

The Future Doctor: Scenario Analysis Report

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Executive Summary

The Future Doctor programme aims to identify how the role of doctors is likely to develop in the future and what the implications are for education and training of doctors delivering care into the mid-21st Century.

A range of engagement and intelligence development activities are being undertaken to inform the recommendations and outcomes of the Future Doctor programme. One such activity is the use of scenarios.

Scenarios are widely acknowledged as an effective tool for enabling communities of practice to generate critical insights into the future. Scenarios based on the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA) 'Four futures of Work' were developed in workshops with a range of stakeholders to investigate the potential skills, knowledge and wider competencies that a future doctor could need in 2035.

The following outputs emerged from this process:

- Four scenarios of healthcare in England in 2035
- A patient and doctor story for each scenario, further illustrating how the future may look
- Identified themes and competencies of the Future Doctor.

The eight key themes that were surfaced by colleagues during the scenario workshops as critical features for the doctor of the future were:

1. Leadership;
2. Role in Transformed Multi-Disciplinary Team (MDT) working;
3. Change Management and Emotional Intelligence;
4. Data Interpretation and Communication;
5. Complex Clinical Judgement;
6. Innovation, Research and Education;
7. Flexible working lives and wellbeing;
8. Resource Management.

Several 'core' competencies across scenarios were identified from the above themes, while others were more dominant dependent on the features of particular scenarios. Policy makers should therefore remain vigilant and be ready to adapt their focus as the future develops.

Clearly making firm assertions about exactly 'what doctors will be doing in the future' is a fraught endeavour, as is making cast iron guarantees about what investments should be made in the training and development of the doctors in the future. However, using scenarios and techniques such as 'wind-tunnelling' allow us to provide critical insight into how plausible futures might develop, and how we can ensure our planning can benefit from, or mitigate against, their various implications. The report outlines the structure of the conversations that workshop delegates held about the possible future development of the doctor, providing a record for stakeholders and those exploring possible future trends.

The outputs from this work are being used to support further national conversations on the Future Doctor. They will also be used to develop a set of generic scenarios that can be used to test future planning across multiple work programmes within HEE and with ALB colleagues.

1.0 Introduction

The NHS Long Term Plan, published in January 2019, set out an ambitious 10-year vision for healthcare in England, with specific commitments to take action on prevention and health inequalities, improve quality of care and health outcomes, harness technology to transform services, and get the most out of taxpayers' investment. There has been clear consensus through development of the NHS People Plan process that the healthcare workforce will be critical to future-proofing the NHS beyond 2030. As part of this, HEE has committed to work with key stakeholders and partners to establish a clear view on what the NHS, patients and the public are likely to require from future doctors.

In 2019 HEE established a programme of work named 'the Future Doctor Programme' to identify what is required to respond to the projected demands and needs from the workforce in the future, including the system changes needed to attract, train and retain future doctors. The Future Doctor programme is investigating the role of the doctor, within the context of the future multidisciplinary team, to identify the skills, knowledge and behaviours doctors and the wider team are likely to need in the future to deliver high quality patient care.

A range of conversations and intelligence development activities have been undertaken to inform the Future Doctor programme as part of a continuous process of engagement. This report provides a management summary of a series of three scenario application workshops, undertaken to generate critical insights into the potential skills, knowledge and wider competencies that a future doctor might need in 2035. This report:

- Introduces the concept of scenario thinking overall
- Explains how HEE applied the RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce) scenarios to help us structure conversations
- Outlines the themes that were surfaced along with the competencies within each theme.

It summarises the 'core' skills and competencies that were highlighted by delegates that are likely to endure in each of the themes across the four scenarios, and as a result are likely to be priorities for development in general. The report also highlights those competencies that may come into play should one scenario's drivers start to take precedence over the others.

2.0 Methodology

2.1 An introduction to scenario thinking

Scenarios are defined by the ['Government Office of Science Futures Toolkit'](#) as “stories that describe alternative ways the external environment might develop in the future. Each scenario explores how different conditions might support or constrain delivery of policy and strategy objectives, with the following aims:

- To explore alternative ways that a particular policy area might develop in the future
- To consider how key actors – government, businesses, citizens, competitors – might behave under different conditions
- To identify the key requirements of policy under different conditions.”

Scenario planning is a means of helping to improve the quality of the conversations that communities of practice have about the possible future shape of their endeavours. Scenarios are not predictions or forecasts, but a framework for an ‘outward in’ rather than ‘inward out’ discussion about the future, based on credible, plausible and challenging intelligence. By ‘outward in’ it is meant they start by presenting the reader with an external environment within which they will need to practice their area of work in the future.

Rather than offering a singular prediction for the future of work, this method yields several distinct and divergent visions of what may come to pass. While they are not exhaustive portrayals of the future, they capture a wide range of plausible outcomes and present them in a way that is vivid and easy to grasp, supporting the user to deal with the uncertainty of the future.

In a workforce context, scenarios are widely acknowledged as a tool that can enable communities of practice to consider how their working lives have changed and might change in the future. By undertaking a facilitated process groups are able to imagine how they may need to work in these futures. Set far enough in the future, delegates can freely imagine what skills and competencies might be needed to succeed in these futures.

Using scenarios for planning is widely acknowledged to have several advantages, as they can:

- Help break people out of ‘business as usual’ thinking;
- Introduce readers to novel possibilities while bringing into sharper focus those trends that are likely to play out over time, but which had previously seemed inconsequential;
- Simplify a wealth of information into memorable narratives that are easily recalled and enable collective discussion;
- Give people the space to think about how their community may need to act in situations that are less than desirable.

2.2 About the Royal Society of Arts Scenarios

In order to ensure that our scenarios are built on solid foundations we reviewed several potential future scenario sources. Following careful consideration we decided to use a set of scenarios from the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA) entitled the '[Four Futures of Work](#)', as these were published recently (March 2019), are built on a strong evidence base and, crucially, concentrate on the role of workers in four alternative futures.

These scenarios cover three core questions relevant to the development of future employment:

- What are the drivers behind the 'good work gap' – the difference between our vision of good work and the everyday reality?
- What impact will radical technologies have on the workplace – including but not limited to artificial intelligence, robotics and digital platforms?
- How can we modernise our social contract so that it prepares workers for these shifts?

The RSA's scenarios:

- Shared similar values to those of the Long-Term Plan (LTP) for health;
- Develop from a solid foundation of evidence;
- Highlighted a range of themes that were of interest to the LTP;
- Were detailed and focused on themes of work;
- Offered four alternative 'futures', from which to frame and challenge colleagues.

More detail about the RSA scenarios and the drivers that underlay their development can be found in [Appendix 1](#) of this report. The full RSA document can be found on the RSA website at:

<https://www.thersa.org/discover/publications-and-articles/reports/the-four-futures-of-work-coping-with-uncertainty-in-an-age-of-radical-technologies>

2.3 How we applied the RSA scenarios

The RSA scenarios addressed possible future developments in the overall shape of work for the whole economy. As a major sector, health and social care were referred to, but were not central features. To address this, we worked with delegates to develop and utilise healthcare-focussed scenarios over three one day workshops. These workshops covered three stages.

Familiarisation

- Developing the delegates' understanding of the scenario approach in general.
- Understanding the four RSA scenarios and how they relate to one another.

- The development of teams to champion each of the scenarios.

Development

As we adopted the RSA's scenarios, some development was needed to contextualise and express what they would mean for the healthcare economy in each of these scenarios. These can be found in [Appendix 2](#).

In order to improve accessibility and encourage future use of the scenarios, stories were also developed to illustrate what life might be like for patients and doctors working and living in each of the scenarios. These can be found in [Appendix 3](#).

Application

In terms of application of the scenarios, two related approaches were used. Firstly, delegates considered the scenarios overall and were invited to consider how doctors' roles might develop in each. Delegates then together considered what themes underlying these roles would be of importance for further consideration.

Once the themes were established, a process of wind-tunnelling was undertaken. Each theme was taken to each scenario champion team, who would consider what type of competencies would be most appropriate for each scenario. These competencies were then passed to the next teams to test how they would apply in those scenarios. The outputs from this process can be found in [Appendix 4](#).

3.0 Outputs

Analysis of Core and Scenario dependent competencies

Eight themes were highlighted by workshop delegates as critical for the doctor of the future.

These were:

1. Leadership;
2. Role in Transformed Multi-Disciplinary Team (MDT) working;
3. Change Management and Emotional Intelligence;
4. Data Interpretation and Communication;
5. Complex Clinical Judgement;
6. Innovation, Research and Education;
7. Flexible working lives and wellbeing;
8. Resource Management.

Each of the themes is set out in the following section. As previously described the process of wind-tunnelling has enabled us to identify for each theme which competencies are core across all four scenarios, and which are scenario-dependent.

3.1 Leadership – identified core competencies to 2035

Leadership was considered a core theme for the doctor of the future. In each of the scenarios, complexity will continue to grow and the need for the doctor of the future to demonstrate leadership in a number of contexts would be required. Several competencies were considered as ‘core’ by delegates including:

- A style of adaptive leadership would be a prevailing requirement throughout the scenarios. These would imply core leadership competencies including the ability to facilitate well and enable the work of others.
- Coaching skills would come to the fore, with future doctors seeking to unlock the potential of others.
- Enabling skills were regarded as useful, meaning that they will need to be skilled in assisting colleagues in making decisions.
- As leaders they would also be in a position to facilitate the development of patient involvement, in particular the creation of patients as partners.
- Advocate for others to lead within the MDT when appropriate, knowing when to be team member as opposed to team leader – ‘followership’. (*Also raised as part of MDT working*).

Scenario dependent elements

Those future doctors working within the context of the **Empathy Economy** are more likely to have to exercise a range of so-called softer skills, such as providing guidance to others.

In instances where **Big Tech** has risen the doctor of the future may be more inclined to utilise a more assertive style. With Big Technological companies having such an influence over healthcare delivery there is likely to be less collaboration and reduced interaction due to technology/automation, and doctors may need to develop a more assertive style to influence design and adoption of clinical systems.

With its emphasis on tight control the future doctor in the **Precision Economy** is less likely to pursue a ‘distributive’ style of leadership.

Leaders working in the context of the **Exodus Economy** would require a high degree of resilience compared to other scenario economies due to resource constraints. Patients will be more likely to be required to take a more active role in their healthcare, especially within primary and community care settings.

