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# MEDINFO 2023 — The Future Is Accessible

Proceedings of the 19th World Congress on Medical and Health Informatics


Edited by

Jen Bichel-Findlay

*Honorary Associate,*
*University of Technology Sydney, Australia*

Paula Otero

*Pediatrician,*
*Hospital Italiano de Buenos Aires, Department of Medical Informatics, Argentina*

Philip Scott

*Programme Director,*
*University of Wales Trinity St. David, BCS Health & Care, United Kingdom*

and

Elaine Huesing

*Chief Executive Officer,*
*the International Medical Informatics Association (IMIA), Canada*



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# Preface

After many years of constrained travel, social movement, and large gatherings of people, the Editorial Committee for MedInfo 2023 welcome you to the resumption of our in-person biennial conference in the beautiful harbour city of Sydney, Australia. MedInfo conferences require considerable effort by numerous people, many of whom are volunteers, and our gratitude is extended to all those involved in the organisation of this 19th World Congress on Medical and Health Informatics. Our community will come together again to showcase our latest research and perspectives, reacquaint with trusted colleagues, and form new professional friendships. MedInfo conferences not only energise those attending but provide a common platform to commence or continue discussions focusing on applied approaches to data, information, knowledge, and wisdom in health and wellness.

The last few years have indeed demonstrated the theme of the conference – The future is accessible. The pandemic highlighted the value of global partnerships, the proficiency of converting laborious manual/analogue processes to an online/digital format for various health transactions, and the flurry of inventive approaches to improving the patient-centric journey and healthcare provider efficiency. It also emphasised the difference in the healthcare system when all its component parts collaborate and work together to deliver patient- and citizen-centric quality care. Finally, it accentuated the growing empowerment of citizens when they feel included in their health and wellness ventures and have access to their data.

During this time, enormous pressure was placed on the discipline of biomedical and health informatics to innovate quickly whilst the healthcare system adapted to the new landscape. Telehealth and remote monitoring were elevated from optional and nice-to-have to essential tools for many countries attempting to support the health outcomes of their citizens residing in urban, rural, and remote locations. Those with chronic disease enjoyed the saved opportunity costs derived from healthcare consultations via teleconferencing methods. Many healthcare providers and citizens like this new connected health landscape and fear the system will revert to its former offerings rather than embrace the future.

Unfortunately, not all countries had the existing infrastructure and could not pivot so quickly, which displayed the negative consequences of the digital divide. Preparing for a digital healthcare ecosystem required multifactorial opportunities – educating and upskilling of current staff, attracting, recruiting and retaining talent in digital health, and creating digital health career pathways. Emergent concerns around data sovereignty required many countries to review their laws and government policies to ensure compliance with privacy and data security obligations. Poorly designed IoT devices available in the healthcare environment reiterated the need for co-design to ensure the user experience was positive and healthcare providers were willing to prescribe them to other citizens. Lastly, digital literacy has become more prominent for both citizens and healthcare providers, and continued effort is required in this area.

The significant leap forward in artificial intelligence, machine learning, augmented reality, virtual reality, and genomics holds great hope for future healthcare planning, delivery, management, education, evaluation, and research. These themes feature in the

8–12 July MedInfo 2023 sessions, displaying how these digital approaches will revolutionise the healthcare environment through improved quality health outcomes and reduced potential for error. It is anticipated that attendees at MedInfo 2023 will not only exploit the benefits of these technologies but also collectively identify ways to overcome their associated challenges.

Dr Jen Bichel-Findlay FAIDH CHIA
MedInfo 2023 Editorial Chair

# About the Conference

Like the phases of the Moon and the daily cycle of the sea tides, we have hopefully returned to the normal cycle of in-person biennial MedInfo conferences for the international medical and health informatics community.

Digital advances during the pandemic years rapidly moved so many things from 'eternal pilots' to business as usual and made continued services in those difficult times possible to continue, yet perennial challenges remain to be resolved in areas as diverse as public trust outside of emergency periods, equity of healthcare provision, workforce crises and building real learning health and care systems. These are all areas where informatics has pivotal contributions to make.

In Medinfo 2021, IMIA highlighted that human health cannot be considered in isolation, we need to consider the "one health" concept and recognise the planetary ecosystem. We cannot lose sight of that bigger picture as we now focus on the accessible future.

