

The Australian Medical Council:

Capability Framework in Digital Health in Medicine

19/08/2021

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Executive Summary

The Australian Medical Council (AMC) in collaboration with the Australian Digital Health Agency (the Agency) and broader stakeholders of health have developed a capability framework to guide how medical education providers throughout the continuum of medical education can play a further role in the development of a digitally capable medical workforce in Australia and New Zealand. This document is designed for medical schools, prevocational training providers across all Australian jurisdictions as well as College vocational training programs and Continuing Professional Development Programs – CPD, International Medical Graduate (IMG) Assessment and Support and other providers of digital health education i.e. professional bodies and institutes. It calls for intergenerational, cross sectorial and cross curriculum learning and assessment of digital health in medicine. The framework was shaped by advice from the Medical Workforce Digital Capabilities Advisory Group – with broad representation from across the continuum for medical education in Australia and New Zealand (see Appendix 7) – results from an online survey and follow up consultation focus groups as well as engagement with a broad range of medical education stakeholders in a series of online fora. The AMC and Agency expresses their sincere thanks to the very many people and organisations who participated in the consultation. The feedback has contributed significantly to this framework (see Appendix 8).

A capability framework is a set of descriptions of the key behaviours, and underlying knowledge, attributes, and experiences that are required for successful performance in a specific role. This framework draws on an extensive literature review of national and international evidence concerning digital capabilities in medicine and more broadly in health. Careful analysis of other frameworks, including the Advisory Group’s rating in terms of importance of key domains across seven key eHealth frameworks, was undertaken to recognise relevant existing domains and in the spirit of “not reinventing the wheel” a current state survey was also sent to all medical education providers across the continuum of medical education and has been drawn on to inform this framework.

This framework acknowledges that a number of medical education providers in Australia have integrated digital health into their medical education programs, but for many it is a perceived gap. In response to calls from medical education providers, who have made it clear to the AMC that the introduction of new accreditation standards should be accompanied by some resources to help them further innovate, this framework is designed to support such innovation. This framework seeks to add to the literature and extend the body of work of existing frameworks in digital health in medicine in four important ways:

- 1. Strategic alignment of medical education with the national platform of health reform change** - Explicit strategic alignment with the three horizons as set out in the [National Digital Health Workforce and Education Roadmap \(2020\)](#). These horizons focus on Horizon one: embedding safe, ethical use of systems of record; horizon 2: integrating new technologies and ways of working; and horizon 3: digital health transformation. See pages 10-13 for further information. This framework also explores opportunities for integration of workforce education in digital health with broad priorities of health reform such as prevention of [chronic disease](#), better access to healthcare in [rural and remote](#) areas, [closing the gap](#) of inequality in health outcomes and experiences of Aboriginal and Torres Strait Islander and Māori peoples, achievement of [cultural safety in healthcare](#) and elimination of [violence, abuse, neglect and exploitation of people with disability](#), the health and wellbeing of those impacted by [domestic violence](#), the health and wellbeing of [refugees](#) and migrants, the [LGBTIQ+ community](#) and better quality and safety in [Aged Care](#) and better health and support for [prisoners](#) and the [homeless](#). It is recognised in this framework that these groups have specific needs related to digital healthcare delivery. This framework provides opportunities for doctors to learn about these needs through experiential learning as well as explore current policy positions and data related to these different health groups to gain a better understanding of health impacts and

safe and quality care options. It is important that teaching and learning for these different communities is designed with members of the community in question, preferably with experience in the health sector and that education is not reduced to a discussion of their vulnerability without consideration of how a strength-based approach to their care and new understandings for doctors, their patients and carers is achieved.

2. **Intergenerational and cross-continuum focus** – Adopt a cross continuum focus to the capability framework which acknowledges the need for capability development for all generations of doctors – junior doctors and their more senior colleagues. The need for agile curricula development cycles to deal with disruptive change and areas of health reform priority such as digital health as well as the building of cohesion of skill development across the medical education sector.
3. **Constructive alignment of education program components** – Provide guidelines about each component of an aligned program of learning, assessment and evaluation:
 - **Core purpose** the building and delivery of culturally safe, value-based, person-centred care leveraged through effective use of current, emerging and future technologies.
 - **Domains** with 7 clearly defined domains and learning outcomes
 - **Teaching and learning** with scaffolded capability development built through multiple strategies with a focus on self-directed, simulated and workplace learning;
 - Alignment with newer methods of **assessment** with a focus on programmatic assessment (Schuwirth LWT, Van der Vleuten CPM. 2011);
 - The **measurement of impact** includes markers linked to quality, safety and efficiency in healthcare, and continuous improvement cycles across the medical continuum
 - **Focus on how learning can best be integrated into the medical workflow** A key challenge of medical education is that there is a tension between service and learning. It can be difficult to integrate learning into the medical workflow. This is a particular challenge if competencies are too detailed. Overly detailed competencies can also result in atomistic learning.
4. This framework draws on the medical education innovation of **Entrustable Professional Activities (EPAs)** (ten cate 2006). An EPA for each of the three horizons of the [National Digital Health Workforce and Education Roadmap](#) is proposed as a means to better integrate learning and assessment in the clinical workflow and improve judgements about clinical performance in digital health in medicine. EPAs are used widely in medical education nationally and internationally. The EPAs in this framework are categorised in terms of clinical care and system change to allow for diversity and flexibility across a range of medical specialties and different settings. Equally, these EPAs operate at a range of levels of learning: knowledge, routinised practice, problem solving and leadership to allow for scaffolded learning across the continuum and targeted assessment for different levels of experience in digital health.

The framework provides guidance as to how minimum standards can be achieved in digital health education. It can be seen as an interim step to inform medical education providers as they work towards new models of curricula in the coming years, which provide integrated models of medical education incorporating digital capabilities. The final section of this framework concludes with a summary of proposed next steps to help support the implementation of this framework and further development of digital capabilities across the medical education continuum for new medical workforce roles and team based competence in healthcare.

Introduction

Technology change has significant implications in the skills development of health professionals. It is important to note that technology is ultimately a tool. The focus needs to remain firmly on how technology can be leveraged and used to support good medical practice and quality healthcare, particularly around resolution of longstanding challenges in healthcare delivery including equitable access in rural and remote areas, closing the gap on health outcomes and experiences for First Nations peoples; and better support in aged care and those living with chronic disease and disability.

The COVID-19 pandemic has posed particular challenges for the health system and has accelerated the uptake of a range of digital technology. It forced rapid uptake of telehealth and increased use and awareness of electronic prescriptions and My Health Record (MHR.) It will be important in the coming years to maintain the gains in digital health and recognise that ethical approaches to a digitally enabled practice that includes awareness of the limits of technology and the importance of access to in-person physical care.

Education providers play a pivotal role to help doctors navigate change and ensure the quality and safety of patient care. Changes in health technology do not only impact doctors and other health professionals. They also affect consumers who are taking more responsibility for their health and working together with their doctors to improve their health experiences and outcomes. The doctors' familiarity with personalised technologies, data analytics and the underpinning principles of cultural safety, patient-centred and value-based care is central to healthcare transformation.

This framework aims to address the gap between real life medical services and medical education. In Australia and globally, digitally-enabled hospitals are emerging, EMRs and other systems are being implemented. But are we training our current and future medical workforce to work in this environment?

This framework seeks to promote thought on current, emerging and future models of capability development in digital health in medicine as well as to provide sample ideas to support further innovation and lifelong learning across the continuum. It aligns to the three horizons of the [National Digital Health Workforce and Education Roadmap](#). Horizon three, as the end goal of the roadmap, provides ways in which technology allows us to reimagine how healthcare can be delivered. This can impact all aspects of care from how we monitor consumer health, how and when we intervene and how we actually deliver care by whom. The targeted use of current, emerging and future technologies brings to the fore new

underpinning knowledge, changes to health work practices and clinical workflows, privacy and safety issues, ethical concerns, an increased focus on effective use of data analytics from multiple sources and some assumptions, which need to be challenged.

The new ways of working have implications for all generations of doctors. It is the purpose of this framework to set out guidelines for what education providers can do to better prepare all generations of doctors to build their digital health capabilities.

Principles for Development of a Capability Framework for Digital Health in Medicine

These five principles were created to guide the development of this capability framework for digital health in medicine by the Advisory Group and further refined as part of the consultation process by broader stakeholders of medicine:

Principle 1: Fit for Purpose

- 1.1 Aligns with broader system change priorities and health reform goals.
- 1.2 Focuses on consumer expectations and needs – acknowledging diversity and specific health needs of Aboriginal and Torres Strait Islander and Māori peoples as the original custodians of their lands.
- 1.3 Aligns with current, emerging and future doctors' capability needs in digital health and medical workflows.
- 1.4 Ensures [cultural safety](#) and inclusiveness, and reduces rather than widens, existing gaps and inequities in healthcare outcomes and experiences.
- 1.5 Is implementable across the continuum of learning and across a range of contexts – diverse medical specialties across many education providers, and varied geographic and population health settings.

Principle 2: Builds the Case for Why Change

- 2.1 Recognises digital health is integral to medical workforce capability development.
- 2.2 Acknowledges that there will be some resistance to change – explore opportunities to work collectively to remove barriers and listens and acts on concerns, acknowledging and respecting the various speeds at which people take on change.

Principle 3: Evidence based

- 3.1 Acknowledges and references good practice that exists and ensures that where evidence base is limited, inappropriate or non-existent, approaches to culturally safe digital medicine must build reflection to promote new assumptions and ways of working.
- 3.2 Ensures that the approach balances evidence from the literature with experiences and the realities of the workplace across diverse settings – metropolitan, rural and remote.

Principle 4: Flexible and able to be delivered agilely

- 4.1 Ensures the approach is flexible and developed within an agile framework.
- 4.2 Is strategic and offers guidelines without prescription.

Principle 5: Constructively aligned, collaborative and implementable

- 5.1 Provides holistic guidance on domains of learning in digital health, teaching and learning (including supervision), assessment and impact evaluation – ensuring consistency and mapping between components of the program.
- 5.2 Recognises the importance of co-design in curricula and creates an environment to foster collaborative program design in digital health in medicine with and between stakeholders of the broader health education ecosystem.
- 5.3 Implementation is key – ensures that it is designed for implementation and further support.

A National Platform for Change in Digital Health Workforce Development & Education

Over the next twenty years the global health landscape will be impacted by current, emerging and new technologies. Current technologies include telehealth, electronic prescriptions, secure messaging, My Health Record and other electronic records systems. These current technologies focus on increased and more convenient access as well as safe and quality delivery of care. Emerging technologies include genomics, artificial intelligence, and robotics. In addition, new technologies, focused on personalised healthcare and sophisticated data analytics are increasingly becoming available.

Central to the effective use of technology in healthcare is the use of validated tools, sharing of good practice implementation across the globe and the integration of value-based and person-centred approaches to healthcare delivery. This means that the implementation of technology innovation in healthcare needs to be undertaken in such a way that it is less about the technology and more about the delivery of patient-focused care. Sometimes referred to as value-based care, this is seeing 'a profound shift in perspectives towards wellbeing and wellness, convenience, flexibility, self-direction and personalised experience. This goes beyond sick care to healthfulness inspiring, encouraging and teaching individuals to make positive care and lifestyle choices and engage in accountable for lifelong health.' (Coughlin et al. 2017)

Value-Based Health Care Benefits



NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Figure 1: High Value Healthcare – key benefits

For these current, emerging and personalised technologies to deliver on their promise for improving healthcare and patient wellbeing, they need to be implemented in such a way that value-based care principles are met. Value-based care is an evidence-based concept which explores how value can be built across the system from a range of stakeholder perspectives that make up the health landscape: the patients, providers, payers, suppliers and society.

Value-based care is distinguishable from low-value care in that it is premised on ethical and well governed medical business models, practice models as well as patient health literacy. This ensures that care is determined based on the achievement of better care and better outcomes not just cost reduction:

- **business models** Low value care and loss of in-person services business models (both commercial and within public health facilities) may favour cheaper phone based services regardless of context and need. For value based care to be achieved through use of digital technologies the limitations of technology need to be realised as well as active steps taken for in-person care when more appropriate;

- **practice models** Low value practice models may result in fragmented care (i.e. lack of coordination of specialist/allied health/EM care with overall healthcare plan). This points to the need for integrated and co-ordinated primary care across all health settings including rural and remote as well as acute and community care when using digital health in the delivery of care;
- **patient health literacy and behaviour** patients may opt for low-value care (i.e. less hassle to use the phone) when this may not in their best health interest. It is vital for patients to be well informed and for patients and their doctors to advocate for the care they need. Regular in person care may be combined with technology delivered care.

Value based care focuses on fair and equitable allocation of resources to areas of need to improve the health and wellbeing of all Australians. A primary area of focus is improving the health outcomes and experiences for patients living with chronic disease, their families, and the community. According to the Australian Institute of Health and Welfare *_AIHW – Australia’s Health 2020 (2020)*, it is estimated that almost half of Australians had 1 or more chronic conditions in 2017–18. Common chronic conditions include cancer, cardiovascular diseases, arthritis, asthma, diabetes, chronic kidney disease and mental and behavioural conditions.

Value based care recognises that the healthcare experiences and outcomes of all Australians is not equal. Generally, Australians can expect to enjoy long and relatively healthy lives, however, there are disparities across some population groups. The AIHW 2020 report puts it that ‘a person’s health is closely linked to the conditions in which they live and work. Factors such as socioeconomic position, educational attainment, employment opportunities, disability status, access to health services, social supports, and the built and natural environments can strengthen or undermine the health of individuals and communities.’ These factors are referred to as the Social Determinants of Health and are used as data points to track person, community and population health and focus on how improvements can be made to the health and wellbeing of all Australians. Often, people living in rural and remote and/or lower socioeconomic areas, people with disability, and Aboriginal and Torres Strait Islander people experience higher rates of illness, hospitalisation and death than other Australians. (AIHW 2020).

Illustrative Example – AIHW Report on Members of the Stolen Generations

Some compelling illustrative data, from the AIHW report (2021), commissioned by the [Healing Foundation](#), *Aboriginal and Torres Strait Islander Stolen Generations aged 50 and over: updated analyses for 2018-2019*, shows connections between trauma, lived experience and health. This data from the stolen generations (dataset aged 50 and over), as a subset of the Aboriginal and Torres Strait Islander population, finds that ‘in 2018–19 there were an estimated 27,200 surviving Aboriginal and Torres Strait Islander people aged 50 and over who had been removed from their families and communities as a result of past government policies. This represents around 1 in 5 (or 21%) of the total estimated Aboriginal and Torres Strait Islander population aged 50 and over in the scope of the 2018–19 National Aboriginal and Torres Strait Islander Health Survey.’ The findings of this report show that ‘stolen generations aged 50 and over face poorer outcomes across a range of health and social measures when compared to other Indigenous (and non-Indigenous Australians) of the same age’, as set out below:

Figure 4: Odds ratio estimates of the effects of being removed for those aged 50 and over, on 17 selected outcomes, 2018–19

Compared with the Indigenous reference group, the Stolen Generations aged 50 and over were

- 1.8 X as likely** Does not own a home
- 1.8 X as likely** Used substances (last 12 months)
- 1.7 X as likely** Current smoker
- 1.7 X as likely** Experienced discrimination due to being Indigenous (last 12 months)
- 1.6 X as likely** Household members could not raise \$2,000 in an emergency
- 1.5 X as likely** Victim of actual or threatened physical harm (last 12 months)
- 1.5 X as likely** Government payments are main source of income
- 1.4 X as likely** Severe or profound disability
- 1.4 X as likely** Poor mental health—Kessler-5 score range 12–25
- 1.3 X as likely** Ever diagnosed with a mental health condition
- 1.3 X as likely** Currently not employed (age 50–64)
- 1.3 X as likely** Household income in bottom 3 deciles (lowest 30%)
- 1.2 X as likely** Poor or fair self-assessed health
- 1.2 X as likely** Living in an overcrowded household
- 1.1 X as likely** Problem(s) accessing health services
- 1.1 X as likely** Does not speak an Indigenous language as main language at home
- 0.8 X as likely** Did not complete Year 12

Figure 2: [Aboriginal and Torres Strait Islander Stolen Generations Aged 50 and over – AIHW \(2021\)](#)

Importantly, we need to move beyond a deficit model to adoption of strength based models of addressing health inequities. This is focused on integration with the good work of many agencies and organisations dedicated to self-determination of resolution of these issues. Strength based models work towards increased recognition and valuing of the social, cultural and political context of Australia’s Indigenous peoples’ lived experience, and practice of cultural safety when working with, and treating Aboriginal and Torres Strait Islander people and families. For Aboriginal and Torres Strait Islander strength based solutions in medicine and medical education see [AIDA](#), [NACCHO](#), [LIME](#) and the [Healing Foundation](#).

Central to this framework in digital health in medicine is consideration of how digital technologies can be used to link to the agenda of cultural safety, people-centred and value-based care linking with experts and good practice to improve rather than further widen the gap between the ‘haves’ and ‘have nots’ across the Australian population. It points to the need to focus on the health of vulnerable groups and to integrate learning about digital health with other broad themes such as equity, and social determinants of health and impacts on healthcare delivery and quality care.

The [National Digital Workforce and Education Roadmap 2020](#) (Figure 3) sets out a clear strategy for the workforce development required now to – 2027. This roadmap has at its centre three horizons which require workplace changes and skills development. This capability framework seeks to align to this strategic platform of change to support the required change for medical professionals in Australia and New Zealand.



	Horizon 1	Horizon 2	Horizon 3
VISION	<p>Embedding safe ethical and effective use of systems of record</p> <p>Healthcare workers and consumers have access to digital health tools and increased access to information, equipping them with greater decision making power.</p>	<p>Integrating new technologies and ways of working</p> <p>Systems and organisations are better connected, enabling them to analyse information, plan and respond to health demands. Emerging digital technologies will re-shape health functions and new roles will emerge. The focus will be in enterprise transformation.</p>	<p>Digital health transformation</p> <p>Healthcare delivery is transformed for example through value based healthcare, personalised medicine, empowered consumers and a shift towards home and community health service delivery and primary and preventative health.</p>
POTENTIAL OUTCOMES & BENEFITS	Efficiency and safety will increase with the introduction of new technologies such as Electronic Medicines Management and My Health Record.	Integrated data sources will be implemented at scale, whilst health technologies will change health jobs (by augmenting or automating tasks) and challenging existing scope of practice.	New models of care will emerge to support the whole of system transformation, such as navigation roles to support consumers.
WORKPLACE CHANGES	Core digital systems will be embedded, consolidating visibility of patient health information and reducing the need for manual data entry.	Enhanced communication through technologies such as eReferrals will increase efficiency, whilst new digital tools will support both patients (i.e. apps for self care) and clinicians (i.e. AI diagnostic tools and genomic pathology).	The use of new technologies will evolve to deliver whole of system improvements through population medicine, precision medicine and predictive analysis.
WORKFORCE AND CAPABILITY REQUIREMENTS	The requirement for change leadership will increase during Horizon 1, with strong delivery of employer provided digital literacy training on the newly implemented EMRs/EHRs.	Nuanced job specific changes will shape capability requirements. Change leadership will focus on Enterprise Transformation, with associated risk and governance frameworks. New technologies will require ethical frameworks and technical capabilities.	Capabilities will reflect new models of care and ways of working including job specific changes (such as health services in the home). Change leadership will focus on System Transformation, with associated risk and governance frameworks.
HEALTH EDUCATION PRIORITIES	Digital Literacy will be the key priority to enable secure and ethical management of individuals' data.	Education pathways that support new and emerging roles in health. Governance, Risk and Ethical training will be the key priority to enable safe and secure ways of working with new technologies.	Governance, Risk and Ethical training will remain important to support new models of care, whilst training on new job requirements will be also needed.
	<p>Now to beyond 2027 →</p> <p>Now to ~2027 →</p> <p>Now to ~2022 →</p>		

Figure 3: National Digital Health and Workforce Roadmap (2020)

Horizon 1: Embedding safe, ethical and effective use of systems of records [now to 2022]

Horizon 1 focuses on the basics of digital medical workflows using current technologies. Current technologies include use of electronic records such as My Health Record, secure messaging, telehealth and electronic prescriptions. A significant part of this first horizon is to develop basic skills in safe and ethical use of digital technologies in the delivery of healthcare. Central to this horizon is to acknowledge that patients too are on their own health and digital literacy learning journey and it will be essential to recognise their skill level and preferences in care. Ethical approaches to digitally enabled practice means that practitioners recognise the importance of cultural safety, the limits of technology and when it is important that patients have access to in-person physical care.

