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RESEARCH ARTICLE

THE COMPETENCIES NEEDED BY HEALTH SECTOR INFORMATION QUALITY ADVOCATES

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ABSTRACT

OBJECTIVES:

1) To introduce to expert colleagues the concept of health sector information quality advocates.
2) To obtain these colleagues opinions on worth of the advocate role and the competencies needed by an advocate.
3) To identify existing courses that matched the needs of the advocacy role.

DESIGN:

1) A workshop and pre-workshop survey of participants.
2) An online search of courses targeting a health workforce audience based on key words from the competencies identified by the workshop participants.

SETTING:

The workshop was conducted at the 35th Patient Classification Systems International (PCSI) Conference in Iceland in September 2022. The pre-conference online survey used SurveyMonkey. The online course search used Google Chrome and Google Scholar and the English language.

MAIN OUTCOME MEASURES:

1) Agreement of expert colleagues on the need for an Information quality advocate role.
2) Consensus by the expert colleagues on the important competencies.
3) The identified courses described in terms of mode of course delivery, course cost and duration, the delivering institute and key competencies covered. Each course was assessed and scored on a scale from 0 to 10 based on comprehensiveness and effectiveness.

RESULTS:

The top five competencies for the information quality advocate in order of importance were data governance principles, quality management, stakeholder engagement, information and system governance, and information culture. The online search results identified many courses for specific technical roles, but most did not have the focus on data validity, reliability and information usefulness that matched the needs of the advocacy role.

CONCLUSIONS:

Focused training is needed to support appropriately skilled information quality advocates for the health sector. The presence of information quality advocates at the point of data collection facilitates the pathway to best practice in data collection.

