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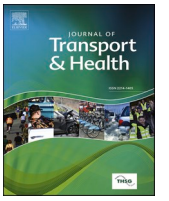

'By us, for us'; Co-designing disability inclusion training for bus drivers☆

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ABSTRACT

Introduction: Passengers with disabilities report being driven past, denied bus access, inappropriately assisted, and rudely addressed by bus drivers. Bus drivers report their behaviour in encounters with passengers with disabilities is impacted by their limited understanding of their passengers' needs. This study aimed to create a bus driver training program targeting how bus drivers engage with passengers with disabilities.

Methods: Drawing from co-design and inclusive research approaches, a team of seven researchers, transport advocates with lived experience of disability, and bus drivers, collaborated for 30 hours over approximately twelve months to co-design a bus driver training program and evaluate the design process. Participant evaluations of the co-design process and resulting training program were completed.

Results: Team evaluations indicated the co-design process was inclusive and collaborative, with key challenges including resource constraints and a hard-to-navigate university payment system. A 90-min online training program, and 180 minute face-to-face training program, were developed using a slide-deck and role-play activities to support drivers when interacting with passengers with disabilities. Named the Better Transport Inclusivity for all Passengers (Better Trip) Training Program, the prototype is ready for small-scale implementation, revisions, and wider rollout.

Conclusions: The Better Trip Training Program offers bus companies and the wider transport community the opportunity to increase their inclusion of people with disabilities. The co-design process ensured people with disabilities and bus drivers' needs were reflected in the final product. Further research is required to test and refine the newly developed training program.

☆ Note on language: 'Person-first' language has been used here as it was the majority preference of the authors who had lived experience of disabilities. The exception in the paper is when referencing Deaf and Autistic persons who have a well-established preference for identity-first language. The authors acknowledge alternative preferences and affirm all persons' right to be referred to how they wish.

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1. Introduction

1.1. Bus drivers' current engagement with passengers with disabilities

Australian media reported that Melbourne woman, Louise Pearson was denied bus access by a bus driver who stated, 'no dogs on this bus!' (Poposki and Mazzoni, 2020, p.1), not recognising a passenger's right to have a Guide Dog on public transport (Department of Transport Victoria, 2024; Guide Dogs Victoria, 2024). Louise is quoted as saying, 'I'm totally blind. I'm just trying to go to work!' (Poposki and Mazzoni, 2020, p.3). This example of a blind passenger's negative encounters with bus drivers is consistent with the wider literature on the experiences of transport passengers with disabilities (Boadi-Kusi et al., 2023). People with disabilities describe experiencing negative attitudes and communication methods, both from transport operators generally (Park and Chowdhury, 2018; Bezyak et al., 2017; Bigby et al., 2017) as well as bus drivers specifically (Belcher and Frank, 2004; Das Neves et al., 2022; Gallagher et al., 2011; Stjernborg, 2019). Reported negative behaviours include being driven past, bus drivers refusing to stop (Bezyak et al., 2017; Park and Chowdhury, 2018; Unsworth et al., 2017; Velho et al., 2016); rushing dis-embarkment (Low et al., 2020), and not positioning the bus safely for dis-embarkment (Casey et al., 2013); not waiting for passengers with disabilities to be seated and/or positioned before accelerating, and/or braking and cornering unsafely (Asplund et al., 2012; Gallagher et al., 2011); and denying the ramp or bus kneeling to some passengers (Park and Chowdhury, 2018; Stjernborg, 2019). In order to improve the encounters between bus drivers and passengers with disabilities, understanding the factors influencing these encounters, and their impact, is required.

1.2. Understanding the factors influencing, and impact of, occupational encounters between bus drivers and passengers with disabilities

Occupational encounters are interpersonal interactions that significantly impact a person's occupational engagement (Das Neves and Unsworth, 2024), where 'occupation' is defined in occupational therapy literature as 'doing, being, belonging and becoming' (Hammell, 2004), including anything from work to grocery shopping, or meeting a friend (Das Neves and Unsworth, 2024). Encounters between bus drivers and passengers with disabilities may be described as occupational when they impact a passenger's means to access their community for meaningful and/or productive occupations (Das Neves and Unsworth, 2024). The Interpersonal-Person-Environment-Occupation-Performance (I-PEOP) Model has been developed to explore the occupational encounters between passengers with disabilities and bus drivers, drawing on the established Person-Occupation-Performance (PEOP) Model by Baum and colleagues (2015) and data from bus drivers and passengers with disabilities (Das Neves and Unsworth, 2024). Like the more widely recognised International Classification of Functioning, Disability and Health (ICF) (WHO, 2001), the I-PEOP examines factors influencing a person/s, including environmental and personal factors. However, the I-PEOP centers on how such factors influence a given occupational encounter, and the impact of that encounter on a person's quality of life and well-being. Additionally, the I-PEOP prompts examination of the relationship between intersectional factors and power imbalances between persons or groups, recognising dynamic interpersonal forces. In applying the I-PEOP model to data from bus drivers and passengers with disabilities (Das Neves and Unsworth, 2024), several key findings were identified. Firstly, bus drivers' behaviour in encounters with passengers with disabilities was found to be impacted by both environmental and personal factors influencing their attitudes towards, and knowledge of disability, including their training, and relationships with people with disabilities in their personal life. Use of the I-PEOP Model also demonstrated that there is an inherent power imbalance between bus drivers and passengers with disabilities, with bus drivers inadvertently becoming gatekeepers of passengers' community access through their entire control over factors such as deciding whether or not to stop the bus, determining whether a person can board with their assistance animal or mobility equipment, and deciding whether to deploy the ramp or bus kneeling functions (Das Neves and Unsworth, 2024). Some bus drivers' attitudes towards disability can be enmeshed with their attitudes towards other intersectional factors, resulting in passengers experiencing multifaceted discrimination, for example being seen as faking their disability or being harassed because they are a young woman (Das Neves and Unsworth, 2024). The culmination of these factors can result in some passengers with disabilities reducing or ceasing their bus use, restricting their community access (Park and Chowdhury, 2021; Stjernborg, 2019; Das Neves and Unsworth, 2024) and thus their occupational participation and engagement. Therefore, bus drivers may have a concrete impact on people with disabilities' experience of being in and belonging to their communities. Bus drivers (Fast and Wild, 2019), passengers with disabilities (Das Neves et al., 2022), and the wider literature (Boadi-Kusi et al., 2023) identify a need for bus drivers to have targeted training programs to improve how they engage with passengers with disabilities. This introduction frames the need for a training program for bus drivers, targeting their attitudes, behaviours and communication methods in encounters with passengers with disabilities. The following discusses the justification for, and potential approaches considered, to effectively design such a training program.

1.3. Disability-inclusion training programs for bus drivers

Historically called disability awareness training, disability-inclusion training is an educational program that seeks to improve participants' knowledge of, and attitudes towards, disability, and how to better include people with disabilities (Singh and Meeks, 2022). This training has been recommended in the literature for bus drivers to improve their attitudes, behaviour and/or communication methods towards passengers with disabilities (Akaateba et al., 2023; Chapman et al., 2023; Das Neves and Unsworth, 2024; Haveman et al., 2013; Hersh, 2014; Lindsay, 2019; Tillmann et al., 2013) including being requested by bus drivers themselves (Das Neves, Browning and Unsworth, 2024; Fast and Wild, 2019; Tillmann et al., 2013). Whilst disability-inclusion training programs are recommended in the literature, and many Australian bus operators (the setting for this study) are known to deliver such training programs, there is almost no literature on the design or application of such training programs (Haveman et al., 2013). One exception is

a study by Haveman and colleagues on the use of buses by children with disabilities in a segregated school (2013). This study documented the benefits of having the key stakeholders collaborate in the design of the disability-inclusion training program that they would receive, notably including bus drivers (2013), and recognised bus drivers' input as being valuable to the training design process. In addition to the benefits of engaging bus drivers in the design process, authentically engaging people with disabilities in disability-inclusion training design and delivery is reported in the literature as integral to ensuring training programs reflect their needs and experiences (Cox et al., 2024; Moore and Nettelbeck, 2013). Whilst including people with disabilities in disability-inclusion training may seem obvious, many disability-inclusion training programs are developed and delivered without being led by lived-experience, instead asserting health professionals or other non-disabled advocates as the 'experts' (Rotenberg et al., 2022). An alternative position is the Disability Justice Framework which calls for 'leadership of the most impacted' (Berne et al., 2018), recognising that people with disabilities are the 'experts' in their experiences and as such have a right to lead conversations about them and their communities. The researchers therefore looked for a disability-inclusion training design approach that would centre lived experience as expertise. Further, drawing from the Disability Justice Framework which recognises people with disabilities as whole persons with complex intersectional identities and calls for cross-disability solidarity (Berne et al., 2018), a collaborative approach was sought that would enable the researchers to overturn homogonous notions of disability and inclusion and instead reflect the diverse experiences of people with disabilities. Given Haveman and colleagues' study (2013), the training program also needed input from bus drivers to ensure it reflected their needs and point of view. The following discusses the collaborative approach chosen by the researchers for this study.

1.4. Review of co-design and inclusive research approaches

Drawing from multiple co-design and collaborative approaches, the researchers created an original disability-inclusive approach to co-design.

