Health Informatics Career Pathways Project

Report B: Full Survey Findings

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Contents

About this document

This document is a supplement to the Informatics Career Pathways Project summary report for those who are interested in the complete findings from the survey. The survey findings highlight lots of interesting themes that have the potential to be explored further in the future. We have made this document public to both share our assumptions and methodologies but also as a thank you to all those who participated in the research, sharing an emerging evidence base and to encourage opportunities for further learning to take place. We recommend reading the summary report first if you have not already done so.

Methods

The project started off with a high level literature review and general engagement using social media, known contacts and online forums. We also engaged with the professional bodies (see summary report) relevant to health informatics for ideas.

The main author then developed a survey with expertise from University College London after identifying key areas of interest. The survey was piloted and then launched in April 2019. The survey had four component parts. The first was a general overview and contextual information. The second part explored their career pathway. The third section focused on reflections around the career pathway up to date including exploring enablers and barriers. The final section looked to the future, including what future training should look like and exploring the concept of licensing within health informatics. The full list of questions can be found in Appendix A of this report.

The survey was mainly promoted via Twitter but also on the Digital Health forum (discourse), via professional body newsletters, local communication bulletins and circulated within networks including the Digital Academy, the NHS Graduate Management Training Scheme, and the Informatics Skills Development Network.

Individuals also shared it within their organisations and professional groups. It is therefore important to note that the results may sometimes be skewed based on those groups but we hoped this would give us a mixture of individuals at all stages of their careers. This is mainly relevant to questions around Professional Body membership.

507 participants in total completed the survey in a three week window. The initial survey findings and recommendations were presented at the UK Health Show (June 2019) and Digital Health Summer School (July 2019) and input from that has also helped to shape the final discussion and recommendations. The participation rate exceeded our expectations, demonstrating the appetite for conversations in this area.

This is a high level piece of research based on an extensive dataset. Where assumptions have had to be made, we have been transparent about them throughout the report. An online survey was deemed the most cost effective method for this as a discovery piece, not knowing what level of interest and engagement we would receive.

Identifiable information

It was important that participants could be honest about their experiences while preserving their anonymity. There is an added complexity that career pathways are identifiable due to their individuality, so we had to be mindful of this. We have remained GPDR compliant throughout this piece of work.

While quotes are used to illustrate themes, no individual should be identifiable in this report. All personal information will be deleted by March 31st 2020, which allows a time period for any follow up questions and dissemination of results where participants consented to being contacted for those purposes.

Names and email addresses were removed from the data set immediately and it is only the main author who has had access to the full dataset. We have generally not segmented the findings in this report by group (e.g. organisation, seniority or professional area); each question has been managed at an aggregate level given the scope of the project.

Survey results

Demographics

Individuals were invited to participate if they identified as being part of the non-clinical health informatics workforce in the UK and Ireland. Social care colleagues were encouraged to participate, alongside those who did not work in the public sector. We needed to keep the scope of this project contained and, as a key aim was to explore recruitment and retention, this would be different for those with and without clinical registrations. Perhaps unsurprisingly, the majority of participants were working in NHS organisations.

Where individuals are currently working (or most recent role)

The majority of participants worked in NHS organisations based on their current or most recent role. Table 1 shows the number of individuals working within each career area against the level of seniority. This is the coding method we used to produce the career pathway heatmap and more detail is available from page 13. The largest proportion of participants worked in Business Intelligence & Analyst roles (35.6%).

	Executive, Director or CXIO	Assistant or Deputy Director or CXIO	Head of Service	Deputy Head of Service or Senior Manager	Senior or Specialist role	Manager	Standard Role	Support & Administrative Roles	Graduate Trainees & Apprenticeships	Clinical Front Line Role	Totals
Academia & Professional Bodies	1		1	1			2				5
Business Intelligence & Analysis	5	4	21	11	63	15	24	4	2		149
Business Analyst & Change				1	4	5	6	1			17
Clinical Audit & QI			1				1				2
Clinical Coding			3		6	5	6	1			21
Clinical Leadership & Support	3				2		1	1		1	8
Clinical Systems			2	1	15	2	7				27
Data Warehousing			1		3	1	4				9
Education & Training						1	1	2			4
Health Informatics (Generic)	38	3	13	1	9	6	1	2	4		77
Health Records						1	3				4
IT /IM&T/ ICT (Generic)	3	3	2	2		2					12
IG & Data Quality			1		2	2		2			7
Library & Knowledge Services								1			1
Network & Infrastructure			1		1	2	4	1			9
Other	1	2	1		1	3	1	1			10
Portfolio & Programme Management			2	5	2		11	2			22
Project Management				1	1	3	13	4	2		24
Systems and Software Development			3		3		3	1			10
User Research					1						1
Grand Total	51	12	52	23	113	48	88	23	8	1	419

Table 1: Participant current roles (419/507 provided information on this)

Equality and Diversity

We did not ask for and capture information around demographics in this survey although some findings around diversity and equal opportunities arose and are discussed later in this report.

Digital Academy

A number of participants were currently on Cohort 1 or Cohort 2 of the Digital Academy (5.6%). Another 6.6% were interested in applying to the next Cohort.

Are you part of a NHS Digital Academy cohort?	N	% (out of 499)
I don't know what this is	92	18.4%
No	346	69.3%
No but I would like to apply to Cohort 3	33	6.6%
Yes, Cohort 1	12	2.4%
Yes, Cohort 2	16	3.2%

Table 2: Digital Academy participation

8 participants did not answer this question and are excluded from the percentages.

Graduate Training Schemes

Participants were also asked if they were currently on or were alumni of a graduate training scheme or programme within health informatics due to the initial focus on early and entry level career pathways. 13 participants did not answer this question and are excluded from the percentages.

Those who answered yes were asked a few more questions for context. Some participants were excluded where they appeared to be referring to an academic qualification in isolation or they had not given any further information making it impossible to make that judgement.

Are you currently on or have you completed a graduate training scheme or programme in health informatics?	N	% (out of 494)
No	430	87.0%
Yes	36	7.3%
Excluded	28	5.7%

Table 3: Identification of graduate scheme trainee or alumni

The majority of participants had completed or were completing the Health Informatics specialism of the national NHS Graduate Management Training Scheme (GMTS), although other schemes were referenced. The majority of participants who completed this section were current trainees or very recent alumni.

Scheme type (including specialism)	Alumni	Current trainee	Totals
GMTS General Management Specialism	1		1
GMTS Health Analysis Specialism		2	2
GMTS Health Informatics Specialism	15	13	28
Graduates Into Health - Data Analysis Specialism		1	1
Regional Informatics Graduate Training Scheme	1		1
STP - Clinical Bioinformatics		1	1
STP - Health Informatics Specialism		1	1
STP - Specialism Not Specified		1	1
Totals	**17**	**19**	**36**

Table 4: Scheme types and specialisms

Scheme type (including specialism) GMTS	2017	2018	2019	Totals
GMTS - Health Analysis Specialism	1	1		2
GMTS - Health Informatics Specialism	5	8		13
Graduates Into Health - Data Analysis Specialism		1		1
STP - Clinical Bioinformatics			1	1
STP - Health Informatics Specialism	1			1
STP - Specialism Not Specified			1	1
Totals	**7**	**10**	**2**	**19**

Table 5: Current Trainees by Scheme Type & Specialism

Scheme type (including specialism)	Pre-2010	2010	2011	2012	2013	2015	2016	Totals
GMTS - General Management Specialism	1							1
GMTS - Health Informatics Specialism	1	1	1	1	3	6	1	15
Regional Informatics Graduate Training Scheme	1							1
Totals	**3**	**1**	**1**	**1**	**3**	**6**	**1**	**17**

Table 6: Alumni by Scheme Type & Specialism

Scheme type (including specialism)	2012	2013	2014	2015	2016	Totals
GMTS - Health Informatics Specialism	1	3	0	6	1	11
Number of Health Informatics Trainees in year	19	19	15	16	16	85
% response rate	5.3%	15.8%	0.0%	37.5%	6.3%	12.9%

Table 7: GMTS Health Informatics response rate

We used intake information from the Leadership Academy to understand our response rate for the graduate management training scheme.

What attracted individuals to an informatics graduate scheme?

We asked participants where they had originally heard about the graduate programme they had undertaken. Responses included: already working in the NHS, graduate job searches, colleagues, newspaper adverts, word of mouth, university events, university careers services, internet searches (with reference made to NHS graduate scheme rankings), NHS jobs, generally online, at a conference, NHS staff family member, websites e.g. the GMTS website or NHS jobs.

Motivations for why individuals wished to work in Health Informatics are explored later for all participants in this survey. We felt it was important that this more specific question was asked to graduate trainees to understand what is deliberately attracting them in the first place while they were still (for the majority) in education.

Health informatics on the board

We asked participants if they knew how informatics was represented on their organisations board. 10 participants did not answer the question and were excluded from this analysis.

Do you know how health informatics is currently represented on your organisation's board?	N	% (out of 497)
No I don't know	246	49.5%
Yes (please state in the box below which role(s) in your organisation represents Health Informatics on the board)	213	42.9%
Yes, I represent informatics on the board	38	7.6%

Table 8: Health Informatics on the board

Where participants advised they represented informatics on the board, approximately half were in a Director/Executive or CIO role. The other half of participants provided a range of responses including Heads of Services and other Management roles. Where participants provided information about who else represented informatics on the board, the majority of roles were either an informatics or finance role although references were made to other roles including CEOs, Strategy, Programmes and Medical Directors.

