Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Editorial

Innovative physiotherapy clinical education in response to the COVID-19 pandemic with a clinical research placement model

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Coronavirus Disease 2019 (COVID-19) is challenging the healthcare system and affecting current and future generations of physiotherapists. Physiotherapists in the workforce have been rapidly adapting to new models of care under significant pressure.[1–3] Physiotherapy students have also been impacted profoundly by the global pandemic, as most face-to-face teaching and learning activities have been restricted to reduce the rapid spread of the virus. One aspect of physiotherapy education that has been severely impacted by the COVID-19 pandemic is clinical education.[4] Clinical education is a core component in the curriculum of undergraduate and graduate-entry physiotherapy degrees and a requirement for registration in many countries.[5] Prior to the pandemic, clinical education for physiotherapy students was mostly delivered face-to-face in hospitals, private practices and aged-care facilities, with remote activities such as telehealth rarely encouraged.[4] This Editorial presents alternative solutions to overcome barriers in traditional models and assist clinical education during and beyond the pandemic.

The impact of COVID-19 on physiotherapy clinical education was evident in Australia in March 2020, with restrictions on face-to-face teaching and learning activities. Almost half of traditional physiotherapy placements were paused or cancelled at the University of Sydney. In 2021, the impact of the pandemic remains, and managing clinical placement shortages has become part of the educational context in Australia and internationally. The reasons for placement cancellations are multifactorial and include restrictions on face-to-face consultations and redeployment of physiotherapists to COVID-19-related work.[1,5] Other contributing factors may include insufficient personal protective equipment and concerns that students could be infected and transmit the virus unknowingly.[6] Placement shortages have presented a substantial challenge for progressing students through their degree, particularly through their final year and into the future healthcare workforce. A shortage of new graduates is a national threat, as timely graduation and registration are critical to workforce sustainability,[5] especially during the pandemic when physiotherapists have several roles in managing patients admitted to hospitals with confirmed or suspected COVID-19.[2]

In response to COVID-19, rapid innovations in clinical education have been developed to provide authentic learning experiences for physiotherapy students to develop their clinical skills. One of the educational solutions that has been implemented successfully to provide real-life experiences of evidence-based patient management for physiotherapy students, while adhering to accreditation requirements,[5] is 'clinical research placements'. In this model, clinical education is delivered in the context of research, whereby students are integrated in research projects that involve the delivery of evidence-based care. This Editorial provides an overview of the strategies explored to identify adequate learning opportunities for near-completion physiotherapy students via clinical research placements. It discusses how placements were co-designed with researchers and clinicians, and how the model was piloted in two research trials to build students' clinical skills and graduate qualities. Strengths and barriers of clinical research placements have been suggested by researchers, clinicians, academics and students, and these aspects are discussed in this Editorial.

Developing clinical research placements

Recognising the sudden and dramatic challenges that COVID-19 presented to timely graduation of physiotherapy students, a detailed consultation was undertaken by Work Integrated Learning (WIL) academics in charge of clinical education. The main goal of the consultation was to evaluate: the number of physiotherapy placements needed to be filled, the student clinical education requirements to satisfy course accreditation, the timing of clinical placement blocks, the tasks required to assist students' clinical experiences during a research clinical placement, and the student upskill required prior to commencement of the research clinical placement. As clinical educational models rely heavily on successful partnerships with internal and external stakeholders,[7,8] WIL academics explored several opportunities for partnerships with healthcare providers and researchers, including novel collaborations to deliver high-quality evidence-based care in clinical research settings. We initially consulted with all research theme leaders across the University of Sydney School of Health Sciences and collated information about past successfully implemented research-integrated placements across other health disciplines (eg, Bachelor of Applied Science - Exercise Physiology). Due to the nature of the pandemic, it was identified that telehealth-based clinical trials in physiotherapy would be targeted. To ensure an appropriate learning experience for physiotherapy students, the placement model was co-designed by joint efforts from WIL academics and researchers, considering the research context, accreditation requirements, educational practices and students' learning needs.[8]

Piloting clinical research placements within trials

The clinical research placement was piloted by integrating physiotherapy students into two telehealth trials led by physiotherapy researchers. The trials from the Musculoskeletal Research Group at the Sydney School of Health Sciences investigated physiotherapist-led interventions for people with chronic musculoskeletal conditions (knee osteoarthritis and low back pain). These trials were the few unaffected by the social distancing measures implemented by local governments during the pandemic. Both trials involved the

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Table 1
Examples of learning and teaching opportunities for students and clinician-researchers involved in the clinical research placement pilot.

