

Telehealth and technology-based health services in primary care

Summary statement

The Royal New Zealand College of General Practitioners (the College) advocates the adoption and effective use of technology (such as telehealth and technology-based health services) to assist GPs and rural hospital doctors to provide safe, quality health care, improve health equity and increase service efficiency.

The College is of the view that the use of technology in general practice should support the ongoing relationship between the patient and the general practice team, complementing in-person consultations but not replacing them. Accordingly, the adoption and use of technology should be driven and led by the general practice team. The College agrees with the following statement by Dr Jordan Shlain:

“Health care is a people business that needs technology. It is not a technology business that just needs people.”¹

Key points

- The College supports the use of telehealth and technology-based services where it assists GPs and rural hospital doctors to provide safe, quality health care, improve health equity and increase service efficiency.
- The adoption and use of health technology should be responsive to the needs of the patient, their family and whānau, and the community.
- Technology-based services will work best when people are actively involved in their own care and when it is built into wider service redesign.
- The use of technology should support the ongoing relationship between the patient and the general practice team, complementing in-person consultations but not replacing them.
- Technology should not be used in a way that risks fragmenting the ongoing care and management of patients in general practice.
- Technology can never substitute the human elements of general practice, such as empathy, compassion, kindness and perception.
- Patient safety remains of paramount importance. Health practitioners must comply with legal, professional, ethical and other relevant standards in providing health care, whether or not telehealth or other forms of technology are used.
- Technological innovation requires education, training and better funding models, with general practices needing to budget for implementation and maintenance.
- Good governance is essential to making the use of technology mainstream in the delivery of health care, to realise its potential in improving health access, reducing clinical risk, and using clinical administrative resources more efficiently.
- Success in the future will depend on practices better supporting interoperability by procuring and using systems that comply with national data and interoperability standards.

“Health care is a people business that needs technology. It is not a technology business that just needs people.”¹

Introduction

The College advocates the adoption and effective use of technology to assist GPs and rural hospital doctors to provide safe, quality health care, improve health equity and increase service efficiency. This *Position Statement* focuses on situations where telehealth and technology are used to provide health services to patients in New Zealand. It does not address other elements of ehealth such as health informatics or health information dissemination and storage. It considers the benefits and challenges of telehealth, emerging health technologies that are likely to have a significant effect on general practice and considerations when adopting and using telehealth and technology-based services in general practice. It also outlines the College's role in promoting the use of technology in general practice.

Telehealth: benefits and challenges

Telehealth has the potential to improve health equity, efficiency of health care delivery and population health.⁷ Implementation of telehealth may extend timely, convenient, affordable and high-quality general practice to patients.

Improving health equity

The College considers improvement in health equity to be a key potential benefit of telehealth in general practice.⁸ Health equity focuses on changing the systems and distribution of resources that unfairly disadvantage the health of some groups of people over others.⁸

Telehealth has the potential to reduce health inequities by minimising the effect on groups of traditional barriers to health care such as:⁹

- geographical distance, eg living in rural or remote communities
- physical and cognitive limitations associated with age, illness or disability
- social and financial barriers (eg having personal or family responsibilities that make it difficult to attend an appointment)
- lack of information and education
- lack of connections.

Telehealth can improve access to health care services, particularly for people who are spared the cost and inconvenience of travel,^{10,11} and thus may address inequities in access for groups such as rural communities. For instance, a patient located at a rural practice, with the assistance of their GP, can have a videoconference consultation with a specialist located elsewhere. Improved access to specialist expertise can reduce costly referrals and hospital admissions, and improve care. Telehealth can also facilitate the upskilling of rural GPs, who are more accessible to patients.¹²

Terminology

The New Zealand Telehealth Forum describes **telehealth** as:²

“The use of information and communication technologies to deliver health care when patients and care providers are not in the same physical location.”

Telehealth can facilitate communication between a health practitioner and patient as well as between health practitioners. Data transfer can be synchronous (in real time) or asynchronous (using store-and-forward technologies where clinical information is collected and sent electronically to another site for evaluation).

Telehealth includes:

- telemedicine (eg videoconferencing, store and forward, electronic messaging)
- telemonitoring (ie remote collection and transmission of patient data), and
- mhealth (ie the use of mobile communications and applications technologies to deliver health services and information).

Technology-based patient consultations has been defined as:³

“Patient consultations that use any form of technology, including, but not restricted to videoconferencing, internet and telephone, as an alternative to face-to-face consultations.”

A **health application** (or **health app**) is:⁴

“A piece of software designed to provide information, advice and feedback on health, fitness or wellbeing that can be downloaded onto smart phones or other mobile devices.”

The Ministry of Health states that health apps have “the potential to support patient self-care, to promote the maintenance and improvement of health through monitoring of personal wellbeing, and by encouraging positive behaviour change.”