Some provided qualitative comments that indicated informatics was not represented through the route it was supposed to be. Some said that everyone represented it which warrants a question about accountability and ownership. Others said that no one represented it, or it simply isn't. Some organisations were informatics organisations so this question didn't apply in the same way. One participant highlighted that Non-Executive Directors had a growing interest but their CIO was not on the board. These comments highlight why it may be nearly half of participants answered no to this question.

Professional bodies and training

Professional body membership

We asked participants about their professional body membership and which bodies they were members of (or applying to become members of). 13 participants did not answer the initial question and were excluded from this analysis.

Are you a member of a health informatics professional body? (If you are currently applying then please select yes and give further information)	N	% (out of 494)
No and I am not interested	93	18.8%
No but I am interested	248	50.2%
Yes I am a member or applying to be a member (please provide information of which body and your status below)	153	31.0%

Table 9: Professional body membership

Further Information on Professional Body Membership	N	% (out of 153)
American Health Information Management Association (AHIMA)	1	0.7%
ALT - Association for Learning Technology (ALT)	1	0.7%
Association of Professional Healthcare Analysts (APHA)	64	41.8%
British Computer Society (BCS)	51	33.3%
College of Healthcare Information Management Executives (CHIME)	5	3.3%
The Chartered Institute of Library and Information Professionals (CILIP)	2	1.3%
Certified Information Systems Auditor (CISA)	1	0.7%
Faculty of Clinical Informatics (FCI)	6	3.9%
Faculty of Health Informatics (FHI)	1	0.7%
The Federation for Informatics Professions (FEDIP)	11	7.2%
Health Information Management Association Of Australia (HIMAA)	1	0.7%
Health Informatics Society of Australia (HISA)	1	0.7%
Institute of Health Records and Information Management (IHRIM)	11	7.2%
UK Council of Health Informatics Professions (UKCHIP)	3	2.0%
Blank / Insufficient information given	4	2.6%

Table 10: Professional Body Membership Type

Percentages do not add up to 100% as some participants were members of multiple professional bodies; in particular there often was overlap with FEDIP or CHIME and another professional body.

Qualifications, professional registrations and training

At the start of the survey, we asked participants about their qualifications and professional registrations. The majority of participants either had these (or were actively working towards them) (41.3%) or were interested in doing so (43.8%). Only 14.9% of participants were not interested. 16 did not respond to this question and were excluded from the percentages.

Have you obtained any qualifications or professional registrations relevant to Health informatics? (If you are currently studying/applying please select yes and give further information)	No	% (out of 491)
No and I'm not interested	73	14.9%
No but I would like to	215	43.8%
Yes I have or I am in the process of studying/applying (please give more details below)	203	41.3%

Table 11: Qualifications and Professional Registrations

The results presented a muddled picture of professional registrations and qualifications and some were confused between the difference between professional body membership and their professional registration. In hindsight the questions should have been separated out. Additionally, we later asked participants about training they had undertaken and this again presented a lot of overlap. We have not included the list in this report with nearly 500 individual responses to consider however this is something we can do further research on and potentially look at themes within training undertaken so far in itself.

Benchmarking

We were interested in what tools participants had used for benchmarking purposes. Although we were primarily interested in benchmarking tools that could support understanding the maturity of workforce skills and capabilities either at individual or organisational/system level, we got broader results too which looked beyond workforce. Similar to the training questions we received a huge variety of responses and the following were referred to as potential benchmarking tools:

American Medical Informatics Association knowledge domains, Apha tools, Beautiful Information, BCS Skills Framework / SFIA, CHIME tools, CILIP Professional Skills & Knowledge Base, Digital, Data and Technology Profession Capability Framework, FEDIP, Gartner, Health Service Modelling Associates (HSMA) programme (NIHR Penchord South West), Health Foundation Analytical Maturity, Hi Five Programme NHS Wales, Health Informatics Careers Framework (HICF), HIMMS, Internal skills Matrices (non-specific), International Medical Informatics Association (IMIA) educational, Informatics Skills Development (ISD) annual benchmarking and skills frameworks, KLAS, Local Government Association Digital Maturity Index, Microsoft Business Intelligence certification paths, Model Hospital (benchmarking on IT spend), National body frameworks (non-specific) – from PHE, CQC, NHSI, NHSE, National School of Healthcare Science (NSHCS), Competencies for Healthcare Scientist Trainees, NHS Digital internal individual competency frameworks, NHS CareCERT & Cyber Essentials, NHS Graduate Management Training Scheme competency frameworks, NHS England Knowledge Skills Framework for Analysts, NHS England Digital Maturity Index, NHS England Fingertips, NHS Information Governance Toolkit, Public Health England Analyst Framework, PHE Population Health Intelligence Skills Mapping Tool, Sustainability & Transformation Partnerships local benchmarking framework (as part of).

One of the common benchmarking tools for both individuals and teams/organisations is SFIA (Skills for Information Age). However the majority of participants 73.3% had not heard of it or they had but did not understand it (9.1%). 17.6% of participants confirmed that they both knew of it and understood it. 12 did not respond to this question and were excluded from the percentages.

Defining health informatics

While we have used the term health informatics throughout this project, we acknowledge the terminology can be contentious. Throughout the research we had conversations with individuals who felt they did not identify with this term, and within the responses itself it was not always favourable. For example, one response read, "Informatics is too much related with IT. If you mean data or information call it just that or analysis".

We decided to ask participants to describe health informatics. Our aim was not to try and agree a definition but to shine a light on why opinions may be varied. We ended up with over 300 individual definitions, from which we took a sample, which we then segmented into broad categories using a Venn diagram to understand any overlap.

The three key elements of descriptions were (i) information (ii) technology and (iii) change/outcomes (i.e. doing something with information and/or technology). What this highlights is that we lack coherence about what the term means and the consequence is that interpretations of what we are asking will differ immensely. The "targets" of who were trying to help also varied including references to patients, clinicians, the NHS or system as a whole.
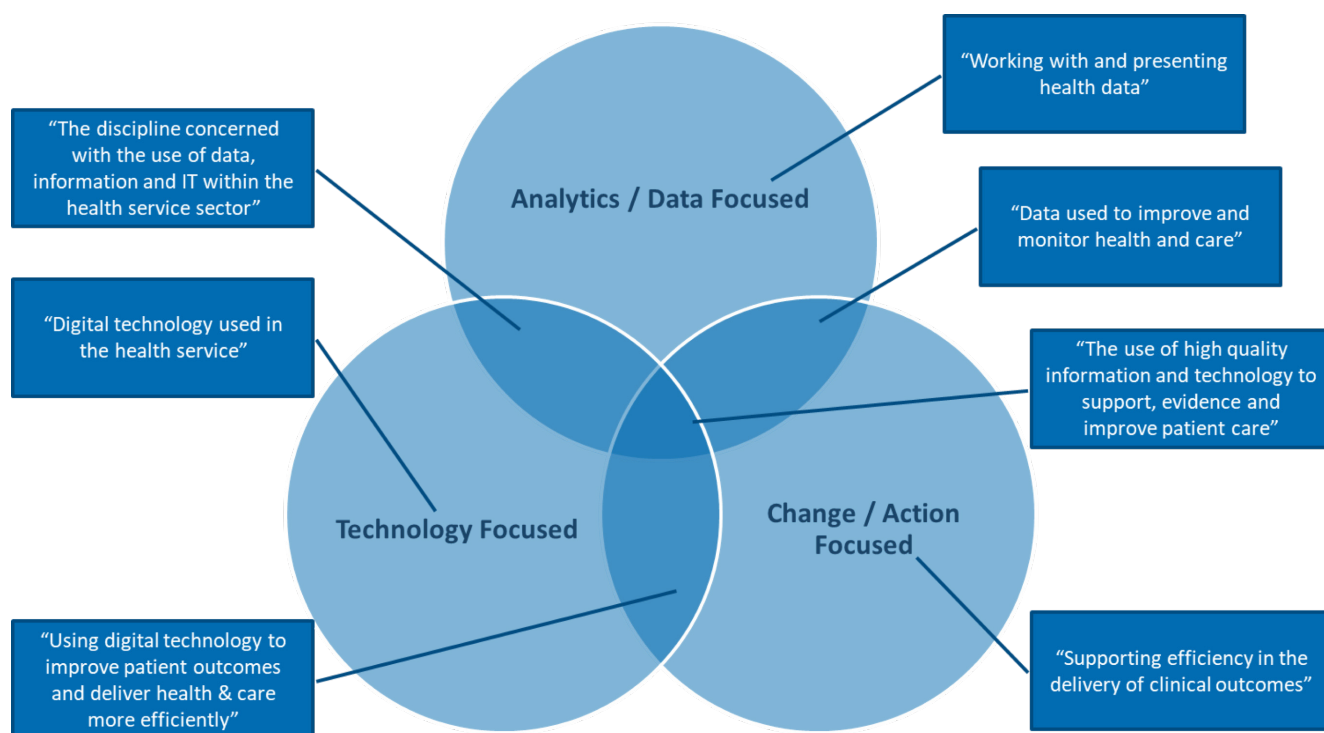

"Working with and presenting health data"

"The discipline concerned with the use of data, information and IT within the health service sector"

Analytics / Data Focused

"Data used to improve and monitor health and care"

"Digital technology used in the health service"

"The use of high quality information and technology to support, evidence and improve patient care"

Technology Focused

Change / Action Focused

"Using digital technology to improve patient outcomes and deliver health & care more efficiently"

"Supporting efficiency in the delivery of clinical outcomes"

Diagram 1: Health Informatics descriptors Venn diagram

Other terminologies

We asked participants if they used other terminologies to describe Health Informatics although we received some comments that we had introduced bias to those working more in the technology space. We have included the results of this question below however due to the validity of question we will use that with caution. Where participants did select some of the terminologies offered the results were as follows:

- 234/507 for digital health
- 76 / 507 for digital tech
- 116 / 507 for digital transformation
- 123/507 for ehealth
- 102/507 for health tech

When we asked participants if they used other terms, unsurprisingly given the feedback, the majority of these were focused on analytics/BI. Terminologies included data science, digital, transformation, ICT and performance. A slightly more eclectic term offered was the "Digital Washing Machine".