Horizon 2: Integrating new technologies and ways of working [now to 2027]

Emerging technologies can improve people's lives and health in many ways. Technological advancement can help health workers to complete tasks more efficiently, keep patients safer and healthier and protect the environment. There are a variety of potential technologies, at varying stages of development and application (Figure 4).

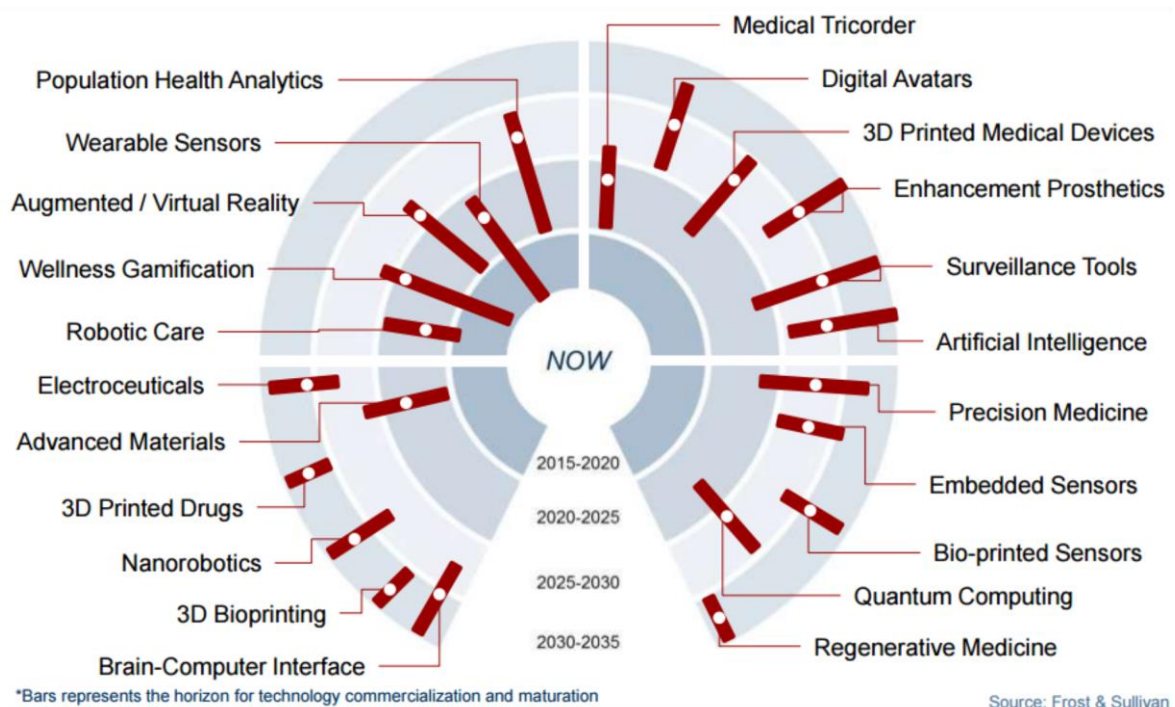


Figure 4: Technology Commercialisation and Maturation – Frost and Sullivan <https://ww2.frost.com/>

Key to learning about these new technologies is for doctors to gain capabilities in how they are used to support decision making, the changes to workflows and work practices, how data sets from these different technologies integrate and how such data can be used for more sophisticated data driven models of care. Furthermore, use of these technologies involves new ethical decisions, as well as, privacy and security issues. Cultural safe practice is embedded in this horizon with new protocols to be negotiated with the introduction of new and emerging practices. Equally, data sovereignty is central to this horizon. A useful ethical guide to such protocols are embodied in the work of the National Centre for Indigenous Genomics with the three pillars of:

'respect for culture and a culture of respect, participants in control of their samples and data, and conducting research that matters to Indigenous Australians and that has potential to make a difference.' <https://nciq.anu.edu.au/about/ethics>

Horizon 3: Digital health transformation [now to beyond 2027]

Horizon 3 is essentially about moving to a world of real-time risk assessment across complex health systems and the use of combined data sets that support continual monitoring and outreach as well as virtual care navigation. We currently have little or no contact with patients between events. Access to data analytics from various sources including patient data such as Patient Reported Experience Measures (PREMs) and Patient Reported Outcomes Measures (PROMs), medicare data, mortality and morbidity data and complication rates provides doctors and other healthcare professionals with the evidence they need about what is working and where improvements can be made. This data also helps guide where support should be targeted. This horizon represents a far more patient-centred and proactive system that challenges current models and funding.

An example of such a shift is managing a person post discharge with cardiovascular disease. The doctor can monitor patients and assess risk using wearable technologies allowing continual monitoring of primary, acute and personal device data as well as triage to live call and intervention as required. Technology improves access to ensure patients have a GP and that they get to that GP. It also involves the use of apps and devices to encourage compliance with medication.

This horizon is fundamentally about team work, empowering patients, and revising roles as well as models of care. This horizon aims for a more cohesive, and connected health system and patient experience. It aims to enable integrated care with social care and priorities of health reform such as improving the health of First Nations peoples, Aged Care, Chronic Disease and Disability.

Why Digital Health in Medicine Matters

Perspectives



Health Consumer

"Digital health empowered me to take care of myself in a safe way, as well as enable my healthcare professional to remotely monitor me."

Ms Debra Letica



Junior Doctor

"Understanding the roles of Clinical Informatics and Data Technology ranked second lowest in the 2019 Preparedness for Internship Survey, with the average intern feeling only somewhat prepared. I now know that I was not alone in feeling like this."

Dr Alice Ngar Wing Leung



Rural & Remote Doctor

"In the Northern Territory 30% of our population is Aboriginal. English may not be their first language and their health and digital literacy may vary significantly. We need to develop models that don't exacerbate the gap but help to close it."

Associate Professor Marco Bricenco



Medical Registrar

"As a proud Wiradjuri man and GP registrar working in Broken Hill for the Flying Doctors' Service, I see the value of digital health to be that it increases access to health services that patients may not usually have. These services provide greater access to those who need it the most."

Dr Justin Gladman

Perspectives



Medical Futurist

"As a proud Yuggera/Biri-Gubba-Juru man, and the first Aboriginal ophthalmologist in Australia, I work hard to ensure my practice is culturally safe by balancing strong connection with patients and use of advanced technologies. I look forward to welcoming the second Indigenous ophthalmologist in Australia and, within my lifetime, to see population parity within medicine."

Associate Professor Kris Rallah Baker



Medical Educator

"We need to prepare medical students to manage the complexity and diversity of systems with which they are going to work and teach them to be adaptable."

Professor Inam Haq



Medical Innovator

"Clinicians in traditional career paths need to learn to work with new technologies. At the same time, new technologies will also open up new career paths."

Dr Amandeep Hansra



Medical Leader

"Clinicians understanding the system implications of individual behavior is critical. Including systems type thinking into basic clinical training is so valuable for our nation. It will allow our healthcare delivery to become increasingly sustainable."

Associate Professor Clair Sullivan

Current State in Digital Health Learning Across the Continuum

Medical Schools and Digital Health Capabilities

There are 23 medical schools in the Australian and New Zealand Higher Education system accredited through the AMC. They are both undergraduate and graduate medical programs. The national and international literature on digital capabilities in medical schools has been explored, which shows many innovative medical education programs which are working hard to integrate digital technologies across medical school programs – see sample case studies on page 22. However, overall there is a gap in current medical school curricula pertaining to the integration of digital capabilities into medical school curricula, teaching and learning, and assessment programs in national and international medical school programs. Showing this is a challenge for medical educators worldwide, Ken Masters (2017) in *Medical Teacher Article AMEE Guide 2017 — Preparing the medical student for the ePatient* acknowledges that ‘medical teachers and professionals may wonder where to find time and space in the curriculum’ (for learning about eHealth) but goes on to argue that ‘educators and doctors need to recognise that patients will use the Internet and apps irrespective of guidance’. In this way, he argues for an increased focus in medical school training on eHealth and the context of the ePatient for medical education providers internationally. It is important to note that patients’ needs, digital literacy and care preferences are varied. In the pre-digital age, the patient-doctor relationship was one where the doctor had the expertise and the relationship with patients was to convey information and enact care. Nowadays, patients are more likely to have done their ‘homework’. They will bring prior knowledge and information into the consulting room and regardless of whether this information is correct or incorrect, they will expect the doctor to take this into account. Equally, patients will come to the consultation with a lived experience and cultural expectations, norms and health practices which needs to be acknowledged and valued within the patient and doctor relationship. This requires a different type of preparation of future doctors in medical education.

Equally, analysis of Australian medical school accreditation standards shows that there is little focus on digital capabilities in the graduate outcomes statement or medical school provider standards. The AMC standards are an acknowledged lever for change, as Edirippulige et al. (2018) highlight in their study of all medical school curricula and interviews with curriculum and program leaders *Its Important, but not important enough: eHealth as a curriculum priority in medical school education in Australia*. In this article, they conclude that ‘medical schools consider eHealth to be important but systemic problems impede its inclusion in the curriculum. Until accrediting bodies expect competence in eHealth the situation is unlikely to change, and the future workforce will remain unprepared.’

Prevocational Medical Training and Digital Health Capabilities

Prevocational Training is the foundation of medical education from which doctors develop competencies after completion of their basic medical qualification. The first two postgraduate years after medical graduation (PGY1 and PGY2) provide a grounding for future vocational training. State and Territory Postgraduate Councils have a responsibility for intern (and PGY2 in most states) accreditation of training posts in health services. Further information on each states’ accreditation process can be viewed on their [respective websites](#). In 2014, the AMC implemented a new national framework for medical internship on behalf of the Medical Board of Australia. The Framework replaced state-based internship requirements and complemented new national registration requirements of the Medical Board of Australia. The AMC is currently conducting a comprehensive review of all of the elements of the National Framework for Medical Internship. The review scope has been expanded to include developing a two-year Capability and Performance Framework, including Entrustable Professional Activities (EPAs), and e-portfolio

specifications on behalf of the Australian Health Ministers' Advisory Council (AHMAC). This work arose from the Health Ministers' response to the recommendations of the 2015 COAG Review of Medical Internship. Further information can be found below on the AMC [website](#).

The Preparedness for Internship Survey is a useful source of information about the current perceived skill level of junior doctors in Australia. The survey has been run jointly between the AMC and the Medical Board of Australia between 2017 and 2019. It is designed to find out how work-ready interns feel after medical school and improve how medical schools prepare graduates for internship. It is sent to all interns in Australia each year. The most recent survey completed in 2019, included a question related to digital health capability. One of the questions in this survey is: "Based on what you learned and experienced at medical school, how prepared do you now feel you were for the following in clinical work: Understanding the role of clinical informatics and data technology in improving healthcare" (1 = not prepared at all to 5 = very well prepared). Results from 2019 Survey showed that this skill was the second-lowest rated of all the skills queried, rating below 3 (= somewhat prepared) (Figure 5).

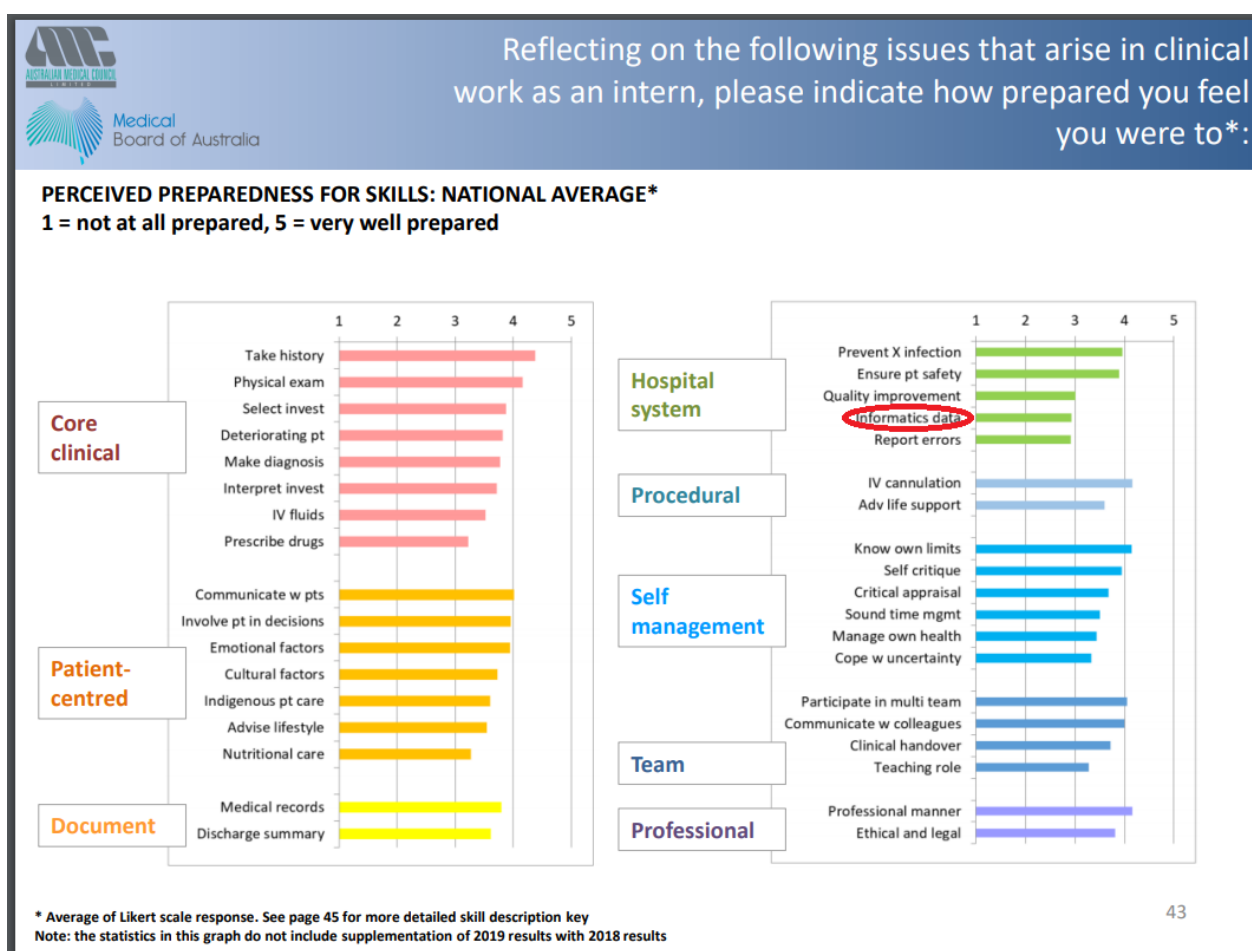


Figure 5: Results of Preparedness for Internship Survey

Specialist Colleges and Digital Health Capabilities – Vocational Training and Continuing Professional Development and Support for International Medical Graduates

Following completion of university medical education and the pre-requisite intern year, medical graduates may decide to undertake specialist medical practice. To do this, they must complete a recognised medical specialty training program. The only accredited providers of such programs are the specialist medical colleges. There are 16 Medical Colleges in Australia, a number of which oversee Australian and New Zealand Medical Programs. Specialist Colleges' programs are accredited by the AMC.

Some standout innovations in Australian Specialist Colleges in terms of forging a strategic platform of change in digital health include the position statement of the Royal Australasian College of Medical Administrators (RACMA) which focuses on recognising the significant impact of digital technologies on health and the role of medical administrators in leading system change. In addition, the Royal Australian and New Zealand College of Radiologists (RANZCR) have produced a paper – Towards Interoperability: Clinical Radiology Forging the Path Ahead, A vision for Clinical Radiology in the World of Digital Health (2020). Furthermore, the Royal Australasian College of Physicians (RACP) has an impressive curated collection of resources to support its members in gaining capabilities in digital health. This curated collection was developed in partnership with the Australian Digital Health Agency. The Australian College of Rural and Remote Medicine (ACRRM) has innovated extensively in the digital space. It has a dedicated digital health team which supports members in their knowledge, skills and confidence using digital technologies. <https://www.acrrm.org.au/resources/college/digital-health> Nevertheless, a review of current vocational specialist training programs and curricula frameworks in specialist colleges shows that digital capabilities are integrated only to some extent across many specialist medical education programs.

Specialist Medical Colleges also have responsibilities for Continuing Professional Development (CPD). CPD is the means by which members of the profession maintain, improve and broaden their knowledge, expertise and competence, and develop the personal and professional qualities required throughout their professional lives. (MBA 2016) In 2016, the Medical Board of Australia introduced a new registration standard for continuing professional development. This registration standard sets out the Medical Board of Australia's minimum requirements for continuing professional development (CPD) for medical practitioners. Medical practitioners who are engaged in any form of practice are required to participate regularly in CPD that is relevant to their scope of practice in order to maintain, develop, update and enhance their knowledge, skills and performance to ensure that they deliver appropriate and safe care. Medical practitioners who have specialist registration must meet the requirements for CPD set by the relevant specialist medical college for every specialty in which they hold specialist registration. There may be CPD activities undertaken that fulfil the CPD requirements of more than one specialist college or specialty, and can only choose a self-directed programme of CPD if that programme meets the requirements for CPD set by the relevant specialist medical college ([MBA consultation 2020](#)).

Specialist Medical Education CPD programs vary in their place on a continuum of change towards reform in lifelong learning to meet the needs of the community and health systems. These reforms can be thought of in terms of a number of key shifts in learning provision:

- ❖ Adopt competency-based systems and monitoring systems, which are digitally enabled to gather learning analytics about competencies and capabilities achieved at multiple touchpoints within the continuum of learning, across different roles, scopes of practice and institutions;

- ❖ Align competency-based system and monitoring systems with broad health priorities based on evidence of health community needs, current gaps in professional practice and a focus on new capabilities for a changing world;
- ❖ Shift thinking about learning so that it is seen as integral to practice with a focus on performance improvement and continuous improvement cycles based on peer learning, authentic learning and assessment tasks rather than simply knowledge acquisition and learning through knowledge dissemination;
- ❖ Recognise and explicitly integrate lifelong learning into the learning pathways and performance improvement practices;
- ❖ Build continuity of lifelong learning across the education continuum and career of all doctors;
- ❖ Shift lifelong learning models from more quantitative measures of success (points, time and activities) to outcomes and impacts;
- ❖ Model and share good practice in lifelong learning nationally and globally;
- ❖ Support design of flexible pathways and options for lifelong learning with a focus on just in time training and micro-credentialling to maximize practice improvement and reduce likelihood of burnout, burden and non-compliance - particularly in low-income and middle-income countries;
- ❖ Expand lifelong learning to health communities, patients, carers and their families;
- ❖ Increase the likelihood of multi-level impacts of lifelong learning through involvements of Nation States, Regions, Health workers, Policy Makers, Educators Leaders and Consumers across the global health systems.

(Adapted from WHO (2019) *Background Paper: Maximising Impacts of Lifelong Learning: Open Models of Recognition for Health Professionals and Global Collaboration*. Global Symposium on Health Workforce and Regulation, Istanbul, 11 December 2019.)

Although the Medical Board standards do not specify content of learning or relate CPD activities to a capability framework, clear indications from the literature on lifelong learning is linkage with a number of key shifts in medical and health practice. Integral to the vision of quality lifelong learning and achievement lifelong learning reform across the globe in medicine is change to the design and implementation of learning systems by building on existing good practice in knowledge dissemination by education providers, and by proposing programs focused on behaviour change in health. Key to such behaviour change is a shift in current practice from disease specific, conventional care to holistic health and primary care which leverages the use of current, emerging and personalised technologies. Equally important is the development of lifelong learning approaches which focus on fostering the health literacy of patients and caregivers by improving their ability to operate effectively as partners in health care. A global consumer-centric health movement is underway that promotes self-care, shared decision-making and engagement with health workers from an informed position. Given these systemic shifts in global health, learners and educational systems are transforming programs of teaching and learning, assessment and certification based on new behaviours, ethics and ways of working. Data is driving this change, which focuses on analysis of current and future needs and measurement of impact of learning and capability development.