3.2 Doctor and Multi-Disciplinary Teams - identified core competencies to 2035

The role of the future doctor in team working and the development of multi-disciplinary teams, was very closely linked to the theme of leadership. Delegates were of the view that being able to participate and where appropriate lead in these situations would be an important competency. The following competencies were identified as being core:

- Working with others will require an understanding of the roles and capabilities of the whole MDT within which they work and supporting them to work at the top of their licence where appropriate, whilst allowing variety within roles to reduce 'burn-out'.
- Being able to live the values of the NHS organisations that they are working within and be 'role-models' in terms of behaviours for others in system.
- Demonstrate followership skills and knowing how to contribute to initiatives when they are working in a supportive capacity. (*Also highlighted within 'Leadership'*).
- Work flexibly with a range of partners within an MDT, some of which may not be clinical (e.g. data analysts, support workers, carers etc), and to adapt to working with new roles and ensuring coordination of activities within the evolving multi-disciplinary team.
- Overall, the future doctor's role is likely to change dependent on the context of the patient on different pathways and even at different points on those pathways (e.g. more authoritarian in an emergency situation, more democratic in ongoing care) but will always involve complex decision making, particularly the safe management of patients who do not fit neatly into a particular patient pathway, guideline or protocol.

Scenario dependent elements

The **Empathy Economy** will see an emphasis on doctors having holistic oversight of the patient's care. Doctors will have an emphasis on being the guardian of ethics in the capture and use of data, they will also have a greater role in supporting patients to understand their own data and intelligence.

The future doctor in **Big Tech** is likely to find themselves as having an emphasis on protocol driven decision and handover points set by big tech giants. This would be an environment where some doctors have less autonomy. Whereas, other more senior / experienced doctors might work with big-tech to set and revise algorithms. In this scenario MDTs may be managed by big-tech corporations through Artificial Intelligence (AI).

With its emphasis on detail, doctors working in the **Precision Economy** will have a greater granular information about their MDT colleagues' activities in order to manage resources most efficiently. Doctors in this economy will also have a greater role in supporting patients to understand their own data and intelligence

Exodus economy will see doctors having to exercise skills in working with wider community teams. Doctors are likely to have a role supporting communities of health. There will be more emphasis on making the best use of resources, including devolved responsibility for training, recruitment and retention.

3.3 Change Management and emotional intelligence - identified core competencies to 2035

Given their key role in the system, it was felt that the future doctor will need to be cognisant of a range of skills competencies and behaviours surrounding the management of change. An appreciation of emotional intelligence and the skills associated with this were also highlighted. The following core competencies of change management included:

- Openness to change as since we cannot know the future for certain, but we know it will be different, future doctors must be flexible/agile and willing to adapt to whatever they might face.
- Influencing skills including; stakeholder management skills, knowing who the key stakeholders were their roles and how they might be approached in order to develop services. Techniques regarding persuasion and making the effective case for change were also identified.
- Recognising change and importantly when it's happening as the health care system will continue to develop and so too will its level of complexity. The sense of change will be needed as will the ability to measure the change as it's happening.
- Self-awareness and self-management in terms of adapting to change, linked closely to the competency of emotional intelligence, including the ability to understand their own role and develop this in order to ensure that they continue to be well.
- Knowing how to drive change and teaching others how to change - in this respect demonstrating 'empathy models' for doctors.
- Development of new roles as well as understanding how new roles can be defined and integrated into new ways of working.
- Emotional intelligence was identified as a key competency. The capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically was viewed generally as a key competency that would require ongoing development for the doctors of the future. Not least as doctors will be making a series of decisions and judgements and be confronted with the range of situations that at times require decisions for which there are few easy answers. Whilst the doctor of the future would still be valued for their intelligence and medical knowledge, emotional Intelligence is likely to continue to grow in its value to the doctor of the future across all scenarios.

Scenario dependent elements

In the **Empathy** economy change management would be directed towards the aim of 'making more time to care'. The doctor of the future would use their emotional intelligence to be more attuned to working through influencing others, gaining buy in and enabling them to work through others.

Big Tech will see the future doctor in this context needing to have a deep understanding of patient's needs and how these interplay with the technical environment. The doctors will be providing an important bridge between the technologically driven service and the care that patients need.

Doctors in the **Precision** scenario would need a high degree of emotional intelligence to support patients with complex data about risk factors and to help them make difficult decisions. Doctors will need to manage process to ensure that certain groups are not excluded, by ensuring that the individual patient is kept at the centre.

Doctors working in the **Exodus** scenario would need to become especially expert in converting things that have been researched elsewhere and incorporating them into their working practices.

3.4 Data interpretation/Communication - identified core competencies to 2035

An increase in use of data and associated technologies was identified throughout all the scenarios. However, in some there was a greater grip of new types of technologies than others. As a first sketch of the skills, knowledge and behaviours, delegates highlighted the following competencies:

- Understanding of increasingly complex data (e.g. polygenic risk scores and drug interactions) will be a critical feature of the future doctor community.
- The ability to compartmentalise information to understand which data is important in the context of an issue.
- With the growth of data and data management, the future doctor will require enough knowledge to effectively manage data scientists and the work that they are undertaking.
- Ability to take complex information and apply clinical judgement practically to the context of the individual patient. Interpretation of information according to the circumstances of a patient and effective communication / transfer of this knowledge in a way that is easily understood by the patient / carer / family member and other members of the future clinical team.
- Being able to adapt to, and collaborate with, new technologies and data as they develop.
- Put more knowledge in the hands of the MDT to manage simpler cases according to protocol, freeing up doctors to deal with more complex cases outside of protocols.
- Ability to communicate effectively with other professionals and understand the contribution of each MDT member.
- They will also need to be brave in the sense that they will need to enforce the values and the behaviours that they would like to see develop in the future.

Scenario dependent elements

The Empathy economy would see a greater emphasis on the volume of data being used to harness more time to care, and supporting the continued development of patient experts. There will be an increased emphasis on the development of technical skills to manipulate data and communicate risk effectively, alongside supporting self-care.

The **Big Tech** is likely to emphasise the analysis being undertaken by Artificial intelligence or specialists and given to doctor to interpret data. In this respect the doctor wouldn't need to undertake this themselves.

In the **Precision** scenario the volume of data interpretation would be heavily increased and used to enhance bespoke patient care. Will also have an increased emphasis on the development of technical skills to manipulate data and communicate risk effectively, alongside supporting self-care.

The **Exodus** economy would see data continue to be collected at a similar level to today, but with more emphasis on using it to support resource management at a community level, and require increased resilience to support patients who may have more difficulty accessing services.

3.5 Complex clinical judgement - identified core competencies to 2035

Complex clinical judgement was agreed as certainly a core role for the future doctor to 2035 and beyond. The discussions between delegates revealed how the core of complex clinical judgement may develop over the coming years, but also how it might be shaped if certain drivers become more pronounced over time. The core competencies identified were:

- Significantly more data and information will be available to the doctor of the future. There will be a real emphasis on data interpretation, such as detailed test results. Faced with the plethora of information, doctors of the future will require highly developed communication skills to relate the complex results to patients' carers and to others in their teams in order to ensure informed decision making.
- Likely increased propensity of complex clinical judgement to focus on future-risk management, rather than simply diagnosis of current issues. People will have more knowledge about possible future health issues that they may develop, and therefore a key competency of future doctors will continue to be managing uncertainty and evaluating risk. These may introduce a broader range of ethical considerations especially when looking at information around genetics that may impact on more than just their current patient.
- The doctor of the future will need to undertake an individualised and holistic review of the patient in development of the care plan. The doctor of the future will still need to draw out information from patients that can't be measured. It's felt the future doctor will need more time to achieve this due to the provision of greater information. Further complexity may be added where the patient isn't always physically present.
- Increase in need for clinical judgement at a population level, such as which services / interventions are required to improve a populations' health, in addition to clinical judgement at the individual patient level.
- Many doctors will have significant clinical input into the design of protocols/algorithms that assist in the development of this data and intelligence. In this respect, an element of clinical judgement will be embedded in the products. It will also be necessary for those who aren't part of the process to have confidence in the clinical 'judgement' embedded.

Scenario dependent elements

A great deal of commonality was identified by delegates regarding the effect of **Empathy and Precision Economy**. It was felt we would see the emergence of health consumers, bringing new data and potentially privately purchased test data/results into their interactions with doctors. These could make more challenging interaction with patients if doctors haven't previously seen these. There is likely to be more of an emphasis on a shared responsibility / accountability and a team approach to making clinical judgements. A single doctor couldn't be expected to know the entire holistic view of an individual patient's complexity. There would be an increasing emphasis on supporting patients through shared decision making.

Big Tech emphasises the growth influence of large corporations, who will be driving the development of technology and financing investment in the health sector. It is envisioned that in growing range of cases, technological development manages to take over some elements of complex clinical judgement. Diagnostic skills of the future doctor may be in less demand for this scenario, but they are more likely be called in to address 'wicked' problems or to make agreements with patients about next step. A focus could be on doctors who provide interventions, including surgery where robotics cannot undertake it.

In the context of the **Exodus Economy**, the emphasis for the doctor of the future will be rapid decision making. Resource constraints and risk management will inform which diagnostic tests are undertaken. In this environment the doctor would be placed in a greater position of decision making with fewer opportunities to test and sense check. Delegates signalled that a future doctor in this context would need to consider the impact on wider society as part of the clinical judgement. The aim would be to have individuals contributing as members of the society due to resource constraint nature with a real focus on long-term clinical outcomes.

3.6 Innovation, Research and Education - identified core competencies to 2035

Doctors have a long-established tradition in participating in innovation, research and education in a range of capacities. In some cases, they have worked with universities as academics. In others, they have worked in partnerships with community organisations and with industry. There was a sense, that these types of working opportunities and the development of new medical practices would continue to be a feature of the future doctor's professional life. However, research and innovation will be within the domain of the future transformed multi-disciplinary team and not the future doctor alone.

A number of core competencies were highlighted, including:

- An ongoing need for innovation in order that new ways of working and technological advances can be developed. One of the key issues going forward is likely to be in the dissemination of innovations and making them operational.
- Making effective use of the doctor's time to develop innovations utilising the technology available, as it will be important to ensure that these are utilised to drive real health improvements.
- The future doctor community will need to deal with a range of ethical challenges, so reasons behind research must be made clear to the public. Data security around patient information must be maintained.
- Educating the public in using the technology and in processes/systems in place to support innovation, research and education will be key in each economy.

Scenario dependent elements

In the **Empathy Economy** the ethical reasoning behind undertaking research will play a major role and must be demonstrated clearly to patients. The interest will lie in the mental health and well-being of the patient, throughout the research process and beyond. Patients will need to be educated to use the available data to manage their own care where possible.

In the world of **Big Tech** research, innovation and education will be more influenced by profits and corporate interests of the big tech companies. They will be in the position to choose and fund research projects, and able to select the doctors or hospitals to undertake it. Whilst some Big Tech companies may adopt values that are congruent with the UK's model of providing health care, the presence of big tech companies could heighten concerns and conflicts. Data security and the ethics around research could prove to be issues due to the transfer or outsourcing of data

to external companies. Ultimately, there was a consensus that most doctors will have less direct influence in the Big Tech economy. Some delegates highlighted a possible shift towards a model where doctors are mostly trained to perform routine, physical examinations or procedures that the technology cannot do, for example inserting cannula.

