Australian Medical Council Limited

Australian Digital Health Agency and the Australian Medical Council:

Capability Framework in Digital Health in Medicine

(Consultation Version)

Milestone 6: Preparation of Digital Capability Framework in Digital Health in Medicine in Australia

(Part B – Consultation version of Digital Health in Medicine Capability Framework. See also Part A - Synthesis of Evidence and Recommendations for a Capability Framework in Digital Health in Medicine)

18/04/2021

Contents

Executive Summary

This document provides a proposed capability framework for how the continuum of medical education can produce a digitally capable medical workforce in Australia and New Zealand. 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 proposal draws on an extensive literature review of national and international evidence concerning digital capabilities in medicine and more broadly in health. It was further 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 – as well as results from an online survey and follow up consultation focus groups, which sought feedback from the Medical Workforce Digital Capabilities Advisory Group and broader stakeholders of medicine concerning current digital capability frameworks and the proposed model. This work is commissioned by the Australian Digital Health Agency (the "Agency") and undertaken as a joint project with the Australian Medical Council (AMC) and key stakeholders of health. This document sets out the background of the partner organisations and their respective strategic priorities and frameworks, and the findings of the preliminary literature review (key trends in current and future technologies in medicine and the context of workforce change in health).

This proposal 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.

In line with the core principles for development of a capability framework in Digital Health in Medicine, this framework does draws heavily on, and aligns with, a number of excellent national and international strategy and capability frameworks. For details of these frameworks see the themes identified in the section on current state analysis and a more detailed overview of the literature provided in the evidence paper supporting this framework. The careful analysis of these other frameworks, including the Advisory Group's ranking in terms of importance of key domains across eight key eHealth frameworks, was undertaken in the spirit of "not reinventing the wheel". 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 National Workforce Framework in Digital Health Capability Development** Explicit strategic alignment with the three Horizons of the National Digital Health Workforce and Education Roadmap – see the background of this paper for details of these horizons.
2. **Design for integrated teaching and learning, and assessment of priority work-relevant tasks** Address a key critique of competency based programs that detailed competencies can be difficult to implement and result in atomistic learning through leveraging the medical education innovation of Entrustable Professional Activities (EPAs). Focus on the operationalisation of multiple learning outcomes and gaining holistic teaching and learning as well as assessment of doctor performance on priority work tasks learners can be entrusted to perform with three key EPAs.
3. **Cross continuum focus** – Adopt a cross continuum focus to the capability framework in acknowledgement of 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.

4. **Integration of reference to teaching and learning, assessment and measurement of impact evaluation** rather than leaving these elements to stage 2 implementation plans. These proposed high-level teaching and learning, assessment and evaluation elements align with good practice methods of:
    - **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;
    - the **measurement of impact** being explicit in the model with markers linked to quality, safety and efficiency in healthcare, and continuous improvement cycles across the medical continuum.

The approach to the proposed model is a sample of how such minimum standards can be achieved and 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. In line with medical education innovations across the continuum in Australia and overseas, this document elaborates on a possible option for how those medical education providers, who have yet to integrate digital capabilities into their curricula, could do so and get started by integrating some foundational capability development in digital medicine based on Entrustable Professional Activities (EPAs) (Ten Cate 2013) into their medical education programs. The three proposed EPAs align with the three horizons of the Australian National Digital Health Workforce and Education Roadmap:

- **EPA 1** focuses on capabilities related to consultations delivered with technology and record keeping with electronic record systems.
- **EPA 2** focuses on critical appraisal and effective use of technology based decision support.
- **EPA 3** makes important connections with building consumer digital and health literacy, improving access to healthcare through personalised technologies and integration of principles of value-based and people centred care.

These EPAs offer skill development focused on how clinical practice is shifting with use of current, emerging and future technologies with the view to providing all generations of doctors with skills and equipping them with new options in their toolkit for the delivery of safe and effective care for their patients. They are supported by evidence of teaching and learning, assessment and measurement of impact in medical education.

The paper concludes with a summary of potential next steps for further collaboration between the AMC and its partners: to pilot and implement the framework as well as to provide a certificate in horizon medicine in health reform with a focus on a micro-credential in digital health leadership and other key areas of change required of the medical and broader health workforce in the coming years. The document also includes a number of appendices, which provide the details of three proposed sample EPAs, and the Advisory Group Members and AMC team who are supporting the design and development of this project. For further details and references about the evidence supporting this framework see the Synthesis of Evidence and Recommendations document – Digital Health in Medicine Capability Framework.

Consultation Questions at a Glance

Consultation Question 1: Principles of a Digital Capability Framework in Medicine (See pages 11-12)

1a. How relevant do you think these principles are to guiding the development of a capability framework in medicine?

1b. Are there principles we should add? Amend? Or delete?

Consultation Question 2: Why a Model for Digital Health in Medicine that Crosses the Continuum (See pages 13-18)

2a. How important is it to develop capabilities in digital health across the generations in medicine?

2b. The flexible model focuses on assisting education providers who have identified a gap in digital health and supports more advanced programs to continue – what do you see to be the advantages and disadvantages of such an approach?

Consultation Question 3: Current State Analysis Across the Continuum (See pages 19-29)

3a. What are the key messages in this current state analysis of digital health across the continuum in medicine?

3b. What other further key points do we need to consider in thinking about the current state in digital health in medicine across the continuum?

Consultation Question 4: A Framework to Take Us Forward (See pages 30-43 and Appendices 1-3)

4a. In considering the 3 Entrustable Professional Activities and the domains and sub-domains of the proposed Digital health framework for medical education providers - do you think this is what doctors need to learn? *(Is it fit for purpose?)*

4b. How can we best teach, learn and assess such outcomes – do the proposed strategies align with good practice in medical education? (*Is it aligned with good practice in medical education*?)

4c. In considering the proposed Digital health framework for medical education providers throughout the education cycle (primary degree, intern, postgraduate and CPD) - what do you see as the barriers and enablers to implementing this approach? *(Is it feasible?)*

Consultation Question 5: Next Steps (See pages 44-46)

5a. Implementation is challenging – do the implementation strategies capture the main areas of challenge in digital health?

5b. How could the medical education sector work together to improve digital health curriculum development in medicine?

Introduction

Technological advancements over the next decade will significantly change the nature of work. The advent of artificial intelligence augmented decision-making and support across all professions and fields, including health, will pose challenges and opportunities for the health workforce of the future.

The COVID-19 Pandemic has posed particular challenges for the health system and has seen the increased uptake in a range of technology systems. Whilst up-take of technology trends such as telehealth have been increasing over the past few decades, the COVID-19 pandemic forced rapid uptake of such health technologies and have seen other innovations such as ePrescribing and increased use of digital health record systems (EMRs). Technology change has significant implications for the focus of skills development of health professionals. It is important to note that technology is ultimately only a tool. The focus needs to remain firmly on how good medical practice and how technology can be leveraged and used to support good medical practice.

Education providers play a pivotal role to help doctors to navigate disruptive change and ensure the quality and safe care for their patients in a world where machines can learn, and doctors and other health professionals will have access to huge data sets on which decision making about care can be made. The power of these new systems will outstrip the accuracy and speed that a human can make based on their professional knowledge base alone. The use of Artificial Intelligence (AI) augmented decision making will bring to the fore new ethical dilemmas for resolution in health and require of the health workforce a focus on what they add to health by way of humanising care beyond what a machine can achieve more efficiently and cost effectively. These shifts occur at a time of great societal transition where consumers are also taking more responsibility for their health and calling on their doctors to work with them to better improve their health experiences and outcomes. The doctors' familiarity with personalised technologies and the underpinning principles of patient centred and value-based care is central to healthcare transformation.

This framework seeks to promote thought on current 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. What horizon three, as the Roadmap end goal provides, are 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. The effective use of new, 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 and some assumptions, which need to be challenged. The new ways of working have implications for all generations of doctors within the health workforce.

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

A focus on digital technologies in medicine brings into stark relief answers to foundational questions such as: "what doctors of the future need to learn, their role in the inter-professional health team

as well as how they should be assessed". These questions consolidate longstanding arguments within the medical professions about the need to shift learning and assessment from a focus on knowledge acquisition to performance. Integral to shifts in practice is workforce development and engagement of education providers, accreditors and health systems. The joint efforts of these key players in the health sector will involve curricula renewal, which reflects work practice change to technology integrated workflows, as well as, a focus on professional uptake and commitment to lifelong learning and work practices in digital health in medicine, at an individual level.

Background

In this section, we outline key background about the AMC and the Agency, and joint work to support the development of a digitally capable Australian Medical Workforce and associated impacts on curricula design and accreditation practices.

Our Partnership - The AMC and the Agency

The Australian Medical Council (AMC) and The Australian Digital Health Agency (the Agency) have formed a partnership to engage in a new project aimed at understanding how technology impacts the standards of medical education, training and practice in Australia. This aligns with the AMC's roles as a national standards body for medical education and training, and as the accreditation authority for the medical profession under the Health Practitioner Regulation National Law (Figure 1). The Agency is the corporate Commonwealth entity tasked with improving health outcomes for Australians through the delivery of digital healthcare systems and the national digital health strategy for Australia (Figure 1). As part of this strategic project, an Advisory Group has been established which provides expert advice and feedback to the project and its components from peak bodies in medicine and stakeholders of digital health. Central to this project is also consultation with broader stakeholders of health to ensure that the proposed approach to capability development in digital health is fit for purpose for the medical profession.

The Australian Medical Council – The AMC

The Australian Medical Council (AMC) ensures that standards of education, training and assessment of the medical profession promote and protect the health of the Australian community. The AMC is the accreditation authority for medicine under the Health Practitioner Regulation National Law (the National Law) and undertakes accreditation of programs in New Zealand in collaboration with the Medical Council of New Zealand. The AMC develops and maintains accreditation standard across all phases of the medical education continuum and accredits 23 Australian Universities for primary medical programs, eight state-based intern training accreditation authorities, and 16 specialist colleges for their vocational training programs and lifelong learning. In addition, the AMC sets standards for and conducts assessments of international medical graduates seeking to practise in Australia, via a computer adaptive multiple-choice examination, a clinical examination delivered through the AMC National Test Centre, and accreditation of workplace-based assessment programs offered in Australian health services. In line with its strategic plan, the AMC is building and demonstrating the value of its knowledge, expertise and relationships as a standards setting and accreditation body, to meet National Law objectives and the AMC's organisational purpose.

The Australian Digital Health Agency – The Agency

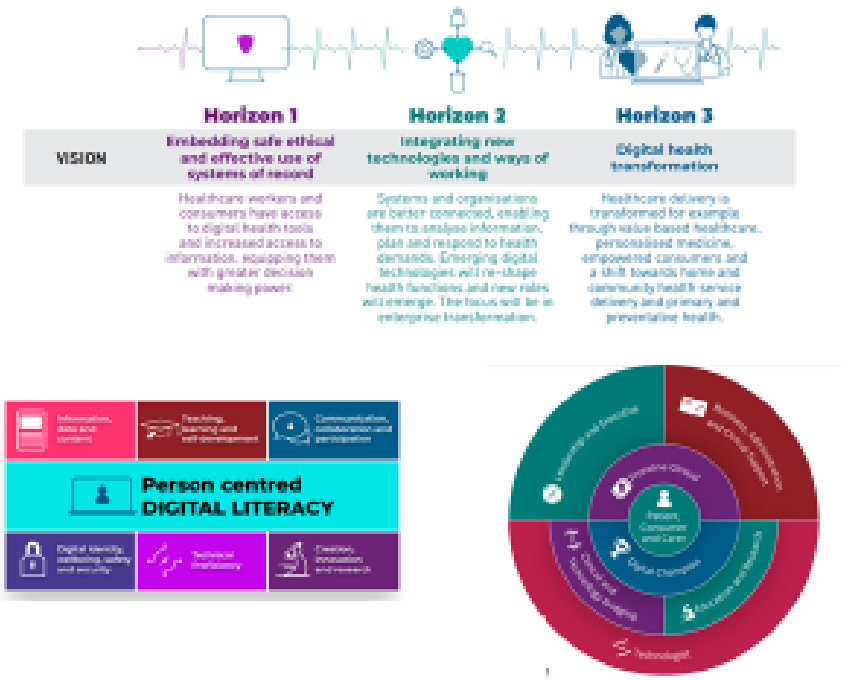
The Agency is the lead organisation in Australia responsible for the fostering of a digitally capable workforce and health community. The Agency's remit is to foster "Better health for all Australians enabled by seamless, safe, secure digital health services and technologies that provide a range of innovative, easy to use tools for both patients and providers". The Agency is tasked to deliver these world-leading digital health capabilities through an open, transparent and collaborative approach.

