

## The Topol Review

# Preparing the healthcare workforce to deliver the digital future

The Topol Review and how NHS Librarians can help to advance its agenda

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**THE NHS  
CONSTITUTION**  
the NHS belongs to us all

January 15 2020

Visit <https://topol.hee.nhs.uk/>

# Objectives:

To enable participants to:

- appreciate the scope of the review, the approach and the principles agreed
- understand the structure of the final report; component elements
- be aware of the Top Technologies expected to impact on healthcare and the healthcare workforce over the next 20 years
- Take an overview of recommendations pertinent to information professionals
- consider the implications for health librarians and knowledge specialists
- consider how health librarians can advance this agenda in the context of Knowledge for Healthcare

# The Topol Review: scope

## 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?



# Three principles

1. Patients: included as partners and informed about health technologies
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 and guidance to evaluate technology applications. A fit-for-purpose, legal and ethical governance framework everyone can trust.
3. The gift of time: wherever possible the adoption of new technologies should enable staff to gain more time to care



# Themes

## Genomics



## Artificial intelligence and robotics



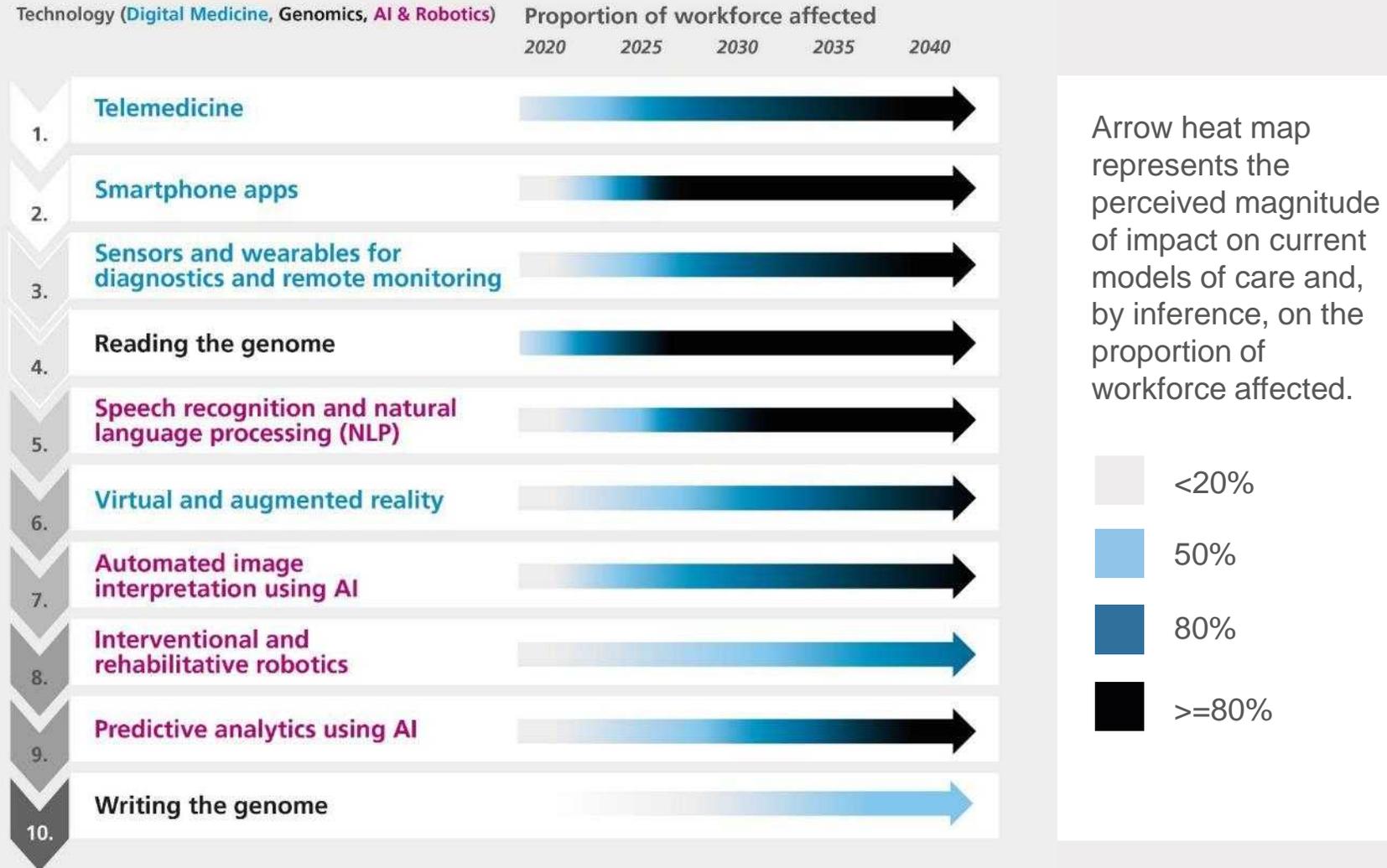
## Digital medicine



## Organisational development



# Top technologies



# Use case: Telemedicine – Virtual fracture clinics

## Case: Fracture clinics at Brighton & Sussex University Hospital

Large and increasing demand on traditional and outdated fracture clinic services.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).<sup>123</sup> If these clinics were introduced nationally, they could potentially deliver very large savings for the NHS.

Annually, there are approximately



**7.6 million**

trauma and  
orthopaedic outpatient  
appointments<sup>124</sup>

At least

**50%**

of fracture clinic  
appointments  
could be virtual<sup>93,125</sup>

Virtual fracture clinic  
appointments reduce  
the total number  
of appointments  
needed by

**15%**<sup>126</sup>



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

# Future scenarios: Interventional robotics

## Scenario: Colonoscopy

Robotic colonoscopy, under development at the University of Leeds and next to first-in-human trials, is designed to be painless and extremely easy to perform.

## Roles/functions change

- AI augmentation allows staff (eg primary care clinicians) to perform procedures