KEYWORDS

Data quality, health information, competence, advocate

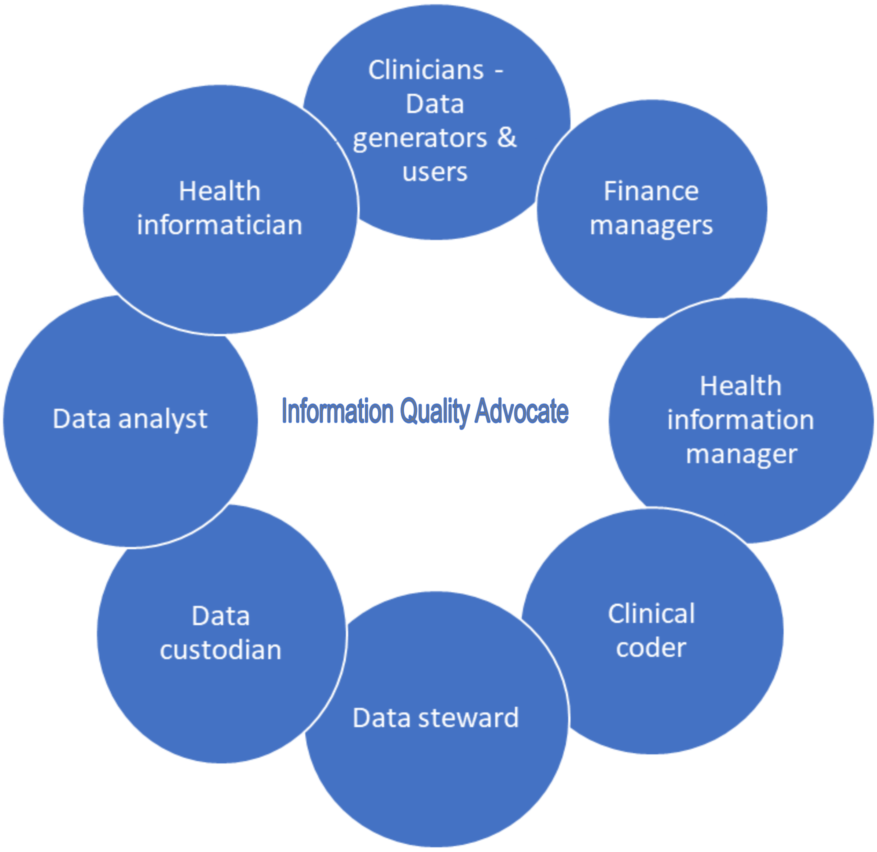
INTRODUCTION

Problems in data quality can arise at every stage of the data life cycle [1] but we have argued elsewhere that a key factor undermining the quality of data is if the data are not used [2]. Not using the data sets up a “vicious cycle” of loss of motivation for the data generators and collectors which perpetuates poor quality data. This situation is widespread as the World Health Organization (WHO) has reported that 50% of (133) countries had data quality limitations for monitoring the quality of care in parts or the whole of their health system [3].

Throughout the authors’ work in data quality assessment and improvement conducted in Australia [4], Ireland [5],[6], Singapore [7], Kingdom of Saudi Arabia [8], and Fiji, a set of common factors were identified that undermine data quality improvement initiatives including poor workforce development, fragmented workforce deployment, ambiguous role definition, poor workforce motivation and deficient strategic direction.

The key health workforce categories that influence data quality are shown in Figure 1 (extracted from [9]). These workforce categories tend to function like other specialised professions in the healthcare system, working independently and in operational siloes that are connected but not always integrated [10, 11]. This lack of integration means some areas of practice are performed by several professionals (potential duplication) while responsibility for other areas of practice is unallocated (potential gap). We argue that data quality leadership and governance is the most important area of practice needed for producing the best quality information. We have therefore identified the need for a role we are calling a healthcare information quality advocate – a role that ensures all the components of data quality are addressed and the sum of the parts of the different workforce categories are greater than the whole. Where we have seen evidence of this role being performed (in a hospital, regional health administration, and primary care system), it has had a material effect on the validity, reliability and fit for purpose of the data collected [5].

FIGURE 1: MAIN WORKFORCE CATEGORIES ASSOCIATED WITH DATA QUALITY



What functions would an information quality advocate carry out? Once an information quality advocate is aware of problems in the data and/or that the data are not being used, their function we propose is to:

- Analyse the causes of poor quality and locate any barriers to using the data through using quality management tools such as root cause analysis.
- Identify and understand the stakeholders with essential roles in achieving high quality data.
- Engage/influence/motivate these stakeholders appropriately.
- Create a change management strategy applying sound data governance principles to improve the data quality and use.
- Use data quality improvement tools to create a cycle of continuous improvement.
- Influence decision makers to use the data to improve the care of patients.

The role of an information quality advocate could be played by any (or several) of the professions shown in Figure 1. Some, for instance Health Information Managers, have the competency training [12] to be arguably better suited to the role. However, as noted already, for various structural and organisation cultural reasons allied health professionals tend to act within narrowly defined practice parameters defined through professional socialisation processes [13]. Ideally each data collection and use ecosystem would have several advocates, from different professional backgrounds.

We are proposing that more training and support for people to fill this function is critical to improving the quality of the data. To build a cohort of information quality advocates, the training needs to be appropriate (comprehensive attainment of relevant learning outcomes), and effective (delivering learning outcomes as quickly as possible and for the least cost). The remainder of this article lays the groundwork for the design of such training.

METHODS

The Patient Classification Systems International (PCSI) Conference, held in Reykjavik, Iceland, in September 2022 presented an ideal opportunity to discuss these ideas and validate the need for information quality advocates, identify what training is needed, and assess if the appropriate training is available currently. The input from Conference participants was elicited through a pre-Conference half-day interactive workshop, and through a short pre-Conference survey of participants registered for the workshop. Following the workshop, a web-search for existing courses was undertaken focused on the core competencies identified during the workshop. Each data collection process is described below.