1.4.1. Introducing co-design

Co-design is a broadly applied term that sits within or alongside many research models and their respective terminology, including collaborative design, inclusive research, and participatory action research, amongst others (D'Cruz et al., 2022). Similar to these alternative collaborative approaches, co-design typically involves an intentional process whereby power that is traditionally held by professionals in intervention development is shared with the 'end-users' they work with (Slattery et al., 2020). Unlike alternative collaborative approaches, co-design suggests a higher degree of choice and control for co-designers, beyond advisory roles, working alongside researchers (McKercher, 2020). For example, when co-design approaches are applied in disability research, rather than non-disabled professionals researching people with disabilities as passive subjects, co-design is instead 'by us; for us' (JFA Purple Orange, 2021, p.2), engaging people with disabilities as co-designers and co-producers working with non-disabled researchers and/or professionals (Benz et al., 2024). As such, co-design approaches are increasingly used by researchers to combat the power imbalances between non-disabled professionals and the disability community (Benz et al., 2024). Given the mandate of the Disability Justice Framework guiding the researchers to assert people with disabilities as experts in their experience, co-design was chosen over other collaborative approaches as the framework applied to guide training development. The researchers reviewed a range of co-design

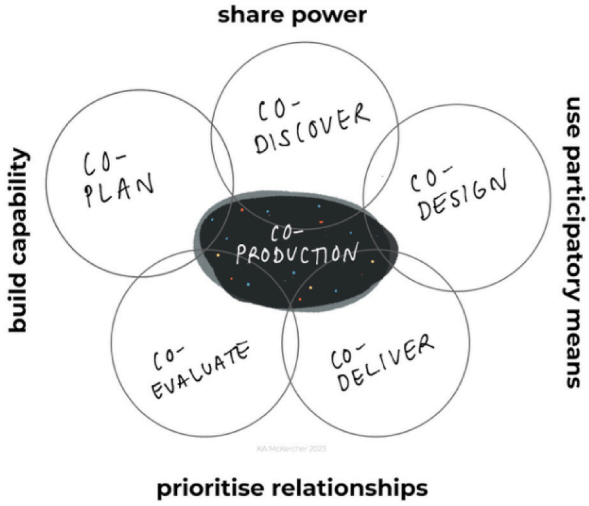

Fig. 1. McKercher's co-design principles diagram. Note: This figure has been reproduced with permission from McKercher's 'What is co-design' (2024) and Beyond Sticky Notes (2020). *Image Description*: A diagram. A centred black landscape oval with colourful dots with white text reading 'Co-production'. Interlaced with this oval are five white circles with black outlines, each with one hyphenated black word, reading (clockwise from top) 'co-discover, co-design, co-deliver, co-evaluate, co-plan'. Above these interlaced circles in black text reads 'share power', to the right of circles 'use participatory means', below 'prioritise relationships', and to the left 'build capability'.

approaches to identify the best approach to meet the study needs.

1.4.2. Co-design approaches guiding co-design facilitators

When reviewing possible co-design approaches, the researchers found some well-described and disability-inclusive approaches in non-peer-reviewed literature such as Purple Orange's Guide to Co-Design (2021) and the Victorian Mental Illness Awareness Council (VMIAC)'s Lived Experience Led Research Principles (VMIAC, 2023). These approaches contained excellent practical recommendations that were included in this study design. However, these frameworks lacked the formal development and underpinning evidence required for use in the current study. A more evidence-based approach to co-design was adopted by Hyett and colleagues, who used a six-step co-design design process in their project targeting improving the inclusion of children with disabilities in schools (2020). Hyett and colleagues' co-design approach drew from the work of Kimbell (2016) and Sanders and Stappers (2016), the former discussing the relevance of prototyping in co-design (Kimbell and Bailey, 2017), and the latter suggesting co-design tools such as generative

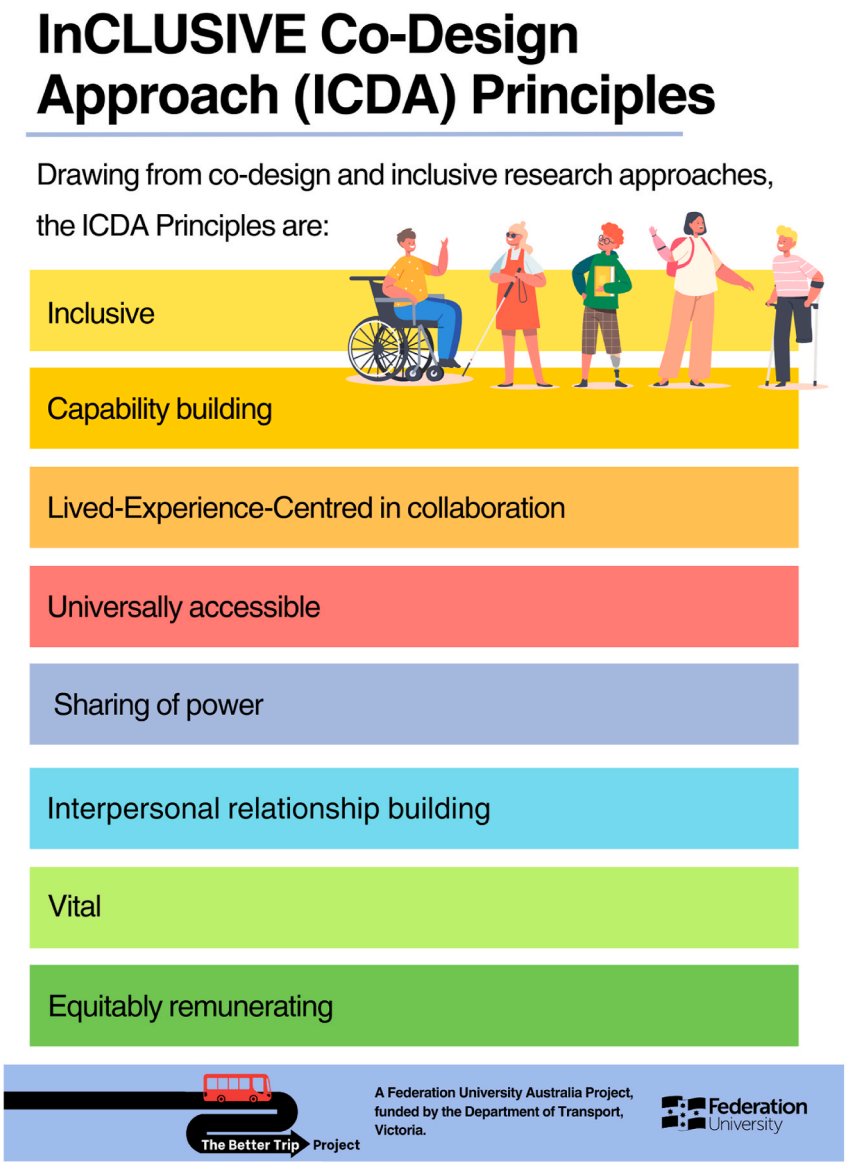

Fig. 2. InCLUSIVE Co-Design Approach (ICDA) Principles. *Image Description:* A poster style infographic. Titled in large black underlined text 'InCLUSIVE Co-Design Approach (ICDA) Principles'. Below in smaller text 'drawing from co-design and inclusive research approaches, the ICDA Principles are', then below are eight colourful text boxes, with one word in each text box 'Inclusive, Capability building, Lived-experience-centred in collaboration, Universally accessible, Sharing of power, Interpersonal relationship building, Vital, Equitably remunerating'. Below, at the base of the page, a blue strip with an icon of a bus on a winding road ending in a rightwards facing arrow reading 'The Better Trip Project', with black text to the right reading 'A Federation University Australia Project, Funded by the Department of Transport Victoria.', and the Federation University logo. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

collaboration (Sanders, 2000; Sanders and Stappers, 2016). The six-step approach, whilst containing several useful components, does not have clear directives for co-design facilitators to address power imbalances, which is essential when facilitating collaboration between researchers and non-researchers, particularly with marginalised groups. Therefore, while some strategies from Hyett and colleagues' and Sanders and Stappers' (2016) work were utilised, the researchers still required a leading co-design approach. McKercher's 'Beyond Sticky Notes' (2020) offers both a practically detailed application and is frequently cited in contemporary literature (Örnekoğlu-Selçuk et al., 2023; Thorburn et al., 2024); including transport (Kennedy et al., 2024) and has been applied in the Australian context (Benz et al., 2024). McKercher's understanding of co-design is built on co-designers sharing power, prioritising relationships, using participatory means, and building capability (McKercher, 2020) (Fig. 1). This co-design approach asserts that designers work together as equals, which requires professionals to 'listen, learn and, in some cases, get out of the way', acknowledging and addressing their power (McKercher, 2020, p.11). McKercher's approach prioritises connection between participants, and rather than being focused on traditional outputs such as reports, it encourages the shared creation of materials that reflect all co-designers' input. Finally, through coaching by facilitators, co-designers are encouraged to build their capability and become experts in their own right. A limitation of McKercher's approach is that it was not specifically designed for engaging co-designers with disabilities, so it does not have clear recommendations for accessibility. Therefore, an approach that had a greater emphasis on the design stage was required.

