HISA AUSTRALIA'S DIGITAL HEALTH COMMUNITY

Leadership in Clinical Informatics

A HISA WHITE PAPER

Australia has gained real momentum with large scale and accelerated investment in infrastructure, infostructure, the My Health Record (previously the personally-controlled electronic health record - PCEHR), clinical software for GP practices and enterprise clinical information systems for public hospitals. Commonwealth, State and Territory governments are to be commended for building the foundations for electronic health (e-health) which began with the formation of the National E-Health Transition Authority (NEHTA) in July 2005. To its credit NEHTA laid the foundations for digital health with integration infrastructure and standards for health information. These included, healthcare identifiers, the Australian Medicines Terminology, standardised nomenclature using SNOMED-CT, and secure messaging. The baton has now been passed to the new statutory entity, the Australian Digital Health Agency (ADHA) whose role it is to progress the transformation agenda focusing on engagement, innovation, quality and safety.

The digital transformation journey must continue not only for its viability but to ensure it thrives and keeps pace with the world of the future. Insights from commentators on the megatrends shaping healthcare in the next ten years describe a rapidly evolving landscape[1]. Artificial intelligence, sensors, real-time analytics and a sharing economy is the next wave of smart health technology. As the baby boomer workforce exits, the future is for subsequent generations, for whom technology is a way of life, not a choice. Machines will also become workers and so the human role in this new world of digital innovation needs to be understood. Our health system is currently data rich but information poor. No clinician or system of healthcare delivery can perform to their potential without access to patient information when and where it is needed. Interoperability and communication will be critical as we do more with less and move from volume to value. Through greater cloud-based platforms, there will be fewer healthcare systems due to consolidation and shared sources of information. Electronic medical record tethered portals will further strengthen the capacity of more engaged patients who will read and contribute to their own clinical notes. Of course, the cost of digital transformation is high and the onus will be on health service providers, the beneficiaries of this outlay, to ensure money, time and effort is spent wisely.

Installing computers or using an App without altering clinical practice is not digital transformation. In fact, technology can get in the way if it is not well integrated into the clinical workflow. Getting it right

[1] The Upside of Disruption: Megatrends Shaping 2016 and Beyond (2016) EY http://www.ey.com/gl/en/issues/business-environment/ey-megatrends-health-reimagined

DRAFT

National office: 1A/21 Vale Street North Melbourne Victoria 3051 Australia
t: +61 3 9326 3311 | e: hisa@hisa.org.au | w: www.hisa.org.au
ABN: 80 097 598 742 | ACN: 097 598 742

requires leadership in clinical informatics to make judicious decisions about technology design and implementation so that it gives the information needed to drive real change in clinical practice. It must be accepted that the financial returns will be in the longer term when we have the information about our health system's activity (inputs and outputs) together with the outcomes of that effort. As for any other investment in infrastructure (not just healthcare), it will be at that point when information informs practice, that the cost of digital transformation will be offset.

Existing clinical informatics leadership roles have emerged organically. Typically, organisations that have accelerated digital health and created such roles are those implementing an electronic medical record. These organisations are attempting to ensure clinical engagement by selecting influential clinicians known within the organisation to take on initially temporary, and then part-time roles in health IT within the organisation. These clinicians bring clinical credibility and the capacity for collaboration to these roles, but this approach to selection of candidates fails to recognise the far broader skillset required to function at a senior level in a health informatics leadership role.

They are then thrown into unfamiliar territory and must immediately adapt, champion and take responsibility for a radically altered environment that is vastly different to that from which they earned their accolades as a clinician. This *strategy* of bestowing clinical informatics leadership is essentially tactical so as to obtain 'just enough' clinical engagement to get the "IT project" over the line.

The original leaders in clinical informatics were early adopters and research pioneers in the field. However, as informatics knowledge and experience grows and clinical systems become more complex and sophisticated, so too does the need for clinical informatics leaders to possess sufficient knowledge and experience to act as change agents who understand how to leverage informatics knowledge and capability.

The purpose of this whitepaper is to tackle the topic of leadership in clinical informatics. It is informed by the valuable lessons learned from international experience but is moderated by where Australia is currently situated along the digital health journey. It discusses broadly clinical informatics professionalism and the preconditions to effective clinical informatics leadership particularly at the level of a Chief X Informatics Officer.