More broadly, in 2005 the World Health Assembly adopted resolution WHA58.28, which described **ehealth** as:⁵

“The cost-effective and secure use of information and communications technologies in support of health and health-related fields including health-care services, health surveillance, health literature, and health education, knowledge and research.”

The World Health Assembly urged the World Health Organization and its Member States to endorse ehealth as a way to strengthen health systems.⁶

* ‘Equity in health care’ is ‘equal access to available care for equal need; equal utilization for equal need; and equal quality of care for all’.⁸

However, in order to achieve its potential, other factors may need addressing such as internet connectivity (eg availability of rural broadband), technology literacy and ability to afford internet access or a device.

Other benefits of telehealth

Other potential benefits associated with telehealth in general practice include:

- more timely communication between GP and patient, and between GPs and other health practitioners
- allowing GPs to observe and interact with their patients in their own homes
- enabling GPs to monitor disease progression and propose timely interventions^{11,13,14}
- facilitating patient ownership of their condition and its management^{15,16}
- enabling peer communication amongst GPs, which may reduce professional isolation, particularly for those in rural areas
- enhancing coordinated care with seamless information exchange between health practitioners¹⁴
- allowing for accessible referrals without scheduling conflicts using store-and-forward telehealth
- improving rural workforce retention¹⁷
- improving cost-effectiveness.^{11,14,18,10}

Despite these potential benefits, the evidence for the benefits of telehealth use has been mixed.^{19,20,21,22,23} The College acknowledges that comprehensive and rigorous evidence on the benefits associated with health technology needs to be better established.^{24,11,16} Any evaluation of telehealth should be based on factors relevant and important to the communities involved.

Barriers and risks to adopting telehealth

Potential risks and barriers to the use of telehealth in general practice include:^{11,16,25,12}

- reduced face-to-face contact with patients, which might be less acceptable to patients and staff
- the potential for collected information to be incorrect or inaccurate
- the potential for clinical risk from limited information exchange and inability to perform a clinical examination
- the need to overcome significant technical, logistical and regulatory challenges
- new privacy and security risks arising from more efficient connections and access to information
- limitations in technology (such as encryption technology for data security, available memory for data storage, network bandwidth for data transmission, computer hardware specifications for image processing and display, and videoconferencing interconnectivity across provider networks)

- lack of investment for infrastructure such as facilities, technology and support staff
- insufficient training and telehealth consulting skills
- lack of protocols and guidelines for care pathways
- a decrease in, or replacement of, in-person specialist visits, such as to rural communities
- over-reliance on telehealth, which can result in older people spending more time on their own
- reluctance of health practitioners and patients (for example, from perceptions that telehealth does not work well and increases workload, and protection of the traditional model of care delivery)
- inadequate reimbursement schemes
- some population groups may show decreased engagement with technology over time, because of both financial barriers and a lack of fit with their culture and values
- poor public awareness
- increased benefits of telehealth might mean a lack of access to technology will have important implications for equity and empowerment in later life.

Emerging health technologies

Disruptive technologies

Health technology is rapidly advancing and has the potential to support new ways of health care delivery and monitoring. Its use in general practice will continue to widen beyond telehealth consultations.

The McKinsey Global Institute has identified a range of potentially economically disruptive technologies,²⁶ and many of these will have a significant effect on general practice in the future. The technologies include:

- the mobile internet (ie internet-enabled mobile computing devices and apps)
- automation of knowledge work using artificial intelligence (AI), machine learning and natural interfaces
- the Internet of Things (IoT), eg allowing remote patient monitoring
- cloud technology
- advanced robotics
- next-generation genomics for routine diagnostics and treatments matched to patients
- 3D printing enabling on-demand production of objects.

The New Zealand context

Under the New Zealand Health Strategy, the theme 'smart system' takes advantage of opportunities offered by new and emerging technologies.²⁷ Moreover, the Ministry of Health's Digital Health 2020 aims to progress core digital technologies.²⁸

The College considers improvement in health equity to be a key potential benefit of telehealth in general practice.

In the future, general practice is likely to be driven by data, customised to the patient, focused on prevention, and accessible anywhere there is a device such as a mobile phone or computer. Technology will enable better information sharing and facilitate collaboration between health care practitioners. Most administrative work will be automated.

The College considers the increasing role of health technology will make it vital for GPs and rural hospital doctors to have internet connectivity for health care to practise effectively. The nature of a GP's work will change as new and emerging technologies are adopted and used. In the future, general practice is likely to be driven by data, customised to the patient, focused on prevention, and accessible anywhere there is a device such as a mobile phone or computer. Technology will enable better information sharing and facilitate collaboration between health care practitioners. Most administrative work will be automated.

Furthermore, patients will be more involved in their health care and their expectations will differ. Technology will allow GPs to spend quality time with their patients rather than on managing processes, administrative tasks and routine communication, and allow GPs to define their relationship with their practice and patients in a positive and socially beneficial way.

