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“This Time, We Were First": From Recipients to Solution Shapers in the Co-Design of a Rehabilitation Service Innovation for Aging in Place in Underserved Rural Appalachia

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Abstract

Background

Community-engaged approaches are increasingly promoted as mechanisms for addressing health inequities in underserved communities. However, relatively little is known about how community members experience participation in service-development processes, particularly within places characterized by longstanding health disparities and histories of disenfranchisement from community and health-service decision-making.

Methods

We conducted a qualitative-dominant convergent mixed-methods evaluation of a community-engaged co-design of a rehabilitation service innovation supporting aging in place, undertaken in a medically underserved rural Appalachian community in Ohio. The process integrated a participatory regional governance structure (e.g., selecting a county in need and local participants for codesign), codesign toolkit (i.e., access mapping, user personas, and a menu of evidence-based program options with rural adaptations), and structured co-design workshops in the selected county. Participants included a regional Steering Committee (n = 7) and county-level Codesigners (n = 5). Anonymous participants standardized survey data were collected on the acceptability, feasibility, and appropriateness of the process and toolkit. Qualitative data were collected through focus groups and analyzed using inductive, interpretivist thematic analysis, validated by the participants.

Results

Participants reported highly favorable perceptions of both the co-design process and toolkit. No disagreement responses were observed across survey items. An overarching qualitative theme, *“Oh, You Want My Input?”: From Being Consulted to Shaping Solutions*, captured participants' experiences. Four themes emerged: (1) *“We Already Know the Gaps”*; (2) *“This Time, We Were First”*; (3) *“They Heard That”*; and (4) *“What Began Here Seems So Big.”* Together, these themes informed a proposed context-mechanism-outcome (CMO) pathway in which recognition of local expertise, inclusion in shaping priorities, and visible influence over decisions fostered ownership of a locally shaped service innovation and generated momentum for continued engagement and future collaboration.

Conclusion

Recognition, epistemic legitimacy, decision-making influence, and ownership emerged as potential mechanisms through which participation became meaningful within a historically underserved Appalachian community. Together, the findings informed a preliminary context-mechanism-outcome

pathway suggesting how community engagement may translate into ownership, sustained participation, and future collective action.

INTRODUCTION

The prevalence of older adults and people with disabilities is higher in rural than urban areas, including after adjustment for sociodemographic characteristics (Okoro et al., 2018; Sage et al., 2019; Varadaraj et al., 2021; Zhao et al., 2019). Rural residents also experience substantial barriers to healthcare and rehabilitation access that contribute to rural-urban inequities in health, functioning, participation, and aging in place (Mesmar et al., 2025; Swendener et al., 2025). As rural populations age and disability prevalence increases, access to home-based rehabilitation and community-based supports becomes increasingly important to support independence, participation, and aging in place; however, many rural communities continue to experience inequitable access to these services against a backdrop of constrained service capacity (Ayres et al., 2026; Jesus et al., 2026; Murad et al., 2024). Designing and implementing context-sensitive approaches to improve access to rehabilitation and community-based supports therefore remains an important public health and health-services priority (Ayres et al., 2026; Rhodes et al., 2021).

Although evidence-based strategies exist to improve rehabilitation access and support aging in place (National Council on Aging, 2026; Rahmati et al., 2023), translating evidence into practice remains challenging, particularly in rural, medically underserved areas (Epps et al., 2024; Rhodes et al., 2021). Many interventions require workforce capacity, infrastructure, funding, or implementation supports that may be unavailable in rural, resource-constrained settings. (Ayres et al., 2026; Wilkinson et al., 2022) In addition, rural communities differ substantially in geography, organizational capacity, partnerships, service availability, culture, and community priorities (Ayres et al., 2026; Hauck et al., 2019; Rhodes et al., 2021; Wilkinson et al., 2022). Therefore, determining which evidence-informed approaches are locally appropriate, feasible, and sustainable represents an important translational challenge (Epps et al., 2024; Rhodes et al., 2021).