In the **Precision Economy**, due to the abundance of data, areas of research and innovation should be easy to identify. Innovation will become business as usual with technological advances making it easier to adapt. Patients will also need to be educated to use the available data to manage their own care where possible. Remote learning and simulation-based training could feature highly.

Within the **Exodus Economy**, there will need to be a pulling and pooling of different resources to maintain the quality of care provided. Innovation could move focus from patient safety and quality of care towards increasing productivity. Incorporating research into the day-to-day life of a doctor may be necessary so as not to take time away from patients. Education and training might have to be completed in the doctor's own time. Doctors are likely to have a greater influence in the education, training and building of the MDT.

3.7 Flexible working lives and wellbeing - identified core competencies to 2035

One of the most closely aligned values of the RSA's programme and that of the Future Doctor, is the creation of high quality and meaningful jobs. Work should be viewed as a place where clinicians not only create value for patients and those that they care for but also a place where the doctor is able to be satisfied and able to lead a balanced life. If this is achieved, then there would be an improved level of retention in the workforce as well as an improvement in the quality of care. Core competencies included:

- The continued development of MDT / multiskilled teams was identified as crucial across all four of the scenarios if flexible working lives are to be achieved, including improved support for allied healthcare professionals / emerging roles to become fully integrated in the future clinical team. This collaborative working will support rotation through various leadership roles, when appropriate for others to lead (e.g. physiotherapists), reducing the clinical burden, promoting cohesive team working, increasing peer support as a result of this MDT working relationship.
- This reduced focus on the need to constantly lead the patient care pathway may contribute to an increased wellbeing as there is less 'single person dependability', this would reduce the pressure on the future doctor and should improve individual resilience.
- Increased flexibility in the training pathway, promote 'portfolio careers', sabbaticals, training breaks and increased opportunities for job sharing. The rigidity of national recruitment programmes should be reduced.
- Promotion of preventive healthcare and empowering patient self-management, to reduce the strain on the limited workforce.
- Delegates highlighted areas of possible opportunities in each scenario to promote flexible working and wellbeing, these could be 'mined', for further initiatives.

Scenario dependent elements

In the **Empathy Economy**, there would be opportunities to promote conditions that are broadly sympathetic. Here there would be a need to promote the multi-disciplinary team approach. Patients would be able to access more health-related information, and this could cause an increase in mental health issues, so doctors should be more aware of how patients can access appropriate care and have this understanding for themselves, to manage their own wellbeing.

In the **Precision scenario** there would be an opportunity to make better use of technology to increase monitoring of the workforce to take breaks and introduce

smarter rostering to improve shift planning. There is likely to be more focus on skills available across the team rather than a rigid sticking to specific roles.

In the **Exodus Economy** there be pressure to promote wellbeing that doesn't reduce the supply of clinical time. There is a greater emphasis on retention and promoting more flexible working patterns as an incentive to retain staff, in this already limited staffing pool. Doctors have a responsibility to be 'fit for work', so more should be done to support this to reduce instances of burnout, such as enforced breaks, reducing the number of clinical hours for more intense roles, increased peer support, support for doctors living, e.g. on call accommodation to reduce travel time.

Within **Big Tech**, flexible working may be promoted by introducing:

- Global training programmes, to allow free movement across countries, to effectively distribute the workforce;
- Shorter 'specific' training programmes;
- Less intense working due to more algorithm-based diagnosis;
- Increased productivity-based payments.

3.8 Resource Management - identified core competencies to 2035

Whilst some of the scenarios envisaged a widening of the gap between supply and demand for health care, others indicated there would be more resources available. Even where growth in resources was indicated, it was recognized that there would be a need to manage finite resources. Delegates agreed that the doctor of the future would need to engage further in the resource management and relate these effectively to clinical decision making. A number of key competencies were highlighted including:

- The ability to understand the outcomes of interventions and generate evidence that can be used.
- There would be a need to have a firm grasp of population-based medicine.
- The future doctor would also need to offer a clinical perspective on the hard decisions around rationing and prioritisation.
- Knowledge to effectively signpost patients to well evidenced (quality) services, both NHS and non-NHS. e.g. social prescribing.
- Communicating what resources are available to the patient population and managing their expectations. e.g. the more data savvy are more likely to have greater expectations.

Scenario dependent elements

Many of the principles of resource management run consistently through the scenarios. However, there are some important nuances. In the case of **Big Tech** there will be an increased focus on influencing skills to manage the resource available as big corporations would hold more power around resource allocation than the clinical workforce themselves.

In the **Precision** and **Exodus** economies it will be necessary for the future doctor to think more creatively around how to make the best use out of available resources i.e. multiple uses for the same products and be able to think outside of the box.

Doctors in the **Empathy Economy** would require a greater understanding of moving resources (physical and virtual) around the system (in alignment with the precision and exodus scenario views). Specialists would be delivering services from a distance and at scale e.g. patient care and delivering training, as well as increased use of remote medicine (telemedicine).

4.0 Conclusion

The scenario application events have provided the Future Doctor programme with a series of observations about the potential future competencies needed by the community of doctors in around 15 years. These should be considered by policy makers in the first instance, and those developing the agenda for the training and development of doctors, alongside the outcomes from other stakeholder conversations and evidence gathering.

The wind-tunnelling approach undertaken to develop these core competencies within themes also enabled us to make reasoned judgements about the possible competencies that may be needed by doctors if one scenario became more dominant than the others. In this respect, they remind policy makers to be constantly alert to emerging developments, and to underline the importance of avoiding narrow thinking by enabling groups to draw in new observations as the sector develops. Clearly making firm assertions about the exact role of doctors in the future can never be 100% certain, nor can we make cast-iron guarantees about what investments should be made in the training and development of the doctors in the future. This is not to say endeavours such as this are not worthwhile, as they allow us to make decisions based on explicit assumptions that can be monitored and tested over time, and can be adjusted as new trends and different plausible scenarios emerge. This report is intended to provide a record from which those exploring possible future trends can review and build upon. The outputs from this work are being used to support the national conversation on the Future Doctor programme. They will also be used to develop a set of generic scenarios that can be used to test future planning across multiple work programmes within HEE and with ALB colleagues.

APPENDICES

APPENDIX 1 - RSA Four Futures of Work Scenario Summaries and Drivers

One of the key aims of the RSA scenarios was to contribute to the public conversation about how to safeguard a future of good work. They seek to provide insights into the critical challenges that may face workers in the future and offer policy and practice innovations in order to improve the prospects for work in the future. This positive ambition is shared by the NHS long term plan.

The RSA's scenarios were created by the utilisations of 'morphological analysis'. Key to this method is identifying high impact, highly uncertain drivers of change (or "critical uncertainties") and then exploring their potential projections – the different ways they could play out over time. Together, these uncertainties formed the basis of the scenarios. In practice, a projection was selected for each uncertainty and combined these to form a coherent vision for the future of work. One of the key areas of emphasis for the development of scenarios was the impact of technology. A detailed taxonomy of technologies was created by the RSA. Regarding these uncertainties the RSA notes:

'A helpful way of thinking about uncertainties is as though they are dials, which can be lined up and set at different levels (or 'projections') to arrive at a clear pattern. One dial, for example, may point to economic stagnation while another may refer to a slowdown in technological adoption'.

They treated the development and adoption of most major technologies as highly uncertain, even if the impacts could be significant. A combination of these uncertainties would form the basis of scenarios and a combination of these were weaved together to form the basis for the story.

The four scenarios developed by the RSA can be summarised as follows:

1. The 'Big Tech' Economy

- Technological breakthroughs come thick and fast.
- Automation eliminates cognitive and non-cognitive, routine and non-routine roles.
- Tech giants reap the greatest rewards, hoovering up profits and transferring them overseas.
- Jobs are in short supply, with a 20-hour working week the norm.
- Workers are too weakened to take a stand, while tech giants stifle dissent with well-oiled PR machines.
- Tech developments hold out the promise of keeping everybody suitably fed, sheltered and entertained.

2. The 'Precision' Economy

- Technology advances at a steady pace, but the most ambitious projects are abandoned.
- Businesses turn to IoT sensors and big data to create value and spot opportunities for efficiency gains.
- Automation is modest, with most jobs that involve creativity or dexterity secure for the time being.
- But workers are subject to a new level of algorithmic oversight, with ratings systems now pervasive.
- On demand labour grows as firms have a better picture of who they need, at what times and at what skill level.
- Extensive monitoring of people and objects brings about improvements in healthcare, policing and environmental management.

3. The 'Exodus' Economy

- A severe economic crisis raises unemployment and leads to a new round of austerity measures.
- Contingent working practices become commonplace as firms try to cut costs and stave off bankruptcy.
- Investment in innovation drops off a cliff as businesses prioritise short-term concerns.
- Automation is therefore limited, but this keeps the UK economy uncompetitive and unproductive.
- Weakened domestic firms merge in a bid to find economies of scale or are bought out from overseas investors.
- Disgruntled with ebbing living standards, many workers take to the streets, bringing the economy to a standstill.
- Others seek out a different way of living, leaving the cities in droves for a better life in rural areas.
- Those who take part in this exodus find themselves materially worse off but richer in other ways.

4. The 'Empathy' Economy

- Technological breakthroughs are a regular occurrence, often coming from the UK's own tech scene.
- The public's attitude towards technology steadily turns sour as the risks become more apparent.
- Faced with a looming regulatory crackdown, tech companies decide to mend their ways and self-regulate.
- Automation is moderate as firms work with staff and unions to adopt technology on mutually beneficial terms.
- Profits in the main are retained in the UK, preventing consumer spending from dipping.
- People's disposable income flows into empathy sectors of care and education that are most resistant to automation.

- But this work can be emotionally demanding, with people required to manage one's emotions in service of boosting the feelings of others.

RSA-identified Influential Drivers

Each scenario emphasises different trends, ranking from high to low in terms of predicted impact presented in table 1.