1.4.3. Disability-inclusive collaborative approaches

Inclusive Research centers the rights of people with disabilities, engaging people with disabilities as collaborators (O'Brien et al., 2022), and ultimately enabling people with disabilities to contribute to research that benefits them (Bigby et al., 2014). Inclusive Research has been defined within a context of enabling people with an intellectual disability, as by Walmsley and Johnson (2003), stating people with an intellectual disability should experience owning research questions, choice and control across the research process and outputs, accessibility, and that the outputs are beneficial to the community of people with disabilities (2003). Whilst having useful theoretical recommendations, Inclusive Research does not offer researchers enough guidance on how to implement this approach to achieve a practical outcome such as the development of a training package. Therefore, an Inclusive Research approach can be supplemented by McKercher's practically oriented 'Beyond Sticky Notes' approach (2020), and the wider referenced co-design literature, to create a robust disability-inclusive co-design approach.

1.4.4. Approaches to communicating co-design outcomes

Co-design approaches were also reviewed for the communication of their study outcomes, as many co-design studies do not present the co-design process and outcomes in a replicable manner (Palmer et al., 2018). Hyett and colleagues however tabled their co-design process aims and outcomes (2020), providing readers clarity around their approach, a practice that was applied in this study. This is particularly important given criticisms of co-designers' lack of transparency and rigour in the evaluation of process outcomes (Voorberg et al., 2015), and therefore Hyett and colleagues' approach (2022) informs this study's communication of processes.

1.5. Introducing an approach to designing a training program for bus drivers

Drawing from co-design and disability-inclusive collaborative approaches, in particular McKercher's (2020) ideologies of co-design, the researchers developed key principles of disability-inclusive co-design, summarised using the acronym InCLUSIVE Co-Design Approach (ICDA): **In**clusive; **C**apability building; **L**ived-Experience-Centred in collaboration; **U**niversally accessible; **S**haring of power; **I**nterpersonal relationship building; **V**ital; and **E**quitably renumerating (Fig. 2). A summary of the literature supporting the use of these principles is presented in Table 1. Co-creation approaches, such as ICDA, can help facilitate practical solutions to transport accessibility problems, which in turn enable improved community health and well-being (Bell et al., 2021). One such transport accessibility problem identified in the literature is bus drivers' existing engagement with passengers with disabilities. An intervention suggested by bus drivers, passengers, and the wider literature is an educational training program, that addresses the knowledge gaps of bus drivers, and the expectations of passengers with disabilities (Boadi-Kusi et al., 2023; Das Neves and Unsworth, 2024; Fast and Wild, 2019; Tillmann et al., 2013). Therefore, the aim of this research was to develop a bus driver training program targeting bus driver's engagement with passengers with disabilities, that reflects both the needs of passengers with disabilities and bus drivers, through the application of ICDA principles.

2. Methodology

Within a pragmatist epistemology, this study sought to apply ICDA principles to design a bus driver training program that targeted bus drivers' engagement with passengers with disabilities. Ethical approval for the study was obtained from Federation University Human Research Ethics Committee, Approval number 2022-156.

2.1. Participants

The research team that developed the bus driver training program were a convenience sample and included the primary researcher (called the Research Guide) and a senior researcher (the Research Mentor), two bus drivers (the Bus Driver Guide and the Bus Driver Mentor), a co-design expert (the Co-Design Guide) and two transport accessibility advocates (the Lived Experience Guide and the Lived Experience Mentor). The Research Guide, Co-Design Guide, and Lived Experience Guides and Lived Experience Mentor all have lived

Table 1
Inclusive Co-Design approach (ICDA) principles and their application to the training design study process.

Principle	Brief principle explanation	References informing the principle	Application in the Training Design Study
Inclusive	InCLUSIVE Co-Design is cross-disability inclusive, including all disabilities and mental and chronic health conditions, but should also reflect intersectional experiences, including co-designers diverse in age, gender, race, LGBTQIA + identity, and any other factors that impact their experience, as disability is as diverse as people are.	'Cross-disability' (Berne et al., 2018), disability-inclusive co-design (JFA Purple Orange, 2021) and considering intersectional factors (Berne et al., 2018; JFA Purple Orange, 2021; Jiang et al., 2022; King et al., 2022).	• An open question on identity factors was used in the intake survey so that recruiters could ensure the team was diverse and identify what factors needed to be considered throughout the process. • The intake survey included questions on what language designers preferred for discussing disability, which was used for the process and outputs. • The recruited team sought to reflect a cross-section of Australian society including women and men from diverse cultural backgrounds; younger and older persons with lived experience of disability; the LGBTQIA + community; and the Aboriginal Australian community. • Cross-disability inclusion was sought, engaging co-designers with mental and chronic health conditions; and lived experience of Autism; ADHD; hard of hearing and Deafness; being short-statured; and mobility equipment use and communication barriers. • Inclusive practices identified by different groups were engaged for all meetings (for example the use of pronouns, Acknowledgement of Country, etc.).
Capability building	Facilitators should support co-designers in setting and achieving goals and building skills relevant to them over the co-design process.	McKercher's co-design (2020).	• Designers were drawn from previous *Better Trip Project* studies so as to provide them with the opportunity to build experience and impact. • Designers were asked personal goals/skills they wished to develop over the project so that their hours could be prioritised for tasks with those skills. • The Co-Design Survey included questions on whether such goals were fulfilled.
Lived-Experience-Centred in collaboration	At the heart of InCLUSIVE Co-design is respecting that people with lived experience are experts in their own lives, with input that is valuable; their perspectives should drive the collaboration process and outcomes.	Raman & French's co-design (2021) and Lived-Experience-Led Research (VMIAC, 2023).	• People with lived experience of disability were directly employed as co-designers. • A co-design facilitator with lived experience of disability (the Co-Design Guide) was engaged before other co-designers were recruited to help design the process (including enrolment) to ensure the study was safe and inclusive • The Co-Design Guide was engaged to facilitate meetings. • The Training Recommendations Summary Document was created to ensure the developed training program reflected the reported needs of people with disabilities and bus drivers from previous studies. • Minutes were taken of recommendations made by co-designers and listed to be actioned in order to ensure the final product had definitive, traceable, and extensive input from all co-designers. • Collaboration was facilitated by the use of a virtual whiteboard, and open, informally run brainstorming meetings. • All admin (notes from meetings, emails, scheduling meetings, etc.) was completed by the Research Guide to ensure the hours available to the co-designers were spent directly developing the project, maximising their input.

(*continued on next page*)

Table 1 (*continued*)

Principle	Brief principle explanation	References informing the principle	Application in the Training Design Study
Universally accessible	Enable genuine and accessible participation for people at all process stages, from recruitment, to design, to evaluating, creating and publishing outcomes.	Inclusive Research (Walmsley and Johnson, 2003) and disability-inclusive co-design (JFA Purple Orange, 2021).	• The intake survey included questions on what access needs and preferences were, which were then met. • Access needs were part of an ongoing conversation and adjusted as needed. Flexibility and responsiveness were required when different platforms were preferred by different co-designers. • The introductory booklet provided materials on having a 'safe spoon space', where designers could participate in the project to whatever extent that they felt comfortable but were encouraged not to over-extend themselves. • The introductory booklet also provided contact details for different individuals should a designer have a concern during the design process. For example, should a co-designer not be comfortable speaking to the Research Guide about an issue, the details of the Research Mentor were provided, and numbers for mental health supports were also provided in the event of personal issues arising from the study. • All outputs were provided in accessible formats with summaries.
Sharing of power	Power balance concerns are identified at three co-design levels, between co-designers, between co-designers and facilitators, and between facilitators and external stakeholders, and are managed through active measures.	Raman & French's co-design (2021); Jiang et al. (2022) and McKercher's Co-design (2020).	• Privilege and power were acknowledged in the first meeting and discussed as to how to manage (for example, the Research Guide explained the need for the Co-Design Guide was to ensure the process was suitably moderated by someone with lived experience who would not be influenced as significantly by the external pressures of the study). • A Co-Design Guide was engaged to help design the study and facilitate the meetings to share the power typically held by the primary researcher.
Interpersonal relationship building	The co-design process prioritises respect between co-designers and building authentic relationships throughout the process to foster genuine collaboration.	Massey et al. (2024) and McKercher's Co-design (2020).	• Collaborative work hours (working directly together in virtual meetings) comprised over a third of the hours completed by the co-designers to prioritise relationship building over siloed work. • Co-designers were encouraged to bring their whole selves to the design process, modelled by the sharing of personal experiences.
Vital	The co-design process and outcomes should reflect an identified need in a given community and be beneficial to and necessary for the communities the given project seeks to help.	Raman and French (2021); lived-experience-led research (VMIAC, 2023); and Inclusive Research (Walmsley and Johnson, 2003).	• The use of the Training Recommendations Summary Document to design and evaluate the training program ensured it reflected the wider disability and bus driver communities. • Designers with existing relationships with their communities were selected (for example, the Lived Experience Guide, Research Guide and Research Mentor are members of a consumer transport advocacy group led by people with disabilities, and the Bus Driver Guide is part of large bus driving and cultural community groups). • The Co-Design Survey included multiple questions on the proposed impact questions and whether the project would benefit the disability community.
Equitably renumerating	Co-designers should not be patronised or engaged as with survey or focus group participants, rather as peers working equally alongside researchers, and renumerated accordingly.	Lived-experience-led research (VMIAC, 2023).	• All designers were offered to be paid at the standard academic rate.

