Co-designing A Mental Health Referral System in Rural Australia

Kate Bartel, Asini Siriwardene, Paul Worley, Kim Pearce, Niranjan Bidargaddi, Bronwin Patrickson, Simon Moody, Sharon Wingard, Martin Jones, Brian McKenny, Darryl Cameron, Sharon Lawn, Amy Mendham

Submitted to: Journal of Medical Internet Research
on: March 05, 2025

Table of Contents

Original Manuscript **5**
Supplementary Files **20**
Figures **21**
Figure 1 ..... **22**
Figure 2 ..... **23**
Figure 3 ..... **24**
Figure 4 ..... **25**
CONSORT (or other) checklists **26**
CONSORT (or other) checklist 0 ..... **27**
CONSORT (or other) checklist 0 ..... **27**

Co-designing A Mental Health Referral System in Rural Australia

Kate Bartel[1, 2*] PhD; Asini Siriwardene[1*]; Paul Worley[1, 2] PhD; Kim Pearce[2]; Niranjan Bidargaddi[3] PhD; Bronwin Patrickson[3] PhD; Simon Moody[4]; Sharon Wingard[4]; Martin Jones[5]; Brian McKenny[6]; Darryl Cameron[7]; Sharon Lawn[2, 8] PhD; Amy Mendham[1, 2] PhD

[1] Riverland Academy of Clinical Excellence Riverland Mallee Coorong Local Health Network Berri AU
[2] College of Medicine and Public Health, Rural and Remote Health Flinders University Adelaide AU
[3] College of Medicine and Public Health, Flinders Health & Medical Research Institute, Digital Health Research Lab Flinders University Adelaide AU
[4] Riverland Mallee Coorong Local Health Network Berri AU
[5] Edith Cowan University Bunbury AU
[6] Barossa Hills Fleurieu Local Health Network Angaston AU
[7] Moorundi Aboriginal Community Controlled Health Service Inc. Murray Bridge AU
[8] Lived Experience Australia Adelaide AU
[*]these authors contributed equally

Corresponding Author:
Amy Mendham PhD

Riverland Academy of Clinical Excellence
Riverland Mallee Coorong Local Health Network
10 Maddern Street
Berri
AU

Abstract

Background: In rural Australia, geographical isolation, limited resources, and complex healthcare navigation create significant barriers to mental health care access. Mental healthcare professionals and organisations often work in segregation, exacerbating existing barriers. Digital technology provides an opportunity to improve communication between providers and streamline workflows while supporting a diverse range of consumers.

Objective: This co-design study aimed to identify rural community needs and develop digital solutions to enhance mental health service delivery pathways.

Methods: Using design-thinking methodology, we conducted focus groups and workshops with 17 participants (7 consumers and carers, 10 healthcare professionals) from a rural region to understand mental health service needs, systemic challenges, and design potential digital solutions. Thematic analysis followed a grounded theory approach, involving systematic coding and theme development through an iterative consensus process.

Results: Access to mental healthcare emerged as the central theme. Rural community participants reported strong community connections but faced challenges including limited technological innovation and substantial travel burdens. Healthcare professionals highlighted critical systemic pressures: under-resourcing, overwhelmed clinicians with extensive waitlists, and complex referral processes. Both groups identified overlapping barriers in service limitations and system navigation. During the design phase, we developed personas capturing consumer and healthcare professional experiences and conceptualized an integrated digital solution comprising a healthcare professional dashboard and a consumer-facing app with carer access to enhance service coordination.

Conclusions: The study demonstrated strong stakeholder support for implementing an integrated digital solution to enhance rural mental health service delivery. Further research is required to test, optimize, and scale the solution.

(JMIR Preprints 05/03/2025:73460)
DOI: https://doi.org/10.2196/preprints.73460

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✔ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✔ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http
No. Please do not make my accepted manuscript PDF available to anyone.

Original Manuscript

Co-designing A Mental Health Referral System in Rural Australia

Authors: Kate Bartel[1,2]*, PhD; Asini Siriwardene[1]*, BSci; Paul Worley [1,2], PhD, MD; Kim Pearce[2], BSci(Hons); Niranjan Bidargaddi[3], PhD; Bronwin Patrickson[3], PhD; Simon Moody[4],BNursing Sharon Wingard[4],DAboriginal Health Management; Martin Jones[5], DNursing; Brian McKenny[6],MD; Darryl Cameron, Sharon Lawn [2,7], PhD; Amy Mendham [1,2] PhD
**Co-first authors*
Affiliations:
[1]Riverland Academy of Clinical Excellence, Riverland Mallee Coorong Local Health Network, South Australia Health, South Australia, Australia
[2]Flinders University, College of Medicine and Public Health, Rural and Remote Health, South Australia, Australia
[3]Flinders University, College of Medicine and Public Health, Flinders Health & Medical Research Institute, Digital Health Research Lab, South Australia, Australia
[4]Riverland Mallee Coorong Local Health Network, South Australia, Australia
[5]School of Nursing and Midwifery, Edith Cowan University, Western Australia, Australia
[6]Rural and Remote Mental Health Service, Barossa Hills Fleurieu Local Health Network, South Australia Health, South Australia, Australia
[7]Lived Experience Australia**,** South Australia, Australia
Corresponding Author: Amy Mendham amy.mendham@sa.gov.au

Abstract

Background: In rural Australia, geographical isolation, limited resources, and complex healthcare navigation create significant barriers to mental health care access. Mental healthcare professionals and organisations often work in segregation, exacerbating existing barriers. Digital technology provides an opportunity to improve communication between providers and streamline workflows while supporting a diverse range of consumers.
Objective: This co-design study aimed to identify rural community needs and develop digital solutions to enhance mental health service delivery pathways.
Methods: Using design-thinking methodology, we conducted focus groups and workshops with 17 participants (7 consumers and carers, 10 healthcare professionals) from a rural region to understand mental health service needs, systemic challenges, and design potential digital solutions. Thematic analysis followed a grounded theory approach, involving systematic coding and theme development through an iterative consensus process.
Results: Access to mental healthcare emerged as the central theme. Rural community participants reported strong community connections but faced challenges including limited technological innovation and substantial travel burdens. Healthcare professionals highlighted critical systemic pressures: under-resourcing, overwhelmed clinicians with extensive waitlists, and complex referral processes. Both groups identified overlapping barriers in service limitations and system navigation. During the design phase, we developed personas capturing consumer and healthcare professional experiences and conceptualized an integrated digital solution comprising a healthcare professional dashboard and a consumer-facing app with carer access to enhance service coordination.
Conclusions: The study demonstrated strong stakeholder support for implementing an integrated digital solution to enhance rural mental health service delivery. Further research is required to test,

optimize, and scale the solution.

Keywords

Co-design; digital solution; focus group; referral; mental health; rural healthcare

Introduction

Mental health burden has significant economic and social impacts (1), particularly in rural areas (2, 3), which typically have fewer trained professionals, limited services, and less service innovations compared to metropolitan areas (3-6). In Australia, 7 million rural residents face substantial barriers to mental health care access. These obstacles include fewer resources, limitations in technology, lack of knowledge of services, distance to services, and a deficiency in culturally-sensitive practices (7), with complex and often ineffective treatment pathways (3).