Colleges also support the assessment and ongoing learning of International Medical Graduates (IMGs). The International Medical Graduate program brings health professionals who have been trained outside of Australia and may have a different level of digital health foundation knowledge from those educated in Australia. Any gap in digital health knowledge or skill would need to be recognised and filled as part of their training program. IMGs background may vary depending on where they are from, as such there may be variance within the IMG population of exposure

depending on where they have been trained and worked. Many IMGs work in Area of Need areas in rural and remote health settings.

Again, this trend of the lack of focus on digital health capabilities at the postgraduate specialist medical education level is reflected in international trends. A recent systematic review published in BMJ Open 2019 by Jidkov, L et al. comprised a mixed methods study of digital health in UK and international curricula. It drew on a scoping review, curricula content analysis and expert interviews. From 2734 references it identified 21 curricula documents eligible for inclusion including 12 papers from the USA, 3 from Canada, 2 from the Netherlands, 1 from Australia and a collaboration between the Netherlands and Germany. The curricula content analysis found over half of proposed curricular outcomes were not represented in any of the 71 UK postgraduate curricula examined. It concluded that 'Health Informatics education for postgraduate doctors is not fit for purpose, partly due to inconsistencies in HI terminologies and scope within existing HI curricula.' They go on to argue that 'it is unsurprising that without agreement on what to teach, postgraduate training curricula often represent a 'token competency' approach'.

Gap between Interest and Expertise Across the Medical Sector in Digital Health

While the case has been made for including digital capabilities in medical graduates and postgraduate learning and development, there is a gap between interest and expertise across the medical sector in digital health (Figure 6). The gap between the interest and expertise shows the importance of workforce development and education across the medical education continuum. Other literature points to the intense competition globally within the medical profession with young doctors seeing the development of digital capabilities as an opportunity to increase their marketability and likelihood of securing a job. This research highlights the demand and need for the development of capabilities in digital health in medicine. It has seen many doctors turn to professional institutes and bodies such as the Australian Institute of Digital Health (AIDH) <https://digitalhealth.org.au/> as well as join flexible networks such as Creative Careers in Medicine <https://creativecareersinmedicine.com/> to help them to make the necessary step changes required in digital health and improve their digital health literacy as well as meet their career goals.

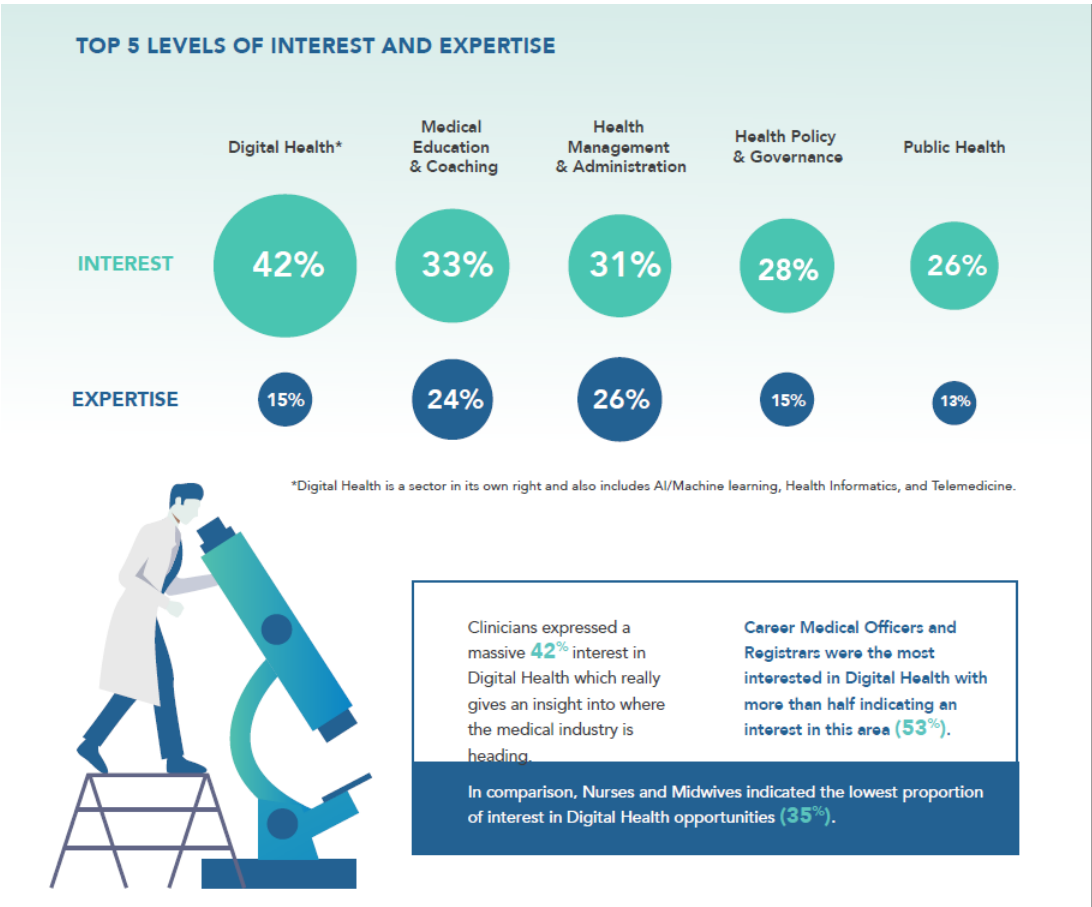


Figure 6: Gap between Interest and Expertise Across Medical Sector in Digital Health. Extract – The Changing Face of Clinical Careers – Career pathways for health professionals beyond traditional clinical roles – (2020) Wavelength international, Ccentric Group and Creative Careers in medicine.

International and National Strategies and Capability Frameworks on Digital Health

The current state analysis which informs the development of a digital health capability framework for medicine also extended to review of National and International Strategies and Reports on Digital Health relevant to Medicine. The literature scan provides a useful background about the need for digital health and the scope and focus of approaches to digital health and workforce development across the globe.

The current state analysis also included a review of seven identified international and national frameworks in digital health identifying six key themes:

Theme 1: Clinical Practice;

Theme 2: Digital Literacy;

Theme 3: Digital Leadership and Collaboration;

Theme 4: Information and Technology;

Theme 5: Organisational; and

Theme 6: Other.

Further information is provided in appendix 5 and 6.

Case Studies from the Continuum

Some exemplary programs in Digital Health in Medical Education Programs on which we have drawn to create a framework to take us forward include:

- University of Queensland and Queensland Health
- University of Sydney
- Deakin University
- RMIT
- Australian College of Rural and Remote Medicine (ACRRM)

Read the case studies of good practice in digital health in medicine developed to inform this framework.

Case Studies

Themes from these strategies, capability frameworks and case studies have been integrated into the proposed framework and further extended. This is explored in the next section of this document – A Framework to Take Us Forward.

A Framework to Take Us Forward

This section of the document sets out the proposed framework for digital health in medicine and is based on the concept of constructive curriculum alignment with the key aligned educational components as set out below.

Constructive Curriculum Alignment

Constructive Curriculum alignment is based on the work of Biggs (1996), an Australian Higher Education expert. He pointed out that where a lot of education programs fall down is that the educational components don't work as a mutually reinforcing system and can in fact set learners up for failure i.e. assessment doesn't align with the learning outcomes. This encourages us to do mapping between the components.

Digital health is like any other medical education priority - it needs to be underpinned by good medical education practice and integrated into aligned components of the medical education program:

Core Purpose	The framework has as its core purpose the building and delivery of culturally safe, person and value-based care leveraged through effective use of current, emerging and future technologies.
Domains	<p>This framework sets out seven domains of digital health in medicine each with three sub-domains and key outcomes of learning.</p> <p>These outcomes are aligned with the teaching and learning and assessment programs and are used as metrics in the evaluation of impact.</p> <p>The domains, subdomains and associated learning outcomes are aligned to and integrated into the three EPAs.</p>
Teaching and Learning Program	The teaching and learning program in digital health models effective use of digital technologies and provides learning opportunities at the four levels of performance for each EPA – knowledge, routinised practice, problem solving and leadership.
Assessment Program	The assessment program in digital health is delivered through the EPAs with the support of a supervisor or peer assessor at the four levels of performance for each EPA – knowledge, routinised practice, problem solving and leadership.
Measurement of success and impact	Measurement of success and impact relates to the need to examine the effectiveness of the digital health learning and assessment at a program level.

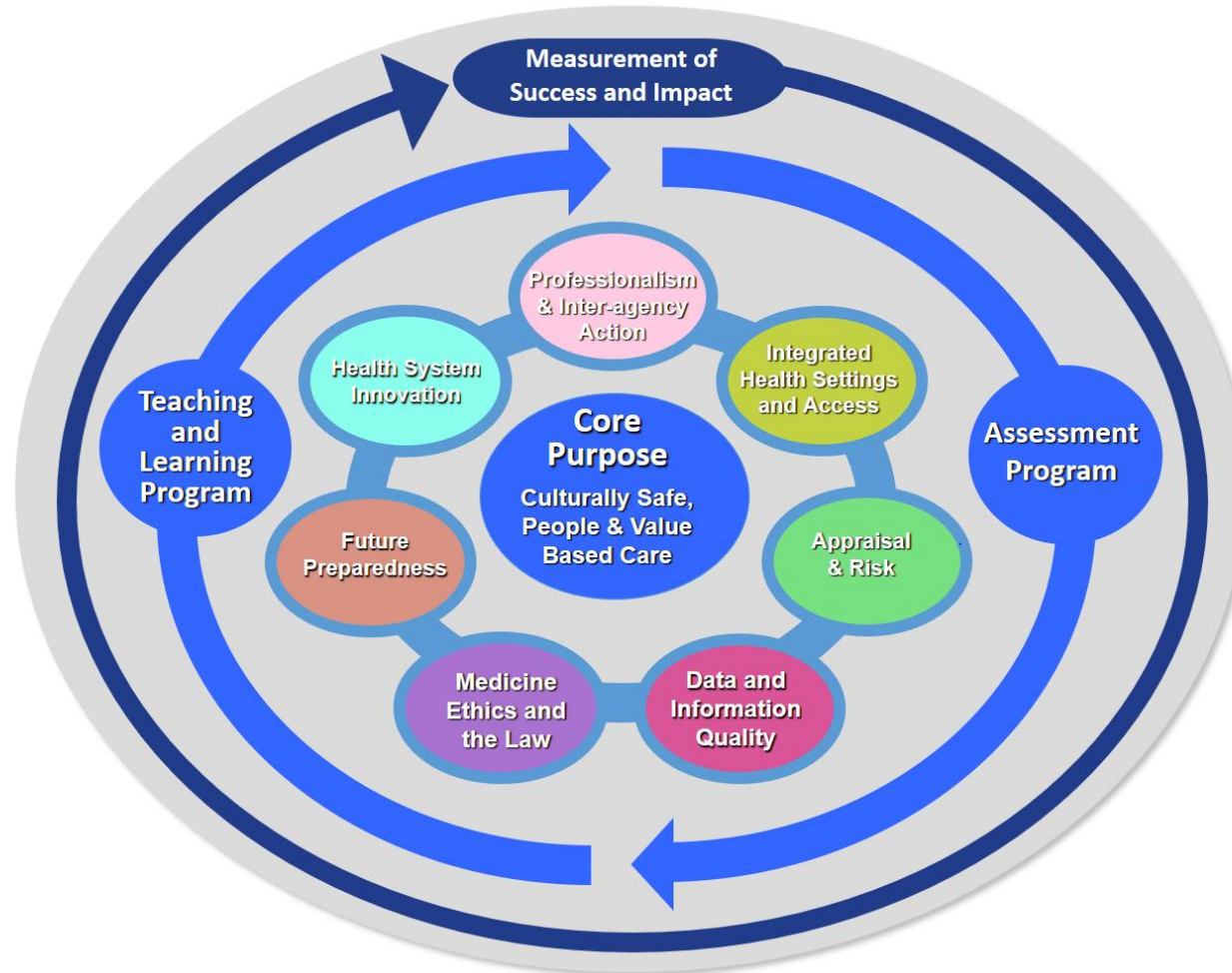


Figure 7: A model of digital health in medicine based on the concept of constructive curriculum alignment – adapted from Biggs, J (1996) *Enhancing Teaching Through Constructive Alignment*. *Higher Education* 32, 347-364.

Core Purpose

The framework has as its core purpose the building and delivery of culturally safe, people and value-based care leveraged through effective use of current, emerging and future technologies.

1. Culturally Safe, People and Value-Based Care

1.1 Cultural safety and Improved Patient Experiences and Outcomes Ensures that digitally enabled medical education and medical care is culturally safe and focused on the improvement of equity in patient experience, access and health outcomes.

The AMC endorses the AHPRA and National Boards National Scheme's Aboriginal Torres Strait Islander Health and Cultural Strategy (2020-2025) on cultural safety. Cultural safety 'is determined by Aboriginal and Torres Strait Islander individuals, families and communities. Culturally safe practise is the ongoing critical reflection of health practitioner knowledge, skills, attitudes, practising behaviours and power differentials in delivering safe, accessible and responsive healthcare free of racism. To ensure culturally safe and respectful practice, health practitioners must:

- a. Acknowledge colonisation and systemic racism, social, cultural, behavioural and economic factors which impact individual and community health;
- b. Acknowledge and address individual racism, their own biases, assumptions, stereotypes and prejudices and provide care that is holistic, free of bias and racism;
- c. Recognise the importance of self-determined decision-making, partnership and collaboration in healthcare which is driven by the individual, family and community;
- d. Foster a safe working environment through leadership to support the rights and dignity of Aboriginal and Torres Strait Islander people and colleagues.' ([AHPRA and National Boards National Scheme's Aboriginal and Torres Strait Islander Health and Cultural Safety Strategy 2020-2025](#))

Placing cultural safety at the core of this framework provides a focus on the needs of Aboriginal and Torres Strait Islander patients and the importance of culturally safe practice in digital medicine to close the gap in health (AIDA 2021). Equally, in line with the [Medical Council of New Zealand statement on cultural safety](#) (20219) a broad range of contexts and communities are acknowledged 'Developing cultural safety is expected to provide benefits for patients and communities across multiple cultural dimensions which may include Indigenous status, age or generation, gender, sexual orientation, socioeconomic status, ethnicity, religious or spiritual belief and disability¹. In Aotearoa / New Zealand, cultural safety is of particular importance in the attainment of equitable health outcomes for Māori.'

1.2 Needs and expectations Focuses on patients, their families and community expectations and needs in digital health – acknowledging diversity and specific health needs of a broad range of vulnerable and marginalised groups in our health community and the role of

digital technologies to ensure equity in delivery of safe and quality care. This framework explores alignment with the [National Digital Health Workforce and Education Roadmap \(2020\)](#) and a wide range of other platforms of health reform such as prevention of [chronic disease](#), better access to healthcare in [rural and remote](#) areas, [closing the gap](#) of inequality in health outcomes and experiences of Aboriginal and Torres Strait Islander and Māori peoples, achievement of [cultural safety in healthcare](#) and elimination of [violence, abuse, neglect and exploitation of people with disability](#), the health and wellbeing of those impacted by [domestic violence](#), the health and wellbeing of [refugees](#) and migrants, and the [LGBTIQ+ community](#) and better quality and safety in [Aged Care](#) and better health and support for [prisoners](#) and the [homeless](#).

1.3 Lifelong health and digital literacy journeys Recognises that patients are on a health journey whereby they too are developing their digital and health literacy. Adopt a critically aware and reflective stance to use of digital technologies in recognition that technology advancement may deepen the gaps for marginalised communities such as migrants and refugees and migrants and older people who may not have access to the required technologies. Shows a commitment to partnership with patients and other healthcare professionals within culturally safe environments committed to equitable access and integrated care.

This framework puts culturally safe, patient-centred and value-based care at the centre of digital health provision.

Central to the achievement of this core purpose is the building of a digitally capable medical workforce. It is vital that cultural safety, people-centred and value based care is explicitly taught, learnt and assessed and used as metrics to measure success of the medical education digital health program impact.

Domains – Digital Health in Medicine

The domains and sub-domains below outline the focus of expertise which needs to be developed by doctors across the continuum of medical education. These domains align with the three horizons of the National Digital Workforce and Education Roadmap, are integrated into the learning outcomes of the associated EPAs and are reinforced in medical education teaching and learning and assessment programs. In addition, they form key metrics to measure success and impact of the digital health program.

1. Health System Innovation

1.1 Current state Recognises the current barriers and enablers of good medical practice and the role of digital health in addressing current challenges in health systems and settings.

1.2 Future State Has an awareness of future trends in good medical practice and the role of digital health in system and patient and community health improvement.

1.3 Continuous improvement Innovates through system review and/or research focused on exploring digital health implications in continuous improvement of systems and patient and community health outcomes, experiences and access.

This domain requires an understanding of the health system in its current and future states. It further requires an appreciation that there is an ongoing need for continuous improvement in order to provide high value and quality care.

2. Professionalism & Inter-Agency Action

2.1 Medical Recognises digital health as integral to the expertise required of all generations of the medical profession across a diverse range of specialties, fields and scopes of practice – sharing digital information, data and content appropriately across the medical professions.

2.2 Interprofessional Works with respect and shares digital information with other health professionals recognising their roles and workflows in achieving health outcomes and better experiences and access for patients, their families and communities through leveraging digital technologies.

2.3 Inter-Agency Works with respect with a broad range of agencies and bodies which impact health recognising their role and support in achieving better health outcomes, experiences and access for patients, their families and communities leveraged through digital technologies.

This domain emphasises the need for medical professionals to work collaboratively with many other health professionals as part of a broader healthcare team to explore how digital technologies can be leveraged in healthcare delivery. It recognises the link between health and other sectors the social sector, employment and legal systems (WHO 2015). Increased inter-agency action means bigger picture thinking in healthcare practice about the determinants of health and the fostering of relationships with experts in the law, employment agencies, immigration, mining, agriculture, social services, disability, mental health and housing among others to foster better outcomes for patients, their families and communities and to better meet their complex care needs through leveraging digital technologies.

3. Integrated Health Settings and Access

3.1 Community Seeks to understand the community demographics of the health communities they serve with a focus on the health of vulnerable health groups and explores how digital health can be leveraged to improve their care, access and health experiences and outcomes with a focus on patient safety, adoption of the principles of trauma aware healing, prevention and wellness. This also extends to use of effective communication technologies for Culturally and Linguistically Diverse (CALD) people or hearing impaired using captioning, mobile health to address communication barriers for consent purposes, clinical trial recruitment, explanation and medication communication

3.2 Hospital Familiarises themselves with the digital technologies in local hospital settings as well as interoperability of technologies required for follow up with other health settings.

3.3 Personalised Explores with patients, families and communities healthcare delivery in home settings and with respect to personal circumstances – adapting medical advice and support accordingly, with a focus on achieving integrated, culturally safe, people-centred and value-based care leveraged through technology.

This domain takes into account the various population levels and settings which digital technology can affect. There is natural connectivity through these population levels, and diverse settings requiring a broad understanding of health. This domain recognises that ‘accessing digital health is not necessarily intuitive for anyone. This also holds true for patients for whom English is often is their second, third or fourth language. For example, knowledge about proximity, body language and relationships is vital to providing culturally safe care for Indigenous patients and the curriculum on digital medical treatment should be as diverse as the people the medical students and practitioners will be working with. Skills need to be developed around culturally safe communication, working with speakers of other languages in a digital format, and relationship building across digital platforms. ‘ AIDA (2021).

4. Appraisal and Risk

4.1 Critical appraisal of technologies Critically appraises the utility and sources of current, emerging and future technologies in relation to good medical practice (representativeness of the data sets, data useability, cultural safety, unintended consequences and ease of use) and is able to recommend appropriate digital technologies for their environment and the specific needs of their patients, families and communities.

4.2 Privacy, intellectual property and security Has a deep understanding of privacy and security issues and intellectual property in digital health in medicine and respects the views of patients, their carers and communities as well as other health professionals and system requirements and guidelines.

4.3 Implementation barriers and solutions Has an awareness of implementation barriers and risks in digital health and works actively, individually and with others, to contribute constructively to system solutions including awareness of protocols in the event of emergencies when IT systems are unavailable (due to equipment failure, hackers, ransomware, attack or routine upgrade or maintenance which may involve reverting to paper-based systems).

Technology is constantly evolving and medical professionals will be required to critically appraise new technologies and further understand how these technologies can be integrated into care in a manner that maintains patient confidentiality and privacy and recognises implementation challenges and is solution focused.

