The Doctors' Download: Exploring doctors' digital priorities for action

Executive summary

This report explores doctors' digital attitudes and their experiences of data, information, knowledge and technology in their working lives.

In the second half of 2019, 416 doctors - from every part of the UK and representing a broad range of medical specialities and experience – engaged in a collaborative online workshop to explore their digital priorities for action. The Doctors' Download was held in partnership with the Academy of Medical Royal Colleges and the Professional Records Standards Body and supported by Health Education England's Building a Digital Ready Workforce programme. It aimed to ensure that the views of doctors could be captured, analysed and used to influence the national debate on the use of digital technology in the NHS.

Part 1 of this report presents high-level findings from the Doctors' Download. The doctors who engaged in the workshop tended to be technology enthusiasts who were confident in their digital skills and abilities. However, they were less sure that this would always help them optimise their practice for the benefit of patients, and even less convinced that they were working in NHS organisations (such as NHS trusts, GP practices and other employers) that support their digital aspirations.

Their online conversation about digital challenges and priorities focused on four key themes and a view from doctors that:

- More attention should be paid to the fixing basics of technology in healthcare environments
- Doctors could take more of a leading role in shaping technology and ensure it delivers benefit for patients
- There is a shared responsibility to improve the collection, management and use of data, and that consistency in data standards would be welcomed
- Action should be taken to rationalise the proliferation of different technology solutions across different NHS organisations, to reduce day-to-day friction in the use of technology to support healthcare service delivery.

Part 2 of this report provides a comparison with previous workshops that have supported HEE's Building a Digital Ready Workforce programme. Placing doctors' concerns and comments in the context of previous similar online workshops with informaticians and nurses, it becomes clear that:

- The three professional groups consider themselves equally digitally ready, but that doctors are twice as likely as informaticians to describe themselves as feeling worried or lost in relation to data, information and technology

- Even where NHS organisations are providing programmes to enable doctors' digital skills development – and some still are not – doctors are failing to feel the benefit of this support
- Despite being more likely than nurses to self-identify as digital enthusiasts, both professions see fixing the basics as the most important issue for the digital agenda.

Part 3 sets out a wide range of proposals for action. These emerge from this workshop with many ideas about what national bodies, NHS organisations and individual doctors can do in relation to technology, skills, organisational drivers for change and individual attitudes. These proposed actions need to be placed in the context of the considerable work that is already underway across the NHS to deliver significant improvements on digital issues. But more broadly, they also point towards the need for greater collaboration between national bodies that set priorities, provide funding and enable transformation, and local NHS organisations that have the freedom and flexibility to respond to local need.

With rich and detailed qualitative feedback from more than 400 doctors who engaged in the online workshop, the Doctors' Download demonstrates the value of listening. The emerging priorities from this online workshop are important to consider as the NHS brings its digital future into being. They can enhance current and future initiatives to provide digital solutions, enable healthcare professionals and enhance patient care. Listening carefully to the experiences of doctors and other professionals can help to ensure that the NHS's digital future is built on solid foundations.

Part 1: The Doctors' Download

The word digital has become almost ubiquitous in the context of the NHS. Many people are enthusiastic about the potential of the NHS's digital future. Some see it as the silver bullet for the problems of workforce shortages, or the answer to prayers on budget cuts and financial challenges. Others see the potential for life-changing treatments and understanding of health challenges across populations. Digital is the workstream which can, apparently, solve anything and everything.

And to a certain extent, there is truth in this. Many of the problems in the NHS can be addressed by individuals and organisations using data, information, knowledge and technology. And the NHS's digital future is an crucial element in a wide range of recent strategic reviews: the NHS Five year forward view (2014), the NHS IT strategy (2017), the Topol Review (2018) and the Vision for better digital health tools in the NHS (2018).

Despite the enthusiasm for the digital future of health and care services, many questions remain unanswered, including:

- What are the experiences of doctors in the NHS (across all sectors, grades and regions) when utilising or accessing digital services?
- How can we find a language around the digital agenda that is accessible to all, so that all doctors feel that the issues are relevant to them and that they have an active stake in improving the utilisation of digital tools?
- What can we do better to support doctors to use technology day-to-day, to make an even greater difference to quality and patients? And what currently gets in the way?

If the NHS's digital future is going to be realised, changes will need to be made at a national, regional and local level. And doctors themselves will also need to make changes. But what are the actions that could be taken, and who should take responsibility for these? This report sets out the views of doctors who responded to these challenges through engaging in the Doctors' Download.

About the partners in the Doctors' Download

The Doctors' Download online workshops were held in partnership with the Academy of Medical Royal Colleges and the Professional Records Standards Body, the organisation established to ensure there are consistent standards for care records. These organisations were funded by Health Education England's Building a Digital Ready Workforce programme to host a national online workshop with doctors where the views of the profession could be captured, analysed and used to influence the national debate on the use of digital technology in the NHS.

Beyond the Doctors' Download, the Building a Digital Ready Workforce programme brings together a diverse range of partners from across the health and care sector in England, seeking to use data, information, knowledge and technology to transform the way that health and services are delivered.

Clever Together has engaged three different professional groups on behalf of the programme in a series of workshops over the last two years. Since late 2017, over 2,000 informaticians, nurses and doctors have shared their views on their vision for a digital future, the digital challenges they face in their working lives, and the good examples they have seen of how digital is already transforming health and care services.

Analysis of participants

The first Doctors' Download online workshop was held in July and August 2019, and a follow-up workshop was held in November and December of the same year.

Despite extensive promotion of the opportunity to engage in the workshop by the partner organisations and others, the take-up among potential participants was low. Across these two workshops for the Doctors' Download, 416 individuals participated. The Doctors' Download, therefore, might be better thought of as a gathering of experts and enthusiasts (as reflected in the findings about their digital attitudes, below) rather than as an exercise in mass participation.

Participants were asked to complete a gateway survey to gain access to the online workshop. Of these who participated, over nine out of ten (384, 92.3%) identified themselves as registered doctors.

In terms of demographics, three-fifths (253, 60.8%) were male and almost two-fifths were female (154, 37.0%). The majority (299, 71.9%) were aged 40 or over. Perhaps reflecting their age profile, participants tended to be more senior and experienced doctors. Of the more than three-quarters (327, 78.6%) who identified their grade, two-thirds (204, 62.4%) were consultants, and one in ten (39, 11.9%) were GPs.

England-based doctors accounted for the largest group with almost nine in ten (360, 86.5%) primarily working in the country. More than four-fifths (342, 82.2%) were in clinical roles, with the remainder fairly evenly spread between medical management, education and training, research and other roles.