General practitioners (GPs), as the primary contact for mental health support (8, 9), face considerable challenges when connecting patients with appropriate mental health care, primarily due to time-constraints in determining suitable referrals and limited availability of services in rural communities (10, 11). Adding to the complexity, service availability, fee structure and communication methods vary between providers and change frequently, reflecting poor integration between services. This exacerbates the problem caused by inefficiencies and complexities in the healthcare system, decreasing efficiency of care provision and inadvertently resulting in potentially less effective care (2).

The Australian Government has provided the Initial Assessment and Referral Decision Support Tool (IAR-DST), a clinical decision support tool to assist with mental healthcare level determination. While IAR-DST determines care need, clinicians require additional support to rapidly identify suitable local providers and optimise referral processes ~~(12)~~. Without such support, rural GPs may struggle to initiate the right referral on their first attempt where limited service availability already constrains their options. This may lead to rework, delayed treatment, and patient disengagement (13). Moreover, many rural Australians forgo seeking support altogether due to the difficulties in accessing GPs, so the importance of getting the referral processes right on the first attempt is even more imperative (10).

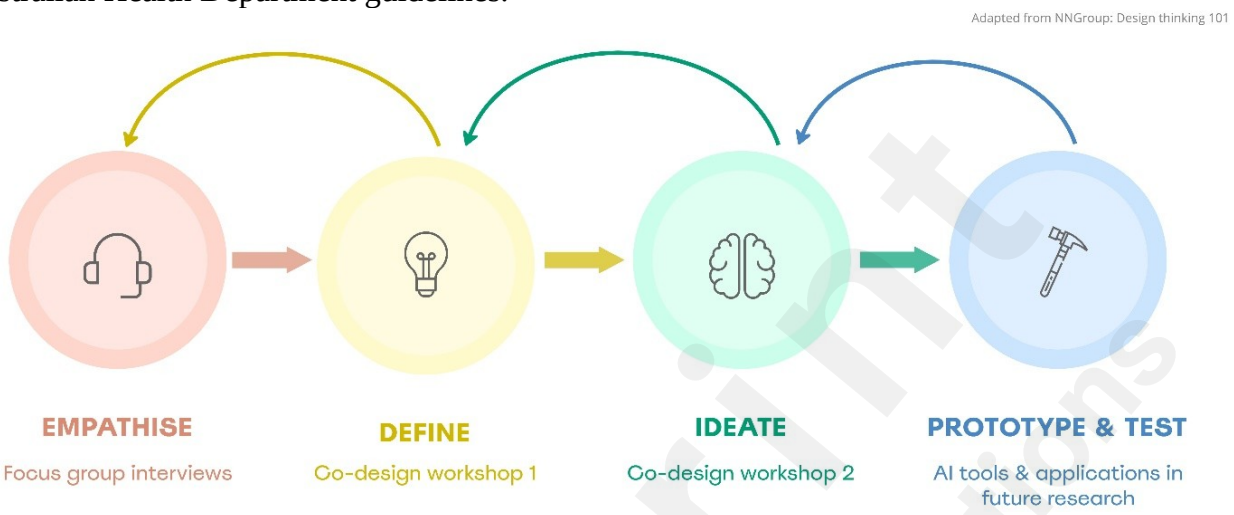
Digital referral platforms could augment existing assessment tools by automating provider matching and streamlining referral workflows (14). Such systems show promise in reducing administrative load while supporting culturally and linguistically diverse consumers, for example, through better matching of services and more informed options (15). However, their utility in rural Australian settings remains unexplored. Awareness of the needs and context of the community, what resources are available and how their systems operate is invaluable (5, 8). Thus, to explore whether this could be a useful strategy, the community in which it would be implemented must be involved in the co-design process.

The primary aim of this study was to explore digital solutions for mental healthcare referral pathways in a rural community using participatory and human-centred design thinking methods. Specifically, this study explored if the rural community *want* a digital solution for mental health referral pathways, *how* it would be useful and *who* would benefit.

Methods

Participatory and human-centred design-thinking methodologies informed the structure and approach for all participant activities (Figure 1). Design-thinking methodology is an iterative, user-centric process, which aims to create a solution that is desirable, feasible and viable (16) to end-users,

stakeholders and the supporting infrastructure. Accordingly, consumers' and healthcare professionals' lived experiences, preferences and needs are prioritised to develop a technological solution to improve referral efficiencies in rural communities. This project was approved by the Department of Health and Wellbeing Ethics Committee (2023/HRE00227) and the Aboriginal Health and Research Ethics Committee (04-23-1104). All participants provided written consent prior to their inclusion in the study, were briefed on study goals and were renumerated for their time according to South Australian Health Department guidelines.



Design-thinking methodology

Design-thinking phases were reflected in the study design:

i. Empathise: Semi-structured focus groups with consumers and healthcare professionals to develop a deep understanding of the rural community needs.
ii. Define: A workshop to start the co-design process with combined consumer and healthcare professional input, to prioritise the pain points in the mental healthcare system.
iii. Ideate: A second workshop with consumers and healthcare professionals to brainstorm possible solutions.

Setting

The study took place in the Riverland, South Australia, which is a small, rural region with a high level of rurality (Modified Monash Model 5) which entails considerable geographical remoteness and smaller population sizes. The Riverland area represents a typical low-resourced and low socio-economic rural context with a Socio-Economic Indexes for Areas score of 996.8, indicating a level of socio-economic conditions that fall below the national average.

Participants

Consumers were recruited through researcher and clinician networks and included those with lived experience of mental health issues and formal/informal carers of people who experienced mental health issues. To be eligible to participate, consumers needed to be over 18 years of age and experienced a mental health issue and/or cared for someone with a mental health issue in the previous 24 months. Healthcare professionals were recruited using purposeful sampling. Those who worked in the Riverland region in South Australia and had experience working with mental health consumers in the previous 24 months were invited to participate. The services approached included

all public health sites, private mental health services, non-government organisations, charities, and Aboriginal services. Contact to prospective participants was made via email and/or telephone.

Data Collection

Data collection occurred from June to September 2024.

Empathise: Focus groups

All focus groups followed a semi-structured format as provided in Supplementary Table 1. Consumers (n=7-10) participated in two, 90-minute, face-to-face focus group discussions that were facilitated by experienced co-investigators (KP, SL), including a lived experience representative (SL). The first session explored past experiences with mental health care and expectations of mental health management. The second focus group discussion explored current digital engagement behaviours and willingness to explore AI supported digital solutions. Healthcare professionals (n=7-10) participated in two, 60-minute focus group discussions conducted online (via Microsoft Teams) with the same facilitators. The first session explored the coordination of care and navigation across the mental health system. The second focus group discussion centred on experiences with technology as a solution and willingness to explore further an AI-supported digital solution.
Following the completion of the focus group interviews, all participants were invited to participate in two, 3-hour face-to-face design workshops. The workshop was facilitated by two external design-thinking experts; a consumer representative (SL) and members of the research team with a background in psychology and/or focus group research assisted (KB, AM, AS). All face-to-face focus groups and workshops were held in a local hospital meeting room.