PRE-WORKSHOP SURVEY OF REGISTERED PARTICIPANTS

Conference registrants were asked pre-Conference to nominate as attendees for one of the morning and afternoon workshops on the 27th September 2022. All those who had nominated to attend the 'Health care data advocacy: Meeting the skills needs of information quality advocates for the health sector' workshop by the 1st September (approximately 55 participants although 75 attended the actual workshop), were sent a link to an online survey. The survey was designed in accordance with ethical standards and deemed appropriate to be administered by the Conference organisers independently of the researchers. Participation in the survey, and the workshop described below, was entirely voluntary and so considered to imply consent.

The survey was set up in SurveyMonkey and asked 11 questions. The first two questions sought respondent details, the next two sought information on any courses the respondent knew of that could address one or more of the draft competencies (Appendix 1) that might be required by an information quality advocate.

This draft list of competencies was created by the authors using expert judgement eliciting competencies from broader digital health competency frameworks [12, 14, 15] the first two of which were identified as the most comprehensive in an audit of competency frameworks undertaken by Nazeha, et.al [16]. A total of 22 competencies were identified that might be appropriate for the information quality advocate role.

CONFERENCE WORKSHOP

The workshop commenced with a presentation to outline the issues, define terms and possible areas of learning need. Discussion groups of 5-10 participants were asked to discuss a draft set of competencies for an information quality advocate (Appendix 1) and to:

- Reach agreement on the value and nature of the role including brief description. Are there differences between low, middle, and high-income countries? Are there differences between primary, secondary, and tertiary care settings?

- Discuss the suitability of the draft competencies for the agreed role. Any competencies missing? Any competencies that need to be discarded?
- Identify core / critical competencies from the list of draft competencies.

Feedback from small group discussions was presented to the whole workshop and synthesized. Prior to a break, participants were asked to independently identify the top five competencies from the draft list that they thought were most applicable to the role of information quality advocate. A total of forty responses were gathered and tallied immediately to create a revised set of competencies.

After the break, the discussion groups were asked to review the revised set of competencies and identify existing courses within their region (Europe, Middle East, Africa, Asia, Western Pacific, Americas) that might be able to satisfy development of some or all the competency requirements, especially the core competencies. The discussion groups presented their findings at the final plenary, which focused on differences between competencies, especially those for which there were some capacity building options and others for which the options were limited.

POST-WORKSHOP WEB-SEARCH FOR DATA QUALITY COURSES

A search was undertaken of the web for any existing courses that addressed competence in attaining data quality in general or any of the competencies ranked highly by participants at the workshop. The search was conducted using Google Chrome and Google Scholar and limited to the English language. The key words adopted for the search are shown in Table 1.

TABLE 1 KEY SEARCH WORDS

Primary key words	Secondary key words
Health	Data governance principles
Information Data quality	Quality management
Advocacy	Stakeholder engagement
Governance / Stewardship	Information and system governance
Leadership	Information culture
	Leadership strategies
	Business alignment
	Legislative and regulative
	Information privacy
	Information science concepts

While many courses focused on data quality exist outside of the health sector it was decided to search only for courses that targeted the health workforce. The search concluded when different searches began to identify the same courses that had already been found.

A total of 45 courses were identified as potentially relevant. Each was described in terms of mode of course delivery, course cost and duration, source of course design, the delivering institute and key competencies covered. These details were captured in an ACCESS database for subsequent analysis. Each course was assessed and scored on a scale from 0 to 10 based on comprehensiveness (the extent to which the key competencies required of the information quality advocate role were covered in the course) and effectiveness (a subjective opinion on the capacity of the course to deliver competency outcomes). Each course was rated independently by two of the authors and where there was disagreement in scores a third author provided an assessment arbitration.

RESULTS

PRE-WORKSHOP SURVEY RESULTS

Just over one third of those registered for the workshop (n = 21, 38.2%), at the time of the survey administration, responded to the survey. As might be expected, given the location of the Conference, most respondents (52%) to the survey were from the WHO Europe region. There were also respondents from all the other WHO regions except for the Africa region (Table 2).