experience of disability, and/or mental or chronic health conditions. The Research Guide was responsible for initiating the study, ensuring the study reflected the wider transport accessibility literature, and meeting funding and human research ethics committee requirements. McKercher calls for researchers to identify when they are not the right person to facilitate a co-design process (2020). Therefore, the Research Guide identified that she was not the appropriate person to facilitate the co-design process as these factors would all further condense her power in that role, instead engaging a Co-Design Guide to facilitate the co-design process. Drawing from McKercher's concept of the importance of having a small tight circle of designers, supported by a larger circle of other stakeholders (2020), the Co-Design and Research Guides developed the ICDA Model, informing the recruitment of designers. The ICDA model also depicts the stakeholders and limiting and enabling factors influencing the study (Fig. 3), prompting co-designers to recognise the factors influencing their engagement in the study. The Guides (Bus Driver Guide, Lived-Experience Guide, Research Guide, and Co-Design Guide) made up the 'core' team of co-designers, with the additional bus driver, senior researcher and advocate supporting the Guides as 'Mentors' and connecting them to the communities they represented in the study. The Bus Driver Guide and Lived-Experience Guide were aware they could not represent all persons who were bus drivers or who had lived experience of disability respectively. The Bus Driver Guide and Mentor were connected with multiple bus driver communities, and the Lived Experience Guide

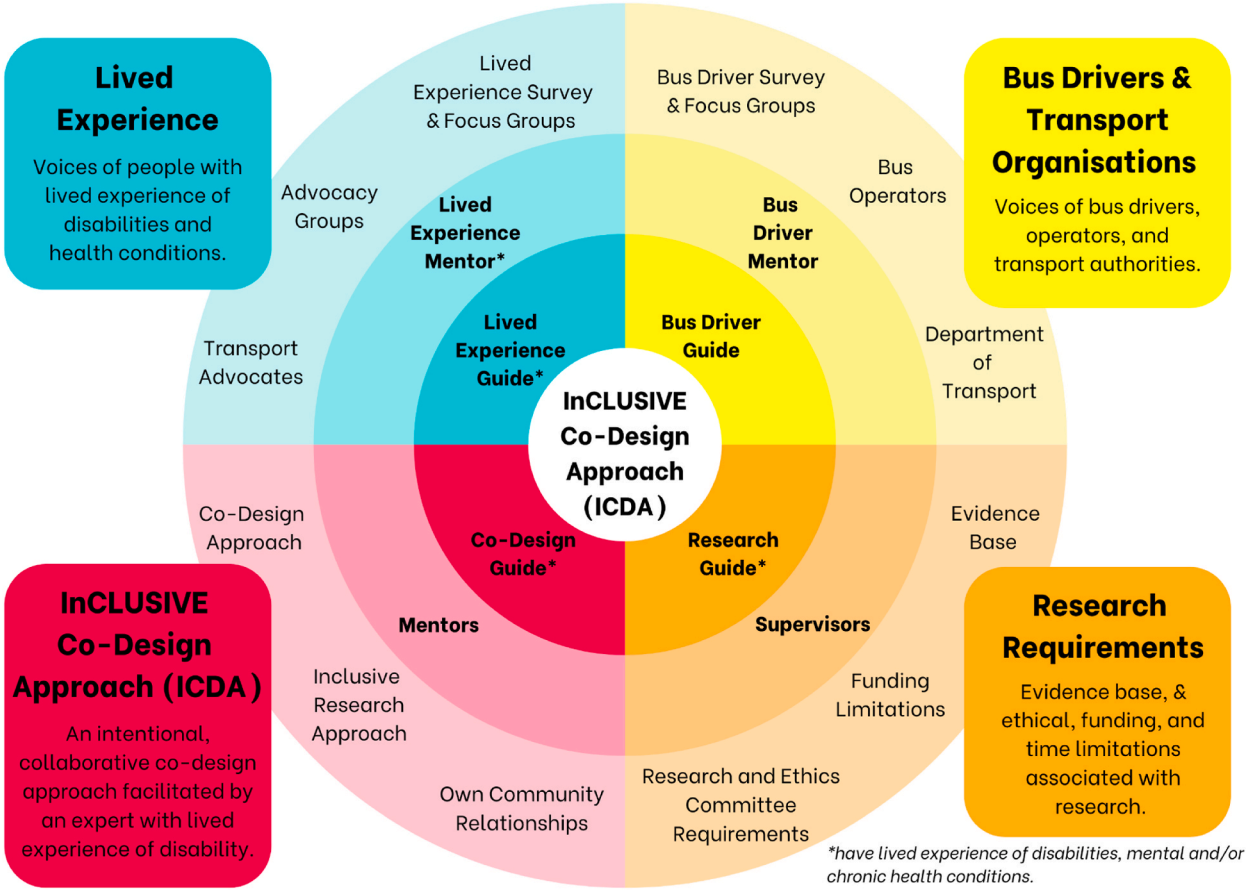

Fig. 3. The Training Design Study's ICDA Model. *Image description*: Four concentric circles, in white centre reads in black text (black bold text used throughout) 'InCLUSIVE Co-Design Approach (ICDA)'. The surrounding three circles are divided into coloured quarters described clockwise from the top right as, yellow quarter 'Bus Driver Guide', orange 'Research Guide', pink 'Co-Design Guide', the blue 'Lived Experience Guide'. Maintaining these colours in clock-wise, in yellow 'Bus Driver Mentor', and behind this circle a lighter yellow circle reading 'Bus Driver Survey & Focus Groups, Bus Operators, and Department of Transport', then a yellow rounded rectangle next to the circle reading 'Bus Drivers & Transport Organisations: Voices of bus drivers, operators and transport authorities'. Then in the orange bottom right, 'Supervisors', then in the lighter outer circle 'Evidence Base, Funding Limitations, Research and Ethics Committee Requirements' next to an orange rounded rectangle reading 'Research Requirements: Evidence base & ethical, funding, and time limitations associated with research.'. Then in the pink bottom left reading 'mentors' then in outer lighter circle 'Co-Design Approach, Inclusive Research Approach, Own Community Relationships' next to a pink rounded rectangle reading 'InCLUSIVE Co-Design Approach (ICDA): An intentional, collaborative co-design approach facilitated by an expert with lived experience of disability.' Then the top left quadrant in blue 'Lived Experience Mentor', then in the lighter outer circle 'Transport Advocates, Advocacy Groups, Lived Experience Survey & Focus Groups' by a rounded blue rectangle reading 'Lived Experience: Voices of people with lived experience of disabilities and health conditions.' Lived Experience Guide, Lived Experience Mentor, Mentors and Research Guide all have an asterisk, noted at the bottom of the image as '*have lived experience of disabilities, mental and/or chronic health conditions.' (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

and Mentor to many accessibility and disability advocacy groups, including intersectional disability communities. Therefore, the Guides and Mentors drew upon not only their experiences but the knowledge of their wider communities throughout the study. All co-designers are passionate about improving transport access and equity while respecting the disparate views of people with disabilities, transport service providers and drivers. Rather than each co-designer trying to hold all views on improving bus drivers' engagement with passengers with disabilities, the co-design roles were designed so that each co-designer could position themselves from the perspective of their specific role, maintaining this position throughout the study. This ensured each perspective was represented, and biases identified rather than ignored. The roles of each co-designer are detailed further in Table 2.

2.2. Recruitment

All Guides and Mentors were known to the Research Guide from previous research projects and were invited to participate via email. The Co-Design Guide had been previously engaged as a consultant for the project. Inviting people engaged in previous research projects to join this one reflects the co-design principle of 'building capability' (McKercher, 2020) where people continue to develop new research skills or apply learned skills in new ways.

2.3. Instruments

2.3.1. Checklist to evaluate the training program

To evaluate the training program, a checklist was devised. Previous research (Das Neves, Unsworth & Browning, 2023; Das Neves, Browning, & Unsworth, in review) ascertained recommendations from 131 passengers with disabilities and their support workers, and 73 bus driver participants, concerning a bus driver training program to improve engagement with passengers with disabilities. These recommendations are summarised in Table 3 (the Training Recommendations Summary Document) and were used as a checklist to determine if the newly developed training program addressed all areas, therefore accurately reflecting the needs of both bus drivers and passengers with disabilities.

2.3.2. Survey and checklists to evaluate the co-design process

The co-design process was evaluated using three approaches, a Co-Design Survey, the VMIAC Lived Experience Led Research Design Checklists (2023), and a collaborative evaluation. The Co-Design Survey was a midway and final evaluation developed to evaluate the design process against the ICDA principles, using a five-point Likert scale (strongly agree to strongly disagree), with closed questions including examples such as 'I feel culturally and emotionally safe throughout the co-design process; I can access all materials produced by the process; I can see that my contributions matter and are being included; the needs of the groups I represent are being met'. Open questions were added to enable recommendations on how the project could be improved, as well as inter-team feedback.

To evaluate how well the study included lived-experience input, two checklists were used. The Lived Experience and Bus Driver Guides completed The Victorian Mental Illness Awareness Council (VMIAC)'s Research Participation Checklist, which is from a 'participant' designer perspective, and the Research Guide and Mentor completed VMIAC's Lived Experience Principles Checklist (VMIAC, 2023). These checklists capture key areas important to disability-inclusive research, including acknowledgement and respect for lived experience; diversity and inclusion; fair payment; information ethics and safety; and research impact and importance. Whilst developed for people with mental health conditions, the checklists are also applicable for disability and chronic illness, as they address the same concerns of disability-inclusive co-design approaches reflected in ICDA. The checklists were re-written onto a virtual survey platform to increase accessibility for participants, and the item 'The project addresses intersectional experiences related to mental health challenges' was changed to ' … related to disability and chronic illness …' to better reflect the needs of the project. The relationship between both the Co-Design Survey and checklist questions and the ICDA principles are represented in Table 4.