Four-fifths of participants (335, 80.5%) identified a work setting. Of those, the two largest groups were those in secondary settings (141, 42.1%) and tertiary or specialist services (135, 40.3%).

Two-thirds of participants (274, 65.9%) identified a clinical specialism. Of those, one-fifth worked in anaesthesia (59, 21.5%). A wide range of other specialisms was represented in among other participants (in descending order): paediatrics and child health, emergency medicine, intensive care medicine, psychiatry, ophthalmology, acute medicine, radiology, orthopaedics, oncology, obstetrics and gynaecology, pathology, geriatric medicine, cardiology, gastroenterology, endocrinology, general surgery, vascular surgery, palliative medicine, urology, colorectal surgery, neurology, respiratory medicine, nephrology, rheumatology, haematology, transplant surgery, ENT, oral maxillofacial, clinical genetics, occupational medicine, microbiology, stroke and neurosurgery.

Attitudes towards digital

Participants were presented with a series of propositions to test their digital attitudes. The first question asked them to choose one of the following statements. Compared to others in the medical profession, would they describe themselves as:

- "Digitally Lost" - I feel a bit lost in this new digital age, the digital way of life is somewhat foreign to me, the traditional ways often seem better and I often wonder why we're changing them?
- "Digitally Worried" - I'm "getting my toes wet" in the digital world but often feel worried; I'm developing my digital skills in and out of work, can see some of the benefits of these new ways of doing things but they often make me feel nervous."

- "Digitally Ready" - I feel "settled" into the digital world; I am comfortable with these tools and feel I have the core skills to cope with the change that "digital" brings.
- "Digitally Leading" - I love adapting to the changes that the digital world can bring. I can see the opportunities offered by technology and I see myself as an advocate for the changes that "digital" brings

Those who described themselves as digitally leading represented almost half of those who responded to the question (190, 46.1%). More than a third (159, 38.6%) described themselves as digital-ready.

They were also enthusiastic about the potential impact of data and technology on medicine. The overwhelming majority of participants (397, 96.4%) agreed that the development of digital, data and technology would make a positive contribution to medicine. Almost as many (354, 85.9%) agreed or strongly agreed that digital, data and technology would fundamentally change how doctors practise medicine from diagnosis to treatment and lead to the development of radically new approaches to health and care.

Despite their enthusiasm, they were somewhat less convinced that data would help optimise their practice, enabling them to spend more time on the things that matter to patients, with seven in ten (289, 70.3%) agreeing or strongly agreeing with that proposition. Fewer still felt their organisations did a good job of supporting doctors to develop their digital capabilities, with only one-third (143, 34.7%) agreeing or strongly agreeing.

Analysis of contributions

The number of participants in the Doctors' Download workshops - 416 individuals - was smaller than for previous workshops supporting the Building a Digital Ready Workforce programme (see the comparison in part 2). Nonetheless, the workshops engaged many more people than would have been feasible using traditional qualitative interview methods, and their contributions were thoughtful and extensive. Across the two Doctors' Download workshops, participants contributed 220 unique ideas and comments and voted 956 times on these contributions.

Thematic analysis

Contributions from the first round of the workshop were explored using an inductive thematic analysis approach, which sought to identify, organise and describe patterns and themes within the qualitative data. This analysis proceeded iteratively, capturing insights that emerged from the data using an established step by step approach. This resulted in a coding frame of seven broad descriptive themes that sought to capture the richness of the conversation in the online workshop.

These themes were summarised in high-level statements that were presented to participants for discussion in the second workshop. Participants in the second round commented and expanded on these themes, and additionally shared new ideas. All their contributions were coded.

Participants were also asked to rank the seven thematic statements according to their relative importance to them (1-7). Mean ranking scores for each thematic statement were calculated. These were used – along with the frequency of codes across both rounds of the workshop – to determine the relative importance of the seven themes.
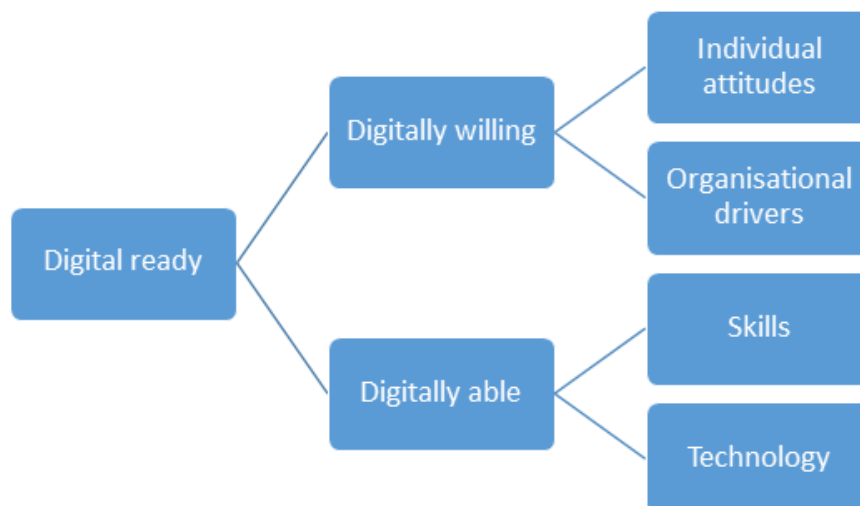
Digital readiness

Alongside this thematic analysis, contributions were also coded using a frame that describes digital readiness.

The digital readiness coding frame, developed through previous engagement with informaticians and nurses, proposes that digitally ready people are both digitally willing and digitally able.

Digitally willingness and digital ability both have individual as well as organisational aspects. Digital willingness comprises the need for appropriate individual attitudes – such as being change positive, enthusiastic about technology and willing to learn. But it also points to organisation drivers of digital willingness, such as having a supportive organisational culture, policies and processes that enable the adoption of digital solutions, and an approach to technology project management which is inclusive of diverse perspectives.

Likewise, digital ability has individual and organisational dimensions. While it includes individual skills – from basic digital literacy to advanced technical competencies – it also points to the role of organisations in enabling the use of those skills in practice, including through the provision of appropriate technology.

The digital readiness coding frame was also used to analyse the results of previous workshops with informaticians and nurses. This allowed for a comparison of the relative weight given by doctors, nurses and informaticians to different digital priority action areas (see part 2).

The digital readiness coding frame also provides a reporting structure for the priorities for action (see part 3).