Career pathway heatmap

Approach

Participants were asked for information about the five most recent roles on their own career path. They were asked to include the following information: job title, team type, reporting to, organisation (type was sufficient if they did not wish to reveal their place of work), banding, number of years in role. The completion rate of this section was 33.7% (855/2535, where 2535 is the total had each of the 507 participants had provided information on five roles). The majority of participants provided information for their current or most recent role (83.0%) but this continued to drop for each additional role and significantly by the fifth role (10.3%).

73.3% (627/855) of the job titles given were unique. While some of this is down to typos or individuals specifying a level of seniority (e.g. Head) or focus area (e.g. performance or a clinical service line) this highlights the inconsistency and sheer volume of job titles in existence under the Health Informatics umbrella.

The project team opted to allow free text for job titles and teams rather than restricting them into categories from the outset knowing these inconsistencies likely existed. The existing Health Informatics Career Framework[1] was used initially and a coding frame was developed iteratively as the survey results came in. We also looked at other existing frameworks for inspiration such as the GDS framework. Every role was then placed on a coding framework based on (a) level of seniority indicated and (b) career pathway. Where individuals had provided us with multiple roles on their individual career paths, we were also able to map the movements to create a 'health informatics career pathway heatmap'. We were able to plot 435 movements in total.

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1. HICF is the current framework reference by HEE however it is not currently being updated

The coding frame was developed and reiterated several times based on conversations with individuals and experts, recoding several times and then checking for consistency. Table 12 shows how we categorised seniority and table 13 shows how we have categorised career pathway areas. We grouped smaller groupings together when it felt sensible to do so, both in terms of seniority and roles. This is a first attempt to undertake this work with limited resources therefore we have been open about assumptions made; we fully appreciate that the coding frame developed contains categories that are not always mutually exclusive and interpretations will likely vary between organisations or even within teams.

We also acknowledge that hierarchies are not always helpful and that some of these levels of seniority will differ between specialisms, however we needed a way to capture and map them. We used information we had on banding and who individuals reported to where this was available helped.

Seniority	Assumptions and examples
Executive, Director or CXIO	Executives, Directors, CIOs, CDOs, CDIOS, Chairs, other Board Members. CNIOs and CCIOs included but overlap with clinical informatics. Includes associates. CIOs may not always be on the board in their organisations but for the purposes of the mapping we wanted to group that level of seniority together.
Assistant or Deputy Director or CXIO	Assistant or Deputy Director in job title.
Head of Service	Head in job title
Clinical Front Line Roles	Clinical roles e.g. doctor, consultant, pharmacist – usually because they were part of a pathway with other informatics roles in (Acknowleding its likely many maintained a dual role at some point even if at other points they appear to be in other roles).
Deputy Head of Service or Senior Manager	Roles with senior manager, or deputy heads of service.
Senior or Specialist role	For a role to become 'senior' it needed to include one of the following words: senior, principal, team leader, advisor, specialist, business partner, consultant, auditor, associate, higher level, advanced. Assumption made that they have specialist knowledge or skills.
Manager	Manager in job title
Standard Role	Roles without level of seniority required – and it may be that in different career pathways the 'standard' role requires more skills or experience
Support & Administrative Roles	Roles that indicate administration, facilitative or support. These would include typical entry level roles and some people will be happy to stay here which is absolutely fine.
Graduate Trainees & Apprenticeships	Roles which have identified themselves as being a graduate trainee or apprentice.
Other assumptions: Regional or National roles were not separated out for the purpose of this activity. Acting / Secondment was ignored for the purpose of this activity. These are not necessarily linear and in some areas a specialist may be more senior than a manager, and vice versa for other area.	

Table 12: Coding frame levels of seniority

Broad Category	Career Pathway	Example Roles	Assumptions / Notes
Clinical Informatics	Clinical Leadership & Support	Chief Nursing Informatics Officer, Clinical Advisor, Associate CCIO (Also clinical roles e.g. Consultant, Physiotherapist)	
	Clinical Systems	Pathology IT Manager, EPR Product Specialist, IT System Manager	More focused on maintenance or support for a specific system
Library & Knowledge Services / Training & Education	Education & Training	Trainer & Implementation Officer, Learning & Development Trainer, Digital Systems Trainer	
	Library & Knowledge Services	Knowledge Services Manager, Library Assistant, Librarian	
Clinical Audit, Clinical Coding & Health Records Management	Clinical Audit & QI	Clinical Audit Assistant, Quality Improvement Lead, Regional Clinical Auditor	
	Clinical Coding	Clinical Coder, Clinical Coding Improvement Manager, Head of Clinical Coding	
	Health Records	Health Records Clerk, Waiting list/ PAS Manager, Health Records Manager	
Data, Information & IG	IG & Data Quality	Data Quality Facilitator, Data Protection Officer, Head of Information Governance	Emerging overlap with networks/infrastructure i.e. Cybersecurity
	Business Intelligence & Analysis	Director of Performance & Analytics, Senior Information Manager, Data & Information Officer, Head of BI	Includes performance and contracting roles
Data Warehousing	Data Warehousing	Data developer, SQL Server Data Warehouse Developer, Information Technician	More focused on the platforms to extract/ hold data rather than the clinical facing system
Generic Areas	Health Informatics	CIO, Health Informatics Consultant, Health Informatics Trainee, Digital Lead	Vague terms like informatics, digital used - usually vague with level of seniority in job title
	IT / ICT / IM&T	IT Service Manager, IM&T Manager, Head of IT	IT, ICT or IM&T mentioned (or team type) – usually vague with level of seniority in job title

Broad Category	Career Pathway	Example Roles	Assumptions / Notes
Software/Hardware Technical Expertise	Systems & Software Development	Software Development Manager, Chief Solutions Architect, Web Developer	More focused on product development and/or interoperability of multiple systems
	Networks & Infrastructure	IT Security Manager, Server Support, IT Infrastructure & Development Manager	
Projects & Programmes/ Change & Engagement	Portfolio & Programme Management	Head of PMO, Programme Manager, Programme Co-ordinator	
	Project Management	IT Project Manager, Informatics Project Assistant, Digital Project Lead	
	Business Analysis & Change	Business Analyst, Implementation Lead, Senior Benefits Manager	Potentially more overlap with the BI/analysis space than the data captured
	User Research	Lead user researcher	
Other	Operational	Planning Manager, General Manager, CCG Board Member	Includes some comms & engagement roles – was not obvious if these were within an 'informatics' capacity or happened to be a previous role
	Academia & Professional Bodies	Senior lecturer, PHD student, Professional Body Chair	

Table 13: Career pathway area

Health informatics career pathway heatmap

We used this coding frame to map movements individuals had undertaken between roles on their own journeys. We have included an example below but please see the accompanying career pathway heatmap document.
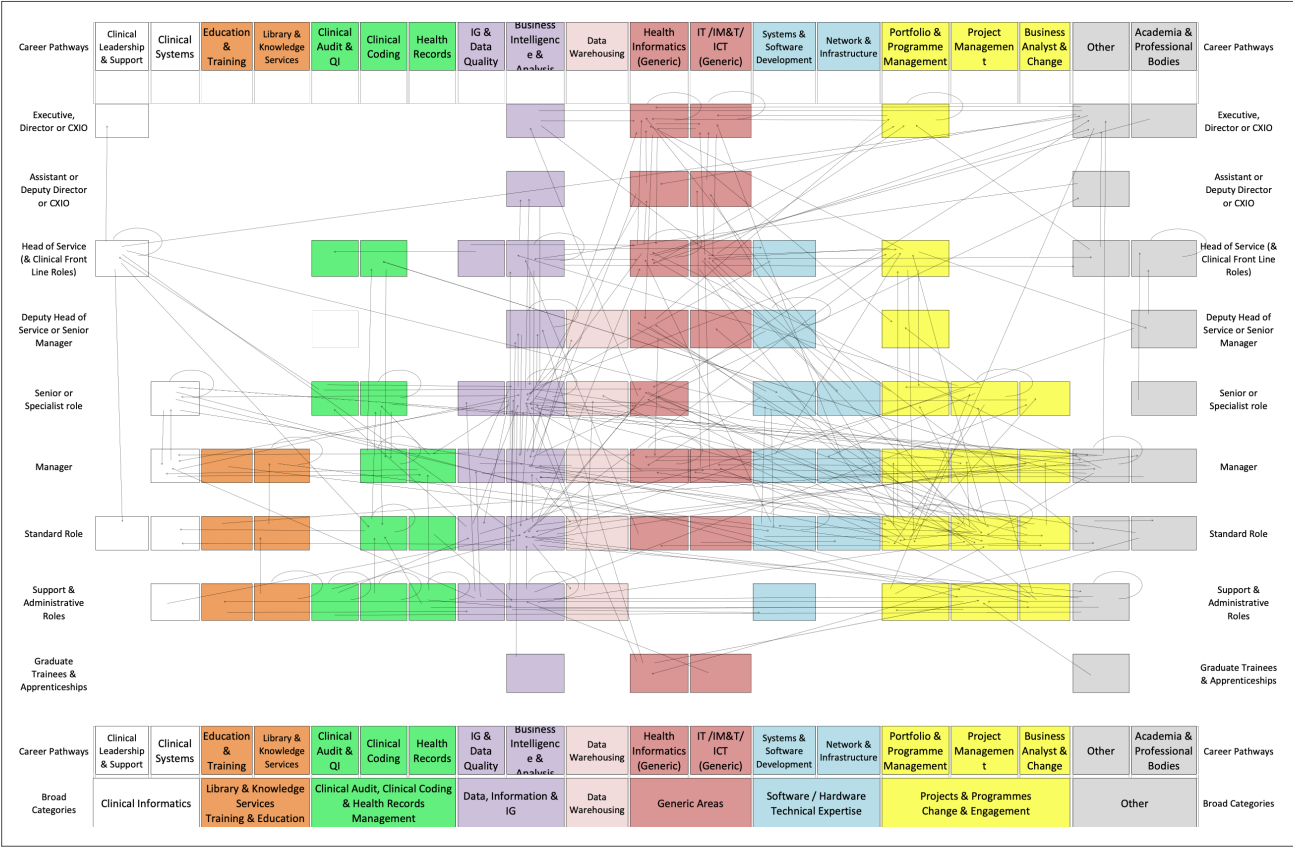

