National Competency Framework for Data Professionals in Health and Care

Competency Framework Booklet

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Introduction

This booklet is designed to guide you through a defined set of core competencies for Data Professionals in Health and Care. By Data Professionals it is meant Data Analysis, Data Engineering, and Data Science. These competencies denote at which level technical work is conducted. NHS England and NHS Improvement (NHSE/I) have commissioned this work to create a level playing field for those who work with data for healthcare so that career progression can be both more visible and standardised. The ultimate aim is to promote the professional profile of the sector and ensure that people working in the field have access to a supportive tool which allows for innovative skill mixes.

The contents page has been constructed so that it is easy to navigate to the sections that interest you should you wish to refer only to part of the whole document. Each section has its own "How To" guide along with an example case study for those who find that style of narrative helpful.

This is the second, and much more comprehensive, version of the National Competency Framework for Data in Health and Care (NCF 4 DCH), built to incorporate the valuable feedback from the pioneers who tested version one. This feedback has led to the expansion of the framework to include Data Engineering and Data Science.

As with all frameworks that covers such a diverse and specialised range of skills, there are limits to the level of detail that can be included. The document attempts to address the skills as deeply as possible whilst keeping them applicable to all staff working in the sector from an Assistant Analyst in a small community Trust to a Data Architect within a central NHS organisation.

The key thing to remember when using this document is that this is a *competency* framework and not a *development* framework, even though one is inextricably linked to the other. A competency framework is designed to show what sort of activities the workforce should be capable of at a defined level. Being capable of operating at that level, does not necessarily mean being paid at that level, only that a staff member would be capable of doing that role if they were appointed to it. Nonetheless, it does provide a good matrix for the sorts of development activities you should be aiming for.

The main uses for the framework are intended to be:

- Standardising the industry
- Recruitment (e.g., job descriptions, adverts and interviews)
- Performance Appraisals
- Benchmarking

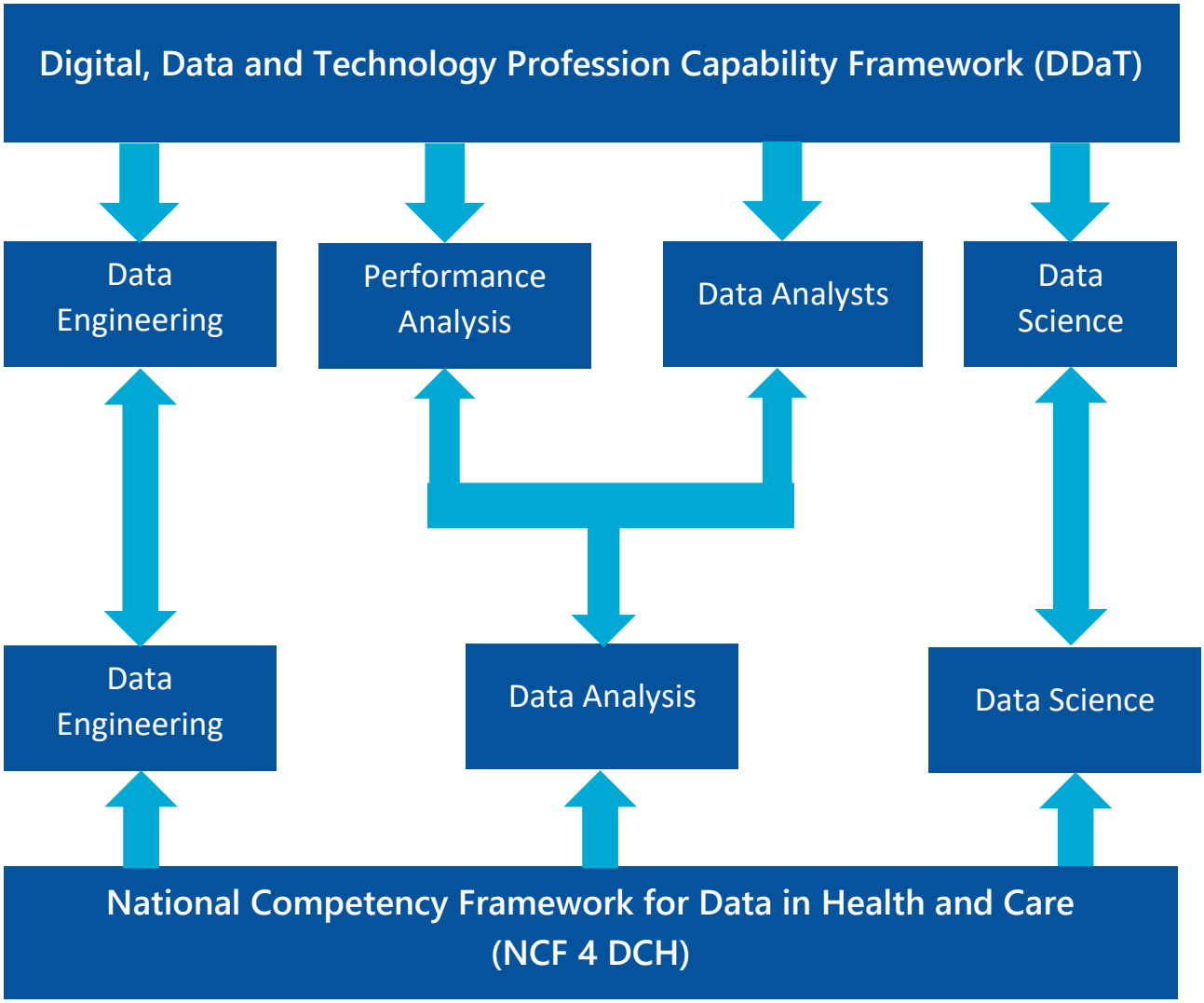
although it can be used in other ways if preferred.

Due to the fact that job titles vary so much and that the size and complexity of what is described as the same job may differ it is not possible to be specific about job titles or even pay bands, but the framework does give indicative pay bands to illustrate the levels of skill and responsibility usually found at each tier of competency. In order to firmly establish uniformity through the sector the tiers follow those of the Federation of Informatics Professionals (FedIP) and the Association of Professional Healthcare Analysts (AphA).

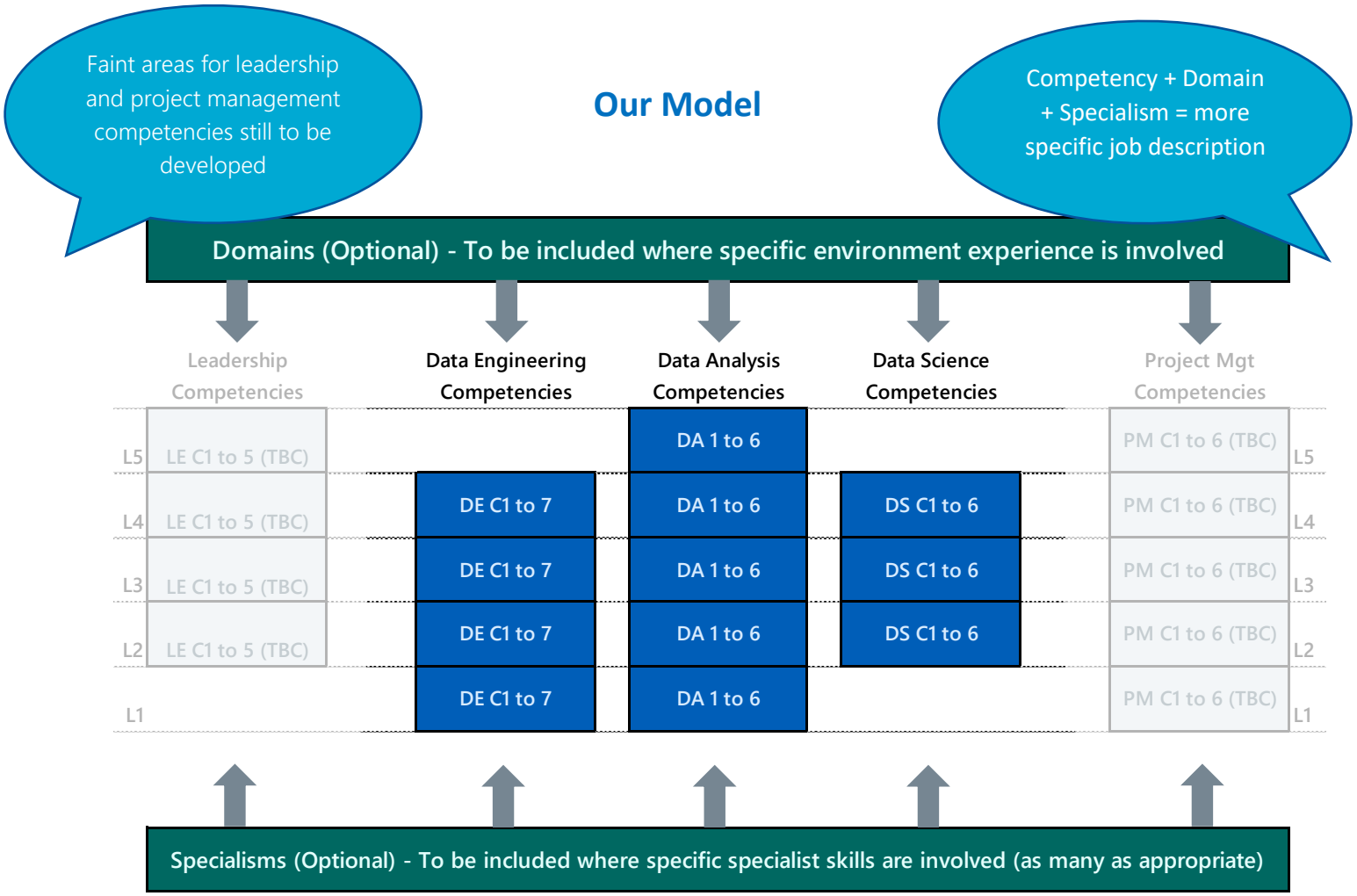
We look forward to presenting the Data community to the world as the cutting-edge healthcare profession that it truly is.