The College considers the way general practice harnesses technology and creates new opportunities to help address the increasing demand for health services with finite resources (including workforce) will affect the future sustainability of general practice. Innovative and affordable alternatives to in-person consultations will be necessary.

Some emerging technologies (below) provide a glimpse of what the future might hold for general practice.

Patient portals

In New Zealand, there has been increasing uptake of patient portals such as ManageMyHealth, Health 365 and Indici. These portal platforms and apps are developed by the makers of GP practice software. Other emerging third party portals, including Vensa and ConnectMed (which offer less functionality at the time of writing), are under active development. More mature platforms and apps (eg ManageMyHealth and Health365) enable patients to review their medications, test results, allergies and diagnoses. They also allow patients to communicate securely with health care providers, and are being further developed to enable video consultations. Notably, the 'OpenNotes' international movement encourages health care practitioners to share what they have written with the patient.

Over time, it is likely that more features will be added to portals making them an important part of the telehealth landscape. Such additions include links to sensors such as Fitbit® devices, blood pressure monitors and digital scales. The advantage

of telehealth via existing portals is the ability to extend current models of care and relationships in general practice without disruption.

More personalised health care

Data, machine learning and AI will enable GPs to improve diagnostics, predict outcomes and provide patients with more personalised health care. Technology can assist with data gathering, which supports GPs to make evidence-based decisions. For example, health apps, wearable devices, and other remote and sensing technology enable data gathering and real-time monitoring. Embedded clinical pathways and decision support systems at the point of care in electronic patient management systems will improve access to best practice medicine. In the future, patient data along with cognitive analytics will assist GPs to provide more proactive and faster customised patient care.

Examples of this technology include:

- A deep learning algorithm capable of diagnosing potentially cancerous skin lesions as accurately as specialists.^{29,30}
- Pathway Genomics: AI, deep learning and personal genetic information are used to provide personalised health and wellness guidance.³¹
- Lumiata: Predictive analytic tools can make insights and predictions related to symptoms, diagnoses, procedures and medications.^{32,33}
- AiCure: Mobile technology and facial recognition technologies determine if a patient is taking the right medicines at the right time, alerting doctors if something is wrong.³⁴
- CellScope's mhealth products: Imaging capability is used for at-home diagnosis, eg a smartphone-enabled otoscope for remote diagnosis of ear infections,³⁵ and mobile phones to take images of sputum or blood (eg sickle cell screening).³⁶
- The SENSOR project aims to develop and evaluate early warning systems for community-based patients with chronic respiratory disease.³⁷
- DeepMind Health: Apps using mobile technology send immediate alerts to clinicians when a patient deteriorates.³⁸
- IBM's Watson for Oncology supports doctors to provide evidenced-based, patient-centric treatment for people with cancer.³⁹

Health apps such as Ada, Babylon, BetaMe and HealthTap help health care scale and allow patients to make more informed decisions about their health. The Ada app uses a conversational interface to help patients work out their

symptoms. The platform is powered by an AI engine combined with an extensive medical knowledge base. Ada considers the patient's information, including their past medical history, offers information on possible causes and a follow-up remote consultation, if needed, with a real doctor over text.

Babylon Health is a mobile health delivery platform that uses a mixture of AI and video and text consultations with doctors. The UK National Health Service (NHS) is trialling its AI-powered chatbot 'triage' service as an alternative to the NHS's 111 telephone helpline for urgent but non-life-threatening conditions.

BetaMe is a New Zealand-developed health platform that connects people with long-term conditions to clinicians, information and networks of similar people.⁴⁰ HealthTap, an online platform and mobile app, allows patients to talk to an out-of-hours doctor by video, voice or text.⁴¹ The Indici patient app also enables real-time communication with the health team.⁴²

Collaboration

Technology can help GPs and rural hospital doctors to share health data to support clinical decision-making, which in turn facilitates collaboration and continuity of care. HealthLink currently enables practices to share health information securely with the rest of the health system.⁴³ Integrated information and communications systems will decrease the divide between primary and secondary care.

Preventative care

The future model of health care delivery is likely to focus on prevention and health promotion as data and technology support and target screening, immunisation and other public health initiatives. Technology such as the Internet of Things will enable patient monitoring, and analytics will predict the patients at risk of clinical deterioration so they can be managed early. Next-generation genomics will change the way diseases are diagnosed and match treatment to patients.

Access anywhere

Technology will support how, where, and when GPs provide services. Cloud technology enables service delivery over a network or the internet and new business models such as pay-as-you-go service models. SmartHealth is an online health care service. It includes HealthTap, an online platform and mobile app that connects people with a range of health services using a smartphone, tablet or computer. Patients can talk to a doctor out of hours by video, voice or text.⁴¹ Technology also enables GPs to work outside of clinical settings; apps for mobile devices can provide access to clinical data systems. For example, the UberHEALTH service offers free, on-demand influenza vaccinations in cities in the United States.⁴⁴

Automation

Automated systems can be used to carry out administrative tasks and improve productivity. For example, Vensa's features include automatic appointment reminders, SMS recall reminders for screening and vaccines, patient text-in requests for appointments, and prescriptions and messages that are automatically filed in patients' records.⁴⁵ Less time will be spent on routine communication as voice recognition and natural language processing become common.

