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INTERIM REPORT

Data Driven Healthcare in 2030: Transformation Requirements of the NHS Digital Technology and Health Informatics Workforce

Summary and Recommendations

HEE Digital Readiness Programme
March 2021

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Data Driven Healthcare in 2030: Transformation Requirements of the NHS Digital Technology and Health Informatics Workforce – Summary and Recommendations

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1. Background

This report was commissioned by HEE's Digital Readiness programme to identify the capacity and capability challenges facing the NHS digital technology and informatics workforce (the 'digital workforce') in the next 10 years. The challenges identified are the outcomes of a project focussing on acute secondary care but can be applicable to other health and care sectors. A set of methodological steps was used to draw out these challenges and involved the development of scenarios describing what the future could hold for this part of the workforce. It also involved a demand-forecasting exercise whereby senior NHS digital leaders estimated the workforce size, and considered job role and skill requirements in the context of these scenarios.

Information from the exercise was used to model projected demand, and data from the NHS Electronic Staff Record used to model projected supply, for the digital workforce for the period 2020 to 2030. Particular attention was paid to workforce demand and the job roles and skills needed in a scenario called the Data Driven Future. This scenario reflects the digital transformation ambitions of the NHS, as set out by the Topol Review and NHS Long Term Plan, because it envisages a ubiquitous flow of data around the health and social care system and the extensive use of IT, machine learning technologies and artificial intelligence (AI) in the NHS. A review of reports and journal articles published in this area was also undertaken to contextualise and report on the findings from the demand-forecasting exercise. An alternative scenario, called the Data Desert Future, was also used in the exercise to obtain estimates of workforce demand where there has been a cautious and cost-conscious approach in the development of digital technology in the NHS.

The main findings from the demand-forecasting exercise has led to a number of recommendations that will underpin key parts of the HEE Digital Readiness proposed delivery plan over the coming years. This report therefore acts as a very important driver to ensure that HEE and key stakeholders (see Section 5) understand the required capacity and capability when shaping the future digital workforce and are able to put in place the mechanisms to bridge any gaps.

2. Main findings

Realising the ambitions of the NHS (the Data Driven Future scenario), through data-driven healthcare, digital transformation, and technology-supported organisational change, requires a workforce with the right job roles and specialist skills in health informatics and data, digital, information technology, and knowledge-management services. An increase in staffing levels and changes in the composition of the digital workforce between 2020 and 2030 will be needed to realise these ambitions in the NHS. The main findings of this report are:

- (Figure 1) The projected NHS digital workforce demand for an ambitious future indicates that a significant increase in the overall number of staff will be required. The increase is in the region of 69 per cent, or an additional 32,000 whole-time equivalents (WTEs) in the workforce, from its current size of 46,000 WTEs in 2020 to the forecasted required size of 78,000 WTEs in 2030.

Figure 1: Supply projection and demand forecasts for the NHS digital technology and health informatics workforce in a Data Driven Future and Data Desert Future – 2020/21 to 2029/30

