MEDINFO 2017: Precision Healthcare through Informatics
A.V. Gundlapalli et al. (Eds.)

doi:10.3233/978-1-61499-830-3-783

The Australian Health Informatics Competencies Framework and Its Role in the Certified Health Informatician Australasia (CHIA) Program

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Abstract

The Certified Health Informatician Australasia (CHIA) program consists of an online exam, which aims to test whether a candidate has the knowledge and skills that are identified in the competencies framework to perform as a health informatics professional. The CHIA Health Informatics Competencies Framework provides the context in which the questions for the exam have been developed. The core competencies for health informatics that are tested in the exam have been developed with reference to similar programs by the American Medical Informatics Association, the International Medical Informatics Association and COACH, Canada's Health Informatics Association, and builds on the previous work done by the Australian Health Informatics Education Council. This paper shows how the development of this competency framework is helping to raise the profile of health informaticians in Australasia, contributing to a wider recognition of the profession, and defining more clearly the body of knowledge underpinning this discipline. This framework can also be used as a set of guidelines for recruiting purposes, definitions of career pathways, or the design of educational and training activities. We discuss here the current status of the program, its results and prospects for the future.

Keywords:

Certification, Professional Competence, Medical informatics.

Introduction

In other countries, certification in health informatics is achieved through university degrees. However, in Australia, only a few universities offer studies related to health informatics or a full undergraduate or postgraduate degree in this area [1]. In addition, health informatics lacks formal recognition in the Australian health workforce [2].

To address this, the Health Informatics Society of Australia (HISA), in collaboration with the Australasian College of Health Informatics (ACHI) and the Health Information Management Association of Australia (HIMAA), launched the *Certified Health Informatician Australasia* (CHIA) certification program in July 2013 at HIC, the major Health Informatics Conference in Australia. The CHIA consists of an online exam, which aims to test whether a candidate has the knowledge and skills that are identified in the competency framework to perform as a health informatics professional.

A competency is the specification of knowledge and skill, and the application of that knowledge and skill, to the standard of performance expected in the workplace. A competency is the smallest unit that can be assessed and recognized [3]. Competencies should be used to set clear expectations for professionals in providing them with direction on what level they need to be performing in the work place. It also provides professionals with an itinerary for development and continuous education, including closing knowledge gaps. Competencies also provide a framework for career growth and improvement in recruitment processes. Finally, competencies can help establish professional opportunities, including horizontal and vertical moves within an organization [4].

The CHIA Health Informatics Competencies Framework provided the context in which the questions for the exam were developed. It was developed by a committee composed of representatives from HISA, HIMAA and ACHI, and included leaders in health informatics academia and the Health IT sector. The core competencies for health informatics, that are tested in the exam, have been developed with reference to similar programs by the American Medical Informatics Association (AMIA), the International Medical Informatics Association (IMIA) and Canada's Health Informatics Association (COACH), and builds on the previous work done by the Australian Health Informatics Education Council.

Methods

The Health Informatics Competencies Framework

Health and Biomedical Informatics (HBI) is a discipline with more than 50 years of existence. Along this period, many sub-specializations have emerged. HBI is considered as the core set of information methods, theories and tools, which are relevant to healthcare, biomedical research, and public health. However, depending on the application domain, different sub-specialties can be identified. The original intention by the CHIA governing bodies was to introduce specialization exams based on segmentation by discipline (e.g. CHIA-NI for nurse informaticians). However, given workforce trends across the globe that show the need for transferability of skills and knowledge across disciplines, we are now considering a tiered structure of increasingly advanced health informatics knowledge that is not discipline specific. The decision and subsequent development of 'CHIA+' will be occurring from late 2017 onwards. To develop a set of highly regarded competencies in health informatics (HI), we needed firstly to refer to the most relevant existing frameworks:

- AMIA – A leading professional and academic organization in biomedical informatics, published the most recent white paper on core competencies in June 2012 [5];
- IMIA – Peak body at the international level in the area of health and biomedical informatics, published revised education Recommendations in 2010 [6]; and

- COACH – Canada has many similarities to Australia in terms of healthcare systems, population and geography. COACH has a good working relationship and strong ties with HISA. They published Health Informatics Professional Core Competencies in 2012 [7].