- Can be performed by clinicians in the community without anaesthetic cover or support



# Personas: Eddie the Bioinformatician 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 recommendations

## 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)
- NHS online content should be a vital trusted source of health information and resourced appropriately (DM1)



# Investing in the current workforce

## Healthcare professionals

- invest in existing workforce to develop specialist digital skills, including the assessment and commissioning of digital technologies (DM3)
- lifelong training should be available to healthcare professionals with continuing support in this field (G3)
- educational resources should be developed to educate and train all healthcare professionals in: health data; the ethics of AI; critical appraisal and interpretation of AI and robotics (AI&R2)
- healthcare professionals will need to access training resources and educational programmes in digital healthcare technologies to assess and build their digital readiness. (OD3)
- review the regulation and compliance requirements for new digital healthcare technologies (OD9)
  - Guidance and training on cyber security, data privacy and data anonymisation.
  - Learning from international healthcare systems.

# Education and development of the whole workforce

Staff should have the opportunity to access information about genomics and digital technologies and develop the necessary skills.

- HEE should establish a new Digital Education Programme (E5)
- Employers must ensure that **support for staff to develop and enhance digital literacy is built into training programmes, career pathways and placements** (E6)
- Professional, Statutory and Regulatory bodies and practitioners need to **identify the knowledge, skills, professional attributes and behaviours needed** for healthcare graduates to work in a technologically enabled service, and then work with educators to redesign the curricula for this purpose (E7)
- Organisations responsible for employing and training must **ensure that current and new staff are supported to reach an appropriate level of digital literacy** for their career stage. (E8)

# Digital medicine / AI and robotics

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)

*“New roles in data science, data security, ethics, human factors, implementation science, and interdisciplinary collaborations with EPSRC centres, doctoral training programmes and the Alan Turing Institute”*

# 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.”*

# 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**.





# Three areas for our organisations to consider:

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?