A third coding frame was used to examine statements specifically about responsibility for action. Participants did not universally state what action should be taken or who should take it. But in those cases where they did point to organisations at national or local level, or groups of individuals, who could take action to implement their ideas, this was noted.

Thematic analysis: Digital priorities for doctors

Based on the number of contributions coded to different themes, the areas of greatest concern to participants were that doctors should take a leading role in shaping systems, that data quality needed to be improved and that there would be a benefit from rationalising the diverse software systems across different NHS settings.

Participants in the second phase of the online workshop were also asked to rank the seven thematic statements in order of priority for action. In this ranking, fixing the basics emerged as the top priority. This additional priority is reflected in the importance placed by participants on technology as an enabling factor in digital readiness.

	Contributions		Ranking	
	No.	%	Mean	SD
Doctors shaping systems	60	27.3%	3.9	1.9853
Improving data	41	18.6%	3.6	1.4985
Rationalising systems	35	15.9%	4.1	1.8401
Fixing the basics	29	13.2%	2.1	1.5949
Education and training	29	13.2%	4.2	2.0704
Communicating the vision	16	7.3%	4.5	1.4286
Investing in change	10	4.5%	5.5	2.0915
Total	**220**	**100.0%**		

This overview of the online workshop consequently focuses on describing doctors' digital priorities in relation to fixing the basics, doctors shaping systems, improving data and rationalised systems.

Fixing the basics

"Barrier Number 1. REALLY, really slow computers. This is the biggest problem in all the places I have worked. Cause: Really old PC that are overdue their upgrades, poor computer processor and network speeds. Solution: Install the fastest possible computers in clinical areas. Need one big investment here with massive gain."

"Hospital infrastructure is way behind what is digitally possible. My PC takes over 10 minutes to boot up. Not an app in sight. For anything speedy most people resort to their personal mobile phone."

"Slow internet speed for our web-based patient record system is SO frustrating. So much time in each day looking at a turning circle and waiting for something to happen. With thousands of clicks in a day to do everything from sign off prescriptions to requesting tests these delays add hours to my working day!"

There was strong support from participants for the idea that NHS organisations could do much more to recognise the cost and impact on doctors' working days of inadequate and failing technology, and the effect that this had on patient care. Doctors felt that NHS organisations needed to prioritise investment in fixing the basics.

The slow speed of networks and computers emerged as the doctors' primary concern. They especially commented on the time delays caused by slow-running machines, suggesting that they sometimes waited up to 20 minutes for all their systems to be ready for work. One participant commented that they had taken to restarting their computer as they left work to ensure it was ready for use the following morning.

Doctors highlighted the need for investment in IT infrastructure. Some drew attention to the possibilities offered by new software that might improve patient care but commented that this could never run on existing computers and networks. For some doctors, their frustration with inadequate technology at work contrasted with their experience of using technology outside work. Things that were ordinary in everyday life, like tablet devices and voice recognition, felt like a pipe dream in the workplace.

Doctors shaping systems

"Please can we set standards for NHS documentation so every Trust doesn't have to waste money modifying each bespoke software package to emulate their current NHS ways of work."

"Specifications for all electronic medical records and associated software must include ease of use for clinicians, to minimise the numbers of clicks, reduce duplication and permit data capture about all patient needs."

"Feedback is key and I don't believe that clinicians are currently being listened to enough to ensure that these systems perform at their peak for the end-users."

The doctors who participated in the workshops were keen to highlight the role that they could play in shaping the development of technology.

Doctors were keen that they should be involved in the design and roll-out of any new software systems. A key concern was that programmes should be easy to use, enabling doctors to focus on their patients. Critically, they wanted systems that supported how they already worked, not that required them to change their way of working to meet the system's requirements. Other doctors highlighted the role of business analysts and process specialists in supporting doctors to change their working systems to take advantage of new technologies.

Medical leadership in the development and implementation of technology was seen to be vital by some, though others expressed concern about doctors taking leadership roles in technology projects that they were ill-equipped to lead. Some participants drew attention to the role of CCIOs in providing leadership that spanned clinical and digital domains. But others were concerned that if doctors thought that digital specialists should always lead technology projects, they would come to believe that digital was someone else's problem.

Whether or not they stepped into digital leadership roles, doctors generally wanted to be more involved in the specification of new systems. They wanted their priorities to be acted on throughout the procurement process and wanted to feel listened to when technology was being introduced. Having a poor experience of a technology project was a factor in some doctors' perceived technophobia, and it was suggested that this led some medics to resist further change.

They also pointed to the role of boards, suggesting that regulators should not consider an organisation well-led if its board was not providing robust digital leadership.

Improving data

"Trusts up and down the country are all opting for different EPR's which do not integrate with each other. I foresee a massive problem when these contracts come up for renewal. Specifically, because these systems will have become so deeply embedded within organisations it will be extremely hazardous to both patients and Trusts' operations to consider switching to a different provider. Worse, there is no standard format for the export of data from one system to permit import into another."

"Recording diagnoses in a structured way can be an onerous task with no immediate rewards for the clinicians entering the data. However, it should not be like that - it should make clinicians' work easier by displaying the information in a useful way."

"There needs to be a much wider debate about the costs and benefits of the collection and sharing of data within health and with other agencies. To have all the information gathered in several health encounters could be very useful. It could also prejudice the current encounter and provide very sensitive and confidential information unnecessarily and against the wishes of the patient."

The doctors who contributed in this area considered the collection, management and use of data in healthcare environments.

Doctors expressed concern that the NHS's approach to data was not meeting their patients' expectations. Some reported patients expressing surprise that their data was not readily accessible in every consultation and needed to be repeated. Others wanted to ensure that the burden of data collection was reduced, to improve the quality of interactions between doctors and patients when time was limited.

Doctors considered consistency in data standards to be vital. They called for mandatory data structures for electronic patient record systems, to ensure data could be migrated between providers and across the whole NHS.

They felt that a considerable amount of core data for all patients could be standardised, ensuring consistency in the collection and management of data such as names, addresses, contact details, protected characteristics, diagnoses, care preferences and treatment. They also felt that there could be greater consistency in data standards for specialisms. While some doctors called for consistency, others called for greater latitude to use natural language in databases, to limit the multiplicity of codes for conditions and clinical outcomes.

However, without consistent data standards in place, doctors feared ongoing 'garbage in, garbage out' problems with NHS data. Improving data quality was seen as everyone's responsibility and that individuals should be empowered to fix mistakes.

There were mixed views on access to data. Some felt that patient data should be more easily available to clinicians. Others called for a wider debate on the benefits and costs of sharing data in this way.

