



The Royal Australian and New Zealand College of Radiologists®

2 March 2018

Mr Steven Palethorpe
Secretary, Select Committee on the Future of Work and Workers
Department of the Senate
PO Box 6100
Parliament House
Canberra ACT 2600

By email: futureofwork.sen@aph.gov.au

Dear Mr Palethorpe,

The Royal Australian and New Zealand College of Radiologists (RANZCR) welcomes the opportunity to provide feedback to the Senate Select Committee on the Future of Work and Workers and have attached our response to the Terms of Reference.

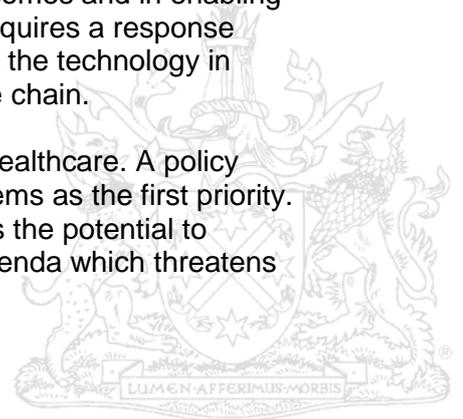
A number of important trends are shaping the future of healthcare. A transition to value-based care, preventive and population health initiatives is occurring alongside new advancements in technology.

Our response centres on the impact of technological change on healthcare professions with a focus on clinical radiology and automation where the discussion is currently placed. There will also be implications for radiation oncology, as a similarly highly technical field, over time but our emphasis within this submission is on the impact to radiology more broadly.

Radiation oncology is the medical specialty involving the controlled use of radiation to treat cancer. Radiation oncologists are early adopters of new technologies and techniques to improve the management of cancer and patient outcomes. Through AI there are opportunities to improve the quality of our practice and service delivery. Any considerations in this area must be placed in the context of the rising burden of cancer and increasing survivorship.

Our key recommendations relate to a need for policy leadership to spearhead an agenda which places people first, both in terms of driving quality patient outcomes and in enabling the required workforce transitions to the new models of care. This requires a response which sees the healthcare professions supported to adapt alongside the technology in order to realise its full potential at each stage of the healthcare value chain.

It is also important to understand the limitations of AI in health and healthcare. A policy imperative has to be to ensure the technology solves the right problems as the first priority. There is also a need to balance the discussion going forward. AI has the potential to transform healthcare but that won't be achieved through a fearful agenda which threatens to lock people out.



Clinical radiologists have a leadership role in terms of how this technology is applied in the real world. Intelligent automation can only be realised through a partnerships approach which brings the tech and healthcare professions together at this early development stage. The Federal Government has a key role in terms of placing some required limits through regulation and enabling supportive structures to provide specialist oversight to bring important ethical considerations to the fore.

Thank you again for the opportunity for RANZCR to contribute to this important work. We would be pleased to support the upcoming public hearings in Perth or Melbourne in bringing an important focus to the impacts and opportunities for radiology and healthcare.

Yours sincerely,

Dr Lance Lawler
President

Select Committee into the Future of Work and Workers

A response from the Royal Australian and New Zealand College of Radiology (RANZCR)

Date submitted: March 2018

About RANZCR

RANZCR is the peak body advancing patient care and quality standards in the clinical radiology and radiation oncology sectors. It represents over 4,000 members in Australia and New Zealand. RANZCR's role is to drive the appropriate, proper and safe use of radiological and radiation oncological medical services.

Clinical radiology relates to the diagnosis, treatment or monitoring of a patient through the use of medical imaging. Diagnostic imaging (DI) uses plain X-ray, computerised tomography (CT), magnetic resonance imaging (MRI), ultrasound and nuclear medicine imaging techniques to obtain images that are interpreted to aid in the diagnosis of disease. In addition to their diagnostic role, clinical radiologists also provide treatments and use imaging equipment in an interventional capacity.