Consider health technology as a strategic opportunity

Health technology can be considered a strategic opportunity to change the way patients receive or are empowered to take responsibility for their own care. It is not merely about technological intervention, standalone devices and device-based applications, and more than a way to increase the efficiency of an existing service model.

Disruptive technologies create new markets and displace existing ones. GPs and rural hospital doctors can reap the opportunities presented by emerging technologies but must be agile in approaching the arising challenges and opportunities. General practices should be prepared to innovate and collaborate.

The College considers that telehealth and technology-based services will work best when people are actively involved in their own care and when it is built into wider service redesign. Thus, technological innovation needs governance tailored to patient engagement and community care. It also requires education and training, appropriate funding models and practices budgeting for implementation and maintenance.

GPs and rural hospital doctors are likely to turn to their primary health organisation (PHO) and/or district health board (DHB) when starting a digital health care strategy. Research has revealed lessons for successfully implementing such a strategy that include the following:⁴⁶

- **Technology needs to support new ways of working** and to make people's jobs or patient interaction easier. It should not be viewed merely as a layering of technology on top of existing structures and work patterns.
- **Invest in organisational change at least as much as the technology itself.** Clinical and technological leadership, a culture receptive to change, active staff engagement, staff training and technical support are important.
- **Technology should support the 'workflow' of practices (tasks and processes) and the process of clinical decision-making.** Clinicians should be involved in the development of systems.

The College considers the way general practice harnesses technology and creates new opportunities to help address the increasing demand for health services with finite resources (including workforce) will affect the future sustainability of general practice. Innovative and affordable alternatives to in-person consultations will be necessary.

- **Invest in evaluation and learn from data collection** in order to improve operational and clinical processes, population management and treatment optimisation.
- **Implementation should be seen as an ongoing process with continuous learning.**
- **Support interoperability across the system** so that data can be shared across multiple settings.
- **Maintain strong information governance with robust data security.** Processes should be clearly explained to patients.

Using technology and the role of GPs

The College is of the view that use of technology should support the existing relationship between patient and general practice team. Providing telehealth services or technology-based services in the absence of a previous relationship can undermine the basic tenets of general practice, which is relationship-based, generalist medical care for a defined, registered population. Thus, technology should not be used in a way that risks fragmenting the ongoing care and management of patients. It should be used to support and to improve, but not replace, the care provided by GPs.

Continuity of care is a cornerstone of high-quality health care. A proper history, clinical examination and investigations contribute to the ongoing relationship and understanding of the patient. GPs put care in the context of the whole person, including the patient's history, their home life, social circumstances and other issues.⁴⁷ These matters are also important for appropriate decision-making in the absence of a visual or in-person consultation and clinical examination.

Online services offering advice, medical certificates and specialist referrals might seem easier and more convenient. However, the quality of care provided by episodic telehealth and technology-based consultations differs to that of physical in-person consultations. The doctor providing online services will be unfamiliar with, and not necessarily have access to, the patient's medical history, will not perform a physical examination or monitor and assess suggested treatment. The services also risk interrupting continuity of care.

Importantly, such services are unable to replace the crucial human elements of general practice, such as empathy, compassion, kindness and perception. Technology should never get in the way of listening to patients. The way forward is with both technology and human elements.

Moreover, these services do not meet the need for comprehensive care for complex or developing health needs.

Where there is an existing relationship between patient and GP, it is easier to pre-empt more significant problems. Much of the benefit of comprehensive primary care, eg lower costs, fewer hospitalisations⁴⁸ and improved health outcomes,⁴⁹ can be attributed to opportunistic interventions. Online services that fragment care may lead to subsequent higher health care costs with missed opportunities for preventative care and delayed diagnosis of conditions.

The College also considers that GPs should be vocationally registered (or on the pathway to vocational registration) with the Medical Council of New Zealand to use telehealth and technology-based health services for patients in New Zealand.

The professional GP

The GP and rural hospital doctor's role to provide quality care to patients and to meet evolving professional and clinical standards does not change when using new tools, resources and processes. The College considers that when adopting technology-based services, GPs and rural hospital doctors should continue to use best available evidence and practice, share knowledge, reduce errors, and collaborate with others.