5. Data and Information Quality

5.1 Data quality Has an awareness of the importance of data quality and commits to the production of good quality data within healthcare environments aligned with standards for making data computable and interoperable to support good decision making and access to care.

5.1 Data management Seeks to build shared understandings of the value of digital health, terminology and concepts in healthcare settings, contributes actively to capture, recording and aggregation, storage and has an awareness of the benefits and challenges of accessing data analytics from various sources including patient data such as Patient Reported Experience Measures (PREMs) and Patient Reported Outcomes Measures (PROMs), medicare data, mortality and morbidity data and complication rates to provide doctors and other healthcare professionals with the evidence they need about what is working and where improvements can be made.

5.3 Information creation, use and sovereignty Recognises the connection between the provision of patient centred care, cultural safety and awareness of potential bias in data and the required data protocols and infrastructure to ensure effective creation, and sovereignty of digital health data. Data sovereignty is a concept which is well developed in the literature related to Indigenous Peoples. The 5 key principles also apply more broadly as best practice data management and include the following 5 key questions: for whom are we collecting the data; how do we collect the data; what should be measured; who should control the information; and what are the data for (David. M. 2016 Data and the United Nations Declaration on the Rights of Indigenous Peoples. Page 29. In Tahu Kukutai, John Taylor. *Indigenous Data Sovereignty: Toward an agenda*. ANU Press.) The Indigenous Data Sovereignty Principles of Aboriginal and Torres Strait Islanders [Maiam nayri Wingara](#) (2018) is part of 'a global movement concerned with the right of Indigenous peoples to govern the creation, collection, ownership and application of their data. Indigenous Data Sovereignty is outlined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Australia has declared its support of the UNDRIP.' [Te Mana Raraunga](#) is the Māori Data Sovereignty network.

The professional will require knowledge regarding how data is accessed, managed and controlled. Understanding issues related to freedom of information, the potential bias in data and information sovereignty are key factors related to overall patient privacy confidentiality and impact access, equity and quality care.

6. Medicine, Ethics and the Law

6.1 Clinical workflows and pathways Understands clinical workflows and pathways and commits to shifting practice to support new ways of working leveraged through digital health.

6.2 Clinical expertise and lifelong learning Recognises digital health is core to clinical expertise and needs to be part of lifelong learning.

6.3 Ethics, policy and the law Engages with digitally health enabled practice ethically, in line with policy parameters, regulation, security, privacy and cultural and legal requirements.

The ongoing evolution of digital medicine will require professionals to continuously update and augment their clinical practice, as well as understand the associated ethical, policy frameworks and legal aspects. This domain includes a wide range of new ethical dilemmas and considerations to resolve and incorporate into the professional practice of doctors. Examples include recognition of privacy, security and new protocols with the advent of new ways of working and communication for social media, information sharing and data control.

7. Future Preparedness

7.1 Challenges in health Anticipates and plans to address current, emerging and future trends in health through exploring the role of digital health in medicine and improvements to health care delivery.

7.2 Opportunities and risks Plans to mitigate risk and creates opportunities through exploring the role of digital health in medicine.

7.3 Redundancy Identifies redundancy and shifts medical practice to new ways of working leveraged through digital technologies.

This domains addresses future preparedness, where the professional is able to anticipate future technology evolution and mitigate risk while capitalising on opportunity. There is also a need to understand redundant systems to identify where cost and time savings can be made where practices have evolved and are superseded.

Teaching and Learning Program

Teaching and Learning programs need to comprise a variety of strategies including access to self-directed learning resources to build learner knowledge and experience. Such strategies may include factsheets, webinars, online modules and observation opportunities. It is also vital that learners build capability in routinised and complex care contexts in a diversity of settings and with a range of different patient, family and community groups including vulnerable health groups. Learning opportunities need to build capability include simulated learning experience i.e. an EMR sandpit and simulated consultations, guided observation and assessment tasks with supervisory feedback, audits, peer discussion of results and professional reflections on lessons learnt and personal and system learning. In this way learning models good practice in digital technologies and provides authentic and safe environments to build digital capability using current, emerging and personalised technologies.

For a framework for digital health in medicine to work we need to consider how we will convince the educational leadership the supervisory workforce and peer reviewers for those already in practice to help foster lifelong learning experiences and peer supported learning in digital health aligned to 21st century healthcare needs. It is vital that they are well supported to undertake professional development opportunities in digital health so that they can best support other more junior staff and navigate change to workflows impacting their own work practices effectively.

The curation and development of the associated support resources is central to the successful implementation of the proposed digital capability framework in medicine as well as awareness building with supervisors, peer reviewers and Medical Education and System Leaders so that they have an understanding of the aims and scope of the National Digital Health Roadmap and the associated framework for workforce capability development in medicine, supporting teaching and learning, as well as, assessment guides. For further information on implementation considerations see the final section of this report.

Assessment Program

Assessment is integral to education programs across the continuum of health education. It is the mechanism by which the medical education provider determines the ability of individual members to meet specific milestones of the training program and ultimately measures readiness for unsupervised practice. Assessment is also fundamentally a learning process in itself. It has long been recognised that assessment drives learning but increasingly assessment *for* learning is emphasised. Assessment should promote learning. Assessment of digital capabilities needs to draw on and integrate into existing good practice in assessment in medical education. A key idea within assessment is that it needs to be authentic so that assessment mirrors real world tasks and priorities.

For supervisors and at a system level there is a growing acknowledgement that we need better systems to ascertain what doctors can be entrusted to perform in the workplace through more rigorous programs of assessment. Equally, assessment is useful not only to guide the practice and improvement of junior doctors and doctors in training, but also their more senior colleagues. Peer review and peer assessment are well established ways for senior doctors to improve their practice and learn new skills.

Newer thinking about assessment has focused on the link between assessment and learning (Cilliers FJ, Schuwirth LWT, Adendorff HJ, et al. 2010; Cilliers FJ, Schuwirth LWT, Herman N, et al. 2012.) and feedback (Ericsson KA. 2007; Boud, D and Molloy, E 2012). Assessments should ideally provide feedback on a variety of aspects of practice, such as clinical knowledge, communication and quality and safety. This acknowledges that assessment is a powerful way to improve performance and this is best achieved through support rather than punitive means. Assessments should also be undertaken across a broad range of contexts and include different methods such as direct observation, case discussions, audit and opportunities for reflection. It is through multiple biopsies of a learner's performance and ongoing feedback that a complete and more accurate picture of their level of ability can be formed and learning is consolidated (Schuwirth LWT, Van der Vleuten 2011.) Assessment has also seen a shift from purely psychometric concerns of assessment focused on statistical analysis of validity and reliability (Norcini et al 1985) to the use of qualitative measures, which are more aligned to the recognition of the subjective nature of assessment decision making (Hodges, B 2014). Van der Vleuten (1996) strengthens this position with the observation that utility is a compromise between reliability, validity, educational impact, cost and acceptability, but in that compromise none of these five aspects can be zero. That compromise is important because it requires fit for purpose thinking and is therefore an essential steppingstone towards programmatic assessment.

Programmatic Assessment, first proposed by leading medical educators Professors Cees van der Vleuten and Lambert Schuwirth, is a useful term which encapsulates the key concepts underpinning newer ways of thinking about health education assessment. Central tenets are the need for more transparent benchmarking of assessments across providers (Schuwirth LWT, Van der Vleuten CPM. 2011), and standard setting (Weller JM, Misur M, Nicolson S, et al. 2014; Cook DA, Kuper A, Hatala R, et al. 2016). Newer thinking about determining the quality of assessment also highlights the question of the role of the learner in assessing their own performance, supervisors and other stakeholders including other health workers, employers and consumers. Also, part of the movement towards more contemporary evidence-based decision making in assessment is the use of technology enabled reporting to assist with the storage and interpretation of assessment data (Moonen-van Loon, J.M.W., Overeem, K., Donkers, H.H.L.M. et al. 2013).

Bringing it Together – A Good Practice Approach: Integrating Digital Learning and Assessment into Medical Workflows

Implementing education programs in complex environments such as health is challenging. This is largely because workloads are high and there is a constant tension in balancing service and learning needs. Equally, many doctors perform both clinical care roles and operate at a strategic change level creating population health and strategic solutions impacting national and global health system and health communities. Furthermore, many doctors have more than one specialist qualification. Because of this, it is important to find learning solutions which maximise opportunities for doctors to integrate learning into various healthcare roles and across a wide range of workflows with the support of their supervisors or peer assessors.

Central to the framework is the concept that patients are on a health journey whereby they too are developing their digital and health literacy. This learning is best achieved in partnership with their doctors and other healthcare professionals within a culturally safe environment of integrated care. Supporting patients are doctors who work in clinical care roles, involving direct work with them and at a system change level.

This framework offers an Entrustable Professional Activity (EPA) for the 3 horizons of the National Digital Health Workforce and Education Roadmap. The concept of EPAs is based on the work of the Dutch Medical Educationalist ten Cate (2006) who developed EPAs to address some of the concerns of the integration of competency based training into complex systems such as health. EPA based programs have been widely adopted in medical education nationally and internationally. EPAs are essentially priority work tasks which have:

- specific learning outcomes
- scaffolded teaching and learning support
- assessment through direct observation to ascertain the doctor's evolving level of performance.

It is anticipated that doctors will undertake the EPA for each of the three horizons, which best meet their roles, career aspirations and the needs of the health community they serve.

Three Entrustable Professional Activities (EPAs)

- Acknowledge in the framework that patients, their families and the community have learning needs too and are on their own digital and health literacy journeys
- Focus on good practice in medicine and position technology as an enabling tool
- Create learning and assessment pathways for clinical care doctors and those involved in system change.

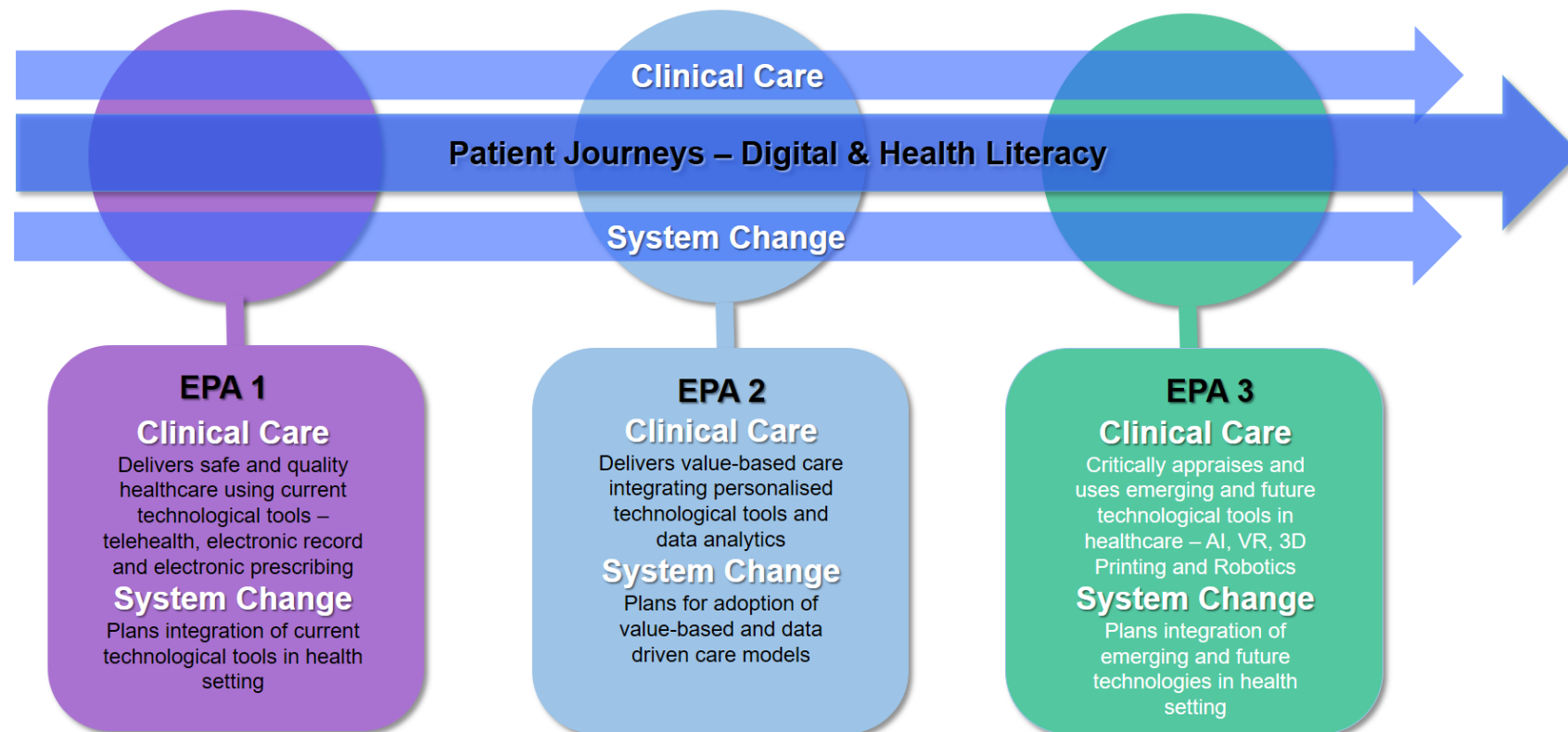


Figure 8: The EPA based Framework

EPAs operate at four distinct levels: Knowledge, Routinised Practice, Complex Contexts and Problem Solving and Leadership. Aligned with the timeframes of the three horizons of the National and Digital Health Workforce and Education Roadmap, all EPAs are relevant now and can be undertaken in the order which best suits individual specialist needs and setting requirements. For the purposes of this framework horizon 2 and 3 have been reversed to reflect the likely access to and roll out of emerging technologies across Australian healthcare settings in the coming years. For EPA constructive curriculum alignment templates, see Appendix 1-3.

Integrating Digital Health in Medicine Across Programs and Measuring Success

6 Flexible Approaches to Integration of Digital Health in Medicine

- For a long period of time educationalists and medical education have focused on spiral learning and vertical integration. The implication of this for the teaching and learning and assessment of digital health in medicine is that it is best implemented by integrating with other key themes in the program and not as an isolated block of learning in the curriculum.
- Learning and assessment of digital health in medicine is ideally woven as a theme throughout the program. The advantage is that this allows for reflection, and connection between concepts. Equally learners develop medical concepts and their application in a range of settings holistically throughout the program. This allows the learners to incrementally build their skills and growing understandings
- A focus on integration strengthens our key message that technology is a tool not the focus of program outcomes - it enables good medical practice
- Integration is also more sustainable in that it helps with the context of learning we have - fast paced environments where it is difficult to balance service delivery and learning
- We need to focus on improving delivery of health services - so learning needs to be integrated into medical workflows. Integration improves the likelihood of uptake and use by time poor medical health professionals.




 <p>1. Assess the maturity of digital health in your medical education program</p>	 <p>2. Undertake common learning across the continuum to deal with shared disruption</p>	 <p>3. Integrate Bite Sized Learning at different levels across the continuum</p>
<p>What it looks like in practice</p> <p>This option acknowledges that education providers will be at different levels of maturity in terms of integrating digital health into their medical education programs. Map the outcomes in your existing program to the minimum standards in this framework.</p> <p>Think about small changes to your current program to address any gaps and identify ways to weave learning in digital health into your programs i.e. how does your current curricula relate to the digital health outcome in this framework – core purpose, EPAs domains, teaching and learning, assessment and measurement of impact.</p> <p>For example, think about how the patient consult could be delivered using telehealth and the new ethical, privacy, patient safety, quality care and knowledge and skills to make it work.</p> <p>A further priority is to ask how you will integrate the capabilities you are developing in your program in digital health with other key themes in your curriculum i.e. improving healthcare for Aboriginal and Torres Strait Islanders and Māori peoples, disability, aged care and migrant and refugee health.</p> <p>Think about the bigger changes you plan to integrate into future curricula renewal projects</p>	<p>What it looks like in practice</p> <p>Undertake the EPAs as designed to meet just in time learning needs in digital health capability development across the continuum.</p> <p>This approach recognises the learning needs of all generations of doctors and seeks to ensure that all meet a minimum standard of competence in digital health in medicine. It also considers that this common learning will help providers to share resources and build collegiality across the sector.</p>	<p>What it looks like in practice</p> <p>Integrate the EPA outcomes and learning and assessment across the continuum and program – scaffolded and woven into program.</p> <p>Integrated with different program units depending on approach in curriculum – problem based learning, case based, discipline, clinical workflows, priorities in health focused on in you program – Aboriginal and Torres Strait Islander and Māori Health and etc.</p> <p>Integrate the levels, teaching and learning and assessment at different stages throughout your program and the continuum:</p> <ul style="list-style-type: none"> - Knowledge (i.e. earlier stages of med school) - Routinised practice (i.e. integrated into first rotations and supervised practice) - Problem solving (i.e. integrated into more advanced rotations further in training) - Leadership – development of specific roles – later in training.

Figure 9: 6 Flexible approaches to integrate digital health capabilities into your medical education program (continued overleaf)



4. Build on the Samples Provided

What it looks like in practice

Build out your program based on the ideas in this framework or forge links with other providers in the spirit of “Not reinventing the wheel” - look at our case studies. The samples in this framework focus on clinical care and system change roles. Doctors may undertake a range of roles related to technology and medicine i.e. Education design and delivery, strategic boundary spanners, Executive leadership, research, Technical IT, Media and Communication, Advocacy, Global aid and collaborations. You may choose to evolve your program so that it is more targeted to supporting your learners take on new medical workforce roles related to digital health in medicine. We would be happy to work with you further on developing these new EPAs or showcasing your work with others as part of our communities of practice in digital health in medicine.



5. Create Local Learning Set in Digital Health in Medicine

What it looks like in practice

Build a local community of practice around digital health to support inter-professionalism, improved health care delivery, digital health change and workforce development. Or integrate digital health into your existing Grandrounds or Schwarz Rounds sessions in your local health setting. System level medical health professionals and those medical specialists involved in clinical care undertake the EPAs in this framework. Learners, and supervisors/peer reviewers form a local learning set to discuss multi-level learning experiences and outcomes and implications at a health delivery level and for system change. Consider inviting other health professionals as well as patients and their families to learn together to develop digital and healthcare literacy, develop capabilities and bring about improvements in healthcare and systems.



6. More Information? Want to Collaborate Further?

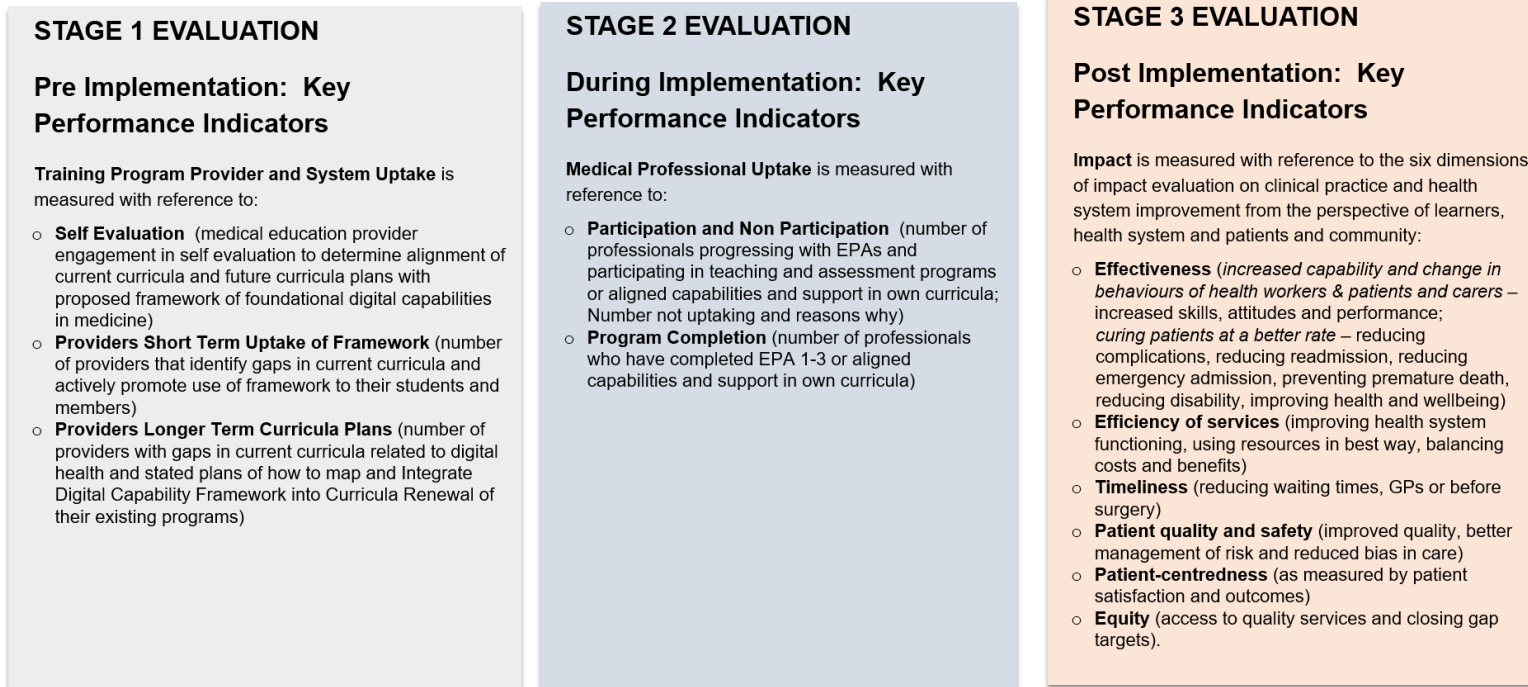
What it looks like in practice

Have other ideas about how you could flexibly integrate this framework into your program? Or need further support with your program design and implementation? Willing to share your experience of running a local learning set or designing and implementing digital health as part of your program? Have resources you have developed to support your program? We would love to hear from you – email us your comments or questions and join the digital health in medicine community of practice network.