Diagram 2: Career pathway heatmap

The visual map highlights a number of key findings:

1. Many entry level roles are specialist from the start, indicated by job titles, although some graduates and apprentices had broader sounding roles. This indicates that individuals may be pigeonholed quite early on if they are not able to look outwards, or indeed feel confused if the area of health informatics they expected to work in was not where they were placed.

2. More senior roles became harder to code, which may indicate they gain significantly larger portfolios in order to take up those positions. This raises the question as to whether individuals have sufficient support to make that jump both in terms of specialist knowledge and leadership qualities. This also highlighted why it may sometimes be difficult to understand the career path to senior roles in health informatics.

3. The heatmap indicates that movement across different pathways does happen and this includes sideways movements as well as progression. It is however important to note that this composition is made up of lots of individual movements and therefore may not be representative compared to looking at full career pathways, especially considering the changes that have likely occurred between individuals' current and second most recent role.

4. Those who completed this survey did still tend to have quite 'traditional' NHS roles however small numbers of others included those working in transformation, those in support or broader roles where their own profession may be something like communications & engagement but they were supporting a digital programme. Some from academia and the professional bodies also participated.

Are there Common Career Pathways?

One of the original questions we originally set out to answer was whether there were common career pathways. We have explored this a little but it was challenging given the ambiguity around senior job titles. There is the potential to do further work in this area.

We have plotted a few examples below to give a visual representation using the high level broad themes referenced in table 13. As a reminder a key is shown below in table 14.

Clinical Informatics	
Library & Knowledge Services / Training & Education	
Clinical Audit, Clinical Coding & Health Records Management	
Data, Information & IG	
Data Warehousing	
Generic Areas	
Software / Hardware Technical Expertise	
Projects & Programmes / Change & Engagement	
Other	
No data available for role	n/a

Table 14: Key for broader career pathway areas

What do the complete career pathways tell us?

We did some further analysis on the 52 individuals who had provided five roles and therefore a more complete career path history. When grouped into the broad themes, patterns were evident. Looking at the 52 individuals who provided a more complete journey indicated a far higher level of 'stability' and remaining within one or two career pathways than when we mapped the individual movements, the majority of which is the movement between individuals current roles and the one preceding that. It is therefore useful and important to look at the complete pathway data where we have it.
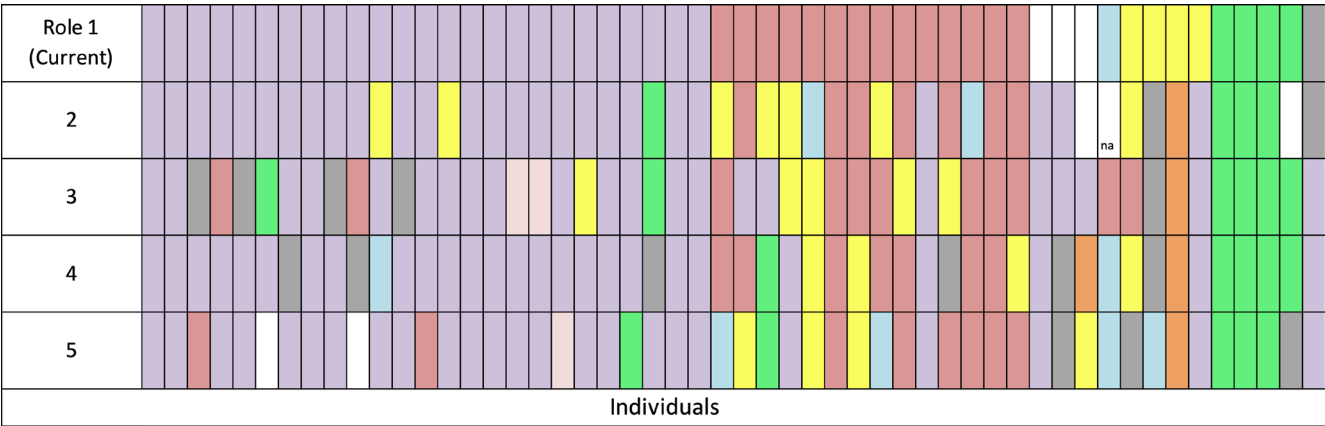
Diagram 3: 52 'complete' pathways and themes

Is there a pathway to CIOs / Executive / Director Roles?

Where we did have available information on those currently in the most senior roles, the majority of job titles were so generic or vague it became difficult to map their pathway in a more granular way. For this exercise to be done in the future, there probably needs to be a more structured conversation or interview to draw this information out. What this does raise however is that the ambiguity around senior job roles on the surface may be part of the reasons individuals feel there are unclear career pathways.
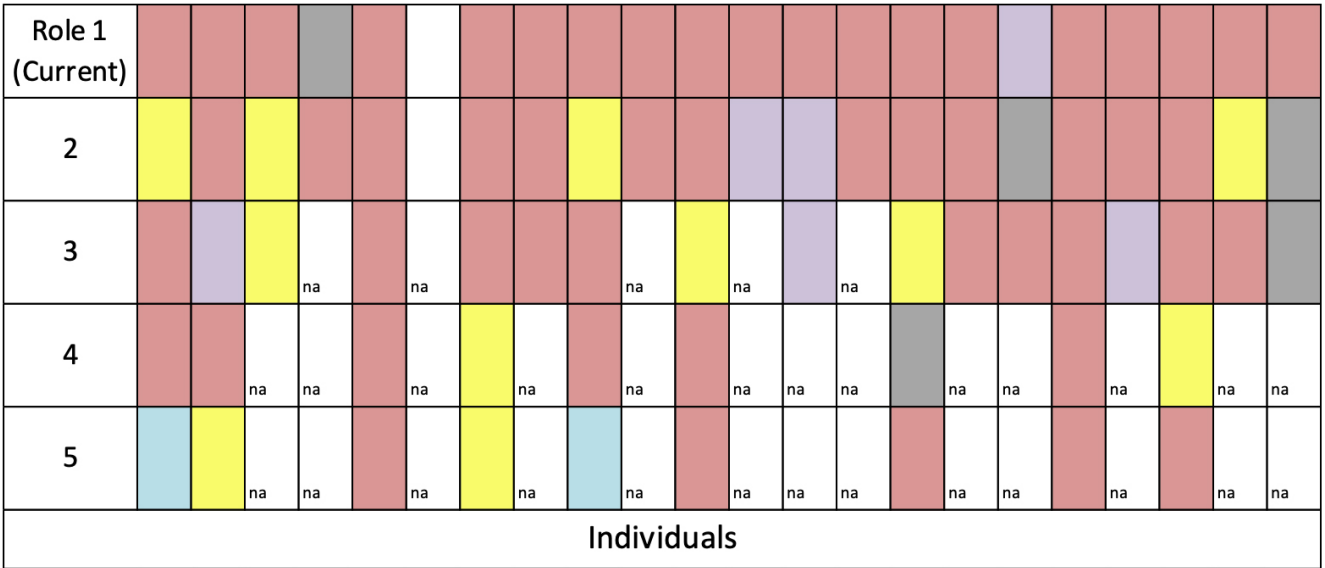