Community-engaged approaches have increasingly been proposed as mechanisms for addressing this challenge (Aguilar-Gaxiola et al., 2022; Ayres et al., 2026; Epps et al., 2024). Community-based participatory research, co-design, integrated knowledge translation, and participatory implementation science all emphasize the need for context-sensitive, community-tailored service development and implementation approaches — including collaboration with community stakeholders in identifying priorities, interpreting evidence, and shaping solutions for local fit (Jull et al., 2017; Ramanadhan et al., 2024; Rhodes et al., 2021). By creating opportunities for community influence over local service development, these approaches may improve the relevance, acceptability, feasibility, and adoption of innovations while fostering local ownership and sustainability of resulting services and programs (Aguilar-Gaxiola et al., 2022; Jull et al., 2017).

The potential importance of community-based co-design may be particularly valuable in medically underserved rural Appalachian communities, within the United States. When compared to other rural American communities, rural Appalachia often experiences poorer health and adverse social determinants of health, including higher rates of chronic conditions, disability, poverty, workforce shortages, and other access-to-care barriers that intersect to compound multiple health and care-access inequities (Cronin, 2023; Hash et al., 2024; Rhodes et al., 2021). Furthermore, these inequities intersect with histories of disenfranchisement, externally driven development efforts, and resource allocation decisions (Keefe, 2009; Peine et al., 2020). Within such contexts, community-engaged approaches may serve not only as mechanisms for adapting evidence to local realities, hence its more likely implementation, but also as opportunities for communities to play a leading, equitable role in shaping evidence-based service innovations to their own culture, identity, and health priorities (Keefe, 2009).

Reviews of rural health innovation partnerships have highlighted the need for more systematic evaluation of engagement processes and stakeholder experiences (Tjandra et al., 2026; Wilkinson et al., 2022), while reviews of co-design have identified substantial variation in how participation is operationalized and evaluated. (Peters et al., 2024; Vargas et al., 2025). However, despite growing interest in community-engaged approaches and the manifestation of participation within co-design of health-service innovations (Lindblom et al., 2021), there remains limited understanding of how community stakeholders experience participation, influence, decision-making, and ownership within these co-design processes — particularly in medically underserved Appalachian communities with histories of disenfranchisement and externally driven decision-making (Keefe, 2009; Peine et al., 2020).

The aim of this study was to examine how stakeholders in a medically underserved Appalachian community experienced participation in the co-design of a response to local rehabilitation access inequities. Using a mixed-methods approach, we explored how community stakeholders experienced participation, influence, decision-making, and ownership throughout service development, alongside perceptions of the acceptability, appropriateness, and feasibility of the co-design process. By doing so, we sought to better understand how community engagement may contribute to the development of locally relevant and community-owned responses to persistent health inequities.

METHODS

Study Design

This study employed a qualitative-dominant mixed-methods design to examine stakeholder experiences within a community-engaged co-design process used to develop a rehabilitation service innovation supporting aging in place in a medically underserved Appalachian community in Ohio. The evaluation examined perceptions of the acceptability, appropriateness, and feasibility of the co-design process and toolkit, alongside qualitative experiences of participation. A companion paper describes the resulting community-led rehabilitation service model **<blinded>**; the present study focuses on participants' experiences of the co-design process.

Ethics

The Ohio State University Institutional Review Board approved the study (STUDY20250099). All participants provided written informed consent, including consent to be acknowledged as participants. Qualitative quotations are attributed by participant role and not linked to participant identities.

Overview of the Community-Engaged Co-Design Process

The evaluated process comprised six phases (Fig. 1): (1) development of county-level maps of rehabilitation access across Ohio; (2) Steering Committee (SC) review of these data to select the target county for codesign and identify county-level Codesigners; (3) development of a codesign toolkit; (4) county-level codesign of a rehabilitation service innovation supporting aging in place; (5) SC review of the resulting model; and (6) mixed-methods evaluation of participants' experiences of the community-engaged process. After describing the participants, we describe Phases 1–6 and then the data synthesis. While the procedures of our six-phase co-design process are described below, the data synthesis is focused on the stakeholders' experiences being involved in the co-design process.