Table 1. critical uncertainties ranked within the context of each of the four RSA scenarios

RSA Economies:	The Big Tech Economy 	The Precision Economy 	The Exodus Economy 	The Empathy Economy 
The game changing driver for each economy	Boom in tech capability	Spread of the internet of things and sensors	Economic Crash	New 'norms' for technology
Technological progress/ adoption	High	Medium	Low	Medium
Job Availability	Low	Medium	Low	High
Job Fracturing	Medium	High	Medium	Low
Productivity Growth	High	Medium	Low	Medium
Inequality	High	High	High	Medium
Economic Growth	Medium	High	Low	Medium
Regional Inequality	High	Medium	Medium	Medium
Market Concentration	High	Medium	Medium	Low
Political unrest	Low	Medium	High	Low

As well as the above uncertainties, the RSA set out a series of critical certainties. Unlike uncertainties whose projections are different across all scenarios, the more certain drivers will be constant or uniform across all visions of the future. Nothing is entirely assured, of course, but the following trends were assumed to be broadly certain, barring an unforeseen turn of events:

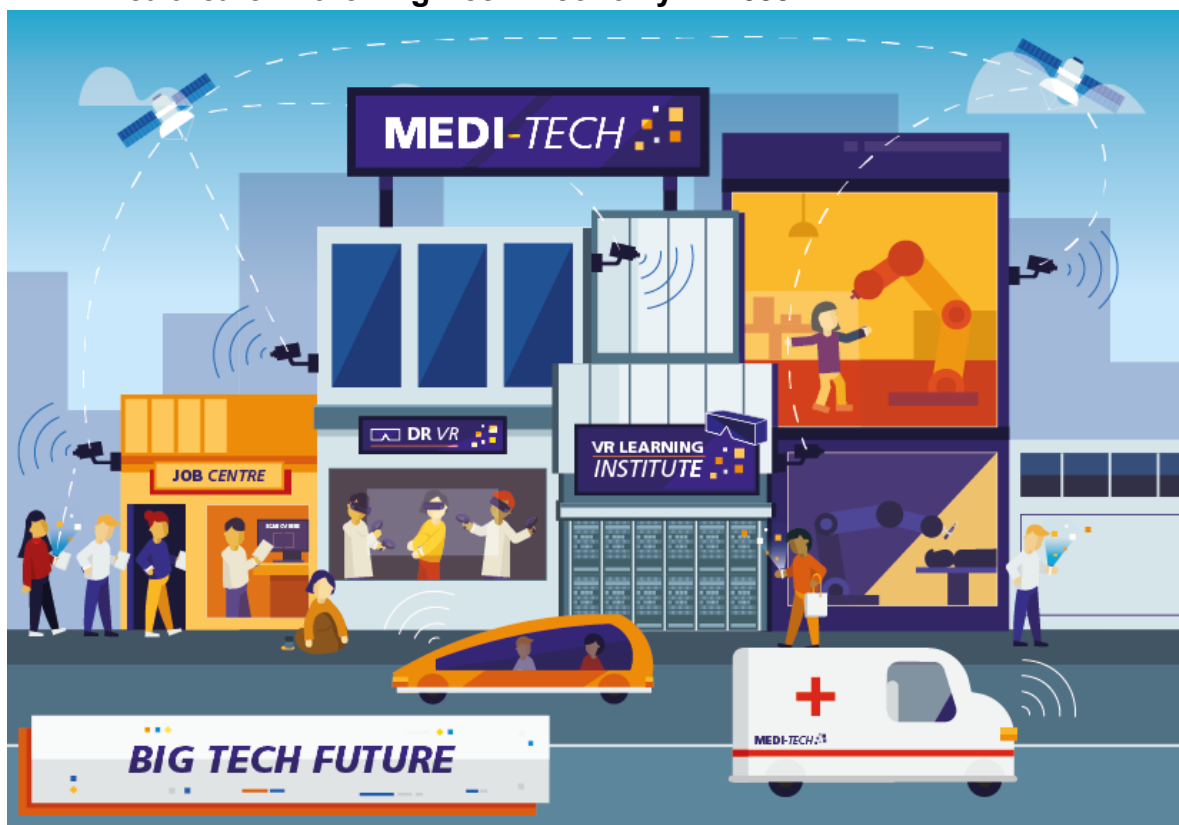
- **The rebalance of global economic power:** China, India, Indonesia and other non-Western countries will continue to grow in economic importance relative to the US and Europe. Some may stutter along the way, but the overall trend of industrialisation in these states will be unrelenting. Economies in Africa, meanwhile, are likely to see high rates of growth as investors seek out cheaper sources of labour. As these non-Western economies mature, so competition for business and jobs will rise up the value chain. The same pressures that affected UK manufacturing workers during the 1980s and 90s may soon be felt by UK professionals in law, finance and accountancy.
- **An ageing society:** The UK population is ageing. Around 18 percent of the population were aged 65 and over in mid-2017, compared to 16 percent in 2007. This figure is expected to grow further to 20.7 percent by 2027. Birth rates could plausibly increase, and life expectancy fall, over the coming years. However, these changes would need to be very significant to stem the gradual ageing of the UK population. Pressure will grow on an increasingly small workforce to care for an increasingly large retired population, both in a financial sense (i.e. paying higher taxes to cover the state pension) but also literally, with care work taking up a larger share of job growth.
- **Climate change:** Recent years have seen an unprecedented rise in global temperatures. The past four years have been the hottest on record, while the 20 warmest have all occurred in the last 22 years. There is still time to mitigate disastrous climate change in the long-run, yet global temperatures are set to rise one way or another in the immediate years. Indeed, while global leaders have pledged to keep temperatures from rising 2C above pre-industrial levels, that would still result in extreme weather events, making some regions uninhabitable. One obvious consequence will be an uptick in migration to the UK, as well as more expensive food imports as climate change devastates agriculture.
- **The development and take-up of prosaic technologies:** While the development of AI, robotics, autonomous vehicles and similar technologies is highly uncertain, other innovations are almost guaranteed to impact workers in the coming years. This includes 5G, cloud computing, gig platforms, and search engines, all of which are either widely adopted already or on track to be. These technologies garner little media attention but will have a meaningful impact on workers. 5G will strengthen communication channels, allowing for more remote working and virtual service provision (e.g. in healthcare). Search engines, meanwhile, will become increasingly sophisticated at finding the right information, improving the productivity and effectiveness of knowledge workers everywhere.

APPENDIX 2 - Developing a picture of the health economies within each future

In order to build on the RSA scenarios, we convened a Future Doctor (FD) Development Group with membership from stakeholder organisations as well as from our Patient Advisory Forum. The FD Development Group participated in three workshops. During the workshops the Group reviewed and built further on the global scenarios developed by the RSA, delving deeper into the themes and competencies that the community of doctors will need to have in 2035, to deliver high quality care and thrive. The focus of the first workshop was to take the RSA's four scenarios and apply them in a healthcare context, to consider the impact on the healthcare system, patients and the public as well as doctors.

The summary outcomes from those discussions are as follows:

1. Healthcare in the 'Big Tech' Economy in 2035



- Breakthroughs in machine-learning have had profound impact on how people are diagnosed and treated.
- Health brands closely associated with reputable 'tech' organisations have continued to grow and they have made their influence felt across the sphere of health and wellbeing.
- Home based exercise classes have become more common place. Few people worry about handing over their data, as sharing the measurement of their very own heartbeats entitle them to a discounted rate. The networked

nature of these classes has meant they have been particularly popular for those undertaking rehabilitation.

- It is now standard practice for patients to wear monitoring type technologies. Smart homes and sensors are popular and the promise of a good standard of care, without extortionate premiums or taxpayer burden, is enough to offset any of the doubts that people may have about their data being shared.
- Physically 'seeing' the doctor, however, is something that patients still do. There are also a myriad of other ways in which the patient can make contact with those providing health advice and guidance. Personalised messaging is not uncommon.
- In the Big Tech economy doctors find themselves having closer relationships with large companies more than ever before, with corporate players including those developing pharmacy and other health care technologies offering close working relationships with NHS hospitals, doctors and other medical professionals. Such companies value the insight that this collective working can offer.
- Many cast doubt on the motives of these companies, who 'at the end of the day' need to make profit in order to survive, but the slick PR of companies, alongside a public health system wishing to do as much as they can within a restricted envelop and insatiable demand, enables these large companies to flourish in 'partnership'.
- This close working with large organisations presents an interesting challenge for many doctors. On one level they will have a considerable challenge in terms of balancing their personal and professional values against working with larger corporations who may have mixed motives. At another level, it is likely that the future doctor will also need to be commercially savvy as they enter these arrangements. Learning how to make innovations spread into service will also be a valuable skill as well as having an understanding business models.
- There will be doctors who are happy to be closely aligned with technology sectors and as such find themselves generously rewarded.
- The mass of data and intelligence being processed highlights how doctors need to become experts in assimilating new intelligence and insights as knowledge and understanding continues to develop. This provides new challenges for doctors as increasingly, there is simply too much intelligence generated for one person to hold.
- Projecting medical expertise both in terms of remote intervention with patients and assisting other medics continues has become common place. With high resolution VR and AR headsets, doctors can 'almost' be in the room to assist colleagues providing complex interventions. This new, almost, intimate level of advice and guidance can be given both to and from doctors. Such a 'projection' of skills is global, and as a result so is its market
- Doctors find themselves in positions of leadership and are held in high levels of trust by the community when it comes to the deployment of new technologies. The deployment of versatile robots, capable of complex tasks and human interaction, are in 2035 ubiquitous in healthcare environments,

and the acceptance of their introduction has been dependent on the promotion to the public by trusted medical professionals.

- Doctors in the Big Tech economy have continued to 'do well' in an only relatively 'medium' performing economy. However, the teams which they are dependent on have fared less well. They have experienced a higher degree of job fracturing and many struggle to find full time employment. Many work shorter (20 hour) working weeks. As a result, doctors find themselves working in teams where a great number of their colleagues are working shorter hours. Consequently, doctors find themselves becoming experts in juggling the tasks of others. As a result, they worry about the consistency of care that their patients are receiving from members of teams.