Rationalising systems

"Barrier: Multiple applications, multiple user ID passwords, expiring unnecessarily too frequently. Cause: No good all in one software available easily. Some centres have this but most don't. Overcautious IG policies necessitating passwords changes."

"Trainees and doctors move around different trusts in a nationalised healthcare system. Each are doing their own thing; you have to relearn everything every time. GPs use much better single systems that do everything the user needs it to do. We need one fast, simple system that is interoperable with all the other systems and talks to them all for you."

"We need systems that talk to each other. I work across 3 hospital sites. One site has all systems available through one entry point, one is making progress but there are still standalone electronic systems … difficult access can make electronic systems an impediment to providing good care, rather than a help."

Doctors discussed the merits of reducing the number of systems needed in the NHS, and how to move towards a single and simplified system to capture information from most patient contacts.

The number of different systems was a key concern. One doctor described using six different programmes and databases during a consultation to access information and make another appointment. For doctors in training, getting to grips with new systems every time they moved organisation represented a significant drain on time and resources.

Many doctors wanted fewer systems and more integration. Notably, doctors commended the idea of a single patient record, accessible, understandable and usable across different NHS services. Some participants thought patients themselves should control these records. Others raised concerns about the need for increased security of these records and highlighted a danger that centralisation would create an over-reliance on a single technology provider.

Other issues

Several other subjects were described by doctors, although with less clarity and consensus about what action should be taken to implement their ideas or address their concerns.

In relation to education and training, some doctors felt that more could be done to help them develop general digital skills at every point in their career. Others discussed the need to support doctors to become data and technology specialists. There were contributions for and against the idea of informatics as a distinct medical specialism, supported by its own royal college.

Doctors wanted an NHS digital vision that encompassed not only aspirations for the use of data and technology, but the practicalities of how that would be achieved. Especially given the historic under-investment in this area at organisational level, they wanted this type of vision to be communicated at a national level.

Finally, a few doctors called for the NHS to begin to design and build proprietary technology, rather than purchase it from external providers, although this idea was not widely supported. Others thought decision-making processes seemed designed to frustrate change, rather than enabling it.

Part 2: Comparison with informaticians and nurses

The Doctors' Download is the third of three online workshops held with different professional groups as part of the Building a Digital Ready Workforce programme.

Informaticians

The first workshop engaged individuals whose roles centre on data, information, knowledge and technology. These informaticians were invited to share their thoughts on a vision for digital in the NHS, their role and the role of their clinical colleagues, and examples of the tools and methods that have been used to improve digital readiness.

The workshop was run with support from a wide range of stakeholders, including the British Computer Society, CCIO and CIO Networks, CILIP, the Faculty of Clinical Informatics, the Federation of Informatics Professionals, the Local Government Association, NHS Digital, Soc ITM and both Skills for Health and Skills for Care. The workshop was held in November and December 2017. 1,061 individuals took part from a wide range of professional backgrounds and contributed 3,622 ideas, comments and votes.

The key findings emerging from this workshop included:

- A shared purpose for digital in the NHS, centred on improving the health and wellbeing of people and populations
- That this purpose could be supported by organisations in which it is easy to drive innovation, efficiency and quality, in which patients and staff are empowered, and in which services are increasingly integrated
- That there was a distinct role for informaticians in ensuring data, information, knowledge and technology become business as usual in health and care delivery
- That there was a need to improve the skills of clinicians to make the best of technology, and that the attitudes of these groups could be a barrier to change.

Nurses

The second workshop explored the digital experiences of nurses, midwives and healthcare assistants. Similarly, these individuals were invited to share their thoughts on a digital vision for the NHS. To test the findings of the workshop with informaticians that skills and attitudes the primary issues to be addressed, nurses were asked to identify specific barriers and enablers to the use of data, information, knowledge and technology in health and care services.

The workshop was run in partnership with the Royal College of Nursing, supporting the RCN's 2016 commitment that every nurse should be able to use data, information, knowledge and technology to maximum effect for patients, service users and carers. Five face-to-face focus groups were held with nurses around the UK, and 896 individuals took part in the online workshop held during January and February 2018. Across the focus groups and online workshop, participants contributed 2,453 ideas, comments and votes.

The key findings emerging from the workshop with nurses included:

- A refined vision for data, information, knowledge and technology in health and care, centred on better outcomes for patients and service users, better experiences for staff and more efficient ways of working

- That a focus on digital literacy (making skills and attitudes a primary concern) ignored the practical barriers to the use of technology in NHS environments
- That nurses are held back by inadequate and failing technology and by organisations that do not consistently support them to take digital leadership roles
- That there was a mismatch in priorities between informaticians and nurses. While informaticians were enthusiastic about innovative technologies, nurses wanted a focus on fixing the basics of technology, such as network speeds, hardware upgrades and more straightforward software for core activities, such as managing patient records.

Comparing participants across all three workshops

Participants were required to complete gateway questionnaires to gain access to each of the three workshops.

Consistent data was collected on participants' sex. Different age categories were used in each of the workshops (reflecting the different reporting priorities of partner organisations) but we can compare those aged over 40, for whom digital has become an emerging priority during their careers, and those under 40, who might better be described as digital natives. Information about participants' country of employment was also gathered.

None of these factors – including age – appeared to influence participants' responses. In relation to age, that may be because differences in digital aptitude between age groups are disappearing over time, as older people become more familiar with new technologies. But given the self-selecting nature of the participants in the workshop, including their general enthusiasm for technology's positive impact, differences between age groups in the wider workforce may warrant further future research.

However, there are noticeable differences based on participants' professional group. Each questionnaire collected information on participants' job roles, and the proportion of their time dedicated to data, information, knowledge and technology. Adjusting for the small number of participants who took part in more than one workshop and excluding those in other roles (such as administrators and managers), it is possible to compare the attitudes of over 2,000 informaticians, doctors and nurses across all three workshops.

	Informaticians	Nurses	Doctors	Total
Workshop 1: Informaticians	855	31	61	947
Workshop 2: Nurses	26	821		847
Workshop 3: Doctors			382	382
Totals for comparison	**881**	**852**	**443**	**2,176**

Three questions were consistently asked in all the workshops, allowing for a meaningful comparison of these three professional groups:

- Whether they identified themselves as digitally leading, ready, worried or lost in relation to data, information, knowledge and technology
- The extent to which they felt that digital would have a positive impact on health and care services, on patient outcomes and the working lives of clinicians
- The level of support they felt their organisation provided to improve digital readiness

Leading, ready, worried or lost?