Diagram 4: Career pathways and themes for CXIOs, Executives & Directors
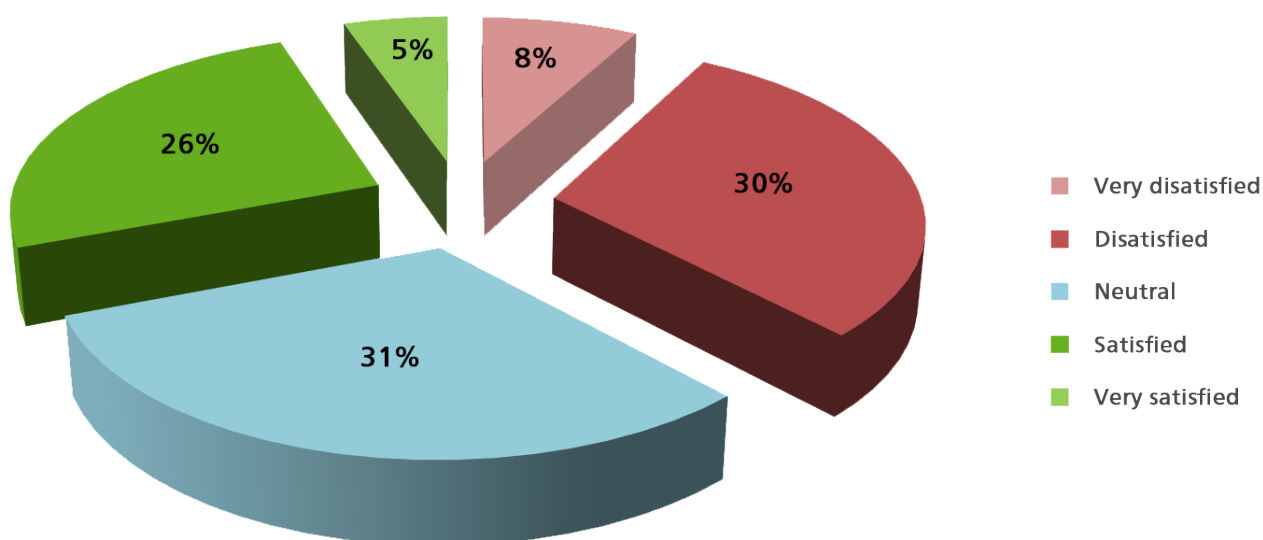
Reflections on career pathways: satisfaction

Following sharing their career pathways, participants were asked to reflect on their career pathway to date. We firstly asked participants how satisfied they were with their career path journey. Participants were more likely to be dissatisfied (143) than satisfied (116) with the rest remaining neutral. 130 did not respond to this question and were excluded from the percentages.

To support this question we asked participants some qualitative questions to better understand why people may be feeling this way.

As you have travelled on your individual career path journey, how satisfied are you that the career path was clear?	N	% (out of 377)
Very Dissatisfied	30	8.0%
Dissatisfied	113	30.0%
Neutral	118	31.3%
Satisfied	96	25.5%
Very Satisfied	20	5.3%

Table 15: Career satisfaction

Graph 1: Career Satisfaction

Challenges to career pathways

We asked participants "What challenges have you faced in your career?" and a number of themes emerged which were generally focused on culture and system issues.

Lack of flexible and up to date career pathways to enable progression

The strongest theme by far linked back to a lack of career pathways. However as the research progressed, it felt that this was less so about individual and linear career pathways (which did exist, albeit to a certain ceiling) and more about flexibility across multiple pathways and under a careers framework in general. Some individuals felt that they had just coasted along and become 'jack of all trades, master of none' rather than having clarity about what they were trying to do with clear objectives and personal development processes were cited as issues.

As we suspected from the outset, unclear career pathways to senior roles was raised with a call for "apprentice to director" pathways being useful. Job descriptions in general were inconsistent and unhelpful and some mentioned a pressure to specialise early on because they were not sure how to navigate the various options.

It was often not clear what the options available were. Some of these comments came from those new to the field: for example, "Being new to informatics it took a long time to become fully aware of the scope of the informatics field, the different types of jobs that are available. Now it is trying to work out the required skills and depth of technical knowledge needed to obtain the positions I desire". This highlights a mismatch between expectations and reality.

Several mentioned dead ends and bottleneck with the hierarchal structure of the NHS failing to support people to progress effectively. For some of the more technical roles, it was argued that career paths stopped after one or two band progressions and individuals did not know where to go next. For more senior roles, it was sometimes difficult to progress without having a degree or becoming a manager once a certain point had been reached.

For those not already working in the NHS, there was sometimes a feeling they had to start again from the bottom rather than having their external experience valued. There was also concern expressed that any pathway work undertaken should be flexible enough to allow people to leave and come back in: "The experiences outside the NHS are highly valuable in forming my NHS roles. Would suggest you assume a career path that can step back and forth between private and public sectors - and we absolutely must not build something that de facto excludes those who have built a career outside the NHS from steeping in with their valuable experiences at a later stage (just because they don't have the right bit of paper)".

This has all been exacerbated by NHS organisations not always having appropriate careers advice available for staff. Individuals were not always sure where they could go to for advice about broadening their career path and options which links to our theme around lack of or bad support mechanisms.

Keeping up with the evolving world and the political landscape

Individuals highlighted that the world was changing around them with the sheer amount of information available and constant technological advances. There were feelings of being unprepared and how changing roles and skills can keep up with and align to the future. Some spoke about keeping their skills up to date, yet the NHS being "old fashioned and not keeping up to date" meant learned skills could not always be applied. Some spoke about constant business as usual requirements being a blocker to changing to more future proofed ways of working.

Individuals sometimes linked failure to deliver in their roles to external factors with the ability to progress in their careers. The overall ownership and leadership of the Health Informatics agenda was referred to including the politics of external national organisations having an impact on local direction and implications around funding which does not support the required infrastructure.

Part of this included a 'clash of cultures' reference, maintaining vested interests and maintaining the status quo. The instability of government policies and the consequential impact on long term approaches does not help and the constant change of organisations, processes and system cause fundamental delays: "bureaucracy – the NHS changes before anything can happen".

Personal Qualities

Some identified their own personal qualities as being a challenge, notably where they lacked confidence or other leadership skills. It was however far more common for individuals to recognise personal qualities that had enabled them rather than hindered and this is explored in the next section.

A few individuals also mentioned the difficulty of managing poor performance within the NHS and the impact that it "quickly saps the ambition, innovation and drive out of others in all when colleagues lack ambition, innovation or drive to perform in their positons."

Organisations (and executives) not appreciating Health Informatics

A common theme was that organisations, teams or individuals did not understand the benefits that health informatics could offer and how it should be playing a critical role in organisations.

While recognition from clinicians and other teams was sometimes mentioned, the focus was mainly on conflict with the board. Some highlighted that informatics was solely focused on from a financial perspective or data was only used when it was suitable to fit a pre-determined outline. One of the impacts of this is that informatics continues to receive a lack of investment and low prioritisation at board level, which leads to difficulties in long term planning. A lack of senior sponsorship for digital programmes was also mentioned. This is clearly not the case everywhere, but the survey response indicated there is core work to be done to address these issues.

It was clear that many individuals felt demotivated and downtrodden by how they were being perceived and treated, often as a scapegoat for when things went wrong. Some highlighted how those not working within health informatics did not understand the challenges and risks, the stressful working conditions and constant pressure coupled with "inadequate systems and software – leaving you exposed individually to failure and risks for which you take the blame, having to be expert in a complex environment and with complex data with little support". One example was given where analytics teams were blamed for data quality issues rather than acknowledging a need to address data entry at source.

Not being taken seriously as a Health Informatics professional

This mirrors the above in that individuals did not feel that they were personally taken seriously and that their own efforts to professionalise had not been appreciated. Individuals spoke about not having their skills, qualifications and professional body memberships respected and that their teams were not valued as a core vehicle to enable and deliver change, one referred to "always being lumped in with finance". Part of this theme also highlighted the professional bodies and previous failed attempts to professionalise and align the bodies, alongside where individuals felt the professional bodies had previously not done enough to help this.

Lack of or bad support mechanisms

This was mainly focused around poor management culture within the NHS and some participants highlighted bullying and managers being deliberately obstructive. Poor leadership and a lack of visible or appropriate mentors and role models were mentioned and some pointed out they had a lack of objectives or direction to know what they were supposed to be doing in their jobs. High staff turnover was also mentioned, indicating instability in team settings for some organisations.

Access to training and education

This was a very common theme with many indicating it was really hard to gain access to training and education. The main reasons given were:

i.   General availability of training including lack of short courses available

ii. Lack of funding or a will to invest in people

iii. Lack of OD support

iv. Lack of perception that the training or education was useful

In addition, reactive rather than proactive training was mentioned, indicating that individuals were not being upskilled and supported to take on new roles and support career advancement. Individuals were also not trained proactively to keep up with the latest advancements in technology and information. The impact of this included barriers to progression.

There was also a focus on more generic leadership skills, including improving presentation or communication skills, alongside general leadership training support: "No formal NHS training or obvious ways of preparing for more senior roles other than googling stuff".

Staff turnover and difficulty to progress internally

Many spoke about changing teams, organisations or even sectors in order to both gain a promotion and to learn new skills. The general consensus was that it was difficult to secure promotions in existing teams, partly due to a lack of openings, partly due to a lack of structured succession planning. One individual spoke of a vacancy being empty for 18 months yet there was no opportunity to progress into that role.

There appears to be a lot of movement between organisations in this space. A disadvantage that came with this, particularly for those working with technical systems, was the extensive re-training required to learn another organisation's ways of working. For a couple of areas such as Library and Knowledge services, the small number of jobs available and high competition was also referenced.

The extreme opposite to this was sometimes mentioned where individuals ended up in a more senior role because of 'dead man's shoes' and had not necessarily planned for or been equipped for that role with appropriate knowledge and training. Skills were often lost when individuals left rather than proactive succession planning taking place.