Activities	Student learning opportunities	Added value for research teams
Engaging in telehealth consultations	Students were exposed to safe evidence-based practice, communication styles, behaviour change strategies, various physical therapies and interventions, exercise prescription and advice, goal-setting and management planning of musculoskeletal clients.	While learning, students assisted with background research, preparation for therapy and assessment sessions, delivery of therapy or aspects of therapy and follow-up consolidation activities.
Simulated telehealth consultations	Students practised skills learnt during placement with peers and clinician-researchers, including communication, clinical reasoning, implementation of therapy and management plans.	Throughout clinical education, clinician-researchers mentored students and promoted knowledge translation.
Screening of potential participants	Students participated in screening for red flags, diagnosis evaluation and triage of patients.	Students assisted with screening and quality control of participant entry into trials.
Clinical notes and monitoring of participants	Students liaised regarding management plans for participants, follow-up and reference to baseline data.	Students assisted therapists to maximise individualised therapy and documentation.
Quality improvement project (eg, literature review and presentation)	Students received additional training on the conditions being studied, research methodology, literature review and research communication skills. Students gained experience presenting to an audience of researchers and clinicians.	Students prepared material that can be used for knowledge translation and presentations, generating rich discussions on the topic and ideas for future clinical practice and research.

delivery of telehealth interventions focusing on education, strength training, pain management strategies, physical activity prescription and aspects of cognitive behavioural therapy. Students engaged in most of the activities and, after participant consent was obtained, they had opportunities to observe and practise their skills with a variety of patient presentations. The educational model that was used was shared care,[9] where experienced physiotherapists led clinical assessments and key aspects of therapeutic delivery, while student primary roles included support of clinicians through various aspects of healthcare delivery and research. This was identified as the most appropriate educational approach for the pilot, to ensure adequate learning experiences for students while leaving the original study design and aims unaffected.

Similar to a traditional placement, a full-time 5-week program provided students with the opportunity to be clinically involved in managing patients with musculoskeletal conditions. Students engaged in a 100% online placement, which was designed to be safe and offered a variety of learning opportunities to enhance student skills, knowledge and employability in telehealth care and evidence-based practice (Table 1). This placement model was unique in that the students' education was delivered by clinicians and researchers. The learning experiences were designed to expand students' understanding of the latest evidence but to also offer wider insights into the process of how evidence is developed and applied in musculoskeletal health. The placement required students to have both telehealth clinical days, where students engaged with telehealth physiotherapists during their consultations and assisted with therapy delivery (eg, exercise prescription) and clinical notes, as well as research days, where students worked with the study project manager on research-based tasks for a quality improvement project. On completion of the pilot, a registered physiotherapist assessed the five physiotherapy students involved in the project, and they met the learning outcomes according to the Assessment of Physiotherapy Practice.[10]

Embedding clinical research placements across healthcare settings

Following the successful pilot, acceptability of clinical research placements among academics, clinicians, researchers and students has been growing. Clinical research placements have now been embedded in tertiary and community healthcare settings across Sydney, including a research institute embedded in these settings. The Institute for Musculoskeletal Health is a research collaboration between Sydney Local Health District and the University of Sydney and is offering ongoing clinical research placement opportunities for physiotherapy students. As part of this placement, physiotherapy students engage in clinical trials and evidence-based training with leading musculoskeletal researchers and participate in traditional clinical activities with physiotherapists from the Local Health District. Students complete the online Physiotherapy Evidence Database (PEDro) Scale training program to understand and appraise trials efficiently and develop skills in research communication. This model may be particularly relevant to provide learning opportunities for physiotherapy students in several areas that are common barriers to evidence-based practice, such as confidence to identify and critically appraise research.