The College considers the role of the GP and rural hospital doctor to include:

- monitoring, responding and adapting to the changing environment through continuous learning. This might include:
 - building awareness of the technological changes affecting general practice
 - experimenting with new technologies that can deliver the same or better outcomes for patients
 - digitising, streamlining and automating business processes and incorporating new technologies wherever appropriate
 - considering how business strategy, growth targets, and investment plans may be affected by new technology
 - implementing appropriate business models and developing appropriate indicators to evaluate use.
- developing health technology literacy and additional competencies to enable the proficient use of telehealth and other technologies, which support best practice and provision of quality care. This might include:
 - being ready to re-invest in training
 - seeking to broaden the skill set of the GP and rural hospital doctor regarding use of technology

Providing telehealth services or technology-based services in the absence of a previous relationship can undermine the basic tenets of general practice, which is relationship-based, generalist medical care for a defined, registered population. Thus, technology... should be used to support and to improve, but not replace, the care provided by GPs.

Patient safety is at the core of health care provision. Health practitioners must comply with legal, professional, ethical and other relevant standards when providing health care, whether or not telehealth or other forms of technology are used.

- enhancing the human elements of practice and developing skills in areas less likely to be automated, eg skills when interacting and empowering patients via technology
 - knowing how to meaningfully interpret and act on health data.
- using technology to benefit patients where appropriate while keeping patient confidentiality, protecting the doctor–patient relationship and maintaining public trust in the profession.
 - guiding patients, families and colleagues to high-quality health technology resources and tools where possible.

Telehealth in practice

Patient safety is at the core of health care provision. Health practitioners must comply with legal, professional, ethical and other relevant standards when providing health care, whether or not telehealth or other forms of technology are used.

Relevant applicable standards include the [Code of Health and Disability Services Consumers' Rights](#),⁵⁰ the [Telecommunications Information Privacy Code](#),⁵¹ [Health Information Privacy Code](#)⁵² and the Medical Council of New Zealand's [Statement on telehealth](#).⁵³ **Technical standards**[†] will also apply.

The College recommends GPs and rural hospital doctors take actions to help mitigate potential risks from telehealth and technology-based services. These can be divided broadly into the areas of governance, practice staff, the consultations and technology.

Health technology governance

Good governance is essential to making the use of technology mainstream in the delivery of health care, and to realise its full potential in improving access to health care, reducing clinical risk and using clinical administrative resources efficiently. Establishing a formal, specific governance structure and appointing health technology leaders or clinical champions are crucial. One option is to set up a telehealth governance group as a subcommittee of, or incorporated within, the PHO or DHB clinical governance group.

Functions of the governance group include:⁵⁵

- sponsoring and supporting the planning, implementation and ongoing activities of the telehealth programme.
- developing an investment plan and providing oversight of telehealth investment. This helps to ensure technical infrastructure meets any current unmet demand of the practice and for future growth.
- advising senior management on telehealth strategy.
- ensuring robust information governance mechanisms.
- ensuring adoption of standards and guidelines for the effective use of telehealth.
- communicating and promoting the use of telehealth with users. Planning and implementation must be responsive to the needs of patients and staff.
- promoting collaboration with other organisations and seamless technical interconnectivity with other health care providers.

Health technology governance includes:

- an appointed health technology leader or clinical champion
- a programme manager or facilitator
- strategies and policies governing the introduction and use of technology-based health services in the practice, and protocols or guidelines on using health technology and for managing risk (eg to detect, diagnose and fix equipment problems)
- dedicated resources for ICT infrastructure, including availability of support for planning and operations.

It is important to invest in robust evaluation of the clinical and fiscal benefits for both individual patients and the organisation from the use of technology.

Practice staff

Ensure practice staff:

- are aware of the benefits and risks of providing health services using technology and the limits within which health care can be provided safely. Consider the implications of privacy, security, safety and clinical effectiveness.
- are appropriately trained and competent to use the tools and equipment.
- are culturally safe towards patients when using telehealth and technology.
- are familiar with organisational policies and procedures on telehealth and technology-based services.

† For example, HISO 10037: Connected Health; HISO 10049: Videoconferencing Standard; HISO 10029:2015 Health Information Security Framework.⁵⁴

Patient consultations

Select patients who may benefit. Consider clinical factors (eg continuity of care, model of care), practical factors (eg availability of technology and staff) and patient factors (eg ability to travel, cultural needs). Using telehealth for follow-up appointments is one way to get started.

The College considers that telehealth and technology-based patient consultations are an appropriate alternative when used:

- to complement in-person consultations
- for regular patients of the practice, and
- when it is clinically appropriate.

GPs and rural hospital doctors should always err on the side of caution and work to their own level of comfort. If there are any doubts during a telehealth consultation, ask the patient to come in for an in-person visit to diagnose and manage care safely.

- Ensure the patient is informed of the identity and physical location of all participating health practitioner(s), and the patient's identity is confirmed at each consultation.
- Consider whether a physical examination is necessary.
- When arranging the first telehealth consultation:
 - Provide an explanation to the patient on the appropriateness and limitations of telehealth or technology-based services.
 - Ensure the patient is aware of the privacy and security issues involved. For example, for store-and-forward telehealth, tell the patient that information will be transmitted electronically to another site.
 - Obtain the patient's informed consent to the use of telehealth or to receive technology-based services and their consent to the collection and use of health information.