Diversity and Equity of Opportunity

There were a number of comments about individuals being overlooked for advancement due to gender, race or age. Much of this focused on women still working in a 'male dominated environment' and challenges around maternity leave or caring responsibilities, although it was noted that this was improving. There were also comments about those in the right friendship groups or select staff being

given opportunities to develop and that this was not open or fair to all. We did not explicitly ask for information around this which was a missed opportunity we acknowledge given the response rate.

Organisational Structures and Silos

A reoccurring theme was conflict between "disparate teams under the health informatics umbrella". Some explicitly did not want to be associated with other teams and there was a sense of tribalism. Communication between teams and departments was generally negative with a lack of clear strategy and direction. However, others saw the opportunity to work closer with other teams to understand the fuller picture and that working in small teams or in isolation meant there was little opportunity to learn from others.

There was also a challenge for specialists embedded within in a clinical department or other operational team; while there was the clear benefit of being closer to operations it meant they sometimes missed out on specific training opportunities that may be available.

A focus on: analysts

While we have generally not delved into individual career pathways, there were some key barriers around analyst progression which were highlighted. This demonstrates that it is likely valuable in the future to undertake some work with each professional area; indeed this is already happening in some areas.

- Analysts can get stuck at a glass ceiling, often band 6/7, unless they want to into management
- Analysts do not always get the appropriate training and support when progressing into management roles which requires some quite different skill areas
- There is difficultly securing senior analyst NHS roles without previous NHS experience and sometimes individuals have to enter the NHS in a more junior roles despite having extensive experience elsewhere
- There is a desire for a forum or professional body to support analysts. (It is important to note that APHA have undertaken significant promotion and activity since this survey launched in May 2019.)
- There was a need to give analysts the right tools so they could focus on understanding business and providing insight to their stakeholders rather than doing numbing jobs that could be automated.

Enablers to career pathways

We also asked participants "What has helped you along the way in your career path?" We had a similar amount of individual responses on enablers, although there was less variety and answers were often more concise. Enablers had a much greater weight on individuals own personalities and drive, luck and having good support networks around them.

Support Networks

The most prevalent theme was access to support networks including: mentoring and coaching, action learning, good senior leadership, supportive teams and colleagues, attending conferences, Skills Development Network, online forums, peers e.g. other graduate trainees, family and friends. These networks were deemed necessary for advice and support and the identification of inspirational role models who were happy to support through good will. Some also referred to learning from poor behaviours which they would want to themselves avoid "remember poor management which I don't emulate" so bad experiences with support networks also in turn became an enabler.

Colleagues being able to share their skills and the ability to work with talented people was also highlighted; as well as the fact day to day work pressures mean it can be challenging to do this effectively and transfer learning. "Time to learn – this no longer exists as the pressure to get things done and quickly is too big." One mentioned organisational support from the Chief Executive which contrasts to the bigger consensus around lack of perceived support from the board.

Personal Qualities

Personal qualities were deemed as really important with individuals describing themselves as being hard working, having drive and determination, looking for opportunity, ability to make and own decisions while taking control of their own destiny. Many spoke about how they actively improved their own knowledge and skills and were open minded and curious, rather than waiting for things to happen. Being prepared to take a risk and understand personal needs enabled them to learn new things.

Additional skills were mentioned and things like having good communication skills and the ability to problem solve were deemed as enablers. Interestingly, having a thick skin and resilience was also mentioned as some referenced needing to survive the environment.

Training, Education and Skills

Some noted their education and training as a positive enabler, although some highlighted that they had self-funded their studying in order to progress. Those in clinical backgrounds or those who had worked 'at the coal face' felt they were at an advantage alongside those who had studied certain academic qualifications, mainly those with a scientific background. Previous experience was also mentioned from technical skills such as SQL to change management and stakeholder engagement.

Wider exposure and flexibility

This was seen as really important, whether it was exposure to different teams and areas of health informatics, exposure in different types of organisations or learning from a national programme. There was a clear enthusiasm for learning from what others are doing well and the ability to get 'outside my desk' and engage with the wider workforce or public. Flexibility was also highlighted as important as part of this so that individuals were able to gain the wider exposure that they needed.

Exposure outside of the NHS was seen as a positive for several reasons including "getting out of the NHS echo chamber" and having clearer career pathways in commercial organisations. Some also highlighted that working independently and free from internal cultural or political constraints had given them more exposure, so they had left the NHS.

Motivations for a career in health informatics

In order to consider how we manage recruitment and retention, we asked participants whether they had set out to pursue a career in Health Informatics. A staggering 82.2% of participants had not set out intentionally. 131 did not respond to this question and were excluded from the percentages.

Did you set out to pursue a career in Health Informatics?	N	% (out of 376)
Yes	67	17.8%
No	309	82.2%

Table 16: intention to pursue a career in health informatics

Upon exploring the drivers and motivations behind this, it was clear it was often not as black and white as a single point in time decision.

Stimulation and an exciting area of work

Participants indicated that they liked a challenge; they wanted to solve problems and be curious. Roles in health informatics often sounded niche and relevant. However, this motivation did not always align with reality. One graduate scheme trainee however highlighted despite picking health informatics because it sounded like the most interesting one, "the description of health informatics was vastly different to what it turned out to be so I went into a scheme thinking I'd be managing services and using information, rather than creating it and making pretty graphs".

Wanted to work in healthcare

Some highlighted that they wanted to work in the NHS and make a difference by supporting the frontline and not necessarily in a clinical role. For some this was due to personal experiences where the NHS had saved them or their family members. Some mentioned cultures in the private sector generally or pharma as lacking empathy and that they didn't feel they were contributing back to society; they wanted to "improve outcomes for people rather than shareholders".

The opportunity to work with data and technology

Here, the potential of data and technology had been recognised and there was an opportunity to problem solve at scale "I wanted to improve outcomes in a way that one medic alone couldn't do". Some individuals referred to patients and improving outcomes, some did not and simply had an interest in an area such as BI or computers. There were frustrations that technology and information were not being used to their full potential.

Transferrable skills

Some individuals referenced that their backgrounds had lent themselves to a career in this area, for example having a scientific background or being 'good with numbers', having had a background in training or research. Some had also been recommended a role in the field after being identified by someone they knew as having transferrable skills such as project management experience. One individual referred to their background as a translator being a natural skill for clinical coding!

Exposure to Health Informatics as part of a project or piece of work

A common theme was that individuals either got a taste for or became stuck after working on one or more projects such as supporting new clinical system implementation, remaining with that team once the project was over. There were multiple references to the national programme for IT. Some gained indirect exposure and became curious for example one individual gained exposure to medical libraries as part of a paralegal role which led to an interest in evidence based practice. One individual highlighted that there was Microsoft office training available for Bands 1-4 and through this they were able to upskill themselves from their current role following an initial interest in their departments clinical system.

Other Accidental

For a number of participants, it was pure accident. This was sometimes dictated by personal circumstances such as relocating or they had friends and family already working in the NHS including those who had provided inspiration. Some referred to being headhunted or recommended roles via recruitment agencies. Others spoke about it being their first job after school or university but did not elaborate on why that had become their first job. A number of people mentioned the big NHS reorganisations or recessions (such as the 2008 recession) had led individuals needing to explore alternative career pathways. Some simply referred to needing a job to pay the bills.

Looking forwards: next career moves

We finished the survey by looking to the future, firstly asking individuals how confident they felt about their next career move. Participants were generally more confident (147) than unconfident (103). This is an interesting contrast given all of the challenges presented in previous sections and indicates we may be seeing improvement in this area. 149 did not respond to this question and were excluded from the percentages.

If you think about your next potential career move (e.g. a promotion or a sideways move), how confident are you that you know what it will be?	N	% (Out of 358)
Very Confident	40	11.2%
Confident	107	29.9%
Neutral	108	30.2%
Unconfident	75	20.9%
Very Unconfident	28	7.8%

Table 17: Confidence in next career move
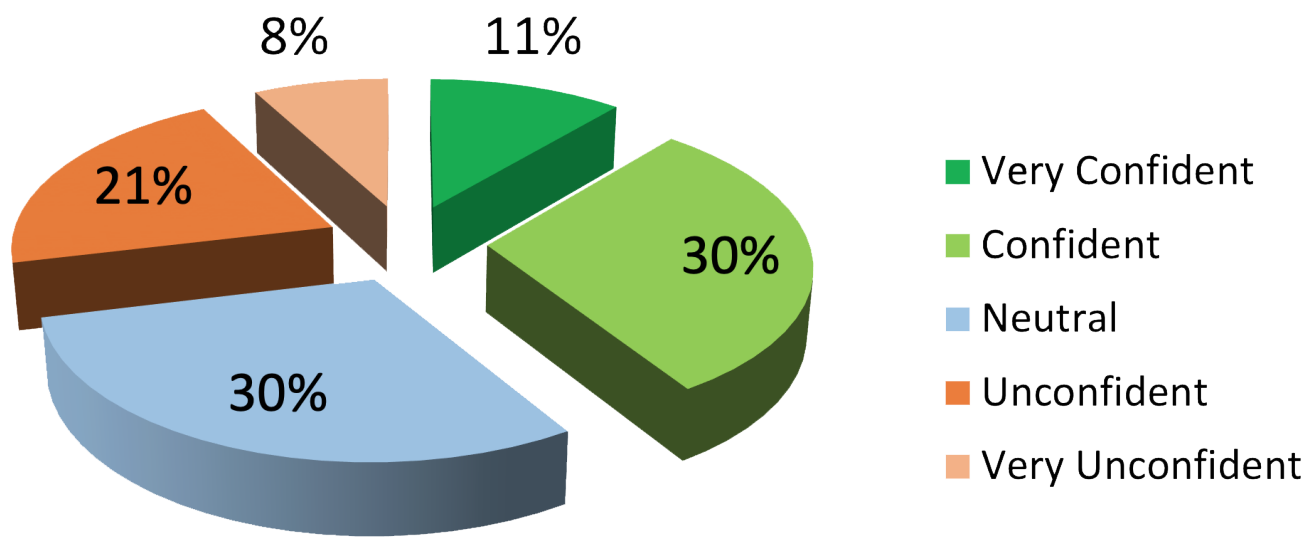
Graph 2: Confidence in next career move

Developing a charter for future career pathways

We also asked participants what the one thing they would like to change about health informatics career pathways going forwards, and we have developed a charter from the responses.