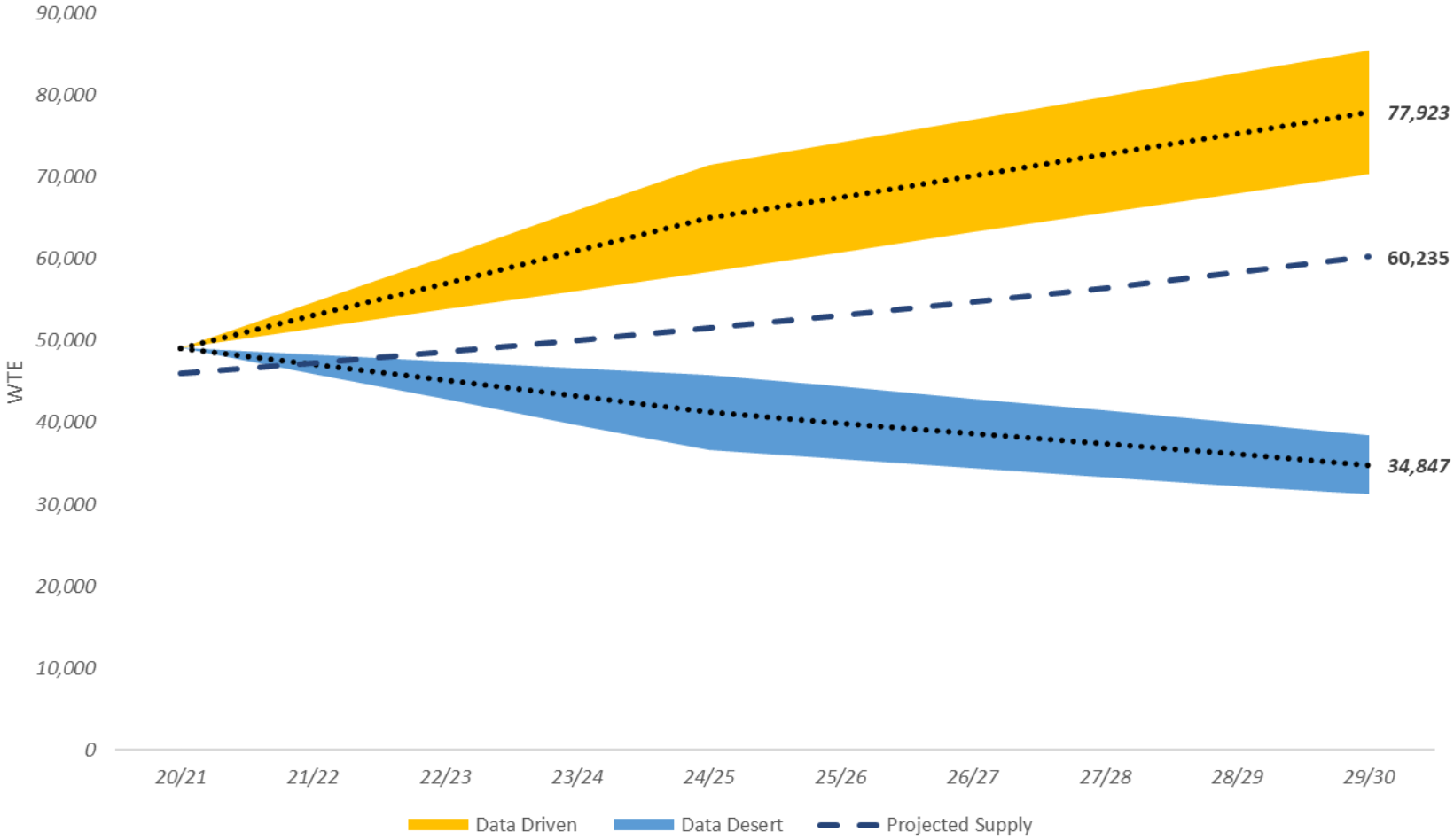


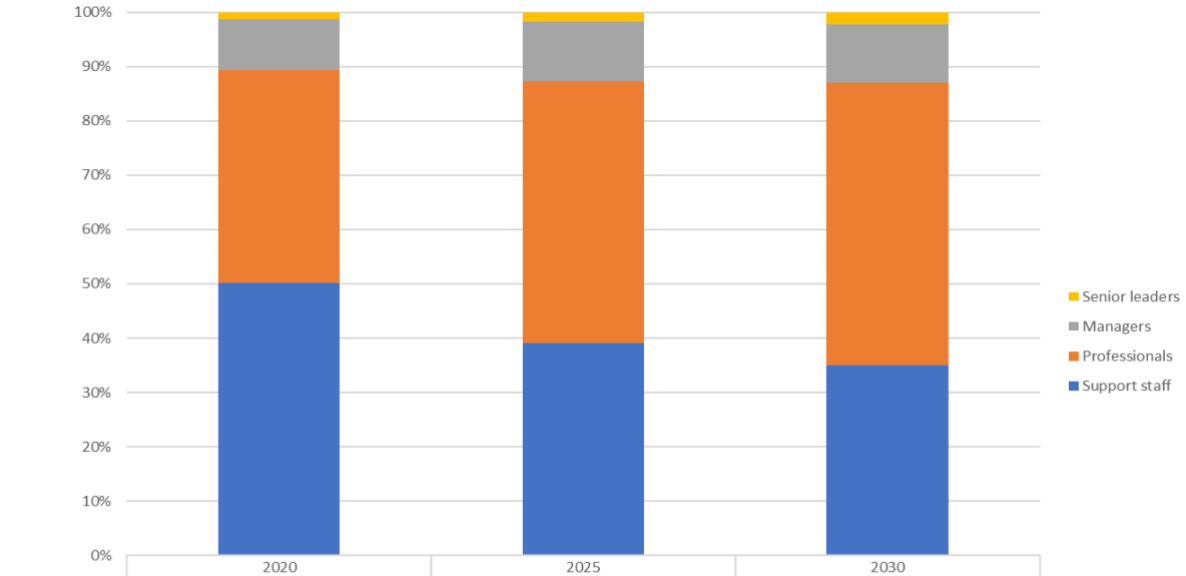
Table 1: 10-year increase or decrease in workforce size required by area of work, based on demand projections in a Data Driven Future

Role family	Area of work	Workforce size in 2020 – WTEs	Projected demand in 2030 – WTEs	10-year decrease (-) or increase (+) required – WTEs	10-year decrease (-) or increase (+) required – %
Data architecture	Clinical coding	3,560	3,101	-459	-13%
	Health records	12,610	12,315	-295	-2%
	Information management	8,113	15,961	+7,848	+97%
Technical infrastructure	Information and communications technology	16,407	21,963	+5,556	+34%
Application	Clinical informatics	1,778	13,731	+11,953	+672%
	Knowledge management	788	2,199	+1,411	+179%
Organisational transformation	IT programmes and project management	1,741	4,859	+3,118	+179%
	IT strategy and development	801	3,407	+2,606	+325%
	IT education and training	212	387	+175	+83%
	Total workforce	**46,009**	**77,923**	**31,914**	**+69%**

- (Figure 1) The projected supply for this workforce, based on trends observed for 2016–17 to 2018–19 and the assumption that no significant policy or related actions are taken, indicates that the overall number of staff will increase from its current size by 31 per cent to 60,250 WTEs in 2030. This increase is not sufficient to the meet the projected demand for this workforce in a Data Driven Future. By 2030, there will be a shortfall of around 17,750 WTE members of staff.

- (Table 1) The extent of the increase required varies according to the areas of work covered by the NHS digital workforce. In some areas, a reduction in staff numbers will be needed by 2030 and this offers the opportunity for redeploying or upskilling staff to take on roles where there is a demand. The greatest growth in workforce