Keep a clinical record of the consultation in accordance with relevant professional standards (refer to the Medical Council of New Zealand's statement [The maintenance and retention of patient records](#)).

Exercise caution when issuing prescriptions for medicines or recommending treatment to patients who have not been examined physically. (Refer to the Medical Council of New Zealand's [Statement on telehealth](#)).

Technology

Consider the reliability of technologies for providing safe and effective health care. Practices should ensure they use the appropriate technology (at both sites where relevant) that complies with the relevant technical, legal, and quality standards, including those on privacy and security of storage, and transmission of health information. Use encryption of transmissions to enhance security.

The College's view is that success in the future will depend on practices better supporting interoperability by procuring

and using systems that comply with national data and interoperability standards. This is critical to success when scaling up. For example, is the practice's system able to communicate with that of the local DHB? Telehealth equipment should be compatible between sites (eg interoperability between videoconferencing products). If mhealth and ehealth systems are interoperable and share common standards, integration costs might be better contained.

The College's role

The College will do the following to encourage the adoption and use of health technology in general practice:

General

- Foster the effective and appropriate use of health technology in general practice to provide safe, quality health care while protecting privacy and confidentiality.
- Advocate better integration of telehealth and innovative models of health care delivery using technology in overall service provision, particularly where health is integrated with social and economic contexts.
- Call for greater support, including sustainable sources of funding, for the adoption and use of telehealth and technology-based services in general practice.
- Support technological development that is evidence based and people centred and that improves care and focuses on responding to the needs of users (patients and staff).
- Encourage the government's ongoing commitment to fund rural broadband initiatives, as better internet connectivity is vital to realising the potential of telehealth to improve equitable access to health care.
- Promote the adoption of health technologies in general practice that contribute to reducing health inequities in knowledge, access to technological-based services, outcomes and connectivity.
- Advocate strong cooperation, meaningful collaboration and interoperability that optimises the provision of quality health care.

Quality

- Develop a quality standard for general practices on telehealth and technology-based services to ensure patients receive high-quality care.
- Examine the extent to which the College's current quality standards unnecessarily encumber technology uptake and, where necessary, amend to encourage technology use in practices.
- Support robust evaluation and monitoring of telehealth use for quality improvement.
- Advocate the development of national best practices that are cost-effective and supported by rigorous research and evaluation.
- Facilitate shared learnings, where permitted, on adoption of telehealth and technology-based services in general practice.

Promotion and resource material

- Promote the use of telehealth and technology-based services through the College's media platforms.
- Provide guidance to assist members to implement and use telehealth and technology-based services in general practice.

Training and professional development

- Support GPs and rural hospital doctors to be better equipped with the skills and motivation to engage in a more digital health sector.
- Facilitate and encourage continuing professional development activities that help GPs and rural hospital doctors to approach the challenges and opportunities arising from technological change.
- Encourage formation of supported networks of health professionals using telehealth and technology-based services.