# Our role in developing a digitally capable workforce



# Education: meeting the NHS educational challenge

- The NHS 1.4M staff
- 90% of all jobs will require digital skills in 20 years
- Develop a programme of digital education
- New professional roles
- Educational provision that is appropriately personalised
- Comprehensive learner profile
- Enable and support returners
- Provide time for staff to learn and train
- Make learning fun, exciting and (even) addictive



## Digital literacy for an evolving healthcare workforce

“There is a need to raise awareness of genomics and digital literacy among the health and social care workforce. The latter requires the development of the skills, attitudes and behaviours that individuals require to become digitally competent and confident.

The levels of digital literacy, the workforce’s awareness of the required capability, access to training and support, and skills to enable patients and citizens to improve health and wellbeing through technology will all need to be improved, as a fundamental shift in the balance of skills in the workforce takes place over the next two decades.

This will present new career opportunities for some of the workforce.”

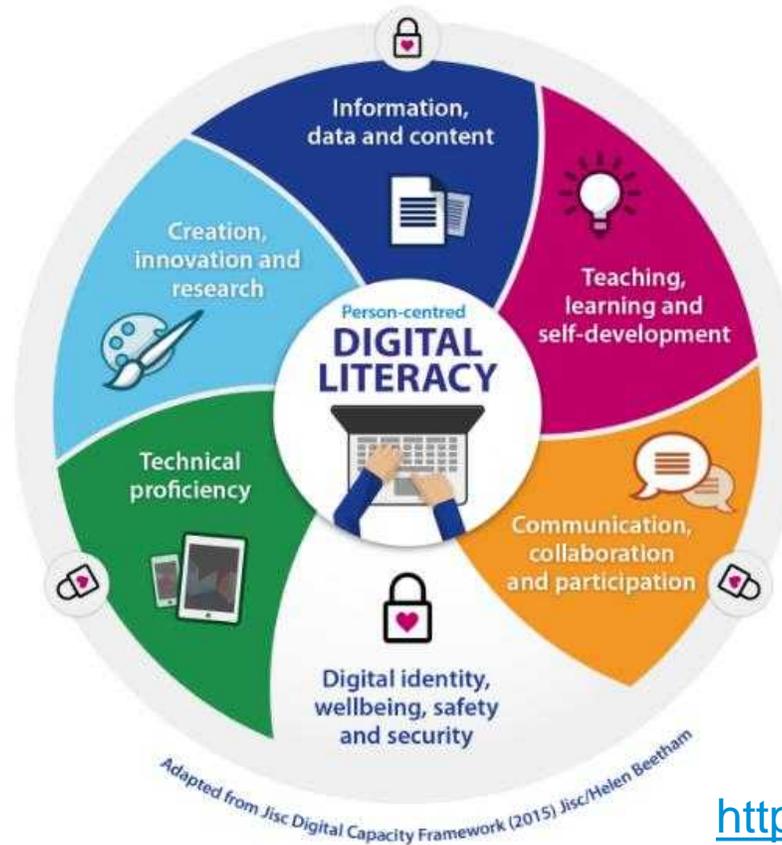
# Digital skills

How will we gain, and what roles will we play in delivering the two different types of skills required?

1. **Digital skills** – the technical skills required to use digital technologies.
2. **Digital navigation skills** - a wider set of skills needed to succeed in the digital world. These include finding information, prioritising information and assessing the quality and reliability of information.



# Building a digital ready workforce



<https://www.hee.nhs.uk/our-work/digital-literacy>

# Our role in developing information, health and digitally literate citizens



# Literacy: 1 in 6 adults is functionally illiterate

- 16% adults in England are functionally illiterate - literacy levels at or below those expected of an 11-year-old
- 21% of Britain's population lack the basic digital skills and capabilities required to realise the benefits of the internet
- Just under 10% of the adult population may never be able to gain basic digital capabilities, because of disabilities or basic literacy skills.
- Where is our role? How can we contribute?



# Digital literacy: Helping citizens benefit from the digital age

- 21% of Britain's population lack the basic digital skills and capabilities required to realise the benefits of the internet
- Just under 10% of the adult population may never be able to gain basic digital capabilities, because of disabilities or basic literacy skills.
- Where is our role? How can we contribute?