Figure 10: 6 Flexible approaches to integrate digital health capabilities into your medical education program.

Evaluation of Impact

Impact data can be generated from surveys and longitudinal studies to ascertain training program innovation and patient and health community experiences and impacts. Evaluation techniques such as contribution analysis, and ethnographies can be used to gather qualitative data through direct observation of practice, combined with quantitative data. This includes the identification of planned and unintended consequences of change interventions. The use of learning analytics and integration of the collection of data into curriculum design and technology delivery systems is paramount to contemporary evidence-based measurement of impact. An excellent resource for evaluation practice in Aboriginal and Torres Strait Islander settings can be accessed [here](#). This resource is a useful guide to support ethical evaluation practice:



Evaluation Levels for Health Education (adapted from Belfield et al, 2001) WHO Impact Measures in Health and the GRASP Framework, Khalifa et al. 2019.

Figure 11. Evaluation levels for health education (adapted from Belfield et al, 2001) and the GRASP Framework, Khalifa et al. 2019

Proposed Next Steps

Implementation challenges

Some key challenges in medical education curricula change include:

- The crowded curriculum
- Importance of not reinventing the wheel – leveraging off good practice
- Professional development of supervisors to equip them to undertake new learning models
- Curriculum change management
- Agile project innovation
- Resistance to change
- Ensuring models are fit for purpose – stakeholders have opportunities to have their say
- Communication of change
- Technology infrastructure and access for doctors and their patients
- Implementing competency-based approaches so they move being tick box to integrated programs of learning
- Implementation so that learning intervention works across diverse settings
- Monitoring and support of uptake and success to inform continuous improvement.

Some proposed next steps and implementation dependencies are as follows:

Pilot	Description
Pilot Design and Implementation of Capability Framework	A pilot of the design and implementation of the proposed medical education framework in digital health is conducted across jurisdictions and with the support of medical education providers across the continuum of medical education.
Implementation Dependencies	
Community of Practice	Collaborative, ongoing and sustained support needs to be provided so that education providers, health services and other stakeholders of medicine can share good practice examples in digital health in medical education. More advanced and well-resourced providers can share lessons learnt and good practice models are achieved through collaboration which ensures that smaller providers are not left behind. COPs ensure that the implementation is fit for purpose, supportive and collaborative.
Accreditation Standards	Design and approve AMC accreditation in digital health to clarify expectations, share good practice examples and support curriculum change across the continuum.

Communication	<p>Clear information needs to be provided about the pilot and proposed implementation of the capability framework to medical education providers and jurisdictions. This needs to align with the broader Commonwealth Government plans for capability development of the health workforce across the health system.</p>
Technology	<p>A critical success factor of implementation will be fair and equitable access to emerging technologies by all medical practitioners and their patients. This will be important so that all doctors have access to the required technologies to achieve entrustment and experience with the required technologies for each of the three horizons and related EPAs and that patients have the care they need. In this way, equity of access will be assured, bottlenecks in training will not result and technology is more likely to deliver on one of its core promises and advantages: to improve access and equity in healthcare delivery and education in all healthcare settings.</p> <p>Technology requirements for the horizons is as follows:</p> <ul style="list-style-type: none"> • Telehealth (Horizon 1) • Electronic Record System (Horizon 1) • Genomics (Horizon 2) • Advanced Robotics (Horizon 2) • Artificial Intelligence (Horizon 2) • 3D Printing (Horizon 2) • Consumer health app or home technology devices (Horizon 3). <p>A current risk is that smaller rural sites may have less access to emerging technologies than larger and better resourced flagship hospital settings in metropolitan areas. Equally, for horizon 3 technology some consumer groups i.e., aged care may have limited expertise and digital literacy in using consumer centred technology.</p> <p>The need to advocate for the funding of accessible digital technologies for patients, as pointed out by AIDA (2021), is especially important for Aboriginal and Torres Strait Islander patients. According to the 2019 Australian Digital Inclusion Index, 'Indigenous Australians scored below the national average in each of the three areas - access, affordability, and digital ability - with affordability showing the largest gap.' Winyama Digital Solutions 2021 How can we Close the Digital Divide These considerations should be built into next steps of the digital health in medicine capability framework implementation if it is to also contribute to achievement of targets in closing the health gap between Indigenous and non-Indigenous patients.</p>
Education Resources	<p>The EPA templates, teaching and learning programs, and assessment programs suggest a number of education resources which will help support the learning of medical doctors across the continuum. Base curated resources need to be available for the pilot so that medical professionals can learn knowledge, skills and attitudes relevant to each</p>

	<p>of the tasks and associated horizon in the Australian National Framework. The model will also require increased infrastructure i.e., learning management platform, and ePortfolio.</p> <p>Equally, it would be useful to consider how micro-credentials in Digital Capability Development could be offered as part of a broader Certificate of Health Reform with other micro-credentials on priorities such as Aboriginal and Torres Strait Islander Healthcare, Aged Care, Disability, Improving Access and Equity in Healthcare, Training Pathways etc.</p>
<p>People Engagement and Training (Awareness and Skills Development Training)</p>	<p>There needs to be recognition that all groups are time poor and there are many competing priorities for their attention.</p> <p>System Leaders and Medical Education Leaders: Health system leaders across the jurisdiction and in Commonwealth Departments and Medical Education leaders in jurisdictions and medical education providers need to have opportunities to gain awareness of the Digital Health Capability Framework in Medicine and implications for their medical workforce and others across the health system.</p> <p>Medical Education Supervisors: Vital to the success of the implementation of the pilot and subsequent adopted approaches in capability development across education provider in digital health in medicine is the need to provide quality supervisor training to ensure that supervisors have an awareness of the framework and build skills so that they can implement the framework effectively and integrate it into their teaching and supervisory practice.</p> <p>Digital Experts in Jurisdictions, Health Workers, Community Support and Technical Support People: Digital champions, health workers, support people and the technical support teams across the jurisdictions need to be aware of this framework and the associated technology requirements. They need to be ready to act as champions for the implementation of this framework in their setting and provide the technical and community support for its implementation.</p>
<p>Impact Evaluation</p>	<p>Analyse the success and challenges of the proposed framework so recommendations for further improvement can be made. Technology solutions for data collection and analysis of impact need to be confirmed. Impact evaluation needs to focus on the success of the learning intervention and consider a myriad of interacting factors within complex systems such as health and medical education.</p>
<p>Research</p>	<p>Further research including conference presentations, publications and pilot studies should be undertaken to contribute to the body of evidence in the formal literature of digital health in medical education.</p>
<p>Implementation Plans</p>	<p>Following adjustments to the framework implementation plans are developed aligned with pilot recommendations which test implementation in a range of settings and contexts. Implementation plans need to include clear roles and responsibilities for different stakeholders, models of sustained resourcing, key milestones and dependencies.</p>

Further possible digital roles to inform next steps in digital health capability development across the continuum in medical education:

This framework focuses on the foundational skills in digital health required for all medical doctors aligned with the three horizons of the National Digital Health Workforce and Education Roadmap.

There will be some medical professionals who seek a more advanced knowledge base in digital health. The roles in digital health as set out in the National Digital Health Workforce and Education Roadmap provide a guide (illustrated in Figure 12 below):

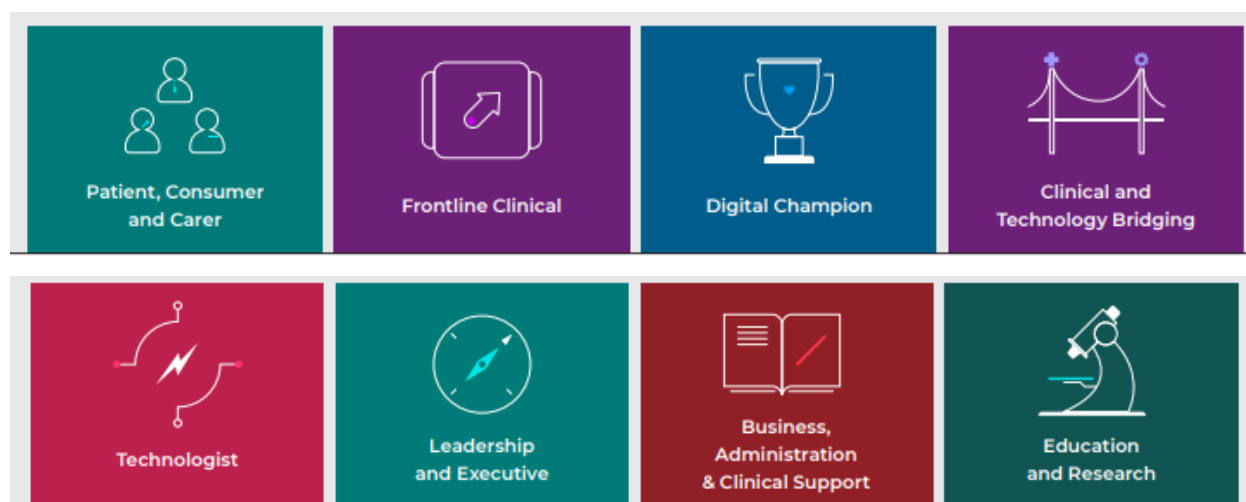


Figure 12. Roles in Digital Health – Extracted from National Digital Workforce and Education Roadmap

As part of next steps, it would be useful to expand on this foundational digital health capability framework to develop more advanced educational offerings to support medical innovation and new technology leveraging career opportunities for doctors in roles as set out in figure 12 above.

Individual and Team based Performance

A further level of analysis worth considering within the context of capability is the concept of ‘team competence’ or ‘collective competence’ proposed in the work of Lorelei Lingard (2004). Developing standards and assessments for teams – not simply individuals, is a challenging area given that performance has traditionally been assessed exclusively at an individual level. Shifting assessment to collective and organisational capability is an important mechanism to unlock long held barriers to team performance and interprofessional learning and work practices.

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Appendix 1: Entrustable Professional Activity 1 – Constructive Curriculum Alignment

The table below shows Constructive Curriculum Alignment (Biggs 1999) for EPA1 (alignment between learning outcomes and core domains of practice, alignment with teaching and learning, and entrustment supervision levels in assessment for the task over four levels of Complexity – Foundational Knowledge, Routinised Practice, Problem Solving and Complex Use and Leadership). For a sample EPA Assessment Form see Appendix 4.

<p>EPA1:</p> <p>Clinical Care: Delivers safe and quality healthcare using current technological tools – telehealth, electronic records, electronic prescribing, eOrdering and eRequesting.</p> <p>System Change: Plans integration of current technological tools in health settings.</p>	
<p>Clinical Care Context: This EPA applies in admission, reviewing patient on request of particular concern, ward call tasks, ward rounds, lower acuity ED presentations, general practice consultations, or outpatient clinical attendance. It applies to medical practitioners in rural and remote and metropolitan and community settings.</p> <p>System Change Contexts: This EPA also includes additional outcomes and learning strategies which can be applied to those medical practitioners who are working at a population health level, and engaged with strategy building in health systems and in policy and research.</p>	
<p>Description: A key aim of the National Digital Health Workforce and Education Roadmap is to address the gap between real life medical services and medical education. Horizon 1 focuses on the transition of paper-based practices and systems across healthcare settings to electronic systems of records and use of telehealth and electronic prescribing in the delivery of healthcare. This EPA focuses on providing medical doctors across the continuum with the skills and experience to navigate new digital health workflows for safe and quality healthcare delivery: to undertake telehealth consultations, electronic prescribing and effective use of electronic record keeping. Ethical approaches to digitally enabled practice means that practitioners recognize the limits of technology and when it is important that patients have access to in-person physical care.</p> <p>This EPA requires entrustment of the ability to acquire foundational knowledge, to demonstrate routinised practice, perform in complex contexts and problem solve and leadership (optional) to effectively conduct telehealth consultations and uses electronic records for safe and quality care and in driving system change:</p>	
<p>Foundational Knowledge</p> <p>Learning Outcomes</p>	<p>Clinical Care</p> <ul style="list-style-type: none"> • Focuses on patients, their families and community expectations and needs in digital health – acknowledging diversity and specific health needs of a broad range of vulnerable and marginalised groups in our health community and the role of digital technologies to ensure equity in delivery of safe and quality care. This framework explores alignment with the National Digital Health Workforce and Education Roadmap (2020) and a wide range of other platforms of health reform such as prevention of chronic disease, better access to healthcare in rural and remote areas, closing the gap of inequality in health outcomes and experiences of Aboriginal and Torres Strait Islander and Māori peoples, achievement of cultural safety in healthcare and elimination of violence, abuse, neglect and exploitation of people with disability, the health and wellbeing of those impacted by domestic violence, the health and wellbeing of refugees and migrants, the LGBTIQ+ community and better quality and safety in Aged Care and better health and support for prisoners and the homeless • Understands the principles of cultural safety and implications in use of current digital technologies in health. • Uses the standard identification question at every admission, including telemedicine. • Analyses the benefits and challenges of effective use of telehealth to determine when telehealth consultations are and are not appropriate • Understands what an electronic record system is and how it functions in clinical care. • Analyses the benefits and challenges of effective use of electronic records. • Analyses the benefits and challenges of effective electronic prescribing. • Understands clinical workflows and pathways and commits to shifting practice to support new ways of working leveraged through digital health • Understands principles of good data quality – coding of medical data, and storage in medical systems including videos and photos observing privacy and security • Understands privacy and security concerns and practices related to effective use of electronic records. • Understands ethics and the law in relation to effective use of electronic records • Reviews and builds an awareness of data sovereignty see Aboriginal and Torres Strait Islander data Sovereignty Network and The Indigenous Data Sovereignty Principles of Aboriginal and Torres Strait Islanders Maiam nayri Wingara (2018) is part of ‘a global movement concerned with the right of Indigenous peoples to govern the creation, collection, ownership and application of their data. Indigenous Data Sovereignty is outlined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Australia has declared its support of the UNDRIP.’ Te Mana Raraunga is the Māori Data Sovereignty network. • Understands the policies, national strategies and guidelines related to digital health • Reflects on the current and future barriers and enablers in health and identifies how digital health can lead to continuous improvement at a system, professional performance level and health outcome level • Reflects on implications of this knowledge for practice and system improvement. <p>System change</p> <ul style="list-style-type: none"> • Has a deep understanding and experience in clinical care and is able to articulate the key issues impacting system change and medical workflows as set out in learning outcomes above • Understands change management techniques • Understands strategic policy, goals and aims of organization and stakeholder groups. • Understands leadership techniques • Can write at an academic standard • Has effective public speaking and presentation skills • Understands how collaborative, interprofessional and intra-agency action is achieved • Understands quality improvement techniques • Understand the policy cycle and how policy evolves.
<p>Routinised Practice</p>	<p>Clinical Care</p>

Learning Outcomes	<ul style="list-style-type: none"> • Demonstrates effective use of telehealth and electronic records in simple cases and stable routinised clinical environments: <ul style="list-style-type: none"> ○ Accesses and reviews patient information in an electronic record system. ○ Synthesises information relevant to patient care from multiple sources. ○ Shares digital data with interprofessional health team and patients. ○ Observes privacy and security of information in a digital electronic record system. ○ Consults effectively with patients with telehealth system about, and with reference to, electronic records ensuring correct interactions and eye contact with patient rather than technology tools. ○ Participates in clinical and multidisciplinary patient meetings held via tele/videoconference. ○ Prepares and uploads clear records – codes data appropriately aligned with principles of good quality data and manages capture and storage of files (including video and image) appropriately observing privacy and security protocols. ○ Updates an electronic record contemporaneously with the patient consultation. <p>System Change</p> <ul style="list-style-type: none"> • Uses current digital tools in clinical practice in simple cases and stable routinised clinical environments as set out above • Demonstrate the benefit and risks of current tools in clinical practice. • Creates effective guidelines, change initiatives or support strategies or reports to improve implementation of safe and effective use of current technologies in local or team based clinical environments. 		
Complex Contexts and Problem Solving Learning Outcomes	<p>Clinical Care</p> <ul style="list-style-type: none"> • Demonstrates effective use of digital records in complex cases and challenging clinical environments. <ul style="list-style-type: none"> ○ Deals effectively with a medical emergency. ○ Treats vulnerable patients. ○ Effectively manages patients and/or colleagues who may be resistant to telehealth and electronic records, sensitively and ethically. ○ Audit practice records through reference to an electronic record system and transcript of telehealth consultation. • Demonstrates technical resolution and troubleshooting and is aware of support technical support resources. <p>System Change</p> <ul style="list-style-type: none"> • Discusses current clinical issues, and match with digital solutions with higher level health management aligned with learning outcomes in complex cases and challenging clinical environments, as set out above. • Uses quality improvement to effect change in healthcare. • Creates effective guidelines, change initiatives or support strategies and reports to improve implementation of safe and effective integration of current technologies at a broad system level and targeting resolution of broader system issues: <ul style="list-style-type: none"> • Cultural Safety of Aboriginal and Torres Strait Islander and Maori health patients, their families and communities • Risk management • Implementation and change management. 		
LEVEL OF TASK COMPLEXITY AND LEARNING OUTCOMES	TEACHING AND LEARNING	SUPERVISOR ENTRUSTMENT AND PEER REVIEW LEVELS	ALIGNMENT WITH CORE DOMAINS OF PRACTICE
ENTRUSTMENT LEVELS 1 – 3 (Required for Safe and Quality Practice)			
Foundational Knowledge Learning Outcomes	<ul style="list-style-type: none"> ✓ Factsheets. ✓ Webinars. ✓ Online module with quiz. ✓ Online sandpit to trial telehealth and play with dummy records in simulated system. ✓ Observation of health worker use of telehealth and digital records in a range of healthcare settings. ✓ Reading and reviewing strategic policy documents. 	<p>Directs learner to online resources for self-directed achievement and learning of foundational knowledge as part of regular supervisory check-ins.</p> <p>Learner informs supervisor when learning is complete.</p> <p>LMS and ePortfolio linked automatic record of learner's successful completion of learning.</p> <p>No direct supervision/peer review of performance required by supervisor/peer reviewers for this level.</p>	<ul style="list-style-type: none"> ✓ Digital Health – Foundational Current Technologies. ✓ Clinical Care. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Performance in task components and domains drawn from scores in teaching and learning and associated assessments.
Routinised Practice Learning Outcomes	<ul style="list-style-type: none"> ✓ Online sandpit to play with dummy records in simulated system. ✓ Observation of health worker use of digital records on the ward. ✓ Demonstrates simple case use of digital records 	<p>Entrustment through observation of routinised clinical cases.</p> <p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision – supervisor/peer reviewers readily available and may do 	<ul style="list-style-type: none"> ✓ Digital Health - Foundational Current Technologies. ✓ Clinical Care. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law ✓ Strategic planning and system change.