2.3.3. Collaborative evaluation and visual scribing

As the formal evaluation measures were led by the Research Guide and completed in a small team which may make giving negative

Table 2
Training design study roles.

Title	Role
Co-Design Guide	Guiding study design and facilitating the design process including leading group sessions, and ensuring all parties were heard and included throughout.
Co-Design Mentors	Supporting the Co-Design Guide and reviewing their processes against the ICDA Principles.
Lived Experience Guide	Representing the needs of the disability community through personal and professional connections with the community, referencing passenger reports from previous studies and own lived experience.
Lived Experience Mentor	Supporting the Lived Experience Guide and reviewing the study's processes and outcomes against their community's needs.
Bus Driver Guide	Representing the needs of the bus driver community through personal and professional connections with the community, referencing bus driver reports from previous studies and own lived experience.
Bus Driver Mentor	Supporting the Bus Driver Guide and reviewing their processes and outcomes against their community's needs.
Research Guide	Applying an evidence-based approach to design, documenting the process and measuring outcomes, facilitating outputs, and ensuring the study process is ethically conducted.
Research Mentor	Providing supervisory oversight to the Research Guide, reviewing all processes and outcomes.

Table 3
Training recommendations summary document.

Theme	Training recommendations	Recommended by			Included in the training scope
		Passengers	Drivers	Literature	
1. Understanding disability	**1.1 Defining disability**:				
	1.1.1 Historical understandings of disability (medical, tragedy and charity models) and why they are problematic			X	✓ 1.1.1
	1.1.2 Social and identity-based definitions of disability			X	✓ 1.1.2
	1.1.3 Preferred terms to use (and not use) regarding disability		X		✓ 1.1.3
	1.2 Disability has no 'look'				
	1.2.1 Disability diversity		X		✓ 1.2.1
	1.2.2 The importance of providing support for all passengers who need it	X			✓ 1.2.2
	1.2.3 Intersectionality: understanding disability as intersectional	X			✓ 1.2.3
	1.3 All disabilities are valid:				
	1.3.1 Some disabilities are invisible and fluctuate	X			✓ 1.3.1
	1.3.2 People communicate in different ways (e.g. AAC devices, Auslan, etc.)	X	X		✓ 1.3.2
	1.3.3. People mobilise in different ways, and may still require support (someone without visible aid may still need the bus lowered, etc.)	X			✓ 1.3.3
	1.3.4 Support diversity (Assistance Animals and mobility equipment)	X			✓ 1.3.4
	1.3.5 Many wheelchair users independently propel themselves and so may not need your help	X			✓ 1.3.5
	1.3.6 Sunflower lanyard – explain use	X	X		✓ 1.3.6

Theme	Training Recommendations	Recommended by			Included in the training scope
		Passengers	Drivers	Literature	
2. Rights of passengers with disabilities	**2. Rights of passengers with disabilities**				
	2.1 Do not have to 'look' like you have a disability/ies (as that is not how disability works) or prove disability to access priority seating	X			✓ 2.1
	2.2 Do not have to carry disability pass as 'proof'	X			✓ 2.2
	2.3 Have a right to the equipment they need for bus access (i.e. ramp not just for wheelchair users)	X			✓ 2.3
	2.4 To have space made for them on the bus (including vacating priority seating if necessary)	X			✓ 2.4
	2.5 To be given the time it takes to board / communicate / sit or position themselves / disembark	X			✓ 2.5
	2.6 To have the bus stop for them	X			✓ 2.6
	2.7 To have their 'no' respected if they do not want assistance	X			✓ 2.7
	2.8 To not have to answer intrusive questions	X			✓ 2.8
	2.9 To be treated with the same respect and dignity as everyone else	X			✓ 2.9
	2.10 Understanding transport inaccessibility and the impact on transport anxiety	X			✓ 2.10
	2.11 These rules apply regardless of a person's race, gender, sexual orientation, religion, etc.	X			✓ 2.11
	2.12 Everyone has a right to access the bus	X			✓ 2.12

Theme	Training Recommendations	Recommended by			Included in the training scope
		Passengers	Drivers	Literature	
3. Impact of bus driver behaviour	**3.1 Why buses matter**				
	3.1.1 Limitations with private transport options (practical and financial) for some person with disabilities	X			✓ 3.1.1
	3.2 Understanding the impact of negative bus driver encounters on passengers with disabilities (including falls; transport anxiety; exclusion from community access; social isolation).				
	3.2.1 Being driven past	X			✓ 3.2.1
	3.2.2 Not waiting for passenger to board / sit / disembark	X			✓ 3.2.2
	3.2.3 Driving unsafely	X			✓ 3.2.3
	3.2.4 Denying equipment use	X			✓ 3.2.4
	3.2.5 Talking to the support worker not the person / ignoring passenger	X			✓ 3.2.5
	3.2.6 Questioning disability	X			✓ 3.2.6
	3.2.7 Not ascertaining consent / ignoring decline	X			✓ 3.2.7
	3.2.8 Denying support animal use	X			✓ 3.2.8

Theme	Training Recommendations	Recommended by			Included in the training scope
4. Practical skills	**4. Practical skills**				
	4.1 Initiating asking a passenger for assistance	X	X		✓ 4.1
	4.2 Ascertaining consent	X			✓ 4.2
	4.3 Communication strategies to support diverse communication methods	X	X		✓ 4.3
	4.4. How to safely provide physical assistance if asked**		X		☐ 4.4
	4.5 How to communicate safety requirements respectfully		X		✓ 4.5
	4.6 Strategies to de-escalate passenger encounters		X		✓ 4.6
	4.7 Advocating for passengers to other passengers (e.g. priority seating, when being abused by other passengers).	X	X		✓ 4.7
	4.8 Responding to significant incidences (falls etc.)		X		✓ 4.8
5. Role and responsibilities	5.1 The impact of a positive attitude on passengers' experience	X	X		✓ 5.1
	5.2 Policies around providing physical assistance including WH&S limitations, and how to communicate those limitations**		X		☐ 5.2
	5.3 Responsibilities when a passenger is unable to access the bus (e.g. due to mobility device not fitting on) **	X	X		☐ 5.3
	5.4 Responsibilities when there is a replacement bus service or other service**	X			☐ 5.4
	5.5 Responsibilities during emergencies (such as a fall)**	X	X		☐ 5.5
	5.6 Role of mentor bus drivers**		X		☐ 5.6

Theme	Training Recommendations	Recommended by			Included in the training scope
		Passengers	Driver	Literature	
6. Self-care	**6. Self Care**				
	6.1 Understanding and self-assessing burnout risk**			X	□ 6.1.1
	6.2 Strategies to manage stress, including advocating for suitable workplace supports**			X	□ 6.1.2
	6.3 Managing stress during and after emergency situations**			X	□ 6.1.3
7.Mode of training delivery	**7. Mode of training delivery**				
	7.1 Use of real footage to provide examples of negative and positive behaviour		X		□ 7.1
	7.2 Having half training theory, half training practical		X		□ 7.2
	7.3 Having people with disabilities develop and lead training	X	X		✓ 7.3
	7.4 Use of mentor drivers to support novice drivers		X		✓ 7.4
	7.5 Have a translator or someone from same cultural group as drivers		X		✓ 7.5
	7.6 Verbally lead training (for drivers with English as a second language)		X		✓ 7.6
8. Training evaluation	**8. Training Evaluation**				
	8.1 Bus drivers to complete a self-evaluation pre- and post-training			X	✓ 8.1
	8.2 Questions to be provided in both written and verbal form, given language and cultural differences of drivers			X	✓ 8.2
	8.3 Evaluation of skills should be part of the general annual review*			X	□ 8.3
	8.4 Regular refresher training, including following a significant incident*		X		□ 8.4

*recommendation to be provided to operators, however beyond scope of training program to enforce.

**recommendation is beyond the scope of a training program for bus drivers; to be included in future operator modules

Table 4
Link between the InCLUSIVE Co-Design Approach (ICDA) principles and the Co-Design Survey and VMIAC's Research Participation Checklist Questions.

InCLUSIVE Co-Design Principles	Related *Co-Design Survey* Questions	VMIAC *Research Participation Checklist* Questions
Inclusive	I feel culturally and emotionally safe throughout the co-design process.	The diversity of lived experience is acknowledged. The project addresses intersectional experiences related to disability and chronic illness. Participant recruitment is inclusive or targeted at a priority group.
Capability building	My personal goals for the co-design process are being met.	
Lived-Experience-Centred in collaboration	I can see that my contributions matter and are being included.	The research team includes lived experience researchers. The expertise of people with lived experience is acknowledged and valued.
Universally accessible	I can access all meetings. I can access all materials produced by the process.	Participants will be informed about research findings, and it is easy to be kept informed. The researchers have a plan to share their findings.
Sharing of power		People with lived experience have been involved in developing and conducting the research. The research is led by lived-experience researchers and/or research partners. People with lived experience have been involved in the project, other than as participants.
Interpersonal relationship building	I trust all of my fellow co-designers. I can express what I think and feel freely in the group.	The research has been approval by a Human Research Ethics Committee, or equivalent. The research design and procedure are trauma informed. Adequate support is provided for participants during and after participation, if needed.
Vital	Our group goals for the co-design process are being met. The needs of the groups I represent are being met.	The research topic is important to me. The research question has been identified as important by people with lived experience. The research will answer important questions. The research is likely to have impact (e.g., published, used by governments, services, advocates.
Equitably renumerating		Participants with lived experience are paid fairly. Participant payment covers travel, meals, and preparation time. Unpaid participation (e.g., volunteer, a prize draw) is reasonable for the project, not standard practice. Participants can choose how they will be reimbursed for their time.

feedback difficult, an informal discursive evaluation was also completed, with the Research, Lived Experience and Bus Driver Guides discussing their reflections on the co-design process together in a final meeting. Visual scribing of this final meeting was undertaken. Visual scribing is the summarising of information into drawn images and simple text to create a graphic typically by a designer trained in the process, used in co-design to help illustrate discussions accessibly (Ink Factory, 2019; Ryan et al., 2024). A visual scribe reviewed a recording of the final evaluative meeting of the Guides to generate a graphic representation of the Training Design Study evaluation process, which also provides an accessible output from the study depicting the co-design process.