Define: Design workshop 1

Participants were asked to choose from consumer scenarios presented (as outlined in the results section). For each scenario, consumers and healthcare professionals worked together in groups (n=4-6) to map the key interactions that happen along the consumer mental health “journey”. Following the mapping process, these interactions and timelines were discussed with the entire group to fill in any gaps and highlight barriers in the system (pain points).

Ideate: Design workshop 2

Key journey moments across the scenarios in workshop one were prioritised for conversation in workshop two. Using these “key moments”, the room was split into two groups (one group of consumers and one group of healthcare professionals). Each group discussed the pain points in the referral pathways and identified possible technological solutions. Following these small group discussions, the core pain points, and technological solutions were discussed with the entire group. Participants were provided with a scope to focus on interactions between using mobile phone applications and healthcare professional facing dashboards.

Data Analysis

Focus groups were recorded, transcribed and deidentified. Field notes were written by As and KB. Data were thematically coded using qualitative analysis software NVivo (v14) by AS, guided by grounded theory approach of open, axial, and selective coding. Initial interpretations were checked for accuracy (KB). Saturation of data was discussed. Themes and subthemes were finalised by AM,

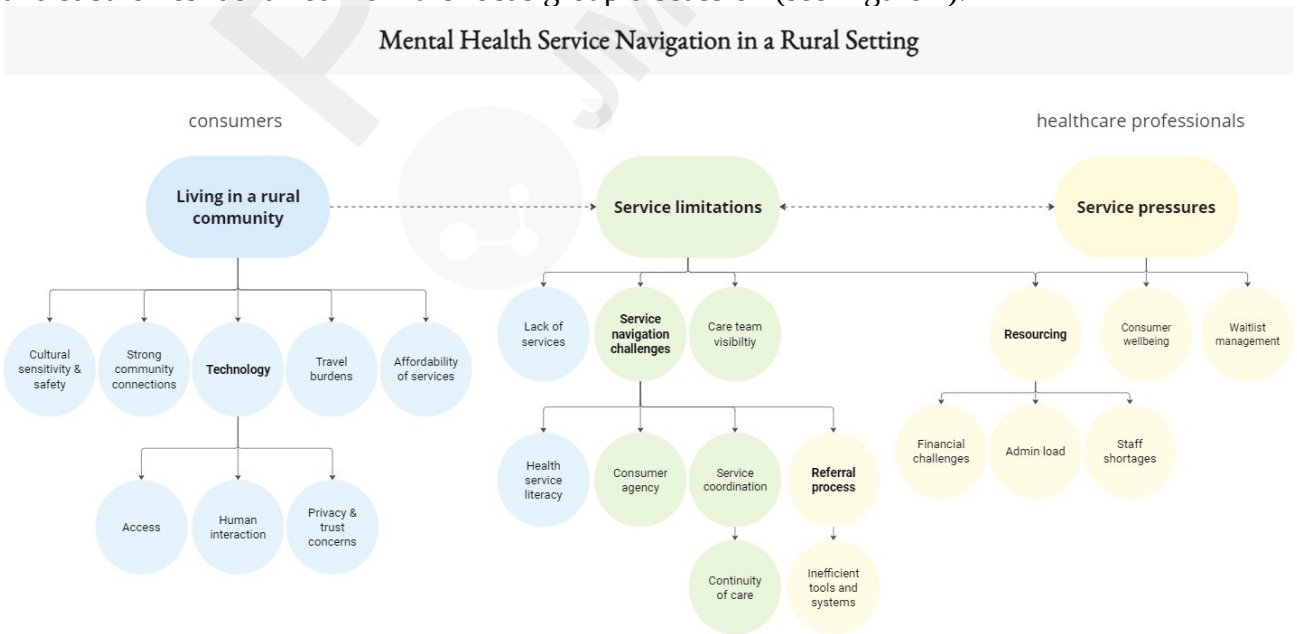
AS, BP, KB and SL. This study followed the COREQ reporting guidelines, ensuring transparency in reporting researcher reflexivity, study design and data analysis (Supplementary file 2) (17).

The iterative process of design-thinking methodology was implemented throughout the study, with data collected and analysed in each phase to advise the next phases of data collection. Participants were provided with a verbal summary of previous session content, at the commencement of session, and given the chance to comment or provide correction. Preliminary analyses of the focus groups were discussed with the research team and external user-experience designers advised on the planning of co-design workshop one. Participant outputs were digitally collated, and user-personas were developed. User-personas are a fictional representation of real-life users who share common characteristics, behaviours, goals, and pain points (18, 19). This effectively narrows down the intended users of the platforms and creates a more targeted approach, reflecting the “define” stage of the design thinking process. Moreover, it creates a more detailed representation of the consumers to inform effective and targeted design decisions while maintaining the anonymity of the real study participants and reflecting their experiences accurately. Insights from co-design workshop two were similarly digitised and analysed to identify key themes, which were then grouped to uncover opportunities. These opportunities were mapped back to the user-personas to ensure that the solutions created serve the user.

Results

A total of seven consumers and ten health care professionals participated in focus groups and design workshops. Ten consumers were contacted; 2 were unavailable, 1 did not attend with no notice and 7 participated in at least one focus group/workshop. Fifteen health professionals/organisations were contacted. Three professionals were unavailable, 2 did not return contact and 10 attended a minimum of one focus group/workshop. Healthcare professionals included a psychiatrist, GPs (n=2), a clinical psychologist in private practice, NGO and non-profit managers (n=2), mental health nurses (n=2), and an Aboriginal nurse unit manager. Of the consumers, five had experienced a mental health issue and two cared for someone with a mental health issue in the previous 24 months. One of the two Aboriginal consumers was an Aboriginal Elder.

The unifying theme identified across consumer and healthcare professional focus groups was *Access to mental healthcare in a rural community*. A coding tree displays an overview of the main themes and subthemes identified from the focus group discussion (see Figure 2).



Empathise: Focus groups

Consumer insights were primarily shaped by the experience of living in a rural community. Such experiences were underpinned by the effects of geographical isolation and lower population densities, often resulting in service limitations. These limitations may in turn stem from broader service pressures faced by healthcare professionals such as staff shortages and lack of resources, contributing to the unique challenges faced by rural communities in accessing mental healthcare.

Living in a rural community

In spite of the challenges faced, consumers (C) living in rural settings had strong community connections, describing themselves as “one really, really big family” (C4), feeling a sense of pride in residing in the country. Aboriginal participants echoed these sentiments by having support networks to care for those with mental health issues. Regardless of strong community connections, trust in healthcare systems was varied, with Aboriginal participants less likely to trust in healthcare systems. As an Aboriginal elder observed:

“That’s where it’s different for Aboriginal people. The health system was where they stole kids.” (C2)

Historically Aboriginal people in Australia have faced systemic discrimination (20), leading to distrust in the healthcare system, underscoring the importance of cultural safety and sensitivity when developing the technological solution. Distrust in healthcare systems may also extend to distrust in technological products issued by these systems, as corroborated by consumers, regardless of Aboriginality. Lacking cultural and rural appropriateness, privacy and data mishandling concerns may contribute to this varied trust.