	<ul style="list-style-type: none"> ✓ Engages with stakeholders and leaders in policy and health system change. 	<p>part of the task for modelling</p> <ul style="list-style-type: none"> • Indirect Supervision (Reactive) – supervisor/peer reviewer is nearby e.g. in the same ward or same floor – e.g. able to help quickly • Independent (learner able to do task independently reliably) – Supervisor/peer reviewer available on phone or for emergencies. <p>To achieve this level learner needs to demonstrate a minimum of multiple routinised cases in different clinical contexts.</p>	<p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Supervisor ranks performance in task components and domains. • Provides qualitative comment on learner performance.
<p>Complex Contexts and Problem Solving Learning Outcomes</p>	<ul style="list-style-type: none"> ✓ Online sandpit to trial telehealth consultation and play with dummy records in simulated system – simulation of complex use cases of digital record. ✓ Fact sheet – technical trouble shooting. ✓ Schwarz Round Multidisciplinary Discussion about Complex Clinical Cases (Including implications for Telehealth and Electronic Records). ✓ Audit Research into clinical cases and peer discussion of results. ✓ Demonstrates complex patient case effective use of Telehealth Consultation and electronic health record. ✓ Professional reflection on lessons learnt and personal and system improvement ✓ Reviews organisational risk, disaster recovery plans, strategic implementation plans for digital health ✓ Attends conference sessions and workshops on digital health and/or presents research paper ✓ Engages with experts and end users to understand system errors and emerging problems in digital health. 	<p>Entrustment through observation of complex clinical cases.</p> <p>Can be signed off for this level of entrustment in simulated environment (in the event that clinical environment offers routinised learning only – important so bottlenecks in training do not occur).</p> <p>Entrustment through observation of routinised clinical cases.</p> <p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision – supervisor/peer reviewer readily available and may do part of the task for modelling • Indirect Supervision (Reactive) – supervisor/peer reviewer is nearby e.g. in the same ward or same floor – e.g. able to help quickly • Independent (learner able to do task independently reliably) – Supervisor/peer reviewer available on phone or for emergencies. <p>To achieve this level learner needs to demonstrate an agreed minimum number of multiple complex cases in different clinical contexts.</p>	<ul style="list-style-type: none"> ✓ Digital Health - Foundational Current Technologies. ✓ Clinical Care. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Supervisor ranks performance in task components and domains. • Provides qualitative comment on learner performance.
<p>ENTRUSTMENT LEVELS 4 (Optional)</p>			
<p>As an extension option - For learners who perform particularly well or have an professional career interest in Digital Health – Leadership is demonstrated in one or more roles in digital health:</p> <ul style="list-style-type: none"> • Demonstrates leadership skill related to core skills development in EPA 1 with either clinical care or system change focus. Leadership skills related to core roles in digital health (digital champion, strategic boundary spanner, technologies, researcher, teacher, manager and admin and/or executive.) 			
<p>Leadership</p> <p>Demonstrates leadership skills in relation to one or</p>	<ul style="list-style-type: none"> ✓ Workshadow a leader. ✓ Attend a coaching session with a mentor. 	<p>Learner is entrusted for supervision at a distance</p>	<ul style="list-style-type: none"> ✓ Leadership in Digital Health – Foundational Current Technologies (telehealth and digital records).

<p>more of the core roles related to telehealth and electronic record systems:</p> <ul style="list-style-type: none"> • Digital Champion. • Strategic Boundary Spanner. • Technologist. • Researcher. • Teacher. • Manager and Admin. • Executive. 	<ul style="list-style-type: none"> ✓ Engage in project work. ✓ Demonstrate leadership behaviour. ✓ Learn from feedback from supervisor or peer assessor. 	<p>(phone) on achievement of this level.</p> <p>If they choose to demonstrate leadership in teaching – they take on some teaching duties.</p> <p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision • Indirect Supervision (Reactive) • Independent (learner able to do task independently reliably) <p>(see above for definitions of these supervisor/peer reviewer entrustment levels)</p> <p>To achieve this level learner needs to demonstrate a minimum of multiple leadership roles in different clinical contexts.</p>	<ul style="list-style-type: none"> ○ Champion of Digital Health. ○ Strategic Boundary Spanner in Digital Health. ○ Technologist in digital health ○ Research in Digital Health. ○ Manager and Admin in Digital Health. ○ Executive Leadership in digital health. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Reflective tool and discussion with supervisor to discuss outcomes of project for sign off. • Supervisor ranks performance in domains and for roles and provides qualitative comment on learner performance.
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Appendix 2: Entrustable Professional Activity 2 – Constructive Curriculum Alignment

The table below shows Constructive Curriculum Alignment (Biggs 1999) for EPA2 (alignment between learning outcomes and core domains of practice, alignment with teaching and learning, and entrustment supervision levels in assessment for the task over four levels of Complexity – Foundational Knowledge, Routinised Practice, Problem Solving and Complex Use and Leadership). For a sample EPA Assessment Form see Appendix 4.

<p>EPA1:</p> <p>Clinical Care: Delivers value-based care integrating personalised technological tools and data driven care.</p> <p>System Change: Plans for adoption of value-based and data driven care models.</p>	
<p>Clinical Care Context: This EPA applies in admission, reviewing patient on request of particular concern, ward call tasks, ward rounds, lower acuity ED presentations, general practice consultations, or outpatient clinical attendance. It applies to medical practitioners in rural and remote and metropolitan and community settings.</p> <p>System Change Contexts: This EPA also includes additional outcomes and learning strategies which can be applied to those medical practitioners who are working at a population health level, and engaged with strategy building in health systems and in policy and research.</p>	
<p>Description</p> <p>Horizon three of the National Digital Health Workforce and Education Roadmap offers, as the focus of this EPA, models in which technology allows us to reimagine how care can be delivered. This can impact on all aspects of care from how we monitor consumer health, and how and when we intervene and how we actually deliver care by whom. Ethical approaches to digitally enabled practice means that practitioners recognize the limits of technology and when it is important that patients have access to in-person physical care.</p> <p>This EPA requires entrustment of the ability to acquire foundational knowledge, to demonstrate routinised practice, perform in complex contexts and problem solve and leadership (optional) in value based care for patients and their families through integration of effective use of personalised technologies:</p>	
<p>Foundational Knowledge Learning Outcomes</p>	<p>Clinical Care</p> <ul style="list-style-type: none"> • Focuses on patients, their families and community expectations and needs in digital health – acknowledging diversity and specific health needs of a broad range of vulnerable and marginalised groups in our health community and the role of digital technologies to ensure equity in delivery of safe and quality care. This framework explores alignment with the National Digital Health Workforce and Education Roadmap (2020) and a wide range of other platforms of health reform such as prevention of chronic disease, better access to healthcare in rural and remote areas, closing the gap of inequality in health outcomes and experiences of Aboriginal and Torres Strait Islander and Māori peoples, achievement of cultural safety in healthcare and elimination of violence, abuse, neglect and exploitation of people with disability, the health and wellbeing of those impacted by domestic violence, the health and wellbeing of refugees and migrants, the LGBTIQ+ community and better quality and safety in Aged Care and better health and support for prisoners and the homeless • Understands the principles of cultural safety and implications in use of personalised technologies and data analytics in health. • Understands the principles and practice of value-based care • Gains an in-depth perspective of the challenges associated with engaging in healthcare for patients and carers, and the influences of personal and community context through patient interviews and observations in clinical and home contexts, and patient journey mapping (including patients with routine and complex health conditions and different patient cohorts which may include homeless, paediatric, in aged care facility, adolescent drop in centre, Indigenous, those living with disability and their support workers and carers, CALD patient and carers, etc.) • Reflects on why value-based care matters including review of benefits, risks and required shifts in current practices in terms of fostering health literacy, empowerment, and improved health experiences and outcomes • Understands how technology can be leveraged to develop sustainable models of value-based care in clinical settings and home and community health environments • Understands that technologies have underpinning assumptions and algorithms • Reviews and builds an awareness of the benefits and risks of a range of personalised technologies for different consumer groups, consumer health needs, and preferences aligned with specialty fields of practice and a range of health conditions and health settings • Reviews and builds an awareness of data sovereignty see Aboriginal and Torres Strait Islander data Sovereignty Network and The Indigenous Data Sovereignty Principles of Aboriginal and Torres Strait Islanders Maiam nayri Wingara (2018) is part of ‘a global movement concerned with the right of Indigenous peoples to govern the creation, collection, ownership and application of their data. Indigenous Data Sovereignty is outlined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Australia has declared its support of the UNDRIP.’ Te Mana Raraunga is the Māori Data Sovereignty network. <p>System change</p> <ul style="list-style-type: none"> • Has a deep understanding and experience in clinical care and is able to articulate the key issues impacting system change and medical workflows as set out in learning outcomes above • Understands the use of epidemiology in healthcare and clinical practice and explores the consolidation of these skills related to a digital health initiative in medicine • Understands value based and patient based care • Understands the use of big data sets, both limitations and advantages • Understands basic statistics in the health context • Understands key performance indicators and how they function within health care • Understands the role of Australia Institute of health and welfare within the health context • Understands health promotion • Understands social determinants of health • Understands health needs assessments.
<p>Routinised Practice</p>	<p>Clinical Care</p>

Learning Outcomes	<ul style="list-style-type: none"> Identifies opportunities for shifts in personal practice and system improvements to integrate value based care leveraging sustainable use of personalised technologies for patients with routine health condition, in stable health setting contexts and supportive culture. Reviews current clinical workflows and develop plans to integrate improvement to practices identifying anticipated positive impacts for patients, families and communities, personal professional performance and performance at a system level. Participates in clinical and multidisciplinary patient meetings held via tele/videoconference to further embed value based care in patient case management and system change. Implements the planned change. Monitors the outcomes and impacts: <ul style="list-style-type: none"> effectiveness (curing patients at a better rate – reducing complications, reducing readmission, reducing emergency admission, learning a new skill, making a shift in personal practice) efficiency of services (using resources in best way, balancing costs and benefits) timeliness (reducing waiting times, GPs or before surgery) patient quality and safety (quality, risk and bias in care) patient-centredness (as measured by patient satisfaction and outcomes) equity (access to quality services). <p>System change</p> <ul style="list-style-type: none"> performs simple epidemiological and statistical calculations using data sets related to digital health and value-based care Explains basic epidemiology terminology and applies to clinical context Differentiates individual health context within the larger population Performs a clinical audit and generate appropriate summary statistics Analyses strengths and weakness of healthcare initiatives using key performance indicators Performs a health needs assessment. 		
Complex Contexts and Problem Solving Learning Outcomes	<p>Clinical Care</p> <ul style="list-style-type: none"> Identifies opportunities for shifts in personal practice and system improvements to integrate value based care leveraging sustainable use of personalised technologies for patients with complex health condition and dealing with resistance or complex health setting contexts. Reviews current clinical workflows and develop plans to integrate improvement to practices identifying anticipated positive impacts for consumers, personal professional performance and performance at a system level. Implements the planned change. Monitors the outcomes and impacts: <ul style="list-style-type: none"> effectiveness (curing patients at a better rate – reducing complications, reducing readmission, reducing emergency admission, learning a new skill, making a shift in personal practice) efficiency of services (using resources in best way, balancing costs and benefits) timeliness (reducing waiting times, GPs or before surgery) patient quality and safety (quality, risk and bias in care) patient-centredness (as measured by patient satisfaction and outcomes) equity (access to quality services). <p>System change</p> <ul style="list-style-type: none"> Interprets and uses epidemiological data for improvement of population health issues related to digital health and integration of value based care in medicine Presents data and findings to health system leaders and management (including key performance indicators) Uses health promotion and epidemiological principles to effect change at the population level. 		
LEVEL OF LEARNING & CORE CAPABILITIES	TEACHING AND LEARNING	SUPERVISOR ENTRUSTMENT/PEER REVIEW	ALIGNMENT WITH CORE DOMAINS OF PRACTICE
ENTRUSTMENT LEVELS 1 – 3 (Required for Safe and Quality Practice)			
Foundational Knowledge Learning Outcomes (see above)	<ul style="list-style-type: none"> ✓ Factsheets. ✓ Webinars. ✓ Online module with quiz. ✓ Patient Interviews in diverse community settings and Transcripts. ✓ Review of Sample Patient Journeys. ✓ Review of Sample Clinical Workflows. ✓ Review of Practice Improvement Plan. ✓ User guides and information with links to curated collections of personalised health technologies and data analytics. ✓ Observation of health worker and consumer use of personalised health 	<p>Directs learner to online resources for self-directed achievement and learning of foundational knowledge as part of regular supervisory check-ins.</p> <p>Learner informs supervisor when learning is complete.</p> <p>LMS and ePortfolio linked automatic record of learner's successful completion of learning.</p> <p>No direct supervision/peer review of performance required by supervisor for this level.</p> <p>This level may already have been achieved and may be achieved through Recognition of Prior Learning (RPL) – agreed in discussion with supervisor</p>	<ul style="list-style-type: none"> ✓ Digital Health – Patient and Home/ Consumer focused Health Technologies. ✓ Clinical Care. ✓ Decision Making and Judgments. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Performance in task components and domains drawn from scores in teaching and learning and associated assessments.

	technologies and data analytics.	or peer assessor with view to progress and commence EPA at Level 2: Routinised Practice.	
Routinised Practice Learning Outcomes (See above)	<ul style="list-style-type: none"> ✓ Use tool for routinised test cases in simulated system. ✓ Observation of health consumer and home technologies ✓ Patient Interviews and Transcripts in home setting ✓ Demonstrates simple case use of personalised technologies and value based interviewing skills ✓ Attends conference sessions and workshops on digital health and/or presents research paper ✓ Engages with experts and end users to understand system errors and emerging problems in digital health. 	<p>Entrustment through observation of routinised clinical cases.</p> <p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision – supervisor/peer reviewer readily available and may do part of the task for modelling • Indirect Supervision (Reactive) – supervisor/peer reviewer is nearby e.g. in the same ward or same floor – e.g. able to help quickly • Independent (learner able to do task independently reliably) – Supervisor/peer reviewer available on phone or for emergencies. <p>To achieve this level learner needs to demonstrate a minimum of multiple routinised cases in different clinical contexts.</p>	<ul style="list-style-type: none"> ✓ Digital Health – Patient and Home/ Consumer focused Health Technologies. ✓ Clinical Care. ✓ Decision Making and Judgments. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Supervisor /Peer Assessor ranks performance in task components and domains. • Provides qualitative comment on learner performance.
Complex Contexts and Problem Solving Learning Outcomes (See above)	<ul style="list-style-type: none"> ✓ Use tool for complex test cases in simulated system. ✓ Fact sheet – technical trouble shooting. ✓ Schwarz Round Multidisciplinary Discussion about Complex Clinical Cases (Including implications for home and consumer facing health technologies). ✓ Audit Research into clinical cases and peer discussion of results. ✓ Demonstrates complex patient case effective use of personalised health technologies. ✓ Patient Interviews and Transcripts in home setting ✓ Professional reflection on lessons learnt and personal and system improvement. 	<p>Entrustment through observation of complex clinical cases.</p> <p>Can be signed off for this level of entrustment in simulated environment (in the event that clinical environment offers routinised learning only – important so bottlenecks in training do not occur).</p> <p>Learner is entrusted for supervision/peer assessment at a distance (phone) on achievement of this level.</p> <p>To achieve this level learner needs to demonstrate a minimum of 2 complex cases.</p>	<ul style="list-style-type: none"> ✓ Digital Health – Patient and Home/ Consumer focused Health Technologies. ✓ Clinical Care. ✓ Decision Making and Judgments. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Supervisor/ peer assessor ranks performance in task components and domains. • Provides qualitative comment on learner performance.
<p>As an extension option - For learners who perform particularly well or have an professional career interest in Digital Health – Leadership is demonstrated in one or more roles in digital health:</p> <ul style="list-style-type: none"> • Demonstrate leadership skill related to value-based care and core roles in digital health (digital champion, researcher, teacher, manager and admin, and/or technologist). 			
ENTRUSTMENT LEVELS 4 (Optional)			

<p>Leadership</p> <p>Demonstrates leadership skills in relation to one or more of the core roles related to effective use of personalised technologies and data analytics in medicine:</p> <ul style="list-style-type: none"> • Digital Champion. • Strategic Boundary Spanner. • Technologist. • Researcher. • Teacher. • Manager and Admin. • Executive. 	<ul style="list-style-type: none"> ✓ Workshadows a leader. ✓ Attend a coaching session with a mentor. ✓ Engage in project work. ✓ Demonstrate leadership behaviour. ✓ Learn from feedback from supervisor or peer assessor. 	<p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision • Indirect Supervision (Reactive) • Independent (learner able to do task independently reliably) <p>(see above for definitions of these supervisor entrustment levels)</p> <p>To achieve this level learner needs to demonstrate a minimum of multiple leadership roles in different clinical contexts.</p>	<ul style="list-style-type: none"> ✓ Leadership in Digital Health. <ul style="list-style-type: none"> ○ Champion of Digital Health. ○ Strategic Boundary Spanner in Digital Health. ○ Technologist in digital health ○ Research in Digital Health. ○ Manager and Admin in Digital Health. ○ Executive Leadership in digital health. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Reflective tool and discussion with supervisor/ peer assessor to discuss outcomes of project for sign off. • Supervisor/peer assessor ranks performance in domains and for roles and provides qualitative comment on learner performance.
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References:

General intro to Value-Based Care (VBC)

- <https://catalyst.nejm.org/doi/full/10.1056/CAT.17.0558>
- <https://www.health.nsw.gov.au/Value/Pages/default.aspx>

Partnerships with patients

- <https://valuebasedcareaustralia.com.au/resources/value-in-partnership-with-patients/>

Aboriginal and Torres Strait Islander families

Green, Anna et al. (2020): *It's Quite a Complex Trail for Families Now' – Provider Understanding of access to services for Aboriginal children with a disability* Journal of Child Health Care, Vol. 25, Issue 2, 2021. <https://journals.sagepub.com/doi/full/10.1177/1367493520919305>

Povey J, Mills PPJR, Dingwall KM, Lowell A, Singer J, Rotumah D, Bennett-Levy J, Nagel T *Acceptability of Mental Health Apps for Aboriginal and Torres Strait Islander Australians: A Qualitative Study* J Med Internet Res 2016;18(3):e65 doi: [10.2196/jmir.5314](https://doi.org/10.2196/jmir.5314) JMIR Publications: Advancing Digital Health and Open Science.

Measuring VBC

- <https://valuebasedcareaustralia.com.au/resources/measuring-outcomes-and-costs/>
- <https://www.ichom.org/>

Policies of Health Reform

Aged care

- <https://agedcare.royalcommission.gov.au/publications/final-report>

Disability and Health

- [Department of Health | National roadmap for improving the health of Australians with intellectual disability](https://www.health.gov.au/resources/publications/national-roadmap-for-improving-the-health-of-australians-with-intellectual-disability)

Aboriginal and Torres Strait Islander and Māori Health

- [https://www1.health.gov.au/internet/main/publishing.nsf/content/b92e980680486c3bca257bf0001baf01/\\$file/health-plan.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/content/b92e980680486c3bca257bf0001baf01/$file/health-plan.pdf)
- <https://ctgreport.niaa.gov.au/>

Reviews and builds an awareness of data sovereignty see Aboriginal and Torres Strait Islander data Sovereignty Network and The Indigenous Data Sovereignty Principles of Aboriginal and Torres Strait Islanders [Maiam nayri Wingara](#) (2018) is part of 'a global movement concerned with the right of Indigenous peoples to govern the creation, collection, ownership and application of their data. Indigenous Data Sovereignty is outlined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Australia has declared its support of the UNDRIP.' [Te Mana Raraunga](#) is the Māori Data Sovereignty network.

Appendix 3: Entrustable Professional Activity 3 – Constructive Curriculum Alignment

The table below shows Constructive Curriculum Alignment (Biggs 1999) for EPA3 (alignment between learning outcomes and core domains of practice, alignment with teaching and learning, and entrustment supervision levels in assessment for the task over four levels of Complexity – Foundational Knowledge, Routinised Practice, Problem Solving and Complex Use and Leadership). For a sample EPA Assessment Form see Appendix 4.