The proportion describing themselves as digitally ready was consistent across all three professional groups, with just over a third of informaticians (36.9%), nurses (38.8%) and doctors (38.0%) placing themselves in this group. Informaticians were most likely to identify themselves as digital leaders, with over half (54.9%) placing themselves in this category, compared to just less than half of doctors (45.9%) and two-fifths of nurses (39.3%).

There was greatest variation in the proportion of informaticians, doctors and nurses identifying themselves as worried or lost. Doctors were twice as likely as informaticians to describe themselves as worried (14.7% compared to 7.5%), and nurses were even more likely to feel worried, with almost one in five nurses (19.8%) using this descriptor of themselves. Although the number of participants identifying themselves as lost was very small overall, nurses were most likely to feel lost (2.0%) compared to doctors (1.4%) or informaticians (0.7%).

Positive impact

All three professional groups agreed that data, information, knowledge and technology would have a positive impact. More than nine of out ten informaticians (99.0%), doctors (96.6%) and nurses (94.6%) agreed or strongly supported this proposition. However, the strength of this agreement varied by profession. Informaticians were most enthusiastic, with over nine out of ten (91.3%) strongly agreeing that there would be a positive impact. The strength of agreement was less pronounced in other groups; four-fifths of doctors (82.2%) and three-quarters of nurses (76.9%) strongly agreed.

Organisational support

Informaticians were asked whether their organisations had programmes in place to support the digital readiness of the workforce. One in five (19.5%) strongly agreed with the statement and two-fifths (42.0%) agreed. As a comparison, both doctors and nurses were asked whether they felt their organisations did a good job of supporting the development of their digital capabilities. Among doctors, one in eight (12.8%) strongly agreed and one-third (32.2%) agreed. Among nurses, one in twelve (8.4%) strongly agreed and one-quarter (26.0%) agreed.

What observations might be made by considering these three questions together?

- There were similar levels of optimism across the three professional groups that data, information, knowledge and technology could have a positive impact on health and care services. Although the strength of this feeling varied, informaticians, doctors and nurses can all rightly be described as supporters of a digital future for health and care.
- The larger proportion of informaticians who described themselves as leading, compared to doctors and nurses, may be indicative of the lower barriers for these professionals to take up formal or informal leadership roles in relation to data, information, knowledge and technology – but other factors may be in play.
- A greater proportion of doctors and nurses appeared to be digitally worried or lost compared to informaticians. This may simply be because data, information, knowledge and technology play a smaller part in their day-to-day roles. But it may be that the barrier of inadequate and failing technology contributes to feelings of digital concern.
- Local NHS organisations have a role to play in enabling the digital aspirations of doctors and nurses. The fact that over a third of informaticians disagreed or were unclear whether their

organisation had programmes to support digital readiness suggests that more organisations need to establish clear and coherent approaches to digital skills development.

- But even where such programmes exist, there is the potential for a greater positive impact for clinicians. Overall, doctors and nurses were more likely than not to be neutral about or dissatisfied with their organisation's programmes to support digital capabilities. It may be that more can be done at a local level to ensure clinicians are confident in their organisation's commitment to their digital development.

Comparing priorities

The themes emerging from the workshop with doctors (see part 1) – fixing the basics, enabling doctors to take a leading role, improving data and rationalising systems – are not in themselves new. Similar issues were raised in the workshop for nurses.

The mismatch of priorities previously observed between informaticians and nurses is in evidence in the Doctors' Download as well. The doctors who took part in the workshop were digital enthusiasts and many regarded themselves as digitally leading - and even so, they expressed concern that the basics of technology failed to deliver for them. Doctors are closely allied with nurses in feeling hamstrung by technology that does not meet their basic needs, and which hampers their ability to focus on the people in their care.

To explore these issues further, 332 ideas from the three workshops were compared using the digital readiness coding frame. All the ideas from the Doctors' Download were included in this analysis, along with priorities and examples from the workshop with informaticians, and barriers, enablers and examples from the workshop for nurses. This allows a comparison of the relative importance that those engaged in three workshops gave to:

- Technology, as an enabler of digital readiness in organisations
- Skills, as an enabler of digital readiness at an individual level
- Drivers in organisations that support digital readiness
- Attitudes among individuals that support digital readiness.

While the absolute number of ideas in each workshop should not be taken as a proxy of the importance of each of the four elements of the digital readiness framework, a comparison of the workshops can usefully illuminate some of the differences in perception between each of the three professional groups.

	Informaticians	Nurses	Doctors	Overall
Technology	21.1%	58.1%	66.3%	44.0%
Skills	39.5%	15.1%	15.2%	25.9%
Drivers	15.0%	17.2%	10.9%	14.5%
Attitudes	24.5%	9.7%	7.6%	15.7%

In the workshop for informaticians, a relatively low priority was placed on technology itself. Just one in five ideas (21.1%) specifically highlighted the role of technology as an enabler of digital readiness in organisations. In contrast, over half of nurses' ideas (58.1%) and two-thirds of doctors' ideas (66.3%) focused on technology, with many of these centring on the inadequacy of networks, hardware and software, the frustration of needing to use multiple and incompatible systems to

complete and document simple tasks, and the lack of a common approach to technology in different health and care settings.

At an organisational level, the contextual drivers around data, information, knowledge and technology, such as an enabling culture, good project management, and supportive policies and processes, emerged as an important but relatively low priority. A similar amount of focus in each of the workshops was given to these drivers, accounting for around one in seven ideas for informaticians (15.0%), one in six for nurses (17.2%) and one in ten for doctors (10.9%).

When it comes to the elements of digital readiness that relate to individuals, informaticians were more than twice as likely as either doctors or nurses to highlight skills development as the most important priority. Two-fifths of ideas (39.%) in the informaticians workshop were related to skills, compared to fewer than one in seven ideas among nurses (15.1%) and doctors (15.2%).

An even more pronounced difference was seen in relation to individual attitudes that support digital readiness. One-quarter of ideas (24.5%) in the informaticians workshop pointing to individual attitudes as a barrier or enabler in relation to digital readiness. In comparison, this emerged as lowest priority in both the nurses' workshop (9.7%) and even less important in the workshop for doctors (7.6%).

Broadly speaking, when posed with open questions in workshops, individuals will respond with whatever is front-of-mind for them at the point that they are asked. For informaticians, technology appeared as a lower priority than either skills or attitudes, and many of the ideas about technology focused on innovation. However, for doctors and nurses, difficulties with basic technology dominated the online workshop. This apparent mismatch of priorities is a cause of frustration and difficulty. The enthusiasm of informaticians and systems leaders for the potential of new technologies can too easily be misread as a disregarding of the real problems caused by computers that take twenty minutes to start, networks that are too slow, and multiple software packages to handle basic tasks. And informaticians' focus on individual skills and attitudes can be misinterpreted by clinicians as blaming their lack of enthusiasm and ability for the difficulties in achieving digital transformation.