The Agency recently conducted an extensive strategic consultation to determine the National Digital Health Workforce and Education Roadmap. This document builds on Australia's National Digital Health Strategy and the Associated Framework for Action. It seeks to provide a basis for understanding the digital capability requirements of all those involved in the health system including health workforce, volunteers and health consumers. The Roadmap and Snapshot document can be downloaded here:

https://www.digitalhealth.gov.au/about-the-agency/workforce-and-education

Aligned Agency and AMC Strategic Plans

Australian National Digital Health Workforce Roadmap



Pillar 6: Digital Health Strategy - Workforce and Education

AMC Strategy Plan 2018 - 2028

Pillar 4: Professional Practice in a Changing World

Figure 1: The Agency and AMC Strategic Plans

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

A starting point for the work of the Advisory Group for development of a Capability Framework in Digital Health in Medicine is the establishment of a number of key principles and criteria underpinning a good practice model of capability development for digital health in medicine. These principles and how this project seeks to meet them are set out below.

Criterion 1: **Align the Framework with Broader System Change, Strategic Goals with a Focus on Consumer Expectations and Needs** – As set out in the AMC strategic goals, the National Digital Workforce and Education Roadmap and other key policy plans with the recognition that technology impacts all Australians. Equally, the power of lived experience participation and consumer engagement in this project is key to the design and delivery of effective medical workforce capability development:

- Hope and belief that an individual may design a meaningful life of their own choosing, beyond the limitations of 'illness'
- Empowerment, education and autonomy to ensure that the needs of the individual are being met and that they are enabled to guide their own healing journey
- Respecting the role of spirituality – whatever that means for the individual
- Acknowledging and actively addressing the need for community, social inclusion and connection with others.

Criterion 2: **Build the Case for Why Change** – Recognise that capability development is integral to change management and that there will be some resistance to change – dissenters and early adopters need to be listened to and brought on the journey. Central to the delivery of this criterion is drawing on good practice evidence of why digital health in medical education matters as well as broad stakeholder engagement with this question. Session 2 of the online forum workshop focused on 'why digital health in medicine matters'.

Criterion 3: **Build the Capability Framework based on Current Frameworks** Do not reinvent the wheel. It should build on the good practice that already exists. To achieve this end, an extensive literature review has been undertaken and the Advisory Group and broader stakeholders have had opportunities to review current frameworks and reflect on their relevance to medical education and the development of this framework.

Criterion 4: **Innovate in Workforce Development Based on Current Good Practice Innovations in Medical Education, the Broader Education and Health Education Literature** – An approach to digital medicine should be considered within the context of this literature and good practice. See the *Synthesis of Evidence and Recommendations for a Capability Framework in Digital Health in Medicine* for further information.

Criterion 5: **Ensure the Approach is Flexible and Future Proofed** – balancing current, emerging and future technology workforce capability needs appropriately by being focused on the core foundational skills the medical workforce requires for the future. Future proofing is integrated into the approach adopted in this capability framework with alignment with the three horizons of the National Digital Health Workforce and Education Roadmap with its focus on current, emerging and future horizons of digitally enable healthcare and workforce development. Equally, flexibility is ensured by providing guidelines and samples rather than fixed notions of how capability can be built.

Criterion 6: **Ensure the Approach is Simple and Able to be Delivered Agilely** - The approach should be delivered within an agile framework with opportunities for providers to flexibly offer further enhanced and disaggregated offerings across the medical education continuum to further enhance skills of professionals and achieve further system benefits, rather than replace or disrupt innovations. This project is one year in length which is agile in the context of framework development in medical education.

Criterion 7: **Build a Framework that Provides Guidance for the Tasks Doctors Do, Learning Outcomes, Teaching and Learning, Assessment, Evaluation and Implementation Considerations** – The curriculum model needs to extend beyond identification of capabilities to an integrated program of learning, assessment and strategy for measuring success drawing on good practice in capability frameworks in medical education. The curriculum model needs to support capability development for the current, emerging and future work of doctors so that they can deliver safe and high quality care in high and low technology based health environments and meet the needs of patients and their carers with differing digital literacy. This approach has been integrated into the design of the framework. See section on a framework to take us forward for further information.

Criterion 8: **Ensure that the Framework is Implementable Across the Continuum of Learning and Across a Range of Contexts** – Implementation of curricula across the medical education continuum is complex and needs to be carefully considered to ensure successfully implementation across a range of clinical and population health settings. Implementation considerations have been considered as part of the design and set out in the current state analysis for this framework and in next steps.

Consultation Question 1: Principles of a Digital Capability Framework in Medicine

1a. How relevant do you think these principles are to guiding the development of a capability framework in medicine?

1b. Are there principles we should add? Amend? Or delete?

Why a Model for Digital Health in Medicine that Crosses the Continuum

In this section, we outline some of the challenges of current curricula innovation models in medical education and explore why a cross curriculum model for doctors makes sense, with the view to more advanced and disaggregated offerings being developed at a later stage.

Current State – Models of Curriculum Design in Medicine

Curriculum design in medicine currently operates in such a way that innovations can occur across any of the four broad areas of the continuum (Medical Schools, Intern Training, Specialist Vocational Training and CPD). This can pose challenges which impact on agile cross curriculum skills development for the medical workforce in areas such as digital health:

1. **The assumption that beginning learners are digital natives and don't need formal training in digital health** – research into digital health shows that many junior doctors feel ill equipped to learn the foundations of clinical practice as well as having primary responsibility to learn new technology systems in healthcare settings. A common comment from junior doctors is that although they use their phones and social media more than older cohorts, this does not equate to the complexity or nature of learning required to navigate technology systems in healthcare settings. They do not have the underpinning knowledge related to these systems, and they are not familiar with the new ethical, quality and safety issues these technologies represent. Junior doctors also indicate that they need more formal training in how to use these systems effectively to maximise the care of their patients and minimise stress and burnout in their training. Equally, many settings use different levels of technology – junior doctors need the skills to help them understand good medical practice in highly developed technology settings as well as in low use technology settings.
2. **The length of time it takes to integrate curricula change across the entire continuum is slow** – the changes taking place in areas of medicine are moving quickly – even as part of COVID the protocols and workflows have changed significantly with increased uptake of telehealth and ePrescribing. This means that there are some changes i.e. digital health in medicine, which affect skill development for all – for junior doctors, interns and specialist medical doctors. It is important that we adopt models of curricula change for such important areas of skill development in such a way that we can share some common areas of learning across the entire continuum so we all have, at a minimum, some shared areas of foundational capability.
3. **Impacts on the health system** – there needs to be more connected methods of co-designing and diffusing medical education innovations across the health system so that workforce skills are shared across the continuum of medical education and other health professions. This aims to support collaboration between health workers, and foster system integration through the sharing of common learning frameworks and agreed work practices.

The AMC plays a key role as the accreditor to support education providers to build curricula which:

- promote incremental learning across the medical continuum
- clarify foundational requirements in areas of innovation such as digital health
- provide joined up solutions to workforce education across health settings

- share good practice across the professions and sectors within the medical education as a means of increasing collaboration and minimising time consuming and costly reinvention of innovation in silos.

Integral to any approach to curriculum innovation will be the need to ensure that education providers who are early adopters in medical education innovation in digital health are able to continue with their advanced program offerings and their programs are not disrupted by any proposed approach to digital health in medicine.

This proposal is designed in response to a call for action by Australian Medical Education Providers to the AMC. These providers have stressed that it is important for the AMC to provide samples of what good practice looks like and guidance for areas of significant change.

The proposed approach is aligned with good practice in change management. Such an approach stresses the need for system leader support, supervisor and peer train the trainer support, and jurisdictional and technical support underpinning a lifelong learning approach to building a digitally capable medical workforce. It also foreshadows the resourcing requirements for such a change and advocates for increased support for education providers to make this change a reality. Furthermore, the proposed approach is seen to be short term only with education providers integrating customised approaches to capability development in digital health into their curriculum renewal projects.

A Proposed Model – Cross Curriculum Model of Digital Health in Medicine

In the proposed model, foundational capabilities in digital health are identified and rolled out across all stages of the medical education continuum simultaneously

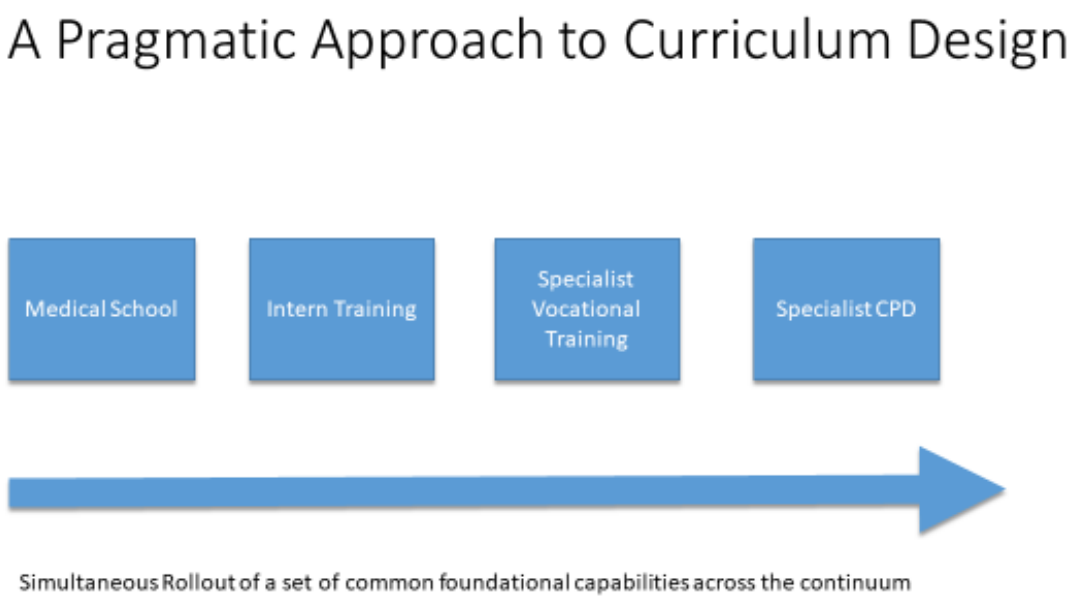


Figure 2: A pragmatic approach to curriculum design

Advantages of this model are that:

1. **Disruptive change means new learning for all across the continuum of medical education** Change that is a result of broad disruptions are a feature of a changing world, have impacts across the whole continuum of the medical workforce with implications for the need for skill development and new ways of thinking across the whole continuum of medical education, not just for junior doctors. In such a model, the learning needs of all members across the continuum are addressed in the spirit of tacking disruptive change responsively and learning together, rather than focused on hierarchy. Furthermore, through a modest and unifying learning offering, systems leaders are brought on board for the change and resources allocated appropriately to support the change.
2. **Technology is not the only change impacting health** - the challenge of the crowded curriculum means that it is important that change is realistic. Equally, digital capabilities need to be developed in such a way that the approach reflects good practice in medicine and supports the medical workforce to make the required change in practice which new workflows require of them.
3. **Technology is positioned as a tool for improved healthcare** It is important to ensure that technology is seen for what it is – ultimately a tool. We need to think about how we can reimagine healthcare through technology. The alignment of this capability framework with the three horizons of the National Digital Health Workforce and Education Roadmap, with their focus on leveraging technology to bring about health improvements, enables us to achieve this end through future workforce development and education.