<p>EPA1:</p> <p>Clinical Care: Critically appraises and uses emerging and future technological tools in healthcare – Artificial Intelligence (AI), Virtual Reality (VR), 3D printing and robotics.</p> <p>System Change: Plans integration of emerging and future technologies in health settings.</p>	
<p>Clinical Care Context: This EPA applies in admission, reviewing patient on request of particular concern, ward call tasks, ward rounds, lower acuity ED presentations, general practice consultations, or outpatient clinical attendance. It applies to medical practitioners in rural and remote and metropolitan and community settings.</p> <p>System Change Contexts: This EPA also includes additional outcomes and learning strategies which can be applied to those medical practitioners who are working at a population health level, and engaged with strategy building in health systems and in policy and research.</p>	
<p>Description</p> <p>Horizon 2 of the National Digital Health Workforce and Education Roadmap focuses on effective use of Emerging Technologies in healthcare delivery. This EPA explores the human machine interface. Key to learning about these newer technologies is for doctors to gain capabilities in how they are used to support decision making, the changes to workflows and work practices, how data sets from these different technologies integrate and how such data can be used for more sophisticated data driven models of care. Furthermore, use of these technologies involves new ethical decisions as well as privacy and security issues. Ethical approaches to digitally enabled practice means that practitioners recognize the limits of technology and when it is important that patients have access to in-person physical care.</p> <p>This EPA focuses on requires entrustment of the ability to acquire foundational knowledge, to demonstrate routinised practice, perform in complex contexts and problem solve and leadership (optional) of critical appraisal and use of an emerging technology as decision support in healthcare:</p>	
<p>Foundational Knowledge</p> <p>Learning Outcomes</p>	<p>Clinical Care</p> <ul style="list-style-type: none"> • Focuses on patients, their families and community expectations and needs in digital health – acknowledging diversity and specific health needs of a broad range of vulnerable and marginalised groups in our health community and the role of digital technologies to ensure equity in delivery of safe and quality care. This framework explores alignment with the National Digital Health Workforce and Education Roadmap (2020) and a wide range of other platforms of health reform such as prevention of chronic disease, better access to healthcare in rural and remote areas, closing the gap of inequality in health outcomes and experiences of Aboriginal and Torres Strait Islander and Māori peoples, achievement of cultural safety in healthcare and elimination of violence, abuse, neglect and exploitation of people with disability, the health and wellbeing of those impacted by domestic violence, the health and wellbeing of refugees and migrants, the LGBTIQ+ community and better quality and safety in Aged Care and better health and support for prisoners and the homeless • Understands the principles of cultural safety and implications in use of emerging technologies in health. • Selects a validated clinical decision support tool with integrated technology solutions – refer to a curated collection per specialty, for the various stages in the clinical process (diagnostics, prognosis, and therapeutics), and for priority health system contexts of validated clinical decision support tools i.e. chronic care and rural health in the associated Digital Health in Medicine Teaching and Learning Program Guide. These tools have been validated using the GRASP Framework, Khalifa et al. <i>BMC Medical Informatics and Decision Making</i> 19, Article No 207, 2019. • Explores the benefits and challenges for patients and clinicians of usage of the clinical decision support. • Critically appraises the assumptions on which the decision tool algorithms are based and consider ways in which transparency about these assumptions can be improved to foster effective use of the decision tool and rigor of the judgments made in its usage. • Reflects on the similarities and differences of your clinical practice, with and without use of the decision tool, including ethical implications: • Understands what a digital decision tool is and how it functions in clinical care. • Understands the benefits and challenges of effective use of digital decision tools. • Demonstrates understanding of privacy and security concerns and practices related to effective use of digital decision tools. • Selects a validated decision tool related to specialty or a priority health context and familiarises oneself with its features. • Critically appraises the assumptions on which the decision tool algorithms are based. • Reviews and builds an awareness of data sovereignty see Aboriginal and Torres Strait Islander data Sovereignty Network and The Indigenous Data Sovereignty Principles of Aboriginal and Torres Strait Islanders Maiam nayri Wingara (2018) is part of ‘a global movement concerned with the right of Indigenous peoples to govern the creation, collection, ownership and application of their data. Indigenous Data Sovereignty is outlined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Australia has declared its support of the UNDRIP.’ Te Mana Raraunga is the Māori Data Sovereignty network. • Demonstrates understanding of ethics and the law in relation to effective use of digital decision tools. <p>System change</p> <ul style="list-style-type: none"> • Has a deep understanding and experience in clinical care and is able to articulate the key issues impacting system change and medical workflows as set out in learning outcomes above • Has a strong understanding of system theory, complex adaptive systems and project management to affect positive change • Clinically appraises scientific evidence related to digital health emerging and future technologies • Understands evidence based practice

	<ul style="list-style-type: none"> Understand health impact assessments. 		
Routinised Practice Learning Outcomes	Clinical Care <ul style="list-style-type: none"> Demonstrates effective use of digital decision tools in simple cases and stable routinised clinical environments: <ul style="list-style-type: none"> Use the tool for diagnosis. Use the tool for prognosis. Use the tool for therapeutics. Observe privacy and security of patient data. Demonstrates cultural safety. Considers ethics and possible bias in decision making. System change <ul style="list-style-type: none"> Uses evidence based practice in the clinical context. Analyses and identifies impacts of how health will be affected by novel and new technology. Uses understanding of system theory, complex adaptive systems and project management to affect positive change at the local level to improve uptake and quality of digital health workforce development 		
Complex Contexts and Problem Solving Learning Outcomes	Clinical Care <ul style="list-style-type: none"> Demonstrates effective use of digital decision tools in complex cases and challenging clinical environments: <ul style="list-style-type: none"> Use the tool for diagnosis Use the tool for prognosis <ul style="list-style-type: none"> Use the tool for therapeutics. Treats vulnerable patients and patients/colleagues who may be resistant to digital decision making tools, sensitively and ethically. Observes privacy and security of patient data including consideration of ethics and possible bias in decision making. Audits practice records through reference to a digital decision tool: <ul style="list-style-type: none"> effectiveness (curing patients at a better rate – reducing complications, reducing readmission, reducing emergency admission) efficiency of services (using resources in best way, balancing costs and benefits) timeliness (reducing waiting times, GPs or before surgery) patient quality and safety (quality, risk and bias in care) patient-centredness (as measured by patient satisfaction and outcomes) <ul style="list-style-type: none"> equity (access to quality services). Reflects on the similarities and differences of your clinical practice, with and without use of the decision tool, including ethical implications. <ul style="list-style-type: none"> Observe privacy and security of patient data Considers ethics and possible bias in decision making. Demonstrates technical resolution and troubleshooting. System change <ul style="list-style-type: none"> Explain the limitations and benefits of emerging technology and how it will impact health Formulates the clinical governance of emerging health technologies. Uses understanding of system theory, complex adaptive systems and project management to affect positive change at the local level to improve uptake and quality of digital health workforce development impacting a broad range of stakeholders in multiple settings 		
LEVEL OF LEARNING & CORE CAPABILITIES	TEACHING AND LEARNING	SUPERVISOR ENTRUSTMENT	ALIGNMENT WITH CORE DOMAINS OF PRACTICE
ENTRUSTMENT LEVELS 1 – 3 (Required for Safe and Quality Practice)			
Foundational Knowledge Learning Outcomes (see above)	<ul style="list-style-type: none"> ✓ Factsheets. ✓ Webinars. ✓ Online module with quiz. ✓ User guides and information with links to curated collections of decision tools. ✓ Observation of health worker use of decision tools on the ward. 	Directs learner to online resources for self-directed achievement and learning of foundational knowledge as part of regular supervisory check-ins. Learner informs supervisor when learning is complete. LMS and ePortfolio linked automatic record of learner’s successful completion of learning. No direct supervision of performance required by supervisor for this level. This level may already have been achieved and may be achieved through Recognition of Prior Learning (RPL) – agreed in discussion with supervisor or peer assessor with view to progress and commence EPA at Level 2: Routinised Practice.	<ul style="list-style-type: none"> ✓ Digital Health – Foundational Technologies. ✓ Clinical Care. ✓ Decision Making and Judgments. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains. <ul style="list-style-type: none"> • Performance in task components and domains drawn from scores in teaching and learning and associated assessments.

<p>Routinised Practice Learning Outcomes (see above)</p>	<ul style="list-style-type: none"> ✓ Use tool for routinised test cases in simulated system. ✓ Observation of health worker use of digital decision tool on the ward. ✓ Demonstrates simple case use of digital decision tool. 	<p>Entrustment through observation of routinised clinical cases.</p> <p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision – supervisor/peer reviewer readily available and may do part of the task for modelling • Indirect Supervision (Reactive) – supervisor/peer reviewer is nearby e.g. in the same ward or same floor – e.g. able to help quickly • Independent (learner able to do task independently reliably) – Supervisor/peer reviewer available on phone or for emergencies. <p>To achieve this level learner needs to demonstrate a minimum of multiple routinised cases in different clinical contexts.</p>	<ul style="list-style-type: none"> ✓ Digital Health. ✓ Clinical Care. ✓ Decision Making and Judgments ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Supervisor ranks performance in task components and domains. • Provides qualitative comment on learner performance.
<p>Complex Contexts and Problem Solving Learning Outcomes (see above)</p>	<ul style="list-style-type: none"> ✓ Use tool for complex test cases in simulated system. ✓ Fact sheet – technical trouble shooting. ✓ Schwarz Round Multidisciplinary Discussion about Complex Clinical Cases (Including implications for Digital Decision making tools). ✓ Audit Research into clinical cases and peer discussion of results. ✓ Demonstrates complex patient case effective use of digital decision making tools. ✓ Professional reflection on lessons learnt and personal and system improvement. 	<p>Entrustment through observation of complex clinical cases.</p> <p>Can be signed off for this level of entrustment in simulated environment (in the event that clinical environment offers routinised learning only – important so bottlenecks in training do not occur).</p> <p>Entrustment through observation of routinised clinical cases.</p> <p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision – supervisor/peer reviewer readily available and may do part of the task for modelling • Indirect Supervision (Reactive) – supervisor/peer reviewer is nearby e.g. in the same ward or same floor – e.g. able to help quickly • Independent (learner able to do task independently reliably) – Supervisor/peer reviewer available on phone or for emergencies. <p>To achieve this level learner needs to demonstrate a minimum of multiple complex cases in different clinical contexts.</p>	<ul style="list-style-type: none"> ✓ Digital Health. ✓ Clinical Care. ✓ Decision Making and Judgments. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p> <ul style="list-style-type: none"> • Supervisor ranks performance in task components and domains. • Provides qualitative comment on learner performance.
<p>As an extension option - For learners who perform particularly well or have an professional career interest in Digital Health – Leadership is demonstrated in one or more roles in digital health:</p> <ul style="list-style-type: none"> • Demonstrates leadership skill related to decision support and core roles in digital health (digital champion, researcher, teacher, manager and admin, and/or technologist). 			
<p>ENTRUSTMENT LEVELS 4 (Optional)</p>			
<p>Leadership</p> <p>Demonstrates leadership skills in relation to one or more of the core roles related to effective use of digital decision making tools in medicine:</p> <ul style="list-style-type: none"> • Digital Champion. • Strategic Boundary Spanner. • Technologist. 	<ul style="list-style-type: none"> ✓ Workshadow a leader. ✓ Attend a coaching session with a mentor. ✓ Engage in project work. ✓ Demonstrate leadership behaviour. ✓ Learn from feedback from supervisor or peer assessor. 	<p>Learner is entrusted for:</p> <ul style="list-style-type: none"> • Direct Supervision • Indirect Supervision (Reactive) • Independent (learner able to do task independently reliably) <p>(see above for definitions of these supervisor entrustment levels)</p> <p>To achieve this level learner needs to demonstrate a minimum of multiple leadership roles in different clinical contexts.</p>	<ul style="list-style-type: none"> ✓ Leadership in Digital Health. <ul style="list-style-type: none"> ○ Champion of Digital Health. ○ Strategic Boundary Spanner in Digital Health. ○ Technologist in digital health ○ Research in Digital Health. ○ Manager and Admin in Digital Health. ○ Executive Leadership in digital health. <p>Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.</p>

<ul style="list-style-type: none">• Researcher.• Teacher.• Manager and Admin.• Executive.			<ul style="list-style-type: none">• Reflective tool and discussion with supervisor to discuss outcomes of project for sign off.• Supervisor ranks performance in domains and for roles and provides qualitative comment on learner performance.
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References

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- Elvidge E, Paradies Y, Aldrich R and Holder C. (2019) Cultural Safety in Hospitals: Validating an empirical measurement tool to capture the Aboriginal patient experience', *Australian Health Review*. AH19227 (accepted for publication).

Appendix 4: Sample EPA Assessment Form

EPA Title	The task or activity as one sentence e.g. Telehealth Consults and Uses Digital Records
Clinical description	The clinical case scenario
Complexity	Knowledge/Routinised Practice/Problem Solving and Complex Care/Leadership Low/Moderate/High
Learning Outcomes	
Observed/Reviewed/Supervised by	Trainee / registrar Consultant – Peer Reviewer/Supervisor Other
Self-assessment of performance	How did I go?
Feedback dialogue	Summary of what went well, what to work on next time 2-3 points
Supervision level next time	Level 1 Direct supervision Level 2 Indirect supervision (nearby) Level 3+ Usually independent (remote supervision)
Actions	Based on this performance and feedback I am going to work on/do ...

Appendix 5: International and National Strategies and Reports on Digital Health



NHS - UK

The Topol Review: Preparing the Healthcare Workforce to Deliver the Future: An Independent report on behalf of the secretary of state health and social care (February 2019).

Key Messages on Digital Medicine:

The review proposes three principles to support the deployment of digital health care technologies through the National Health Service (NHS):

1. Patients need to be included as partners and informed about health technologies, with a particular focus on vulnerable/marginalised groups to ensure equitable access.
2. The healthcare workforce needs expertise and guidance to evaluate new technologies, using processes grounded in real-world evidence.
3. The gift of time: wherever possible the adoption of new technologies should enable staff to gain more time to care, promoting deeper interaction with patients.

Genomics, digital medicine and AI will all have a major impact on patient care in the future. A number of emerging technologies, including low-cost sequencing technology, telemedicine, smartphone apps, speech recognition and automated image interpretation will be particularly important for the health workforce.

Key Messages on Workforce Capability in Medicine:

There is a need to raise awareness of genomic and digital literacy among the health and social care workforce.

Process of Development:

The review sought out expert opinion from a broad range of stakeholders – desk reviews of available literature, one-to-one interviews, meetings with experts, visits and seven round table events including representatives from patients and patient advocacy groups, industry education, professional groups and regulation.

URL: <https://topol.hee.nhs.uk/>

World Health Organisation

Digital Education for Building health workforce capacity (2020).

Key Messages on Digital Medicine:

Global health mandates and resolutions have consistently emphasized the need for health workforce strengthening through lifelong learning opportunities. A thematic analysis of recent global health-related international resolutions (including United Nations General Assembly resolutions, World Health Assembly resolutions and other intergovernmental organizational strategies and workforce related strategies) reveals an urgent need to address global health workforce challenges to deliver better health services performance and



outcomes. These concerns are presented under key themes and sub-themes that provide a framework for policy directives on digital education (also known as e-learning) to address health workers' issues. This broad array of educational needs differs by setting. Some relevant examples include the need to increase student enrolment, improve learning outcomes, deliver education to health workers in remote areas, strengthen the competency of educators and enable lifelong learning.

Key Messages on Workforce Capability in Medicine:

Digital education has the potential to improve the competencies and satisfaction of health professionals. However, the effectiveness of digital methods depends upon the manner of implementation. Published studies that point to the benefits of digital health education have been found to have variable evidence quality and limited generalizability. Effectiveness of digital health education and outcomes vary widely depending on the learning objectives, modality (e.g. mobile phones, online digital education, virtual reality, serious gaming and gamification), delivery mode (e.g. fully digital or blended), instructional method (e.g. simulations, direct instruction), assessment methods (i.e. use of validated or non-validated instruments), learning pedagogies (e.g. digital problem-based learning or digital team-based learning), study population (e.g. nurses, allied health professionals, doctors), and the topic, discipline and health condition being taught (e.g. smoking cessation, diabetes management, domestic violence, antibiotic management, dermatology, child health, elderly care). The phenomenon of the digital divide is also important from an implementation perspective as it exists both within and between countries, and may be a significant barrier for students, limiting equal access to digital education. Further research, rigorous evaluations, audits, investments and collaborations are required to optimize approaches for the effective use of digital education.

Process of Development:

This paper combines evidence from the scientific literature (including evidence from a collection of systematic reviews on digital tools and health workers' education), practical suggestions for stakeholders to formulate approaches, and guidance in using digital tools to scale up health workforce education and capacity.

URL: <https://www.who.int/publications/i/item/dfigital-education-for-building-health-workforce-capacity-978-92-4-000047-6>



MIT Technology Review

Asia's AI Agenda: AI and Human Capital (2019)

Key Messages on Digital Medicine:

The impact of AI on work, jobs, and people is one of the most controversial aspects of today's technological wave that will undoubtedly transform companies, industries, and societies in the years ahead. In this report, "AI and human capital," part of our research program Asia's AI agenda, we explore the degree to which executives in Asia Pacific are expecting and preparing for the automation of job roles. We also look at how staff working in companies across the region are responding to the increasing need to work "shoulder to software." The report also explores a new data set provided by Faethm, a future of work software as-a-service company. It shows, by country and industry, the

proportion of formal sector jobs that will become redundant through automation. It also shows the proportion that will be supported and augmented by AI, making those jobs more productive and highly skilled.

Key Messages on Workforce Capability in Medicine:

Front and centre. AI deployment is not a zero-sum game where headcount is reduced in lockstep with new AI software. For Asian businesses, this is doubly so, for not only are businesses in the region increasing their headcount to capitalize on market growth, the departments which are growing their staff the most—front-line, customer-facing talent—are also where most AI investments are going.

- AI will be a major growth driver for Asia in the coming decade.
- The large majority of companies are expecting headcount to increase.
- AI will affect one in every five jobs in Asia— eliminating one in eight.
- AI will produce winners and losers.
- Talent and technology agendas must align to sustain long term growth.

Process of Development:

Analysis of trends using workforce modelling with Faethm software, review of literature and survey data.

URL: <https://www.technologyreview.com/2019/05/10/135421/asias-ai-agenda-ai-and-human-capital/>



EY

Health Reimagined: A New Participatory Health Paradigm (2016).

Key Messages on Digital Medicine:

A significant catalyst for change is an engaged and participatory patient or healthcare consumer; one that assumes a role as an equal partner in their healthcare experience. Participatory health is supported by:

- Technology that orients around the person and mobility features that support health anytime, anywhere.
- Core features common to a vast range of devices (sensors, cameras, connectivity to social platforms) and emerging intelligence capabilities in recognising and understanding an individual's habitual behaviour patterns.
- Cheap wireless technology and extensive connectivity of everyday things with sensors to the internet.

Key Messages on Workforce Capability in Medicine:

As healthcare becomes untethered by mobile technologies the epicentre of healthcare shifts to the home and community. In person encounters and hospitals will always play a vital role in any health system, however, digital and mobile technologies make considerable headway towards re-envisioning healthcare way beyond episodic acute and facility-based care.

Process of Development:

Consultancy research – method not disclosed.

URL: https://www.ey.com/en_au/health



EY

The Future of Health Insurance: A roadmap through change (2015)

Key Messages on Digital Medicine:

Disruptive ideas related to change for insurers and digital health include:

1. Could your new approach be powered by m-health technologies – allowing much greater insight and influence over patients’ behaviours and driving down costs through widespread adoption?
2. What if you could make data a central component of a new insurance offering – creating the complete picture that has so far been missing to better understand and influence risk.
3. Could you develop a proposition that places the customer squarely in the centre – using deep data about customers to understand their needs and deploying m-health technologies to build relationships and guide customers’ behaviours?

Key Messages on Workforce Capability in Medicine:

Insurers need to not only price and underwrite risk but influence and reduce risk as well.

Process of Development:

Consultant report.