TABLE 2: DISTRIBUTION OF RESPONDENTS BY GEOGRAPHIC REGION

WHO Region	Percentage (%) of respondents
Africa	0%
Americas	19.0%
Eastern Mediterranean	19.0%
Europe	52.4%
Southeast Asia	4.8%
Western Pacific	4.8%

None of the respondents were able to identify or name any courses with any relevance to the competencies proposed as required for the information quality advocate role. It is possible that some respondents misunderstood the survey question (a possibility that was confirmed during discussion at the workshop). For others, who focused on the role title rather than the competencies, no such course was able to be identified.

RESULTS OF THE WORKSHOP

The workshop attracted 75 of the 255 (29%) people who attended the PCSI conference. The profile of the workshop participants included people across the world who research, develop, and use patient classification systems to support health systems challenges, including pandemics, population ageing, increased rates of chronic disease, workforce shortages and rising health costs.

The initial group discussions, after reporting back to the plenary, overwhelmingly supported the concept of an information quality advocate as a potentially missing ingredient in the pursuit of higher quality data. They were unclear on whether the role was likely to be appropriate in different national contexts (low-, middle- or high-income countries) but felt there was no reason why this shouldn't be the case. Similarly, the information quality advocacy role was considered likely to be equally valuable across different health care contexts (primary, secondary, and tertiary). One participant summed up this aspect of the discussion by saying….

> *"You guys have captured the need for local advocates perfectly."*

The top five competencies identified by participants during the workshop are provided in Table 3. Appendix 1 sets out a brief description of each of the competency areas. Only one area of competency was identified as required by most participants (data governance principles, which requires the application of the principles of data governance to achieve quality data and information).

The top five included three generic / non-technical competency areas, where the so-called 'soft' skills (or non-cognitive competencies [17]) are required to attain high competency performance. If that analysis is extended to the top ten identified areas of competence, it could be argued that seven of the ten competencies are generic rather than digital health technical specific.

TABLE 3: RANKING OF COMPETENCIES REQUIRED BY DATA QUALITY ADVOCATES BY WORKSHOP PARTICIPANTS (N = 40)

Area of skill	Number of workshop participants identifying competence as important	Proportion (%) of total participants (n = 40)
Top five		
Data governance principles	25	62.5
Quality management	18	45.0
Stakeholder engagement	15	37.5
Information and system governance	14	35.0
Information culture	14	35.0
Second five		
Leadership strategies	13	32.5
Business alignment	13	32.5
Legislative and regulative	11	27.5

Area of skill	Number of workshop participants identifying competence as important	Proportion (%) of total participants (n = 40)
Information privacy	11	27.5
Information science concepts	10	25.0
Remaining competencies		
Value management and benefit realisation	9	22.5
Health literacy	9	22.5
Health sector structures	8	20.0
Problem solving	8	20.0
Implementation, adoption, and evaluation	4	10.0
System security	4	10.0
Change management	4	10.0
System lifecycle	3	7.5
Risk management	3	7.5
Health sector roles	2	5.0
Program and project management	2	5.0
Process re-engineering	1	2.5
Indigenous data sovereignty	1	2.5

A common discussion theme was that there was currently no systemic way of evaluating advocate skills nor building capability that was relevant to advocates' local environment and health system. There was consensus that when the identified competencies were present then this established a firm platform for quality improvement. It was felt that 'soft' skills were often forgotten in favour of the technical skills of data acquisition e.g., clinical coding. While both technical and advocacy competencies are important, it was agreed that without the advocacy skills data quality improvement was challenging.

RESULTS OF THE SEARCH FOR EXISTING COURSES

We identified a total of 45 relevant courses. Most of the courses (75.6%, n = 34) were delivered exclusively through an online platform. A much smaller proportion (20%) of the courses were delivered through a mixed mode, with online or remote learning modes being supplemented by face to face (classroom) modes of learning. Only two courses were delivered entirely face to face.