Links with DDaT

The original UK Government Digital, Data and Technology framework listed four areas of Data with their respective competencies: data analysis, data engineering, data science, and performance analysis. The framework itself was written for all aspects of Government from Statisticians in Whitehall to Performance Analysts in a small rural acute Trust. As a result, the competencies were not able to capture the complexities of Data roles in healthcare. This framework is designed to map directly to DDaT but with the luxury of being able to be more specific for health and social care Data occupations. Upon adding that detail to the work it became apparent that the similarities in content for performance analysis and information or data analysis were very similar so, at the risk of overcomplicating matters, the decision was made to combine the two to avoid any ambiguity over which one should be used, especially as the names used varied from organisation to organisation and were even used interchangeably.



Our Model



The National Competency Framework for Data in Health and Care (NCF 4 DHC) is designed to be as flexible as possible whilst enabling a standard to be set throughout the industry. The core competencies are designed to map to the DDaT framework but can also be added to where required to include specialisms or domains.

Furthermore, and still under development, the framework allows for other competencies to be substituted or added where a differing job focus is required. For example, it may not be necessary for a Director of Analytics to be an expert in complex coding. In this situation it is envisaged that leadership or project management skills may be preferable.

Data engineering and data science currently have no L5, Leading Practitioner, competency assigned because at that level the competencies are largely equivalent to data analysis. Furthermore, a Leading Practitioner is likely to lead all members of the job family and the data analysis L5 provides the best guide about which skills to aim for.

The framework may well support lateral progression where people with project management skills are looking for a sideways move into analysis or vice versa.

All these competences can then be used in a development framework for individuals to identify areas for improvement and be used to evidence progress.

Data Analysis Competencies Associate

Competency	Associate Practitioner (L1)
Indicative Level	**Band 3/4 (e.g. Assistant Analyst / Data Assistant / Junior Analyst)**
C1 Analyse data for information and/or performance measurement within the context of the relevant health and care environment	You apply basic techniques to transform data into information for your audience. You question the data and your own analysis. You can recognise patterns, outliers, data quality issues and whether data and analysis agree with established practice and expectations. You understand the importance of performance measurement to the business and its objectives.
C2 Employ applicable data sources to produce valid, verifiable and replicable analyses	You understand the data sources for your work; their types, provenance, context, storage and 'owners'. You recognize basic issues of data quality and can take action with guidance to prevent or counteract them. You understand whether data is 'fit for purpose' and can sense check data and analysis. You approach data and analysis with curiosity and ask questions of the data and its context. You perform data extraction and manipulation. You understand how to summarise data and can explain what the different measures mean. You understand how to plot data visually to display snapshots, time series and variance. You can follow and contribute to practices and procedures describing the production of regular analyses and reports. You are aware of the stringent data governance requirements in healthcare environments and follow all data security procedures as directed locally and nationally.
C3 Apply relevant software and numeracy skills with a range of analytical techniques	You are numerate and computer literate. You have a functional knowledge of relevant tools, applications and systems used in your organisation. You are comfortable conducting simple analyses using descriptive statistics. You show aptitude and willingness to learn further.
C4 Deploy problem-solving skills to define requirements for analytical work	You are able to identify sources of information to help you complete assigned projects whilst using your own initiative to show the most efficient way to complete daily tasks. You are able to work with the requestor of the analysis to understand the underlying question and explain it to colleagues.
C5 Generate and communicate insight verbally, visually and in writing to a variety of information consumers	You understand the appropriate media to communicate findings and you shape communications relevant to the audience and their needs. You can define the context for your findings and can give appropriate recommendations.
C6 Engage in continuous skills development, exhibit professionalism and seek out and share emerging best practice	You actively engage with members of the department in an enthusiastic but patient manner. You build instructions into working on your own initiative whilst confirming changes with senior colleagues. You are able to demonstrate mindfulness of other people's pressures and priorities. You present an openness and willingness to learn from those around you, and seek out opportunities to do so. You strive to demonstrate professional values at all times.

Data Analysis Competencies Practitioner

Competency	Practitioner (L2)
Indicative Level	**Band5/6 (e.g. Data Analyst / Information Officer)**
C1 Analyse data for information and/or performance measurement within the context of the relevant health and care environment	You apply a range of techniques to transform data into valid and purposeful information. You can reverse-engineer existing analyses and replicate the method and results. You understand the business context and how the results of analysis will be perceived. You participate in discussions determining which performance measures are appropriate and can turn business needs and goals into performance measures.
C2 Employ applicable data sources to produce valid, verifiable and replicable analyses	You can extract data from multiple sources for your work and can identify if the data is accurate and fit for purpose. You can identify a broad range of data quality issues and perform data cleansing and consistency checks. You understand the limitations of the systems, both human and digital, from which the data arises and incorporate summary statistics to clarify the meaning of the data and variations within it. You review and update analysis production methods and documentation following any changes to data, processing or requirements and employ quality assurance techniques to ensure the validity of the results. You identify problems arising from databases and processes and seek out remedies and preventative measures. You plan ahead for further iterations of any analysis. You apply data governance requirements, anonymisation protocols and follow all data security procedures as mandated.
C3 Apply relevant software and numeracy skills with a range of analytical techniques	You are numerate, computer literate and data literate. You have knowledge of explicative statistical skills. You have a good knowledge of relevant tools, applications and systems used in your organisation. You know how and when to apply further explicative statistical skills. You can adopt the most appropriate tool for the tasks. You ensure work is completed to a high standard. You engage with your team and the wider analytical community to learn about new tools and techniques.
C4 Deploy problem-solving skills to define requirements for analytical work	You are able to make use of appropriate information to help you analyse a range of common types of problem. You are able to employ a number of problem solving techniques (e.g. root cause analysis) to identify the reason for unexpected problems with routines, and utilise a range of skills to solve these. You work with the requestor of the analysis to understand the underlying question and apply your knowledge to plan the preferred approach to the analysis.
C5 Generate and communicate insight verbally, visually and in writing to a variety of information consumers	You understand and can utilise the appropriate media to communicate findings. You shape communications relevant to the audience and their requirements using appropriate language and with awareness of bias and possible issues with commonly misunderstood terms. You present analysis with visualisations to give clear messages. You can translate technical concepts to a non-technical audience and are comfortable presenting appropriate recommendations.
C6 Engage in continuous skills development, exhibit professionalism and seek out and share emerging best practice	You are able to identify and complete tasks within your field of expertise whilst undertaking work and projects allocated by senior staff, documenting your competence and learning in a professional body of work. You will seek out development opportunities for you to learn both as an individual and as a team, sharing your knowledge with your peers, whilst building people skills into all aspects of your daily routine. You will promote the relevant professional values at all times and demonstrate compassion for yourself and colleagues.