2.3.4. Validation of instruments

Formal validations of the survey, checklists and discursive evaluations used in this study were not undertaken. However, to increase the face and content validity of the Co-Design Survey, the Lived Experience and Bus Driver Guides reviewed the draft and provided feedback to ensure the questions were relevant to their understanding of the process, reflective of the needs of their communities, and captured all concerns they had. The Research Participation Checklist, and the Lived Experience Principles Checklist have been previously developed by VMIAC, who note that these tools were developed by people with lived experience of mental health conditions living in the same state in which this study was set.

2.4. Procedure

2.4.1. Enrolment

Two process tools were used to enrol Guides and Mentors. Firstly, an online intake form was developed (using a survey platform identified by a colleague with lived experience as being the most accessible for screen readers). The intake form included questions on access preferences, including what platform co-designers prefer for online meetings, as well as safety and inclusion questions (such as preferred pronouns). All participants were provided with a Participant Language Information Sheet about the research as required by the Ethics Committee. However, a 'Co-Design Group Information Booklet' was also prepared and provided to participants to support

understanding of the research in the event of participants who had English as a second language or who had processing or comprehension-impacting disabilities.

2.4.2. Remuneration

The research was provided with a small funding grant from the Department of Transport (Victoria, Australia). Given the importance of paying co-designers as equals (VMIAC, 2023), the Bus Driver Guide and Lived Experience Guide were employed as casuals by the university and paid at the standard academic rate. Twenty-five hours for each of the Guides was recommended to ensure they had enough time to be involved at all stages of the project (for example enrolment paperwork, planning, development, reviewing, pitching, evaluating, write-up). The remaining budget for the project allowed Mentors 3 h of paid work each.

2.4.3. Training program design

The four Guides and three Mentors designed the bus driver training program. The Guides met virtually across ten meetings over a year with independent work (emails, writing, editing, etc.) being completed in between meetings. An introductory meeting focused on facilitating informed consent and relationship building, to ensure the team and the wider project were a good fit for each co-designer. The Co-Design Guide provided a brief education on McKercher's co-design mindsets (2020), and the team identified what good co-design meant for them and how it would be applied in the study. Drawing from the Double Diamond Design Approach (The Design Council, 2024) the design process moved between divergent and convergent stages. The training design process started with a divergent design approach, reviewing existing recommendations for the training program and exploring and extending them through the use of brainstorming. A virtual whiteboard was used as a generative tool (consistent with Sanders & Stappers' approach (2016)) to enable co-designers to create a 'dream' training program for bus drivers and was also used to store important documents (working drafts, meeting minutes, etc.) (Fig. 4). This ensured all co-designers could access everything in one place. Storytelling (Hyett et al., 2020) was also used, with the Bus Driver Guide sharing some of their challenging experiences helping the other co-designers to hold space for bus drivers and their needs in the face of challenging behaviours described by passengers. After these brainstorm meetings, the design gradually shifted to a convergent approach as the training program was fine-tuned and eventually finalised, with support from Mentors, to ensure the program reflected the needs of both bus drivers and passengers with disabilities. This included exploring a hypothetical bus driver's path through the training program to identify issues, consistent with customer-journey work described in some collaborative design approaches (Lee et al., 2018). Challenges experienced during the design process are discussed in the Results. The application of the ICDA principles throughout the design process is included in Table 1. Evaluations of the process were completed at midway and final meetings as presented in the Results and all Guides co-authored this manuscript, summing to approximately 30 h of work for each Guide across the whole project.

2.5. Data analysis

The data analysed in this study included a review of the Better Trip Training Program against the Training Recommendations Summary Document, a review of closed question responses in the Co-Design Survey and VMIAC Checklists, reflexive thematic analysis of the open question responses from the Co-Design Survey and review and member checking of the visual scribing from the evaluation meeting. An InCLUSIVE Co-Design Approach (ICDA) was applied across these data analysis processes. Throughout the data analysis process, each Guide was aware of their reflexivity and addressed each analysis from their specific role, rather than attempting false

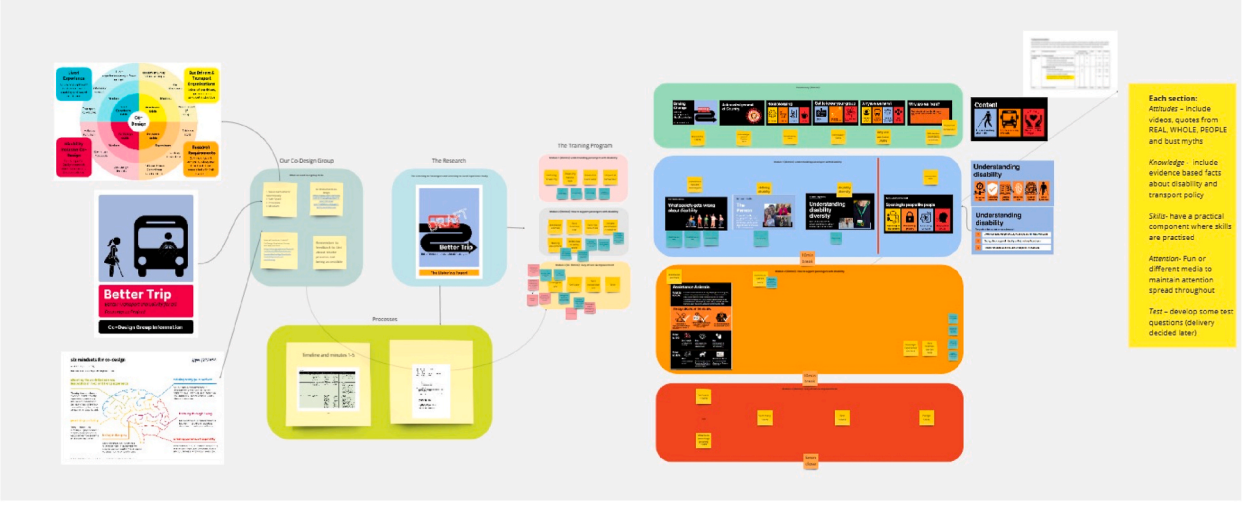

Fig. 4. A screenshot of the virtual whiteboard used for collaborative brainstorming during the Designing of the Better Trip Training Program Study. Note: The image is low-resolution to protect the confidential information on the whiteboard. *Image description*: A screenshot of a virtual whiteboard with colourful diagrams and sticky notes throughout. Text is too small to be read.

neutrality.

In keeping with ICDA principles, the Bus Driver, Lived Experience and Research Guides reviewed the Training Recommendations Summary Document against the developed script and slides and marked the elements that were successfully included in the program, a Lived-Experience-Centred collaborative process, Sharing Power usually held by researchers. This was to ensure the training program reflected the knowledge gaps of bus drivers (represented by the perspective of the Bus Driver Guide), the needs of people with lived experience of disability (the Lived Experience Guide), and accurately reflected the reported literature (the Research Guide). As described, each Guide completed their analysis from an intentional position, resulting in three different lenses being applied to the analysis, and a collaborative outcome.