Course duration varied from as little as one hour to three years, but over half (56.1%, n = 23) were less than one week in duration (Figure 2) and 36.6% were only one day or less in duration. The duration of some courses, advertised as self-paced learning, provided nominal hours or days.

As expected, the cost of the courses varied by duration. Course costs varied from free (22.9%, n = 35) to nearly $AUD50,000. Most courses (60%) were under $AUD500 per participant.

If a score of 7 or more is considered to signal that a course is covering key competencies well, then only seven courses (15.6%, n = 45) were adequate (see Figure 3). Most courses (60%) scored less than 5, and no courses scored 9 or 10. Similarly, only 6 courses (13.3%, n = 45) were scored at seven or above for effectiveness, and most courses (55.6%) scored lower than 5.

FIGURE 2: DISTRIBUTION OF COURSES ASSESSED BY COURSE DURATION (N = 41).

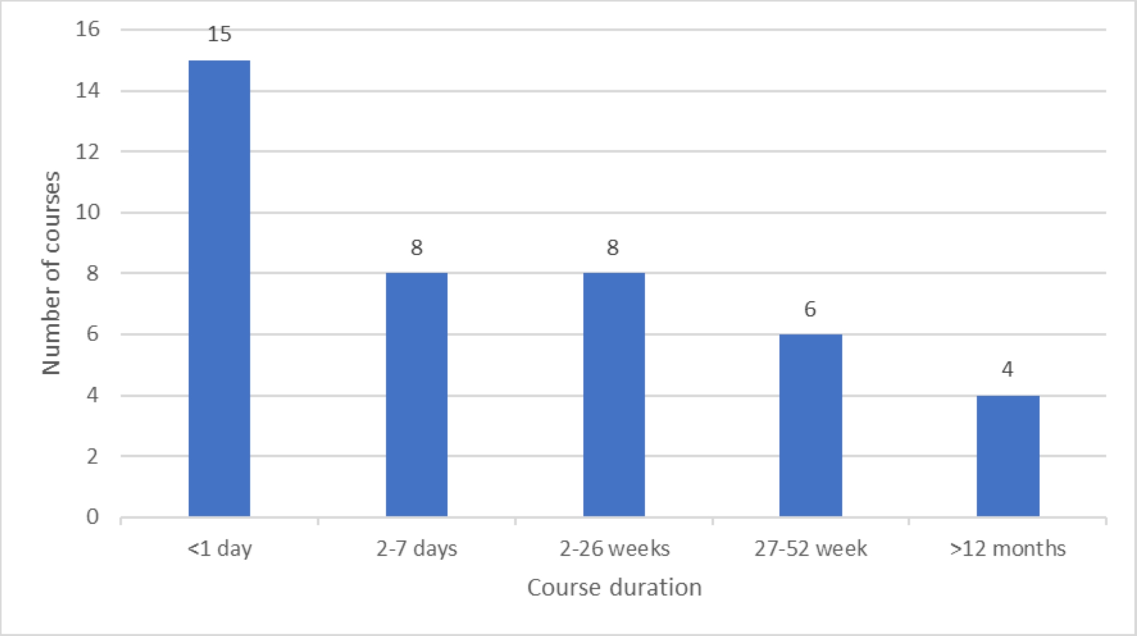
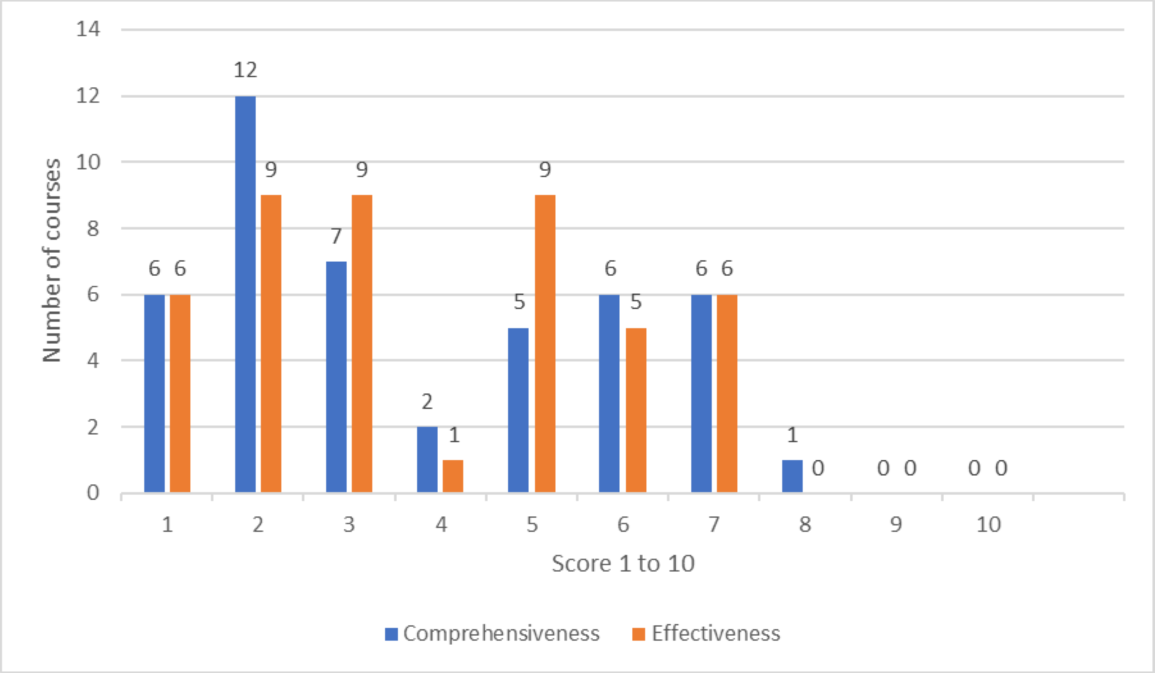