# Health literacy: the challenge

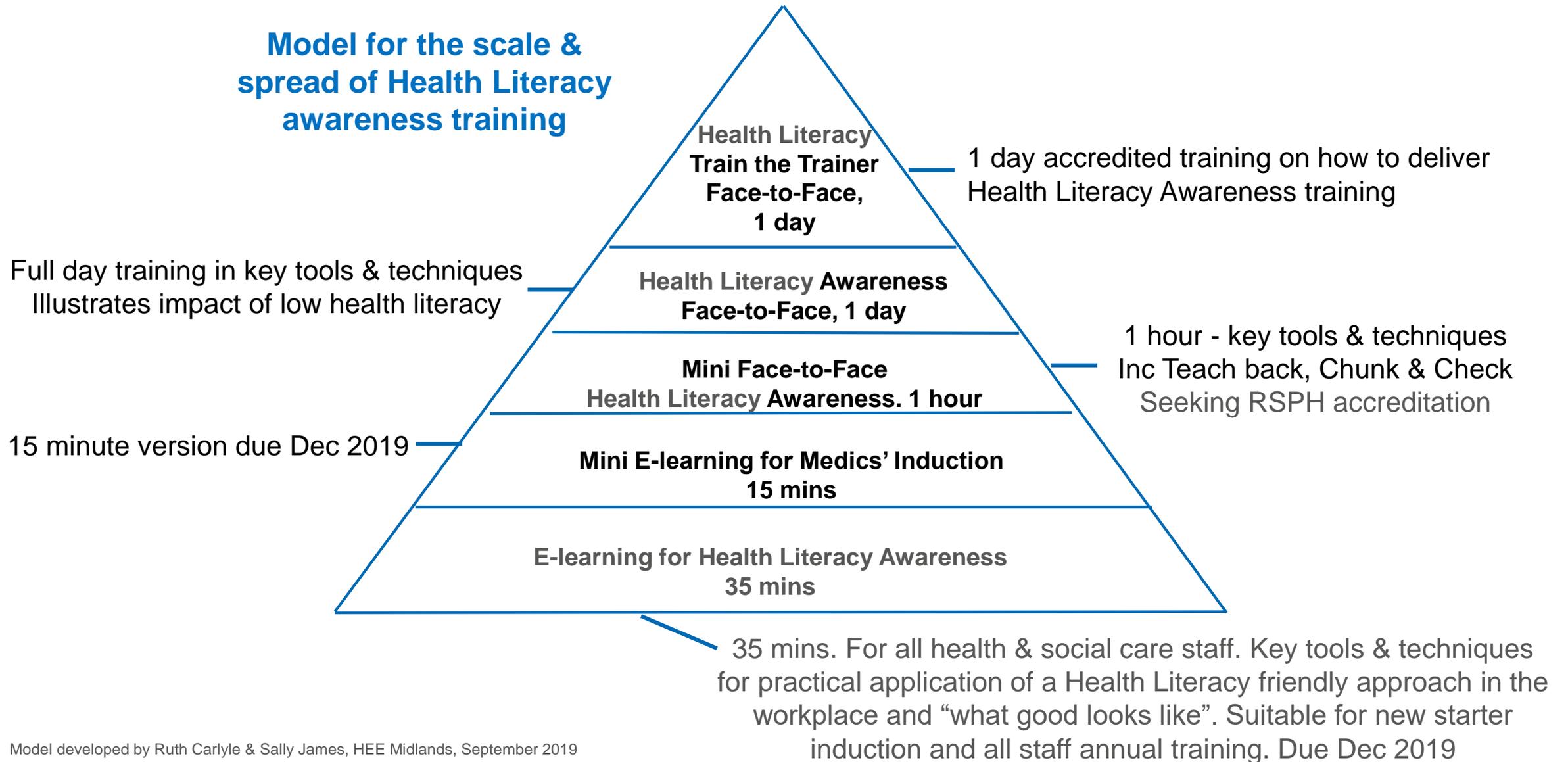
- 42% of working-age adults are unable to understand or make use of everyday health information.
- This rises to 61% where numeracy skills are involved (Rowlands,2015)
- 43% of working-age adults will struggle to understand instructions to calculate a childhood paracetamol dose (Rowlands,2014)
- Where is our role? How can we contribute?