Clinical informatics: inclusive of all clinical disciplines

The discipline of clinical informatics has grown to assist clinicians to become more discriminate users of information, to manage information overload and to develop new capabilities supported by technology. By doing so they are better able to harvest value and new ways of working for a better performing healthcare organisation. It is the additive effect of clinical informatics that differentiates those who are satisfied to simply implement systems that digitise an analogue workflow, from those who take the next step to overlay informatics principles to reduce medical errors, promote evidence-based practice, improve quality and efficiency and to use information to make new discoveries.[2]

[2] Kannry et al (2016) The chief clinical informatics officer: AMIA Taskforce Report on CCIO Knowledge, Education and Skillset Requirements. Applied Clinical Informatics.7: p145

Taking a systemic view, leadership requirements will evolve as digital maturity increases. Given Australia's current state of maturity in this space, it is only through understanding the myriad of potential benefits which can be realised with rapid access to comprehensive high quality clinical information, that people will aspire to take the leap to digital health nirvana. Access to rich information, machine learning and enabling a learning-based healthcare system where we learn from every patient every day[3] (not just when the publication is released) is when true transformation of clinical care will occur. It is also when we recognise the opportunity for role substitution that digital transformation will ultimately be achieved.

The American Medical Informatics Association (AMIA) have successfully argued that clinical informatics is a relevant subspecialty of the medical profession, irrespective of primary practice and training[4]. This is not to suggest that clinical informatics is the exclusive domain of the medical discipline. Rather, it requires knowledge of patient care and the ability to understand how information and communications technology can enable access to the information needed to make decisions at the point of care. Clinical informatics is intrinsically integrative and so the clinical informatician role has evolved to be inclusive of all other health disciplines. AMIA maintains that inside the healthcare services sector, clinical informatics is essentially the same regardless of the health professional group involved (whether a dentist, pharmacist, doctor, nurse, or other health professional). Quite simply, clinical informatics is concerned with information use, application of smart technology and responding to transformative trends in healthcare by clinicians. It should not matter from which health professional group clinicians belong. **In referencing the domain of clinical informatics, HISA intends to be inclusive of all clinical disciplines.**

As depicted in figure 1[5], clinical informatics brings value to health through an intimate understanding of clinical processes and workflows, contextualised within the larger healthcare ecosystem, and the critical information required at any particular point which informs the required information technologies to support them. In short, clinical informatics is the sweet-spot. AMIA's 2014 definition of clinical informatics unpacks this sweet-spot as the science of [6] *'analysing, designing, developing, implementing and evaluating information and community systems that enhance individual and population health outcomes, improve patient care, and strengthen the clinician-patient relationship'*. However, HISA wishes to tweak this definition by saying that it is the

Trans-disciplinary *design, development, adoption and application of information management and information technology based innovation in the provision of clinical services and the improvement of clinical outcomes.* Trans-disciplinary because what results is not only greater, but it's different to the individual parts that contributed. That is, it's truly transformed.

[3] Gallego, B. Walter, S.R. Day, R.O. Dunn, A.G. Sivaraman, V. Shah, N. Longhurst, C.A, Coiera, E. (2015) Bringing cohort studies to the bedside: framework for a 'green button' to support clinical decision-making. Journal of Comparative Effectiveness Research. Vol.4, No.3 https://www.futuremedicine.com/doi/abs/10.2217/cer.15.12

[4] AMIA (2017) History of the Clinical Informatics Subspecialty https://www.amia.org/clinical-informatics-board-review-course/history

[5] Adapted from Gardner, R.M. Overhage, M. Steen, E.B. Nunger, B.S. et al (2009) Core Content for the subspecialty of Clinical Informatics. Journal of the American Medical Informatics Association. Vol 16. No2: March/ April pp153-157. https://www.amia.org/sites/amia.org/files/AMIA-Clinical-Informatics-Core-Content.pdf

[6] AMIA 2014. Clinical Informatics Board Review Course- History. Available from http://www.amia.org./clinical-informatics-board-review-course/history .

Doctors, nurses and allied health professionals possess the necessary clinical training and knowledge of patient care to underpin informatics credentials. What is yet to be achieved in Australia is formal recognition by professional colleges of the subspecialty of clinical informatics.