demand in the next 10 years will be for professionals and specialists in the areas of information management and clinical informatics. An additional 7,850 staff members in information management and 11,950 in clinical informatics are required by 2030. These areas of work are at the early stages of becoming essential and important functions in NHS trusts, underpinning ambitions to become data-driven organisations. Professionals such as clinician-informaticians, health data analysts, data scientists and clinician bioinformaticians will be essential in providing advanced analytics, and in developing AI and machine-learning capability in the use of data.

Figure 2: Composition of the NHS digital technology and health informatics workforce leading up to 2030 in a Data Driven Future



	2020	2025	2030
Senior leaders	1%	2%	2%
Managers	9%	11%	11%
Professionals	39%	48%	52%
Support staff	50%	39%	35%

- (Figure 2) Meeting the priorities placed on NHS trusts relating to digital transformation will determine the in-demand, emerging and new job roles and skills needed over the next 10 years. Many of these job roles require professionals with advanced qualifications and knowledge of the clinical or organisational domains in which technology and data are being applied. Leading up to 2030, the expectation is that the NHS digital workforce will become increasingly professionalised, and that a new cadre of managers and senior leaders will emerge. Chief clinical information officers and chief nursing information officers, together with newer positions in the C (chief) suite such as chief analytical officers, chief data officers and chief knowledge officers, will have a vital role in managing and setting the strategic direction for digital technology and health informatics in NHS organisations.