Data Analysis Competencies Senior Practitioner

Competency	Senior Practitioner (L3)
Indicative Level	**Band 7/8a (e.g. Senior Analyst / Team Leader)**
C1 Analyse data for information and/or performance measurement within the context of the relevant health and care environment	You deconstruct complex business issues and lead on the development of performance measurement regimes. You have a deep understanding of business goals and can turn these into performance measures. You apply a range of techniques to analyse data and provide insight. You proactively communicate findings and encourage utilisation of data for business decision-making. You look beyond initial requirements, challenge assumptions and generate insight.
C2 Employ applicable data sources to produce valid, verifiable and replicable analyses	You understand the end-to-end lifecycle and charcteristics of the data in your area of work from origin to delivery to local and national consumers. You understand and can communicate the limitations of the data and how it can be enriched to deliver more relevant information. You specify how data should be cleansed and prepared and ensure processes and documentation reflect this to ensure valid and replicable results. You peer-review colleagues' analysis to ensure quality and consistency. You integrate qualitatitive and quantitative data to augment analysis, develop complex models and devise hypotheses for testing. You have a good knowledge of data security, data protection legislation and best practice. You proactively engage with stakeholders to explore their needs, search for complementary data sources, explore the limits of the available data and promote business decision-making based on the data.
C3 Apply relevant software and numeracy skills with a range of analytical techniques	You have a good knowledge of predictive, prescriptive and evaluative analytical techniques. You develop deeper expertise in relevant tools,applications and systems and share your knowledge with others. You can apply a range of statistical practices and can advise on best practice and guide others to a high standard. You can determine which tools and techniques to use to explore or solve a variety of business issues. You engage with the wider analytical community to seek out new tools and techniques and translate those to local applications. You share your knowledge to help others develop analytical skills.
C4 Deploy problem-solving skills to define requirements for analytical work	You are able to analyse the causes for a range of complex problems and utilise analytical techniques to solve them including developing new processes that have not previously been attempted. You work with the requestor of the analysis to examine the underlying question and apply your knowledge to generate an approach to the analysis.
C5 Generate and communicate insight verbally, visually and in writing to a variety of information consumers	You can communicate accurate information to technical and non-technical audiences. You can turn complex data analyses into clear and compelling messages and you can present those analyses with visualisations to communicate complex messages. You understand how information can be misunderstood or misrepresented and understand how to convey uncertainty in your findings. You can communicate negative and positive information to stakeholders and know how to facilitate discussions within multisdisciplinary teams. You know how to give tactical and strategic recommendations that influence audiences.
C6 Engage in continuous skills development, exhibit professionalism and seek out and share emerging best practice	You are able to assess your own training requirements and those of less experienced colleagues and proactively identify relevant learning opportunities. You embrace opportunities to add to the variety of services you and your team provide analysis to. Your analytical skills and business awareness are suitably advanced for you to act as a role model and mentor for more junior colleagues. You support those colleagues in reflective practice, signpost opportunities to build their portfolio of work and advocate for professional registration. You are active in the wider analytical community, sharing your work and actively engaging in a network of your peers. You act as an advocate for professional values and standards and promote well-being amongst your colleagues

Data Analysis Competencies Advanced Practitioner

Competency	Advanced Practitioner (L4)
Indicative Level	**Band 8a/8b/8c (e.g. Information Manager / Head of Analytics)**
C1 Analyse data for information and/or performance measurement within the context of the relevant health and care environment	You can apply innovative approaches to resolve business and team issues. You guide colleagues to create and interpret strategic insights. You oversee the development and maintenance of performance measurement frameworks. You ensure these frameworks are continuously aligned to business needs and strategy. You look beyond initial requirements, challenge assumptions and communicate insight. You confidently communicate difficult messages based on the data.
C2 Employ applicable data sources to produce valid, verifiable and replicable analyses	You appraise the accuracy and quality of a range of data ensuring that data is fit for the intended analysis and that the analytical products are suitable for their audience. You anticipate and remove blockages to the processing of data and influence senior stakeholders to facilitate the creation and flow of appropriate data. You can explain data patterns and their implications on interpretation and promote data-driven decision-making. You proactively promote approaches to ensure data variability and standardisation are routinely used in analysis and explore how further metrics and statistics could enhance comprehension of the data. You advise and support your team on the most appropriate analytical techniques to use and create models that support the business strategy, supporting your team to do so. You oversee the development of systems to provide continuous availability of business-critical data. You ensure analysis is aligned to business needs and exploit technologies to automate repetitive outputs. You identify and mitigate risks to the data flows and processing capacity and implement improvements. You anticipate and plan for changes to any business or technical constraints. You have good knowledge of data security and of applying data protection principles and legislation.
C3 Apply relevant software and numeracy skills with a range of analytical techniques	You develop advanced knowledge of predictive, prescriptive and evaluative analytical techniques. You develop advanced expertise in relevant tools, applications and systems and share your knowledge with others. You apply a range of statistical practices, can advise on best practice and guide others to a high standard. You can determine which tools and techniques to use to explore or solve a variety of business issues. You develop systems and processes to improve the use of tools and techniques employed in your organisation. You engage with the wider analytical community to share learning. You actively seek out emerging tools and techniques and find ways to apply them. You share your knowledge with the wider analytic community to help others develop analytical skills.
C4 Deploy problem-solving skills to define requirements for analytical work	You are able to solve complex analytical problems which require data or information from multiple sources. You can design and test new techniques which can be replicated in other areas of analytics.
C5 Generate and communicate insight verbally, visually and in writing to a variety of information consumers	You can communicate relevant, compelling stories using the most appropriate medium. You know how to give complex recommendations at a tactical and strategic level. You can present analysis and visualisations in clear ways to communicate complex messages. You know how to communicate negative and positive information to stakeholders and can manage their expectations. You proactively listen to the needs of technical and business stakeholders and explain them to each other and can facilitate difficult dicussions within your team and diverse senior stakeholders.
C6 Engage in continuous skills development, exhibit professionalism and seek out and share emerging best practice	You identify development opportunities for yourself and those around you, adopting innovations and practices learned from the wider analytics community. You are adaptable and develop new or improved ways of working to support your team, directorate and wider analytical community. You can focus on these initiatives to support the enhancement of patient care as an ultimate goal and this will be recognised beyond your organisation. As a respected specialist, you act as an advocate for professional standards and values within your field of expertise

Data Analysis Competencies Leading Practitioner

Competency	Leading Practioner (L5)
Indicative Level	**Band 8d/9 (e.g. Director / Deputy Director / CIO)**
C1 Analyse data for information and/or performance measurement within the context of the relevant health and care environment	You can apply innovative approaches to resolve business and team issues. You guide colleagues to create and interpret strategic insights. You oversee the development and maintenance of performance measurement frameworks. You ensure these frameworks are continuously aligned to business needs and strategy. You look beyond initial requirements, challenge assumptions and communicate insight. You confidently communicate difficult messages based on the data
C2 Employ applicable data sources to produce valid, verifiable and replicable analyses	You appraise the accuracy and quality of a range of data ensuring that data is fit for the intended analysis and that the analytical products are suitable for their audience. You anticipate and remove blockages to the processing of data and influence senior stakeholders to facilitate the creation and flow of appropriate data. You can explain data patterns and their implications on interpretation and promote data-driven decision-making. You proactively promote approaches to ensure data variability and standardisation are routinely used in analysis and explore how further metrics and statistics could enhance comprehension of the data. You advise and support your team on the most appropriate analytical techniques to use and create models that support the business strategy, supporting your team to do so. You oversee the development of systems to provide continuous availability of business-critical data. You ensure analysis is aligned to business needs and exploit technologies to automate repetitive outputs. You identify and mitigate risks to the data flows and processing capacity and implement improvements to current approaches. You anticipate and plan for changes to any business or technical constraints. You have good knowledge of data security and of applying data protection principles and legislation.
C3 Apply relevant software and numeracy skills with a range of analytical techniques	You have advanced expertise across a range of techniques or you may have a recognised deep expertise in a narrower range of specialisms. You have advanced expertise in relevant tools, applications and systems and share your knowledge with others. You exemplify best practice with methods and tools and guide others to a high standard. You understand, teach and supervise a wide range of practices.
C4 Deploy problem-solving skills to define requirements for analytical work	You have insight into complex, multi-system problems which allows you to formulate and propose strategies which engage a wide range of stakeholders which can deliver positive change both regionally and nationally.
C5 Generate and communicate insight verbally, visually and in writing to a variety of information consumers	You can mediate between people and mend relationships, communicating with stakeholders at all levels. You know how to proactively manage expectations and facilitate discussions in high risk or complex circumstances or under constrained timescales. You can speak on behalf of the analyst community to large audiences inside and outside the healthcare economy.
C6 Engage in continuous skills development, exhibit professionalism and seek out and share emerging best practice	You can implement/develop new and creative methods with emerging analytics for your organisation and the wider community. You proactively collaborate at regional or national evel to improve analytics throughout the healthcare environment. You can influence national policy on "what good looks like". You champion professional standards for analysts throughout the wider health economy and promote the well-being of all personnel.

How to Use Data Analysis Competencies

The competencies have been designed to be as flexible as possible whilst enabling a standardisation of the profession throughout the industry. The following are some useful hints for how you may use the framework.

- Each of the competencies (C1 to C6) are the core skills and abilities you would expect for someone to be able to do at their respective practitioner level (L1 to L5). The points of intersection can be used as coordinates to identify a specific competency. For example, the professionalism competency for a Senior Practitioner on the data analysis framework would be DA C6 L3.

