

FACULTY OF CLINICAL INFORMATICS

DEVELOPMENT OF CORE COMPETENCIES FOR
CLINICAL INFORMATICIANS IN THE UNITED
KINGDOM

PROJECT AIM 1 (STEP 1): DEVELOP AND DEFINE
THE PROFESSIONAL ATTRIBUTES OF A CLINICAL
INFORMATICIAN

FINAL REPORT A (V1.1)

(PUBLISHED ALONGSIDE REPORT B)

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Document Management

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Reviewers

This document must be reviewed by the following people:

Reviewer name	Title / Responsibility	Date	Version
Alan Hassey	Council Member UK FCI & CCP project director		
Lydia Jidkov	Programme Lead NHS Digital Academy & project consultant		

Glossary of Terms

Term / Abbreviation	What it stands for
AoMRC	Academy of Medical Royal Colleges
BDRW	Building a Digital Ready Workforce
CCIG	Cambridge Clinical Informatics Group
CCIO	Chief Clinical Information Officer
CNIO	Chief Nursing Information Officer
FCI	Faculty of Clinical Informatics
UK	United Kingdom

Contents

1	Introduction.....	4
1.1	Purpose of the document	4
1.2	Nomenclature.....	4
1.3	Project scope.....	5
2	Approach.....	6
2.1	Design	6
2.2	Data collection	6
2.3	Analysis.....	6
3	Findings.....	7
3.1	Description of meeting participants	7
3.2	Description of job descriptions	7
3.3	Definition of clinical informatics	8
3.4	Description of clinical informaticians	9
3.5	Professional attributes of clinical informaticians	12
4	Conclusions and recommendations	13

1 Introduction

1.1 Purpose of the document

This document is a summary report of Aim1 (Step 1) – hereafter called Phase 1 of the Faculty of Clinical Informatics' (FCI) project to develop the core competencies of clinical informaticians in the United Kingdom (UK). Phase 1 focuses on defining the professional attributes of clinical informaticians. This report presents:

- Evidence based definitions for clinical informatics and clinical informaticians, and professional attributes of clinical informaticians in the UK
- The methodology adopted to develop the definitions and professional attributes
- Recommendations for further work

The FCI has been commissioned by the Building a Digital Ready Workforce (BDRW) programme to undertake this work.

The definitions and professional attributes have been developed following consultation. However, they are in draft form and require review before endorsement by the FCI.

Recommendation: this report should be reviewed by the FCI membership and the wider informatics health and care community as part of the feedback and validation process.

1.2 Nomenclature

The key concepts for the project, as defined in the project proposal (Hassey & Jidkov, 2019)¹, are presented below. The proposal leans heavily on the paper by Greenhalgh & Macfarlane (1997), which outline the process for developing a competency grid for evidence-based medicine².

Competence (competences): the output of a clinical informatician in terms of work performance (what is achieved). For example, Greenhalgh & Macfarlane (1997) define the core competences of evidence-based medicine as: (1) defines and prioritises clinical problems, (2) obtains evidence, (3) evaluates evidence, (4) implements evidence, (5) evaluates performance.

Competency (competencies): the input, i.e. skills, knowledge and traits that the clinical informatician brings to the job.

Competency framework: a list or grid of the skills, knowledge and traits required of clinical informatician experts.

The order in which the concepts are presented represents the order of progression, i.e., it is necessary to define the outputs of work (competences) before defining what is needed to be brought by the professional to successfully undertake the work (competencies). Likewise, it is necessary to define the competencies before creating a competency framework. These concepts are often intermingled and confused in conversations about competencies.

Greenhalgh and Macfarlane's (1997) paper outlines the process for developing competences and competencies for evidence-based medicine (EBM). The field of clinical informatics is, arguably, more

¹ Hassey, A. & Jidkov, L (2019) *Faculty of Clinical Informatics: Proposal for the development of core competencies for clinical informaticians in the United Kingdom*. Faculty of Clinical Informatics

² Greenhalgh, T. & Macfarlane, F. (1997) Towards a competency grid for evidence-based practice. *Journal of Evaluation in Clinical Practice*. 3(2): 161-5.

diverse and more challenging to define than EBM. For this reason, the project has taken the decision to add a level above competences, which it is calling professional attributes of a clinical informatician. **Professional attributes** are defined as the core features that underpin the work of clinical informaticians.