The future is accessible, but for whom? Of course, as science fiction author William Gibson is famously quoted as saying, "The future is already here – it's just not very evenly distributed." The digital divide is a major concern for health and care informatics professionals, whether in global economic disparities, digital literacy gaps in the healthcare workforce or the general public, or access to reliable information and knowledge about health.

The worldwide community of the International Medical Informatics Association continues to work as a global partnership for a healthy, digitally innovative future. The 19th World Congress on Medical and Health Informatics, MedInfo 2023, was hosted by the Australasian Institute of Digital Health in Sydney, New South Wales, from 8–12 July.

The Medinfo 2023 Scientific Program Committee (SPC) called for submissions under five themes:

- Information and knowledge management
- Quality, safety and outcomes
- Health data science
- Human, organisational and social aspects
- Global health informatics

We received 670 academic submissions and 265 industry submissions from 53 countries across all IMIA regions. Peer review was organised by the SPC co-chairs, and eight track chairs and co-chairs involving 279 reviewers. Finally, 228 full papers, 43 student papers and 117 posters were accepted and are included in these proceedings.

The SPC would like to thank the track chairs and co-chairs, the reviewers, and the CEO of IMIA for their invaluable contribution to the success of this first MedInfo conference since the global pandemic.

Dr Philip Scott and Dr Paula Otero
MedInfo 2023 SPC Co-chairs

**Scientific Program Committee Track Chairs**

Melissa Baysari, Co-Chair, Human, Organizational and Social Aspects Track, University of Sydney, Australia

Arriel Benis, Co-Chair, Health Data Science & AI Track, Holon Institute of Technology, Israel

Vasa Curcin, Co-Chair, Information and Knowledge Management Track, King's College, United Kingdom

Craig Kuziemsky, Co-Chair, Human, Organizational and Social Aspects Track, MacEwan University, Canada

Romaric Marcilly, Co-Chair, Quality, Safety and Outcomes Track, Université de Lille, France

Carlos Otero, Co-Chair, Global Health Informatics Track, Hospital Italiano de Buenos Aires, Argentina

Linda Peute, Co-Chair, Quality, Safety and Outcomes Track, Amsterdam University Medical Center, The Netherlands

Lucia Sacchi, Co-Chair, Health Data Science and AI Track, University of Pavia, Italy

Vignesh Subbian, Co-Chair, Information and Knowledge Management Track, University of Arizonia, USA

Oscar Tamburis, Co-Chair, Global Health Informatics Track, Università “Federico II” Napoli, Italy

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# Health Service Managers' Digital Competencies: A Conceptual Framework

Mark BROMMEYER[a,b,1], Maxine WHITTAKER[a] and Zhanming LIANG[a]
[a] *College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, Queensland, Australia*
[b] *College of Business, Government and Law, Flinders University, Adelaide, Australia*
ORCiD ID: Mark Brommeyer https://orcid.org/0000-0001-7380-1085, Maxine Whittaker https://orcid.org/0000-0002-1677-2991, Zhanming Liang https://orcid.org/0000-0002-8022-4017

**Abstract.** Health service managers play a crucial role in managing and leading in the digital health environment. Development of the health management workforce that is ready to lead and manage digital health transformation requires partnerships across sectors, in not only developing workforce competence but also in developing supportive mechanisms that can translate competencies into practice. A framework presenting a systematic approach in enabling the development of a competent health management workforce in the digital health era has recently been published. The purpose of this paper is to explore and discuss the application of the framework in the Australian context, informed by the findings of a PhD research project that uses an empirically validated four-step approach to confirm the health service management workforce development needs in the digital health context. The PhD project has already confirmed: 1) the paucity of Australian Health Informatics Competency Framework (AHICF) competencies being included in Australian health service management postgraduate program curricula; 2) five key strategies that contribute to developing health management workforce competency and capacity; and 3) seven key factors that enable health management workforce development in the digital health context. Further understanding of the barriers and enablers for health service managers to develop capability and manage in the digital health environment, and the factors that influence digital health policy and practice will be developed, by critically analysing findings from focus group discussions with health managers and semi-structured interviews with digital health leaders, to be completed by May 2023.