The speciality of radiation oncology focuses on the use of radiation to treat cancer and other diseases. Radiation therapy is an effective, safe and cost effective method of treating cancer, and is involved in 40% of cancer cures. Unfortunately, while one in two cancer patients would benefit from radiation therapy, only about one in three will actually receive the treatment. One major reason for this is a lack of awareness about radiation therapy

Role and Value of Clinical Radiologists

Radiologists represent one of medicine's most important but least acknowledged specialties.

Radiologists are medical practitioners who have undertaken broad medical training as well as comprehensive specialist training in performing and interpreting diagnostic imaging tests and imaging-guided procedures or treatments.

Radiologists are often the 'behind the scenes' doctors who have a pivotal role in patient care, working collaboratively with other doctors and healthcare professionals and utilising their general clinical and specialist radiological knowledge and skills to provide expert care for patients referred to them. Radiologists make accurate diagnoses, monitor response to treatment, perform imaging-guided treatments and advise on how best to use imaging in the care of patients.

Introduction

Technology has always shaped medicine and similar periods of disruption have occurred before. A digital health future presents both risks and opportunities for all professions. The power of data is already driving healthcare transformation and changes in care delivery. Importantly, the forces driving innovation have at their core a patient-centred care and outcomes-based delivery focus.

The potential in utilising digital health data in driving new advances in artificial intelligence (AI) and automation has placed an intense early focus on clinical radiology. Our submission aims to provide some clarity to balance the hype generated by a tech-driven discussion towards the more realistic potential of AI and radiology in the future.

While the potential for automation is high, there are some clear limitations. AI is a long way from the cognitive task of diagnosis of the full range of human disease.ⁱ Instead, it is expected that technology will augment clinical care and aid human decision-making.ⁱⁱ Providing for new efficiencies through enabling the space for individuals to harness the uniquely human character and social skills that are the building blocks of healthcare.ⁱⁱⁱ

It is clear that more technology-enabled care models will be needed to respond to increasing demand and in enabling more integration of care. The health value chain is moving from a *labour-driven and technology-enabled* model to a *digital-driven and human-enabled* one.^{iv} Therefore, the rapid changes in healthcare driven by AI and machine learning will only reinforce the role of humans in healthcare.

Radiology and AI

For radiology, we expect innovations in medical imaging with continue to shape our profession.

Clinical radiologists have been a leader in the digital age of medicine. The rapid evolution of technology in diagnostic imaging has clearly shaped our profession. We have been at the forefront of technology adoption in the healthcare industry since the profession began. As imaging technologies and clinical procedures have become more varied, complex and sophisticated, radiologists have adopted new technologies and modalities of care that benefit patients and support the entire health system.

For radiology, AI and deep learning offer new advances from improved diagnosis to enhanced workflow.^v The importance and clinical need for clinical radiologists are only set to increase, with AI expected to add value to improve quality, efficiency, and outcomes.^{vi}
vii viii

A shift in the radiologists' role is inevitable, but most agree AI will not replace radiologists.^{ix}
x xi xii Instead, AI will become an essential clinical support toolset to enhance all aspects of radiology.^{xiii xiv xv} Machine learning software will serve as a very experienced clinical assistant, augmenting the doctor and making workflow more efficient.^{xvi} Therefore, the key shift for the specialty lies in the need to adapt and transform alongside the technology.^{xvii}
xviii xix

Impacts on workforce

There is plenty of hype around AI and its impact on the future radiology workforce. However, it is important to understand the limits of AI in health and healthcare in guiding workforce decisions. More realistic expectations arise from recognising that AI's major function is to automate basic repetitive functions, leaving the high-order cognitive skills to the expert.^{xx} Further, that the application of AI should start from a problem that needs to be solved, not from a technical possibility.^{xxi}

The key policy requirement must be to ensure the technology solves the right problems. A focus on technology alone will not support quality health outcomes and very little can be realised without access to high-quality reliable data. Further, there is an urgent need to prioritise ethical considerations in design and development of these systems. Therefore,

the discussion must centre on ways to guide and align healthcare and technological developments, rather than the current misguided emphasis on role replacement.