- Investments in the NHS digital workforce will need to be made if the NHS is to realise its ambitions around digital transformation. The salary and employment on-costs for the workforce of 46,000 WTEs in 2020 is estimated to be around £2.05 billion. If this workforce is to increase to a projected size of 78,000 WTEs in 2030 and its composition remains the same, the costs will be around £5.2 billion. This calculation is based on a mean salary pay point corresponding to the top of NHS Agenda for Change band 5 and the assumption that salaries will increase by 2.7 per cent per annum, and employment on-cost at 34.9 per cent (21 per cent for the NHS pension and 13.9 per cent national insurance contribution). Investment is also required to develop or enhance education and training pipelines into some areas of the workforce, and in the creation of opportunities and career pathways.

- The NHS faces significant recruitment and retention challenges in a competitive labour market where people with digital and data analytical skills are required by all sectors of the economy. Consideration therefore needs to be given to the monetary, as well as non-monetary, reward factors driving recruitment and retention. The level of investments required in developing this workforce should not be underestimated. To help policymakers make informed decisions around investment, a set of recommendations focussing on workforce planning, workforce development and professionalisation and workforce supply can be found in the next section of this report.

3. Recommendations

The recommendations made in this report are aimed at the transformative, technology-supported, data-driven ambitions set out in key policy, including the Topol Review and NHS Long Term Plan. The principles underpinning these recommendations are:

A. The digital transformation and data-driven ambitions of the NHS will have an effect on the digital workforce in terms of its required capacity and capability.

B. There is a need to implement system-wide terminology and job architecture that reflects advances in technology. For example: AI, machine learning, and the use of genomic data, with the associated need for highly skilled and specialist staff in professional, managerial and senior leadership roles.

C. There is an urgent need for clearly defined career pathways mapped to skill levels in an agreed framework, and to ensure there is an established professional 'home' for these people.

The recommendations made have been categorised according to three areas where change will be needed the most: workforce planning, workforce development and professionalisation and workforce supply. Some of the recommendations will transcend these categories.

Areas of change: workforce planning

Recommendation 1: Develop and sustain an agreed digital technology and health informatics occupational framework in the health and care sector.
There is the need to develop an agreed occupational framework that reflects a modern job architecture for this workforce, so that NHS organisations can employ professionals with the right skills in the right place and at the right time. The framework should complement those that exist already for well-established professional groups including, for example, knowledge and library specialists. The work commissioned by the HEE Digital Readiness programme to align the Government Digital Service (GDS) Digital, Data and Technology (DDaT) Capability Framework to the health and care sector should be done with end users in the NHS in mind, and the framework embedded and sustained to reflect changes and be inclusive of new and emerging job roles. The next step will be to standardise job descriptions for these roles and link them to the professional competence criteria set out by the Federation for Informatics Professionals (FEDIP).

Recommendation 2: Focus on the supply factors affecting the NHS digital technology and health informatics workforce and develop an action plan to address the need for an increase in staffing levels.
Supply factors that fall into the remit and organisational responsibility of HEE should be considered in developing an action plan in 2021, to help address the need for an increase in staffing levels in the NHS digital workforce over the next 10 years. The action plan will need to account for the education and training supply pipeline into the workforce, as well as the policy levers and monetary and non-monetary pull and push factors around staff recruitment and retention.

Recommendation 3: To review the financial reward structures for the NHS digital technology and health informatics workforce with particular attention given to the competitiveness of the labour market in affecting recruitment and retention of staff in the NHS.
A review of financial reward structures will need take into account the existing NHS Agenda for Change pay arrangements for this workforce, including for example senior data analysts who do not wish to progress into a managerial post, and consultation will be required with key stakeholders such as NHSX, NHS Employers and NHS Providers. Any recommendations made in light of this review will need to be subject to a full economic assessment. The NHS Pay Review Body should be informed on any work being carried out in this area in regard to staff in digital technology and health informatics. The work should complement that undertaken by NHS Providers on total reward packages for IT staff which has been highlighted in their 2019/20 written submission to the NHS Pay Review Body.

