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SASHA JOB ; LUKE HEALES ; STEVEN OBST

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Oceans of opportunity for universal beach accessibility: An integrated model for health and wellbeing in people with disability

Sasha Job,¹ Luke Heales,² Steven Obst¹

1. School of Health, Medical and Applied Sciences, College of Health Sciences, Central Queensland University Bundaberg, Queensland

2. School of Health, Medical and Applied Sciences, College of Health Sciences, Central Queensland University Rockhampton, Queensland

Disability is an evolving multidimensional experience that interferes with an individual's participation in society.¹ Because of physical, attitudinal and system-level barriers, people with disability face challenges accessing health care, education, employment and social services.¹ People with disability also face challenges participating in health-promoting behaviours, such as regular physical, social and community activities due to the limited number of inclusive activities, and difficulty accessing facilities and appropriate transport to and from events.² Moreover, people with disability may encounter stigmatisation and discrimination, which further contribute to social, economic and health marginalisation.¹

It is well known that access to nature has a positive impact on human wellbeing and, as such, access to the natural environment is considered an important determinant of health.³ There are two broad categories of the natural environment. 'Green space' refers to natural or urban land areas that are covered either completely or partially in grass, trees or other vegetation (e.g. wilderness, parks, gardens, forests).⁴ 'Blue space' refers to natural or constructed environments that feature visible water (e.g. oceans, lakes, rivers, streams).⁵ Research shows that access to green and blue space has direct benefits to both general and mental health.^{6,7} Further, participation in health-related activities, such as physical activity and rehabilitation, within a natural environment may afford additional benefits to health and wellbeing beyond that offered by urban or indoor environments.⁸

Until recently, research investigating the natural environment has primarily focused on green spaces, with limited research

examining the health benefits of accessing blue spaces (e.g. beach, promenade). Although many characteristics are shared by green and blue spaces (e.g. cooling effects, biodiversity), blue spaces offer additional recreational activities (e.g. swimming) and unique features such as crashing waves and waterfalls, which may provide additional health benefits.⁷ Further, with rapid population growth in coastal areas⁹ and construction encroaching on green space,¹⁰ blue spaces represent increasingly important locations for health and recreation.⁵

Although limited, research suggests that blue spaces are more widely accessed for activities that promote health and wellbeing¹¹ and may offer greater health benefits compared to green spaces. For example, compared to green space, people who access blue space are more likely to participate in positive social interactions with family and friends¹² and meet national physical activity guidelines.¹³ Unfortunately, current research into the health benefits of blue space exposure is largely limited to the general population⁶ and so there is a need to explore whether blue spaces can be used to promote health and wellbeing for people with disability.

The context – Oceans of opportunity

The beach is integral to the Australian lifestyle.¹⁴ With more than 85% of the population residing within 50km of the coastline,¹⁵ the beach is Australia's most popular and most accessed blue space destination for recreational activities.¹⁴ Almost all Australians (>99%) visit the beach, with 75% using their local beach at least weekly.¹⁴ Unfortunately, 21.8% of Australians are unable to participate in their preferred beach activities, and of these

15.8% cite reasons such as disability and/or old age.¹⁴ Recent work from our group indicates these data may underestimate the true impact of disability and/or old age on beach accessibility. In 2020–21 we conducted an online community survey exclusively of Australians aged 65 years or over and/or living with disability to explore physical activity participation and patterns and preferences for beach use. Our unpublished data (n=271) indicate that the percentage of respondents unable to participate in their preferred beach activities may be as high as 60%, with up to 26% unable to visit at all.

The beach offers a dynamic setting for land- and water-based activities that are associated with enjoyment, relaxation and social interaction, as well as improved physiological, psychological, and social health and wellbeing.^{12,16,17} Visiting the beach also provides motivation to exercise¹⁶ and encourages participation in physical activity across the lifespan.¹² While the health-related benefits of accessing blue spaces, such as the beach, are being realised internationally,⁵ there is still very limited research within Australia. Furthermore, no research has explored whether participation in physical activity or rehabilitation within a beach environment could enhance health and wellbeing outcomes for people with disability. Identifying the factors that influence blue space access for people with disability is an important first step.

Current research suggests that barriers to beach access for people with disability include challenging terrains (e.g. sand, water), inappropriate access points and inaccessible facilities (e.g. parking, amenities).¹⁷ These findings are in line with unpublished data from our online community survey, which indicate the most frequently reported barriers to beach access include difficulty moving on soft sand (81%), inaccessible leadup pathways (76%), difficulty accessing the water (76%) and no specialised mobility equipment (69%). There is a lack of research exploring how such barriers may be overcome to provide equitable access to beach environments.