1.3 Project scope

There are estimated to be between 25,000 and 50,000 informaticians in the NHS; the number of clinical informaticians working in social care is unknown³. Interestingly, the BDRW programme reports that of those 25-50,000 there are a number - not specified - who do not self- identify as informaticians. This may be because of a lack of clarity in both the scope and classification of clinical informatics and its subcomponents which has been documented (Barrett et al, 2014). This is despite multiple definitions being in use. The ambiguity over professional identity and lack of clarity on what constitutes the field itself present pressing problems for those tasked with developing a competency framework. Therefore, this project seeks to be explicit about the definitions of clinical informatics and clinical informatician.

The FCI is a new organisation with members across multiple health and social care fields whose areas of clinical informatics experience spans education and professional development, research, policy, software development, information governance, strategic leadership, and implementing informatics innovations in frontline services. It is important that competencies developed for the clinical informatics profession, and the definitions on which they are based, are relevant to and appropriate for the diversity of roles and disciplines represented within the faculty. This project sought to test the emerging definitions and professional attributes with clinicians working in the field of informatics across multiple clinical professions. These will underpin the development of the competences and competencies.

In summary, the project aimed:

1. To define what is meant by clinical informatics and clinical informatician in order to build a foundation for the exploration of professional attributes of clinical informaticians.
2. To identify and describe the professional attributes common to all clinical informaticians in the UK.
3. To make recommendations on further work to be undertaken to test and refine the definitions and professional attributes.

Exclusions

Each clinical profession has its own registering body that outlines the professional attributes to practice in that field. This report does not seek to incorporate all of these into the framework, though the clinical informatician professional attributes should not conflict with them. Rather the professional attributes of clinical informaticians will define the unique additional contribution of the clinical informatician.

³ <https://www.hee.nhs.uk/our-work/building-digital-ready-workforce>

2 Approach

2.1 Design

A qualitative and iterative approach was adopted because it is particularly well suited to the exploration of experience, perception and belief meaning systems⁴ and can enable opportunity to clarify clinicians' understanding of professional identity and practice. This is important when exploring a new and emerging area that is not yet clearly defined (Greenhalgh & Macfarlane, 1997). In line with this study's aims, the focus was on health and care professionals who work in informatics.

2.2 Data collection

Conversations

The report author undertook 16 conversations with clinicians working within informatics to explore their perceptions of the scope and range of clinical informatics, the nature of the clinical informatician role in the context of the participants' careers and the wider profession, and their perception of the unique contribution that clinical informaticians make.

The report author took notes during these conversations and sense checked by reflecting back to participants throughout the meeting the points made. In addition, the findings from the report were circulated among the participants to test their validity. The conversations were not recorded.

An effort was made to ensure representation of meeting participants across the clinical professions and informatics specialist areas held within the faculty membership. A description of conversation participants can be found in section 3.1 of this document.

Job descriptions and other role description documents

A search of digital health and jobs websites was undertaken to collect examples of clinical informatics type jobs. In addition, those participating in conversations were invited to share their job descriptions. Furthermore, clinical informatics role description documents endorsed by national programmes or organisations were reviewed.

2.3 Analysis

The text from the job descriptions part of the documents⁵ were combined into a single document and uploaded into a word cloud website and a list of the most common words and their frequency of recurrence was created. The list was reviewed and (a) words common to generic healthcare role descriptions were deleted e.g. NHS and Trust; and (b) similarly themed words were combined under one heading, e.g. collaborate, collaborative, collaborates and system and systems. A word cloud pictorial was created.

Notes from the conversations were analysed using thematic analysis to identify commonalities and differences in the data, before focusing on relationships between different parts of the data, thereby seeking to draw descriptive conclusions clustered around themes. Analysis was undertaken after each meeting to identify emerging themes (commonalities and contradictions) and these preliminary

⁴ A belief system is an ideology or set of principles that helps us to interpret our everyday reality. This could be in the form of religion, political affiliation, philosophy, or spirituality, among many other things. These beliefs are shaped and influenced by a number of different factors

⁵ the organisation description and person specification parts were excluded

findings were explored with following participants from different healthcare and informatics specialities.