- Practitioner levels (L1 to L5) are used to align with the professional registration standards as set out by the Federation of Informatics Professionals (FedIP) and the Association of Professional Healthcare Analysts (AphA).

- Competencies can be used when preparing for an appraisal or considering applying for a promotion. However, more benefit will be gained by using them in conjunction with a development framework that may have more focus on how to improve in certain areas.

- The more senior the practitioner level, the more likely it becomes that the role will move away from the hands-on core skills. While this has been accommodated with the use of terms such as “oversee” and “manage”, extra generic leadership skills may be necessary to build on the core competencies. Only at L5, Leading Practitioner, should this deviation be particularly significant and would depend on the needs of individual role.

- Core competencies are particularly useful when appraising or being appraised. They are designed to represent a standard that individuals can benchmark themselves against.

- Each competency can also be used to support the development of job adverts or job descriptions. They should be used as the target applicant standard.

- Similarly, an interviewer may use the competencies when designing their interview questions. This also allows the interviewee to use the competencies to ensure they frame their experience in a way which correlates to the interviewer’s questions.

User Profile #1

Yomi is an accomplished Analyst. Not particularly interested in leading teams or management, he enjoys tackling data and producing meaningful intelligence in as many environments as possible. He has worked in some of the largest Trusts in the South East and has been working at a relatively high profile commissioner for some time and he feels that it is time for a change.

Yomi has always wanted to work for a central health organisation such as NHS E/I or NHS Digital but has been put off by colleagues who claimed the roles are incomparable. This time, he sought out an advert and, while some of the language was a little different in terms of the reference points for the work, when he compared it to the Practitioner level (L2) of the data analysis competencies, he could see that the mechanics of the role were very similar to the work he had been doing for a few years.

Whilst the volume of records seemed to be bigger, he has worked at one of the largest Trusts in the country and was completely comfortable with what another shift in data quantity would entail. Furthermore, because of the volume and relative complexity the role pays at a band higher than he currently has, albeit within the ranges on the framework.

There were a couple of “nice-to-haves” that Yomi wanted to brush up on as a specialism but four weeks later he applied for a new role and soon had made the step into central health analysis.

Specialisms for Data Part I

Specialism	Examples for beginning a specialism	Examples for an intermediate specialist	Examples for an advanced specialist
SA1 Data Visualisation (using Tableau, PowerBI, Qlik etc)	You are able to use specific visualisation software to produce basic visualisations, including histograms, bar charts and box plots	You can import data into underlying data models. You understand the relational structure of the data and use the most appropriate visualisation method	You can use underlying coding such as mCODE, DAX etc to create the most efficient datasets to visualise. You can tell a story using data.
SA2 Geographical Data Mapping	You understand how geographical data can be displayed to show geographical features such as simple chloropleth mapping using appropriate tools	You understand different geographies and how they can be displayed using point mapping, density mapping, chloropleth, isoline maps etc. You understand how geographical boundaries relate to each other.	You understand when geographical mapping is appropriate and can combine it with other visualisation methods to create greater impact. You can produce dynamic maps based on changing data.
SA3 Statistical Process Control	You understand the principles of normal and special cause variation and how data can be presented in SPC charts. You are able to produce basic XmR charts	You understand the statistics and assumptions behind XmR charts, including when they are not the best method to use. You know the other types of SPC charts for different data types.	You understand the different types of SPC charts and when each should be used. You have knowledge of process redesign and its dependence on removing special cause variation.
SA4 Descriptive & Explicative Analytics	You understand the role of descriptive analytics and the difference between this and inferential / predictive analysis. You understand data types and how to summarise data.	You understand variablilty and how it affects the data being analysed. You understand how descriptive statistics such as prevalence and incidence are interdependent. You are able to describe data in an unambiguous fashion.	You produce indicators and metrics that clearly measure what is required. You understand and apply reliability and validity assessments. You select the most appropriate methods of visualisation.
SA5 Predictive & Prescriptive Analytics	You understand the role of predictive / prescriptive analytics and their difference from descrptive analytics. You are able to interpret analysis produced by others and communicate with stakeholders	You are able to use key techniques in predictive analytics including regression methods and use them with different data types. You can select the appropriate technique for the subject.	You understand the difference between predictive and prescriptive analysis, and have knowledge of tools and techniques for prescriptive analysis including business modelling and algorithms. You are aware of the link to machine learning.
SA6 Evaluative Analytics	You understand the role of evaluative analytics and the evaluation cycle. You are able to determine measures / metrics for evaluation.	You understand the iterative nature of evaluative techniques. You can identify when there is a cause and effect relationship and take into account the related time lag within any evaluative analysis.	You understand the role of proxy measures for less straightforward outcomes. You can assess these measures and quantify their uncertainty. You can evaluate previous research to determine appropriate measures.
SA7 Advanced Statistics	You understand when advanced inferential statistical techniques are needed and the different methods available. You are able to build basic regression models and analyse results from three or more groups	You understand key regression models, cluster analysis, factor analysis, principal component analysis etc. You apply the currect techniques to the business questions. You understand the limits and assumptions behind each technique.	You know all standard advanced statistical techniques and keep up to date with new developments e.g time series modelling using ETS, ARMA,ARIMA, BATS, TBATS etc. You undestand the context for these developments and their limitations.
SA8 Population Segmentation & Stratification	You understand population segmentation and why it is necessary. You know the 4 key segmentation methods and when each might be used. You use judgmental and binning techniques. You can distinguish between the need for stratification and standardisation.	You are able to use decision trees and cluster analysis in addition to simpler techniques. You communicate about methods and related limitations to stakeholders.	You can use a variety of methods within advanced broad technique categories eg k-mean, k-modes, CHAID etc. You understand Random Forests and how they build on standard decision trees. You know other dynamic segmentation techniques.

Specialisms for Data Analysis Part II

Specialism	Examples for beginning a specialism	Examples for an intermediate specialist	Examples for an advanced specialist
SA9 Data Modelling	You understand what a data model is and how data items are stored. You are able to explain the potential relational nature of data and can express conceptual models. You understand how conceptual, logical and physical data models relate to each other.	You can express logical and physical data models to define how a model will be built. You understand the different data model infrastructures and the limitations of each.	You can build appropriate data models from physical data models and pick the most appropriate infrastructure. You understand data entities, attributes and specific modelling environments. e.g Oracle, SQL Server, Hadoop etc.
SA10 Information Governance	You know the key data protection principles. You understand when data can be accessed and shared and know who in the organisation to approach for advice / approval	You know the key data protection principles. You understand when data can be accessed and shared and know who to approach for advice / approval. You understand the impact of small numbers on identifiability of data.	You know when data can be accessed and shared and know who to approach outside the organisation for advice. You understand how data linkage and different types of analysis can re-identify or help anonymise data. You have knowledge of GDPR and consent to process data.
SA11 Longitudinal Analysis	You can identify when longitudinal analysis is suitable and know the key techniques for analysis	You understand repeated measures designs and the limitations of standard statistical techniques.	You understand pragmatic differentiation between independent measures and repeated measures design. You understand how changing populations can affect analysis and choice of techniques used. You understand data attrition.
SA12 Machine Learning	You understand the principles behind machine learning and their link to predictive analysis. You can Identify the data needed for successful machine learning to take place and understand the iterative nature of machine learning	You can create algorithms / queries etc that use analytical methods such as regression analysis and iteratively enhance the supervised learning models. You understand the differences between the various learning models.	You have detailed understanding of supervised, unsupervised, semi-supervised and re-inforcement models and where these methods are most effective. You have skills in programming languages such as Python to enable more detailed Machine Learning models
SA13 Technological Specialisms (such as R, Python, Excel, SQL, Tableau etc.)	You can use a chosen technology/tool to create or manipulate data sets and create basic visualisations	You utilise associated modules and add-ins in order to perform complex manipulation and visualisation, data linkage and data quality. You can code to a standard to conduct work independently.	You can produce complex data models and visualisations whilst ensuring accurate linkage and data quality. You use appropriately advanced coding and debugging skills to utilise and contribute to the open source community
SA14 Data Automation	You understand timeliness of data and the need for data to flow with minimal interaction. You can identify where automation would improve processes.	You can distinguish between data analytics automation and data flow automation. You can link to and produce data flow maps that show where automation would be beneficial. You can use tools eg Power Query to automate data processing tasks.	You are able to link directly to source data using appropriate tools. You understand the inbuilt functionality of Microsoft and other products to directly link to SQL servers, Azure etc. You have knowledge of APIs and how they may benefit automation.
SA15 Business Analysis	You can gather requirements and identify the "to be" state of processes	You processes map current practices thoroughly. You can create and evaluate detailed gap analyses	You can draw up detailed technical roadmaps to achieve the "to be" state and communicate them with non-technical stakeholders
SA16 Hypothesis Testing	You can identify a business question and convert it into an appropriate hypothesis. You understand the difference between analytical hypotheses and null hypotheses. You understand one-sided and two-sided hypotheses.	You can determine the correct statistical tests for hypotheses, along with whether testing should be one tailed or two tailed. You understand alpha and beta and what p-values and confidence limits mean and you know how to calculate them.	You understand Type I and Type II errors and how these relate to statistical power. You understand a-priori and post-hoc hypotheses, the difference between them and the strengths and weaknesses in relation to exploratory analysis. You understanding splitting data to appropriately test hypotheses formulated in data exploration.