Each stream from the three organizations were reviewed carefully under the topic areas, compared, mapped and then regrouped. Any repetitions, overlaps, and redundancies were removed, and the new competencies were restructured, ultimately producing the final competency framework.

Motivation to redraft the Health Informatics Competency Framework

- Some competencies are now outdated, especially some from IMIA, which originates from 2007.
- IMIA recommendations are extremely useful for the development of educational curriculum.
- There is a clear distinction between information technology and information science; therefore, we have addressed this in creating two separate competency streams in these areas.
- Management is more recognized as a relevant set of competencies in the framework by COACH.
- In Australia, Health Information Management (HIM) is already defined as a distinct professional jurisdiction by HIMAA's HIM Competency Standards for tertiary and postgraduate sectors, and HIMAA's Coder Units of Competency in the VET sector.
- The consideration of health informatics as a scientific discipline is addressed by the AMIA competencies.
- The human and social context is addressed by AMIA.
- We recognize the work and competency framework completed by the Australian Health Informatics Education Council (AHIEC) [8]. However, as the AHIEC framework is mostly based on the IMIA framework, it was decided that the broader IMIA document would be used.
- It is also recognized that the health information management competencies developed by HIMAA are complementary to the health informatics set of competencies, but it is more fitting to define the relationship between these competencies in consultation with the health information management professional jurisdiction at a future date.
- Although both IMIA and AHIEC frameworks contain different levels of competencies and different specializations streams, we preferred to regulate the varying levels of complexities in the form of knowledge, comprehension, application and analysis type of questions during the exam writing process rather than within the competency itself [9].

After the exhaustive exercise of reviewing the three abovementioned competency frameworks, including the mapping of competencies between each of the organizations, it was deemed appropriate to develop a new competency framework based on the existing frameworks, but with a focus on the Australian healthcare system.

Eligibility criteria

In order to achieve a CHIA qualification, a candidate must first meet the eligibility criteria to register. The eligibility requirements in order to be able to sit the CHIA exam are:

- A degree plus three years of associated experience[1]; OR
- Five years of associated experience (no degree required)[2].

The eligibility of individuals who don't meet the above criteria are reviewed by the CHIA Examination Committee on a case by case basis.

Results

The Competencies Framework

Figure 1 provides a representation of the Health Informatics Competency Framework showing the six competency streams as a proportion of the overall. The CHIA exam covers all 6 areas. The list of competencies is provided in Table 1, but the complete information with descriptions and levels of assessment can be accessed at the following URL: http://www.healthinformaticscertification.com/wp-content/uploads/2016/02/CHIA-competencies-Framework_FINAL.pdf

Figure 1 – Health Informatics Competencies Framework

The CHIA Examination Study Guide

An examination study guide entitled "*A Practitioner's Guide to Health Informatics in Australia*" has been published by the Health Informatics Society of Australia (HISA) as a comprehensive body of knowledge (+1000 pages) covering competencies tested in the CHIA exam. It is the definitive guide for CHIA candidates.

The Practitioner's Guide has also been developed with other purposes in mind, including orientation for professionals, such as clinicians or ICT professionals new to health informatics and updates for health informaticians, wishing to maintain the currency of their knowledge, irrespective of certification. It focuses explicitly on the needs of practitioners in the field of health informatics in Australia.

- Covers all of the 52 CHIA competencies at the level of competence required (knowledge, comprehension, application or analysis),
- Aimed at helping candidates achieve certification, and
- Provides a valuable professional and workplace resource.

The Guide is published electronically, into 8 sections and is available for purchase[3].