4. **Importance of focusing on integration of digital health capability development into changing medical practices and workflows** rather than following technological fads.
5. **The length of time it takes to integrate change is significantly quicker** than in the traditional planned innovation model in medical education – with no learners across the continuum missing out on the learning opportunity given that baseline capabilities in priority areas such as digital health are learnt for all across the continuum.
6. **We need to think of curriculum innovation as a change management exercise with change management methods integrated into its design and rollout** – this means ensuring that supervisors have the skills and programs of learning to provide them with the skills to teach others. We also need to ensure that system leaders and technical staff are well briefed and supportive of the change. Addressing supervisor learning needs means that more senior people within the system are given the skills to help them to lead change initiatives and do not feel disempowered. It is anticipated that this will support change and minimise resistance.
7. **The proposed model of curriculum innovation poses a neat antidote to counteract the assumption that beginning learners have less skill in digital health** – with more junior doctors and more senior colleagues in medicine all gaining some base skills.
8. **A risk is that in this model one needs to ensure that there is access to resourcing across the system to ensure that dependencies of success are addressed**. These dependencies include piloting prior to rollout; communication, technology, education resources, people training (awareness and skills development for supervisors and peer teachers) and impact evaluation (model and technology for data collection and analysis).

Flexible Model of Foundational Capabilities Across the Continuum

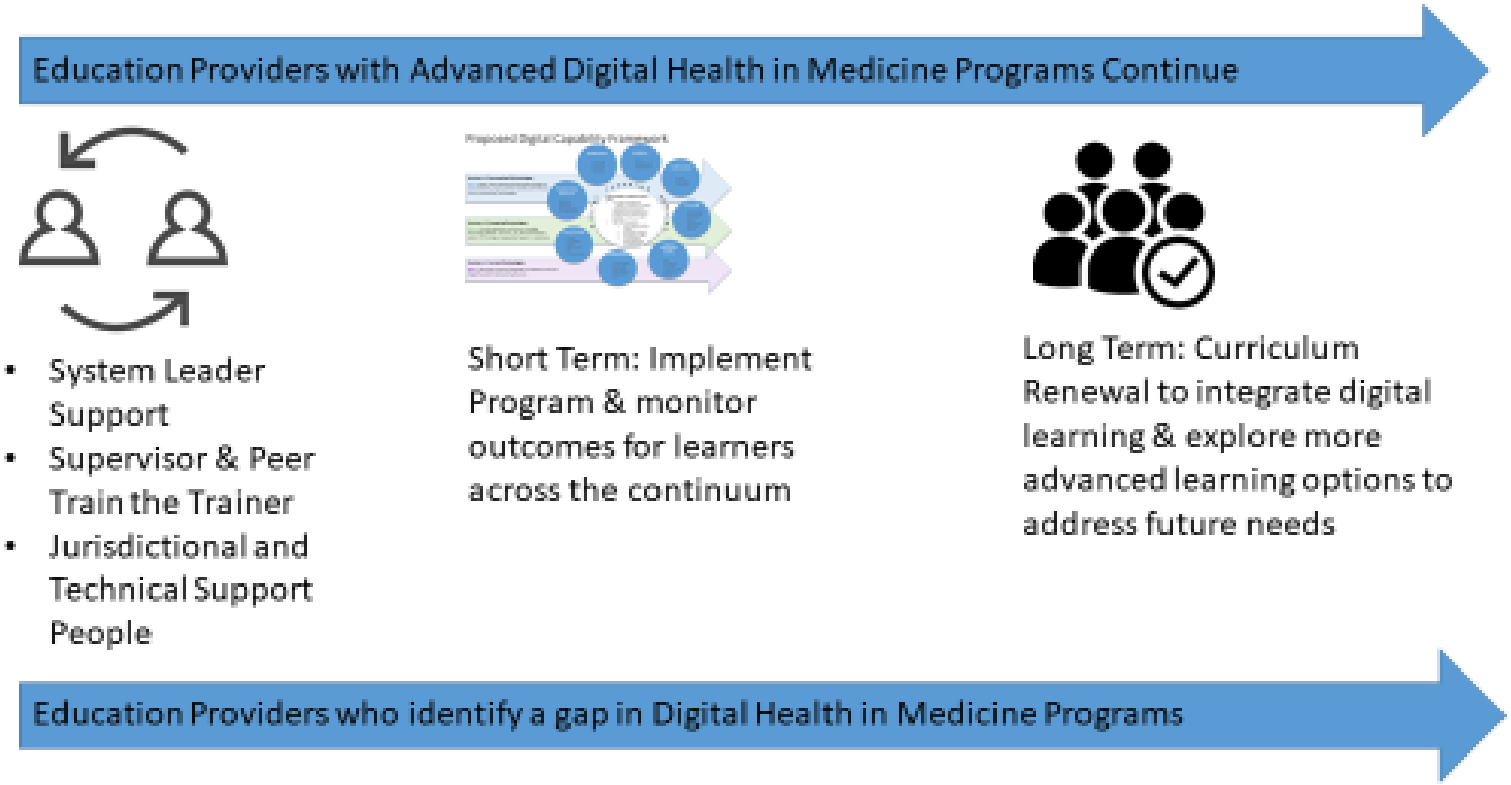


Figure 3: Flexible Model of Foundational Capabilities Across the Continuum

Consultation Question 2: Why a model for digital health in medicine that crosses the continuum

2a. How important is it to develop capabilities in digital health across the generations in medicine?

2b. The flexible model focuses on assisting education providers who have identified a gap in digital health and supports more advanced programs to continue – what do you see to be the advantages and disadvantages of such an approach?

Current State Analysis Across the Medical Education Continuum

In this section, we outline a current state analysis of digital health across the medical education continuum, including an overview of key trends in current, emerging and future technologies in medicine and why it is important to doctors now and in the future; the current state of integration of digital health across the medical education continuum; the gap between interest and expertise in medicine; international and national strategies, reports on digital health and a mapping of the capabilities across eight identified international and national capability frameworks in health and medicine as well as analysis of the Digital Health Capabilities in Medicine Workforce Advisory Group ranking of importance of these domains.

Key Trends in Current, Emerging and Future Technologies in Medicine

Over the next twenty years the global health landscape will be impacted by current, emerging and new technologies. Current technologies include telehealth and digital recording systems for safe and quality delivery of care, with a focus on increased and more convenient access. Emerging technologies include genomics, Artificial Intelligence, and robotics. In addition, new technologies, focused on personalised healthcare 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 people 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 in practice and the informatics health literature as value-based care, such philosophy shifts in healthcare delivery are 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)

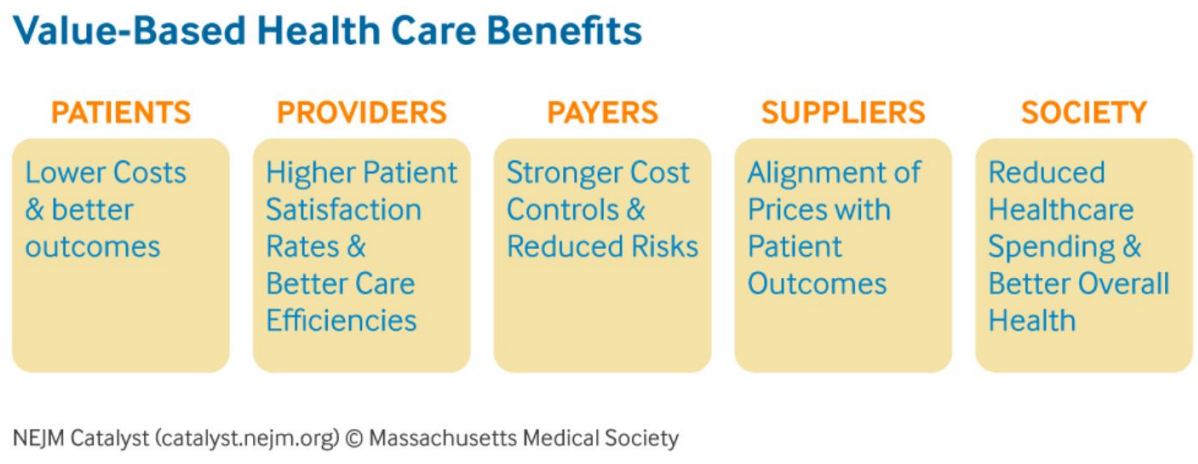


Figure 4: High Value Healthcare – key benefits

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.

Horizon 1: Current Technologies in Healthcare

Why Telehealth Matters

Telehealth can have significant benefits for patients, specialists and their teams. When used in the right context, telehealth can offer an effective alternative to face-to-face consultations (Figure 5).

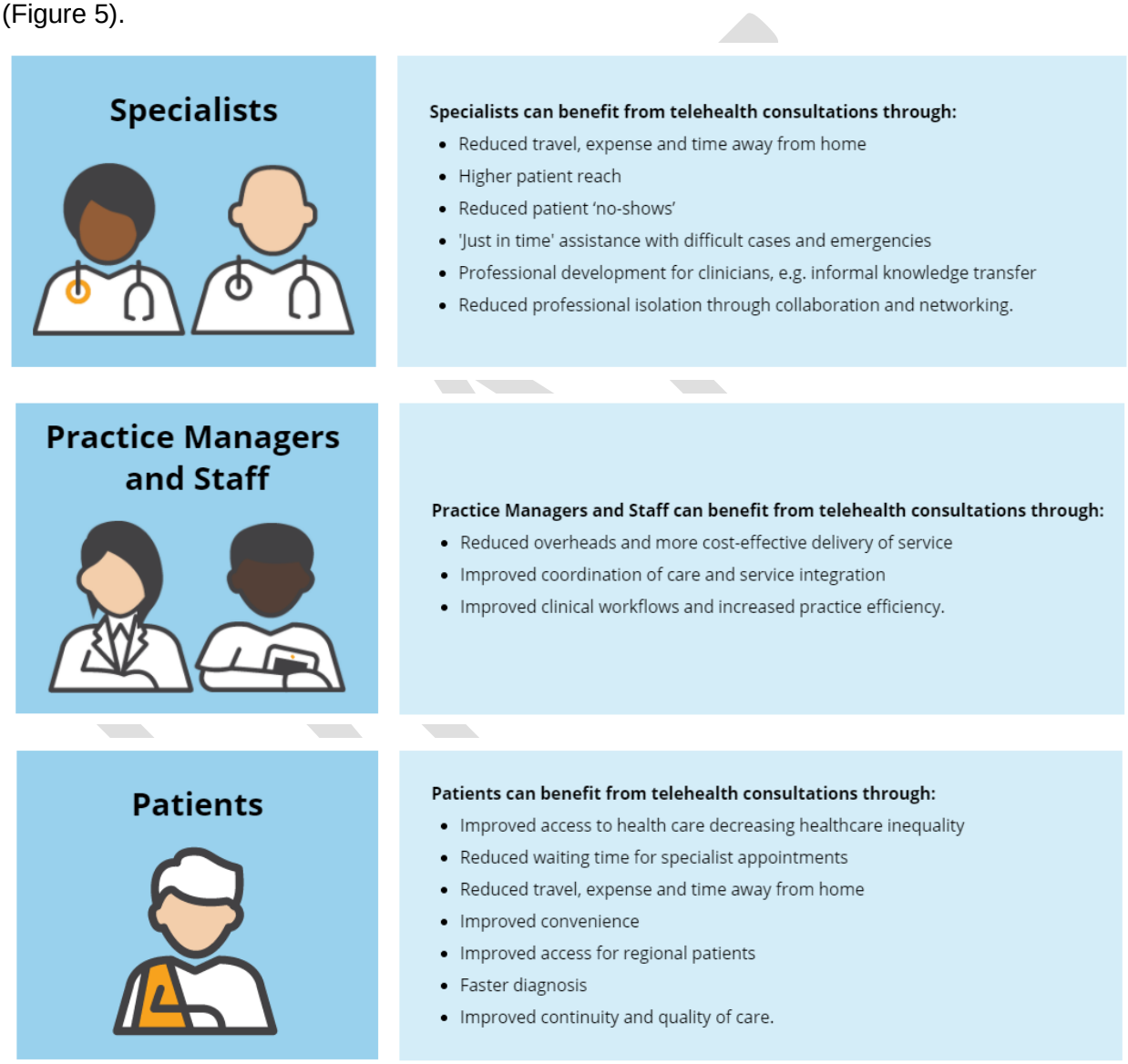


Figure 5: Why Telehealth Matters
https://specialist-toolkit.digitalhealth.gov.au/telehealth-consultations

