriate forms of CPD, using a combination of face-to-face training, e-learning and virtual/augmented reality.

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Persona: Eddie the Bioinformatician

2013, aged 21:
- Zoology undergraduate
- Recently learned how to analyse genetic sequences of insects
- Interested in genomics and decides to pursue training as a bioinformatician
- Accepted for the postgraduate NHS clinical scientist training programme in clinical bioinformatics

2019, aged 27:
- Now a clinical scientist working as a bioinformatician in Genomic Laboratory Hub
- Excited by potential of emerging technologies and detection of molecular disease markers
- Part time on the genetic analysis from the 100,000 Genomes Project.
Eddie in 2029, aged 37:

- Eddie is now a consultant bioinformatician specialising in haematological cancers.
- Clinical responsibilities include analysing genomic data from live tumour cells for new variants that may require a change in medication or more targeted treatment.
- Lead member of a research group developing new personalised treatments for rare haematological cancers.
- Also spends time teaching patient groups and primary care physicians in the community, and curating new educational resources for patients, clinicians and healthcare scientists.
- He has recently applied for the role of NHS Regional Dean for Genomic Education.
The NHS Long Term Plan workforce implementation group has convened experts to work together on the most important workforce challenges facing the NHS, addressing the recommendations of The Topol Review.

- The technology skills and enablement group is chaired by Sir David Behan, Chair of HEE.
- Sir David has been leading work to map the Topol Review recommendations and other technology requirements from other ALBs.
- A high level work plan is expected for 2019/20.
The skills required to navigate a data rich and digitally progressive health environment are much sought after. We will need to increase capacity by attracting the best technologists, informaticians, data scientists to the NHS.

For technology to be of maximum benefit to the NHS, the entire workforce will be offered the opportunity to develop a broad scope of digital and specialist technology literacy.

We must enable a culture, with our leaders at our forefront, which values technology that makes the lives easier for those who provide services and those who use services.

Planning
Recruitment
Retention

Digital Journey
Culture Shift
Professional and Regulatory Landscape

Capability assessment
Digital Skills Development
Knowledge Management
Technology skills and enablement

- Our workforce will be supported and enabled by the latest technology and access insights from real-world data.
- Our leaders must create a culture where digitally supported care is the norm, where interventions are evaluated using real-world data and evidence.
- We will need to attract the best technologists, informaticians and data scientists by making the NHS a destination employer for people with these skills.
- Our approach will be tailored to the needs of the individual with a balance between generic and more specialist capabilities.
Technology skills and enablement

In 2019/20, our priorities to address these aims are focused on impacting boards, digital leaders, the tech/digital workforce and the general workforce. These include:

• Establish the board level leadership development model and start to deliver 'digital boot camps' for boards/leaders to build tech and data awareness.

• Provide an accreditation/credentialing framework for digital leaders.

• Develop a library of education, learning, knowledge and best practice resources to support the current workforce (generic and specialist technology).

• Work to develop and integrate digital education and learning resources into academic and professional curricula.

• Building on the Topol Review, carry out an audit to assess and plan for future digital roles and skills.

• Set out plans for an expanded NHS Digital Academy to develop digital leadership capability.

• Establish the Topol Programme for Digital Fellowships in Healthcare.

• Develop flexible career pathways, particularly for 'scarce' roles, and establish early pathway initiatives for the future digital talent.

• Continue to roll out the education and training interventions available from the HEE Genomics Education Programme.
Three areas which are required:

1. Are all Boards aware of the potential that digital technology will have to transform the way that healthcare services will be provided?

2. Can we create a movement of clinicians who work using technology alongside their clinical skills?

3. 95% of all jobs in the economy are going to require some digital component over the next few years. How do we ensure that everyone who works in health and care has the appropriate awareness so that those technological changes can be embraced by all of us into the future?
Keeping up to date

- https://topol.hee.nhs.uk/

- Weekly bulletin on the Tech: Sign-up by email to: KnowledgeManagement@hee.nhs.uk

- Monthly bulletin for librarians Sign-up by email to: KnowledgeManagement@hee.nhs.uk
Visit https://topol.hee.nhs.uk/

Questions?
What will the roles of librarians and knowledge specialists be like in 2029?

What do you need to do now to prepare for this?
Knowledge for Healthcare

NHS bodies, their staff, learners, patients and the public use the right knowledge and evidence, at the right time, in the right place, enabling high quality decision-making, learning, research and innovation to achieve excellent healthcare and health improvement.

https://www.hee.nhs.uk/our-work/library-knowledge-services
Digital, AI & Robotics: information and libraries

The rise of the Smart Phone and personal assistant

“I don’t have to visit a library; I just ask and it tells me everything I need to know. I speak to it all day.”

Are collections accessible by AI tools such as Alexa?

“We need openly accessible scholarly information” says Chris Bourg, Director Libraries MIT
This library initiative looks at AI as “machine perception, machine learning, machine reasoning, and language recognition.”

Programme to “identify and enact applications of that will help us make our rich collections of maps, photographs, manuscripts, data sets and other assets more easily discoverable, accessible, and analyzable for scholars.”
Our Professional bodies

Libraries embrace digital innovation

Highlight 4 in the report

Centre for the Future of Libraries focusing on emerging trends – ALA

“CILIP-led review of the impact of AI, machine learning and robotics on the library and information workforce, drawing on the insights of the Topol Review”. April 2020 -
The here and now

RobotAnalyst Text Mining tool sifting evidence for complex literature searches in public health and health research

Meet Hugh, the robot librarian

Digital Learning Platforms – e.g. hoopla
Will a robot take our jobs?

Librarians

Likelihood of automation?
It's too close to call (52%)

How this compares with other jobs:

174th of 366

At work, do you need to:
Negotiate?
Help and assist others?
Come up with original ideas?

✓ Your job is safer from automation

http://www.bbc.co.uk/news/technology-34066941
A final thought...

“Artificial intelligence is able to exploit personal data to tailor content and provide more accurate and relevant responses to search queries. But running counter to this, the post-truth agenda and the advent of ‘fake news’ media has resulted in greater value being placed on human assistance, dialogue and support. This represents an opportunity to expand the roles of librarians and curators to make information more user friendly and quality data more digestible.”

Future Libraries, Arup 2017
1. What will the roles of clinical librarians and embedded knowledge specialists be like in 2029?

2. What do you need to do now to prepare for this?
Thank you for your time

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