It would seem to be self-evident that technology, skills, drivers and attitudes all have some part to play in enhancing the digital readiness of NHS organisations and the individuals who work within them. For example, taking a narrow focus on skills development, while not addressing the challenges of basic technology experienced by clinicians, is likely to lead to frustration and even cynicism. Individual attitudes are important but should not be presumed as a barrier to the adoption of improvements. Informaticians, nurses and doctors appear to share an enthusiasm for a digital future, especially if they are given the technology that makes it possible. And beyond procuring the best available technology, organisations have a role to play in establishing cultures, management approaches and policies that enable and make the best of digital opportunities.

More needs to be done to ensure that the health and care sector's digital future is a shared priority and a collective endeavour across professional groups. Yes, doctors and nurses can be more enthusiastic about the potential of digital transformation, and better equipped to deal with a digital future. And yes, informaticians can do more to recognise and address the day-to-day challenges that hamper the delivery of good quality patient care.

In moving towards recommendations, it is important to view these thematic areas in the round. But it is also essential for informaticians, nurses and doctors to seek to understand how the world looks from each other's perspectives, and not to presume that one professional group alone can prioritise responses to the NHS's digital challenges.

The final part of this report draws from the findings of all three previous workshops. Ideas which attracted an above-average number of net positive votes (nine votes for informaticians and nurses and six votes for doctors) have been coded and considered. These 125 ideas have been grouped thematically into action areas supporting each of the four aspects of digital readiness.

Part 3: Actions and responsibilities

The actions identified in part 3 of this report have not been tested and prioritised against existing workstreams, but merely represent the ideas put forward by participants. Some of the actions they have proposed may already be planned or underway. And although these proposed actions are drawn from the ideas that attracted the greatest levels of support among participants, they may not always be the most appropriate or productive way forward. Some further refinement will be required to turn these ideas into a coherent plan of action that can be delivered at national and local level.

Participants suggested a range of actions that could improve the use of data, information, knowledge and technology in health and care services, and the role that doctors and others can play in a digital future.

There will be much in this report that resonates in the delivery of healthcare services in Scotland, Wales and Northern Ireland. However, most of the participants were based in England, and so many of their proposed national actions were focused on the NHS in England. Responsibility for action was seen variously to rest with:

- National bodies such as NHSX, NHS England, royal colleges, professional bodies and regulators in coordinating programmes, developing guidelines and ensuring consistency across the system
- NHS organisations (such as NHS trusts, GP practices and other employers) by supporting and enabling doctors' learning and development, fixing the basics of technology, and making sure doctors are fully involved in the design and roll-out of new systems and improvements to existing technology
- Individual doctors for their attitudes and behaviours and their active engagement with digital projects and programmes.

Participants were not always entirely clear about where responsibility for action should rest. And in some cases, participants pointed to the need for different actors to work together to effect change. Participants highlighted the importance of coordinated effort between national and local organisations to move the NHS towards a digital future.

Technology

Invest in fixing the basics
Health and care services are held back from achieving their digital potential by inadequate and failing technology, including networks, hardware and software. To address this:

- National bodies should agree a funding strategy for the improvement of core NHS technology, including networks and hardware, and the software required for consistent patient care and record keeping
- National bodies should work with NHS organisations to agree acceptable minimum standards for networks, hardware and software, and ensure that resources are appropriately allocated to achieve these minimums
- NHS organisations should prioritise their technology expenditure towards improving the reliability of basic technology, improving connectivity and rolling out free wifi.

Rationalise and optimise

Over time, a complex ecosystem of incompatible systems has grown around basic medical tasks. This should be rationalised and optimised wherever possible, to reduce friction in doctors' working practices and to enhance patient interactions. To deal with this:

- NHS organisations should recognise that poor systems impede good care and avoiding multiple systems for single tasks wherever possible
- NHS organisations should seek to evolve rather than replace tools, where this is feasible, to retain the benefits of doctors' familiarity with existing approaches; and where this is not possible, develop clear strategies to phase out legacy systems that cannot be integrated and to ensure access to vital patient data is not lost
- NHS organisations should revise overcautious information governance policies that require frequent password changes and prompts, to reduce day-to-day barriers in the use of technology

Patient benefit

All NHS technology should be designed and implemented to maximise benefits to patients. To enable this:

- National bodies should establish consistent standards for patient data, including for clinical specialisms, and provide support for NHS organisations to achieve these standards
- National bodies, NHS organisations and technology providers should work to ensure that patient data is consistently recorded and shareable between software systems and organisations, and that patients are able to control this data for themselves
- National bodies and NHS organisations should actively involve patients and service users in developing digital priorities and strategies, ensuring that patient experience data is collated and shared at every level of the health and care system, and that organisations become more responsive to patient concerns and needs
- NHS organisations should be able to provide assurance that their technology development plans are centred on identifiable needs in their patient and service user population

Common approach

While a single and simple system for all NHS interactions has, arguably, been shown to be unfeasible, participants felt the current proliferation of technology solutions across NHS organisations creates barriers for doctors moving between different healthcare environments. A common approach to technology, marrying clear national standards and local autonomy, is required. To achieve this:

- National bodies should establish mandated standards for patient data, including by agreeing basic terminology through an NHS data dictionary
- National bodies should also develop a mandated functional specification for core NHS systems, enabling NHS organisations to procure systems that meet their needs and financial constraints, while also increasing consistency in different health and care environments
- NHS organisations should establish clear development plans to ensure that all systems are brought into line with these national data and functional specifications

Tech for improvement

Where new technology is introduced in organisations, the process of design, development and implementation should enable improvement in the delivery of services. To ensure this:

- NHS organisations should ensure that, when procuring technology, doctors and other clinicians are involved throughout the process, and investment is only made with clinical input and engagement
- NHS organisations and technology providers should take every opportunity in the introduction of new technology to improve clinical processes, such as by automating repetitive tasks

Skills

Education in data, information, knowledge and technology

For doctors to thrive in a digital health future, education in data, information, knowledge and technology needs to be consistent at undergraduate level, through existing postgraduate pathways, and in new and emerging medical specialisms. To enable this:

- National bodies with responsibility for education and training (HEE and equivalent bodies across the UK, General Medical Council and royal colleges) should come together to develop a clear digital education and training strategy and plan for working effectively together
- Linked to the above, national bodies should collaborate with education providers to review frameworks for postgraduate medical education to ensure that all doctors develop the digital skills they need at every point of their career, including by considering the potential benefits and challenges of establishing medical informatics as a distinct postgraduate medical specialism
- Professional bodies, including for informaticians, should create learning materials for doctors on the potential of digital health, ensuring that these are accessible for non-technology specialists
- NHS organisations and education providers should work together to support the development of doctors, ensure that any doctors taking on the leadership of digital projects have the skills to do so, as well as the enthusiasm

Basic skills development

Doctors at every stage of their career may lack basic digital skills. NHS organisations should take responsibility for ensure the basic digital literacy of all their staff. To achieve this:

- NHS organisations should include digital awareness as part of their training programmes, and support doctors to develop basic enabling skills, such as touch typing, as well as more advanced data literacy skills, including the use and interpretation of clinical data
- NHS organisations should ensure, as part of their procurement requirements, that any technology introduced in the NHS includes accessible help in plain English, and should prioritise training for the use of systems in practice, including by identifying and supporting champions

Networked learning

Doctors can enhance their digital skills and capabilities by engaging with other doctors and healthcare professionals. To support this:

- National bodies and NHS organisations should support the establishment of skills development networks and recognise the value of online resources and social media for practice development
- NHS organisations should collaborate at a regional level to create learning networks and to ensure that doctors can access and benefit from these
- Individual doctors should take responsibility for their own learning and use networks (real-world and social) to develop their understanding of medical and digital issues

Recruitment

Digital skills and capabilities should be core competencies for any doctor joining an NHS organisation. To enable this:

- NHS organisations should explicitly recruit for digital skills and, through that process, identify doctors who have the potential to become digital leaders

Drivers

Enabling culture

Beyond their procurement power, organisations at every level can have an impact on the success of a digital future through promoting a culture that enables the potential of data, information, knowledge and technology. To achieve this:

- National bodies and NHS organisations should recognise and invest in doctors as digital professionals
- NHS organisations should ensure that teams are properly resourced to allow time for training to maximise use of systems
- NHS organisations should actively create opportunities for doctors to lead clinical technology projects, as a means of engaging doctors in wider cultural change

Policies and processes

Another driver at organisational level is the adoption of policies and processes that facilitate digital priorities. To do this:

- National bodies should review the information governance approaches taken by NHS organisations, and promote those that allow easier data exchange where this benefits patients

Project management

Too many digital projects are adversely affected by poor project management. To rectify this:

- National bodies and NHS organisations should work together to improve and standardise digital project management methodologies
- NHS organisations should ensure that all digital projects have visible leadership at board level

Attitudes

Collaborate

Collaboration across professional boundaries is important for the success of any digital transformation. To enable this:

- NHS organisations should collaborate to share the learning from the digital projects, and be honest about both successes and failures
- Individual doctors in technology leadership positions should ensure their teams are multidisciplinary, and should seek opportunities for collaboration with informaticians and others to promote digital futures

Professional leadership

Doctors can take a leadership role not just as digital enthusiasts, but as digital experts. To achieve this:

- Individual doctors in positions of influence should promote the potential of digital transformation, focusing on the big picture and creating demand for change
- Individual doctors should be active in seeking clinical leadership roles in technology projects, involving themselves at an earlier sage

Focus on patients

Finally, doctors are uniquely placed to advocate for the needs and aspirations of their patients, ensuring data, information, knowledge and technology has a beneficial impact. To do this:

- Individual doctors in technology leadership positions should ensure their projects maintain a focus on patients rather than technology for its own sake, should challenge their own assumptions about patients' digital needs and be open to change

Conclusion

The doctors who took part in the Doctors' Download were digital enthusiasts. But digital optimism will not fix day-to-day challenges. An overriding message emerging from all the workshops supporting the Building a Digital Ready Workforce is that healthcare professionals have been let down in the past by failing and inadequate technology – and that this has had a detrimental impact on the delivery of high-quality patient care.

Evidently, during the two and a half years that informaticians, nurses and doctors have been engaged in these discussions about data, information, knowledge and technology in the NHS, much has changed. New national priorities have emerged, reviews have been published, investment is being made, and transformational strategies are emerging. Over time, these will have a positive impact. But enthusiasm for transformation at a national level can be perceived as disconnected from the everyday frustrations at a local level, especially if these issues are not being addressed.

Across all three workshops, participants' contributions spoke to two narratives that have shaped the NHS digital landscape in recent times. On the one hand, they wanted standardisation and simplicity - one patient record, one system, one approach everywhere. On the other hand, they wanted freedom to innovate and experiment at a local level, to be responsive to local needs, and to make change happen. These narratives are incompatible. As an alternative approach, the priorities for action in part 3 of this report suggest that positive action could be coordinated, so that national bodies set out clear frameworks and funding strategies, and local organisations have flexibility within these to meet the needs of the people and populations they serve.

As an example, the current proliferation of patient record solutions across NHS organisations is not serving healthcare professionals well as they move around the system – but then neither would centralised control provide all the answers. Collaboration and coproduction are essential in the NHS's vertical dimensions, as well as horizontally between organisations. Doctors have a reasonable right to expect a basic level of technology to do their jobs – and national organisations have a responsibility to set out a clear roadmap to reach it.

The other broader conclusion to be drawn is about the dynamic relationship between individuals and the organisations around them. For doctors, there should be a focus on enhancing basic digital skills (acknowledging that the definition of "basic" evolves over time) as well as enabling longer-term professional development and digital specialisation. Some of this responsibility lies with individual doctors themselves, including for their attitudes that can enable or hold back progress. But NHS organisations can also do more to support doctors not just with the basic technology that enables good quality patient care, but through processes, policies and cultures that enable doctors' development. Greater investment in doctors' digital skills will have a positive impact, but only in the context of organisations that enable this. Digital leadership matters.

Notwithstanding the focus of the conversation in the Doctors' Download, the NHS's digital challenges will not be addressed solely by technology, but by skills, attitudes and organisational drivers too. It is easy to be captivated by the possibilities of the shiniest innovation and the newest kit. But any digital development in the NHS will ultimately be in the hands of healthcare professionals and used for the benefit of people who use or need their services. Whatever else emerges from conversations like the Doctors' Download, the NHS's digital future must always be in the service of people.