3 Findings

3.1 Description of meeting participants

Area of informatics	Clinical focus
Policy and standards raising in the social care sector at national level	Social work
Clinical specialist at NHS Digital	General practice
Clinical fellow in education, responsible for the flexible portfolio training programme, including informatics stream	Respiratory and general medicine (physician)
Chief nursing information officer at CCG	Nursing
Maternity digital transformation	Midwifery
Medical ethics & clinical information governance	General practice
Clinical informatics professional development, NHS Digital	Nursing
Developing professional guidance for recording and sharing of data	Clinical pharmacology and general medicine (physician)
Data science and machine learning engineering	Physician
Digital innovation and AI	Geriatric medicine (physician)
Professional development	General practice
Chief nursing information officer at NHS Trust	Nursing
Implementing standards	Midwifery
Recording data in electronic patient records	Clinical psychologist (retired)
Clinical decision support, recording data in electronic patient records	Dietician
Professional development	Physiotherapist

3.2 Description of job descriptions

25 job descriptions were collected and analysed. The jobs come under the following headings: Chief Nursing Informatics Officer (CNIO), Chief Clinical Information Officer (CCIO), digital advisor to specialist society, informatics/digital specialist roles, and informatics change facilitator roles. The majority of job descriptions are for CCIO and CNIO roles.

A search failed to identify social care informatics job descriptions.

The following papers were also included in the review:

- a) A paper prepared on the role of informatics in social care⁶.
- b) The clinical informatics capabilities for flexible portfolio training were included in the review⁷.
- c) Clinical informatics and digital delivery in health and care: a career framework outline for nurses and allied health professionals⁸.
- d) Fed-IP specification⁹.

3.3 Definition of clinical informatics

Each participant was able to provide a succinct one- or two-line definition of clinical informatics. Their descriptions were consistent with the FCI's definition of: *Safe, effective and efficient health and social care achieved through the best use of information and information technology*. While these types of definitions are felt to be helpful as a general way of introducing the topic, it was felt that they are of limited use when considering the nature, scope and parameters of the discipline.

Some participants found it a challenge initially to identify the components of clinical informatics and how it differs from specialist areas that also use information and data to improve healthcare, such as research and quality improvement (QI). It was not something that they had given great consideration to. Further exploration revealed that while there was agreement among participants e.g. that there is significant overlap in the areas of QI and research and informatics, there were also differences in opinions, e.g. on where the boundaries of QI and research and informatics lie.

In order to tease this out more, participants were asked to describe what comes to mind when describing clinical informatics. **The following principles (or themes) began to emerge:**

- **Purpose:** of clinical informatics is the improvement in the quality and experience of health and social care, and the areas of primary concern for clinical informatics are data, technology and communication.
- **Inclusivity:** *clinical informatics encompasses and gives equal weight to health and social care*. It was felt that clinical informatics has been predominantly focussed on hospital and GP care, and been led by GPs and physicians. There was concern that the discourse continues to be health and physician/GP biased exacerbating the assumption that informatics is about healthcare and failing to recognise the involvement of teams, multidisciplinary and multiservice, as well as the involvement of patients, carers and family.
- **Diversity:** *clinical informatics is a diverse discipline and areas of focus vary greatly*, e.g. developing Apps, guidance on information governance. Each area of focus is equally important to achieving the overall aim of better person-centred health and social care.
- **Interdisciplinary:** *clinical informatics brings together learning from multiple disciplines*. Disciplines involved in clinical informatics include social sciences, biology, ICT, computer science, data science, psychology, linguistics, engineering, statistics, mathematics, medicine, and many others.
- **Whole cycle:** clinical informatics is concerned with the whole cycle of a process, programme, product, project, that is from inception to identifying improvements from evaluation and process shut down. Those working in informatics can operate at one or more parts of the cycle.

⁶ Reay, T. (2019) 'What is clinical informatics, as it applied to the social work role?' paper prepared as part of the NHS Digital Clinical Informatics Fellowship programme

⁷ <https://www.hee.nhs.uk/our-work/doctors-training/flexible-portfolio-training>

⁸

https://improvement.nhs.uk/documents/3255/Digital_career_framework_for_nurses_and_AHPs_sep2018.pdf

⁹ <https://www.bcs.org/media/1056/fedip-standard.pdf>

- **Unit of operation:** Clinical informatics operates at service, system, and population levels and within organisational, developer, practitioner and end user culture. The benefits of clinical informatics are at the individual, service, system and population levels.