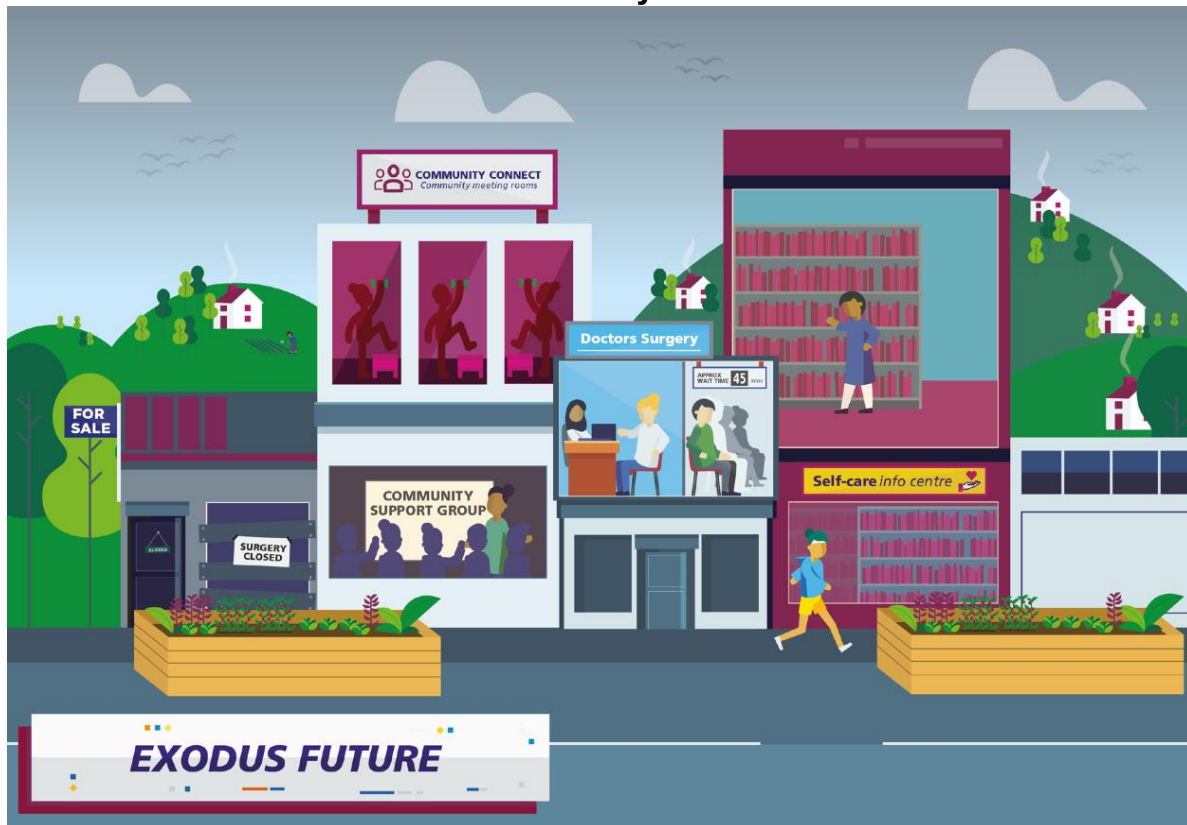
2. Healthcare in the 'Precision' Economy in 2035



- Large scale data sharing dominates with personalised healthcare monitors inter-connected through the Internet of Things (IoT), although many are concerned about the ethical implications of surveillance.
- Growth in genomics and precision medicine (supported by big data analytics) leads to breakthroughs in prevention diagnosis and treatment that improve the physical health of individuals and the population at large. This leads to investment in health promotion taking priority as the requirement for treatment of disease begins to fall.
- Most people are willing to share their health data for the benefit of tailored services, reassured by vastly improved data security. Those that cannot afford their own devices are supported by the NHS.
- Whilst big data is generally inclusive for ethnic minorities and other minority groups, the system finds it much harder to support those unwilling, or who lack the capability, to share data which adversely affects these people.
- Much of the care of patients is driven by highly individualised care protocols. However, the doctor's role remains to lead the multi-disciplinary healthcare team, managing risk as well as dealing with care outside of protocols and developing new bespoke ones to support individual patient care.
- Non-clinical skills like leadership, negotiation and teaching remain core for doctors.
- On-demand labour has impact on the lower-skilled health workforce, but doctors and most other health professionals continue in secure jobs.

- Concerns grow about the broader mental health impact of the 'gig economy' and the pressure of constant monitoring, as well as increasing anxiety through often poorly understood risk scores.
- There is an increase in the 'worried well' based on their greater knowledge, but limited understanding, of their polygenic risk scores. This has also led to growing concerns about over prescribing due to the identification of risks that previously may have remained undetected.
- Doctors have access to more data than ever about the patients they serve, with virtually all citizens regularly capturing and sharing their monitoring data through smart phones and other devices as they work, rest and play. Doctors can immediately access all previous scans and test results on any patient under their care instantaneously wherever they are.
- The government-backed scheme to ensure that all citizens have their genome sequenced since the mid-2020s means that doctors can target the most effective treatments for their patients. The dual focus on precision treatment of disease and more tailored health promotion is prolonging healthy lives.
- Huge advances in pharmacogenomics allow doctors to target specific genetic / disease combinations with the most effective drugs, whilst the problems of poorly misunderstood drug-interactions, which used to cause such difficulties, have also been overcome.
- Gene-editing technologies of more specialist doctors' colleagues have allowed some of the most intractable inherited genetic conditions to be treated.

3. Healthcare in the 'Exodus' Economy in 2035



- Most of the technological advancements promised for healthcare never materialised although 5G is available.
- There are few specialists and large hospitals meaning travelling great distances for specialist care.
- Local communities have had to build effective networks and the population has become skilled at self-care and providing others with support.
- Group sessions, led by local practitioners, are held regularly and are well attended and 'social prescribing' is the norm.
- Some citizens struggle with mental health problems whilst others find that their new lifestyle, away from the stress of the city has greatly improved their mental health.
- Those who embrace self-care feel empowered by this new way of living whilst those less able experience poorer health due the lack of easily accessible traditional healthcare and specialists.
- The doctor continues to have a co-ordinating role as the 'captain of the ship' of the members of the community, and has had to develop excellent leadership and communication skills.
- The doctor must rely on the local practitioners for support within the community to provide some of the required healthcare. Excellent signposting skills are vital.
- New models of health, and social care, have developed with healthcare workers setting up social enterprises. These are also proving popular to the broader healthcare team as they are less hierarchical.

- Prevention is the key for healthcare and the emphasis is keeping people healthy and thus reducing the risk of developing disease.
- Many doctors have ambitions to train further in their area of interest but places at medical schools are limited and competition high.
- It is challenging for the doctor to have to say 'no' increasingly to patients as the demand is continuously greater than the supply.
- An ability to deal with complaints is crucial as the doctor is facing ever-increasing demand and the concerns for a supply crisis are forever looming on the horizon.
- Productivity therefore becomes paramount, but it is an ongoing struggle to address this due to sparse resources and the reality is that productivity is reducing even further.

4. Healthcare in the 'Empathy' Economy in 2035



- Technology developed in support of healthcare delivery has advanced at pace, thanks to partnerships between tech firms and the health system.
- Wearables are commonplace with data willingly shared by most. 'Big Data', with links enabled by the Internet of Things (IoT) and Blockchain are scanned by AI algorithms, leading to new treatments for previously intractable conditions, as well as preventative notifications sent to people's smart devices, designed to alter behaviors. These notifications may suggest contact with a healthcare professional is necessary, though these contacts range from traditional face to face to advanced virtual reality remote clinics. The connectivity of data also allows research to make major leaps.
- Mental Health chatbots allow the patient to share their concerns, with advice and support given in return. Recordings of these conversations are mined by AI algorithms, identifying emergencies, interrupting the chat bot conversation with a Mental Health Specialist if necessary.
- Adoption rates of these new technologies/ways of working vary between regions.
- Though many are willing to engage in the sharing of data for health benefits in return, this is not true of all. Where they are willing, they are not always capable of making use of the data or getting the most from technology; at times this can lead to demand from the "worried well". As such a degree of inequality exists alongside greater patient diversity, as the UK experiences high net immigration.

- Patients lead their relationship with the health service, owning their personal data, though they are not always fully aware of what they are signing up their data for.
- The NHS isn't the 'only game in town', however, as there is a significant rise in the unregulated alternative health and well-being market, with celebrities having the ability to influence the public through personal virtual reality appointments.
- Patients expect their doctor to be aware of the information within the data they share, as well as all health/wellbeing products that may be pushed their way. After all, the small print often says to consult with your doctor if you're unsure or have concerns about using this product. They often expect the doctor to have a deep understanding of their chosen lifestyle with options and advice to fit.
- Doctors are still the gatekeeper to healthcare. Although little can be done to prevent the direct access to the public of the alternative markets, the public do continue to hold doctors in high esteem.
- The doctor's role in patient education is paramount. Compassion, communication and empathy remain core to their role.
- As much as patient expectations are heightened, doctors themselves expect the ability to tailor their careers to their personal needs. This presents challenges as the patient expects a degree of continuity of care, to choose to see the same doctor if they wish. This demand is however offset with the doctor acting as an advocate for other roles within the MDT, helping patients to recognise care from others may be more appropriate for them.
- Across all sectors, private and public there is a desire for local goods and services. In health, we see the hub and spoke model, with generalist doctors within local areas supported by a larger specialist centre. Increasingly patients and public expect the service to come to them in response to higher health related taxation, as well as the norms of other services such as retail.
- Autonomous health vehicles go some way to meeting the need if attendance at a health centre is required. Specialists are also able to make use of robotics housed in local health centres, controlling them remotely. Members of the public that can afford to are willing to pay for private healthcare for an increased level of personalisation.
- Specialist Health Centres have Smart Wards, with much of the monitoring role undertaken by technology. The workforce is increasingly professional in skill mix, responding to technology enabled alerts. Volunteers are a key part of the care team providing regular human interaction for patients, as well as supporting feeding and drinking.
- In this age of human machine partnership, lines of accountability become blurred, but the public still look to people to hold to account. Doctors who are dealing with greater complexity, masses of information and high patient expectations are increasingly susceptible to burn out.
- In response to new care models, research and technological advancement at pace, new roles emerge, both medical and non-medical, placing two-fold demand on doctors; a need to train others alongside increased demand to

stay up to date themselves. These developments also lead to a growing desire for portfolio careers, increasingly there are opportunities for doctors outside of the health system, particularly with tech firms, both in the UK and internationally.

The above have also been captured in 'vignettes' which highlight a day in the life of doctors and patients in each of these economies. These are available in [Appendix 3](#) of this document.

APPENDIX 3 - Pen portraits of 'A day in the life' of patients and doctors in each scenario:

A day in a life in the Big Tech health economy

A Patient story:

Hi my name is Anisha. I live in Bristol. I was cycling on my e-bike the other day on the way to work. And in a completely freak accident my handle-bars broke and sent me into the road. On the one hand I was lucky, I was in one of those lanes reserved for cyclists and auto-buses. They rarely go above 20kmh anyway in cities and since they sorted out the sensors after a few bad accidents about seven or so years ago. Plus, I had my phone and watch with me, these fired off a signal as soon as I hit the deck. A sudden impact pulse was sent out and stopped all autonomous vehicle's in a 25-metre radius. How about that? The only near miss was from a 'traditional' cyclist.

So, I'm on the side of the road. The phone has sent a signal that would confirm some form of impact had happened. And fortunately, other people around me can hail the ambulance. As part of the hailing they tapped their device on my phone that sent my geographic position to the service and the time of sensed impact. For a moment I wasn't classified as an emergency by the AI algorithm. Two hours they said it would take for an ambulance and I was advised to 'uber' it! What?!? Given the pain I was in and the visible blood, the bystander called again, and this time demanded to speak to a human - fortunately, they had enough knowledge of the system. This, so they said, had apparently this happened to a friend of theirs, so they knew what to do. It's more common than you think as the AI algorithms are apparently configured to reduce costs, but, no one seems to care about addressing it.

