Perspective

Is Australia's clinician scientist capacity appropriate for addressing the next pandemic?

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Abstract. Australia's clinical research communities responded quickly to COVID-19. Similarly, research funding to address the pandemic was appropriately fast-tracked and knowledge promptly disseminated. This swift and purposeful research response is encouraging and reflects thorough and meticulous training of the academic workforce; in particular the clinician scientist. Clinician scientists have formal clinical and research qualifications (primarily PhD), and are at the forefront of translating knowledge into health care. Yet in reality, advances in medical research are not rapid. Scientific discovery results from the long-term accumulation of knowledge. The drivers of this knowledge are often PhD students who provide new lines of clinical inquiry coupled with the advanced training of early- and mid-career researchers who sustain discovery through a clinician scientist workforce. A crucial point during these COVID-19 times is that this initial investment in training must be nurtured and maintained. Without this investment, the loss of a future generation of potential discoveries and a vibrant scientific workforce to safeguard us from future global health threats is at risk. This risk includes the modest gains achieved by increasing female and minority representation in STEM and the clinician scientist workforce. COVID-19 has presented serious concerns to Australia's health and economy. This perspective is central to these concerns and urges investment in the continuity of training and maintaining a sustainable clinician scientist workforce sufficient to address current and future pandemics, alongside continuing discoveries to improve the health of Australians.

Keywords: clinician scientist workforce, COVID-19, early to mid-career researcher, health services research, implementation science, MD–PhD, research training, translational medical research.

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Introduction

COVID-19 demanded a quick response from the world's medical and scientific communities. The Australian government showed clear thinking and prompt action to contain the immediate threat within our borders. Similarly, our research community responded decisively and with purpose in addressing the current pandemic. The agile response from the many researchers and laboratories around the country has had them hailed, quite rightly, as superheroes. Although this work is encouraging and speaks to the quality and capacity of these scientists, realistically clinical research does not normally function in this manner. Nor is it a sustainable or realistic portrayal of research to society.

Clinical academic research is primarily undertaken within large health systems and associated academic institutes, most with affiliations to clinicians, but often led by researchers removed from clinical practice. Health and medical research operates within a methodical cycle of responding to clinical questions in a manner that accumulates knowledge and subsequently informs the practice and training of health professionals delivering care. Inherent in this learning process is the

appropriate translation of knowledge between clinical practice and research. This is the hallmark of the clinician scientist.

Clinical research is an applied learning process led by clinician scientists

Clinician scientists have formal clinical (medical, allied health, nursing) and research qualifications (primarily PhD), and integrate clinical practice and research in their professional careers. Clinician scientists are at the forefront of translating knowledge into health care while ensuring research agendas are relevant to health services and their patients. The COVID-19 experience has highlighted the value of clinician scientists, particularly those employed within hospital health services. It is these clinician scientists who juggle the demands of preserving life for those afflicted with this complicated virus while concurrently investigating its science and thus its prevention and cure.

The COVID-19 experience has showcased the fundamental function of clinician scientists in developing, testing and translating solutions to applied clinical problems. Examples within the Royal Brisbane and Women's Hospital of clinician scientist-led research have focused on knowledge generation (e.g. clinical trials of drugs to treat and slow the progression of COVID-19 and staff experience of personal protective equipment) and knowledge translation (e.g. evaluation of rapid implementation of telehealth). An exemplar of knowledge translation led by a local clinician scientist is the development of international guidelines that synthesised the available evidence for physiotherapy management of COVID-19 patients.[1] The work, which was completed within a 4-week time frame and published online in March 2020, has been translated into 26 languages (https://www.wcpt.org/covid19/practice, accessed 1 November 2020) and illustrates one of many discoveries driven by clinician scientists. However, this example does not begin to cover the full scope and potential of clinician scientists in health services research, policy, public health research and implementation science. Nor the science of de-implementation, which is the concept of disinvestment in low-value health care to allow reinvestment in higher-value care and new technologies. The details of these areas are beyond the scope of this paper. What is vital is that appropriate training pathways are available to ensure a sustainable clinician scientist workforce into the future.

How committed is Australia to a clinician scientist training pathway?