Why Electronic Records Matter

The benefits of electronic records have been demonstrated internationally by providing people and clinicians with access to shared health information include including patient safety and health outcomes through increased adherence to treatments, and health system efficiencies relating to time savings for clinicians, reduced unnecessary duplication of investigations and avoided hospital admissions. (Digital Health Evidence Review 2018). Keeping good medical records, preparing timely medical reports and providing accurate medical certificates are essential components of good medical practice. As tangible evidence of standards of medical practice readily visible to others, these three components are a frequent basis of complaints made against doctors and for this reason alone deserve to be dealt with conscientiously. (Breen 2015)

In Australia, My Health Record is a secure online summary of a patient's health information and is available to all Australians. Healthcare providers and other staff that are authorised by their healthcare organisation can access My Health Record to view and add patient health information. Information that can be accessed via My Health Record includes shared health summaries, medicines information including prescription and dispense records, discharge summaries, pathology reports and diagnostic imaging reports.

Figure 6: Why Electronic Records Matter

https://specialist-toolkit.digitalhealth.gov.au/myhealthrecord

Horizon 2: Emerging Technologies

Why Emerging Technologies Matter

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 also protect the environment:

- **Efficiency**
- **Safety**
- **Better Health Outcomes**
- **Environment**

There are a variety of potential technologies, at varying stages of development and application (Figure 7).

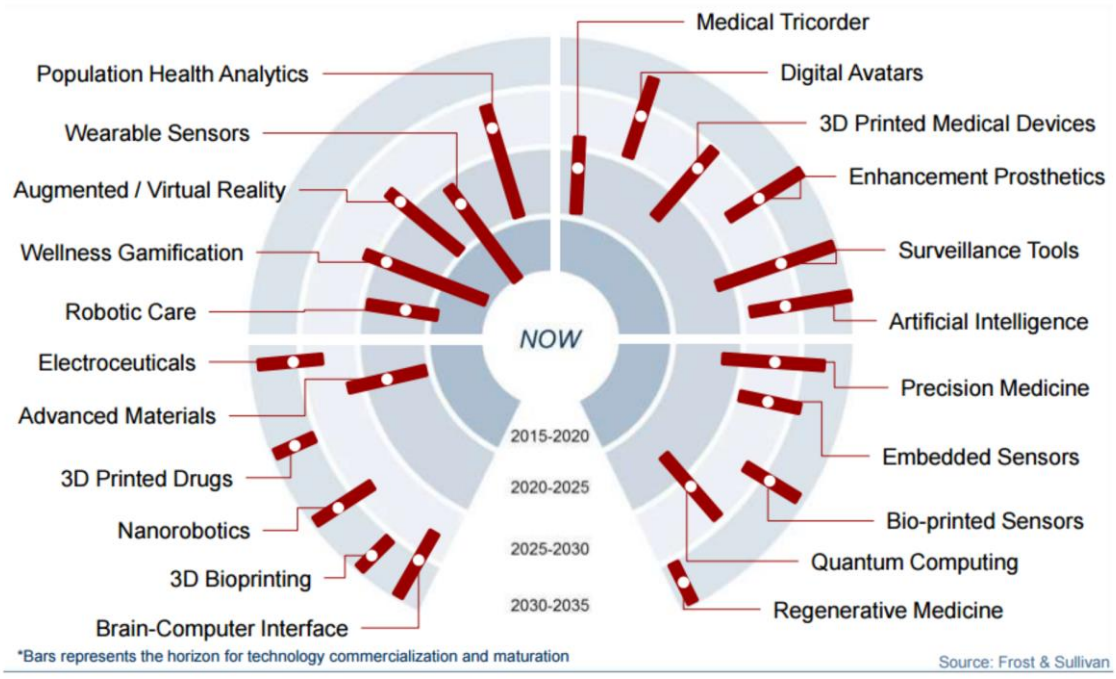


Figure 7: Technology Commercialisation and Maturation – Frost and Sullivan https://ww2.frost.com/

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.

Horizon 3: Personalised Technologies

Why Personalised Technologies Matter

In Australia, we have a strong medical workforce and a robust health system but future health systems and delivery may look quite different. Whilst technology trends such as telehealth have been increasing in up-take over the past few decades, the COVID-19 pandemic forced rapid uptake of health technologies that could minimise face to face contact and ensure safe health care provision. It will be important to monitor how such trends and uptake will continue over the coming years. Some key challenges and key innovations by way of technological capabilities are providing us with opportunities to look at healthcare differently.

In the 21st century many Australians enjoy good living conditions and health. Our communities are, however, not without considerable health challenges: People are living far longer than in previous generations and with increased prevalence of chronic disease. In parallel, many people are within double income families so this makes caring for the elderly and long-term ill more challenging. For those living with chronic disease, disability and are elderly, the key challenge is how do I stay in my home and enjoy a degree of independence and lead a meaningful life? Being admitted to hospital and having healthcare significantly focused on the sentinel event of a hospital admission does not address the daily healthcare needs of the majority of people of the 21st century. The hospital focuses on the emergency and increasingly hospital stays are shorter. Many patients struggle with prevention and rehabilitation – the phases in healthcare which wrap around the admission to hospital. Our challenge in the 21st century in healthcare is to establish better ways of dealing with these phases in the health and wellbeing of patients and as a consequence to review medical workflows and practices. Technology provides opportunities for improvements to healthcare. Furthermore, improvements in healthcare are highly dependent on intra-organisational and system connections which can be facilitated through joined up health, employment, social housing, and community care and engagement as well as better social security systems.

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. 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 use Interactive Voice Recording systems to monitor patients and assess risk 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 also enables a shift away from annual cardiac check-ups with cardiologists for low risk patients based on continual monitoring of primary, acute and personal device data.

This horizon is fundamentally about team work, empowering patients and revising roles.

Learning Across the Continuum

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. The survey is designed to find out how work-ready interns feel after medical school and improve how medical schools prepare graduates for internship, and is sent to all interns in Australia each year. The most recent survey, completed in 2019, included a question related to digital capability.

Question 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 were that this skill was the second-lowest rated of all the skills queried, below a 3 (= somewhat prepared) (Figure 8).

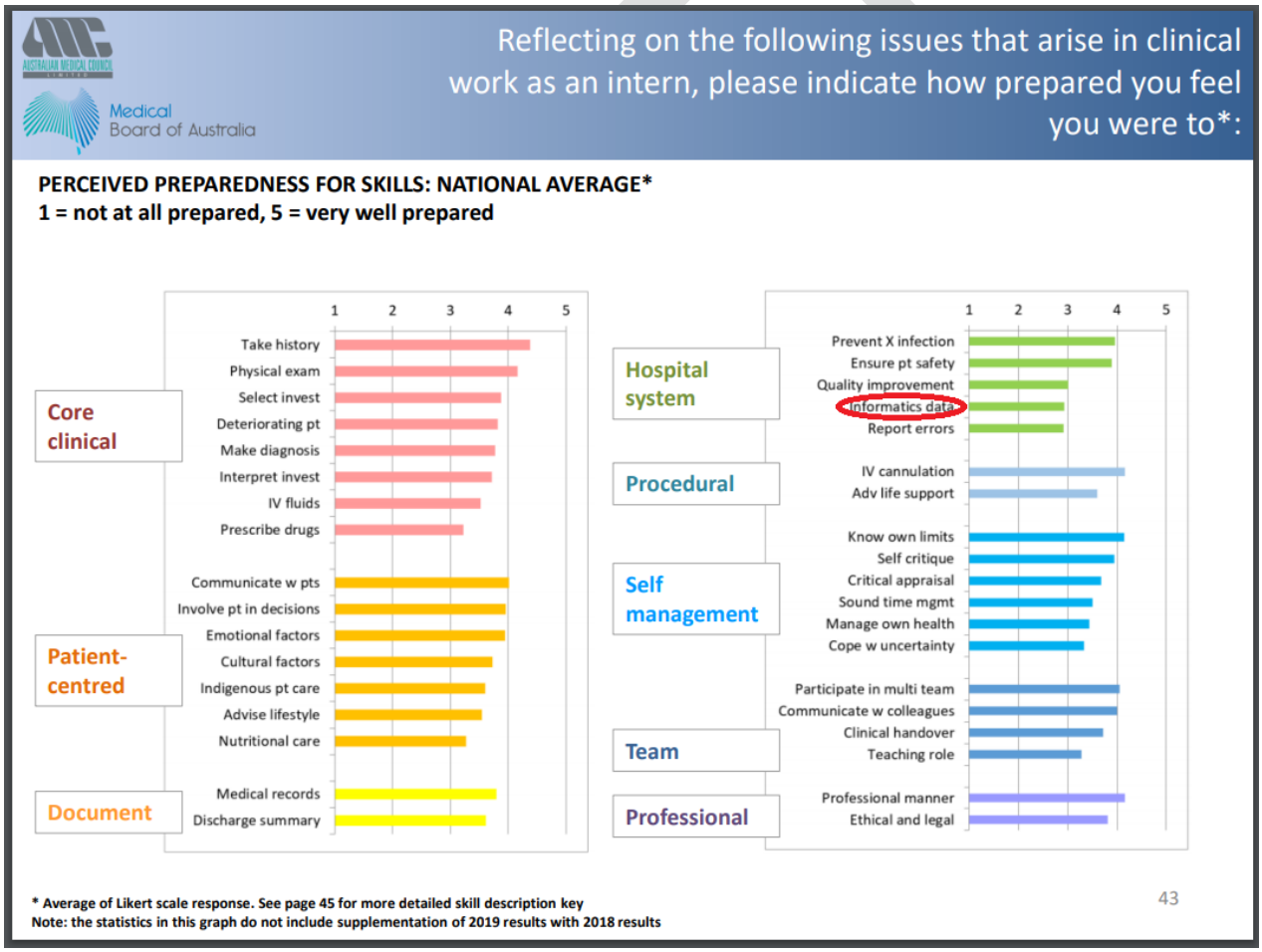


Figure 8: Results of Preparedness for Internship Survey

As part of this current state analysis of digital health in medicine, national and international literature on digital capabilities in medical schools has been explored, which shows 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. 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. Furthermore, Echelard et al. (2020) conducted a comprehensive review of existing literature on medical student training in e-health throughout the world. Their key findings were that 'the most studied aspects of e-health were m-health (mobile health), online medical resources, electronic health records and telehealth, while as a broad concept the Internet of Things (IoT), Artificial Intelligence and programming were the least studied aspects. The marked increase in the number of publications on e-health and medical students in 2019 (six times more than the previous year) indicates that a greater amount of research has been conducted in the last few years, and is likely to portend an increasing number of publications in the next few years.' This study shows an increased focus on eHealth although results are still relatively modest in terms of the rate of uptake and inclusion of digital health in medical school curricula globally and in mainstay not reflective of the significant changes which technology has brought to bear on health care delivery and patient safety.