When asked regarding the general experience of using digital technology tools, consumers raised concerns on the accessibility, as some were unable to afford smartphones, phone credit or had limited digital literacy.

Consumers reinforced that rural mental health services were harder to access due to affordability or geographic location, often requiring numerous visits to metro Adelaide for specialist services. Of the services that were available in the Riverland, most were said to have long wait-times or consumers were not aware of their existence.

Service limitations and potential solutions

Healthcare professionals and consumers voiced that available mental health services were hard to find and difficult to navigate for consumers in rural areas. Despite being a lifelong resident in the Riverland, a consumer was “still not aware of all the services here or what’s available” (C1) and another reinforced that it would be helpful to “create some kind of a roadmap to the services” (C5). This lack of health service literacy may be a by-product of ineffective communication and coordination between mental health services, GPs, and hospital services. Participants identified that effectively increasing inter-service communication can lead to a better continuity of care, improving mental health outcomes for patients.

Care team visibility and effective communication may assist in avoiding duplication of services, as “there’s a lot of overservicing that happens in [the mental healthcare] space” (H1), thus reducing workloads and service limitations. Consumers suggested that this may empower and encourage them to actively participate in their care while reducing the risk of confusion and misunderstanding. Consumers felt strongly regarding patient choice, having the necessary information to make an informed decision regarding their care. In this respect, the role of the carer was also emphasised by both consumers and healthcare professionals, as carers can advocate for patients when they cannot do so themselves. Carers are also “usually the first to know when [patients] are deteriorating” (H1).

Healthcare professionals respectively advocated for the consumers, valuing the importance of care "directed by the client" (H1) and sharing information with the consumers.

Service pressures and potential solutions

The predominant challenges and frustrations for healthcare professionals were categorised under the central theme of service pressures. Services were impacted by limited resource availabilities, which included lack of finances for infrastructure and increased administrative loads due to staff shortages and attrition.

Most mental health services in the Riverland were characterised by prolonged waiting periods for patients as providers were overburdened. Methods for management of waitlists varied between healthcare providers. A psychologist commented that:

"I find waitlist management really hard, because it's impossible for me to predict how long someone's going to need services for" (H5).

Participants suggested that if consumers were able to inform the healthcare service of their symptoms improving or worsening, healthcare professionals would be able to reprioritise consumers and better manage waitlists.

Whilst both consumers and healthcare professionals agreed that displaying waitlists in the technology tool would be quite helpful, services would struggle to update waitlists regularly as it would be the "first thing that slips when practices get busy" (H1).

Healthcare professionals unanimously agreed that referral processes between services were under-optimised and "siloed" (C1), significantly impacting service delivery. Each service used varied processes and systems for referral and inter-service communication, and most relied of inefficient and archaic tools such as fax machines:

"It can actually delay consumer care because the fax might not be working, or got rejected" (H3).

All healthcare professionals except one were unfamiliar with the IAR-DST tool, preferring practical, more familiar tools that allow flexibility in clinical judgement. Clinician discrepancies in tool usage were often not visible to other healthcare professionals, impacting efficiency of the referral process. In a similar vein, out of date waitlists and service directories place a pressure on GPs to efficiently refer patients. For developing the technological solution, healthcare professionals prioritised consumer advocacy and recognised the importance of addressing consumer pain points in improving service provision.

Define: Design workshop 1

Workshop one was conducted with mixed groups of healthcare professionals and consumers.

Based on the preliminary insights from focus groups in the empathise stage, the following consumer scenarios were developed.

1. An older person living alone in an isolated rural location with limited family support, moderate mental health challenges and no internet access.
2. A young adult living and working in town with severe mental health challenges requiring frequent journeys between metro services and rural community support services.
3. A single parent with mild mental health challenges living rurally and accessing GP and NGO supports.
4. A young person attending a rural high school, accessing services and supports following an acute mental health admission at the local hospital.
5. A farmer living on a rural property, experiencing isolation and hesitant to seek support for his mental health challenges.

Participants chose scenarios 1, 2 and 3 for the journey mapping exercise. Each step of the consumer journey was mapped with the current channel that the consumer engages in, value of this interaction,

software capabilities to replace or augment, the value that could be added from this augmentation and the outcome for the consumer.

Scenario 1

The role of the carer and was particularly stressed in this scenario due to the consumer's limited access to technology. All participants agreed that the carer/s should be given access to the technological solution at the discretion of the consumer. The carer will thus be able to facilitate consumer care through the digital tool.

Either as an alternative, or in the absence of a carer, community support groups facilitated mental healthcare support for consumers. This was especially stated to be the case for some Aboriginal consumers, who may lack the means to access smartphones. Conversely, text messaging through basic mobile phones appeared to be more readily available and accepted across the population. By incorporating this feature into a clinician platform, accessibility may be enhanced for individuals with limited technological literacy or low socioeconomic backgrounds.

Scenario 2

Current channels for patient-mental health service interactions were identified to be initial care visits (GP, hospital admissions, community mental health groups), crisis services, specialised services, telehealth appointments, potential police contact and ongoing support groups. Participants valued positive relational interactions in these channels; specifically feeling safe, respected, and avoiding behavioural stereotyping from decision makers such as law enforcement and doctors as it can lead to inappropriate care.

Consumers and healthcare professionals reiterated that navigating the healthcare system with available services was overwhelming and confusing. Moreover, healthcare professionals acknowledged that patient handovers were inadequate, particularly between metropolitan and rural services. To address this, real-time information sharing, such as discharge summaries between services in the dashboard was suggested.

Trust and privacy issues were identified as potential concerns for the clinician dashboard and consumer app. Both consumers and healthcare professionals emphasised the importance of data encryption to protect the transfer of sensitive patient data between services. Including the consumer in the care-team ecosystem was suggested to entrust the consumer with handling of their own information, giving the ability to share or un-share data with selected providers.

Scenario 3

Participants reaffirmed that navigating the available services in the Riverland was overwhelming, advocating for a centralised directory of services in the digital tool with AI driven customisation specific to the user and their mental health requirements. The potential user in this scenario was presumed to have hectic schedules leading to missed appointments or medications. To combat this, participants proposed the software to embed a medication and appointment management system that consolidates and integrates the user's existing applications, to prevent software fatigue.