FIGURE 3: DISTRIBUTION OF COURSES ASSESSED BY COMPREHENSIVENESS AND EFFECTIVENESS SCORES.



One might have expected that the longer and more expensive courses would be more comprehensive and / or more effective, but no relationship was found between either of these course variables and either type of score. Half of the best scoring courses for comprehensiveness were under 7 days duration (one was one day or less) and all the most effective courses were under 26 weeks duration. Similarly, there were no courses with a high comprehensiveness score costing more than $AUD5,000 (two of the highest scoring were between $AUD 1-250) and half of the courses with the highest effectiveness score were between $AUD1 and 250.

DISCUSSION

We started this project because we observed, from data quality assessment projects in several countries, that in organisations where there was high quality data then someone was filling the role of an information quality advocate and the reverse was also true. Using the data is vital to ensuring its quality and the use of the data must have local impact for the data collectors and stewards to understand the impact of their work [2]. The advocates we observed were not restricted to a particular profession, rather they were usually the key drivers of the use of the data.

The participants at the PCSI Pre-Conference workshop were broadly supportive of this idea and were largely agreed on the competencies needed to fill this role, even if they were not able to identify from their previous experience courses that satisfied these competencies. The number of workshop participants represented a substantial proportion of the Conference attendees, who in turn, are recognised experts in data quality issues and represented many countries and world regions.

The skills development of advocates will differ based on their prior education and work experience. However, as recognised by the workshop participants, what is most important for the advocacy role are the 'soft skills' or 'non-cognitive skills' [17] such as those relating to leadership, stakeholder engagement, quality management, cultural awareness, ethics, and aligning the information with the organisational objectives such as improving patient outcomes.