Rowlands et al. The health information gap: ... *BJGP* 2015, 65 e379-386

Rowlands et al. Defining and describing the mismatch between population health literacy and numeracy and health system complexity, 2014

### Model for the scale & spread of Health Literacy awareness training



# How will knowledge services change?



# Re-imagining knowledge services

1. Much of this is about extending the reach of the work we already do
2. Are we anticipating changes in user needs and preferences?
3. What does it mean for the design and delivery of health knowledge services?
4. What does technological change mean for the information products that deliver knowledge for healthcare?

# Fundamental changes in ways of working

## Machine learning for identifying Randomized Controlled Trials: An evaluation and practitioner's guide

Iain J. Marshall , Anna Noel-Storr, Joël Kuiper, James Thomas, Byron C. Wallace

First published: 04 January 2018 | <https://doi.org/10.1002/jrsm.1287> | Cited by: 9

 SECTIONS



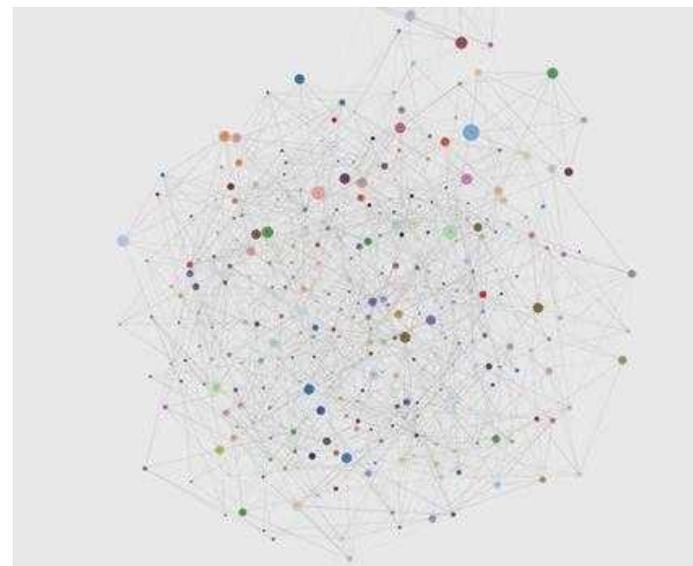
### Abstract

Machine learning (ML) algorithms have proven highly accurate for identifying Randomized Controlled Trials (RCTs) but are not used much in practice, in part because the best way to make use of the technology in a typical workflow is unclear. In this work, we evaluate ML models for RCT classification (support vector machines, convolutional

# Harnessing AI

- Using AI to help people formulate questions
- And to conduct literature searches
- Building technical infrastructure so collections are accessible by APIs and can be used by machine-learning algorithms
  
- To analyse library tasks and workflows
- Using AI to teach information literacy and critical-thinking skills
  
- How will we evaluate algorithms for bias?
- Helping people consider the impact of surveillance and AI on their lives

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



# How will librarians & information professionals prepare?



# Will a robot take our jobs?

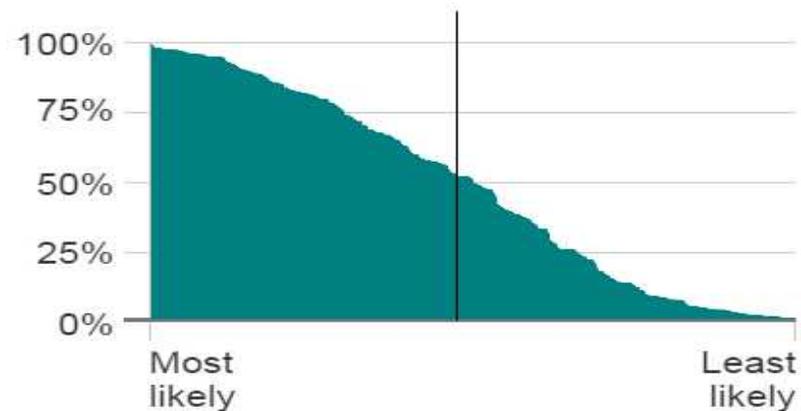
## Librarians

Likelihood of automation?