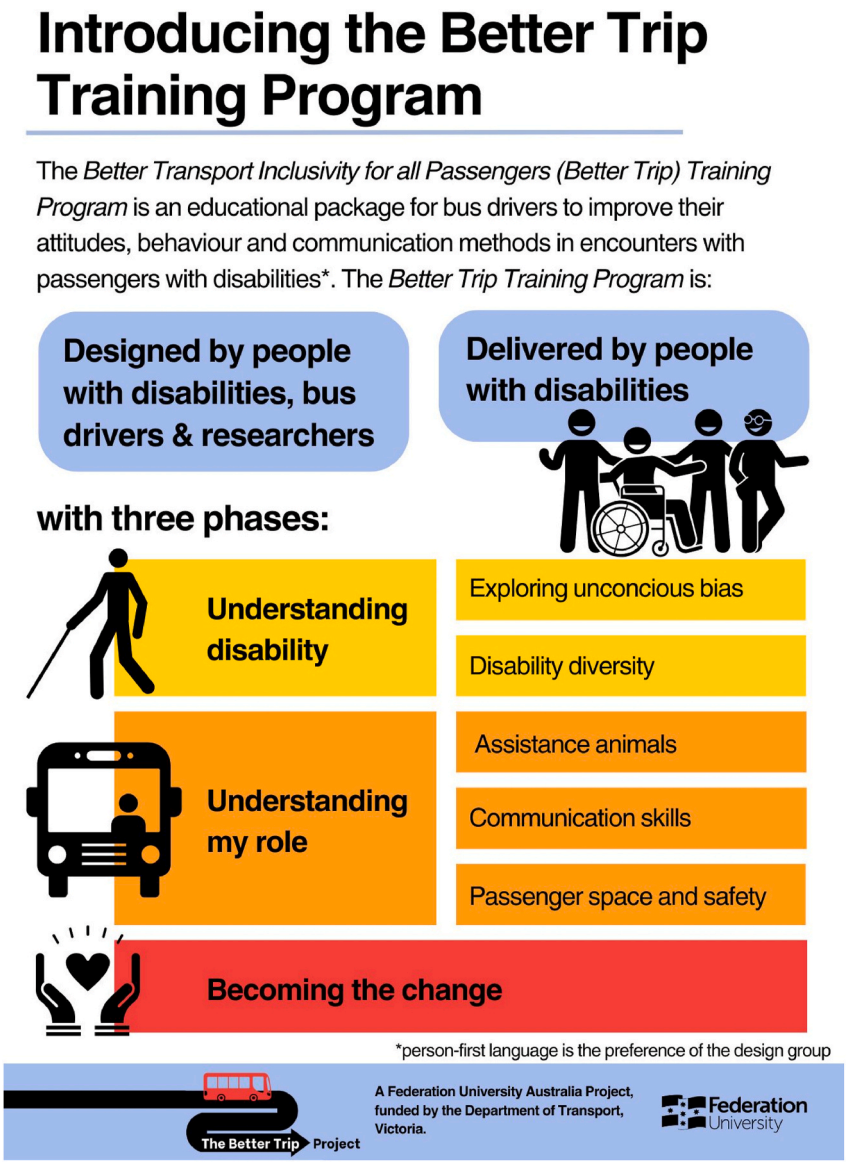

Fig. 5. Summary of the Better Trip Training Program. *Image description*: A poster titled 'Better Trip Training Program Summary' underlined in blue, then in smaller text The Better Transport Inclusivity for all Passengers (Better Trip) Training Program is an educational package for bus drivers to improve their attitudes, behaviour and communication methods in encounters with passengers with disabilities* (*person-first language is the preference of the design group) then back to the body text 'The Better Trip Training Program' is (in bubbles) designed by people with disabilities, bus drivers and researchers, and delivered by people with disabilities, with three phases. Icon of four people, one in a wheelchair. Three phases in speech bubbles, first 'understanding disability' by an icon of a person with a cane, 'exploring unconscious bias and disability diversity'. Then the next phase (orange) with an icon of a bus understanding my role: assistance animals, communication skills, passenger space and safety, and finally 'becoming the change' next to an icon of hands holding a heart. Bottom of the poster has a blue strip with the Federation University logo (flag) and 'A Federation University Australia Project funded by the Department of Transport Victoria'. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

The application of ICDA principles to the analysis of the Survey and Checklists was more challenging. All results from the Co-Design Survey, Research Participation Checklist, and the Lived Experience Principles Checklist were shared between all Guides and Mentors to ensure that the data analysis reflected everyone's views and interpretations, in keeping with Inclusive, Universally Accessible and Sharing Power principles. However, given the limited budget, and the Research Guide wishing to fulfil the ICDA principle of ensuring all co-designers are Equitably Remunerated, the Bus Driver and Lived Experience Guides were not able to participate in all aspects of the analysis of open-question responses from the Co-Design Survey. Therefore, the open-question responses from the Co-Design Survey were initially analysed manually by the Research Guide using Braun and Clarke's Reflexive Thematic Analysis (2022) which consists of six steps: familiarisation; coding; generation of initial themes; developing and reviewing themes; refining, defining and naming themes; and writing up. The preliminary findings from the first five steps were shared with the Bus Driver and Lived Experience Guides. The use of Braun and Clarke's approach to thematic analysis was chosen as it requires researchers to consider their positionality and

Fig. 6. Exemplar poster from the Better Trip Training Program. *Image Description*: Poster reads 'invisible disability', one person icon on the left side of a line, and 9 on the other. Under the one reads 'for every 1 visible disability you can see', and under the 9 'there are 9 invisible disabilities you cannot see'. Then four text boxes (yellow, red, blue, green) reading you will not always 'see' disability - believe passengers who tell you that they need assistance or priority seating; if someone asks you to use the ramp or kneeling functions please provide it to them - bus functions are for everyone; greet the passenger as you would any other, without asking or commenting about their disability, some (not all) passengers may carry a sunflower lanyard or pin to show they may need assistance next to four icons (green shield with a tick, a bus, a hand waving and a yellow sunflower). Blue bottom of the poster has a Federation University logo (flag) and 'A Federation University Australia Project funded by the Department of Transport Victoria'. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

bias when reviewing data and prompts researchers to be conscious of their perspective and the shadow it casts over their analysis, rather than just describing the six steps (Braun and Clarke, 2022). This positionality was particularly relevant since three of the Guides completed the survey and were then the ones responsible for analysing (the Research Guide) and reviewing the write-up (the Bus Driver and Lived Experience Guides) of their own feedback, making it more challenging for them to hold their personal views aside while considering other views. An example of how the Guides managed their reflexivity was in recognising that they had a certain position due to their role in this project (and lived experience), and therefore presented their comments in the Results together with their named role. The Research Guide, having more power and control over the analysis process, applied multiple methods to manage their reflexivity including triangulating the findings from the survey and checklist with the more equally analysed visually scribed graphic, and engaging the Research Mentor to review the six-step data analysis process and findings (in addition to overall review from all Guides) to provide an external perspective.

Finally, the visual scribing of the last evaluative meeting provided an opportunity for all parties to take part in the analysis of study findings, irrespective of their research analysis experience, given that it was a plain language, visually supported medium. In keeping with ICDA principles, the Lived-Experience-Centred collaborative analysis of the visually scribed graphic Shared Power which is normally held by researchers, ensuring all co-designers could contribute equally to the process. The visual scribe shared their initial graphic with the Research Guide, which was then shared with all Guides, who each gave three rounds of feedback, each Guide identifying ways in which the graphic did and did not reflect their analysis of the process, producing a final result which was agreed upon by all Guides.

3. Results

3.1. The better trip training program

The bus driver training program was developed by the co-designers and named The Better Transport Inclusivity for all Passengers (Better Trip) Training Program. The training program includes presenter scripts and slides, posters for bus depots and evaluations for bus driver participants and trainers. A summary of the training program and one poster example are presented as Figs. 5 and 6 respectively. The recommendations for the bus driver training program (for example the inclusion of appropriate terminology regarding disability) that were (and were not) included in the previous research are reflected in the Training Recommendations Summary Document (see Table 3). The training program that was developed includes a 3-h in-person educational program and a 90-min virtual version. The in-person version can be delivered to groups of between two and thirty drivers, and the virtual program up to fifty, delivered by an educator with disability. The Better Trip Training Program introduces the importance of public transport, especially bus drivers, for people with disabilities; it then discusses unconscious bias, asserting that well-intentioned people can believe, say or do things that harm people with disabilities unintentionally; a brief definition of the social model of disability is followed by an introduction to cross-disability diversity and the likely needs of a range of passengers. A round robin of three key subjects, supporting passengers with assistance animals, communicating with passengers, and assisting passengers safely is then delivered, followed by a summary and final evaluation of the training. Throughout the training program, role-play and creative activities are undertaken in small share groups, short prompts of what behaviour to engage in and avoid, and multimedia such as videos are used to help communicate the materials. The training program was shared with the Department of Transport (Victoria, Australia) following completion.

3.2. The Co-design survey and lived-experience-led checklists

All three Guides answered that they 'strongly agreed' with all Co-Design Survey questions both in the midway and the final evaluation (Supplementary File 2). These included questions regarding the inclusivity, supportiveness, accessibility and importance of the study. Following the thematic analysis there were three key barriers to an accessible process identified in the open evaluation feedback. Firstly, the Research Guide reported the challenge of the Co-Design Guide leaving the project early due to ill health, which necessitated the Research Guide to take over the facilitation of meetings, and secondly the limited hours and budget available for the collaboration. Finally, both the Research and Lived Experience Guides mentioned the inaccessibility of the university payment system which consumed a large number of designer hours to complete and caused delays to the commencement of the project. Analysis of the open question responses from the Co-Design Survey revealed four main themes: a practical, solutions-focused approach; flexible, prompt and organised communication; joyfulness of the co-design process; and learning from alternative perspectives in a constructive way without blame. Examples of the last two themes include:

> *It has significantly enhanced my communication skills and deepened knowledge, particularly regarding training ideas and supporting individuals with disabilities'*. (Bus Driver Guide)

> '*Interacting with (the Bus Driver Guide) has enabled me to understand the drivers' side of challenges … She also explained all this without creating a blame game which is very helpful in seeing the issue objectively and thus has helped in designing the training'* (Lived Experience Guide)

All the guides used terms such as 'joy', 'enjoyable' and 'pleasure' to describe the co-design process:

> *'The pre-work done was very helpful in understanding in what was expected from this project. Also, the project design enables flexibility and adaptability which is great and enjoyable.' (*Lived Experience Guide)

The Lived Experience Principles Checklist and Research Participation Checklist were completed by the Research Guide and Mentor, and the Lived Experience and Bus Driver Guides (Supplementary File 3). All responded yes to questions concerning that the research is led by lived experience; that lived experience is acknowledged and valued; that diversity and intersectional experience is acknowledged and accepted; that the process was inclusive; that participants were paid fairly; that the research is important and will have impact, and that all relevant support was provided.