How to Use Specialisms for Data Analysis

The specialisms have been designed to support the specificity of the core competencies whilst enabling a standardisation of the profession throughout the industry. The following are some useful hints about how you may use the framework.

- Each specialism is broken down into three levels (SL1 to 3) of beginner, intermediate and advanced. These do not follow the professional levels as they do not represent the career pathway.

- Each specialism is marked SA1-16. The points of intersection can be used as coordinates to identify a specific specialist ability. For example, the evaluative analytics at an intermediate level on the data analysis specialist framework would be DA SA6 SL2.

- Specialisms can be used when demonstrating added value in an appraisal or considering applying for a specialist position. However, more benefit will be gained by using them in conjunction with a development framework that may have more focus on how to improve in certain areas.

- The specialism framework is a guide to the sort of level individuals should be at for a required proficiency. Inevitably, as with other competencies, the more advanced the specialism level the greater the area is in which to specialise so the advanced level should be read as an indicator rather than an exhaustive range of skills in that field.

- It should always be remembered that, like core competencies, specialist competencies are designed around a job description, not a person specification. When it comes to your position and remuneration, it's not about the job you can do, rather the job you were employed to do.

- Each specialism can also be used to support the development of job adverts or job descriptions wherever the role requires a specific skill that falls outside the core competencies such as familiarity with a specific tool or system.

- Individual tools and systems have been avoided in the wording of the specialisms as they are quickly obsolete or not relevant to many. However, where they are mentioned or alluded to, they may be substituted for systems more appropriate to a post.

- Similarly, an interviewer may use the specialisms when designing their interview questions. This also allows the interviewee to use the specialisms to ensure they frame their experience in a way which correlates to the interviewer's questions.

User Profile #2

Sandra is a relatively new in post Head of Analysis for an established mental health Trust in the North West. She needs to recruit an Analyst who has robust skills in reporting on the Mental Health Service Data Set (MHSDS). She has been informed by HR that, in the interests of equal opportunity, she must develop the job description and advert from a competency framework that is recognised by the NHS.

Her experience with frameworks that she had used previously was either that they were too generic and didn't allow her to focus on the relevant skills or were built by particular organisations where no-one outside that organisation could have reasonably built up those skills.

As a member of AphA, she was introduced to the National Competency Framework for Data in Health and Care (NCH 4 DHC). As she read the booklet, she discovered that she could supplement the core competencies with specialisms and even something called domains. She was therefore able to insist applicants have specialist skills in "descriptive and explicative analytics" from within the domain of mental health services with MHSDS as a preference.

Her support within HR approved the advert first time and, after shortlisting a number of applications, Sandra was able to successfully recruit to the role.

Examples of Domains

Domain Environments
Mental Health (IAPT, Community & Acute)
CAMHS
Acute Services & Medicine
Outpatient Services & Medicine
Community Services & Therapies
Urgent and Emergency Care
Planned Care
Ambulance Services
Paediatric Services & Medicine
Maternity Services & Medicine
Cancer Services
Person Centred Care
Primary Care
Prescription Services
Workforce
Specialist Health Services
Local Authority (Adult Social Care)
Local Authority (Children's Services)
Third Sector/Charity
Health Policy Development
Qualitative Health Economics
Service Review / Evaluation (Research)
Public Health Promotion (e.g., sexual health, childhood obesity, etc.)
Health Protection
Health Inequalities

How to use Domains

The domains act somewhat like specialisms, but without the differing levels of proficiency. Domains are broad categories of working environments such as planned care or public health.

Domains can be used to make the general core competencies more specific to a role. Where the core competencies are unable to specify resources such as the Mental Health Service Data Set (MHSDS) these elements can be indicated, by making reference to the Mental Health Services domain. Core competencies coupled with specific domains can fairly be used to request something along the lines of "extensive working knowledge of MHSDS" in a job advert.

As with some other areas of this model the domains list is not exhaustive. Great lengths have been taken to cover all the main health and social care environments but the requirements of each and every job cannot be fully anticipated. Nonetheless, while the addition of domains greatly enhances the precision of the core competencies, they are not an essential to operate to a professional standard.

More than one domain may be used to describe a role. However, it is worth noting that the greater the number of requirements, especially of domains, the smaller the cohort of professionals able to satisfy the requirement. When writing an advert, you may wish to request experience of urgent and emergency care, community services, and public health, but there will be a far smaller candidate pool qualified to apply.

User Profile #3

Rhys is a Manager within a central health organisation. Skilled in a number of statistical processes, his current position is Head of Service Evaluation Analytics dealing with non-clinical research analysis.

As part of this role, he has been tasked with recruiting three new members of staff to work within his unit at differing levels of experience up to Senior Practitioner to support a number of research analysis workstreams.

Looking at the National Competency Framework for Data in Health and Care, he had found that service evaluation and research had been missed off. However, after reading the guidance and looking closely at the framework he was able to identify not only the core skills, but by using the "service review / evaluation" domain together with the "public health domain", the specialisms in the team that he was looking for.

By adding all three experience levels of the specialism "Evaluative Analytics" (SA6 L1-3) and "Hypothesis Testing" (SA16 L1-3) along with the two domains Rhys was able to recruit three colleagues with the required variety of experience.

Data Engineer Competency Associate Practitioner

Competency	**Associate Practitioner (L1)**
Indicative Level	**Band 4/5 (e.g. Data Engineer)**
C1 Communication Skills	You understand the need to translate technical concepts into non-technical language and can maintain establish communication channels from the data engineering staff to internal and external stakeholders.
C2 Data Analysis & Analytics	You have knowledge of explicative statistical technique and have a good knowledge of business intelligence reporting tools, applications and systems used in your organisation. You can adopt the most appropriate tool for analytical tasks and communicate results visually and verbally.
C3 Data Modelling	You understand the concepts and principles of data modelling and can produce, maintain and update relevant data models for specific business needs. You know how to reverse-engineer data models from a live system. You design, build and test repeatable and reusable data products based on data feeds from multiple systems.
C4 Data Ingestion	You can design, build and test data products based on feeds from multiple systems using a range of different storage technologies and/or access methods. You know how to create repeatable and reusable products and you understand how your tools fit into the business data architecture. You understand the Information Governance requirements for the data you handle and ensure its storage meets current legislation.
C5 Metadata management	You work with metadata to complete tasks such as data and systems integration impact analysis. You maintain a repository to ensure information remains accurate and up to date.
C6 Programming	You design, code, test, correct and document simple programs or scripts under the direction of others. You critique and test the work of a similar complexity by other team members. You contribute to code reviews and use refactoring techniques to enhance the sustainability of the code library.
C7 Technical understanding & innovation	You understand core technical concepts related to the role and can apply them with guidance. You seek out opportunities to innovate with new tools.

Data Engineering Competencies Practitioner

Competency	Practitioner (L2)
Indicative Level	**Band 5/6 (e.g. Senior Data Engineer)**
C1 Communication Skills	You can effectively communicate to and between technical and non-technical stakeholders and facilitate discussions within a multidisciplinary team, with some potentially difficult dynamics. You can advocate for the team externally. You know how to manage different perspectives.
C2 Data Analysis & Analytics	You have a good knowledge of predictive, prescriptive and evaluative analytical techniques. You develop deeper expertise in relevant business intelligence tools, applications and systems and share your knowledge with others. You can apply a range of statistical and data visualisation practices and can advise on best practice and guide others to a high standard. You can determine which tools and techniques to use to explore or solve a variety of business issues and communicate the results of analysis with impact to a range of audiences.
C3 Data Modelling	You understand the concepts and principles of data modelling and can produce relevant data models across multiple subject areas. You know how to reverse-engineer data models from a live system. You understand industry-recognised data modelling patterns and standards and when to apply them. You design, build and test complex or large-scale data products and build teams to conduct data integration services.
C4 Data Ingestion	You can design, build and test data pipelines creating complex or large-scale data products. You know how to build teams with a variety of technical skills to deliver data ingestion projects and resient, scalable data services. You understand how the tools and technologies fit into the business data architecture. You understand the Information Governance requirements for the data you handle and ensure its storage meets current legislation.
C5 Metadata management	You create metadata, design appropriate metadata repositories and manage changes to existing metadata repositories. You understand a range of tools for storing and working with metadata. You provide oversight and advice to more inexperienced members of the team.
C6 Programming	You utilise standard tools to design, code, test, correct and document moderate-to-complex programs and scripts from agreed specifications and subsequent iterations. You collaborate with others to review specifications where appropriate and define test conditions and procedures. You analyse and report test results. You initiate code reviews and promote the use of refactoring techniques to enhance the lifespan of the code library.
C7 Technical understanding & innovation	You apply detailed knowledge and understanding of the technical concepts required for the role. You understand how these fit into the wider technical landscape. You understand the impact of emerging trends on the team of data usage and tools and analysis techniques.