The above themes are reflected to a significant extent in the Cambridge Clinical Informatics Group (CCIG) definition of clinical informatics and areas for research¹⁰. Therefore, in later conversations, when these themes were reflected by the participants the CCIG definition was explored. This definition, with minor amendments to wording was seen to reflect well the purpose, key components, and areas of focus for clinical informatics. **The amended version of the definition is presented below:**

Clinical Informatics is the interdisciplinary study of data, information and computing technology (ICT) and communication with respect to human health and wellbeing; including understanding, developing, integrating, applying, evaluating and closing ICT innovations to advance comprehension of human health and wellbeing, and the delivery of health and social care.

It is worth highlighting that the definition is more expansive than the FCI's, which refers to information and information technology rather than data, ICT and communication.

Clinical informatics includes the following areas:

1. *How people interface with ICT in health and social care, including electronic health and care record (EHCR) systems and person care portals;*
2. *Methods to collect, manage, provide security for, and analyse clinical data and 'big data';*
3. *Application of informatics across the lifespan in the multi-layered and complex context in which health and social care services operate;*
4. *Interventions for clinical decision support, safety alerts, and data visualisation to facilitate optimal health and social care delivery;*
5. *Innovative communications with those receiving care to facilitate their appropriate and informed use of health and social care provision;*
6. *Ethical and information governance frameworks and data usage policies and procedures for assurance of high-quality ethical use of individuals' data.*

There was considerable debate over the exclusion of the CCIG item: '*Life-course studies of human health and disease, as well as clinical epidemiological studies of specific conditions*'. It was proposed that this sits firmly in the realm of epidemiology and is distinct from clinical informatics. One participant proposed that '*research/QI is the scientific analysis of data whereas clinical informatics is the engineering of the data*'. Another offered that research in informatics is '*limited to the analysis of healthcare records (as opposed to bespoke data collection for cohort studies)*'.

Others felt that the point didn't go far enough, that all healthcare research is clinical informatics because it is using data to improve health. Consensus was not reached on this point and wider opinions should be sought.

3.4 Description of clinical informaticians

The FCI definition of clinical informatician is: *Uses unique knowledge and experience of person-centred care and informatics concepts, methods and tools to promote care that is safe, effective, efficient, timely, person centred and equitable.*

¹⁰ <http://www.clinicalinformatics.group.cam.ac.uk/about-us/introduction-to-clinical-informatics/>

Participants were generally content with this definition and discussions focussed on describing and exploring what that definition means in their professional context. Considered of particular importance to them is the focus on person centred care. There were questions about whether ‘person-centred care’ is too medicine focussed, whether it included or ought to include prevention, health promotion and the social aspects of health and wellbeing. There was also endorsement of the explicit naming of ‘knowledge’ and ‘experience’ of informatics in the definition, and the application of these to improve care and outcomes for improved health and social care.

Clinical informaticians see it as their particular responsibility to work with services users to identify, protect and promote their needs – this can be at a service, organisational or population level and may be at any stage of the lifecycle of clinical informatics innovations. In addition, they feel that they are well placed to do this because of their clinical and informatics expertise. Their credibility with service users, clinicians and other stakeholders is anchored in lived experience as a clinician with links to evidence-based practice. It is this which distinguishes them from an empathetic lay person with informatics expertise. It was proposed that clinical ‘knowledge’ and ‘experience’ is given equal weight to informatics ‘knowledge’ and ‘experience’ when discussing clinical informaticians.

The FCI are explicit in their definition of clinician in their fellow and member application criteria, i.e. registered with the Professional Standards Authority for Health and Social Care. This definition was deemed appropriate and it was recommended that it is an explicit part of the definition of clinical informatician.¹¹

The conversations sought to explore the definition to explore the types of roles that a clinical informatician can have, and to identify the unique contribution of the clinical informatician as opposed to clinicians who work on informatics projects. Some participants found the latter challenging, especially when reflecting on it in the context of their own careers. They readily acknowledged that colleagues they work with day-to-day consider them to be clinical informaticians and yet they were sometimes reluctant to describe themselves as such (especially when among clinical informaticians). The reason given was that they do not have a formal qualification in informatics or a specific technical ability, e.g. ability to code. In essence, the participants were reluctant to define absolute boundaries of a clinical informatician in terms of expertise and experience, even for their own role types.