[Figure 1 here]

Participants

The community-engaged process involved two stakeholder groups with complementary roles: a regional SC and county-level Codesigners. SC members were purposively recruited based on expertise in aging, disability, rehabilitation, community health, rural service delivery, policy, and community-engaged research. During the early phases of the process, SC members reviewed county-level data, selected the target county for co-design, and identified local stakeholders to participate as Codesigners. Following completion of the county-level workshops, SC members reviewed the resulting model and provided feedback regarding implementation and transferability.

County-level Codesigners were recruited to represent organizations and services supporting older adults and people with disabilities within the target community. Participants included representatives from public health, aging services, community health, behavioral health, and community-based organizations. Codesigners contributed local knowledge, lived and professional experience, and community-specific perspectives throughout the co-design.

Participant characteristics, organizational affiliations, and inclusion rationales are summarized in Table 1.

Table 1

Participants in the whole community-based codesign, organized by role. All participants were offered hourly-based participant-incentive compensation for the time spent in the role.

Name	Affiliation	Position	Inclusion Rationale
Steering Committee Members			
Jamie Herrmann	Area Agency on Aging District 7 (1); Ohio Association of Area Agencies on Aging (2)	Executive Director (1); Board of Directors, member (2)	Oversee senior support services for one of the rural Appalachian regions, Ohio, and knowledgeable of these services statewide.
Jennifer Westfall	Buckeye Hills Regional Council (1); Ohio Association of Area Agencies on Aging (2)	Executive Director (1); Board of Directors, member (2)	Oversee senior support services for one of the rural Appalachian regions, Ohio, and knowledgeable of these services statewide.
Summer Kirby	Ohio Association of Community Health Centers (1); Compass Community Health Clinic (2); Southeast Ohio Community Advisory Board (3)	Chair of the Board of Directors (1); Chief Executive Officer (2); Board Member (3)	Runs a Federally Qualified Health Center in the region, leads the state association of community health centers, and is an experienced advisor on community-engaged research.
Michelle Stumbo	The Ohio State University Extension Offices	Area 24 Leader and Extension Educator	Conducts numerous extension activities in the target areas out of a large state university
Jennifer Kucera	Ohio's Developmental Disabilities Council & Ohio Olmstead Task Force (1). Center for Disability Empowerment (2). UnitedHealthcare Board: People with Complex Care Needs (3)	Task Force Chair (1); Healthcare Outreach Coordinator (2); Advisory Board Member (3)	Knowledge of long-term and disability-related services, funding, laws, integrated service models and overall supports.
Beverly Stringer	Clinical and Translational Science Institute (OSU) & The Appalachian Translational Research Network	Southeast Ohio Community Engagement Manager	Experienced advisor on community-engaged research in the region
Joe Lemon	Corporation for Ohio Appalachian Development (COAD)	Senior Programs Division Director	Runs the senior programs for a regional organization providing community and volunteering services for the region.
County-level Codesigners – Meigs County, OH, USA			
Rhonda Rathburn	The Blakeslee Center / Meigs Council On Aging	Community Care Coordinator	Knowledgeable of all senior and long-term home & community-based supports

Name	Affiliation	Position	Inclusion Rationale
			provided currently and historically
Marcus Barr	Meigs County Health Department	Health Commissioner	Knowledgeable of population health, health service landscape, funding and initiative to improve access to care
Michelle Gorman	Ohio University	Community Health Worker	Representative of regional Community Health Workforce Programs
Elizabeth Jones Ramirez	Integrated Services for Behavioral Health	County-Level Manager, Meigs	County-level representative of a healthcare provider on integrated community-based mental health service
Robin Dewey	Corporation for Ohio Appalachian Development	Senior Companion Coordinator for Meigs among other counties	Local representative of a regional organization providing volunteer support and other companions to seniors

[Table 1 here]

Phase 1–2: County Mapping and Selection of the Co-design Community

Researchers developed interactive county-level maps aggregating indicators of rehabilitation access, disability, and vulnerability indicators across Ohio using publicly available data sources. Details of how these maps were developed are available from elsewhere (Jesus, 2026). These maps were reviewed by the Steering Committee (SC) through a structured deliberative process to identify a medically underserved community likely to benefit from codesign. Meigs County, Ohio, was selected as the target community, and SC members subsequently identified local stakeholders to participate as county-level Codesigners based on their knowledge of related community services.