A wide variety of courses currently available online or in person were assessed as excellent in providing technical skills for roles such as data analysts, medical researchers, epidemiologists, and health informaticians. However, only seven of the 45 courses assessed came close to meeting most of the competency requirements of advocates, and none of these matched the competencies well. This is not surprising because the courses have been designed to prepare people for specific jobs in the health care sector, and most of them would do that well, but we could not identify any course that was developed for the health sector with information quality advocacy as a prime focus. While the workshop process was not able to fully explore the differences between low, middle, and high-income countries in the need for an information quality advocate or what shape such a role might take, there is reason to believe that such a role is universal. Based on the authors' experience in low- and middle-income countries it is possible that the focus of data and information quality efforts would be more on primary and secondary health care delivery rather than on tertiary care settings.

STUDY LIMITATIONS

There are some limitations to this study. First, the workshop participants achieved a reasonable level of consensus on the most important competencies, but their views still represent a relatively small number of people.

Second, the internet search for relevant courses was limited to English speaking websites and the search engine constraints which resulted from conducting the search from Australia which preferred sites in other English-speaking countries. There may be courses available in other countries which we were not able to access, or which are offered in-house and are not advertising their availability online. As well, the changing nature of the internet impacts on the reproducibility of the search results. A later search may locate new courses and others may no longer be available.

Third, the descriptions on the internet of the identified courses on offer were also a limiting factor. Many courses give only a brief outline of what the student would achieve, some included only four or five student outcomes and little detail of the course content. It is quite possible that some of the soft skills we were looking for were included but just not mentioned on the website's course promotion.

Another limitation is the subjective element to our assessments of the courses found online. The Methods section explains how we dealt with differences between our independent assessments to reach consensus within our team on course scores. However, others may disagree with our conclusions.

CONCLUSION

We have learned much through the process reported here. We are encouraged by the positive reaction at the workshop to our thesis that advocates are needed to ensure the quality of health data. However, more research is needed to understand whether we have identified a real gap in the health workforce to improving data quality. More work is needed to develop a capacity building framework that would support, identify, and nurture suitable candidates for the information quality advocacy role.

Further work is also needed to examine existing digital health workforce capability frameworks to determine if they include the skills and competencies necessary for information advocacy. There are many frameworks in use currently around the world [18] to describe the competence requirements of the health information workforce and these need to be examined to assess coverage of information quality advocacy requirements.

As well, work is needed to provide proof of the concept that the number of information quality advocates can be increased through a focused course that covers the competencies identified and that increasing the numbers of quality advocates can impact on the quality of information for the health sector.