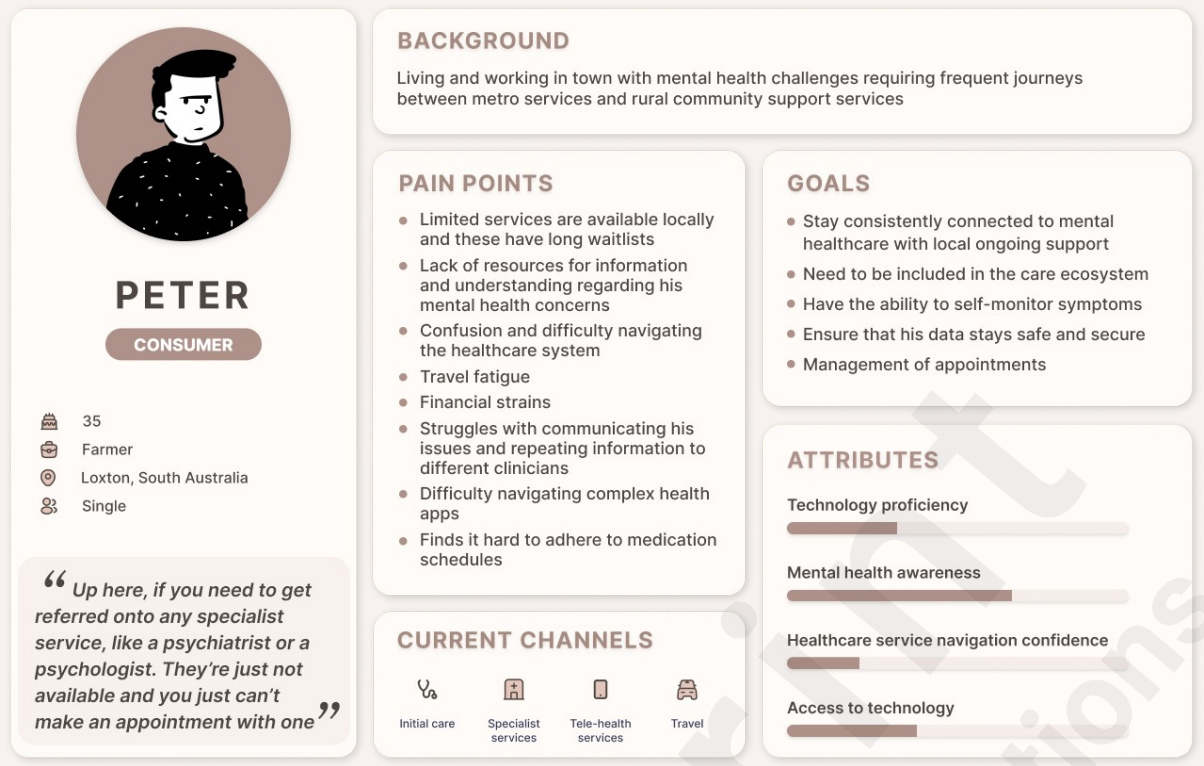
User personas

Informed by the insights derived from the three scenarios, the below user personas were developed (figure 3). "Anna"; a healthcare professional persona and "Peter"; a consumer persona.

Healthcare professional persona "Anna" was structured around a general practitioner, as this is often the initial point of contact for mental health care in Australia (21). One of the biggest challenges in mental healthcare quoted by a clinician (H6) was the lack of specialist services in the Riverland. Healthcare provider bottlenecks and frustrations presented previously are consolidated under pain points: inefficient referral processes, lack of communication between services, under resourcing and

difficulties in maintaining patient wellbeing. The desired outcome for Anna is to ultimately improve patient care by coordinating with other services effectively. The attribute scale displays Anna as proficient in technology, care coordination as poor, service navigation confidence as moderate and time management as poor. Technological channels for providing care entails electronic health record systems and general practise software, telehealth services, and patient communication through mobile devices and email.

Consumer persona “Peter” was framed around scenario two. Similar to healthcare professionals, access and availability of specialist services were quoted to be a pressure point by a consumer (C1). An amalgamation of consumer issues raised in focus groups and scenarios, pain points underscore rural access issues such as service access, long waitlists and service navigation. Peter envisions more consumer driven care and better support throughout his mental healthcare journey. Attribute scale presents technology proficiency as low, mental health awareness as moderate to high, health service navigation as poor and access to technology as moderate. Peter’s current channels for accessing care includes GP for primary care, travelling for specialist services and telehealth services for potential ongoing care.



Ideate: Design workshop 2

Co-design workshop two iteratively revised bottlenecks in prior phases and generated possible solutions through an interaction map between the proposed clinician dashboard and consumer app. An overarching theme of “communication” was identified across the clinician and consumer journey. It was considered essential for health professionals to be able to easily communicate with each other, and for the consumer’s journey to be easily visible, within the constraints of privacy and confidentiality. Health professionals articulated the desire for consumer specific information (e.g., referrals made to other agencies), as well as generic organisation information (e.g., requirements for valid referrals), relevant to the consumer they are seeing, to be made clearly accessible. Likewise, communication was a key aspect of consumer agency, both for consumers being aware of their options, and being able to communicate required information to their health provider, even if that was prompted via an app and discussed in session. Participants also provided personal reflections of the study and its aim, ultimately affirming their support for a consumer facing app and a healthcare professional facing dashboard.

Prototype and Test

Low-fidelity prototypes were developed based on ideated solutions. These displayed key interactions between the consumer app and the healthcare professional dashboard. The main features will be applied and tested in the future and include but are not limited to: the connectivity between platforms used by different providers, self-assessment and patient assessment tools that are required for referral and monitoring processes, medication management, social network building, transport, and telehealth options.

Discussion

The core purpose of this study was to initiate co-designing a digital platform with consumers and healthcare professionals which may enhance referral processes and service navigation in rural mental

healthcare. Three core themes emerged, which include: 1) consumers identifying that ‘living in a rural community’ has both positive aspects (strong community bonds) and negative challenges (access to technology and innovation); 2) healthcare professionals highlighting ‘service pressures’ such as waitlists, consumer wellbeing and resourcing; and finally, 3) both consumers and healthcare professionals identifying ‘service limitations’, such navigation challenges and issues around an inefficient referral process. The human-centred, technological solution that was explored in the workshops highlights the need for ‘communication’ to integrate the consumer, carer, and providers, marking a critical step toward optimising rural mental healthcare.

In the current study, consumers highlighted both challenges and positive aspects of living in a rural community. Struggles included limited access to mental health services, often requiring travel to metropolitan locations for necessary care. Despite these challenges, rural consumers were often mentioned to be supported by dedicated carers and benefited from strong community bonds, especially among the Aboriginal population. These findings are consistent with prior studies (7) that identified barriers such as limited resources and distance to services, while also highlighting the importance of person-centred and collaborative care. Thus, a key implication for future iterations of the prototype is to integrate community-based support systems to reduce strain caused by remoteness. Participants in the current study further mentioned the importance of integrating other health services and community groups in the platform. While this is important for delivering a holistic service, it is outside the scope of this study and requires further investigation of limitations such as data sharing barriers. Future research could explore opportunities to integrate health services providing additional support to consumers.