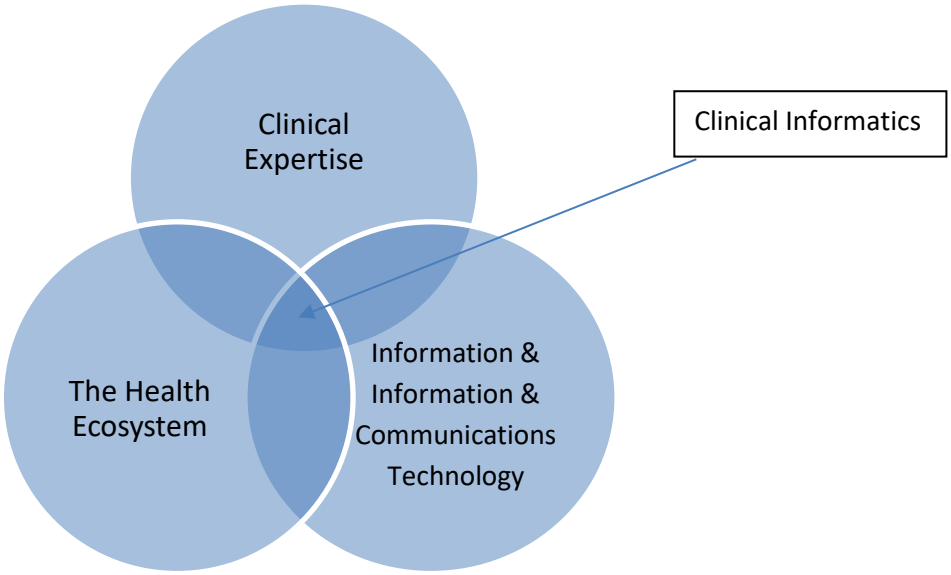

Figure 1: The Clinical Informatics sweet spot

Change management: culture of leadership and enablement for digital transformation

Healthcare organisations are complex and multi-layered and so too is the culture. A climate of change and a culture of leadership and IT-enablement must be developed if organisations are to sustain change beyond being trained how to use a clinical information system. Culture change requires executive and clinical leadership striving for better quality care. Clinical governance is also required to ensure that the correct clinical systems are implemented to support this goal.

It is the oversight by clinical informaticians that is required to bridge the clinical and IT world and Bill Gates also agrees "it's impossible to properly re-engineer a process using technology in an area without oversight of someone who can bridge [the different] teams."[7] Failure to recognise the instrumental role of clinical informatics leaders is to compromise the transformative potential of clinical systems.[8]

In order to effectively engage and enable the organisation to transition to electronic ways of working, it is critical to have clinical informaticians who are trusted and understand the workflow. Although this is easier when the informatician comes from the same discipline, it is more important that they understand and respect the specifics of the actual workflow.

[7] Bill Gates in 1999 in his book Business at the Speed of Thought
[8] Kannry et al (2016). The chief clinical informatics officer: AMIA Taskforce Report on CCIO Knowledge, Education and Skillset Requirements. Applied Clinical Informatics.7: p145 https://aci.schattauer.de/en/contents/archive/issue/2299/manuscript/25654/show.html

One of the driving forces for creating Chief "X" Information(ics) Officer (CXIO) roles has been the failure rate of electronic medical record implementations.[9] Historically, digital health leadership roles across the globe often reported into the C-suite. Research from 2014, suggested that CXIOs were more focused on the clinical aspects of acute care EMR implementations, serving as adoption coaches and superusers of the system and only pulled into tactical problem-solving when required to support the technology or its uptake.[10] However, in recent years a more strategic role that sits alongside the Chief Information Officer (CIO) role has been emerging.

Leadership roles and clinician leaders: a team approach

As health IT systems evolve and mature, so too the workforce and leadership must be appropriate for the task.[11]

In mature healthcare organisations, the Chief X Informatics Office role is a key Executive role. These are organisations that recognise the benefits to be realised from maturing their digital footprint and committing resources to harvest the benefits from their investments. The purpose of this role is to ensure the clinical perspective is effectively translated not only to the technical domain, but more importantly to the Executive and Board. It has emerged in response to the need for clinical-facing and change management elements of clinical systems to be represented alongside the more technical aspects. Without CXIO oversight of clinical engagement in the articulation of clinical needs, and consequent ICT solutions procurement, design and implementation, there is significant risk of negative workflow impacts, poor usability and increased workload. Without a clinical informatics perspective, strategic thinking is myopic and fails to recognise the opportunity of digital transformation.

In Australia, a number of different senior clinical informatics roles have been identified across different clinical streams, including Chief Medical Information (or Informatics) Officer (CMIO), Chief Nursing Information Officer (CNIO), Chief Pharmacy Information Officers (CPIO), Chief Dental Information Officers (CDIO). In organisations without separate streams, or where the multiple streams require a single reporting line, there exists a Chief Clinical Information Officer (CCIO) role. It is anticipated, that as the need for domain expertise with an understanding of the benefits of informatics increases, additional roles are likely to emerge.

Clinical informatics is increasingly recognised as the catalyst for new models of care and redesigned health services. However, an informatics-savvy workforce, in addition to senior informatics leaders are also required to think systemically, possess a mastery of change, understand and align information technology vertically and horizontally to the organisation's strategic direction. Health informatics creates a career track for aspiring clinicians who do not simply want to be recognised as technology cheerleaders or data crunchers. To be acknowledged formally and valued for specialist health informatics capabilities – the professionalisation of the role of the clinical informatics leader - is the action this white paper intends to support.