Observations about clinical research placements

To date, 21 physiotherapy students have completed a clinical research placement designed to address placement shortages and progress students at the University of Sydney. As part of clinical placement quality control, we gathered general information on the acceptability and perceived value to students completing these placements via debriefings with the WIL academics, self-reflection forms and unit of study survey. Overall, students reported valuable learning experiences related to the combination of clinical and research activities and enjoyed being part of a clinical research team. They found that immersion in clinical research was effective in promoting their learning and expanding their clinical skills. We observed that students often spoke enthusiastically about their placement experiences and reported a good balance between learning about research while optimising clinical knowledge and practical skills. Students suggested that the placement may assist some in contemplating participation in clinical research and research training after graduation (eg, PhD). A summary of the suggested benefits and barriers to clinical research placements noted by the authors is listed in Box 1.

Clinicians and researchers reported high levels of satisfaction in working together to educate physiotherapy students and suggested that this educational model provides mutual benefits (Box 1). Clinicians and researchers observed that students gained and applied evidence-based physiotherapy skills while assisting with clinical and research tasks. Students learned from and supported clinical researchers with a variety of tasks including recruitment, preparation for assessment/therapy sessions, writing clinical notes and background research. With the quality improvement projects in the pilot, students assisted the research team by developing educational materials that will be used in knowledge translation and presentations.

Clinicians and researchers valued the opportunity to teach, inspire and contribute to the future workforce by providing clinical and research education; however, potential barriers were identified in the implementation of this educational model. Clinical education often needed to be tailored to the individual student's knowledge and skill level. To provide adequate student support, training and time commitments were required from researchers, clinicians and WIL academics implementing the placement. As with any new clinical educator, the research team comprising clinicians and researchers worked with WIL academics to ensure that adequate learning opportunities were available for students (eg, placement manual, orientation session and supervision strategies). Another

Box 1. Benefits and barriers of clinical research placements.

Benefits for students	• Experience how research is implemented in clinical practice • Gain and apply skills associated with the presentation of research to an audience of clinicians and researchers • Develop confidence with how to find and critically appraise evidence and to link evidence to practice • Gain a better understanding of research methods and how research is developed
Benefits for clinician-researchers	• Satisfaction educating the next generation of physiotherapists • Assistance with clinical activities (eg, preparation for therapy and assessment sessions, delivery of therapy or aspects of therapy and writing clinical case notes for documentation) • Assistance with clinical research activities (eg, recruitment, screening, data collection and literature review)
Barriers for students	• Difficulty finding, understanding and interpreting evidence from published papers prior to receiving the additional training from the clinician-researchers/researchers • Challenge in interpreting de-identified data from assessment timepoints (eg, identification of the baseline pain levels from the raw data of a questionnaire) • Difficulty understanding research study protocols • Some lack of clarity about what is expected from students in research tasks
Barriers for clinician-researchers	• Lack of practice with clinical education • Limited time to design and implement educational activities and supervision • Concerns with research ethical constraints when involving students • Need to provide induction and training for students every 5-week block • Variability in recruitment rate can affect students' activities

barrier raised by researchers was related to research ethics requirements: for each research project, researchers need to identify appropriate activities that could be conducted with students and consult with ethics committees for any potential changes to research activities.

What does the future hold?

The impact of COVID-19 in health sectors and education is extending well into 2021 and beyond. This challenging time has created several opportunities to re-think clinical education for physiotherapy students. Unquestionably, innovations in clinical education are necessary to address placement shortages and ensure timely graduation for physiotherapy students to enter the healthcare workforce. Clinical research placements are one potential solution—assisting students in developing clinical skills while understanding how research is developed and applied in authentic healthcare settings. From an educational perspective, a clinical research placement is a suitable placement model for maintaining access to a range of opportunities for students to build their clinical skills and promote evidence-based practice. We are now expanding partnerships with the physiotherapy research community to integrate students into clinical research projects and promote research capacity. We encourage clinical researchers to consider integrating clinical education in their projects. This will assist in promoting opportunities for evidence-based practice and ensure that emerging physiotherapy graduates have applied knowledge and experience in research methodology.

The impact of COVID-19 has forced innovations in clinical education that may assist future graduates to value clinical research and reduce the existing gap between evidence and practice in physiotherapy.[11] Future clinical research occurring in professional practice areas should consider integrating clinical education at the inception of research design and funding applications, to ensure that this research experience and evidence-based practice is standard practice in physiotherapy education in Australia and internationally.

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