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) in their study of all medical school curricula and interviews with curriculum and program leaders point out in – *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.'

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 (RANCR) 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.

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 9). 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.

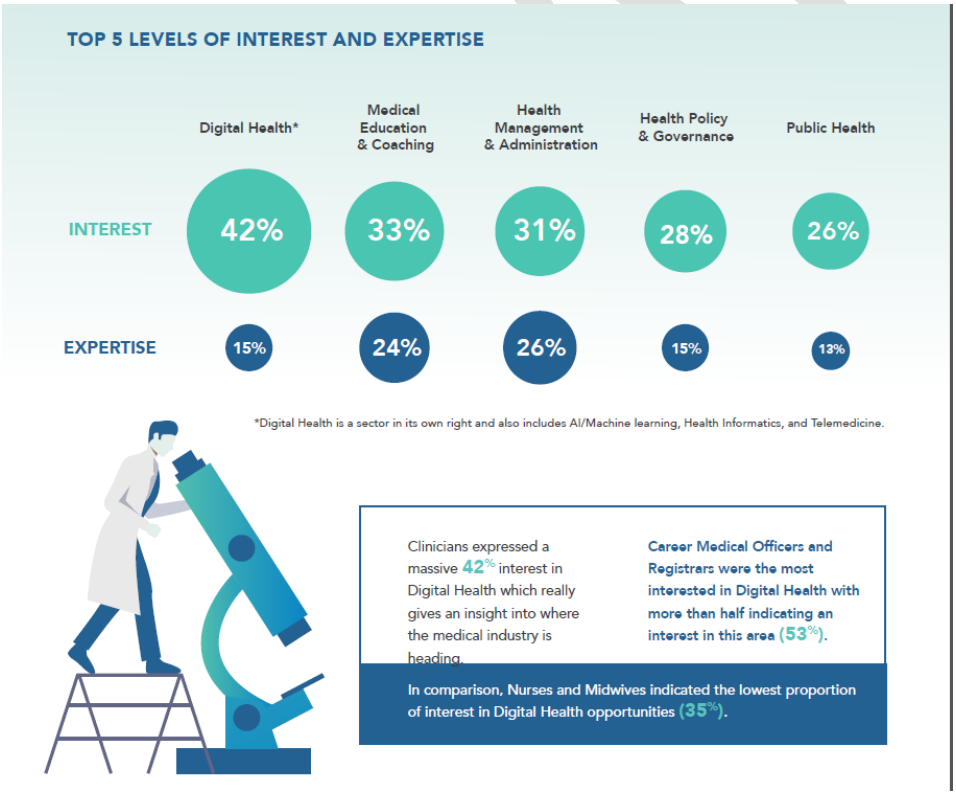


Figure 9: Gap between Interest and Expertise Across Medical Sector in Digital Health.

International and National Strategies, Reports 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 identified strategies provide useful background about the need for digital health as well as help to define the scope and focus of approaches to digital health and workforce development across the globe. For further information see the background research paper which provides the evidence underpinning this framework.

The current state analysis also included a review of eight 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.

For a detailed review of these domains as well as Advisory Group ranking of importance of these domains see the Synthesis of Evidence and Recommendations Report.

Broader Trends in Curriculum Innovation in Medical and Health Education

A key broader trend in curriculum innovation in medical education is the concept of Entrustable Professional Activities (EPAs). This is a useful concept which is being taken up nationally and internationally with a focus on making capability development, its teaching and learning as well as assessment manageable in the busy high volume and high risk environments such as healthcare settings. This curriculum innovation provides us with a way of thinking about how the teaching and learning and assessment of digital capabilities can work in medical education.

Entrustment and Core Tasks for Learning The concept of Entrustable Professional Activities (EPAs), first proposed by the Dutch Medical Educationalist, Olle Ten Cate in 2005, is an innovation in competency-based medical education, which helps to address some of the criticisms of competency training:

- **Detailed competencies can be difficult to operationalise and implement.** This means that many curricula frameworks remain such – a framework which does not show how outcomes, teaching and learning, assessment and measurement of impact is achieved within the program.
- **Competencies can be atomistic** – the separate parts not being representative of the whole.

As described by Ten Cate (2013):

- EPAs are not an alternative for competencies, but **a means to translate competencies into clinical practice**.
- Competencies are descriptors of healthcare practitioners, **EPAs are descriptors of work**.
- EPAs usually require **multiple competencies in an integrative, holistic nature**.

EPAs and competencies differ in that an EPA is a description of the work to be done, and competencies describe an individual's characteristics and abilities – EPAs require workers with competence. EPAs focus on the concept of *trust*. In high stakes environments such as health, where the competence of workers is paramount to the health and safety of patients and wellbeing of co-workers, trust and the degree to which workers can *entrust* more junior or less experienced members of the health team to perform tasks independently is central to the smooth operations of health settings and quality patient outcomes. Ten Cate is insistent that an EPA is not exclusively assessment, although assessment is clearly a key component. The EPA clarifies the competencies required to successfully complete a task. In addition, it focuses on how the learner needs to learn and what teaching and learning they need access to in order to maximise their performance.

Equally important is the work of Stephenson (1999) who sets out a framework for how professional expertise is developed. In Stephenson's work, expertise is seen as being developed across four key domains: **Foundational** where learners can operate safely within known contexts – checking and asking for help when out of depth is central to safety at this level, **Routinised Practice** where learners are competent within boundaries of routinised practice **Complex Problem Solving** where learners can engage in multi-tasking and complexity and **Leadership** providing vision and leadership in the clinical context.

Consultation Question 3: Current State Analysis Across the Continuum

3a. What are the key messages in this current state analysis of digital health across the continuum in medicine?

3b. What other further key points do we need to consider in thinking about the current state in digital health in medicine across the continuum?

- Key trends in current, emerging and future technologies in medicine
- The current state of integration of digital health across the medical education continuum
- The gap between interest and expertise in digital health in medicine
- International and national strategies, reports on digital health and a mapping of the capabilities across eight identified international and national capability frameworks in health and medicine
- Analysis of the Digital Health Capabilities in Medicine Workforce Advisory Group rating of importance of these domains
- Other?

A Framework to Take Us Forward

In this section, we outline the digital health framework of foundational digital health capabilities, entrustment tasks, teaching and learning support, assessment strategies and measurement of impact. This is a sample only of how digital capabilities can be integrated across the curriculum – for other good practice samples see case studies of education providers.

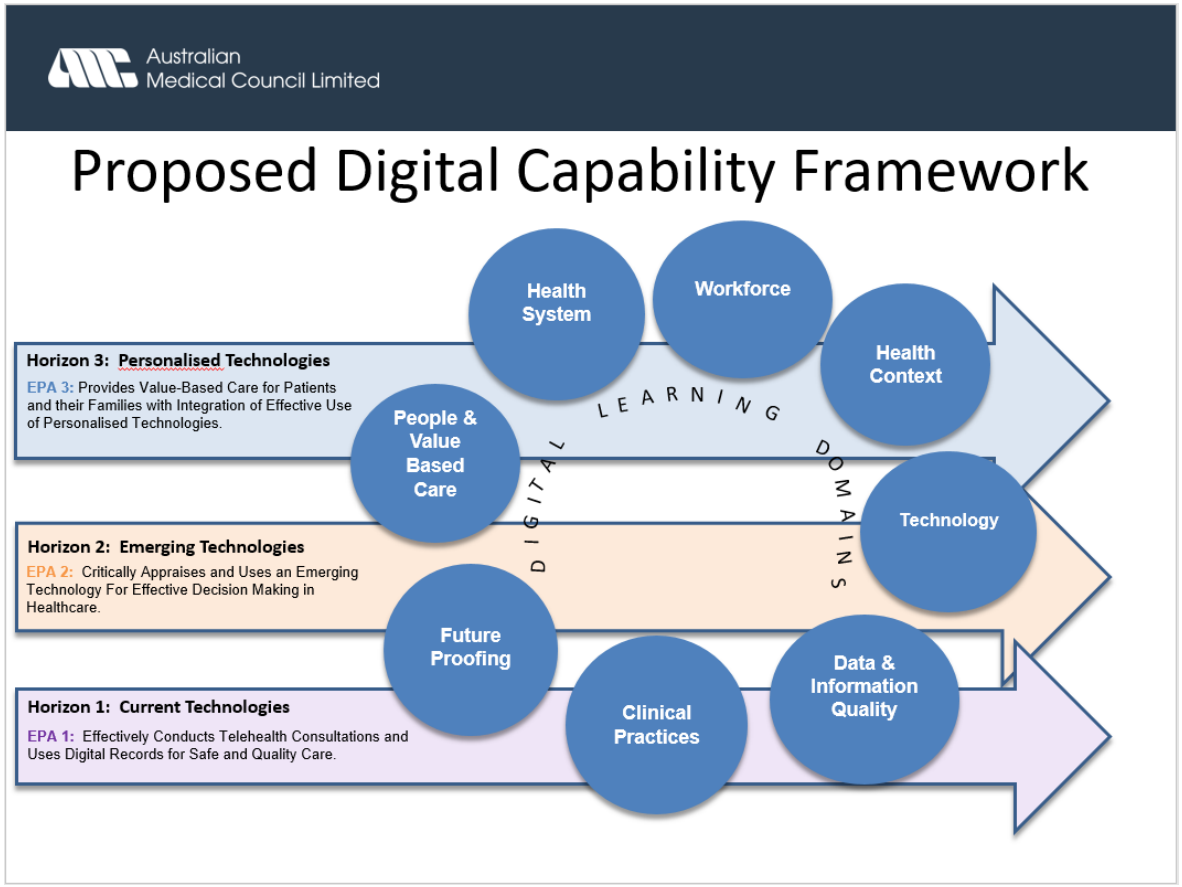


Figure 10: The three tasks mapped to 8 domains of learning

Horizons

The three broad horizons that span the Digital Capability Framework in Medicine act as a guide which applies the domains and subdomains, to teaching, learning and assessment programs as well as evaluation of impact across the medical education continuum.

The three EPAs provide the functional aspect, and describe the associated capabilities.

Horizon 1: Current Technologies

- EPA 1 - Effectively conducts telehealth consultations and uses digital records for safe and quality care.

This horizon and EPA related to the current state of digital health, and the ability of the professional to utilise digital technology for safe and high quality health care provision.

Horizon 2: Emerging Technologies

- EPA 2- Critically appraises and uses an emerging technology for effective decision making in Healthcare.

Horizon and EPA two is forward thinking and skills relate to the professional's ability to critically assess and implement new technology into current practice.

Horizon 3: Personalised Technologies

- EPA 3- Provides value-based care for patients and their families with integration of effective use of personalised technologies.

Horizon and EPA three are patient and family based, where the professional uses technology in a patient centred and value based manner.

Digital Learning Capabilities - Domains and Sub Domains

The following eight learning domains represent key knowledge areas which serve to inform the overarching horizons and are integrated into the learning outcomes of the associated EPAs.

1. **Health System**
    a. Current state
    b. Future State
    c. Continuous improvement

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

2. **Workforce**
    a. Medical
    b. Intra-professional
    c. Inter-professional

An understanding of how the medical workforce is affected by digital technology is important. This domain further illustrates the intra- and inter-professional aspects of the medical workforce.

3. **Health Context**
    a. Community
    b. Hospital
    c. Personalised

This domain takes into account the various population levels at which digital technology can affect. There is natural connectivity through these population levels, requiring a broad understanding of health.

4. **Technology**
    a. Critical appraisal of technologies
    b. Privacy and security
    c. Implementation barriers and solutions

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.