The participant list demonstrates the span of informatics related roles and the participants were able to describe their role within their areas eloquently. Some were reluctant to generalise from their specific role in an area, e.g. policy, to all who work in policy. The areas include policy, strategic and implementation roles in Trusts, education and professional development, machine learning engineering, and development of standards and guidance. All participants spoke with passion about how they use their clinical expertise and networks in their work.

In describing their roles, common themes emerged. These themes are cross cutting. First and foremost was their role to identify, prioritise and communicate clinical requirements. There was an emphasis on how the clinical informatician can be a ‘bridge’ between senior leadership, the profession as a whole, other disciplines both clinical and technical, frontline health and care professionals and those who use the services. Being this bridge ensures that informatics initiatives and innovations (from policy to

¹¹ It was also noted that the majority of people who work in social care would not fit this description. This is considered further in Report B (the validation study)

software design) are practical and implementable. This challenging, if rewarding, role requires ‘soft skills’ of resilience, change management, leadership and communication skills. To be successful clinical informaticians often need to engage the major stakeholder groups that cut across clinical informatics disciplines, e.g. developers, data scientists, health and social care professionals, senior leadership, service users. It was proposed that a key feature of a clinical informatician is developing and engaging with networks. It is a peculiarity of clinical informatics that clinical informaticians can be junior from a clinical perspective but senior from an informatics perspective and vice versa.

Equally important was the focus on clinical safety. Some participants used examples of developments in new technology that had put patients’ safety at risk because the developers and implementers failed to address clinical informatician concerns. Those who spoke about clinical safety emphasised the need for clinical informatician input across the lifecycle of informatics projects,

Contributions from participants on the clinical informatician role were interspersed with their reflections on the skills required for the roles. While these are not the primary focus of this work it is worth reflecting on them as they provide context. Participants proposed that the level of expertise required to be a clinical informatician would differ depending on the role. However, all clinical informaticians ought to have an understanding of how information systems work and how information flows in the NHS and use their data analytical skills to inform their work. Some went further and advocated for knowledge of the psychological and social factors that influence user engagement with systems and information.

Role descriptions

The roles descriptions were heavily skewed towards strategic CCIO and CNIO type roles. While the supporting documents had more varied roles (support, specialist and influencer roles), the description of these roles was less detailed thus providing less data for analysis. The illustration below shows the outcome of the word cloud exercise. The findings are consistent with the conversations in terms of the type of roles/area of clinical informaticians, e.g. policy, change, safety, data, analysis, systems, ICT. However, the emphasis on ‘change’ and ‘senior’ is a reflection of the bias in data towards more senior posts. It is therefore concluded that the data from the job role descriptions is of limited value.

4 Conclusions and recommendations

This document is a summary report of phase 1 of the Faculty of Clinical Informatics' (FCI) project to develop the competencies of clinical informaticians in the United Kingdom (UK). Phase 1 focuses on defining the professional attributes for professional clinical informaticians. It presented:

- Evidence based definitions for clinical informatics and clinical informaticians, and professional attributes of clinical informaticians in the UK
- The methodology adopted to develop the definitions and professional attributes
- Recommendations for further work

To aid explanation the findings chapter of this report has divided the definitions and professional attributes into separate sections. It is recommended that the definitions of clinical informatics and clinical informaticians are not separated from the professional attributes when disseminated. One of the challenges in exploring professional attributes of clinical informaticians is the lack of clarity around the concepts being discussed. Being explicit about what is meant by the concepts can only aid review.

Next steps

- The definitions and professional attributes have been developed following consultation. However, they are in draft form and require review and validation before endorsement by the FCI. Therefore, this document is submitted with the recommendation that following a review by FCI experts and advisers, it is circulated first among FCI members and the wider informatics/healthcare community for validation.
- It is recommended that this report, once validated, informs the next stages of the FCI's Core Competency Project.

Conversation participants expressed a desire to have one overarching competency framework for clinical informaticians. Concern was raised about the number of similar projects being undertaken in the clinical informatics field around professional development. There was worry that the FCI framework would be one of many and a plea for the FCI to take steps to ensure endorsement by leading health and care professional organisations e.g. Academy of Medical Royal Colleges and social care and allied health professional equivalents.

In addition, it was suggested that future work recognise the fast pace of developments in the field and build flexibility into the final competency framework