In a recent Spanish review of beach accessibility, Mayordomo-Martinez et al.¹⁸ provided a description of local features required for beach accessibility for people with disability. Whilst the purpose of their research related to tourism, the authors outlined key elements of an accessible beach

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based on legislation and end-user opinion, including physical equipment and services required. While this research provided a practically useful blueprint for accessible beach design, it did not consider the impact of beach access for health and wellbeing for people with disability. Furthermore, although White et al.¹⁹ proposed a model to depict the relationship between blue space exposure and health and wellbeing, factors that impact human functioning were not comprehensively considered as an effect modifier. Therefore, there is a need to consider not only the design, but also the impact, of accessible beaches for people with disability within a framework that recognises the multidimensional nature of disability, as per the International Classification of Functioning, Disability and Health (ICF).²⁰

The solution – Tides of change

We propose an integrated model of blue space accessibility (adapted to the beach) within the context of healthcare for people with disability – The BlueABILITY model (Figure 1). Our proposed model merges White et al.'s¹⁹ conceptual framework for Blue Space Health and Wellbeing with the ICF-based Physical Activity for People with Disability model.²¹ In doing so we recognise the complex interconnections between the blue space environment, accessibility, physical

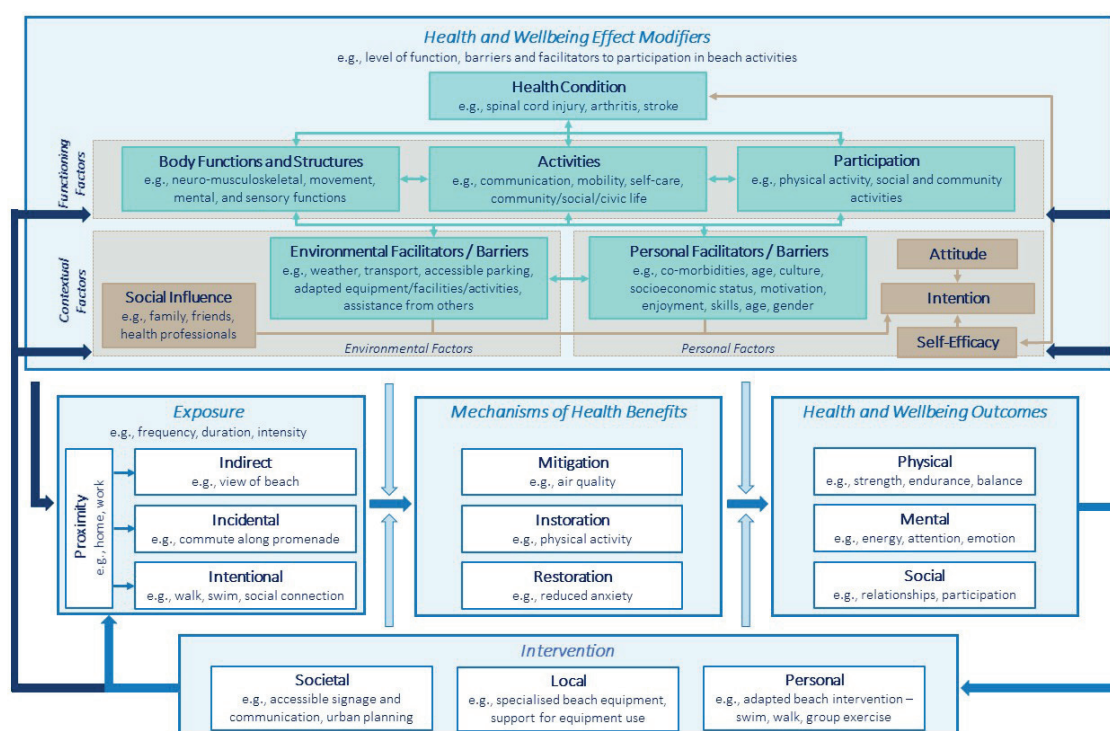
activity, and health and wellbeing for people with disability.

The original conceptual model for Blue Space Health Benefits (Figure 1 – blue boxes, light blue arrows) proposed by White et al.¹⁹ recognises the potential mechanisms of health benefits (i.e. 'mitigation', 'instoration' and 'restoration') that link exposure to blue space (i.e. 'proximity' and 'type') with health and wellbeing outcomes (i.e. 'human' and 'planetary') that inform action and change (i.e. societal, local and personal), which in turn feeds back to exposure. Their model also recognises 'situational' and 'individual' effect modifiers, such as the weather and socioeconomic status, which can influence the potential mechanisms of health benefits and the nature of the outcome.¹⁹ Although the model by White et al.¹⁹ provides a comprehensive overview of blue space health, there is a need to more deeply consider the influence that disability has on each element, but most importantly, as a situational and individual effect modifier. As White et al.'s¹⁹ model was not specifically developed for people with disability, there is no clear recognition of the barriers people with disability must overcome to access blue space. In addition, despite physical activity being identified as a potential mechanism linking blue space and health, determinants of physical activity are not presented as an

effect modifier. Therefore, we propose an extension of the model by White et al.¹⁹ that considers the effect modifiers within both the Physical Activity for People with a Disability (PAD) model²¹ and ICF framework.²⁰