Areas of change: workforce development and professionalisation

Recommendation 4: Develop standardised job roles for multi-professional clinicians, including clinician-informaticians, to address the workforce demand anticipated across the depth and breadth of clinical informatics.
To meet the anticipated workforce demand in clinical informatics in a future where health and care will be increasingly driven by data, the Faculty of Clinical Informatics should scope and develop standardised specialist job roles for multi-professional clinicians, working with other professional bodies including the medical royal colleges and NHS arm-length organisations, and relevant professional organisation service leads, educationalists, and chief professional officers. These job roles should incorporate hybrid clinician-informatician positions at the relevant skill levels, recognising their clinical practice and their role as data, digital, and technology specialists.

Recommendation 5: Commission a postgraduate-level programme to develop chief analytical officers and chief data officers, commensurate with the NHS Digital Academy programme of developing the next generation of digital leaders.
To support the demand in the NHS for senior leaders in the fields of information management and clinical informatics, a development programme should be commissioned to bring through a cadre of chief analytical officers and chief data officers. Work also needs to be undertaken in developing standardised job roles for chief analytical officers and chief data officers, establishing clearly defined career pathways to provide direction for NHS data professionals looking to progress towards these senior roles. The development programme for chief analytical officers and chief data officers should be commensurate with that of the NHS Digital Academy in developing the next generation of digital leaders. Some 300 clinicians and health managers have already or are due to complete the NHS Digital Academy learning programme.

Recommendation 6: Develop a cadre of chief knowledge officers via a commissioned learning programme to meet the demand for senior leadership roles in the knowledge management function of NHS trusts.
The role of chief knowledge officer should be scoped as the first phase in ensuring that the senior leaders forecasted in this report can be developed and retained in the NHS. A suitable educational programme at postgraduate level should be commissioned to develop a cadre of skilled leaders for the NHS, as well as the wider health and care sector, to ensure an adequate cohort capacity is available at the level of integrated care systems.

Recommendation 7: Develop and commission a programme to develop professionals and managers in the field of IT education and training.
Good practice already exists in many NHS trusts in the provision of IT training and education, especially in the coverage of basic digital skills. However, there is a need to enhance the IT education and training function of trusts and integrated care systems through the professionalisation of staff and appointment of managers in this area. A programme to develop and professionalise the role of IT educators and trainers will lead to NHS trusts formulating effective training strategies and programmes for their clinical and non-clinical staff, and therefore more rapid uptake and embedding of advanced digital, data, and information governance skills across functions and services.

Areas of change: workforce supply

Recommendation 8: Health Education England to further work with Health Data Research UK (HDRUK) and expand on a programme of under- and postgraduate education in universities to deliver a supply of health data analysts and data scientists into the health and care sector.
A programme of courses should be developed to support the infrastructure of the health data analytics profession, and therefore requires input from stakeholders including: the Analytics Board, chaired by NHSX and NHS England and Improvement, and networks; informatics skill development networks (ISDNs); communities such as the NHS-R Community and Academic Health Science Network; and industry partners, professional bodies and chief professional officers. Specialist job roles in data analytics and data science that are new to or emerging in healthcare should be scoped, developed and standardised to reflect the skills clustering required in these roles. This should be undertaken as part of the work in developing the supply route into the NHS of health data analysts and data scientists, so that new entrants can be employed as machine learning and AI engineers, knowledge engineers, advanced health data analysts, and in other specialist roles. Another option worth exploring is working with educational providers in

developing specialist health modules for students registered on generic data analytics and related courses.