Rural healthcare professionals in the current study faced pressures of under-resourcing and access challenges. Similar to previous research (22), this resulted in mental healthcare systems that were overly complex, impacting healthcare professionals in coordinating care and consumers in navigating the required care. Our study showed that both providers and consumers deemed the current referral processes to be inefficient, due to lack of care coordination and limited communication between services, exacerbated by existing rural service limitations (7). Participants in this study supported the view that a dashboard for healthcare professionals could address these referral inefficiencies by integrating referral tracking, communication tools, and standardising/displaying referral processes for various services. Participants also agreed that a consumer facing-app complements the dashboard by offering consumers the agency to input information for their care team and displaying real-time service updates. Although the digital platform may not directly resolve resource constraints, it is likely to reduce administrative loads for healthcare professionals, enhance care coordination, and provide a more consumer-centred approach to mental healthcare by improving the accessibility of services for consumers (23). This could also afford a flow-on effect, whereby practitioner burnout is decreased, and retention is improved. In particular, in rural locations where GPs take on a high proportion of mental health cases, easy, appropriate referral could reduce compassion fatigue and burnout {Rattray, 2024 #15}.

Prior studies have explored the use of digital platforms to improve service navigation (15) and potentially improve communication between providers (24, 25). However, these platforms did not integrate well with existing infrastructure used by clinicians and thus they resisted uptake (26). Furthermore, many of these solutions were designed for urban settings and do not resolve the challenges faced by rural consumers and providers. Rural Australia, compared to metropolitan areas, has fewer public mental health systems (27) but a higher prevalence of private organisations that often operate in isolation. The healthcare professional dashboard could enable communication with these private organisations and public systems, facilitating care coordination. Thus, this study distinguished itself by its focus on a rural community. This uniquely positioned the study to codesign a platform to improve rural mental health referral pathways. Due to the location, there were fewer

services to coordinate than a metropolitan region, yet the population could benefit substantially from a platform that decreases the sometimes wastefully siloed service provision and enhances communication between service providers, consumers, and their care teams.

Strengths and Limitations

A key strength of this study lies in its participatory approach, engaging both consumers and healthcare professionals in the design process, ensuring that the digital platforms developed are grounded in real-world experiences (28) and tailored to the unique challenges of rural mental healthcare. By employing design-thinking methodology, the prototyped solutions are human-centric, contextually relevant, and functional {Doorley, 2018 #1297}. The percentage of Aboriginal participants employed in this study were representative of the community demographics, however, further in-depth Aboriginal input is needed prior to implementing the solution. This study was also limited by its total number of participants. While this is reflective of a pilot study, it may also limit the generalisability of the findings to broader contexts and thus, future studies with a greater number of participants are necessary to further prototype the provider platform and consumer facing app, in continued consultation with end-users. This includes testing the feasibility and acceptability and determining which cohorts would benefit most. Furthermore, the solution should be tested in other rural Australian regions to assess scalability.

Conclusions

The proposed human-centred, technological solution aims to integrate the consumer, the carer, and the provider, marking a critical step toward optimising rural mental healthcare. The co-design process empowered consumers to actively engage in their mental health care journey, while suggesting options to streamline system inefficiencies for overburdened clinicians. Ultimately, this platform may not only improve patient wellbeing and satisfaction but also boost the morale and retention of rural mental health professionals – a critical factor in addressing the current workforce shortage. Importantly, designing a solution in collaboration with rural communities may help to ensure a trusted, sustainable, and scalable implementation (28) in the future.

Declarations

Ethics approval and consent to participate

This project was approved by the Department of Health and Wellbeing Ethics Committee (2023/HRE00227) and the Aboriginal Health and Research Ethics Committee (04-23-1104). All participants provided written consent prior to their inclusion in the study and were renumerated for their time according to South Australian Health Department guidelines.

Acknowledgments

We acknowledge the contributions of Darryl Cameron, who passed away before the publication of this manuscript.

Author Contributions

Conceptualization – KB, PW, KP, NB, BP, SM, SW, MJ, BM, DC, AM
Formal analysis – KB, AS, BP, SL, AM
Investigation – KB, AS, KP, BP, SL, AM

Methodology – KB, PW, KP, NB, BP, SM, SW, MJ, BM, DC, SL, AM
Visualization - AS
Writing – original draft – KB, AS, AM
Writing – review & editing – KB, AS, PW, KP, NB, BP, SM, SW, MJ, BM, SL, AM

Funding

Produced with the financial and other support of the Health Translation SA (HTSA) Medical Research Future Fund (MRFF) Catalyst Grant Scheme, led by HTSA, supported by The Hospital Research Foundation Group.

Conflict of Interest

NB is a software developer who has developed a platform for use in mental health care.

Abbreviations

C: Consumer
GP: General Practitioner
HP: health professional
IAR-DST: Initial Assessment and Referral Decision Support Tool
NGO: Non-government organisation

