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Guest Editorial

The Fourth International Physical Employment Standards Conference: Perspectives, Themes and Future Directions

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This special section of *WORK* is intended to provide researchers, practitioners, and policy makers with examples of the varying of the applications of Physical Employment Standards (PES) frameworks in physically demanding occupations. The special section is based on the Fourth International PES Conference held at Bond University on the Gold Coast, Australia, from the 24th–26th February 2023. This three-day conference was attended by researchers, practitioners and policymakers working within the military, law enforcement, fire and rescue, paramedicine, astronautics, sport, and industry sectors from 10 nations. The conference, which was delayed by 18 months due to the COVID-19 pandemic, built upon previous meetings in Canberra (Australia, 2012), Canmore (Canada, 2015), and Portsmouth (United Kingdom, 2018). The previous PES conferences provided the foundations for the further work presented at the 2023 conference, to contribute to the development of PES methodologies covering the design, development, and implementation of PES within various occupations and agencies. In addition, the fourth PES featured the expansion of the PES methodology to aid in physical conditioning and return-to-work planning for personnel and in the evaluation of job-specific assessments and personal protective equipment.

During the PES conference, four keynote presentations provided various lenses through which to consider the conference intent. The first was delivered by Commissioner Georgeina Whelan, AM, CSC and Bar from the Australian Capital Territory Emergency Services Agency (Australia), which

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encompasses urban and rural firefighters, ambulance services, emergency call operators, and state emergency services personnel. Commissioner Whelan's presentation outlined the increasing work demands these personnel face, many of a physically demanding nature, and the challenges faced by organisations to develop and maintain a physically capable workforce. The second, delivered jointly by Rachel Blacklock from Canadian Forces Morale and Welfare Services (Canada) and Leslie Frei for the Royal Canadian Mounted Police (Canada), provided insights into the practical approach and challenges when undertaking real-world research to inform future PES. The third, delivered by COL Anne Fieldhouse, OBE, HQ Defence Medical Services (United Kingdom), reflected on the development and implementation of PES in the British Army, spanning stakeholder engagement through to resourcing. The fourth keynote was delivered by Dr Michael Drew, Assistant Secretary Health Protection and Policy, Department of Defence (Australia), with a focus on value propositions and beginning the conversation on showing outcomes to organisations from an organisation (as opposed to researcher) viewpoint.

A total of 52 abstracts were delivered as either a research podium ($n = 42$) or ePoster ($n = 10$) presentation. These abstracts spanned topics from the quantification of physical demands within the organisational job task analysis across law enforcement, military, fire and rescue and astronautic occupations, to uses of job task analyses and subsequent PES to quality assure physical and technical training, assessment, and rehabilitation. Three panel discussions were held during the conference. The first panel, consisting of Australian and Canadian presenters, focused specifically on paramedics, connecting the dots between research undertaken in this occupation and parallels to other physically demanding occupations. The second panel, Into the Future – The Next Generation, explored the challenges presented by the current environment (e.g., increased obesity, decreased fitness, long COVID-19, increased drone and digital technology use, etc.) in relation to impacts on PES for future workforces. An 'interactive debate', guided by two hosts, had two panellists taking opposing positions, discussing the requirement for PES and debated the pros and cons of current and future PES approaches. The three panel sessions provided a platform for conference delegates to engage in structured discussions, injecting questions, concerns, and viewpoints through which to provide suggestions for future research.

A collection of original articles were peer reviewed and 16 were selected from these free communications to be published in this special section of *WORK* with the articles revolving around three themes, being identification of tasks, physical requirements to perform tasks, and assessment batteries and associated outcomes. The five articles identifying and quantifying tasks covered military, law enforcement, and offshore wind technician occupations. Following an understanding of what tasks are performed, the physiological costs of performing these tasks and the physical characteristics required (e.g., strength, endurance) to complete these tasks must be determined. Six articles were selected that focussed on assessing the costs of, and requirements for performing, identified occupational tasks. Of these, three articles present investigations of tasks in general (e.g., across an occupational day or shift) and three other articles present investigations of specific tasks, ranging from critical tasks in the Australian Air Force to lower-body power in soldiers performing urban combat tasks. Finally, with tasks and their physiological costs and physical requirements identified, assessment batteries can be implemented. The final five articles range from comparing two different assessment batteries and the effect of training personnel (e.g., physical training to improve skills performance or mitigate load carriage injuries) to short (firefighter graduation success) and longer term (police officer health and fitness) assessment battery outcomes.

Three emerging themes have been identified to guide future directions of both PES research and future PES conferences. First, while it was clear from the research presented that PES frameworks and research have been developed and adopted (albeit with varying degrees of success), there is currently a paucity of information on the acute and long-term effectiveness of implementing PES and associated agency outcomes. Considering this, if impacts of implementing a PES are to be studied, appropriate outcome measures need to be determined and evaluated for reliability and validity. Thus, future research would benefit from determining the impact of PES using reliable and valid outcome measures in a structured and unified approach.

Second, while research has typically focussed on the physically demanding requirements of military, law enforcement, fire and rescue, and paramedicine, other occupations with a high physical requirement warrant consideration (e.g., wind turbine technicians).

Finally, the evolution of practices and personnel in physically demanding occupations should be considered in future PES development and revalidation. This includes factors such as the future of the universality of service principle, sedentary populations in traditionally physically demanding occupations, recruitment considerations, strategies to support/incentivise performance, and future technologies (e.g., wearables, exoskeletons, drones, etc). These factors warrant broadening the occupational aperture to future challenges that extend beyond the development of PES.