Table 1 - CHIA Health Informatics competencies framework

Domain of expertise	Areas of Competence	
Information and Communication Technology (Information technology in general, not limited to healthcare, though the principles certainly apply to healthcare)		
	1.1	Basic knowledge of ICT concepts
	1.2	Problem solving through ICT
	1.3	Analysis of stakeholder needs along the System Life Cycle
	1.4	Selection and use of ICT
	1.5	Good practice in System Life Cycle
Health and Biomedical Science (Healthcare systems and practice and basic biomedical science concepts)		
	2.1	Basic health and biomedical concepts
	2.2	Data, information and knowledge in health and biomedicine
	2.3	Factors related to health
	2.4	Clinical decision making
	2.5	Models of care delivery
	2.6	Evidence based clinical practice
	2.7	Health administration and health services research
	2.8	Epidemiology and basic health research skills
	2.9	Clinical language and vocabulary
	2.10	Professional roles & resources in health organizations
Information Science (Information systems in general, not limited to healthcare, though the principles certainly apply to healthcare)		
	3.1	Applicable Mathematical concepts
	3.2	Basic knowledge of IS concepts
	3.3	Information theories
	3.4	Quality principles across the IS life cycle
	3.5	Realization of benefits from I.S.
	3.6	Attributes & limitations of data & information
	3.7	Data analysis and visualisation
	3.8	Identification of gaps in data sources
Management Science (Governance and management of systems development, change management, business practices and organizational strategy at all levels)		
	4.1	Project & change management.
	4.2	Alignment of IS with organizational strategies
	4.3	Information cultures and learning within organizations
	4.4	Good practice in process engineering
	4.5	Risk management
Core Principles and Methods (Health informatics theoretical foundations, practice and applications)		
	5.1	History of HBI & analysis of related literature
	5.2	Theories of HBI
	5.3	Conceptual frameworks in HBI
	5.4	Knowledge representation in HBI
	5.5	Governance of IS in HC
	5.6	IS to support patients
	5.7	Electronic Health Record
	5.8	Informatics in support of education & research
	5.9	Interfacing & patient identification
	5.10	Decision support systems
	5.11	Architectures of Health IS
	5.12	Interoperability & HI standards
	5.13	Integration of clinical data & associated risks
	5.14	Clinical safety & IS
	5.15	Value of IS & adoption
	5.16	Informatics for participatory health
	5.17	New data sources & emerging technologies
	5.18	E-health applications and solutions
	5.19	Knowledge translation in health
	5.20	Areas of specialisation in HBI
Human and Social Context (Human and social context related to healthcare and the systems of healthcare including issues of clinical practice, consumers and legal requirements)		
	6.1	Technology & social aspects
	6.2	The relevance of ethical & legal issues for health informatics
	6.3	Policies, principles & guidelines for HI management
	6.4	Usability & human factors

The CHIA Exam

Becoming a CHIA involves sitting and passing the CHIA exam. The exams covers 6 competency areas and 52 competencies, and includes 104 multiple choice questions (2 questions on each competency at various levels of difficulty). The exam is completed online, and the duration is 2.5 hours maximum. Exam questions are selected at random (i.e. students re-sitting the exam will not be given the same questions as the first time they sat the exam). The exam is managed by an Examination Committee comprising of senior Australasian health informaticians.

Periodic Renewal of Certification

Periodic renewal of the certification is required to maintain certified status. Initial certification or renewal of certification is valid for 3 years. Renewal is required to maintain the CHIA certification. The renewal requirements are currently under review and are likely to be: Submit a recertification journal that documents a minimum level of ongoing professional development or take the exam again.

Discussion

Comparative analysis of competencies in health informatics

We provide the comparative analysis of groups and competencies (Table 2) for a breakdown of the different areas of competencies covered.

Results so far

The official program launch took place on July 16, 2013 at the Health Informatics Conference in Adelaide, in conjunction with a workshop and education session. The first exams took place in December 2013, where 415 candidates have registered to sit the exam, 57 have forfeited (not attempted at all), 32 are pending a first attempt, 84 have failed, and 242 have passed.

Candidates come from a range of organizational settings. The most popular settings are public hospital (30%, n=126), technology or health IT companies (19%, n=79), and state government (14%, n=60). While this is to be expected due to the significant focus on EMRs within hospitals, we need to examine the applicability of the HI framework and CHIA exam to those in primary and community care, and also to raise awareness amongst this healthcare segment.