5. **Data and Information Quality**
    a. Data quality
    b. Data management
    c. Information creation, use and sovereignty

The professional will require knowledge regarding how data is managed and controlled. Understanding issues related to freedom of information and information sovereignty is a key factor and relates to overall patient privacy and confidentiality.

6. Clinical Practice

a. Clinical processes and pathways
b. Expertise and lifelong learning
c. Ethics, policy and the law

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.

7. Future Proof

a. Current challenges in health
b. Opportunities and risks
c. Redundancy

This domains addresses the understanding of future proof, 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, in order to continue healthcare provision in the event of system failure and cost effectiveness.

8. People and Value Based Care

a. Culture and Improved Patient Experiences
b. Needs and expectations
c. Lifelong health and learning journeys

Digital healthcare ultimately functions to augment and increase patient and value based outcomes. This domain keeps the patient and value based care central to digital health provision.

Bringing it Together – A Sample Foundational Digital Health EPA Based Program

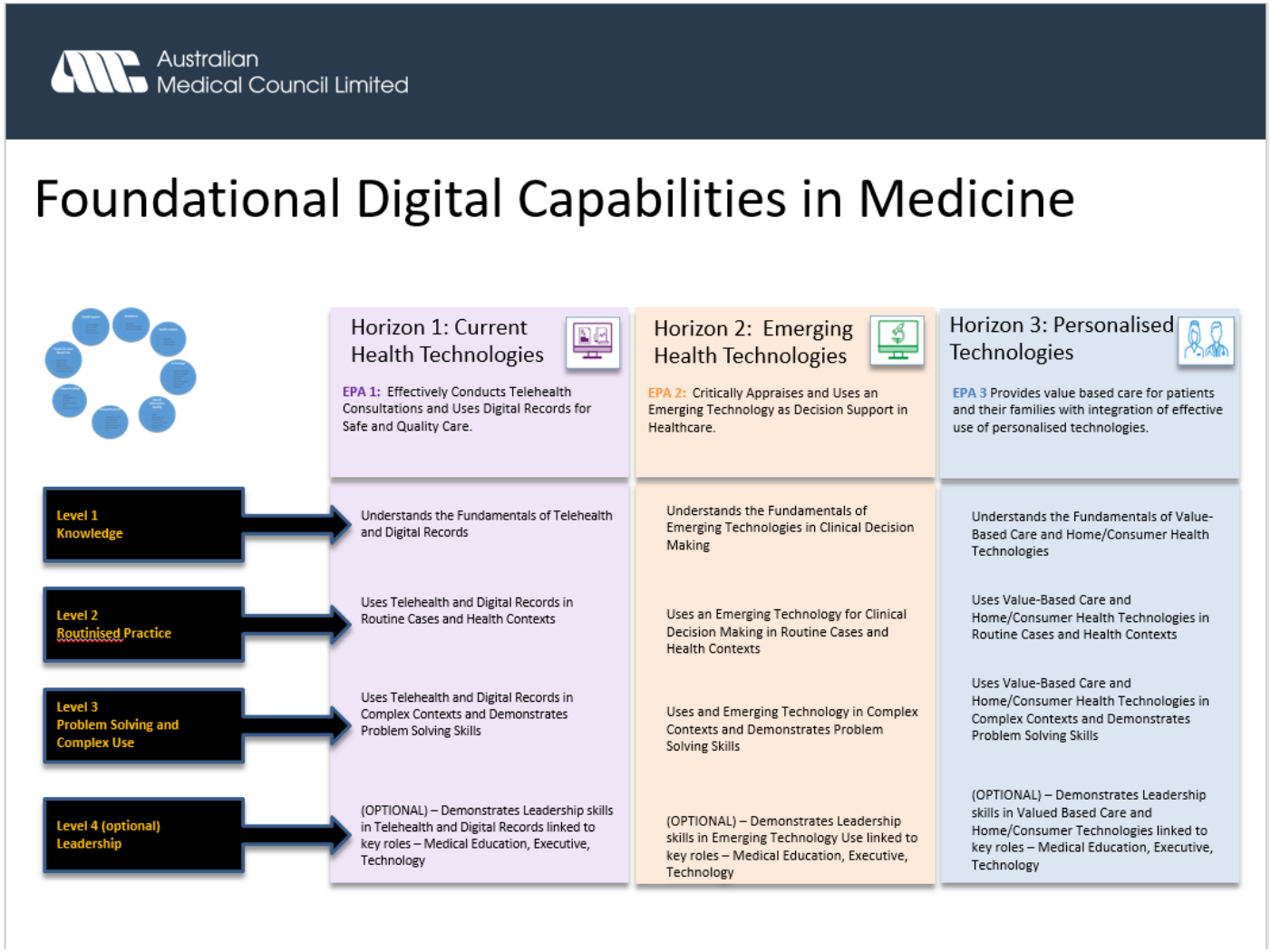


Figure 11: The three tasks mapped to outcomes at each level of learning

Horizon 1: Embedding Safe, Ethical and Effective Use of Systems of Record

[Now - 2022]

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 ePrescribing 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, ePrescribing and effective use of electronic record keeping.

Individual Medical Professional Capabilities:

Effectively Conducts Telehealth Consultations and Uses Electronic Records For Safe and Quality Care – EPA1 Outcomes

- Access and review patient information in a digital record system.
- Consult effectively with patients using telehealth systems and, with reference to, electronic records.
- Synthesise information relevant to patient care from multiple sources.
- Observe privacy and security of information in telehealth consultation and digital record system.
- Prepare clear records in line with Australian Medical Board Code of Conduct:

  8.4.1 Keeping accurate, up-to-date and legible records that report relevant details of clinical history, clinical findings, investigations, information given to patients, medication and other management.
  8.4.2 Ensuring that your medical records are held securely and are not subject to unauthorised access.
  8.4.3 Ensuring that your medical records show respect for your patients and do not include demeaning or derogatory remarks.
  8.4.4 Ensuring that the records are sufficient to facilitate continuity of patient care.
  8.4.5 Making records at the time of the events, or as soon as possible afterwards.
  8.4.6 Recognising patients' right to access information contained in their medical records and facilitating that access.
  8.4.7 Promptly facilitating the transfer of health information when requested by the patient

- Upload an electronic record.
- Treat complex case use of telehealth and electronic records (vulnerable patients and patients and/or colleague who may be resistant to digital technologies, sensitively and ethically).
- Reflect on practice performance and improvement through audit of patient records in an electronic record system.

Workforce Capability Shift:

- Improve digital literacy across the health workforce.
- Develop new mindsets and new skills.
- Lead people through complexity.
- Create more adaptive cultures which will challenge deeply held norms of behaviour.
- Mobilise diverse stakeholders to adopt new ways of working and interacting with a focus on change.

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Horizon 2: Integrating New Technologies and Ways of Working [Now to 2027]

Horizon two of the National Digital Health Workforce and Education Roadmap focuses on effective use of Emerging Technologies in healthcare delivery. 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.

Individual Medical Professional Capabilities:

Critically Appraises and Use of Emerging Technologies in Decision Making – EPA2 Outcomes

- Select 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. *BMC Medical Informatics and Decision Making* 19, Article No 207, 2019.
- Gain awareness of how to use the decision support tool
- Explore the benefits and challenges for patients and clinicians of usage of the clinical decision support
- Critically appraise 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
- Reflect on the similarities and differences of your clinical practice, with and without use of the decision tool, including ethical implications
- Observe privacy and security of information in use of the decision tool and possible areas of bias
- Consult effectively with patients about, and with reference to, decision support
- Treat complex case use of decision support (vulnerable patients and patients/colleagues who may be resistant to decision support) sensitively and ethically
- Reflect on practice performance and improvement through audit of clinical practice with and without decision support – refer to the six dimensions of impact evaluation on clinical practice and health system improvement:
    - 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)
    - equity (access to quality services).

Workforce Capability Shift

- Anticipate and respond to emerging technologies most relevant to their area of focus.
- Resolve new ethical dilemmas and refine policy and roles related to use of new technologies.
- Learn new ways of working across health with support of emerging technologies and the health team.

References

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Horizon 3: Digital Health Transformation [now to beyond 2027]

Provides Value Based Care For Patients and Their Families with Integrated Effective Use of Personalised Technologies – EPA3 Outcomes

Horizon 3 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.

Individual Medical Professional Capabilities:

- 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, disabled, CALD patient and carer, 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
- Identifies opportunities for shifts in personal practice and system improvements to integrate value-based care leveraging sustainable use of personalised technologies
- 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 of the planned change
- Reflects on practice performance and improvement of shift in practice towards value-based care through audit of clinical practice using key impact metrics drawing on data entered as discrete data fields in digital record system:
  - 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).

Workforce Capability Shift

- Adopt more patient centred approaches to health.
- Use new technologies integrated with transformational goals for better care (value-based healthcare, personalised medicine, consumers as partners and care outside hospital settings).
- Engage in small scale trials and transformational change programs in health impacting ways of working, roles, contexts of health provision and outcomes.

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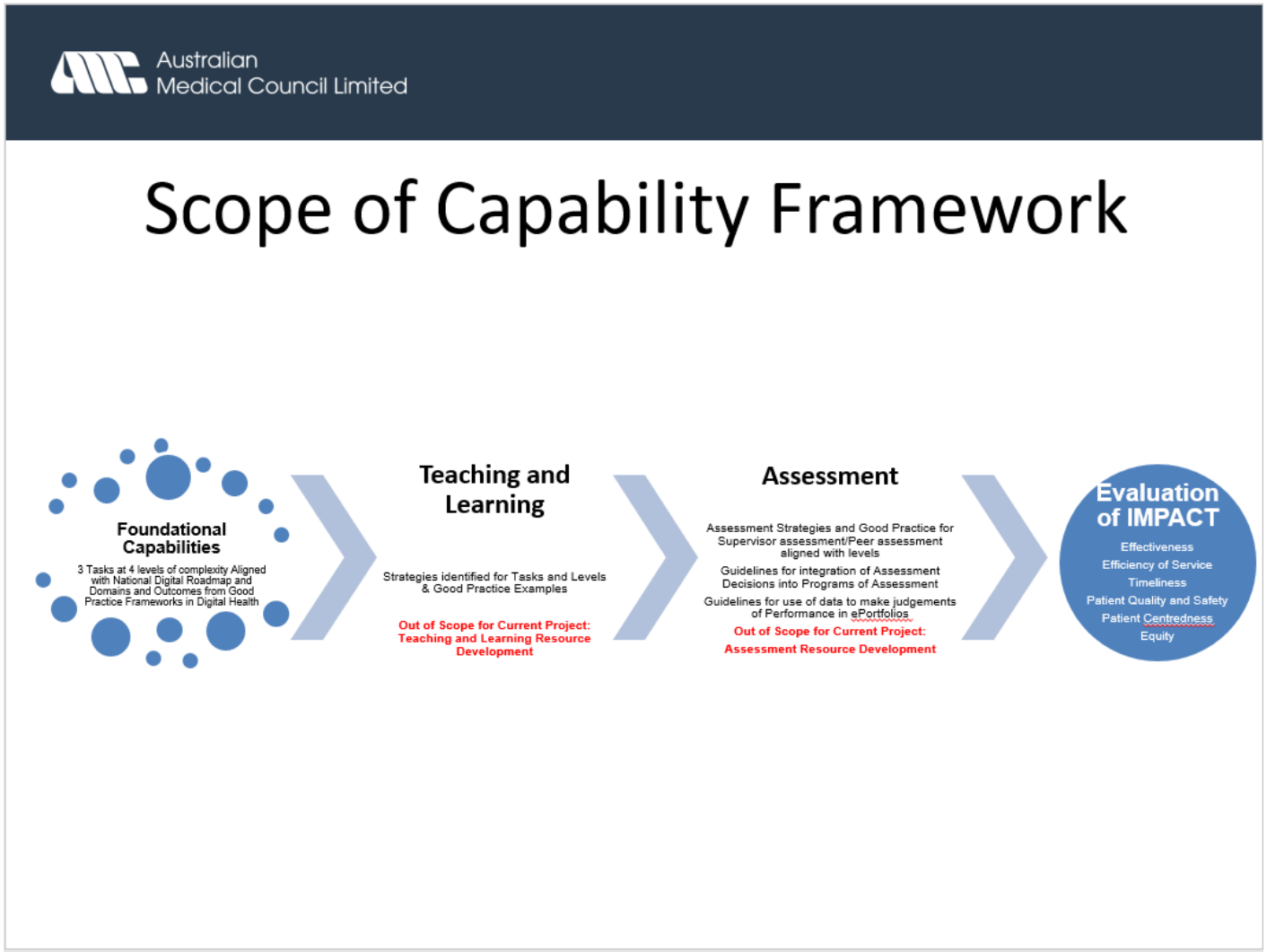


Figure 12: The scope – capabilities, teaching and learning, assessment and measurement of impact

Achieving Constructive Curriculum Alignment

In this section, we set out some key concepts and methods drawn from the literature in good practice in medical education with a focus on Biggs' (1999) concept of constructive curriculum alignment to achieve the alignment between the strategic horizon's, and the associated capabilities with teaching and learning and assessment programs. We also outline the importance of measurement of impact. We apply these concepts the fostering of digital capabilities across the medical workforce.