Ethics and safety

Establishing ethical standards to ensure safe and effective use of the technology is required in guiding implementation. There is a need to encourage the development of more robust systems that meet specific ethical criteria, particularly in healthcare. Balancing efficiency and ethics through developing the systems to undertake ethical checks on autonomous systems and metrics to assess the performance will be key. ^{xxii}

For application, the key to the acceptance of these new methods into practice is a requirement for profession-led implementation with an emphasis on safety and accuracy. Ensuring the technology can improve patient outcomes and support the diagnostician's ability to reach the right conclusion faster will require testing. ^{xxiii} Practical implementation measures which include compatibility with systems and overall effectiveness measures will need to be prioritised. Overall, in ensuring AI adds value to improve quality, efficiency and outcomes, the technology must support more patient-centered care, drive better patient outcomes and prove cost-effective in terms of resource utilisation. ^{xxiv}

A future role for the radiologist will be to train the AI. However, the focus should currently be on ensuring a major role in directing AI development as their expertise is essential in making AI accurate. Development cannot occur in isolation as tools need to be tailored to effectively and efficiently assist radiologists. ^{xxv}

Future skills and competencies

RANZCR is uniquely placed to prepare the next generation for a future which sees radiology working alongside AI. The discussion is broader than AI and the role of clinical radiologists in providing strategic value to health systems should dominate. ^{xxvi} Future skills and competencies for the profession will be more closely tied to value-based care and population health initiatives with AI being one driving factor.

Leveraging existing skills will be just as vital as acquiring new skillsets. The shifts at the patient interface will require clinical leadership while expanded roles as data communicators and in image management will require strong health informatics and a focus on change and process management where leadership interfaces with management. RANZCR has commenced this planning to ensure our members and future members make any necessary skill transition.

Policy leadership

The policy focus must be on ensuring there is a robust regulatory regime to evaluate this technology and assess the safety implications prior to rollout. In health system redesign, significant impacts are certain to arise from shifts in payment methodologies to encompass the AI. This is a complex discussion with wide-ranging ramifications whereby the basis for Medicare is to provide access to free or subsidised treatment by health professionals and capturing automation will be complex.

Clinical radiologists have a leadership role in terms of how this technology is applied in the real world. Intelligent automation can only be realised through a partnerships approach which brings the technology and healthcare professions together at this early development stage. There is a clear role for the Federal Government through the setting of national regulations, establishing data controls and in enabling the required professional oversight

to guide this development phase. RANZCR also has a leadership role in terms of establishing practice standards and for establishing the ethical basis for the deployment of the technology in the sector.

If we are to embrace digital disruption then it is essential to form the right policy coalitions now. Australia needs a proactive national policy to support this transition and this should be done in partnership. RANZCR is keen to forge partnerships with government and industry to advance the development of safe and effective AI solutions. In partnership, there is an opportunity to establish a platform for gathering real-world evidence to determine AI algorithm effectiveness in clinical practice.^{xxvii} This partnership would have a role in determining pre-market and post-market regulatory review pathways for AI.^{xxviii} It would facilitate a lead role in international collaboration working through shared policy exchanges with leading health organisations, government regulators, and international experts.

Establishing an ethical role for AI in healthcare will be reliant on enabling the required partnerships through a national structure. This is the work that should be occurring now and at this early development phase in order to establish the required principles in moving AI and healthcare forward. RANZCR is happy to provide our insights and experience in the deployment of other technologies to support policy discussions occurring at this time and to guide future directions. We are also keen to play a role in fostering international collaboration to leverage the expertise of our global partners in radiology which remains at the epicentre of change.

References

ⁱ Mongan, J. Presentation. Artificial Intelligence and the Future of Radiology. UCSF Radiology. Available at: https://osherminimed.ucsf.edu/sites/osherminimed.ucsf.edu/files/wysiwyg/Nov2_Mongan_AIRadiologyFuture.pdf.