As a Health Informatics professional….

- I would like greater access to and awareness of a defined but flexible career pathways framework, with clear progression routes "from apprentice to director", so I can identify my career goals and make informed decisions about my future.

- I would like the opportunity at any stage of my career to explore the variety of career options, teams and individual pathways that exist under the Health Informatics umbrella, either through my line manager or another appropriate support mechanism. This will also enable me to work better with my colleagues in other teams from day one reducing conflict around responsibilities, and maybe even one day I could join their team!

- I would like structured training linked to career pathways so I can understand what my needs are in achieving my goals rather than randomly stumbling between jobs and I would like more help in identifying which of my existing skills are transferrable to other areas which may happen at a later stage in my career.

- I would like there to be funding available to support my training and development needs. I would like to see cost effective and flexible opportunities for training such as the North West Informatics Skills Development Network rolled out nationally to support this. I want to ensure that if I progress into a leadership role, I have access to the right training and development support for this as well.

- I would like to see case studies of individuals and their career pathways to inspire me, including access to more diverse senior leaders as role models. I want existing senior leaders to feel they are equipped and are motivated to support me in exploring my career options.

- I want acceptance from my organisation that my role is a key enabler of change and should be at the table when having critical conversations about the future vision. I would also like to be able to say when I don't know something in a supportive environment rather than be attacked.

- I want professional accreditation alongside recognition and respect from my colleagues in the work that I do. I would also like to see the Professional Bodies more clearly articulate their clear and non-overlapping remits or see consolidation so I can understand how to best make the use of professional membership.

- I want my managers / organisation to understand that there is value in networking with my peers so I can learn from them and bring back ideas for my own organisation.

- I want opportunities to work across a system, removing artificial organisational barriers so I can collaborate with my colleagues. I also would like the opportunity to either work in or with teams beyond the NHS such as universities.

- I would like the opportunity to do more shadowing and observational work. This includes shadowing senior managers in my own profession but also spending time in the areas I am supporting so that I can make the key links back to the work I am doing for example observing in Primary Care or a medical / surgical specialty area I am supporting.

- I would like more incentives available to me as a recruiting manager to retain staff such as the opportunity to offer flexible working. I want to be able to attract experienced and driven colleagues who are willing to and able to challenge existing ideas and drive change.

- I want to ensure that my role and future career path is fit for the future. I want to be able to move away from being data heavy and insight light to having the right tools and techniques to do my job effectively.

- I want the NHS nationally to do things once where appropriate to avoid duplication and a waste of public money across hundreds of organisations. I then want more investment in infrastructure and skills for the future rather than individual organisations all feeding the beast.

A focus on NHS Jobs and Agenda for Change

As part of this question, a lot of comments emerged around Agenda for Change (AfC) and the NHS Jobs process not being fit for purpose. Many felt that in order to progress they needed to become a contractor or they had to take on a more general senior role but risk deskilling in the technical area. A glass ceiling was mentioned around the Band 7/8A area. Individuals also highlighted that many jobs were still "administrative and clerical" rather than "scientific and technical". Another argued that, "Intangible benefits help to a degree but are not enough anymore to provide a balance to this situation". Post survey the project team also became aware that the Professional Bodies for health informatics are not included on NHS Jobs. This has been flagged to those developing the new NHS Jobs website.

One said "staff retention is good when it means people are treated fairly and can come into work and feel accomplished. It's bad when it stunts professional growth, which the NHS does, in my eyes, in part, with banding". Many indicated management was not the natural path for everyone and indeed did not see the value in such roles. "I would like to be opportunity to progress as an analyst, not just get to a certain band usually a 7 and then nothing unless you want to become head of information or similar and then you are more involved in the administration work rather than the doing."

These issues have been recently highlighted in Achieving a digital NHS report (Nuffield Trust, 2019): "Trusts were experiencing significant challenges with recruiting and retaining the workforce necessary to support digital change. Many felt that Agenda for Change (AfC) was inappropriate for corporate and technical roles and the structure imposed by AfC was severely hindering the ability of the NHS to compete with the private sector".

Future training

To finish, we asked participants "What do you think future training for health informatics professionals should look like?" and identified the following themes:

Underpinned by defined career pathways

It was clear that career pathways and progression needed to be defined and structured enough so individuals could understand the gap between where they were and their goals, at any point in their career. "Training at all levels to guide through the career paths, not just focussed on people who want to be leaders. Not everyone wants to lead they just want to be better at what they do".

What was important was knowing how the different roles complemented one another, both for daily ways of working and so one could consider their transferrable skills. As previously mentioned, there is a focus on flexibility too so that individuals can move between pathways and not get stuck in a rut.

Individuals did not want to lose the diversity that currently exists in individual backgrounds: "There's no one-size-fits-all solution or skills matrix. You can't lump software engineering, data analysis, clinical coding, strategic management, project management, hardware & infrastructure support, and customer services into a single "profession" or training regime".

The use of competency frameworks that lay out best practice across the NHS was suggested as a way for individuals to navigate between training and match their goals. There was a sense that the NHS needed to be more proactive when it came to succession planning and supporting its own staff to progress: "I think as you embark on a new role there should be a set of training courses available that should be linked to each role which staff can partake in as part of their development. With options on where the role could take you in terms of progression which you can then aim towards once the training link to your current role has been completed."

The number of different training and education courses individuals have undertaken is huge. While we did not ask individuals for views on how useful different training types were in this project, individuals welcomed clarity from central organisations such as Health Education England to promote the different roles, training and professionalization options.

An Orientation to Health Informatics

Something we have already highlighted is that individuals appear to become specialised quite early on in their careers. Many participants highlighted the need to develop a better understanding and appreciation of both the health and care system but also generic skills and a basic foundation. Graduate schemes and apprentices should be doing some of this as part of their placement and rotation model, but there is a risk individuals could end up having three very similar placements and miss that opportunity. There is also a role for NHS organisations at scale to consider how they could support some of this with collaboration between trusts offered as a solution.

There may also be a basic education and training package around broader health informatics that all individuals should complete to upskill them and to help both inform future career goals but also facilitate better working relationships across teams "a core training package with a wide range of modular learning options". This should be open to anyone and not exclusive to those starting their careers. It is likely that a 'pool' of individuals would need to come together in order to deliver what an introduction to informatics is.

As digital and information continue to get more and more embedded into daily operational practices, it may also be that a health informatics orientation becomes necessary for all staff and that they become "digital ready". This must not be a tick box exercise but provision of what individuals need to know as health informatics impacts their day to day working. There needs to be a national approach to ensure this continues to progress as part of the Building a Digital Ready workforce programme. What is potentially emerging here is a three stage model. Level 1 involves all staff within the NHS. Level 2 involves those working in a health informatics role. Level 3 is specialism specific training for example in analytics or project management. The feedback from this report indicated more also needs to be done to support executives and other decision making individuals in this area. In addition it may become appropriate that basic training in informatics starts to form part of junior doctor and other clinical training programmes.

Access to ongoing training and equal opportunities

There was a desire to ensure that training and development opportunities should be open for those who want to learn skills for the future in all stages of their career. For some the way the training was delivered was also important to ensure that some individuals did not miss out. It was important that those who worked part time also had the same opportunities for example through more part time courses to be available or more modular learning on the job, and ensuring where national things were available face to face it did not always involve the same hotspots such as London.

One of the challenges previously mentioned was that it was sometimes down to favouritism and friendship groups which indicated who got to undertake training. This was revisited here: "I think future training should be clearly defined and readily available for all staff without any bias and regardless of position".

Blended approach to training

Participants strongly indicated that training needed to be balanced across the following areas. It is useful to note that they are not always mutually exclusive and could be packaged up together where appropriate.

1. Technical / vocational training – this includes training such as project management, SQL or business intelligence tools; the training necessary for the job. In some roles this will be mandatory (e.g. accredited clinical coders). It would usually involve some kind of delivered training, whether that was in a class room or online. They tend to focus on one particular job role. Some highlighted this training should include more opportunities to learn about broader topics such as patient safety and user centred design.

2. On the job training was referred to as problematic, there was a need to learn from others more experienced in a team but there often was not the time to do this properly; or at least there was not the perception that it was time well spent or supported.

3. Leadership and broader skills were seen as critical to all, not just those who wanted to pursue leadership roles. Examples given included service/customer management training, communication, coaching, mentoring, people development, presentation skills, influencing skills, negotiation skills, stakeholder management and social media skills. For those in a line manager role it was also important that they had support in key aspects such as performance management of individuals and motivation techniques.