Teaching and Learning

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. Learning opportunities 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.

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 impacting supervision, see section Possible Next Steps, in 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.

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.

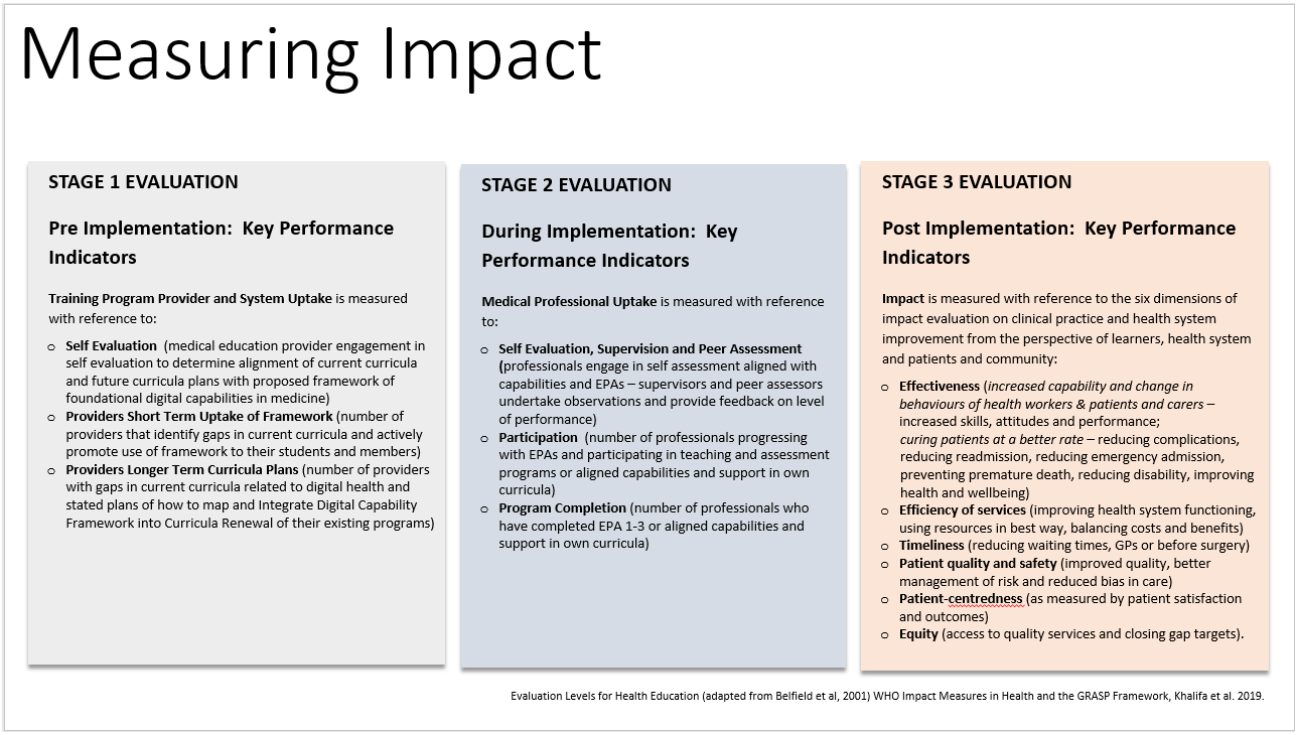
Newer thinking about assessment has focused on the link between assessment and learning (Cilliers FJ, Schuwirth LWT, Adendorff HJ, et al. 2010; Cilliers FJ, Schuwirth LWT, Herman N, et al. 2012.) and feedback (Ericsson KA. 2007; Boud, D and Molloy, E 2012). Assessments should ideally provide feedback 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 Profs 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).

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. 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:



See Figure 13. Evaluation levels for health education (adapted from Belfield et al, 2001) and the GRASP Framework, Khalifa et al. 2019

Consultation Question 4: A Framework to Take Us Forward

4a. In considering the 3 Entrustable Professional Activities and the domains and sub-domains of the proposed Digital health framework for medical education providers - do you think this is what doctors need to learn? *(Is it fit for purpose?)*

4b. How can we best teach, learn and assess such outcomes – do the proposed strategies align with good practice in medical education? (*Is it aligned with good practice in medical education*?)

4c. In considering the proposed Digital health framework for medical education providers throughout the education cycle (primary degree, intern, postgraduate and CPD) - what do you see as the barriers and enablers to implementing this approach? *(Is it feasible?)*

Possible Next Steps

In this section, we outline some possible next steps for medical education innovation and possible future areas of collaboration between the Agency, the AMC, other Commonwealth Government Departments and medical education providers, which extends beyond the scope of this current partnership.

Some piloting and implementation considerations are as follows:

Stages of Program	**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.
Dependencies	
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	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 ADHA plans for capability across the health system.
Technology	A dependency of the pilot is the availability of validated technology tools aligned with the three horizons. This is important so that medical practitioners across the continuum can undertake the task and have clear guidelines about optimal technology to access. Technology requirements for the horizons is as follows: • 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) 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. We need to ensure, through fair and equitable access to emerging technologies, that all medical practitioners have access to the required

	technologies to achieve entrustment and experience with the required technologies for each of the three horizons and related EPAs. 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.
Education Resources	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 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. 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.
People Training (Awareness and Skills Development Training)	**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 Framework in Medicine and implications for their medical workforce and others across the health system. **Medical Education Supervisors:** Vital to the success of the implementation of the pilot and subsequent rollout of the capability framework 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. **Digital Experts in Jurisdictions and Technical Support People:** Digital champions and the technical support team across the jurisdictions need to be aware of this project 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 support for its implementation.
Impact Evaluation	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.
Research	Ethics approval and a formal research project should be prepared to contribute to the body of evidence in the formal literature of digital health in medical education.

Implementation Plans	Following adjustments to the framework implementation plans are developed aligned with pilot recommendations.

Further Possible EPAs Mapped to the Digital Roles Framework include:

Patient Consumer and Carer	**EPA4:**	**Patient Experience and Outcomes**
Frontline Clinical	**EPA5:**	**Clinical Digital Skills**
Digital Champion	**EPA6:**	**Digital Champion**
Clinical and Technology Bridging	**EPA7:**	**Clinical and Technology Boundary Spanner**
Technologist	**EPA8:**	**Technologist**
Leadership and Executive	**EPA9:**	**Leader and Executive**
Business, Administrative and Clinical Support	**EPA10:**	**Business and Administrator**
Education and Research	**EPA11:**	**Educator and Researcher**

Extending beyond digital capabilities for all, which this foundational framework focuses on, there will be some medical professionals who seek a more advanced knowledge base in this area as well as specific technology-based careers in medicine. As part of next steps, it would be useful to expand on this framework to develop more advanced educational offerings to support medical innovation and new technology leveraged career opportunities for doctors.

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.

Consultation Question 5: Next Steps

5a. Implementation is challenging – do the implementation strategies capture the main areas of challenge in digital health?

5b. How could the medical education sector work together to improve digital health curriculum development in medicine?

Appendix 1: Entrustable Professional Activity 1 – Constructive Curriculum Alignment

The table below seeks to show 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.

<table>
<tr><td colspan="4">EPA Title: Effectively Conducts Telehealth Consultations and Uses Electronic Records for Safe and Quality Care</td></tr>
<tr><td colspan="4">Clinical 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.</td></tr>
<tr><td colspan="4">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 ePrescribing 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, ePrescribing and effective use of electronic record keeping.
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) to effectively conduct telehealth consultations and uses electronic records for safe and quality care:</td></tr>
<tr><td>Foundational Knowledge
Learning Outcomes</td><td colspan="3">• Understands the benefits and challenges of effective use of telehealth.
• Understands what an electronic record system is and how it functions in clinical care.
• Understands the benefits and challenges of effective use of electronic records.
• Understands the benefits and challenges of effective ePrescribing.
• Demonstrates understanding of privacy and security concerns and practices related to effective use of electronic records.
• Demonstrates understanding of ethics and the law in relation to effective use of electronic records.</td></tr>
<tr><td>Routinised Practice
Learning Outcomes</td><td colspan="3">• Demonstrates effective use of telehealth and electronic records in simple cases and stable routinised clinical environments:
o Access and review patient information in an electronic record system.
o Synthesise information relevant to patient care from multiple sources
o Observe privacy and security of information in a digital electronic record system.
o Consult effectively with patients with telehealth system about, and with reference to, electronic records.
o Prepare clear records.
o Update an electronic record contemporaneously with the patient consultation.
o Upload an electronic record.</td></tr>
<tr><td>Complex Contexts and Problem Solving
Learning Outcomes</td><td colspan="3">• Demonstrates effective use of digital records in complex cases and challenging clinical environments.
o Treat vulnerable patients.
o Effectively manage patients and/or colleagues who may be resistant to telehealth and electronic records, sensitively and ethically.
o Audit practice records through reference to an electronic record system and transcript of telehealth consultation.
• Demonstrate technical resolution and troubleshooting.</td></tr>
<tr><td>LEVEL OF TASK COMPLEXITY AND LEARNING OUTCOMES</td><td>TEACHING AND LEARNING</td><td>SUPERVISOR ENTRUSTMENT AND PEER REVIEW LEVELS</td><td>ALIGMENT WITH CORE DOMAINS OF PRACTICE</td></tr>
<tr><td colspan="4">ENTRUSTMENT LEVELS 1 – 3 (Required for Safe and Quality Practice)</td></tr>
<tr><td>Foundational Knowledge
Learning Outcomes</td><td>✓ 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 on the ward.</td><td>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/peer review of performance required by supervisor/peer reviewers for this level.</td><td>✓ Digital Health – Foundational Current Technologies.
✓ Clinical Care.
✓ Critical Thinking.
✓ Privacy and Security.
✓ Ethics and the Law.
Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.
• Performance in task components and domains drawn from scores in teaching and learning and associated assessments.</td></tr>
</table>