References

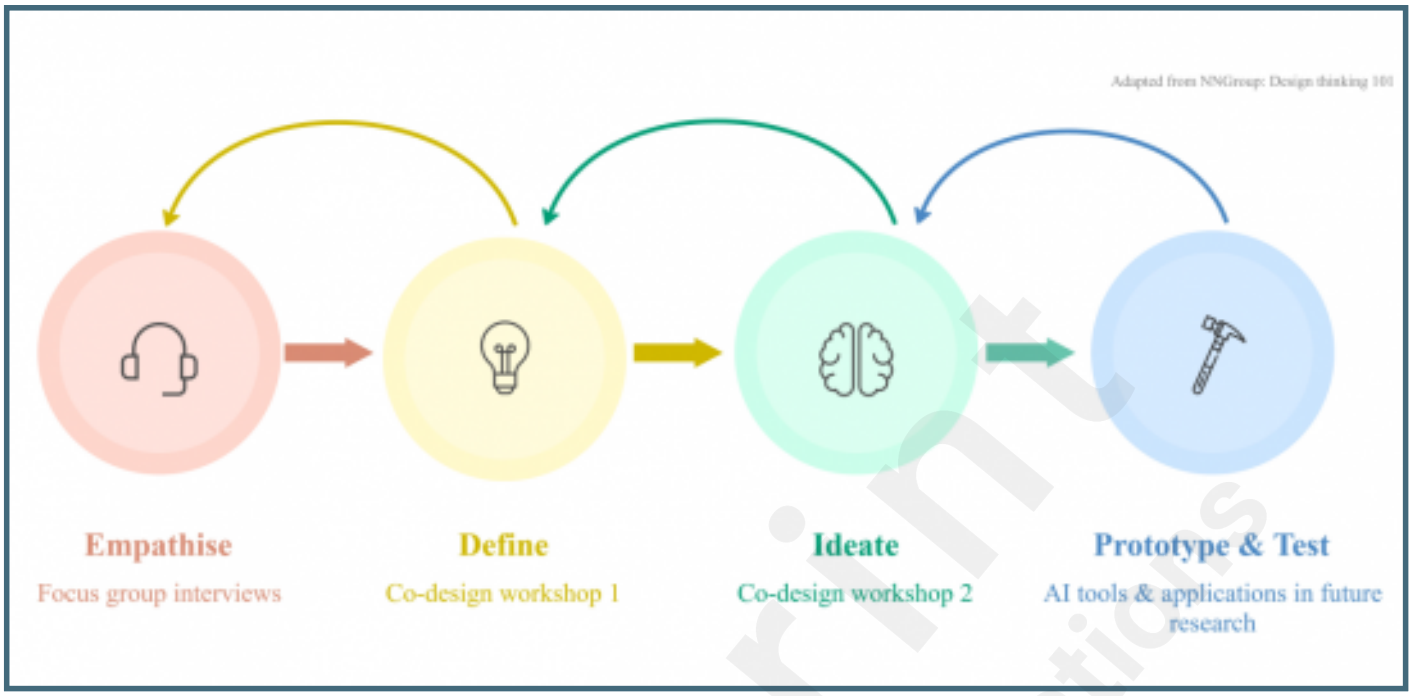
1. Arias D, Saxena S, Verguet S. Quantifying the global burden of mental disorders and their economic value. EClinicalMedicine. 2022;54.
2. Calder R, Dunkin R, Rochford C, Nichols T. Australian health services: too complex to navigate: a review of the national reviews of Australia's health service arrangements. 2019.
3. Morales DA, Barksdale CL, Beckel-Mitchener AC. A call to action to address rural mental health disparities. Journal of clinical and translational science. 2020;4(5):463-7.
4. Andrilla CHA, Patterson DG, Garberson LA, Coulthard C, Larson EH. Geographic variation in the supply of selected behavioral health providers. American journal of preventive medicine. 2018;54(6):S199-S207.
5. Rathod S, Pinninti N, Irfan M, Gorczynski P, Rathod P, Gega L, Naeem F. Mental health service provision in low-and middle-income countries. Health services insights. 2017;10:1178632917694350.
6. Stephenson E. Mental disorders and access to mental health care. Statistics Canada= Statistique Canada; 2023.
7. Kavanagh BE, Corney KB, Beks H, Williams LJ, Quirk SE, Versace VL. A scoping review of the barriers and facilitators to accessing and utilising mental health services across regional, rural, and remote Australia. BMC Health Services Research. 2023;23(1):1060.
8. Rattray M, Fuss B, Shelby-James T, Phegan C, Manger S, Worley P, Lawn S. Exploring practice staffs' perspectives regarding professional roles, confidence, and motivations in delivering mental health care within rural general practice: a qualitative exploration. BMC Primary Care. 2024;25(1):395.
9. Moroz N, Moroz I, D'Angelo MS, editors. Mental health services in Canada: barriers and cost-effective solutions to increase access. Healthcare management forum; 2020: SAGE Publications

Sage CA: Los Angeles, CA.
10. Farrer LM, Walker J, Harrison C, Banfield M. Primary care access for mental illness in Australia: Patterns of access to general practice from 2006 to 2016. PLoS One. 2018;13(6):e0198400.
11. van Spijker BA, Salinas-Perez JA, Mendoza J, Bell T, Bagheri N, Furst MA, et al. Service availability and capacity in rural mental health in Australia: Analysing gaps using an Integrated Mental Health Atlas. Aust N Z J Psychiatry. 2019;53(10):1000-12.
12. Rosenberg S, Iorfino F, Hickie I. Redesigning Primary Mental Health Care for Enhanced Access, Equity and Quality. A Discussion paper.2023.
13. Bellairs-Walsh I, Byrne SJ, Bendall S, Perry Y, Krysinska K, Lin A, et al. Working with Young People at Risk of Suicidal Behaviour and Self-Harm: A Qualitative Study of Australian General Practitioners' Perspectives. Int J Environ Res Public Health. 2021;18(24).
14. Santa K, Dixon C, Ganga RN, Trainor G, Smith G, Furfie V, Brown H. Facilitating Access to Mental Health Services: A Stakeholder-Driven Improvement of the Children and Young People (CYP) as One Referral Platform. International Journal of Environmental Research and Public Health. 2024;21(6):784.
15. Kevat A, Manohar J, Bate N, Harris K. Online referral and immediate appointment selection system empowers families and improves access to public community paediatric clinics. Journal of Paediatrics and Child Health. 2019;55(4):454-8.
16. Doorley S, Holcomb S, Klebahn P, Segovia K, Utley J. Design Thinking Bootleg. 2018.
17. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International Journal for Quality in Health Care. 2007;19(6):349-57.
18. Miaskiewicz T, Kozar KA. Personas and user-centered design: How can personas benefit product design processes? Design Studies. 2011;32(5):417-30.
19. Pruitt J, Adlin T. The Persona Lifecycle: Keeping People in Mind Throughout Product Design Morgan Kaufmann; 2006.
20. Commission AHR. Dismantling systemic racism – perspectives from First Nations peoples: Australian Human Rights Commission; 2024 [Available from: https://humanrights.gov.au/about/news/media-releases/dismantling-systemic-racism-perspectives-first-nations-peoples.
21. RACGP TRCoGP. General Practice: Health of the Nation 2022. 2022.
22. Evans J, Horn K, Cowan D, Brunero S. Development of a clinical pathway for screening and integrated care of eating disorders in a rural substance use treatment setting. International Journal of Mental Health Nursing. 2020;29(5):878-87.
23. Hews-Girard J, Bright K, Barker M, Bassi EM, Iorfino F, LaMonica HM, et al. Mental health provider and youth service users' perspectives regarding implementation of a digital mental health platform for youth: A survey study. DIGITAL HEALTH. 2024;10:20552076241289179.
24. Davenport TA, LaMonica HM, Whittle L, English A, Iorfino F, Cross S, Hickie IB. Validation of the InnoWell Platform: Protocol for a Clinical Trial. JMIR Res Protoc. 2019;8(5):e13955.
25. LaMonica HM, Iorfino F, Lee GY, Piper S, Occhipinti J-A, Davenport TA, et al. Informing the Future of Integrated Digital and Clinical Mental Health Care: Synthesis of the Outcomes From Project Synergy. JMIR Ment Health. 2022;9(3):e33060.
26. O'Shea P, Bates, S., Katz, I., & Gendera, S. InnoWell Platform Summary Report. 2023.
27. AIHW. Rural and remote health. Canberra: Australian Institute of Health and Welfare; 2024.
28. Russell K, Rosenbaum S, Varela S, Stanton R, Barnett F. Fostering community engagement, participation and empowerment for mental health of adults living in rural communities: a systematic review. Rural Remote Health. 2023;23(1):7438.