References

1. Shlain JL. Medicine in 2020 – Digital Empathy. 2016 Dec 26. Available from: <https://tincture.io/medicine-in-2020-digital-empathy-e257296376ce>
2. NZ Telehealth Forum. What is Telehealth? NZ Telehealth Forum & Resource Centre. [cited 2017 June 28]. Available from: <http://www.telehealth.co.nz/what-is-telehealth>
3. Medical Board of Australia. Guidelines for technology-based patient consultations. Medical Board of Australia. 2017 March 28 [cited 2017 July 3]. Available from: <http://www.medicalboard.gov.au/Codes-Guidelines-Policies/Technology-based-consultation-guidelines.aspx>
4. Ministry of Health. NZ health applications guidance. 19 April 2017 [cited 16 May 2017]. Available from: <http://www.health.govt.nz/our-work/ehealth/other-ehealth-initiatives/nz-health-applications-guidance>
5. World Health Organization. Fifty-Eighth World Health Assembly. Geneva; 2005. Available from: http://apps.who.int/gb/ebwha/pdf_files/WHA58-REC1/english/A58_2005_REC1-en.pdf
6. Al-Shorbaji N, Geissbuhler A. Establishing an evidence base of e-health: the proof is in the pudding. Bull World Health Organ. 2012;90:322–322A. doi:10.2471/BLT.12.106146
7. NZ Telehealth Forum. The Benefits of Telehealth. NZ Telehealth Forum & Resource Centre. 2014. [cited 2017 July 3]. Available from: <http://telehealth.co.nz/benefits>
8. Whitehead M. The concepts and principles of equity and health. World Health Organization: Copenhagen: 1985. Available from: http://salud.ciee.flacso.org.ar/flacso/optativas/equity_and_health.pdf
9. Mason C, Fleming A, Paxton G, et al. Lifelong participation through digital technology. Australia: CSIRO; 2017 Feb.
10. Daniel H, Sulmasy LS. Policy recommendations to guide the use of telemedicine in primary care settings: an American College of Physicians position paper. Ann Intern Med. 2015 Nov 17;163(10):787–9. doi:10.7326/M15-0498.
11. Greenhaigh T, Vijayaraghavan S, Wherton J, et al. Virtual online consultations: advantages and limitations (VOCAL) study. BMJ Open 2016;6: e009388. doi:10.1136/bmjopen-2015-009388
12. Bonney A, Knight-Billington P, Mullan J, et al. The Telehealth Skills, Training, and Implementation Project: An Evaluation Protocol. JMIR Res Protoc. 2015 Jan–Mar;4(1):e2. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4296098/>
13. Deloitte & American Well. Empowering Patients with Telehealth. United States. 2016 January. Available from: <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/public-sector/us-fed-empowering-patients-with-telehealth.pdf>
14. Ernst & Young LLP. Health Care Industry Post: Shaping your telehealth strategy. United States. 2014. Available from: [http://www.ey.com/Publication/vwLUAssets/EY-shaping-your-telehealth-strategy/\\$FILE/EY-shaping-your-telehealth-strategy.pdf](http://www.ey.com/Publication/vwLUAssets/EY-shaping-your-telehealth-strategy/$FILE/EY-shaping-your-telehealth-strategy.pdf)
15. Chada BV. Virtual consultations in general practice: embracing innovation, carefully. Br J Gen Pract. 2017;67(659):264. doi: <https://doi.org/10.3399/bjgp17X691121>
16. Ely S, Rogan A. Keeping the NHS great: Delivering technology enabled care services. United Kingdom: Good Governance Institute; 2014 September. Available from: <https://www.good-governance.org.uk/services/keeping-the-nhs-great/>
17. Moffatt JJ, Eley DS. The reported benefits of telehealth for rural Australians. Aust Health Rev. 2010 Aug;34(3):276–81. doi: 10.1071/AH09794
18. Access Economics. Financial and externality impacts of high-speed broadband for telehealth. Canberra, ACT: Access Economics; 2010. Available from: <http://trove.nla.gov.au/work/81015874?selectedversion=NBD46895251>.
19. Flodgren G, Rachas A, Farmer AJ, et al. Interactive telemedicine: effects on professional practice and health care outcomes. Cochrane Database of Systematic Reviews. 2015; 9(CD002098). DOI: 10.1002/14651858.CD002098.pub2
20. Hanlon P, Daines L, Campbell C, et al. Telehealth Interventions to support self-management of long-term conditions: A systematic meta-review of diabetes, heart failure, asthma, chronic obstructive pulmonary disease, and cancer. J Med Internet Res. 2017 May 17;19(5):e172. doi: 10.2196/jmir.6688.
21. de la Torre-Díez I, López-Coronado M, Vaca C, et al. Cost-utility and cost-effectiveness studies of telemedicine, electronic, and mobile health systems in the literature: a systematic review. Telemed J E Health. 2015 Feb;21(2):81–5. doi:10.1089/tmj.2014.0053.
22. Ekeland AG, Bowes A, Flottorp S. Effectiveness of telemedicine: a systematic review of reviews. Int J Med Inform. 2010 Nov;79(11):736–71. doi:10.1016/j.ijmedinf.2010.08.006.
23. Elbert NJ, van Os-Medendorp H, van Renselaar W, et al. Effectiveness and cost-effectiveness of ehealth interventions in somatic diseases: a systematic review of systematic reviews and meta-analyses. J Med Internet Res. 2014 Apr 16;16(4):e110. doi:10.2196/jmir.2790.
24. de Lusignan S, Pearce C, Kumarapeli P, et al. Reporting observational studies of the use of information technology in the clinical consultation. A position statement from the IMIA Primary Health Care Informatics Working Group (IMIA PCI WG). Yearb Med Inform. 2011;6:39–47.
25. Australian College of Rural and Remote Medicine. Telehealth in rural and remote practice: Position Statement. Brisbane: Australian College of Rural and Remote Medicine; 2015 May. Available from: <http://www.acrrm.org.au/docs/default-source/documents/the-college-at-work/telehealth-position-statement---may-2015304B55E65DFC.pdf?sfvrsn=0>
26. Manyika J, Chui M, Bughin J, et al. Disruptive technologies: Advances that will transform life, business, and the global economy. McKinsey Global Institute; May 2013.
27. Minister of Health. New Zealand Health Strategy: Future direction. Wellington: Ministry of Health; 2016.
28. Ministry of Health. Digital Health 2020. Wellington: Ministry of Health; 2017 May 23 [cited 2017 June 15]. Available from: <https://www.health.govt.nz/our-work/ehealth/digital-health-2020>
29. Esteva A, Kuprel B, Novoa RA, et al. Dermatologist-level classification of skin cancer with deep neural networks. Nature. 2016 Feb 2;542:115–18. doi:10.1038/nature21056
30. Brouillette M. Deep learning is a black box, but health care won't mind. MIT Technology Review. 2017 Apr 27 [cited 2017 Jul 3]. Available from: <https://www.technologyreview.com/s/604271/deep-learning-is-a-black-box-but-health-care-wont-mind/>
31. Pathway Genomics pathway.com [cited 2017 June 19]. Available from: <https://www.cbinsights.com/company/pathway-genomics>
32. Lumiata [cited 2017 June 19]. Available from: <https://www.ventureradar.com/profile.aspx?cid=73874eaf-604e-4f6a-a380-c1574c99374c>
33. Marr B. How machine learning, big data and AI are changing health care forever. Forbes. 2016 Sep 23. Available from:

- <https://www.forbes.com/sites/bernardmarr/2016/09/23/how-machine-learning-big-data-and-ai-are-changing-healthcare-forever/#2a044ffa1a1c>
34. AiCure [cited 2017 June 19]. Available from: <https://aicure.com/>
 35. Moshtaghi O, Sahyouni R, Haidar YM, et al. Smartphone-enabled otoscopy in neurotology/otology. *Otolaryngol Head Neck Surg.* 2017;156(3):554–558. doi:10.1177/0194599816687740
 36. Switz NA, D'Ambrosio MV, Fletcher DA. Low-cost mobile phone microscopy with a reversed mobile phone camera lens. *PLOS One.* 2014 May; 9(5):e95330
 37. SENSOR. [cited 2017 Jul 3]. Available from: <http://www.activ8rives.com/sensor/>
 38. DeepMind Health. [cited 2017 July 4]. Available from: <https://deepmind.com/applied/deepmind-health/>
 39. IBM Watson health. Watson for Oncology. [cited 2017 Aug 3]. Available from: <https://www.ibm.com/watson/health/oncology-and-genomics/oncology/>
 40. BetaMe. How it works. [cited 2017 Aug 3]. Available from: www.betame.io/how_it_works
 41. Waikato District Health Board. SmartHealth. 2017 June 1 [cited 2017 June 20]. Available from: <http://www.waikatodhb.health.nz/for-patients-and-visitors/smarthealth/>
 42. Indici. Features. 2017. [cited 2017 Aug 7]. Available from: <https://www.indici.co.nz/patient-app/>
 43. HealthLink. About Us. 2017 [cited 2017 June 20]. Available from: http://www.healthlink.net/en_NZ/about-us/
 44. Uber.com. [cited 2017 July 4]. Available from: <https://newsroom.uber.com/uber-for-health-2016/>
 45. Vensa [cited 2017 July 3]. Available from: <http://www.vensahealth.com/>
 46. Imison C, Castle-Clarke S, Watson R, et al. Delivering the benefits of digital health care: Research summary. London: Nuffield Trust; 2016. Available from: <https://www.nuffieldtrust.org.uk/files/2017-01/delivering-the-benefits-of-digital-technology-summary-web-final.pdf>
 47. Medical Council of New Zealand. Good Medical Practice. Wellington: Medical Council of New Zealand; 2016: Principle 2.
 48. Blakemore A, Petterson S, Peterson LE, et al. More comprehensive care among family physicians is associated with lower costs and fewer hospitalizations. *Ann Fam Med.* 2015 May-Jun;13(3):206–13. doi: 10.1370/afm.1787.
 49. Hansen J, Groenewegen PP, Boerma WG, et al. Living in a country with a strong primary care system is beneficial to people with chronic conditions. *Health Aff (Millwood).* 2015 Sep; 34(9):1531–7. doi: 10.1377/hlthaff.2015.0582.
 50. The Code of Health and Disability Services Consumers' Rights [NZ]. Available from: <http://www.hdc.org.nz/the-act--code/the-code-of-rights>
 51. Privacy Commissioner. Telecommunications Information Privacy Code 2003 [cite 2017 Aug 24]. Available from: <http://www.telehealth.co.nz/images/telehealth/standards/82227719.pdf>
 52. Privacy Commissioner. Health Information Privacy Code 1994. Available from: <https://www.privacy.org.nz/the-privacy-act-and-codes/codes-of-practice/health-information-privacy-code-1994/>
 53. Medical Council of New Zealand. Statement on telehealth. Wellington: Medical Council of New Zealand; 2016 June. Available from: <https://www.mcnz.org.nz/assets/News-and-Publications/Statement-on-telehealthv3.pdf>
 54. Ministry of Health. Approved standards. Wellington: Ministry of Health; 2017 Aug 7 [cited 2017 Aug 24]. Available from: <http://www.health.govt.nz/our-work/ehealth/digital-health-standards-and-governance/health-information-standards/approved-standards>
 55. NZ Telehealth Forum. New Zealand Telehealth Stocktake: District Health Boards. August 2014. Available from: https://www.nzdoctor.co.nz/media/4974949/nz_telehealth_stocktake_report_dhbs.pdf