Routinised Practice **Learning Outcomes**	✓ 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.	**Entrustment through observation of routinised clinical cases.** **Learner is entrusted for:** • **Direct Supervision –** supervisor/peer reviewers 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. **To achieve this level learner needs to demonstrate a minimum of multiple routinised cases in different clinical contexts.**	✓ Digital Health - Foundational Current Technologies. ✓ Clinical Care. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. **Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.** • **Supervisor ranks performance in task components and domains.** • **Provides qualitative comment on learner performance.**
Complex Contexts and Problem Solving **Learning Outcomes**	✓ 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.	**Entrustment through observation of complex clinical cases.** 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). **Entrustment through observation of routinised clinical cases.** **Learner is entrusted for:** • **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. **To achieve this level learner needs to demonstrate a minimum of multiple complex cases in different clinical contexts.**	✓ Digital Health - Foundational Current Technologies. ✓ Clinical Care. ✓ Critical Thinking. ✓ Privacy and Security. ✓ Ethics and the Law. **Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.** • **Supervisor ranks performance in task components and domains.** • **Provides qualitative comment on learner performance.**
ENTRUSTMENT LEVELS 4 (Optional)			

<table>
<tr><td colspan="4">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:
○ Demonstrates leadership skill related to core roles in telehealth and digital records (digital champion, researcher, teacher, manager and admin, and/or technologist).</td></tr>
<tr>
<td>Leadership
Demonstrates leadership skills in relation to one or more of the core roles related to telehealth and electronic record systems:
• Digital Champion.
• Researcher.
• Teacher.
• Manager and Admin.
• Technologist.</td>
<td>✓ Workshadow a leader.
✓ Engage in project work.
✓ Demonstrate leadership behaviour.</td>
<td>Learner is entrusted for supervision at a distance (phone) on achievement of this level.
If they choose to demonstrate leadership in teaching – they take on some teaching duties.
Learner is entrusted for:
• Direct Supervision
• Indirect Supervision (Reactive)
• Independent (learner able to do task independently reliably)
(see above for definitions of these supervisor/peer reviewer entrustment levels)
To achieve this level learner needs to demonstrate a minimum of multiple leadership roles in different clinical contexts.</td>
<td>✓ Leadership in Digital Health – Foundational Current Technologies (telehealth and digital records).
○ Champion of Digital Health.
○ Research in Digital Health.
○ Manager and Admin in Digital Heath.
○ Technologist in digital health.
Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.
• 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.</td>
</tr>
</table>

References

1. Medical Board of Australia. Good medical practice: a code of conduct for doctors in Australia. 2014. http://www.medicalboard.gov.au/Codes-Guidelines-Policies.aspx (accessed Oct 2015).
2. Breen, K et al (eds.) (2010) *Good Medical Practice: Professionalism, Law and Ethics*. Cambridge University Press
3. Australian Digital Health Agency https://specialist-toolkit.digitalhealth.gov.au/
4. http://www.ehealth.acrrm.org.au/telehealth-standards

Appendix 2: Entrustable Professional Activity 2 – Constructive Curriculum Alignment

The table below seeks to show 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.

<table>
<tr><td colspan="2">EPA Title: Critically Appraises and Uses an Emerging Technology as Decision Support in Healthcare.</td></tr>
<tr><td colspan="2">Clinical 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.</td></tr>
<tr><td colspan="2">Description
Horizon 2 of the National Digital Health Workforce and Education Roadmap focuses on effective use of Emerging Technologies in healthcare delivery. 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.
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:</td></tr>
<tr><td>Foundational Knowledge
Learning Outcomes</td><td>• 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. BMC Medical Informatics and Decision Making 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:
o Understands what a digital decision tool is and how it functions in clinical care.
o Understands the benefits and challenges of effective use of digital decision tools.
o Demonstrates understanding of privacy and security concerns and practices related to effective use of digital decision tools.
o Selects a validated decision tool related to specialty or a priority health context and familiarises oneself with its features.
o Critically appraises the assumptions on which the decision tool algorithms are based.
o Demonstrates understanding of ethics and the law in relation to effective use of digital decision tools.</td></tr>
<tr><td>Routinised Practice
Learning Outcomes</td><td>• Demonstrates effective use of digital decision tools in simple cases and stable routinised clinical environments:
o Use the tool for diagnosis
o Use the tool for prognosis
o Use the tool for therapeutics.
• Observe privacy and security of patient data including considerations of ethics and possible bias in decision making.</td></tr>
<tr><td>Complex Contexts and Problem Solving
Learning Outcomes</td><td>• Demonstrates effective use of digital decision tools in complex cases and challenging clinical environments:
o Use the tool for diagnosis
o Use the tool for prognosis
o 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:
o effectiveness (curing patients at a better rate – reducing complications, reducing readmission, reducing emergency admission)
o efficiency of services (using resources in best way, balancing costs and benefits)
o timeliness (reducing waiting times, GPs or before surgery)
o patient quality and safety (quality, risk and bias in care)
o patient-centredness (as measured by patient satisfaction and outcomes)
o 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.
• Observes privacy and security of patient data and possible issues of bias and ethical considerations.
• Demonstrates technical resolution and troubleshooting.</td></tr>
</table>

LEVEL OF LEARNING & CORE CAPABILITIES	TEACHING AND LEARNING	SUPERVISOR ENTRUSTMENT	ALIGMENT WITH CORE DOMAINS OF PRACTICE
ENTRUSTMENT LEVELS 1 – 3 (Required for Safe and Quality Practice)			
Foundational Knowledge Learning Outcomes **(see above)**	✓ 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.**	✓ 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.** • **Performance in task components and domains drawn from scores in teaching and learning and associated assessments.**
Routinised Practice Learning Outcomes **(see above)**	✓ 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.	**Entrustment through observation of routinised clinical cases.** **Learner is entrusted for:** • **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. **To achieve this level learner needs to demonstrate a minimum of multiple routinised cases in different clinical contexts.**	✓ Digital Health. ✓ 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.** • **Supervisor ranks performance in task components and domains.** • **Provides qualitative comment on learner performance.**
Complex Contexts and Problem Solving Learning Outcomes **(see above)**	✓ 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.	**Entrustment through observation of complex clinical cases.** 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). **Entrustment through observation of routinised clinical cases.** **Learner is entrusted for:** • **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.	✓ Digital Health. ✓ 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.** • **Supervisor ranks performance in task components and domains.** • **Provides qualitative comment on learner performance.**

		To achieve this level learner needs to demonstrate a minimum of multiple complex cases in different clinical contexts.	
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: ○ Demonstrates leadership skill related to decision support and core roles in digital health (digital champion, researcher, teacher, manager and admin, and/or technologist).			
ENTRUSTMENT LEVELS 4 (Optional)			
Leadership Demonstrates leadership skills in relation to one or more of the core roles related to effective use of digital decision making tools in medicine: • Digital Champion. • Researcher. • Teacher. • Manager and Admin. • Technologist.	✓ Workshadow a leader. ✓ Engage in project work. ✓ Demonstrate leadership behaviour.	**Learner is entrusted for:** • **Direct Supervision** • **Indirect Supervision (Reactive)** • **Independent (learner able to do task independently reliably)** (see above for definitions of these supervisor entrustment levels) **To achieve this level learner needs to demonstrate a minimum of multiple leadership roles in different clinical contexts.**	✓ Leadership in Digital Health. ○ Champion of Digital Health. ○ Research in Digital Health. ○ Manager and Admin in Digital Heath. ○ Technologist in digital health. **Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.** • **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.**

References

Khalifa M; Magrabi. F.; Gallego, B. (2019) Developing a Framework for Evidence-Based Grading and Assessment of Predictive Tools for Decision Support. *BMC Medical Informatics and Decision Making* 2019; 19(1):207.

https://www.healthit.gov/topic/safety/clinical-decision-support

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Wasylewicz, A. T. M., & Scheepers-Hoeks, A. M. J. W. (2019). Clinical decision support systems. In Fundamentals of Clinical Data Science (pp. 153-169). Springer, Cham.

Appendix 3: Entrustable Professional Activity 3 – Constructive Curriculum Alignment

The table below seeks to show 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.

<table>
<tr><td colspan="4">Title: EPA 3: Provides Value-Based Care for Patients and their Families with integration of Effective Use of Personalised Technologies.</td></tr>
<tr><td colspan="4">Focus and context: This EPA applies in hospitals and health contexts outside hospital settings including community and home care settings.</td></tr>
<tr><td colspan="4">Description
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.
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:</td></tr>
<tr><td>Foundational Knowledge
Learning Outcomes</td><td colspan="3">• 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, disabled, CALD patient and carer, 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.</td></tr>
<tr><td>Routinised Practice
Learning Outcomes</td><td colspan="3">• 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 consumers, personal professional performance and performance at a system level.
• Implements the planned change.
• Monitors the outcomes and impacts:
○ 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).</td></tr>
<tr><td>Complex Contexts and Problem Solving
Learning Outcomes</td><td colspan="3">• 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:
○ 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).</td></tr>
<tr><td>LEVEL OF LEARNING & CORE CAPABILITIES</td><td>TEACHING AND LEARNING</td><td>SUPERVISOR ENTRUSTMENT/PEER REVIEW</td><td>ALIGMENT WITH CORE DOMAINS OF PRACTICE</td></tr>
<tr><td colspan="4">ENTRUSTMENT LEVELS 1 – 3 (Required for Safe and Quality Practice)</td></tr>
</table>

Foundational Knowledge Learning Outcomes **(see above)**	✓ 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. ✓ Observation of health worker and consumer use of personalised health technologies.	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/peer review 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.**	✓ Digital Health – Patient and Home/ Consumer focused Health 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.** • **Performance in task components and domains drawn from scores in teaching and learning and associated assessments.**
Routinised Practice Learning Outcomes **(See above)**	✓ 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 home technologies and value based interviewing skills.	**Entrustment through observation of routinised clinical cases.** **Learner is entrusted for:** • **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. **To achieve this level learner needs to demonstrate a minimum of multiple routinised cases in different clinical contexts.**	✓ Digital Health – Patient and Home/ Consumer focused Health 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.** • **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)**	✓ 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	**Entrustment through observation of complex clinical cases.** 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). **Learner is entrusted for supervision/peer assessment at a distance (phone) on achievement of this level.** **To achieve this level learner needs to**	✓ Digital Health – Patient and Home/ Consumer focused Health 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.** • **Supervisor/ peer assessor ranks performance in task components and domains.** • **Provides qualitative comment on learner performance.**

	✓ Professional reflection on lessons learnt and personal and system improvement.	**demonstrate a minimum of 2 complex cases.**	

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:

- 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)

Leadership Demonstrates leadership skills in relation to one or more of the core roles related to effective use of home and consumer facing health technologies in medicine: • Digital Champion. • Researcher. • Teacher. • Manager and Admin. • Technologist.	✓ Workshadow a leader. ✓ Engage in project work. ✓ Demonstrate leadership behaviour.	**Learner is entrusted for:** • **Direct Supervision** • **Indirect Supervision (Reactive)** • **Independent (learner able to do task independently reliably)** (see above for definitions of these supervisor entrustment levels) **To achieve this level learner needs to demonstrate a minimum of multiple leadership roles in different clinical contexts.**	✓ Leadership in Digital Health. o Champion of Digital Health. o Research in Digital Health. o Manager and Admin in Digital Heath. o Technologist in digital health. **Qualitative and Quantitative data record in ePortfolio – System generates graphic representation of performance across domains.** • **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.**

References:

General intro to 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/

Measuring VBC

https://valuebasedcareaustralia.com.au/resources/measuring-outcomes-and-costs/

https://www.ichom.org/

Appendix 4: Sample EPA Assessment Form

EPA Title	The task or activity as one sentence eg 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 …

Based on the EPA template developed by University of Western Sydney Medical School.

Appendix 4: Advisory Group and Project Team

Advisory Group Members

Name	Role
Dr Caroline Clarke	Chair
Dr Robert Herkes	Australian Commission on Safety and Quality in Healthcare Nominee
Dr Kerryn 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
Mr Justin Gladman	AMC Aboriginal and Torres Strait Islander and Maori Committee Member
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 Kirsa	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	AMC Deputy CEO Senior Project Team Member, AMC