[9] CMIO pushes frontiers of digital health (2015) IDM Image and Data Manager http://idm.net.au/article/0010748-cmio-pushes-frontiers-digital-health

[10] Maestro Strategies 2014. From the Playing Field to the Press Box: the emerging role of the chief health information officer. https://maestrostrategies.com/wp-content/uploads/2014/09/From-the-Playing-Field-to-the-Press-Box.pdf

[11] Wachter, R (2016) Making IT work: harnessing the power of health information technology to improve care in England , p33 https://www.england.nhs.uk/digitaltechnology/info-revolution/wachter-review/

Clinical informatics roles in the USA matured alongside EMR implementations and meaningful use incentives. In Australia, we have learned from the US experience but are better placed to promote the role of clinical informatics beyond supporting EMR implementations.

Tracks to leadership positions: skills required

Health informatics has enjoyed a rich and diverse evolutionary history. While diversity is not necessarily problematic, with a complex digital landscape and the need for prudent stewardship of these investments, there is now a need to consider the skills required for our future digital health leaders in order to assure appropriate skills, experience and training inform decisions and advice which have implications for patient safety and return on investment.

The required skills for CXIOs has not been well described which makes it difficult to provide guidance for organisations seeking appropriately credentialed informatics leaders, or professional development for those aspiring to this type of role. [12] By providing clarity on the skills required, organisations can plan and build workforce capability and career structures for clinicians who aspire to be the conduit between technology and clinical care.

HISA recommends a common set of core competencies to ensure comparable educational background and standards, clear career pathways and equity of recruitment and remuneration. In collaboration with AMIA, it is HISA's position that an agreed set of skills for clinical informatics leadership positions is required.

Only a few universities in Australia offer courses related to health informatics either fulltime undergraduate or postgraduate degree in this area [13] and at this time, health informatics skills lack formal recognition in the Australian health workforce.[14] The Australasian College of Health Informatics (ACHI) have in their pipeline the development of a health informatics accreditation framework for university programs which will assist to raise levels of awareness.

Complementary to university education, 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) developed a professional certification in health informatics, the Certified Health Informatician Australasia (CHIA). One-third of CHIAs in Australia are clinically trained. Currently, CHIA provides certification for experienced health informaticians which cover six domains. These address informatics concepts, methods and tools:

- Information and Communication Technologies (5 competencies)
- Health and Biomedical Sciences (10 competencies)
- Information Science (8 competencies)
- Management Science (5 competencies)

[12] Kannry et al. p. 146
[13] Education directory. ACHI. 2016. Retrieved from http://www.achi.org.au/educationdirectory.htm
[14] Martin-Sanchez F, Gray K. Recognition of health informatics in Australian standard classifications for research, occupation and education. Stud Health Technol Inform. 2014;204:92-7. https://www.ncbi.nlm.nih.gov/pubmed/25087533

- Core Principles and Methods (20 competencies)
- Human and Social Contexts (4 competencies)

CHIA gives aspiring clinical informaticians the breadth of informatics context which draws in the connections to the clinical working environment. However, it is acknowledged that additional domains and a deep dive into areas such as, clinical decision making, workflow, leadership and change management would be required to meet the requirements for certification in clinical informatics.

Professionally, clinical informatics must be recognised as a clinical subspecialty for all healthcare professions. For this reason, the CXIO should first and foremost be a clinical role with the dual requirements to be proficient in both a clinical specialty and informatics. Advancing to a CXIO role also requires knowledge and understanding of leadership, but also new and evolving technologies, in order to determine how best to incorporate into clinical requirements and the organisation's strategic directions. Given this, the following skills are required:

- **Leadership** - ability to think strategically, collaborate, motivate, govern and make decisions
- **Management of Change**- ability to assess and influence organisational culture (including safety culture) and behaviour, engage clinicians and senior management on ICT issues and opportunities
- **Understand the global healthcare context** - Australia and internationally
- **Competent in the language and concepts of technology** – able to converse effectively across clinical, business and IT domains on professional informatics standards, best practice, emerging technology and how to incorporate these in organisational strategic plans
- **Understand clinical environment and clinical workflows** – to undertake workflow analysis, refine and redesign care processes
- **Data analysis** – to assess and use data beyond reporting to inform clinical practice
- **Informatics education** and ability to educate others about informatics
- **Maintain currency -** on developments of health information systems, megatrends and informatics credentials.