URL: https://www.ey.com/en_au/health



The Medical Futurist Institute

Trends in Digital Health In 2020

Key Messages on Digital Medicine:

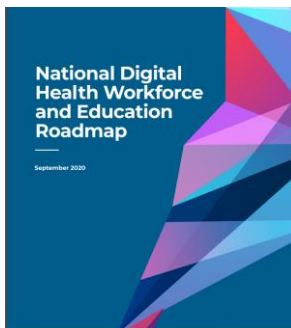
Key trends for 2020 are:

1. Amazon’s employees to get a full scale electronic medical system.
2. An FDA curated and approved database of medical AI based algorithms.
3. At home blood testing becomes the new DNA testing.
4. Betting on its acquisition of Fitbit, Google will launch a new “made by google” line of fitness trackers.
5. A major pharma company will make an unexpected acquisition of a medtech or wearable player.
6. Facial recognition algorithms will be used to predict medical conditions such as atrial fibrillation.
7. Magic Leap will share its first mixed reality healthcare application.

8. An AI start up using AI for drug design will venture to become a pharma company and run the trials itself.
9. A 5G application will be deployed in a healthcare setting.
10. Based on the AI policy recommendations from the American Medical Association, the WHO will release one too.
11. At least five countries will follow Germany and Denmark's example in officially embracing digital health.

URL:

<https://medicalfuturist.com/Digital-Health-Best-Practices-For-Policy-Makers-The-Medical-Futurist-Institute.pdf>



The Australian Digital Health Agency, Commonwealth Government of Australia

The National Digital Health Workforce and Education Roadmap (2020)

Key Messages on Digital Medicine:

Using horizon thinking, this strategy sets out three horizons for future workforce development in health:

- Horizon 1: Embedding safe, ethical and effective use of systems of records
- Horizon 2: Integrating new technologies and ways of working
- Horizon 3: Digital health transformation.

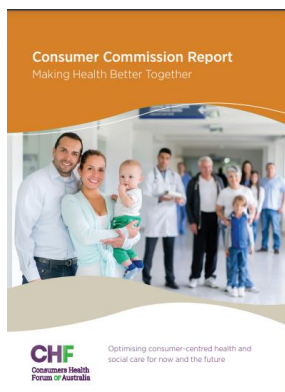
Key Messages on Workforce Capability in Medicine:

- Horizon 1: Healthcare workers and consumers have access to digital health tools and increased access to information, equipping them with greater decision making powers.
- Horizon 2: Systems and organisation are better connected, enabling them to analyse information, plan and respond to health demands. Emerging digital technologies will reshape health functions and new roles will emerge. The focus will be in enterprise transformation.
- Horizon 3: Healthcare delivery is transformed. For example, through value-based healthcare, personalised medicine, empowered consumers and a shift towards home and community health service delivery and primary and preventative health.

Process of Development:

Broad consultation, review of the literature and engagement with stakeholders of health

URL: https://www.digitalhealth.gov.au/sites/default/files/2020-11/Workforce_and_Education-Roadmap.pdf



Consumers Health Forum of Australia

Consumer Commission Report: Making Health Better Together – Optimising consumer-centred health and social care for now and the future (2020).

Key Messages on Digital Medicine:

The Consumer Health Forum (CHF) Consumer Commissioners Group. The Consumer Commission was formed by the CHF to ensure a strong consumer voice was helping to shape the healthcare of the future.

A new report has called for a Consumer Health leaders Academy to strengthen the role of consumers in health system decision-making. The outcome of the Consumer Commissioners conversations were that 4 strategic areas to improve health were agreed upon, being:

1. Mental Health & Wellbeing
2. Integration & care coordination
3. Health equity; and
4. Digital Health.

Key Messages on Workforce Capability in Medicine:

Digital Health can be found on pages 4 and then pages 19 - 20.

Digital health is an enabler to empower consumers/carers to manage their own health & wellbeing and *"support provider teams to work within flexible, integrated interoperable & digitally-enabled environments."*

The report raises number of concerns which included that it is important to ensure equal access for all (address poor internet, lack of a device to connect or afford internet services) and also digital literacy.

Process of Development:

Broad consultation, review of the literature and engagement with stakeholders of health

URL:

https://chf.org.au/sites/default/files/docs/chf_consumer_commission_report_v4final.pdf

Appendix 6: National and International Digital Capability Frameworks

This section of the literature review includes a range of digital capability frameworks from international and national studies from medicine, nursing and health. Links to the full framework are included below. A mapping of the domains across these seven key frameworks and Advisory Group feedback concerning the importance of these concepts for inclusion in a proposed proof of concept for a capability framework for medicine has been undertaken and used to inform this proposed framework.

NHS – A Health and Care Digital Capabilities Framework



<https://www.hee.nhs.uk/sites/default/files/documents/Digital%20Literacy%20Capability%20Framework%202018.pdf>

Figure A: NHS of the UK – A Health and Care Digital Capabilities Framework

National Nursing and Midwifery Digital Health Capability Framework

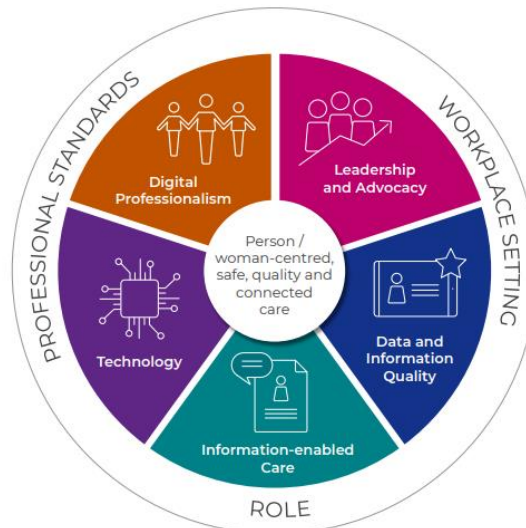


Figure 1. Framework Domains

<https://www.digitalhealth.gov.au/about-the-agency/workforce-and-education/National%20Nursing%20and%20Midwifery%20Digital%20Health%20Capability%20Framework%20publication.pdf>

Figure B: Agency, Commonwealth Government of Australia - National Nursing and Midwifery Digital Health Capability Framework

CHIA – Certified Health Informatician Australasia



https://www.healthinformaticscertification.com/wp-content/uploads/2016/02/CHIA-competencies-Framework_FINAL.pdf

Figure C: Australian Institute of Digital Health - CHIA – Certified Health Informatician Australasia

CPHIMS - Certified Professional in Healthcare Information & Management Systems, Chicago, USA. This certificate has 3 main domains with 9 subdomains:

- General
- Systems
- Administration

<https://www.himss.org/sites/hde/files/media/file/2020/08/18/cphims-handbook.pdf>

Undergraduate Medical Competencies in Digital Health and Curricular Module Development: Mixed Methods Study – Berlin, Germany (Poncette et al 2020)

Figure 1. This sunburst diagram represents the qualitative results. Within the 4 themes (inner ring), subthemes (middle ring) are assigned and specified (outer ring). ELSI: ethical, legal, and social implications.

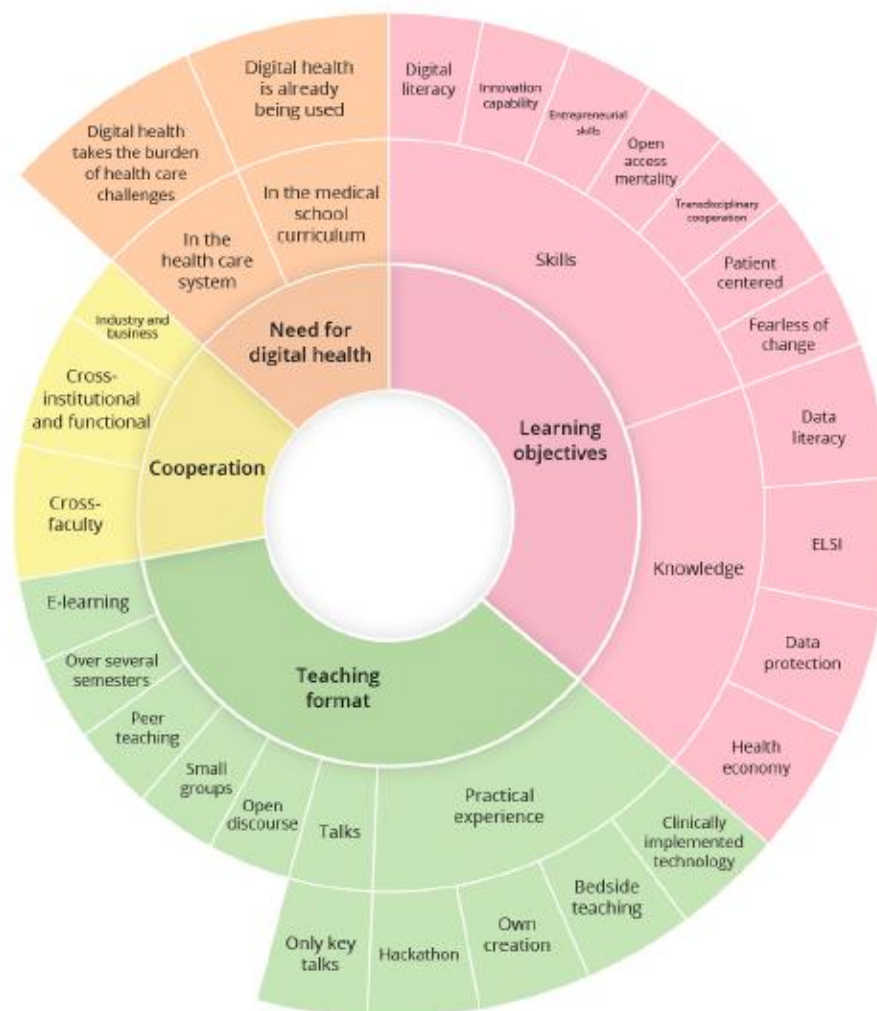


Figure D: Undergraduate Medical Competencies in Digital Health and Curricular Module Development: Mixed Methods Study – Berlin, Germany (Poncette et al. 2020)

University of Queensland and Queensland Health

The link below is a consensus statement published from Queensland on digital clinical priorities:

<https://pubmed.ncbi.nlm.nih.gov/31744594/>

The Metro North digital workforce education strategy run out of University of Queensland and Queensland Digital Academy is adopting a three horizon approach to workforce education development.

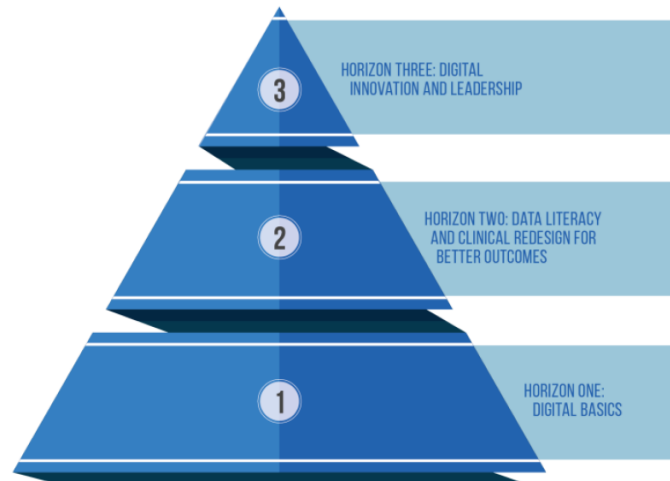


Figure E: Layered Approach to Build Digital Health capability. For the Queensland Digital Academy



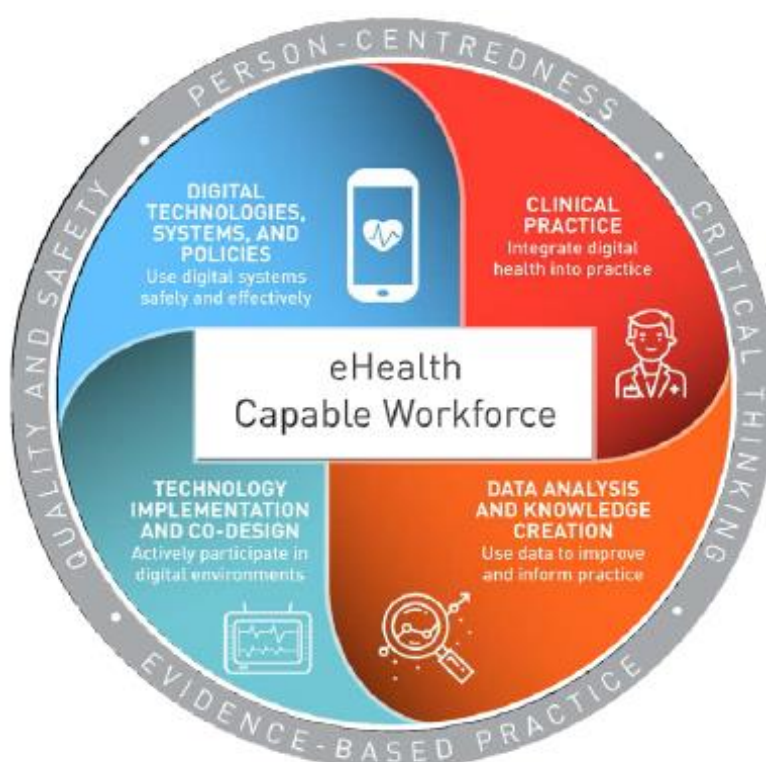
EHEALTH CAPABILITY FRAMEWORK

Background

The University of Sydney has collaborated with NSW Health to develop eHealth capability statements to inform and guide consistent high-quality teaching and learning experiences for both health professional students and the workforce.

This document outlines foundation levels of knowledge and performance required by all healthcare professionals practicing in digital healthcare environments. This level directs the expectations of training and entry-level health professionals who provide direct clinical care to patients and who work under supervision across all sectors, that is, inclusive of all Australian health care settings.

The Framework includes four domains as outlined in diagram below.



<https://www.jmir.org/2018/5/e10229/>

Figure F: University of Sydney and New South Wales Health - eHealth Capability Framework University of Sydney and NSW Health

Appendix 7: Advisory Group and Project Team

Advisory Group Members

Name	Role
Dr Caroline Clarke	Chair
Associate Professor Amanda Walker	Australian Commission on Safety and Quality in Healthcare Nominee (from May 2021)
Dr Robert Herkes	Australian Commission on Safety and Quality in Healthcare Nominee (till May 2021)
Professor Kerrynt Butler-Henderson	Australian Digital Health Agency (Agency) Nominee
Ms Jackie Doolan	Australian Digital Health Agency (Agency) Nominee
Dr Louise Schaper	Australian Digital Health Agency (Agency) Nominee
Dr Bav Manoharan	Australian Digital Health Agency (Agency) Nominee
Professor Tim Shaw	Australian Digital Health Agency (Agency) Nominee
Associate Professor Marco Briceno	Australian Health Ministers Advisory Council Nominee
Ms Belinda Gibb	AMC Aboriginal and Torres Strait Islander and Maori Committee Member
Dr Justin Gladman	AMC Aboriginal and Torres Strait Islander and Maori Committee Member (from February 2021)
Associate Professor Amanda Dawson	AMC Assessment Committee Member
Professor Inam Haq	AMC Medical School Accreditation Committee (MedSAC) Member

Professor Brendan Crotty, AM	AMC Prevocational Standards Accreditation Committee (PreVAC) Member
Professor Alan S C Sandford, AM	AMC Specialist Education Accreditation Committee (SEAC) Member
Dr Claire Blizard	Confederation of Postgraduate Medical Education Councils (CPMEC) Nominee
Associate Professor David Francis	Council of Presidents of Medical Colleges (CPMC) Nominee
Ms Debra Letica	Health Consumer Representative
Associate Professor Suzanne Kirska	Health Professions Accreditation Collaborative Forum (HPACF) Nominee
Dr Alice Ngar Wing Leung	Junior Doctor Representative
Dr Shayne Bellingham	LIME Network Nominee
Associate Michael Professor Franco	Medical Education Expert with Digital Expertise
Associate Professor Rebecca Grainger	Medical Education Expert with Digital Expertise
Associate Professor Clair Sullivan	Medical Education Expert with Digital Expertise
Associate Professor Adrienne Torda	Medical Deans Australia and New Zealand (MDANZ) Nominee

AMC and Agency Project Team

Mr Philip Pigou	CEO, AMC
Ms Amanda Cattermole PSM	CEO, Agency
Dr Julie Gustavs	Project Manager, AMC
Dr Shaun Hosein	Strategy and Policy Officer, AMC
Ms Helen Purdy	Director, Adoption and Clinical Use, Agency
Ms Vandana Chandnani	Manager, Provider Adoption and Workforce and Education, Agency
Ms Tram Do	Provider Adoption Lead, Agency
Mr Patrick Murray	Project Administrator, AMC
Ms Theanne Walters, AM	Deputy CEO, AMC Senior Project Team Member, AMC

Appendix 8: Stakeholder Consultation

As part of this project, a draft of the *Digital Health in Medicine Capability Framework* was available for feedback from various stakeholder groups. Groups invited to participate in this consultation include:

ACT Health	Canberra Region Medical Education Council
Australasian College for Emergency Medicine	Coalition of Peaks
Australasian College of Dermatologists	College of Intensive Care Medicine of Australia and New Zealand
Australasian College of Sport and Exercise Physicians	Confederation of Postgraduate Medical Education Councils
Australian & New Zealand Association for Health Professional Educators	Consumers Health Forum of Australia
Australian and New Zealand College of Anaesthetists	COTA Australia
Australian College of Rural and Remote Medicine	Council of Presidents of Medical Education Colleges
Australian Commission on Safety and Quality in Health Care	Curtin University, Faculty of Health Sciences, Curtin School of Medicine
Australian Government Department of Health	Deakin University, Faculty of Health, School of Medicine
Australian Health Practitioner Regulation Authority	Department for Health and Wellbeing South Australia
Australian Healthcare & Hospitals Association	Department of Health and Human Services Tasmania
Australian Indigenous Doctors' Association	Department of Health and Human Services Victoria
Australian Institute of Digital Health	Department of Health Northern Territory
Australian Medical Association	Faculty of Pain Medicine ANZCA
Australian Medical Association Council of Doctors in Training	Flinders University
Australian Medical Students Association	Griffith University
Australian Nursing & Midwifery Council	Health & Community Services Complaints Commission, NT
Australian Private Hospitals Association	Health & Community Services Complaints Commissioner, SA
Australian Salaried Medical Officers Federation	
Bond University, Faculty of Health Sciences and Medicine	

Health and Disability Services Complaints Office, WA

Health Care Complaints Commission NSW

Health Complaints Commissioner, TAS

Health Consumer Council Western Australia

Health Consumers Alliance of South Australia

Health Consumers NSW

Health Consumers Queensland

Health Department of Western Australia

Health Issues Centre Victoria

Health Professions Accreditation Collaborative Forum

Health Services Commission, ACT

Healthcare Consumers Association of the ACT Inc.

James Cook University

Leaders in Indigenous Medical Educators

Macquarie University, Faculty of Medicine, Health and Human Sciences

Medical Board of Australia

Medical Deans of Australia and New Zealand

Monash University, Faculty of Medicine, Nursing and Health Sciences

National Aboriginal Community Controlled Health Organisation

National Health Leadership Forum

NSW Health Education and Training Institute

NSW Ministry of Health

NT Prevocational Medical Assurance Services

Office of Health Services Commissioner, VIC

Office of the Health Ombudsman, QLD

Postgraduate Medical Council of Tasmania

Postgraduate Medical Council of Victoria

Postgraduate Medical Council of Western Australia

Prevocational Medical Accreditation Qld

Queensland Health

Royal Australasian College of Dental Surgeons

Royal Australasian College of Medical Administrators

Royal Australasian College of Physicians

Royal Australasian College of Surgeons

Royal Australian & New Zealand College of Obstetricians & Gynaecologists

Royal Australian and New Zealand College of Psychiatrists

Royal Australian College of General Practitioners

Royal College of Pathologists of Australasia

SA Medical Education & Training

Te Ohu Rata o Aotearoa

The Australian National University

The Congress of Aboriginal and Torres Strait Islander Nurses and Midwives

The Joint Medical Program, The Universities of Newcastle and of New England

The National Association of Aboriginal and Torres Strait Islander Health Workers and Practitioners

The Royal Australian and New Zealand College of Ophthalmologists

The Royal Australian and New Zealand College of Radiologists

The University of Adelaide

The University of Auckland

The University of Melbourne

The University of New South Wales

The University of Notre Dame Australia (Fremantle)

The University of Notre Dame Australia (Sydney)

The University of Queensland

The University of Sydney, Faculty of Medicine and Health, Sydney Medical School

The University of Western Australia

University of Otago

University of Tasmania

University of Wollongong

Western Sydney University