Eventually, the ambulance arrived and having had my vitals tested I'm assisted by the paramedic who appears to me using some form of exoskeleton. Once settled in the ambulance, and suitably monitored as I've been given plenty of pain killers, the assisted drive ambulance steadily makes its way through the urban traffic to the hospital.

I have a 3D scan during which apparently the AI determines I need urgent surgery. However, it looks like I'm going to have to wait as I'm told there are staffing issues. It's a bit disconcerting as there seem to be lots of people doing different tasks, so I see somebody for one thing and then they disappear, and I see somebody else for another. It's a shame as I don't seem to be able to build up a relationship with any of them to talk to about my concerns.

Hopefully I'll get my operation tomorrow though. I've researched Dr Hamish on my 5G phone and discovered that he is one of the best surgeons around.

Doctor Story:

My name is Dr Hamish and I'm a doctor in the big-tech world of 2035. Where do I start? It's been an exciting couple of years. I guess it's because I've been a bit lucky and happy to take on some new experiences. I've recently completed a form of fellowship with galaxy life-style tech, a subsidiary of one of the tech giants. They were just very interested in my work as an orthopaedic surgeon. The work has been valuable for both sides really. I've been able to extend my thinking on my area of practice, whereas they have been able benefit from my innovative designs for 3D holographic mapping of a joint that enables greater accuracy for incisions. One of the things that has held me in good stead has been my enthusiasm for experimenting with new ways of doing things. And a bit of an affinity for numbers.

Today, we've had a patient brought in as an emergency following an accident where she's suffered a fractured ulna and radius. A detailed 3D scan has already been undertaken and she needs urgent surgery, otherwise she stands a chance of ongoing nerve damage and we'll just have to keep giving her lots of drugs.

We've got some delays though. Not so much me, but we seem to have some holes in the staffing rosters. Whilst we have many machines helping out around here, we still need people, nurses and the wider workforce to physically help and be there to do the tasks, or be on standby to take over in case certain technologies fail.

The trouble is many of these roles have become less attractive as we have restructured in ways that have fragmented roles, reduced their hours and so on. So, we have more people working fewer hours doing smaller parcels of the work.

I've got a couple of calls next week about a few other interesting opportunities. One's in China which sounds interesting. The other's more local. Both, I think, risk moving me away from front line clinical work. The money is of course good, and these opportunities might help me to benefit patients perhaps more globally.

A day in the life in the Precision health economy

Patient story:

My name is Arnold Bulwell. I am 75 years old and suffer from several chronic conditions. Over recent years I have seen a huge change in healthcare. I used to be on a mixture of drugs to treat my conditions and suffered from all sorts of complications that stopped me wanting to take any of them and my health kept deteriorating. However, since I had those genetic tests a few years ago my medication has been reduced to just a couple of bespoke tablets and I feel much more stable. If I forget to take any of my medication, I now get an alert on my phone.

Those genetic tests also showed I had an increased risk of heart attack compared to others my age by a few percentage points. I spoke to one of those new 'NHS Lifestyle Specialists' about it, but I don't want to change my diet - I've never liked salads! I might try to do a bit more exercise though, as walking to the shops occasionally rather than taking the bus will help a bit. My grandson has the same gene and he's changed his diet and increased his exercise levels dramatically since we were told. It's all left me feeling a bit anxious though...

A few months ago I wasn't feeling well and was unable to get out of bed so forgot to take my medication all day – that evening a lovely community support worker came round as they had received an automatic alert from my pill dispenser that I'd missed two doses of medication. He was able to help me to catch up on my medication safely and it gives me great peace of mind to know that I'm being monitored, although I sometimes wonder if I'm being watched all the time even when I go to the toilet!

A few weeks ago, I had one of my regular routine blood tests, which picked up a very early stage of cancer tumour DNA circulating in my blood. I was immediately whisked into hospital for a short dose of treatment. I understand that they caught it before it had time to develop and that I'm now all clear.

I have a smart monitor watch and other devices around my home that keep track of my health. I couldn't afford them myself, so they were prescribed for me – the doctor told me they'd more than pay for themselves by keeping me out of hospital. I know that I certainly feel much happier that if there is a problem I can be seen quickly before I even notice there's something wrong. My grandson laughs at me because he says they aren't the most fashionable versions, but I don't care!

Apparently earlier today there was sensor triggered as it had detected a sudden rise in blood pressure. I have therefore been referred to have an online check-up with that nice Dr Giltbrook and my local pharmacist. Apparently, there is some new data that's been analysed that shows I need to subtly change my drug dosages to optimise my health. Dr Giltbrook has said that she wants to speak to me with my pharmacist to make sure I get the best combination to suit my genetic makeup.

Doctor Story:

My name is Dr Kimberley Giltbrook. As I awake on a warm spring morning in 2035, I know that today is going to be a busy day. As I drive to work, I think back to the early promise of self-driving vehicles and wish that the concept had developed into a form that could be used safely on public roads. Sadly, along with many of the technological promises of the late 2010s, this programme had to be abandoned when meeting road safety standards had been deemed unworkable.

However, I do reflect on the great advancement in the Internet of Things (IoT) and big data that has developed over the last 15 years. For example, my fridge is programmed to automatically order supplies from my favourite grocery stores as my stocks run low, and I can control every device in my home, including heating and security, remotely. Another benefit of this widespread monitoring is that as I head down the road towards my office, I notice all the surveillance cameras automatically tracking vehicles through their number plates, gathering data about all the citizens as we go about our daily lives. However, I still have concerns about the ethical implications of this continuous surveillance.

As a senior doctor I know my number plate is recognised and I feel only slightly guilty that it's obvious that I am being given priority over other users with the traffic lights turning green as I approach each one all the way to my workplace. I know this will also help me later as I go out to do my community work.

As I reflect on my career of over 40 years in the NHS since I first qualified, I am struck by the conviction that the last 15 years have seen the greatest advancements in health and care. As the leader of my local health community I now have access to more data than ever about all the patients I serve, although I have to admit that I often rely on my more junior colleagues to analyse and present the data for me. Whilst I continue to develop my data skills, I recognise that I will never have the innate skills of those 'digital natives' who have grown up coding from primary school and to whom the manipulation of data is second nature.

I appreciate that these changes have allowed for much greater efficiency in my work with patients. No longer do I have to read through scribbled paper notes, or even order new tests as I can immediately access all previous scans and test results on any patient instantaneously through a secure handheld device using the latest superfast 6G. There is more data than ever before with virtually all citizens in the community I serve regularly capturing and sharing their monitoring data through smart phones and other devices as they work, rest and play.

However, my strong belief is that the greatest advances in the last 15 years have been in the area of genomics and precision medicine. The government-backed scheme to ensure that all citizens have their genome sequenced since the mid-2020s means that I am able to target the most effective treatments for my patients. The dual focus on precision treatment of disease and more tailored health promotion is prolonging healthy lives.

The huge amount of data that has been built up over recent years has led to huge advances in pharmacogenomics which allows doctors like me to target specific genetic / disease combinations with the most effective drugs reducing waste considerably and improving the lives of patients. The problems of poorly misunderstood drug-interactions which used to cause us such headaches have also been overcome, leading to huge reductions in unintended side-effects particularly for the elderly and those with multiple conditions. Although much slower to develop, gene-editing technologies of my more specialist colleagues have allowed some of the most intractable inherited genetic conditions to be treated.

The early detection of circulating tumour DNA has enabled huge breakthroughs in the treatment of cancer, with very few new cancer cases reaching the stage where they require surgery, chemo or radiotherapy and a huge reduction in death rates from cancers across the board. The widespread development of polygenic risk scores calculated for each citizen has allowed the setting of bespoke public health and prevention advice and targets for their populations. This has led to huge improvements in overall health and well-being across the population.

However, I have also noted there has also been an increase in the worried well, concerned about what their risk scores mean. This has led me to increase the number of my staff with genetic counselling skills within my multi-disciplinary team (MDT), and they work with individuals to help them understand their scores and ensure a well-balanced approach. None-the-less increasing anxiety levels in some sections of the community are leading to increasing pressure on mental health services.

I am sure that this is linked to the increasing surveillance of workers in the general economy and the fact that full time contracts are a rarity in many sectors these days, with zero-hours contracts making many people unsure of their income prospects. Fortunately, this has not impacted on the medical profession as yet, nor the majority of my healthcare colleagues in other professions, though it is increasingly being used for those undertaking lower grade carer roles.

The MDT that I manage has a range of skills and competencies to support the care of our patients including the development of some new roles including big data analysts. I can see in real time where they all are and what activities they are engaged upon. This allows me to ensure that we are making the most effective and efficient use of resources. The precise monitoring afforded by smart wireless pill bottles allows easy tracking of medication schedules., helping us to support people who forget to take their medications on time, as well as providing analytical data to enable us to offer better care to our patients.

A day in the life of the Exodus economy

Patient story:

My name is Sara. I'm now in my mid-sixties so remember the early 2020's well. It was hard then, after the economic crash we'd just had but since then life has become even harder. We thought things were going to get better but, it didn't go that way, we have only just gone through another economic crash, even greater than the one in 2008.

It has been a difficult time, coping with all the worries about money, work and the services that were previously, although not plentiful, at least reliable. However, it has continually got worse and worse, I lost my job as an administrator, my benefits were not enough to pay for the basics and I finally did what so many others had also done, I packed my bags and moved out into the country.

Luckily my sister and I managed to get a place together. At first, when I realised, I wasn't coping in the city, I felt suicidal as I couldn't see a way forward. It took me a long time to feel able to look more positively. However, my sister has been a fantastic support and comfort to me. We have some savings but have also teamed up with some neighbours and we meet regularly in our village community centre and exchange tips and ideas for how to cope, now that there is less of everything, including healthcare. Here we seek out opportunities to trade some of our skills for goods, within our local community, where we have managed to settle down into a slower pace of life and built new friendships with neighbours and members of our local community allotment group. My sister and I are careful to look after ourselves, exercising and eating as healthily as we can. Recently we have even started growing some of our own vegetables and trading with neighbours.

The fresh air, and the simpler diet is doing me a lot of good, I think. This new way of living is strangely rather empowering for me. I'm also enjoying the support from my neighbours and community group. We know we need each other! I'm conscious that some of the people in my community aren't that lucky and a couple of neighbours have passed away recently before even getting to see a specialist for the care they needed.