4. Culture and politics were also seen as very important as individuals highlighted the need to learn about the local culture and politics within their organisations. A lot of those working in health informatics will have an end user or customer and individuals were rarely equipped with the skills to work with them so meaningful conversations could be had. "The complexities and responsibilities of health informatics can't fully be understood in a classroom environment" and there was a need to ensure individuals felt they were able to work with those affected by any change being made, or any data insight being produced. This can also assist with those working in health informatics as being seen as partners rather than side-lined. Organisational change was also mentioned as part of this, which is likely impacting many as systems move towards ICS and ICP models.

5. Academic training provided mixed views. It was generally seen as a positive thing with some arguing there should be minimum education levels for certain bands; however there was also recognition that this should not be a barrier and that individuals should be supported to undertake academic training where this was missing. Some argued that an undergraduate course in Health Informatics was necessary because it was too much content to cover at Master's level.

6. Attendance at wider events such as conferences and hackathons was also cited as useful in order to develop some of those wider skills and to learn from others what good looked like around the country.

Support mechanisms including roll out of wider initiatives

It was important that individuals had access to appropriate staff in informatics roles that could support them in identifying and pursuing their training needs. It was also important that training programmes that were working well elsewhere were made more accessible, and this would alleviate some of the problems around ensuring individuals could gain appropriate support and advice around their future. Individuals seemed to indicate a better quality education and support package delivered by people who knew what they were talking about was better than individual organisation attempts. This also reduced the risk of training opportunities being cut due to individual training budgets or being rejected because the individual in charge of authorisation did not understand why that training was important to those individuals' goals.

Further rollout of the Digital Academy was mentioned and one individual suggested "the creation of a national Informatics Skills Development Board (ISDB), which will provide leadership, vision and strategic direction to the regional networks, the board will promote and maintain a culture and environment within which the continued learning and development needs of Informatics staff are identified and addressed to meet the needs of the individual, the organisation and the wider NHS."

"An ideal world"

As summarised by one respondent: "First of all, it will be much more structured and organised. The training will be more specific for the profession with examples linked to other procession to demonstrate how health informatics communicate and interact with other fields. The training would involve group exercises, projects, training packages to learn and apply knowledge, which is followed by real life projects (e.g. codes, procedures and examples what intelligent use of information can do). The future training will be well informed, have a good supporting structure in place for the trainees and learners alike, well defined and designed pathway and perhaps different roles for specialisation. The future training will also be filled with projects and funded opportunities to allow innovation, creativity. The training would also involve more people to give a real-life perspective for the individuals in training on how it affects the organisation, individuals and healthcare as a whole. The training programme would also have mentors that know the field well and what to suggest and share experience with the trainees to create a ready workforce who are equipped with the right tools and skills. Perhaps in the future, Virtual reality may be utilised to create training tools and communicate across the world to discuss and acquire information for rare conditions for example"

"A licence to practice"

We also asked Participants how much they agreed with the following statement "In the future, Health Informatics professionals will need a license to practice". The responses to this were varied and comments provided indicated it was very much down to context. 148 did not respond to this question and were excluded from the percentages.

Do you agree with the following statement? "In the future, Health Informatics professionals will need a license to practice"	No	% (out of 359)
Strongly Agree	40	11.1%
Agree	92	25.6%
Neither agree or disagree	103	28.7%
Disagree	89	24.8%
Strongly disagree	35	9.7%

Table 18: A license to practice

Some were sceptical and concerned at the bureaucracy involved in making this a reality and that it would never happen unless mandated but they were not necessarily against the idea. Others however were downright against it and thought it would be terrible, exacerbating the challenges around recruiting talent from outside the NHS. For them it was more important we could easily hire creative and innovate individuals rather than complete a box ticking activity. At the opposite end of the spectrum some were absolutely positive.

 "Clinical staff need to take part in continuous revalidation so why shouldn't other supporting disciplines?" alongside highlighting the impact health informatics can have on business if done badly.

The clear message that came out however was that some kind of standards and strong competency framework would be welcome and it may just be that the underlying issue was it would be impossible to license health informatics professionals in a 'one size fits all' approach due to the breadth and variety of roles on offer, the evolving speed at which things are developing alongside the focus needs to be on professionalism at a more defined speciality level. It may also need to vary depending on seniority. One could therefore argue that the professional body registrations already on offer fit this box; however it was highlighted the remit and overlap was not always clear.

Appendix A: Questionaire

Question	Type of Question (and options if applicable)
This survey should take approximately 10-15 minutes to complete. You may find it helpful to have your CV or LinkedIn profile open. Please note we have used the term "Health Informatics" throughout but we appreciate different terminology may be in use. Criteria: We would like to invite those who self-identify as part of the non-clinical health informatics workforce to participate. You need to be working or actively seeking work within health and social care throughout the UK and Ireland.	
Name	Freetext (Optional)
Email	Freetext (Optional)
Please indicate your contact preferences below. If you do not wish to be contacted at all then please skip this question.	Tick Box (multiple selection) 1. I am happy to be contacted with any follow up or clarification questions directly related to this project 2. I would like a PDF copy of my survey results emailed to me (we have included this as an option as your feedback may be useful for future applications to either professional bodies or jobs) 3. I would like to be notified when the report is published 4. I am happy to be contacted regarding future related projects (note - this does not commit you to participating)
Are you part of a NHS Digital Academy cohort?	Drop Down (one choice) I don't know what this is No No but I would like to apply to cohort 3 Yes, Cohort 1 Yes, Cohort 2
Do you know how health informatics is currently represented on your organisation's board?	Drop Down; if last option selected then free text expansion available No, I don't know Yes, I represent informatics on the board Yes (please state in the box below which role(s) in your organisation represents Health Informatics on the board)
Are you a member of a health informatics professional body? (If you are currently applying then please select yes and give further information)	Drop Down; if last option selected then free text expansion available No and I am not interested No but I am interested Yes I am a member or applying to be a member (please provide information of which body and your status below)

Have you obtained any qualifications or professional registrations relevant to Health informatics? (If you are currently studying/ applying please select yes and give further information)	Drop Down; if last option selected then free text expansion available No and I'm not interested No but I would like to Yes I have or I am in the process of studying/applying (please give more details below)
Have you heard of the Skills for the Information Age (SFIA) framework? (SFIA is a skills framework that is used by individuals and organisations across the profession)	Drop Down - no free text No I haven't heard of it Yes but I don't understand it Yes and I understand it
Please share with us any other frameworks or benchmarking tools to assess informatics (at either individual or team/organisational level) that you are aware of? Please include any locally developed ideas.	Freetext
Are you currently on or have you completed a graduate training scheme or programme in health informatics? (if yes you will have the opportunity to provide more detail on the following page).	Drop Down - no free text Yes No
Are you a current trainee or an alumni? (additional question for those applicable)	Drop Down; if last option selected then free text expansion available Current Trainee Alumni Other (please specify)
Which graduate scheme or training programme are you currently doing/ did you do? (additional question for those applicable)	Freetext
What year did you start your graduate scheme or training programme? (additional question for those applicable)	Freetext
What specialism/service line are you working in / did you work in (if applicable)? (additional question for those applicable)	Freetext
How did you originally hear about the graduate scheme or training programme? (additional question for those applicable)	Freetext
Health Informatics Career Paths Heatmap One of our aims is to develop a heatmap showing movement between roles within health informatics. The more accurate information you can give us here the bigger and better we can make the heatmap so please complete as best as you can. We will be asking for information about your most recent five roles, chronologically, starting with your current or most recent. You may find it helpful here to open your CV or LinkedIn profile.	

Job Title	Freetext
Reporting to (Job Title)	Freetext
What was the team you were in called?	Freetext
What was the name of the organisation? (if you do not wish to say, please describe the type of organisation)	Freetext
How many years have you been or were you in this role?	Freetext
What is your grade/band in this role? (skip if you do not wish to share)	Freetext
Do you want to add another job?	Dropdown
(Participants able to repeat the above role based questions for up to 5 roles) N/A	
Reflections Thank you for completing information about your career path to support our heatmap development. We would now like you to reflect on your career path to date.	
As you have travelled on your individual career path journey, how satisfied are you that the career path was clear?	Likert Scale Very Satisfied Satisfield Neutral Disatisfield Very Disatisfied
What challenges have you faced in your career?	Freetext
What has helped you along the way in your career path?	Freetext
Did you set out to pursue a career in Health Informatics?	Drop Down - no free text Yes No
If the answer to the above was yes, what were your motivations? If the answer was no, how did you find yourself in health informatics?	Freetext
Have you completed any other training courses relevant to your career path that have not yet been mentioned?	Freetext
How would you define Health Informatics?	Freetext

What other terminologies do you use to describe Health Informatics? Please select all that apply.	Drop Down; if last option selected then free text expansion available

Digital Health

Digital Transformation

Ehealth

Health Tech

Other (please specify) |
| Where do we go from here?

We would like to finish this survey with a few questions looking to the future | |
| What is the one thing you would like to change about health informatics careers? | Freetext |
| What do you think future training for health informatics professionals should look like? | Freetext |
| If you think about your next potential career move (e.g. a promotion or a sideways move), how confident are you that you know what it will be? | Likert Scale

Very Confident

Confident

Neutral

Unconfident

Very Unconfident |
| Do you agree with the following statement? "In the future, Health Informatics professionals will need a license to practice" | Likert Scale

Strongly Agree

Agree

Neither agree or disagree

Disagree

Strongly Disagree |
| Would you like to add any additional comments? | Freetext |
| Thank you for completing this survey. This piece of work is really important for inspiring and supporting the next generation of health informaticians. We will be in touch soon where you have indicated you are happy for us to contact you | |