ⁱⁱ Safavi, K. The future of healthcare is not people versus machines. Techcrunch. Jul 11, 2016. Available at: <https://techcrunch.com/2016/07/11/the-future-of-healthcare-is-not-people-vs-machines/>

ⁱⁱⁱ *ibid.*

^{iv} *Ibid.*

^v Pien, H. Healthcare explained: Could AI replace radiology? Feb 13, 2017. Available at: <https://www.philips.com/a-w/about/news/archive/blogs/innovation-matters/ai-replacing-radiology.html>

^{vi} *ibid.*

^{vii} Lindner, M. Adding value with AI in medical imaging. Siemens Heathineers Global. Nov 30, 2017. Available at: <https://www.healthcare.siemens.com/magazine/mso-artificial-intelligence-in-radiology.html>

^{viii} Ridley, EL. SIIM: AI poised to enhance all aspects of radiology. Jun 1, 2017. Available at: <http://www.auntminnie.com/index.aspx?sec=ser&sub=def&pag+dis&itemID=117495>

^{ix} Pien 2017, *op. cit.*

^x Harvey, H. Why AI will not replace radiologists. Towards Data Science. Jan 24. Available at: <https://towardsdatascience.com/why-ai-will-not-replace-radiologists-c7736f2c7d80>

-
- ^{xi} Walter, M. Looking ahead: 4 predictions about the future of AI in radiology. Radiology Business. Jan 23, 2018. Available at: www.radiologybusiness.com/topics/artificial-intelligence/looking-ahead-4-predictions-about-future-ai-radiology
- ^{xii} The Medical Futurist. The Future of Radiology and Artificial Intelligence. TMF. nd. Available at: <http://medicalfuturist.com/the-future-of-radiology-and-ai/>
- ^{xiii} Calhoun, A. Digitalizing healthcare: AI as an essential clinical decision support tool. Forbes. Nov 30, 2017. Available at: <https://www.forbes.com/sites/siemenshealthineers/2017/11/30/digitalizing-healthcare-ai-as-an-essential-clinical-decision-support-tool/#5d0504dc1b96>
- ^{xiv} Ridley 2017, op. cit.
- ^{xv} Forrest, W. AI's role in radiology evolving toward a promising future. AuntMinnie.com. Jan 25, 2018. Available at: <http://www.auntminnie.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=119689>
- ^{xvi} Fornell, D. How artificial intelligence will change medical imaging. Imaging Technology News. Feb 24, 2017. Available at: <https://www.itnonline.com/article/how-artificial-intelligence-will-change-medical-imaging>
- ^{xvii} Harvey, op. cit.
- ^{xviii} Walter 2018, op. cit.
- ^{xix} The Medical Futurist, op. cit.
- ^{xx} Morozov, S., Ranschaert, E. Why Europeans must care more about AI, machine learning. AuntMinner.com. Sep 6, 2017. Available at: <https://www.auntminnieeurope.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=614822>
- ^{xxi} *ibid.*
- ^{xxii} Infosys Limited. AI for Healthcare: Balancing efficiency and ethics. 2017. Available at: <https://www.infosys.com/smart-automation/Documents/ai-healthcare.pdf>
- ^{xxiii} Safavi 2016, op. cit.
- ^{xxiv} Thrall, J. Trends and Developments Shaping the Future of Diagnostic Medical Imaging: 2015 Annual Oration in Diagnostic Radiology. RSNA Radiology. Jun, 2016. <http://pubs.rsna.org/doi/full/10.1148/radiol.2016160293>
- ^{xxv} Mongan, op. cit.
- ^{xxvi} Landi, H. From value-based care to AI, imaging leaders look to radiology's future. Healthcare Informatics. October 10, 2016. Available at: <https://www.healthcare-informatics.com/article/population-health/value-based-care-ai-imaging-leaders-look-radiology-s-future>
- ^{xxvii} ACR. ACR Data Science Institute meets with FDA on AI regulatory issues. American College of Radiology. Oct 27, 2017. Available at: <https://www.acr.org/Advocacy-and-Economics/Advocacy-News/Advocacy-News-Issues/In-the-October-27-2016-Issue/ACR-Data-Science-Institute-Meets-With-FDA>
- ^{xxviii} *ibid.*