One or two neighbours have told me in confidence that they are feeling depressed and are worried as they know that the local doctor is struggling with the waiting list and they don't feel they can keep going to see her, asking for help that isn't readily available. In fact, I've heard recently that the doctor is really struggling keeping up with her workload.

I know that although our local doctor, and the team that supports her, are working very hard they only have limited resources. If I develop something serious, I know I have a very long wait to get to our regional hospital for an assessment. In fact, my expectations on what can be done for me by the NHS have greatly reduced over the years and the only NHS priorities now are cancer, midwifery and mental health.

In spite of that worry I'm actually feeling better in myself than I have for a long time. What worries me greatly though is that I've heard that many of my old friends who stayed behind in the city are experiencing great hardship and I do worry about what's going to happen to them. I can't say I miss the city at all.

I'm thinking about setting up a co-op with some friends providing healthcare and I'm using my savings to pay for training to become a healthcare assistant as I feel I need to do my bit to help. We are planning to get a pharmacist joining us which is crucial as we need someone who can prescribe medication to avoid having to wait to see the doctor.

Doctor Story:

I'd only just got through medical school when the first economic crash of the 2020s happened. That was both lucky and unlucky! Obviously, I had qualified and was able to practice. However, there are now far fewer places available at medical school and I know that I will therefore be under great pressure with staff shortages and long waiting lists. My clinical skills will naturally have to be my focus, as I'm needed to make quick and accurate diagnoses and apply my knowledge to treat my patients to the best of my abilities. My training has been good though, there was a lot of emphasis thankfully on leadership, coaching and resilience skills I know will be crucial in my work as a part of a multiskilled team, and better support patients to self-manage their conditions making decisions about their care options.

Waiting lists for my clinic are huge and therefore, once patients get to see me, they are quite ill and desperate for a diagnosis. Once I've been able to help with that, I will emphasise to the patient that they are unlikely to get to see me again for quite some time. Anything beyond the immediate clinical work I have to leave the patients to try and find out for themselves, although I try to help by signposting them to other services.

Patients have to rely a lot on themselves to get better and I emphasise that they will benefit from learning as much as possible about their condition and how to care for themselves. In the regional hospital I'm now working we are under a lot of pressure and although we are working as hard as we can, we keep getting told we are actually becoming less productive than before.

I'm not happy with that as you can imagine but I'm looking at ways of resolving this, leading a team of doctors from the communities within my patch, providing them with regular training and discussion sessions remotely. I'm thankful that although technological development has slowed down significantly at least we have 5G and can communicate effectively. I've heard that this type of 'hub' working is common in other communities too and I can see why as for us its proved a very effective way of sharing knowledge, and it's great support too for me to engage with other doctors and build up friendships that I can call upon for some much needed peer support.

Some of us have also talked about setting up, or joining, one of these new social enterprises that are now mushrooming around the country. I can see quite a few

benefits and I'm going to explore further with one of my friends who is a pharmacist. We have talked a lot about what has happened in our country recently and, although it has been harrowing at times to see what the impact of the financial crash has had on people, we are trying to be positive.

One of the things we take strength from is that we have to have a much better understanding of the community we work within and we are therefore developing a real partnership with our patients and in fact the wider community.

I mentioned technology earlier, well, the equipment in my hospital is now pretty old fashioned and we don't have much IT support. There is so much more I could do if we had better technology, and I could be so much more efficient. Just getting hold of a patient's case records is a nightmare! I have to spend time during the patients' appointments asking more medical history questions, because I can't always access the records I need.

I do enjoy my work though and although I'd like to develop skills in oncology, I've got to know more about just about everything as our hospital no longer have specialists in each area. We have some new staff coming in from abroad, however we've been told that their qualifications aren't immediately transferable, so they have to work in more junior roles whilst retraining on the job. I have heard work is being done to improve this process and it would make it a lot easier to attract and retain medical staff from abroad.

A day in the life in the Empathy health economy

Patient story:

My name is David and I turn 60 years old later this year. I use the Health Tech UK online medical platform, primarily because it is UK based, with my data also being stored in the UK. It's slightly more advanced than the platforms freely available on the NHS in what it can monitor, though I must admit I don't fully understand all the information it generates. I pretty much agree for it to link to whatever data it requests access to. It uses data from my Smart Watch and gives me prompts based around exercise and diet, to the extent I receive health warnings about food and drink I have purchased at the supermarket. Like the freely available online medical platforms, it is linked to my national health record and interacts with NHS appointment booking services, as well as connecting directly with NHS Urgent Response. I bought a one-year subscription to it for my Mum for Christmas three years ago, but she still hasn't activated it.

I have just arrived at my Community Health and Well Being Centre for my appointment with Dr Jenny loane. I always choose Jenny, she's great. Happy to answer my questions about the latest health advice being pushed to me via Health Tech UK. I know she's very popular and though it can be disappointing if I can't see her, I do feel assured that she trusts the other members of her team.

However, I am a bit nervous today. This is the first time I am attending an appointment that my online medical platform has scheduled for me at my Community Health and Well Being Centre. I know it's not an emergency, but still I am anxious. I was alerted via my Smart Watch that it had picked up a cardiac irregularity.

Now I've had my appointment I can say that the service was great, and I needn't have worried! I was picked up by a self-driving car, accompanied by Lesley, a volunteer. The self-driving cars still amaze me. Once I agreed to my appointment via my online health platform, I was requested to share my location using my phone 3 hours before my pickup time, then 30 minutes before my pickup time I was given an option of pick up points, one of which was directly outside my front door so I chose that. Lesley connected me up to some scanners in the car and informed me the doctor would be using the results at my appointment.

Initially I had thought to decline the self-driving car as the last few weeks I have been a little low on exercising, receiving a few reminders on my Smart Watch. However, my curiosity got the better of me, and I can always go for a long walk when I get home.

Doctor Story:

I am Dr Jenny loane and I have worked in the North East my entire career. My parents emigrated to England before I was born, and both are doctors. I studied my

undergraduate degree in the North East, graduating in 2028; taking slightly longer to graduate as I did an MSc in Health Technology Development in the United States sponsored by health technology company, before completing my final year. Many of my peers did something similar. The tech company offered me the opportunity to return to this area following the completion of my degree, as well as offering to support me to undertake my postgraduate training, but I declined. I always had the desire to complete my training in my home region with the hope of better understanding the population's needs.

I am now a General Local Population Doctor working from a Community Health and Well Being Centre covering a population of around 60,000. Though I am very much a generalist, I have some specialist interests that I am undertaking research in, child obesity and virtual world addictions. Both are a real problem in my local area. Having the flexibility to pursue my research as well work around my caring responsibilities has been a great help.

Today, I am running a scheduled Virtual Reality appointment clinic all morning, but this afternoon it's a more traditional face to face clinic for patients who have been alerted as a result of algorithms that an appointment should be scheduled for them. These can be for a wide range of conditions and ailments, with patients typically a little more anxious. The data available in advance from wearables makes for more effective appointments. For example, a Specialist Cardiologist will be providing remote advice to me in one of the appointments while I consult with the patient this afternoon.



Health Education England

APPENDIX 4 - Wind-tunnelling Scenarios: Outputs from workshops

The following eight slides are derived from the wind-tunnelling undertaken by members of the reference group.

Change management / emotional intelligence



Change management in this context would be more in line with the values that doctors are being instilled with in 2019.

Change management would be directed towards the theme of 'making more time to care'.

Emotional intelligence -the empathy health economy doctor would want a closer relationship with the team members. The would be more attuned to working through influencing others, gaining buy in and enabling them to work through.

Doctors in the precision scenario would need a high degree of emotional intelligence to support patients with complex data about risk factors. Doctor will need to manage process to ensure that certain groups are not excluded, by ensuring that the individual patient is kept at the centre. The ability to use precise data about every individual, including their genetic make-up to design tailored patient pathways will mean that there is a constant need for change management, especially as ongoing developments through the analysis of big data lead to new and diverse treatments. The doctor will need strong change management skills to guide the MDT through this process and manage risk, so all are working well together. Use of motivational interviewing to arrive at the correct approach for the patient.



Emerging core:

Change management

The ability to 'influence' change, knowing who the key stakeholders were, their roles and how they might be approached in order to develop services.

- Recognise change and when it's happening, the health care system will continue to have a high degree of complexity. The sense of change will be needed as will the ability to measure the change as it's happening.
- Self-management in terms of adapting to change, linked closely to the theme of emotional intelligence, it is the ability to understand your own role and develop this in order to ensure that you continue to be well.
- Knowing how to drive change and teaching others how to change
- Empathy models for doctors
- Development of new roles

Emotional intelligence

The capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically. Was viewed generally as a key competency that would require ongoing development for the doctors as the future. Not least as doctors will be making a series of decisions and judgements and be confronted with the range of situations that at times require decisions for which there are few easy answers. Emotional Intelligence may become more important than IQ?



The tone of change management is likely to be reactive in this context. For many there is a sense of making do and borrowing. Doctors working in this situation would need to become expert in converting things that have been researched elsewhere and incorporated into their working practices.

The emotional intelligence would be a second nature to many of those working in what is a more community based environments.

But there would be a level of authenticity for the doctor. The changes are often forced by circumstances in this environment

There is a tension, between the interpersonal structures of the Big Tech environment, with its emphasis on large scale technical interventions and the caring and the personal engagement that doctors would have to make.

They will be the ones making the grey area decisions and a lot will continue to be asked of them. Doctors will need to know what goes inside the algorithm in order to be able to justify their own decisions to themselves as professionals and to patients.

The Future Doctor in this context will need have a deep understanding of patient's needs and how these interplay with the technical environment. The Doctors will be providing an important bridge between the technologically driven service and the care that patients need.



Resource Management



There is a need to prioritise risk. i.e. risk of not delivering a service vs. risk of delivering

- A heightened understating of mental health and the services patients are able to access
- The ability to understand and action, moving resources (physical and virtual) around the system (*agreement with precision scenario view*)
- Specialists delivering services from a distance and at scale e.g. patient care and delivering training
- Increased use of remote medicine (telemedicine)

- Managing the 'free resource' as the number of volunteers increase
- Understanding of the care options available within the local community setting and making the best of that resource
- Ability to move the available workforce around the system, making better use of practitioners
- Influencing skills, to manage the resource available as the big tech scenario implies corporations would hold more power than the clinical workforce

Emerging core:

- Ability to understand the outcomes of interventions
- Firm grasp of population-based medicine
- Rationing and prioritisation
- Knowledge to effectively signpost patients to well evidenced (quality) services - NHS and non-NHS. e.g. social prescribing
- Communicating what resources are available to the patient population and managing their expectations. e.g. the more data savvy are more likely to have greater expectations

The ability to understand and action moving resources around the system i.e. interpreting data to enhance bespoke patient care (where possible) to better allocate resources

Both the Precision and Exodus scenarios would benefit from doctors with oversight of the available workforce. With the authority and ability to move the move roles around where appropriate. i.e. management skills'. It is necessary for the 'Future Doctor', to think more creatively around how to make the best use out of available resources i.e. multiple uses for the same products (think outside of the box). Multidisciplinary teams working will be crucial and so a clear understanding of the skill mix and services is a must. Emphasis on a firm grasp of population-based medicine and the ability to communicate what resources are available to the receiving population, managing their expectations e.g. availability, waiting times. There is a need to prioritise risk given limited resource risk of not delivering a service as resource aren't available to deliver all services identified as beneficial to the patient vs. risk of delivering. It is necessary manage the budget available in the most cost effective way e.g. estates, cost of care.