3.3. Visual scribing

The visual representation of the final evaluation meeting is represented in Fig. 7.

4. Discussion

This study aimed to develop a bus driver training program targeting bus driver's engagement with passengers with disabilities, that reflects both the needs of passengers with disabilities and bus drivers. To design such a training program, an InCLUSIVE co-design approach was undertaken, where power is actively shared, connections built, remuneration prioritised, and designers proactively and flexibly respond to the accessibility and inclusion needs of their peers. Attitudinal, behavioural and communicative barriers (such as how bus drivers interact with passengers with disabilities) can be just as impenetrable as physical ones, with bus drivers serving as inadvertent gatekeepers for their passengers' community access (Das Neves and Unsworth, 2024). Training to improve encounters between bus drivers and passengers with disabilities has been consistently recommended by both passengers and bus drivers, and the wider literature (Akaateba et al., 2023; Chapman et al., 2023; Das Neves, Browning and Unsworth, 2024; Haveman et al., 2013; Hersh, 2014; Lindsay, 2019; Tillmann et al., 2013). The effectiveness of any disability inclusion training is dependent on how well it reflects the needs of the disability community, and, in the case of bus accessibility, the knowledge gaps of bus drivers. This study aimed to develop a bus driver training program targeting bus driver's engagement with passengers with disabilities, that reflects both the needs of passengers with disabilities and bus drivers.

The InCLUSIVE Co-Design Approach (ICDA) applied throughout the study resulted in positive evaluations from co-designers, and the successful creation of the Better Trip Training Program for bus drivers. Strengths identified by co-designers were largely consistent with the wider literature, in that a small, supported group working with a high degree of collaboration (Raman and French, 2021), prioritising mutually respectful relationships between co-designers (McKercher, 2020), equitably renumerated (VMIAC, 2023), facilitated an 'enjoyable' (as per the Co-Design Survey) design experience. The inclusion of advocates with disability as co-designers was essential, the Bus Driver Guide reporting that it will change her practice moving forward. The use of the Training Recommendations Summary Document, ensured the training program could reflect the wider communities beyond the co-design group, honouring the recommendations made by over 200 bus drivers and people with disabilities to have a training program that reflects their needs (Das Neves et al., 2022; Das Neves, Browning & Unsworth, in review). Having accessible enrolment documents that clearly set out the nature of the group and expectations for co-designers was also mentioned by co-designers in their evaluations as helpful.

One finding not previously identified in the wider literature was the value of having bus drivers' input to the training development. Both the Research Guide and the Lived Experience Guide reported the value in hearing bus drivers' perspectives. This firstly improved their empathy for bus drivers (in the face of many reports of negative bus driver behaviour) (Bezyak et al., 2017; Park and Chowdhury, 2018; Unsworth et al., 2017; Velho et al., 2016), but most importantly helped to create a training program that was more practical, relevant and accessible for bus drivers than they would have otherwise. Examples of the Bus Driver Guide and Mentor recommendations included in the training program were the use of minimal words on slides due to many Australian bus drivers having a first language other than English; short and simple behavioural and communicative prompts that were easy for stressed and time poor bus drivers to employ; a focus on assistance animals and mobility equipment; and the development of posters for break rooms. Such a finding suggests that including both proposed training educators (people with disabilities) and the population they will be educating (in this instance bus drivers) in the training program development phase is integral to ensure it is relevant and adds value.

4.1. Limitations

Sample size, resource restrictions and facilitator bias were three key limitations which challenged researchers throughout the design process. Whilst a small circle of co-designers was a strength of the project in enabling genuine co-design (McKercher, 2020), having only seven designers participating in the co-design process restricts conclusions for wider applications due to the small sample size. Additionally, the size limited how reflective the group was of the entire population of 'people with disabilities' as it is impossible to include all natures of disability. Whilst the team attempted to ensure they represented key 'groups' (for example including people with disabilities impacting mobility, cognition, mental health, and communication) as well as intersectional factors, the size of the group restricted how many different communities could be represented. The use of the data from 200 participants from previous research to inform the Training Recommendations Summary Document enabled the small team to reflect the needs of the wider communities they represented. The study only received a small funding grant which impacted the resources available and therefore the study's scope. This meant that the collaboration process had to move quickly across a small number of available meetings. Future studies to validate and further replicate this training program would benefit from more meetings over a longer period, increasing the input of people with disabilities and bus drivers. The loss of the Co-Design Guide early in the project due to their ill health from life stressors, reduced the level to which the project could be authentically co-designed. The resultant shift to the facilitation of meetings by the Research Guide, rather than the Co-Design Guide, places a potential bias as the Research Guide had an agenda of generating

Fig. 7. Scribing of the final *Better Trip Training Program* final evaluative meeting. *Image description*: Diagram titled 'Design of the Better Trip Training Program Evaluation Meeting', on a white background, above a winding light blue road with text and diagrams with arrow in between, description following. Pile of papers figure reading 'Helping bus drivers improve their interactions with disabled passengers', with arrows leading to 'attitudes, behaviour and communication' pointing to 'Through a specialty designed program for bus drivers delivered by people with disability' over an image of a person using a walker, a person with a Guide Dog, and a wheelchair user, with arrow leading to box reading 'The Designers' and a drawn image of three people, with arrow pointing to output: slides, script, handbook and posters, each with an icon above, pointing to a brain icon reading 'Pilot presenter recruitment: brainstorm ideas', arrow leading to 'Final evaluation meeting: 1. Assistance Animals, great information, eye catching, 2. Offering Assistance, design too dark, confusing 3. Invisible Disability, picture isn't powerful, needs a white background, next to icons of posters and text reading '3 posters'. Arrow lead to three speech bubble icons reading 'I loved it. I've really learnt so many things…that I wasn't aware (about) disability…it made a difference to my thinking' (Poonam Singh); 'It's challenged me on a personal and a professional level to be less-self righteous and hold most space and assume that (bus drivers) have the best intentions' (Bonnie Das Neves); 'I'm amazed as to what we achieved in ten meetings, it's been wonderful' (Saumya Kaushik). Then footprints icon reading 'next steps' above 'hear from ombudsman, finalise the posters, run the Better Trip Training Program, finish the survey evaluation, recruit for pilot presenters with lived experience.' At bottom of image, Federation University Logo, and Sketch Group logo.

publishable outputs whereas using a Co-Design Guide promotes a more neutral collaboration process. The Research Guide attempted to mitigate her inherent power and biases by maintaining the approach and recommendations provided by the Co-Design Guide before they left, and the use of the midway and final evaluations. However, it is acknowledged that this could not replace the Co-Design Guide who would have had additional experience and less external pressures influencing their actions. Given that people with disabilities are more likely to experience co-morbidities and related health events, having provisions for such events may enable future projects to better optimise the role of lived experience.

4.2. Future research

Both the training program and the co-design development process are outputs from this study that offer original real-world applications, that would benefit from further research. The Better Trip Training Program can be trialled as a prototype, using the developed evaluations for bus drivers and presenters to identify possible improvements to the presenter or participant experience. The application of the Training Recommendation Summary Document also identified recommendations that were beyond the scope of the Better Trip Training Program. For example, bus drivers in previous research recommended occupational health and safety training on how to safely assist passengers with disabilities (Das Neves, Browning & Unsworth, In review). Recommendations which concern operator leadership rather than bus drivers were not included in the Better Trip Training Program, and instead will inform an additional training course for bus operator leadership in a future study. This will provide bus drivers the systemic support they need to create an inclusive bus environment. In addition, validation studies of the three measures used to evaluate the training program is also required, including validity and reliability testing. Finally, over one billion of the world's population has a disability (Negrini et al., 2020). The InCLUSIVE Co-Design Approach (ICDA) developed for and applied to this study is not only relevant for transport accessibility research but may also guide future researchers seeking to improve the inclusivity and accessibility of their projects. Given the lack of co-design process transparency described in the literature (Voorberg et al., 2015), this study has attempted to share processes as explicitly as possible. Co-designers wishing to apply ICDA can draw from material across this study, specifically from Table 1 (ICDA principles), and 2 (co-designer roles), and Fig. 4 (generative collaboration example) and 7 (visually accessible output example).

5. Conclusion

'Nothing about us without us' is a disability advocacy battle cry, calling for people with disabilities to be part of the conversation, to be participants in design. 'By us, for us' (JFA Purple Orange, 2021) challenges researchers to instead engage people with disabilities as experts in their experience, and ensure any research and interventions add value to the community it purports to support. The aim of the study in developing a bus driver training program was not just to represent the needs of passengers with disabilities, but to also fill knowledge gaps, and meet the challenges experienced by bus drivers. To ensure the training program reflected the needs of both passengers with disabilities and bus drivers, both passengers and bus drivers had to be represented, collaborating with researchers to create an evidence-based, community-centred training program through the application of ICDA principles. Whether in transport accessibility research or beyond, co-designed processes are essential, as policies and interventions that are designed, delivered, and evaluated without the input of the population they are supposedly enabling can never be certain of their impact.

CRediT authorship contribution statement

Bonnie Das Neves: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Amanda Timmer:** Writing – review & editing, Supervision. **Saumya Kaushik:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Poonam Singh:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Carolyn Unsworth:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization.

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Declaration of competing interest

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Appendix A. Supplementary data

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