**Keywords.** Digital health, competency frameworks, health service management, workforce development, sustainable development goals

## 1. Introduction

Health service managers play a crucial role in managing and leading in the digital health environment. Accordingly, how to equip the health management workforce with digital health competence has become a pressing and nascent developing field of research. Although various health management competency frameworks [1-5] and digital competency frameworks [6,7] are separately and readily available to guide the

[1] Mark Brommeyer, College of Business, Government and Law, Flinders University, GPO Box 2100 Adelaide SA 5001, Australia; email: mark.brommeyer@flinders.edu.au.

competency development of health managers and digital health specialists, digital health competency requirements for health service managers have yet to be empirically identified and incorporated into the existing management competency frameworks that guide health management workforce development. Moreover, upskilling is only one of the strategies required for workforce development; a systemic approach is required with collective efforts at institutional, organisational, system and sector-wide levels.

Such a systematic approach and required elements are illustrated in the framework for developing a health management workforce in the digital health era (The Framework) by Brommeyer and Liang (2022) [8]. This was developed by an evidence-informed, three-step triangulated process [8]. Development of the health management workforce that is ready to lead and manage digital health transformation requires partnership across sectors, not only developing workforce competence but also in developing supportive mechanisms that can maximise the capacity of managers in applying the developed competencies in practice. To allow the framework to be operationalised, an understanding of how to translate each of the steps into practice and the specific efforts and investments required that enable translation, needs to be developed.

A PhD research project focused on improving digital health competencies for health service managers is being conducted to collect empirical data to enable the development of such understanding. Further, issues and challenges that need to be addressed in order to develop the overall management capacity of the health system in leading and managing digital health transformation will be articulated and validated, for more effective and efficient health service delivery. This will ensure that the health sector is collectively being built for now and in the future, to be accessible, sustainable and safe, as it uses digital technologies to support achieving the Sustainable Development Goals [9,10]. The purpose of this paper is to explore and discuss the application of the framework in the Australian context, informed by the PhD research project.

## 2. Methods

Critical analysis will be performed on the data collected from the PhD research study, to enable the application of the framework developed by Brommeyer and Liang [8] (Figure 1) in guiding health management workforce development in the digital health context. The PhD research adopted a four-step approach guided by the empirically validated management competency identification process [5], including: 1) an Australian health service management postgraduate program competency mapping analysis, 2) a scoping review of international literatures, 3) six focus group discussions with mid-level managers who are responsible for the day to day operations of Australian public hospitals recruited from different Australian States, and 4) semi-structured interviews with fifteen Australian digital health leaders, who are from Australian public health departments or national digital health organisations.

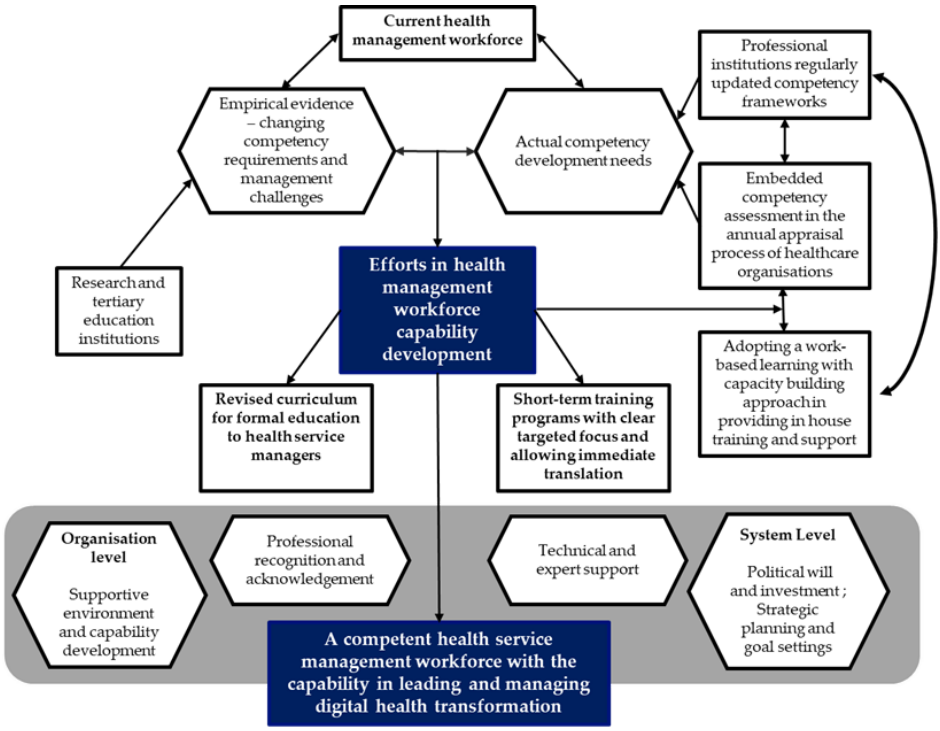


**Figure 1.** Framework for developing the health service management workforce in the digital health context.

The first two steps have been completed, forming part of the triangulation methods used in developing the Framework. Steps three and four have been scheduled to be completed by May 2023. Table 1 details the target populations, and the proposed number of participants for steps three and four.