As disability impacts capacity and opportunity to engage in physical activity, understanding physical activity behaviours and determinants in the context of human functioning is key to improving physical activity participation for people with disability.²¹ The PAD model²¹ describes the main environmental (i.e. 'social influence' and 'environmental facilitators and barriers') and personal (i.e. 'health condition', 'self-efficacy', 'intention', 'attitude' and 'personal facilitators and barriers') factors that influence physical activity behaviour. Given the diversity in how disability is individually experienced, it is essential the health and wellbeing of people with disability is conceptualised as the interaction between health condition(s) and contextual factors through the domains of human functioning.²⁰ This interaction is central to the PAD model²¹; however, the PAD in isolation does not consider how people with disability may be supported to participate in health-promoting behaviours other than physical activity. By recognising and incorporating these variables into the model by White et al.¹⁹ our integrated model identifies factors that may need to be

Figure 1: BlueABILITY – an integrated model of blue space access within the context of health and physical activity for people with disability.



accommodated and/or modified through targeted health interventions to promote health and wellbeing for people with disability.

White et al.¹⁹ include a feedback loop between outcomes and exposure through their proposed actions or interventions, however, neither their intervention or outcomes are specifically linked back to their proposed effect modifiers (i.e. 'situational' or 'individual'). As such, White et al.'s¹⁹ model does not recognise the impact that action/intervention (e.g. rehabilitation program), can have on accessibility and disability. To this end, our integrated model extends the feedback loop to include the effect modifiers, thereby acknowledging that interventions have a direct influence on environmental factors, and that outcomes have a direct influence on both functioning and contextual factors. Because our future research is focused specifically on the beach, we have chosen to centre the model on this location and include examples specific to beach accessibility. However, we believe the model could be adapted to any blue space setting.

The future – Empirical ground swell

Our BlueABILITY model provides a framework for recognising the relationships between the blue space environment, accessibility, functioning, health and wellbeing for people with disability. Our model could be used by various stakeholders, including researchers, health professionals, community groups and policy makers, in a range of contexts including the design, implementation and evaluation of inclusive community and health-related infrastructure, research and services. For example, the model may support local government and disability organisations to provide universal access to blue space environments (e.g. community beach days) by tailoring solutions that include both physical equipment (e.g. access ramps, mobility equipment) and services to support access (e.g. physical assistance, adapted blue space activities).

The model also supports person-centred healthcare and clinical research to ensure that health promotion interventions for people with disability are designed and evaluated within the context of the ICF²⁰ and Blue Space Health Benefits models.¹⁹ For example, we propose to use the BlueABILITY model to investigate whether improved beach accessibility can increase physical activity participation, health and wellbeing in people

with disability. Specific examples of how the model may be contextualised to beach accessibility are included in Figure 1. The first step in translating an integrated model of beach accessibility for healthcare requires detailed knowledge of the barriers, facilitators and attitudes of beach accessibility from the end-users – i.e. people with disability (and their family/ carers) and health professionals (e.g. physiotherapists, occupational therapists). To this end, we propose to use our model as a foundation for identifying these factors by conducting a sequential mixed methods study (surveys and focus groups) involving people with disability and relevant health professionals. Our BlueABILITY model will inform both participant eligibility requirements (e.g. health conditions, activity limitations, participation restrictions) and research questions (e.g. benefits, barriers and facilitators of beach access). The information obtained will be used to inform key aspects of the model, including effect modifiers and highlight potential links between exposure (e.g. nature and dosage of beach visits) and health related outcomes (e.g. self-perceived health, physical activity levels). This information will then inform the design and roll-out of a person-centred beach-based therapeutic intervention tailored to people with disability. The BlueABILITY model will be used to ensure barriers and facilitators of beach access are addressed to provide societal, local and personal interventions aimed at supporting people with disability to participate in beach-based physical activity. Activity type and sequencing of exercises will be prescribed and adapted to suit participant goals and abilities with consideration of the important aspects of behaviour change. Interventions will be evaluated using well-controlled randomised clinical trials for feasibility, cost effectiveness and efficacy at all levels of the model. Given the importance of evidence informed practice, such research may provide the basis for beach accessibility and interventions for people with disability internationally and lead to improved health outcomes for people with disability and improved access and services for local authorities around Australia.

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Correspondence to: Sasha Job, School of Health, Medical and Applied Sciences, College of Health Sciences, Central Queensland University, Bundaberg 4670 QLD; e-mail: s.job@cqu.edu.au