

The Topol Review

# Preparing the healthcare workforce to deliver the digital future

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

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**Welcome**

# 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

This Review proposes **three principles** to support the deployment of digital healthcare technologies throughout the NHS:

1. Patients included as partners and informed about health technologies
2. The healthcare workforce needs expertise and guidance to evaluate new technologies, grounded in real-world evidence.
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



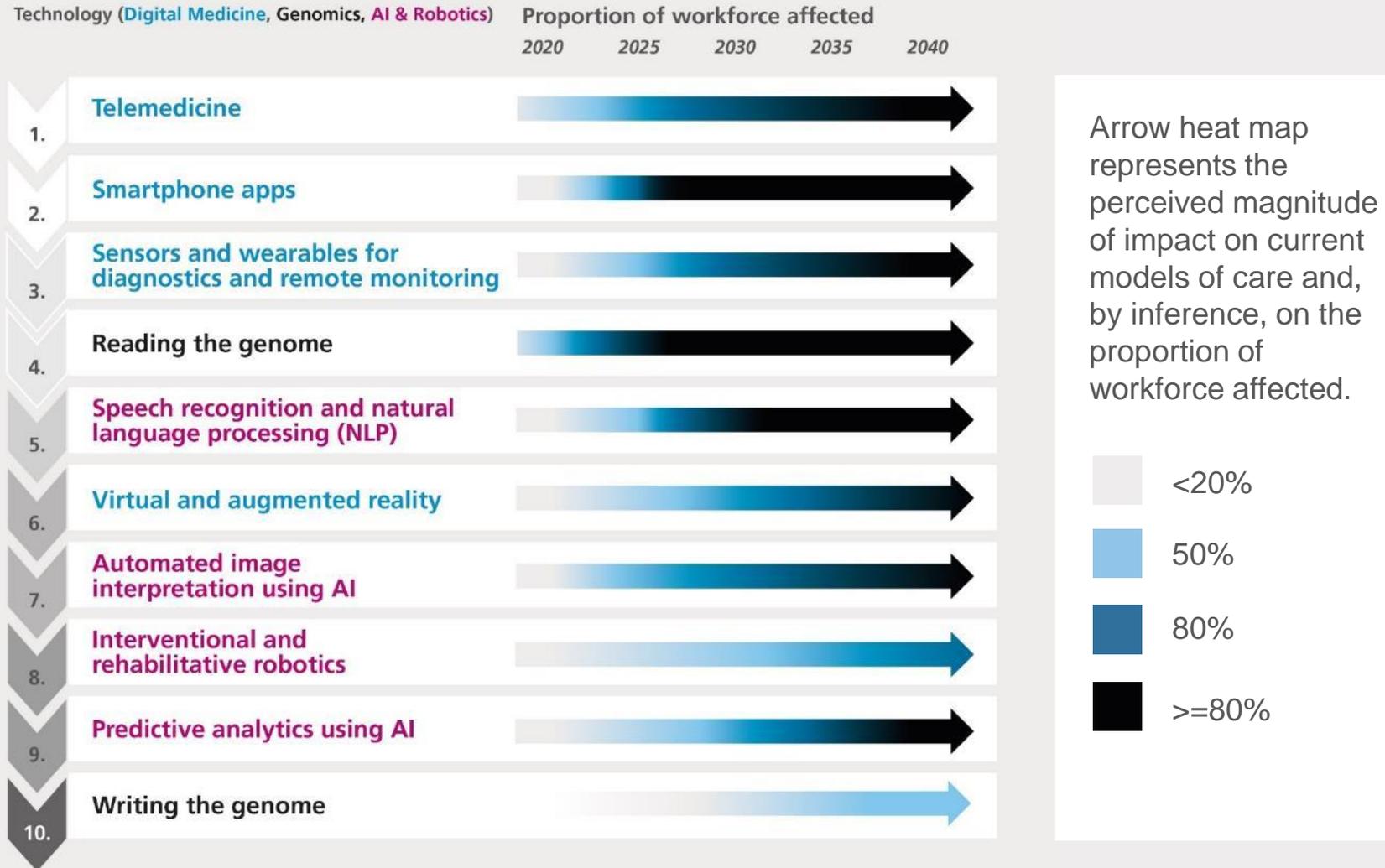
# Ethical considerations

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



# Top technologies



## 7.3.2 Smartphone apps (Example 2 in Figure 1 – Chapter 3): myCOPD app

Chronic Obstructive Pulmonary Disease (COPD) is a common long-term respiratory condition and one of the top five causes of death in the UK. myCOPD is an app that integrates education, symptom reporting and

pulmonary rehabilitation to improve self-management of COPD. Patients who use the app manage their condition more effectively and have fewer unplanned hospital admissions.<sup>127</sup>

Around

**835,000**



people in England alone are currently diagnosed with COPD<sup>128</sup>

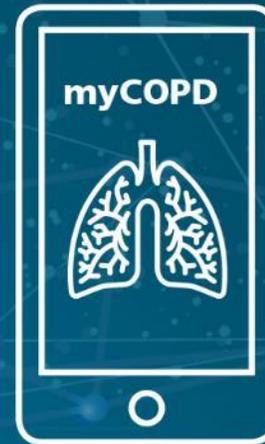
Per year, COPD accounts for approximately



**115,000**  
emergency admissions



**880,000**  
hospital bed days<sup>128</sup>



Users of the myCOPD app saw emergency admission rates reduce by approximately

**19%**<sup>127</sup>



Not all COPD patients will be able or willing to use the app, for example, those with severe COPD or those who use supplemental oxygen.