Appendix 1: Data tables

The Doctors' Download: Gateway questionnaire

Are you a UK registered doctor? (n=416)

	No.	%
Yes	384	92.3%
No	32	7.7%

What is your age? (n=412)

	No.	%
21 or under	3	0.7%
22-29	25	6.1%
30-39	78	18.9%
40-49	136	33.0%
50-59	121	29.4%
60-65	33	8.0%
66 and over	9	2.2%
Prefer not to say	7	1.7%

What is your gender? (n=416)

	No.	%
Male	253	60.8%
Female	154	37.0%
Prefer not to say	8	1.9%
Transgender	1	0.2%

In which UK country do you primarily work? (n=399)

	No.	%
England	360	87.4%
Scotland	26	6.3%
Wales	7	1.7%
Northern Ireland	6	1.5%

Which of the following best describes your work setting? (n=355)

	No.	%
Secondary care	141	42.1%
Tertiary/specialist	135	40.3%
General practice/primary care	48	14.3%
Community	8	2.4%
Public health	2	0.6%
Other	1	0.3%

Please tick one of the following that best describes your main area of practice? (n=411)

	No.	%
Clinical	342	83.2%
Medical management	16	3.9%
Research	15	3.6%
Education and training	15	3.6%
Other	23	5.6%

Which of the following best describes your area of clinical specialty? (n=274)

	No.	%
Anaesthesia	59	21.5%
Paediatrics and child health	23	8.4%
Emergency medicine	18	6.6%
Intensive care medicine	15	5.5%
Psychiatry	14	5.1%
Ophthalmology	13	4.7%
Acute medicine	13	4.7%
Radiology	11	4.0%
Orthopaedics	9	3.3%
Oncology	9	3.3%
Obstetrics and gynaecology	8	2.9%
Pathology	8	2.9%
Geriatric medicine	8	2.9%
Cardiology	7	2.6%
Gastroenterology	7	2.6%
Endocrinology	5	1.8%
General surgery	5	1.8%
Vascular surgery	4	1.5%
Palliative medicine	4	1.5%
Urology	4	1.5%
Colorectal surgery	4	1.5%
Neurology	4	1.5%
Respiratory medicine	3	1.1%
Nephrology	3	1.1%
Rheumatology	3	1.1%
Haematology	2	0.7%
Transplant surgery	2	0.7%
Ear, nose and throat	2	0.7%
Oral maxillofacial	2	0.7%
Clinical genetics	1	0.4%
Occupational medicine	1	0.4%
Microbiology	1	0.4%
Stroke	1	0.4%
Neurosurgery	1	0.4%

What best describes your grade? (n=327)

	No.	%
Consultant	204	62.4%
Specialist training	50	15.3%
GP	39	11.9%
Speciality and associate specialist (SAS)	12	3.7%
GP training	7	2.1%
Foundation year 2	5	1.5%
Foundation year 1	4	1.2%
Other	6	1.8%

Which of the following statements most closely describes how you feel compared to the rest of the medical profession? I am…

- "Digitally Lost" - I feel a bit lost in this new digital age, the digital way of life is somewhat foreign to me, the traditional ways often seem better and I often wonder why we're changing them?
- "Digitally Worried" - I'm "getting my toes wet" in the digital world but often feel worried; I'm developing my digital skills in and out of work, can see some of the benefits of these new ways of doing things but they often make me feel nervous."
- "Digitally Ready" - I feel "settled" into the digital world; I am comfortable with these tools and feel I have the core skills to cope with the change that "digital" brings.
- "Digitally Leading" - I love adapting to the changes that the digital world can bring. I can see the opportunities offered by technology and I see myself as an advocate for the changes that "digital" brings (n=412)

	No.	%
Digitally leading	190	46.1%
Digitally ready	159	38.6%
Digitally worried	57	13.8%
Digitally lost	6	1.5%

To what extent do you agree or disagree with the following statements?

The development of digital, data and technology will make a positive contribution to medicine (n=412)

	No.	%
Strongly agree	316	76.7%
Agree	81	19.7%
Neither agree nor disagree	4	1.0%
Disagree	4	1.0%
Strongly disagree	7	1.7%

My organisation does a good job of supporting doctors to develop their digital capabilities (n=412)

	No.	%
Strongly agree	33	8.0%
Agree	110	26.7%
Neither agree nor disagree	118	28.6%
Disagree	104	25.2%
Strongly disagree	47	11.4%

Digital, data and technology will fundamentally change the way in which doctors practise medicine (n=412)

	No.	%
Strongly agree	180	43.7%
Agree	174	42.2%
Neither agree nor disagree	42	10.2%
Disagree	12	2.9%
Strongly disagree	4	1.0%

Digital, data and technology will help optimise my practice, enabling me to spend more time on things that matter to patients (n=411)

	No.	%
Strongly agree	129	31.4%
Agree	160	38.9%
Neither agree nor disagree	70	17.0%
Disagree	37	9.0%
Strongly disagree	15	3.6%

Building a Digital Ready Workforce comparison

A range of different gateway questions was asked in each of three workshops held to support the Building a Digital Ready Workforce programme. Each workshop included questions with the following themes, enabling a comparison between the professional groups.

Self-description compared to others (Informaticians n=881, nurses n=852, doctors n=442)

	Informaticians		Nurses		Doctors	
	No.	%	No.	%	No.	%
Digitally leading	484	54.9%	335	39.3%	203	45.9%
Digitally ready	325	36.9%	331	38.8%	168	38.0%
Digitally worried	66	7.5%	169	19.8%	65	14.7%
Digitally lost	6	0.7%	17	2.0%	6	1.4%

Digital will have a positive impact (Informaticians n=881, nurses n=852, doctors n=442)

	Informaticians		Nurses		Doctors	
	No.	%	No.	%	No.	%
Strongly agree	804	91.3%	700	82.2%	340	76.9%
Agree	68	7.7%	106	12.4%	87	19.7%
Neither agree nor disagree	6	0.7%	10	2.3%	5	1.1%
Disagree	1	0.1%	18	2.1%	3	0.7%
Strongly disagree	2	0.2%	8	0.9%	7	1.6%

Organisational support for skills development (Informaticians n=881, nurses n=852, doctors n=442)

	Informaticians		Nurses		Doctors	
	No.	%	No.	%	No.	%
Strongly agree	172	19.5%	198	12.8%	37	8.4%
Agree	370	42.0%	274	32.2%	115	26.0%
Neither agree nor disagree	232	26.3%	240	28.2%	129	29.2%
Disagree	85	9.6%	176	20.7%	113	25.6%
Strongly disagree	22	2.5%	53	6.2%	48	10.9%