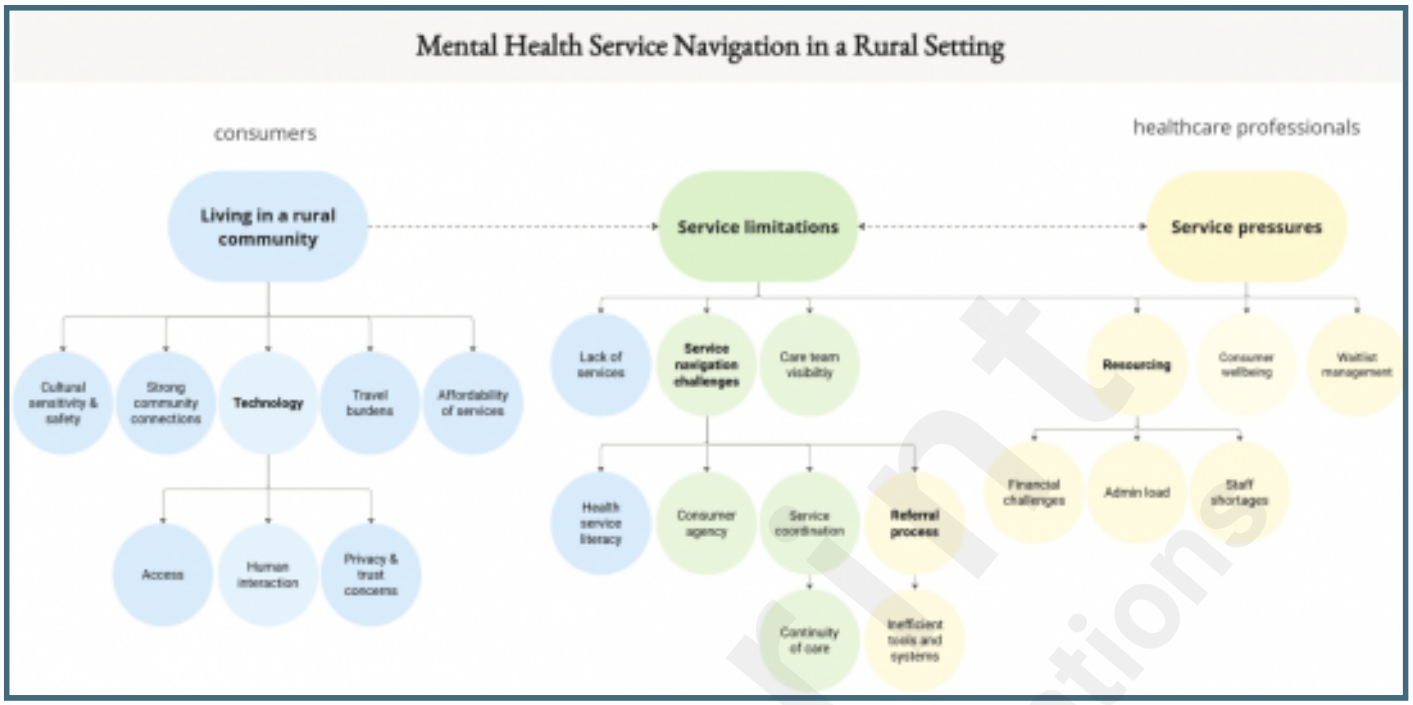
Supplementary Files

Figures

Participatory and human-centred design-thinking methodologies.

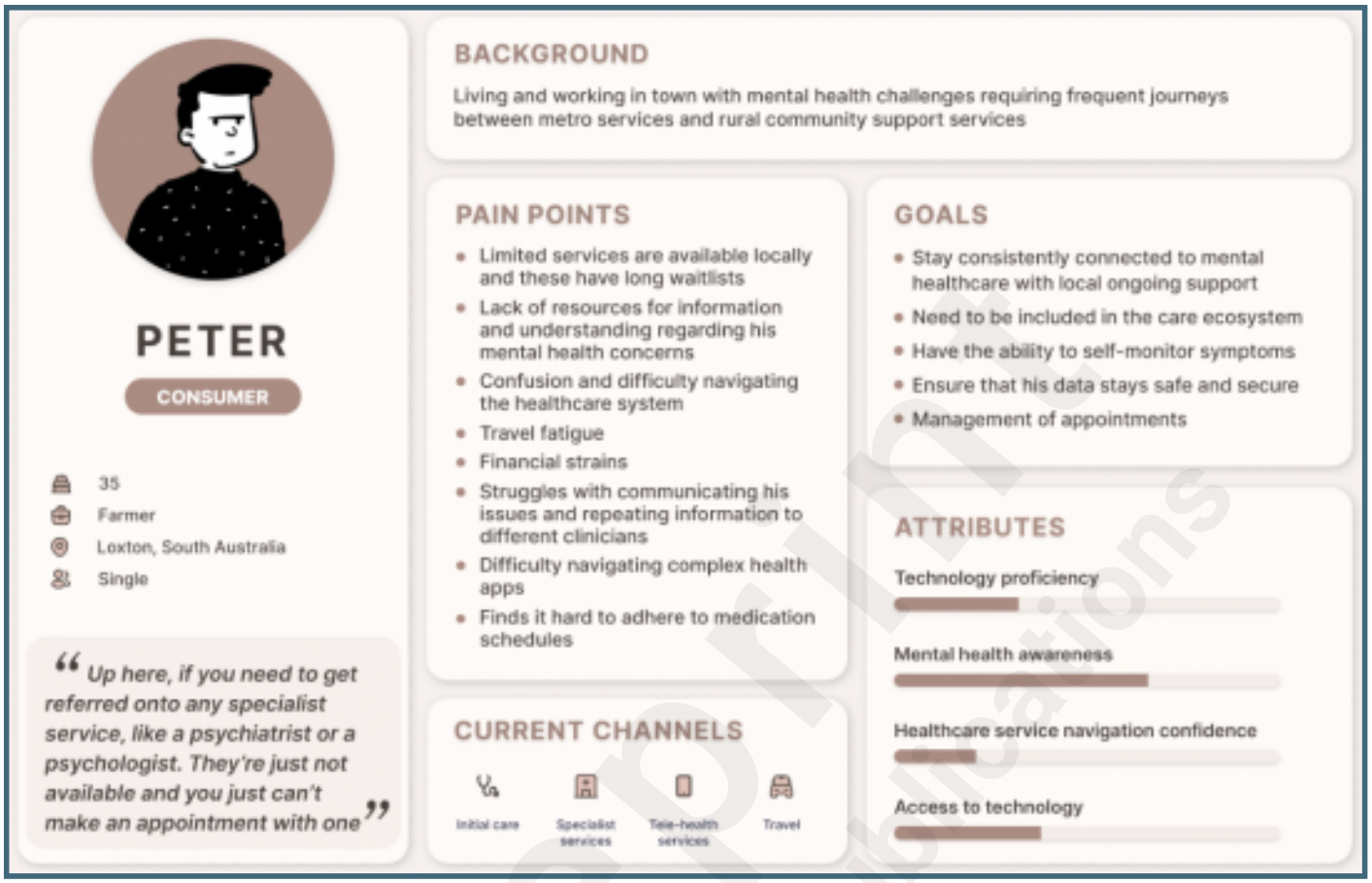


Coding tree of the main themes and subthemes identified from the focus group discussion.



Healthcare professional persona "Anna".

Consumer persona "Peter".



CONSORT (or other) checklists

Focus group discussion guide.
URL: http://asset.jmir.pub/assets/80fae07832ff5e45add3e6e79fb3ed11.pdf

CoreQ checklist.
URL: http://asset.jmir.pub/assets/ce55ff7489090d9193d854b60771be14.pdf