CHIA candidates have a range of job roles, the most popular roles are health IT professional (28%, n=118), clinicians, including physicians, nurses, and allied health (20%, n=84), and health information manager (10%, n=43). The majority of CHIA candidates have a clinical educational background (23%). Others include business (10%), IT (10%) and health information management (6%).

In 2017, we are embarking on a survey of all CHIA registrants to gather quantitative data. However, the anecdotal qualitative data we have, indicates that the most common reason for people failing or choosing to forfeit is a lack of adequate preparation for the exam. These people underestimated the amount of time required to prepare. To address this, we are modifying our communication with candidates to emphasize that successful attainment of CHIA requires a thorough knowledge base, which requires study, regardless of the amount of work experience the candidate has. We are also making available the reading materials/study guide for those who wish to purchase it ahead of registering for the exam (at present the reading materials are only made available after registration).

Conclusion

CHIA is a unique credentialing program for health informatics. The CHIA credential demonstrates that candidates meet the Health Informatics Core Competencies to perform safely and effectively as a health informatics professional. Following the early success of CHIA, several Australian universities are currently evaluating how they can include the Australian HI competencies in their training programs, and help prepare graduates to sit to the exam.

The development of this competency framework is helping to raise the profile of health informaticians, contributing to a wider recognition of the profession, and defining more clearly the body of knowledge underpinning this discipline. This framework can also be used as a set of guidelines for recruiting purposes, definitions of career pathways, or the design of educational and training activities. The framework is being re-evaluated in late 2017, and will be re-evaluated every 3 years.

Notes:

[1] Degree can be any degree and does not have to be in health informatics.

[2] Associated experience includes the following functional areas: health informatics, health administration/management, clinical information systems, e-health, information systems, health information management.

[3] http://www.healthinformaticscertification.com/products/

Acknowledgments

We would like to acknowledge the below individuals who generously gave their time and expertise to CHIA:

COACH (Alison Delle, Neil Gardner, Don Newsham); HISA (Nigel Chartres, Suzanna Zhang); ACHI (Heather Grain, Peter Williams); HIMAA (Vicki Bennett, Ralph La Tella, Richard Lawrence, Sallyanne Wissmann); HINZ (David Parry, Liz Schoff, James Warren; members of the founding CHIA Examination Committee & Project Committee (Frida Cheok, Peter Croll, David Evans, Anneke Fitzgerald, Jo Foster, Kathleen Gray, Terry Hannan, Sonya Hilberts, Anthony Maeder, Geoff Sayer, Robert Webb, Sue Whetton, Trish Williams, John Wilson); current CHIA Board (Travis Ingram, Kerryn Butler Anderson, Klaus Veil, Chris Pearce); current examination committee (Jen Bichel-Findlay, James Walters, Mike Bainbridge, Brendan Wickam, Joy Smith, Paul Macdonald, David O'Driscoll, Robin Mann).

Table 2 – Comparative analysis of competencies in Health Informatics

Competencies/Org	AHIEC	IMIA	AMIA	COACH	CHIA
Scientific skills			✓		✓
Health Informatics	✓	✓	✓		✓
ICT	✓	✓	✓	✓	✓
Information Science	✓	✓	✓	✓	✓
Health Science	✓	✓	✓	✓	✓
Management Science				✓	✓
Areas of specialisation	✓	✓			✓
Human and Social Context			✓		✓
Total number of competencies	45	48	22	51	52
Different levels of competency	YES (6) 1: Know 2: Understand 3: Apply 4: Enable 5: Advise 6: Strategise	YES (2) IT user & HBI specialist	NO	NO	YES 1: Knowledge 2: Comprehension 3: Application 4: Analysis
Specialisation	YES: Health and Aged Care HI IT HI IS HI Specialist HI, Clinical Informatician, Health Information Manager, Clinical Terminologist	YES: 8 focus areas (Imaging, bioinformatics, chemoinformatics, public health informatics)	NO	NO	YES: Combining both IMIA and AHIEC specialties

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