Data Engineering Competencies Senior Practitioner

Indicative Level	Band 7/8a (e.g. Pricinpal Engineer, Data Architect)
C1 Communication Skills	You understand the needs of technical and business stakeholders and interpret them into technical requirements which can be implemented. You manage stakeholder expectations. You are flexible and capable of proactive and reactive communication. You know how to facilitate difficult discussions within the team or with diverse senior stakeholders.
C2 Data Analysis & Analytics	You develop advanced expertise in business intelligence tools, applications and systems and share your knowledge with others. You apply a range of statistical practices, can advise on best practice and guide others to a high standard. You can determine which tools and techniques to use to explore or solve a variety of business issues. You develop systems and processes to improve the use of business intelligence tools and techniques employed in your organisation. You actively seek out emerging analytical tools and techniques and find ways to apply them. You convert the results of advanced analysis into insight for business decision-making.
C3 Data Modelling	You understand the concepts and principles of data modelling and can produce relevant data models. You know how to work across organisational boundaries and recognise opportunities to align with or re-use the data models in different organisations. You establish sustainable enterprise-scale data integration procedures and ensure the team adhers to them. You manage resources to ensure data services work effectively at enterprise level
C4 Data Ingestion	You can establish enterprise-scale data ingestion processes across the data development life cycle. You ensure that teams are appropriately skilled to support current and proposed data pipelines. You can manage people and technical resources to ensure that data services work effectively at scale. You oversee the operational implementation of new technologies and contribute to the modernisation of the business data architecture. You ensure business processes build in Information Governance requirements and develop ethical and effective data sharing agreements for data sources.
C5 Metadata management	You create metadata, design appropriate metadata repositories and manage changes to existing metadata repositories. You understand a range of tools for storing and working with metadata. You provide oversight and advice to more inexperienced members of the team.
C6 Programming	You utilise a variety of tools to design, code, test, correct and document moderate-to-complex programs and scripts from agreed specifications and subsequent iterations. You collaborate with others to review specifications where appropriate and define test conditions and procedures. You analyse and report test results and identify any risks and issues. You direct code reviews and promote the application of a full range of refactoring techniques to enhance the lifespan of the code library.
C7 Technical understanding & innovation	You apply detailed knowledge of the techniques and concepts required for the role. You liaise with other technical teams to ensure seamless service to the organisation. You identify areas for impactful innovation in data tools and techniques.

Data Engineering Competencies Advanced Practitioner

Competency	Advanced Practitioner (L4)
Indicative Level	**Band 8b/8c (e.g.Head of Data Engineering)**
C1 Communication Skills	You can mediate between people and mend relationships, communicating with stakeholders at all levels. You manage stakeholders' expectations and facilitate discussions across high risk or complexity or under constrained timescales. You can speak for and positively represent the technical community to large audiences inside and outside heathcare.
C2 Data Analysis & Analytics	You have advanced expertise across a range of techniques or you may have a recognised deep expertise in a narrower range of specialisms. You have advanced expertise in relevant business intelligence tools, applications and systems and share your knowledge with others. You exemplify best practice with methods and tools and guide others to a high standard. You translate the results of complex analysis into insight for business decision-making.
C3 Data Modelling	You understand the concepts and principles of data modelling and can produce relevant data models. You know how to work across organisational boundaries and recognise opportunities to align with or re-use the data models in different organisations. You establish sustainable enterprise-scale data integration procedures and ensure the team adhers to them. You manage resources to ensure data services work effectively at enterprise level. You engage with the wider technical professions to ensure the data models and processes conform to best practice.
C4 Data Ingestion	You determine technical strategy and ensure alignment with enterprise goals. You pro-actively explore new tools and technologies, set direction for modernising data architecture and build business cases for technical investment. You initiate novel data flows and their data sharing ageements ensuring Information Governance legislation is adhered to and data security standards are built in at source.
C5 Metadata management	You understand how metadata and their repositories support different areas of the business. You promote and communicate the value of metadata repositories. You establish robust governance processes to keep repositories up to date.
C6 Programming	You set local standards for programming tools and techniques and nominate appropriate development methods. You advise on the application of standards and methods and ensure compliance. You take technical responsibility for all stages and/or iterations in a development project, providing method-specific technical advice and guidance to project stakeholders. You apply stringent test conditions, militating against all identified issues and risks. You take responsibility for the lifecycle of the whole code library sponsoring continuous code reviews and refactoring.
C7 Technical understanding & innovation	You predict and advise on future technology changes that present opportunities for products or programmes. You investigate emerging trends in data-related approaches, performing horiozon scanning for the wider technical community .

How to Use Data Engineering Competencies

The competencies have been designed to be as flexible as possible whilst enabling a standardisation of the profession throughout the industry. The following are some useful hints about how you may use the framework.

- Each of the competencies (C1 to C7) are the core skills and abilities you would expect for someone to be able to do for their respective practitioner level (L1 to L4). The points of intersection can be used as coordinates to identify a specific competency. For example, the communication competency for a Senior Practitioner on the data engineering framework would be DE C1 L3.

- Practitioner levels (L1 to L4) are used to align with the professional registration standards as set out by the Federation of Informatics Professionals (FedIP) and the Association of Professional Healthcare Analysts (AphA).

- Leading Practitioner level, L5, has been omitted as, at that level, they become almost indistinguishable from DA L5 and the Leading Practitioner is likely to provide leadership for all the data family components.

- Competencies can be used when preparing for an appraisal or considering applying for a promotion. However, more benefit will be gained by using them in conjunction with a development framework that may have more focus on how to improve in certain areas.

- The more senior the practitioner level, the more likely it becomes that the role will move away from the hands-on core skills. While this has been accommodated with the use of terms such as “oversee” and “manage”, extra generic leadership skills may be necessary to build on the core competencies. Only at L5, Leading Practitioner, should this deviation be particularly significant and the skills would depend on the needs of the individual role.

- Core competencies are particularly useful when appraising or being appraised. They are designed to represent a standard that individuals can benchmark themselves against.

- Each competency can also be used to support the development of job adverts or job descriptions. They should be used as the target applicant standard.

- Similarly, an interviewer may use the competencies when designing their interview questions. This also allows the interviewee to use the competencies to ensure they frame their experience in a way which correlates to the interviewer’s questions.

- Specific systems or tools have been avoided since all organisations use different systems and further specificity can be added through specialisms.

User Profile #4

Charlie is a relative newcomer to NHS Data. They have been in the environment for about six months but loves everything about it. Currently working at the Associate Practitioner level in Analytics, Charlie is fascinated by data science and would like to plan their career in that direction.

Having examined the National Competency Framework for Data in Health and Social Care, Charlie discovered that, given the complexities involved, there is no Associate Practitioner Level for Data Science and that Practitioner is the entry-level.

As the framework lays out the requirements for data science, in a way that maps to their analytics experience Charlie was able to continue to develop in their current role whilst seizing opportunities to pick up smaller data science projects.

Ten months later and Charlie is very much working at Practitioner level as an analyst and is most capable of describing themselves as such. Still fixed on a career in data science, rather than apply for promotion to Practitioner level just to apply for another role, they speak to their line manager who arranges an interview with the Head of Data Science.

Four weeks on and Charlie has begun the next exciting stage in their career in data science.