**It's too close to call (52%)**

How this compares with other jobs:

**174th** of 366



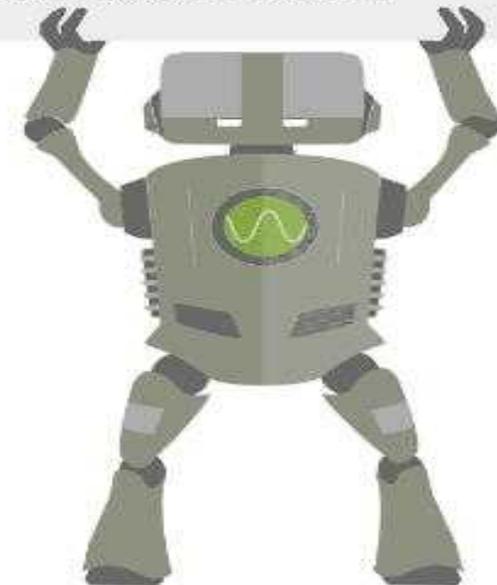
**At work, do you need to:**

Negotiate?

Help and assist others?

Come up with original ideas?

✓ **Your job is safer from automation**



# Re-imagining roles: questions to ask ourselves?

1. How do we ensure that health library and knowledge services staff have the awareness and skills to enable our services to embrace technological changes?
2. How confident are we of the digital capabilities of library and knowledge services staff?
3. How will we build the digital capabilities of our specialist workforce?
4. How do we redesign our workforce for knowledge services?
5. What will the roles of health librarians, information professionals and knowledge managers be like in 2029? How do we build our talent pipeline?
6. What are we doing now to prepare?

# Knowledge for Healthcare

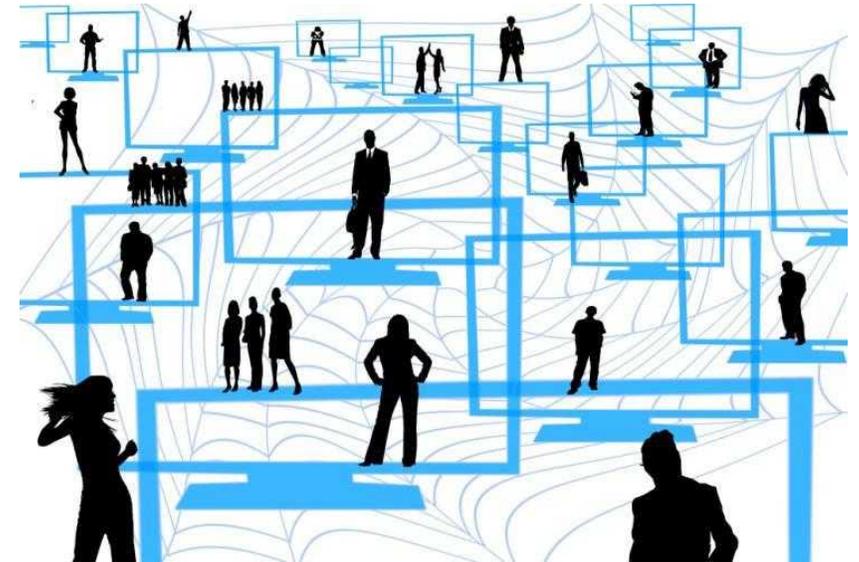
NHS bodies, their staff, learners, patients and the public use the right knowledge and evidence, at the right time, in the right place, enabling high quality decision-making, learning, research and innovation to achieve excellent healthcare and health improvement.