ACKNOWLEDGEMENTS

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References

1. Dasu, T and Johnson, T Exploratory Data Mining and Data Cleaning. Vol. 479. John Wiley & Sons. 2003.
2. O'Connor P, Reid B, Ridoutt L, O'Donovan C, Jalaludin B, Marshall R. Moving data collection from a "vicious" cycle to a "virtuous" cycle – a cycle of continuous improvement. 35th PCSI Conference Reykjavik 27-30 September 2022.
3. World Health Organisation SCORE Global Report 2020 A visual Summary https://www.who.int/data/stories/score-global-report-2020---a-visual-summary 2020.
4. Ridoutt, L., Aisbett, J., O'Connor, P. Northern NSW Local Health District: Clinical coding workforce strategy report 2017Pavilion Health
5. Reid, B., Ridoutt, L and O'Connor, P. Best practice in the management of clinical coding services: Insights from a project in the Republic of Ireland, Part 1. Health Information Management, 2017 46 (2): 69-77
6. Reid, B., Ridoutt, L., O'Connor, P. and Murphy, D. Best practice in the management of clinical coding services: Insights from a project in the Republic of Ireland, Part 2. Health Information Management, 2017 46(3):105-112.
7. MOH ITT A09-2018 the Provision of external clinical coding audit services to the Ministry of Health Singapore. Pavilion Health; O'Connor P, Reid B, O'Donovan C.
8. KSA Clinical Coding Report November 2021. Beamtree; Reid, B., Ridoutt, L O'Connor, P Hirst, V, Nobbs J.
9. Health Workforce Australia (HWA). Health Information Workforce Report 2013
10. Meneses, R and Caseiro, J. Silos Mentality in Healthcare Services. 11th Annual Conference of the EuroMed Academy of Business, Malta, September 2018
11. Maddocks, I. Silo mentality bad for our patients. Medical Journal of Australia, Issue 41 / 24 October 2016 https://insightplus.mja.com.au/2016/41/silo-mentality-bad-for-our-patients/
12. Health Information Management Association of Australia 2017 Health Information Manager (HIM) Competency Standards. https://himaa2.org.au.
13. Nancarrow, S. and Borthwick, A. The allied health professions: a sociological perspective. Policy Press, 2021
14. Australasian Institute of Digital Health Australian Health Informatics Competency Framework. Second Edition, February 2022.
15. Health Information Technology Competencies (2020). URL: http://hitcomp.org/competencies/ [accessed 2020-10-08]
16. Nazeha, N., Pavagadhi, D., Kyaw, B., Car, J., Jimenez, G. and Tudor, L. (2020) A Digitally Competent Health Workforce: Scoping Review of Educational Frameworks J Med Internet Res Vol. 22: 11, e22706 | p. 1.
17. Cabus, S., Napierala, J. and Carretero, S. The returns to non-cognitive skills: A meta-analysis, JRC Working Papers Series on Labour, Education and Technology, No. 2021/06, European Commission, Joint Research Centre (JRC), Seville 2021
18. Almalki, Househ, M and Alhefzic, M. 2019. Developing a Saudi Health Informatics Competency Framework: A Comparative Assessment. MEDINFO 2019: Health and Wellbeing e-Networks for All

APPENDIX

DRAFT COMPETENCIES POTENTIALLY REQUIRED FOR INFORMATION QUALITY MANAGERS

Area of skill	Unit of competence
Health sector structures	Describe how health systems are managed, funded, serviced, organised, and measured.
Health sector roles	Differentiate the roles and responsibilities of health professionals within operational, organisational, and regulatory structures
Information science concepts	Articulate how concepts such as data, information, knowledge, and wisdom are used
Implementation, adoption, and evaluation	Apply information science theories in the implementation, adoption, and evaluation of information systems.
System lifecycle	Apply appropriate, efficient, and effective practices throughout the information system lifecycle.
System security	Select system security risks and mitigation strategies
Leadership strategies	Apply leadership strategies to digital health
Information and system governance	Ascertain the appropriateness, ethics, effectiveness, and efficiency of information and information system governance.
Data governance principles	Apply the principles of data governance to achieve quality data and information.
Business alignment	Build alignment between information and information systems, and business/clinical goals and strategies.
Stakeholder engagement	Develop strategies for stakeholder engagement, applying relationship management principles.
Program and project management	Employ appropriate, effective, and efficient program and project management methodologies
Change management	Employ appropriate, effective, and efficient change management methodologies
Risk management	Employ appropriate, effective, and efficient risk management methodologies.
Quality management	Select appropriate, effective, and efficient quality management methodologies
Value management and benefit realisation	Select appropriate value management and benefit realisation strategies to support delivery of successful outcomes.
Process re-engineering	Apply process reengineering to facilitate business and organisational transformation

Area of skill	Unit of competence
Information culture	Develop an organisation's information culture to contribute to a learning health system
Problem solving	Apply problem solving methods for evidence informed decision making.
Legislative and regulative requirements	Interpret the legislative, regulatory, and policy obligations that are relevant in specific digital health contexts.
Information privacy	Determine best practice in the collection, use, disclosure, access, protection, and disposal of health information.
Health literacy	Determine best practice in integrating health literacy into information sources and systems.
Indigenous Data Sovereignty	Apply Indigenous Data Sovereignty principles to reduce the disparity in First Nations People health.