Data Science Competencies Practitioner

	Practitioner (L2)
Indicative band/title	**Band 5/6 - Data Scientist**
C1 Descriptive & Explicative Analytics	You are able to display summary statistics and select the appropriate method for visualisation. You can produce inferential statistics and conduct hypothesis testing. You may begin to specialise e.g. geospatial, psychometrics, survey design etc. You support stakeholders to visualise and understand features of regular data flows, bringing in additional data sources where appropriate.
C2 Predictive & Prescriptive Analytics	You possess basic knowledge of predictive and prescriptive analytical techniques such as time series forecasting, machine learning, regression and discrete event simulation modelling. You model data which arises from different distributions or processes e.g. continuous, proportions, counts rates etc.
C3 Evaluative Analytics	You conduct basic experimental and quasi-experimental studies considering a range of outcomes, possibly including economic evaluation. You specialise in at least one coding language
C4 Communicating Analytical Results	You understand and can utilise the appropriate media to communicate findings. You shape communications relevant to the audience and can translate technical concepts to a non-technical audience. You are comfortable giving tactical recommendations.
C5 Project Management	You are able to manage data appropriately, complete problem formulation and begin to manage projects from inception through to completion
C6 Standards and Personal Devevelopment	You are able to identify and complete tasks within your field of expertise whilst undertaking work and projects allocated by senior staff. You seek out development opportunities for yourself and contribute to learning in your team and the wider community. You advocate for multidisciplinary working and develop open source materials using, for example, APIs for connecting data sources. You have clear understanding of the impact of your data and an awareness of the ethics of its usage.

Data Science Competencies Senior Practitioner

	Senior Practitioner (L3)
Indicative band/title	**Band 7/8a - Senior Data Scientist**
C1 Descriptive & Explicative Analytics	You are fluent in summary statistics, data visualisation and feature selection along and capable of managing inferential statistics, hypothesis testing and regression modelling. You may specialise further e.g. geospatial, psychometrics and survey design. You can design an end to end tool for applying natural language processing to text data.
C2 Predictive & Prescriptive Analytics	You are fluent in at least one predictive or prescriptive analytical technique such as time series forecasing, machine learning, regression modelling and discrete event simulation modelling, including developing algorithms in a secure platform. You are capable of adding further value through data linkage and and create algorithms that identify outliers
C3 Evaluative Analytics	You are adept at experimental and quasi-experimental studies, and able to make strategic recommendations based on evaluation, including of cost effectiveness. You are able to develop code at pace to demonstrate business value.
C4 Communicating Analytical Results	You can communicate accurate information to technical and non-technical audiences. You turn complex data analyses into clear and compelling messages. You communicate negative and positive information to stakeholders and know how to facilitate discussions within multisdisciplinary teams. You know how to give tactical and strategic recommendations that influence audiences.
C5 Project Management	You can effectively formulate problems, oversee data management, communicate analytical results and oversee project management from inception through to completion. You demonstrate some skills in leadership, coaching and decision quality. You promote open source research-based proof of concepts to add value obtained from data
C6 Standards and Personal Devevelopment	You identify relevant training opportunities for yourself and other members of your team and advocate effectively for their adoption. You examine new ways of working with each task and share improvements within your team and the wider community. You foster ethical approaches to data usage and enable open source development without compromising good Information Governance and ethical standards. You seek out and promote opportunities for interdisciplinary working to share and acquire skills, knowledge and career-enhancing experiences

Data Science Competencies Advanced Practitioner

Indicative band/title	**Band 8b/8c - Head of Data Science / Lead Data Scientist**
C1 Descriptive & Explicative Analytics	You are able to apply data science techniques from the previous levels to present, communicate and disseminate data science products and to demonstrate their impact across stakeholder groups
C2 Predictive & Prescriptive Analytics	You design programs of work using complex models created by a number of predictive and prescriptive analytical techniques such as time series forecasting, machine learning, regression modelling, and discrete simulation modelling. You validate work robustly by identifying and applying appropriate performance measures eg you define the necessary validations for applying models to sensitive imaging data
C3 Evaluative Analytics	You use a wide variety of evaluative and economic analytic methods to answer strategic questions about resource allocation and deployment. You can lead a project across the life cycle using these methods. You are able to bid for larger commissioned projects based on the evidence resulting from rapid short-term coding projects
C4 Communicating Analytical Results	You can communicate relevant, compelling stories using the most appropriate medium. You understand how to give complex recommendations at a tactical and strategic level. You can present analysis and visualisations in clear ways to communicate complex messages. You know how to communicate negative and positive information to stakeholders and can manage their expectations. You proactively listen to the needs of technical and business stakeholders and explain them to each other and can facilitate difficult dicussions within your team and diverse senior stakeholders.
C5 Project Management	You design complex data science projects at a high level, incorporating data management, user experience and engagement, making best use of statistical and machine learning methods. You manage the whole product development lifecycle from scoping and developing the proof of concept to operational use positively engaging with stakeholders at each stage. You lead in open source tooling to create added value
C6 Standards and Personal Devevelopment	You identify development opportunities for yourself and those around you and adopt innovative practices learned from the wider analytics community. You are adaptable and develop new and improved ways of working to support your team, directorate and the wider analytical community. You focus data science resources to ease the information burden on operational colleagues and to enhance patient care and you publicise that work outside your organisation. You lead in advocating for high ethical and technical standards and practice, constructing interdisciplinary frameworks and promoting the use of open source products

How to Use Data Science Competencies

The competencies have been designed to be as flexible as possible whilst enabling a standardisation of the profession throughout the industry. The following are some useful hints about how you may use the framework.

- Each of the competencies (C1 to C6) are the core skills and abilities you would expect someone to be able to do for their respective practitioner level (L2 to L4). The points of intersection can be used as coordinates to identify a specific competency. For example, the professionalism competency for a Senior Practitioner on the data science framework would be DS C6 L3.

- Practitioner levels (L2 to L4) are used to align with the professional registration standards as set out by the Federation of Informatics Professionals (FedIP) and the Association of Professional Healthcare Analysts (AphA).

- Leading Practitioner level, L5, has been omitted as, at that level, the competencies become almost indistinguishable from DA L5 and the Leading Practitioner is likely to provide leadership for all data family components.

- Associate Practitioner, L1, has been omitted because data science requires a skill level commensurate with DA L2.

- Competencies can be used when preparing for an appraisal or considering applying for a promotion. However, more benefit will be gained by using them in conjunction with a development framework that may have more focus on how to improve in certain areas.

- The more senior the practitioner level, the more likely it becomes that the role will move away from the hands-on core skills. While this has been accommodated with the use of terms such as “oversee” and “manage”, extra generic leadership skills may become necessary to build on the core competencies. Only at L5, Leading Practitioner, should this deviation be particularly significant and would depend on the needs of the specific role.

- Core competencies are particularly useful when appraising or being appraised. They are designed to represent a standard that individuals can benchmark themselves against.

- Each competency can also be used to support the development of job adverts or job descriptions. They should be used as the target applicant standard.

- Similarly, an interviewer may use the competencies when designing their interview questions. This also allows the interviewee to use the competencies to ensure they frame their experience in a way which correlates to the interviewer’s questions.

User Profile #5

Chen is a new Senior Practitioner in data engineering. She has recently recruited a new member to her team who has done brilliantly. The probation period has already passed and she needs to give her the first performance appraisal with a view to establishing her development plan. Chen knows that her employee is going to be pushing her on career development.

Not long in post herself, Chen does not feel comfortable in talking through a career path off the top of her head, so she takes the National Competency Framework for Data in Health and Care with her to discuss.