Data Interpretation & Communication



The volume of data is harnessed to support more time to care in the Empathy scenario

Emphasis on development of patient experts who support others through their lived experience

Shared emphasis on technical skills to be able to manipulate data as required, coupled with ability to communicate risk effectively. Both scenarios would seek to empower patients to use their data to support self-management

The volume of data interpretation is heavily increased in the Precision scenario and used to enhance bespoke patient care.



Emerging core:

- Need to understand increasingly complex data (e.g. polygenic risk scores and drug interactions)
- Ability to compartmentalise information to understand which data is important in the context of a particular issue
- Sufficient knowledge to effectively manage data scientists
- Ability to take complex information and apply clinical judgement practically to the context of the individual patient
- Adapt to, and collaborate with, new technologies and data as they develop
- Put more knowledge in the hands of the MDT to manage simpler cases according to protocol, freeing up doctors to deal with more complex cases outside of protocols
- Ability to communicate effectively with other professionals and understand the contribution of each MDT member

Data Interpretation & Communication:

“The ability to interpret and assimilate large quantities of complex data, and communicate risks and options to patients in understandable ways, supporting the individual patient in their context with appropriate clinical judgement”



Access to data would continue at a similar level to today, but more emphasis on using data to support resource management at a community level. Risk profiling data used to support rationing – ownership passed to communities to decide which services are offered. Doctors need resilience to communicate bad news to patients about reduced access to treatments due to higher referral thresholds.

Emphasis on analysis being undertaken by AI or specialists and given to doctor to exercise clinical judgement, rather than the doctor needing the skills to do it themselves. Requirement for doctors to understand of the financial constraints on the system as more may be possible but not affordable

Although there is a large volume of data, increased AI supports the interpretation in Big Tech



Innovation, Research & Education



The ethical reasoning behind undertaking research with play a major role, and must be demonstrated clearly to patients. The interest will lie in the mental health and well-being of the patient, throughout the research process and beyond.

Wearables will play a major part in innovation and education. Basic self-management will be expected of the patients, with patient education being key. They will be expected to know how to use the wearable, while the doctor will be educated in how to interpret the data. Remote learning and simulation-based training could feature highly.

Due to the abundance of data, areas of research and innovation should be easy to identify. Innovation will become business as usual with technological advances making it easier to adapt.



E-rostering could support the facilitation of training by identifying shortage areas. Similarly, learner-driven identification could help with shortage areas. Doctors will have more autonomy and will identify areas of interest, concern or shortages

An asset-based approach involving community care, housing, etc. was suggested with intentions of driving health improvements.



Emerging core:

- Making the most of what is, or isn't, available. Whether it is making effective use of the doctor's time or of the technology available, it is important to utilise these to drive health improvements.
- Ethical reasons behind research must be made clear to the public. Data security around patient information must be maintained.
- Educating the public in using the technology and in processes/systems in place will be key in each economy.

There will need to be a pulling and pooling of different resources to maintain the quality of care provided. Innovation could move focus from patient safety and quality of care towards increasing productivity. Incorporating research into the day-to-day life of a doctor may be necessary so as not to take time away from patients. Education and training might have to be completed in the doctor's own time. Doctors are likely to have a greater influence in the education, training and building of the MDT.

Most research could be dictated by profits and corporate interests of the big tech companies. It was said that the big companies could choose and fund research projects, selecting doctors or hospitals to undertake it. The presence of big tech companies and their technologies could heighten existing concerns and conflicts.

There might be a shift towards a model where doctors are mostly trained to perform routine, physical examinations or procedures that the technology cannot do, for example inserting cannulas.

Data security and the ethics around research could prove to be issues due to the transfer or outsourcing of data to external companies. Ultimately, there was a general consensus that doctors will have less influence in the Big Tech economy.



Doctor in Transformed MDT (incl Doctor as 'Role-Model')



Emphasis on doctors having holistic oversight of the patient's care.

Shared emphasis on doctors role to be a guardian of ethics in the capture and used of data alongside other members of the MDT.

Shared emphasis on supporting patients to understand their own data and participate actively in decisions about their care.

Emphasis on doctors as leaders and managers, having detailed granular information about their MDT colleagues' activities in order to manage resources most efficiently.

Ability to manage performance of dispersed MDT to support improvement.

Emerging core:

- Doctors will need to -
- role-model ethical behaviours and demonstrate values
- understand the roles and capabilities of the whole MDT within which they work and support them to work at the top of their licence
- demonstrate followership skills as well as leadership
- work flexibly with a range of partners within an MDT, some of which may not be clinical (e.g. data analysts, support workers, carers etc), and to adapt to working with new roles and ensuring coordination of activities within the evolving multi-disciplinary team.
- The doctor's role is likely to change dependent on the context of the patient on different pathways and even at different points on those pathways (e.g. more authoritarian in an emergency situation, more democratic in ongoing care) but will always involve complex decision making.

Doctor in Transformed MDT:

The future MDT should work in "an atmosphere of mutual respect and value for the various members, ensuring that the full potential of individuals within those teams can be realised."
"All members need to function effectively together in teams that develop flexibly as advances in healthcare delivery come on stream"



Emphasis in Exodus is on MDTs as wider community teams drawing in non-clinical elements including social care and voluntary sector. The mismatch between supply and demand is likely to grow, bringing a focus on community rather than individual health. Doctors are likely to have a role supporting communities of health. More emphasis on making the best use of resources, including devolved responsibility for training, recruitment and retention.

Emphasis on protocol driven decision and handover points set by big tech giants to maximise profitability. Some doctors have less autonomy ('drones') and are compelled to undertake specific routine tasks as determined by algorithm. More senior / experienced doctors work with big-tech to set and revise algorithms. MDTs may be managed by big-tech corporations through AI. Some new roles developed to support early diagnosis to reduce costs



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Flexible working lives & wellbeing



- Increase in holistic care and so less demand on diagnostic
- Promote patients to be more accepting of care from other specialties when appropriate and so less demand on doctor leadership
- Patients are able to access more health related information and this can cause an increased in mental health issues, doctors should be more aware of how patients can access appropriate care and have this understanding for themselves, to manage their own wellbeing

In Exodus low cost wellbeing is sought that doesn't reduce the supply of clinical time, due to the limited clinical capacity. There is a greater emphasis on retention and promoting more flexible working patterns as an incentive to retain staff, in this already limited staffing pool. This can be promoted early on by increasing the emphasis on staff inductions, in particular for those coming from abroad.



Emerging core:

MDT/ multiskilled teams was identified at crucial across all four of the scenarios. This collaborative working will support rotation through various leadership roles, when appropriate for others to lead (e.g. physiotherapist), reducing the clinical burden, promoting cohesive team working, increasing peer support as a result of this MDT working relationship. This reduced focus on the need to constantly lead the patient care pathway may contribute to an increased wellbeing as there is less 'single person dependability', promoting individual resilience.

Increased flexibility in the training pathway, promote 'portfolio careers', sabbaticals, training breaks and increased opportunities for job sharing. Reduce the rigidity for national recruitment programmes.

Promote preventive healthcare and empowering patient self management, to reduce the strain on the limited workforce

- Opportunity to cycle staff in and out of more stressful roles
- Shift towards a more generalist workforce

Doctors have a responsibility to be 'fit for work', more should be done to enforce this, to reduce instances of burnout - enforced breaks, reduce the number of clinical hours for more intense roles, increased peer support, support for doctors living . E.g. on call accommodation to reduce travel time.

Make better use of technology to increase monitoring of the workforce to take breaks and introduce smarter rostering to improve shift planning.

Focus more on the skills within the team rather than specific roles, allowing:

- Transition across roles based on skills, ability to adapt careers by widening the options
- more flexibility around responsibilities – easing the individual burden/ workload
- More flexibility with taking leave - paternity

Big Tech has an abundance of data for those able to access it, doctors in this environment must be able to work flexibly to navigate between treating the more informed vs. those unable to access this level of technology.

Flexible working can be promoted by introducing:

- global training programmes, to allow free movement across countries, to effectively distribute the workforce.
- Shorter specific training programmes
- Less intense working due to more algorithm based diagnosis
- Increase productivity based payments
- Workplace support to promote staff wellbeing



Complex Clinical Judgement



Empathy and Precision had a great deal of commonality.

It was felt we would see the emergence of health consumers, bringing new data and potentially privately purchased test data/results into their interactions with Doctors – potentially making for a more challenging interaction with patients if haven't previously seen these.

There would be more of an emphasis on a team approach to clinical judgements. A single Doctor couldn't deal with the entire holistic view of patient/complexity. Emphasis on shared decision making.



Emerging Core

- Significantly more data and information will be available to the Future Doctor; a real emphasis on data interpretation (Doctor would receive this in the form of a test result) and communication skills. *Note: data interpretation and communication were considered as stand-alone skills.*
- Greater emphasis on risk management, rather than diagnosis of current issues, which will introduce a broader range of ethical considerations.
- Consider a more individualised and holistic view of the patient in development of the care plan. Emphasis on the Doctor extracting from the patient what can't be measured, though it's felt the Future Doctor will have more time to achieve this due to the provision of greater information. Though complexity may be added where the patient isn't always physically present.
- Increase in need for clinical judgement at a population level – what services/interventions are needed to improve a populations' health, as opposed to clinical judgement at the individual patient level.
- The Future Doctor will have significant clinical input into the design of protocols/algorithms.

Would be expected to consider the impact on wider society as part of the clinical judgement – aim to have individual's being a contributing member of society due to resource constraint nature – real focus on long term clinical outcomes.



Emphasis on the need for rapid decision making. Resource constraints and risk management around what diagnostic tests are undertaken. A sense that Doctor would control decision making more.

Conflicts with the emerging core from this scenario, primarily due to financial drivers and technological takeover/automation of elements of complex clinical judgement.

Diagnostic skills of the Future Doctor will be much less in demand; focus will be on Doctors who provide interventions, including surgery where robotics cannot undertake it.

Strict algorithms would prescribe action Doctor can take – limited freedom for patient engagement.