Recommendation 9: Support the development and retention of ICT professionals in the NHS by setting up a collaborative knowledge and skills transfer programme with public, academic, research, and private sector bodies and employers.
The programme should centre on learning and on knowledge and skill transfer partnerships whereby ICT professionals are able to undertake commissioned, time-limited placements in different work settings outside of the NHS. This should be part of an overall strategy to develop and retain in-demand ICT professionals in the NHS, including cybersecurity specialists, development operations engineers, product managers, and IT system analysts. Consideration will need to be given as to whether the programme should be structured, possibly leading to a qualification, or if it should be a framework through which learning is facilitated. The programme should be collaborative and have a dual purpose. Placements in the NHS for ICT professionals from other sectors will facilitate the transfer of knowledge, skills and new ideas into the healthcare sector, and help address digital challenges at local or regional level, such as integrated care systems. The potential for setting up shared pools of skills, resources and services among NHS and non-NHS partners should also be investigated.

Recommendation 10: Continue to expand, evaluate and roll out the HEE Digital Readiness programme-commissioned NHS Graduate Digital, Data and Technology Scheme.
To meet the immediate and near-future shortages for professionals with skills in information management, clinical informatics and ICT – and particularly the demand for critical roles in software development, IT systems architecture and data analytics – NHS organisations should utilise the NHS Graduate Digital, Data and Technology Scheme as a way to fill current and expected vacancies. Plans are currently in place for a national roll-out of the scheme, with the support of the regional informatics skill development networks (ISDNs). The scheme must work alongside, and not in competition with, the NHS Graduate Management Training Scheme.

Recommendation 11: Develop key roles and a supply of professionals in the area of managing programmes and projects relating to the implementation of digital technology and the introduction of new, technology-supported clinical and organisational processes in NHS trusts.
A need exists to develop the roles of implementation facilitators, organisational development leads and specialists, digital transformation leads, knowledge engineers, and other specialists, many of whom are working on a programme or project basis in implementing digital technology and technology-supported change in clinical processes. Role development should be based on the professional competence criteria set out by the Federation for Informatics Professionals (FEDIP). Developing these job roles, together with fully scoping and standardising their job descriptions, will help NHS trusts plan for the skills required in addressing the technical and adaptive complexities around managing digital change and transformation. Standardised job roles and descriptions and a clearly defined career pathway will help plan for the supply of these specialists into the NHS digital workforce.

4. Next steps

Policymakers in HEE and key stakeholder organisations will need to consider and prioritise the above recommendations to inform decisions on investment in the HEE Digital Readiness programme and its workstreams, their subsequent actions, and their planning and project proposals. The responsibility will then lie with the HEE Digital Readiness programme, in conjunction with NHSX as the commissioning body, to develop costed delivery proposals and

projects, which in some cases build upon existing work already underway in this area. Further information on each recommendation, including suggested action points, methodology and timelines, is provided in the main report.

The aim is to develop a 10-year workforce plan around the supply factors – including education and training pipelines and staff recruitment and retention and professional development (re-skilling and upskilling) – for the health and care digital technology and health informatics sector. The workforce plan will need to consider planned service design (including how digital technology and data services will function within integrated care systems), the productivity of the digital workforce, and factors (including labour market conditions) affecting supply. Best practice around training, recruitment, retention and professional development will need to be identified or developed at the national level, with implementation of initiatives led by local employers.

The principles used to formulate the recommendations found in this report (see Section 3) will also underpin the development of the workforce plan. In addition, planning for supply will use the long-term (10-year) demand projections set out in this report, rather than track short-term demand based on fiscal cycles. Long-term planning will be critical if the digital workforce is to expand its capacity and capability to the levels set out by this report. This will require collaborative working and alignment with those involved with organisational health and care service design and financial planning.

5. Key stakeholders

The networks, communities and organisations that will benefit from reading the main report include, but are not limited to, the following:

Academic Health Science Networks
Department for Education
Faculty of Clinical Informatics
Federation of Informatics Professionals
Government Digital Service (DDaT Capability Framework)
Higher education institutes
Health Data Research UK
Health Education England
Health Informatics Connected Communities – including Skills Development Networks
Institute for Apprentices
NHSX
NHS Digital
NHS Employers
NHS England and Improvement
NHS Pay Review Body
NHS Providers
NHS-R Community
NHS organisations

- Chief Information Officers
- Chief Digital Transformation Officers
- Chief Nursing Information Officers
- Directors of Human Resources
- Organisational Development Leads