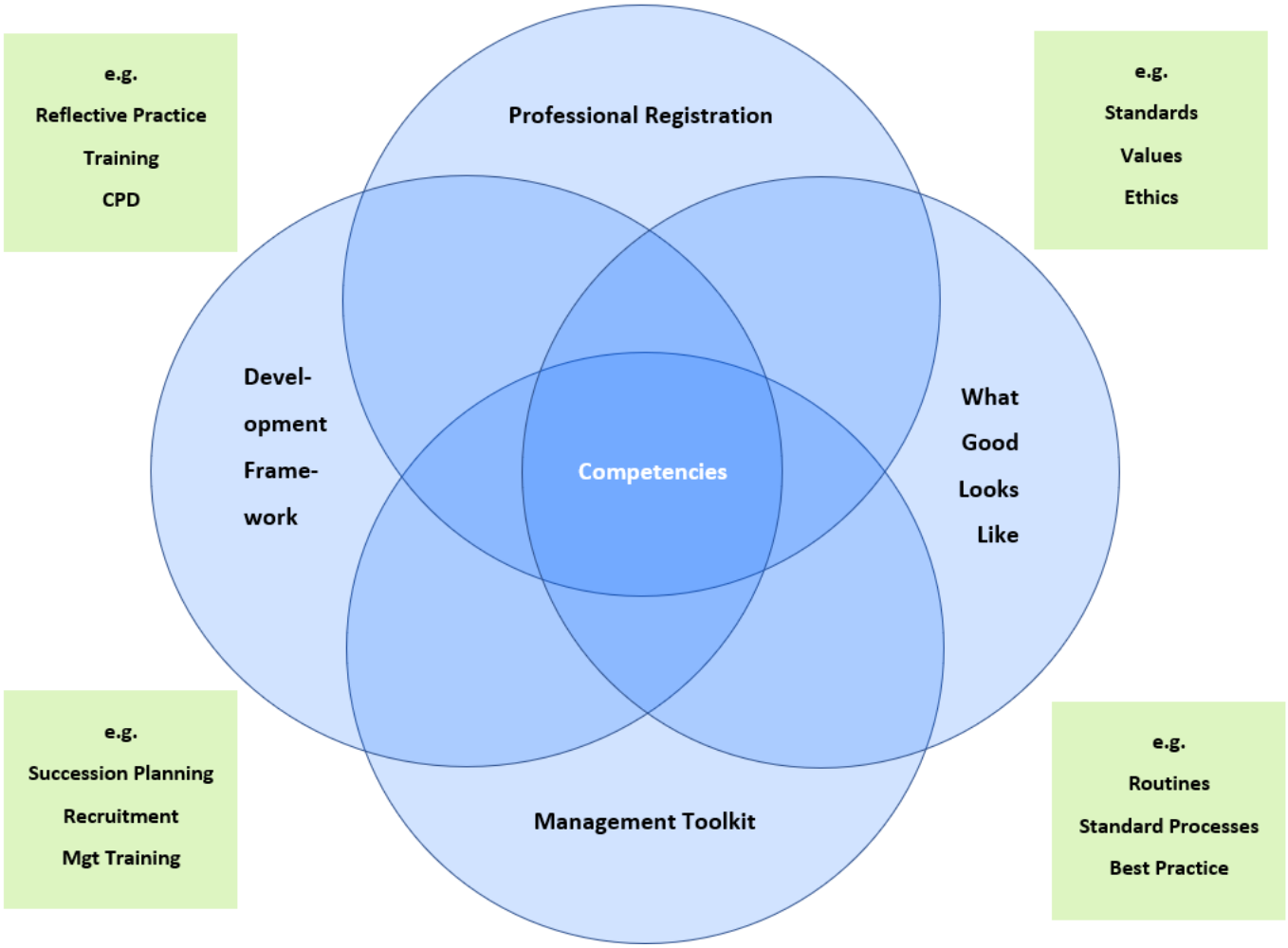
In the appraisal, Chen shows the appraisee the framework and is able to show all four levels of competency within it and what each of those entail. Chen also shows how these can be refined with the use of specialisms and domains but her employee asks, “what about after Advanced Practitioner?”.

Fortunately, Chen is able to explain that at the Director level, the Director of Data Engineering skill set is the same as the Director of Data Science and Data Analysis.

She also explains that, as daunting as that may seem, the steps required along the way enables exposure to those sections and, when she is ready, she can apply where there is a vacancy. Alternatively, if she wanted to apply to a different organisation, she would either need to have their specific technical skills if there was a Director of Data Engineering post, which may not be likely, or have developed leadership competencies. Chen suggested they leave those for a few appraisals’ time.

Long Term Plan

With the development of a competency set for leadership skills and project management to act as alternatives to the core technical competencies for Advanced, but predominantly, Leading Practitioners, it will be possible to use the framework in conjunction with something like NHS South, Central, and West CSU's excellent career development platform project to establish an overarching standardisation process that enables data family career innovation on a national scale.



Whilst professional registration is encouraged by NHS national bodies and the development platform is in progress there is no uniform management toolkit, nor an established process to manage the proliferation of "what good looks like". Consequently, there is still much to do beyond the development of the core competencies but, with the professionalisation agenda progressing with real momentum, it is an exciting time to be involved with data in Health and Care.

Leadership Skills Holding

Currently, leadership skills (LS) are being researched and will likely form a part of any future development of this framework. This page is intended to demonstrate where in the framework those competencies would fit when they are complete.

User Profile #6

This page is a holding page for a User Profile to demonstrate how to connect leadership competencies with the core competencies of the data family.

Project Management Holding Page

Currently, project management skills (PM) are being researched and will likely form a part of any future development of this framework. This page is intended to demonstrate where in the framework those competencies would fit when the work is complete.

User Profile #7

This page is a holding page for a User Profile to demonstrate how to connect project management competencies into the core competencies of the data family.

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Points Based Progression

Using a points-based approach for the National Competency Framework for Data in Health and Care

Introduction

The NHS System Analytics Board has commissioned work to develop a new '*National Competency Framework for Data in Health and Care*'. During the development of the framework it has been suggested that there may be merit in thinking about a points-based approach to the framework. This brief paper describes what is meant by a points-based approach, outlines the rationale for such an approach and provides examples of where this type of approach has worked well elsewhere.

What is a points based approach?

A points-based approach can be taken when using a competency framework as a method for assessing the level at which an individual is working for the purposes of assigning a formal recognition of that level (e.g. for professional registration).

For example, the National Health and Care Competency Framework recognises five different levels ranging from Associate Practitioner to Leading Practitioner. Rather than determining that someone has reached Leading Practitioner level by requiring that they meet all or a fixed proportion of the competency descriptors at that level, points can be assigned for reaching a given level in each of the competencies and the overall level at which the individual is determined to be operating depends on the total number of points that they have obtained.

Here is an example from the NHS Digital Data Science Competency Framework:

		Competency areas							
Band	Indicative benchmark (total score)	Analytics	Professional standards & quality	Achieve impact with Analysis	Innovation	Data Management & modelling	Programming & Software Development	Leadership & Collaboration	Delivery
8D	48	6	6	6	6	6	6	6	6
8C	43	6	5	6	5	5	5	5	6
8B	37	5	5	5	4	4	5	4	5
8A	32	4	4	4	4	4	4	4	4
7	26	4	4	3	3	3	3	3	3
6	21	3	3	2	3	2	3	3	2
5	16	2	2	2	2	2	2	2	2

Advantages of a points-based system

As individuals move upwards in their careers, they generally develop deep expertise in the areas in which they work rather than maintaining or developing knowledge and skills right across their field. This is inevitable and reflects the fact that knowledge and skills which are not used regularly tend to fade over time. A pass/fail approach to the National Health and Care Competency Framework, especially at more senior levels, would not allow for this and risks setting unrealistic expectations that senior individuals will have a deep level of knowledge and expertise right across the whole field of analytics. Given the diversity of the analytics field this would pose a real challenge.

A related advantage is that this approach would cater for the diversity of the analytics profession. Many individuals that do not have 'analyst' in their job title consider themselves to be analysts and will have knowledge and skills that are relevant to the profession. A points-based approach is more flexible and creates ways of including these individuals clearly within the analytical community.

How could it operate?

There are broadly two ways of operating a points-based system:

1. A given number of points is required to achieve recognition at a particular level. This is the simplest approach and has been used in the earlier example from the NHS Digital Data Science Competency Framework.
2. A more nuanced approach would be to stipulate a minimum number of points in certain competency areas/domains as well as an overall points threshold. This could be useful if there are competency areas that are felt to be critical for all analytical staff.

Are there examples of this kind of approach in use elsewhere?

1. The NHS Digital Data Science Competency Framework mentioned above.
2. The UK Public Health Register used to have a system of both 'generalist' and 'defined specialist' registration. This is no longer in use due to changes in the registration system for public health specialists. When it did operate a defined specialist was able to gain registration by demonstrating deeper knowledge and skills in their defined area and a shallower coverage of skills and knowledge in other areas. Defined specialist registration was often pursued by those from analytical backgrounds.
3. The Chartered Institute of Library and Information Professionals uses a portfolio route to registration which allows registrants to focus on a sub-set of the total competencies outlined in their competency framework. They don't have a points system but there is flexibility within the system with a guide to choose 10-12 competency areas (out of 14 overall).

Glossary of Acronyms

Acronym	Extrapolation / Explanation
AphA	Association of Professional Healthcare Analysts
ARIMA	Auto Regressive Integrated Moving Average (time series forecasting model)
ARMA	Auto Regressive Moving Average (time series forecasting model)
BATS	(time series smoothing model)
C	Competency
CAMHS	Child and Adolescent Mental Health Services
CPD	Continuous Professional Development
D	Domains
DA	Data Analysis
DAX	Data Analysis Expressions (Library)
DDaT	Digital, Data and Technology Competency Framework
DE	Data Engineering
DS	Data Science
ETS	Error, Trend, and Seasonality (time series forecasting model)
FedIP	Federation of Informatics Professionals
IAPT	Improving Access to Psychological Therapies
L	Professional Standards Level
LS	Leadership Skills
mCODE	Minimal Common Oncology Data Elements (non-proprietary language and model)
MHSDS	Mental Health Services Data Set
PM	Project Management
SA	Specialisms for Analytics
SDE	Specialisms for Data Engineering
SDS	Specialisms for Data Science
SPC	Statistical Process Control (quality-based control method)
TBATS	(trigonometric time series smoothing model)
X-MR	Individuals and Moving Range (X-MR) chart is a pair of control charts for processes with a subgroup size of one