It is difficult not to compare Australia to other countries with established pathways for training clinician scientists, primarily MD–PhDs. The US and Canada have enviable programs that provide funding to eligible medical schools to deliver the highest-quality research training to select medical students. The UK addressed comparable concerns with their well-established integrated academic postgraduate training pathway.[2–6] In contrast, formal training opportunities for clinician scientist career pathways in Australia are limited and fall well behind those schemes. Opportunities for dedicated clinician scientist careers are mostly provided by National Health and Medical Research Council (NHMRC) schemes and some speciality training colleges and hospital health services.

A Working Party of the Royal Australasian College of Surgeons, established in 2015, has diligently reviewed and developed training pathway models for the Australian context while lobbying funding bodies such as the Medical Research Future Fund for support.[7] It is encouraging that over the past 3 years several new schemes have aimed at early to mid-career researchers, including 5-year fellowships for clinicians. However, despite these opportunities for clinicians to undertake research, there is no clear scheme for establishing more clinician scientists, or providing sustainable dedicated employment as a clinician scientist following training.

Certainly the clinical academic training pathway is complex, including several distinct training programs across various jurisdictions. Ideally, to achieve a truly integrated pathway this requires administration by one organisation with appropriate support through a collaborative model.[7,8] As the peak body representing the ten NHMRC accredited translation centres, the Australian Health Research Alliance (AHRA) is well placed to oversee this. The goal of the AHRA is to accelerate research translation by integrating health care, medical research, and health professional education across Australia (https://ahra.org.au/, accessed 1 November 2020).[8] Yet, at present, there is nothing evident forthcoming in terms of clinician scientist training. We must keep asking: where are the education and training pathways to which students, junior clinicians and registrars aspire?

The 'locomotives' of Australia's clinical research workforce

If we unpack the way clinical research occurs, we see that PhDs are a vital and the most frequent source of new discovery. That is because a PhD is about creating new knowledge that may contribute to an existing knowledge or pave the way for a new line of scientific inquiry. After moving into the research workforce, newly trained clinician scientists join the cadre of early- and mid-career researchers who represent the 'locomotives' that generate and drive clinical research. These early- and mid-career clinician scientists are the product of many years of under- and postgraduate education and training investment. In turn, these early- and mid-career clinician scientists inspire, support and train the next generation of clinical researchers. The crucial point is that this initial investment in training clinician scientists needs to be nurtured and maintained. This includes the expansion of recurrent dedicated clinician scientist appointments that accommodate protected research time and inter-related clinical practice. The clinician scientist workforce deserves opportunities to advance their careers and research output, leading to grant acquisition that underpins funding for new PhDs and training of new clinician scientists, perpetuating the continuum of clinical research.

If continuity in training and support for these 'locomotives' of Australian clinical research is not maintained, we risk losing a generation of potential discoveries and a vibrant scientific workforce to safeguard us from future global health threats. This risk includes the modest but important gains that have been achieved over the past decade by increasing female and minority representation in STEM (science, technology, engineering and mathematics) subjects and the clinician scientist workforce.[9,10]

Recommendations to grow and maintain Australia's clinician scientist workforce

There is no disputing that given the commitment and investment required to obtain a PhD, funding is the primary concern for aspiring clinician scientists.[11,12] In light of this, the economic impact of COVID-19 on postgraduate research training suggests an uncertain future. University graduate schools across the country, responsible for the administration of PhD degrees, are generously yet strategically ensuring that support for current PhD students is maintained to graduation. However, expectations for future funding to those PhDs destined to contribute to the clinician scientist workforce is less certain. Therefore, central to considerations around funding for research is the investment in scholarships and quality training opportunities for PhDs, and a career pathway integrated with and complementary to the continuum of medical education and clinician training. Academic–health service partnership models are needed to provide this integrated research and clinical training, as well as part-time PhD pathways for practicing clinicians to gain formal research qualifications. Defining the value of clinician scientists as it relates to health benefits and cost-effective health service provision is key to providing further justification for the investment of public funds to train and support this workforce.

Our vulnerability to pandemics has been discussed for years; COVID-19 has brought this concern home and on a global scale. The economic impact of recent events has far-reaching consequences across society, and policies to address this effect will largely be determined by political leaders and government funding agencies. Considering the greater good of society, how will research be treated when funding questions arise? Will expenditure on research be considered as a way of easing the broader public debt or be considered as an important investment to help us regain economic stability? Are we certain that our clinician scientist workforce is sufficient to address current and future pandemics, alongside continuing discoveries to improve the health of Australians?

Competing interests

The authors declare no competing interests.

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