**Table 1.** Details of the PhD study focus group discussions and interviews**.**

| **Methods** | **Focus group discussions via videoconference** | **Semi-structured interviews via videoconference** |
|---|---|---|
| Focus | To explore the competencies that health service managers need to acquire to effectively work with and manage in the digital health context, along with factors that enable and inhibit the acquisition of these competencies. | To validate the findings from the focus group discussions in terms of core health service manager competencies, barriers and enablers for health service managers to manage in the digital health environment; and to explore issues that influence digital health policy and practice. |
| Who are the participants? | Mid-level managers who are responsible for the day-to-day operations of Australian public hospitals. These positions may include Department Directors, Unit Managers and Ward Managers representing level 3 and 4 management* from public hospital settings. | Digital Health Leaders and Chief Digital Health/Clinical Information Officers from national digital health organisations and public health departments who have executive responsibility for digital health. |
| Number of participants | 48 (8 per group x 6 focus groups) | 15 |

*Management levels are defined by the organisational reporting hierarchy, with level 1 being the Chief Executive Officer (CEO), level 2 reporting to the CEO, level 3 reporting to level 2 management, and level 4 reporting to level 3 management.

## 3. Results

Overall, the mapping of the digital competencies addressed by the 21 Australian health service management (HSM) postgraduate programs, accredited by either the Australasian College of Health Service Management (ASCHM) or the Royal Australasian College of Medical Administrators (RACMA), confirmed that the vast majority of the competencies in the Australian Health Informatics Competency Framework (AHICF) have not been included in the HSM postgraduate program curricula [11].

The scoping review identified five key strategies for developing health management workforce competency and capacity which were: 1) embedding competency assessment into management development processes, 2) creating a competency model to guide developing competent managers, 3) providing formal, digital development opportunities to managers, 4) providing short-term training programs targeting specific competency areas; and 5) adopting a work-based learning and capacity-building approach for training and support across the organisation [8]. The key strategies have been incorporated into the boxes directly linked to the box 'Efforts in health management workforce capability development' at the centre of the Framework (Figure 1). Further, key factors that enable health management workforce development in the digital health context were also confirmed and categorised into system, professional and tertiary institution, and organisation levels; these are included in the bottom grey box of the Framework.

Once the focus group discussions with Australian mid-level health service managers and semi-structured interviews with digital health leaders have been completed (May 2023), core information captured will be critically analysed to understand the barriers and enablers for health service managers to develop capability and manage in the digital health environment, and the factors that influence digital health policy and practice.

## 4. Discussion

The Framework (Figure 1) not only provides a comprehensive guide in developing the capacity of the current and future health service management workforce in leading and managing in the digital health context, it also maps out the role of different parties ranging from government, professional and tertiary institutions, and healthcare organisations in achieving this agenda. Furthermore, it recognises that upskilling in the digital health environment is only one aspect of capacity building, investment in infrastructure and the development of supportive mechanisms are also critical.

The PhD research findings will operationalise each key component of the framework and allow the formulation of actionable strategies with input from the international audience at *MedInfo2023: the 19th World Congress on Medical and Health Informatics*. This provides further insights into the healthcare system's digital workforce policy implications, as well as the additional competencies that healthcare

organisations, professional institutions and tertiary education providers can incorporate into their continuing professional development and training curricula.

## 5. Conclusions

The efficient and effective transformation of healthcare services, and their management through the use of digital health requires careful planning and implementation, as well as adaptive learning informed by monitoring and evaluation. To support this process, health service managers need to develop leadership and management competency in managing and leading digital transformation, guided by an evidence-informed framework with supportive working environments and enabling mechanisms in place.

The PhD research project described will contribute relevant empirical data and analysis to inform the health system leadership and management capacity development, necessary to harness the potential of digital health in contributing towards better healthcare service delivery [9,10].

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