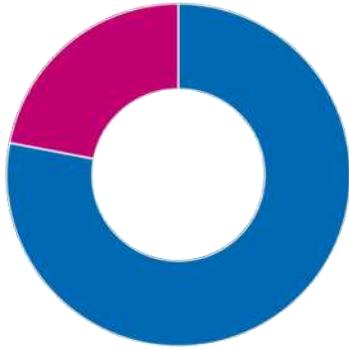
<https://www.hee.nhs.uk/our-work/library-knowledge-services>

# Focus on meeting the needs of health and care

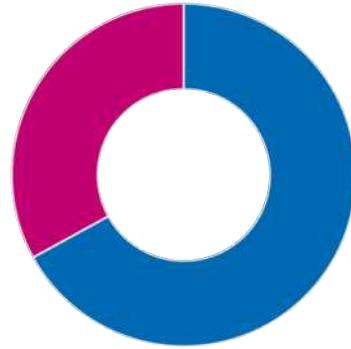
- Focus on priorities and place
- Work together as virtual teams, across boundaries
- Learn together; understand the USP
- The skills of data, information and knowledge management can be learned, but it takes time and experience to become a specialist.
- Demonstrate impact; make the case



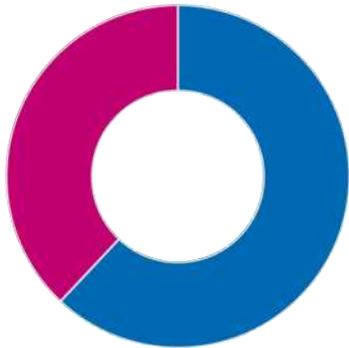
# 'Decision-ready' information



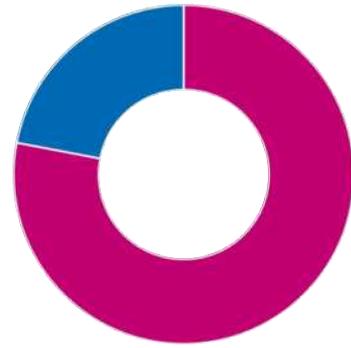
78% provide  
Research  
services



67% lead on  
Acquisitions &  
Licensing



62% provide  
Knowledge &  
Information  
Management



23% support  
Information  
Governance

- A shift from providing Information to providing Insight and Analysis as well as research and discovery
- Trend towards 'decision-ready information'
- Increasingly an embedded profession

# Role enlargement and enhancement

Empower knowledge services staff to drive and deliver the vision of Knowledge for Healthcare by fostering innovation and service development, through role enlargement, role enhancement and role substitution

Page 39 Knowledge for Healthcare



# CILIP response



CILIP will engage with Health Education England to progress three linked programmes, with the common aim of ensuring the supply of talent and skills needed to develop the healthcare workforce of the future. These are:

1. To work with the CILIP Health Libraries Group and Health Education England to review CILIP's Workforce Strategy 2019-2024 to ensure that it reflects the priorities defined in the Topol Review;
2. To liaise with the CILIP Health Libraries Group and Health Education England to explore new approaches to supporting specialist skills development for information professionals in health;
3. To progress a 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

# Keeping up-to-date



## Monthly technology update

Includes evidence and news updates from the previous month relating to emerging technologies in libraries

Sign-up by email to:

[KnowledgeManagement@hee.nhs.uk](mailto:KnowledgeManagement@hee.nhs.uk)

Or please go to

<https://nhs.us12.list-manage.com/subscribe?u=7734b9153778c17c3579695f6&id=d4adc2d967>

# Questions?



## The Topol Review

# Preparing the healthcare workforce to deliver the digital future

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Thank you

# Further thoughts?

By all means send further questions through to [catherine.micklethwaite@nhs.net](mailto:catherine.micklethwaite@nhs.net) for discussion via a blog post on the emerging technologies website