If 50% of patients with COPD used myCOPD or an equivalent app, reduced admission rates for acute exacerbations would equate to a minimum approximate annual saving of



**84,000**  
bed days



**150**  
nurses' 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)



# Genomics

## The citizen and the patient

- establish a clear, robust framework for healthcare professionals to use genomic data (G1)

## Healthcare professionals

- healthcare professionals should receive core training in genomic literacy (G2)
- lifelong training should be available to healthcare professionals with continuing support in this field (G3)
- accredited genomic training for healthcare professionals to incorporate genomic testing and genomic counselling into their practice. (G4)
- capacity built within NHS Genomic Medicine Service through support for specialist healthcare professionals (G5)

# Genomics



## Health system

- career pathway developed for bioinformaticians, and expansion of Higher Specialist Scientist Training for clinical bioinformaticians (G6)
- framework for genomic leadership developed across clinical specialities and primary care (G7)
- academic institutions should ensure genomics and data analytics are prominent in undergraduate curricula (G8)

# 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)



# 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)





# 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.



# Artificial intelligence and robotics

## The citizen and the patient

- ensure patients are involved from the beginning in the design and implementation of AI software for healthcare (AIR1)

## Healthcare professionals

- 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 (AIR2)

## Health system

- leverage its global reputation and integrated datasets to attract skilled experts from the global community of data scientists (AIR3)
- national programme of 'Industry Exchange Networks' (AIR4)

# 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

## Health System

- frameworks to implement technological solutions and ensure staff are trained to use (OD7)
- support collaborations between NHS staff and industry aimed (OD8)
- 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.**

*“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”*

# Education and training needs

*“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



# The Current NHS Educational Challenge

- 1.4M staff
- Wide ranging roles
- Diversity of backgrounds
- Current training is often one size fits all
- Impact and effect mostly unknown
- Crammed into already busy schedules



# The New NHS Educational Challenge

- 1.4M staff
- New professional roles
- Personalised learning
- Comprehensive learner profile
- Enable and support returners
- Make learning fun, exciting and (even) addictive



# Education and training needs



## Educating the future workforce

- Communicate the excitement and diversity of the future of healthcare practice
- Support high aspirations in all young people
- Articulate the knowledge, skills and professional behaviours needed

# Education and training needs

## Next steps – existing workforce

The NHS, HEE and employers will need to:

- Develop a programme of digital education
- Provide educational provision that is appropriately personalised
- Ensure that education is valued by providing time for staff to learn and train
- Develop a cadre of skilled educators

## Next steps – future workforce

The NHS, HEE and employers will need to work with:

- Schools
- FE and HE institutions
- Alternative education providers
- Professional and regulatory bodies

# Methods of learning

A wide variety of learning methodologies should continue to be employed to support workforce learning through high-quality, co-created resources and interventions, including online, 'bite-sized', 'just-in-time' learning. Technology Enhanced Learning (TEL) can conjure up negative ideas of statutory and mandatory training with claims of educational benefits over traditional learning often going unsubstantiated. However, it can be useful in providing education at scale within the NHS. Blended learning, combining TEL with face-to-face experiences, can provide the essential combination of social, emotional and physical elements of learning. In time, collaborative virtual reality, for example, through holoportation, could potentially replicate the face-to-face element.

# Persona: Salma the paramedic

## Salma in 2009, aged 38:

Salma is a psychology graduate and worked for various medical charities for 10 years before deciding to pursue a new career. She remained very interested in working in the healthcare field.

Following completion of a two-year Level 3 vocational course, she graduated with a degree in paramedic science and recently qualified as a paramedic.

Salma's training contained very little about how paramedics may benefit from evolving technology throughout their careers.



## Salma in 2019, aged 48:

Salma, a senior paramedic, is a team leader in a large city. She is frequently frustrated by the lack of patient information accessible at the scene of an emergency. Furthermore, she would like to be able to provide A&E departments with better real-time information on the patients she is treating, in advance of their arrival at A&E department, in order to streamline the handover and treatment process.

Salma is determined to increase her knowledge and skillset to deploy health technologies at work. She has researched how digital health tools could improve healthcare, but has yet to see significant change or investment in technology that improves her working life. Salma participated in the comprehensive NHS consultation process aiming to capture workforce opinions on their competencies and challenges in adoption of technology.



## Salma in 2029, aged 58:

Salma has seen her work transformed by the impact of digital technologies. She is transported in an autonomous ambulance that drives the most efficient route to an emergency, improving response times. On receiving the patient details, Salma gains immediate access to the integrated electronic patient record that is projected onto a digital display, providing information on medical history, allergies and pharmacogenomics profile.

Salma's smartwatch and smartphone, enabled with mobile vital signs and an ECG reader, and AI-augmented ultrasound scanner, facilitate real-time monitoring and diagnostics. All the data captured are immediately transmitted to the hospital-based team who, with the help of machine learning algorithms providing decision support, can advise, plan and prepare any additional treatment prior to the patient's arrival. Salma receives regular education and training updates on innovation in clinical practice hosted within clinical skills hubs, which model how technology and health data can best be used to improve patient care.



# Next steps

The NHS Long Term Plan workforce implementation group will convene 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 is 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.



“It really will be transformative that eventually... the patient will be truly at the centre.”

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Eric Topol, MD



## The Topol Review

# Preparing the healthcare workforce to deliver the digital future

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Thank you

The Topol Review

# Workshop discussion

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# Discuss

It's 2029. The adoption of technology in the NHS has moved on considerably:

Which changes/recommendations/aspects of the Review have made the biggest impact on this change?

# Discuss

- What will Technology Enhanced Learning for the NHS be like in 2029?
- What do you need to do to prepare for this?

# Thank you!

# Any Questions?

# Download a copy of the report

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