Phase 3: Co-Design Toolkit

To support evidence-informed community-engaged co-design, the research team developed a toolkit comprising detailed county-level maps, user personas, and a menu of evidence-based service-delivery options and rural implementation adaptations. The toolkit was intended to facilitate collective sensemaking, support community-led decision making, and ensure that co-design activities were informed by both local knowledge and research evidence. **Supplementary Appendix 1** provides the complete toolkit used during the co-design, including each of the tools described below.

Detailed Maps

Detailed interactive maps were developed using county-level rehabilitation access, disability, and demographic data, disaggregated from the maps in Phase 1. For example, aggregated indicators of disability prevalence and rehabilitation need were disaggregated in need type (e.g., normalized rates of all conditions providing neurological sequalae) and then for specific conditions (e.g., normalized stoke prevalence rates). The maps enabled visualization and comparison of specific county-level needs and resources and provided quantitative, comparative, and interactively mapped data supporting a community situation assessment.

User Personas

Four user personas representing common aging-in-place experiences among rural older adults with disabilities and caregivers were developed from evidence synthesis, prior qualitative interviews, and stakeholder feedback (Masterson et al., 2026). Personas were used to incorporate qualitative service-user experiences, priorities, support needs, and access barriers into deliberations and decision-making.

Menu of Evidence-Based Options

A menu of evidence-based options was developed through knowledge translation and toolkit-development methods, drawing upon existing evidence repositories, reviews, guidelines, and program descriptions (Jesus, 2026). The menu synthesized rehabilitation service strategies, workforce innovations, and community-based interventions using accessible descriptions of purpose, evidence base, implementation requirements, and potential adaptations.

Collectively, these tools were designed to facilitate evidence-informed collective sensemaking and support community-led deliberation and decision making from the situation assessment to the local solution co-design.

Phase 4–5: County-Level Codesign and Steering Committee Input

County-level co-design was guided by a Double Diamond framework (Patil et al., 2026; Sevillano-Garayoa et al., 2026) and involved two 2.5-hour in-person workshops, facilitated by the lead researcher (TJ) with the support of an assistant researcher (KM), conducted a few days apart.

Workshop 1 focused on developing a community situation assessment using a Strengths-Weaknesses-Opportunities-Threats (SWOT) framework (Jesus et al., 2023) applied to Meigs County’s context. Guided by the co-design toolkit and the lived experiences of Codesigners, participants identified local strengths, challenges, unmet needs, and opportunities related to aging in place and rehabilitation access. Drawing on these discussions and the Menu of Evidence-Based Options, Codesigners deliberated and preliminarily selected locally appropriate service options for inclusion in a proposed rehabilitation service model.

Between workshops, researchers synthesized workshop outputs, facilitator notes, and audio recordings into a preliminary service model's conceptual map. This synthesis aimed to represent participants' contributions while preserving the community-generated model.

Workshop 2 focused on refining the initial service model concept, specifying operational components and potential funding mechanisms, and identifying implementation requirements, barriers, facilitators, and adaptation strategies. Participants reviewed the synthesized model and collaboratively refined proposed service components, implementation approaches, community partnerships, and sustainability considerations.

Researchers served as facilitators of the co-design rather than designers of the resulting service model. Facilitators introduced activities and toolkit resources, provided clarification, synthesized participant contributions, and ensured equitable participation (Lindblom et al., 2021). Researchers avoided directing the content of the proposed service model.

Following completion of the workshops, Steering Committee members participated in structured focus group discussions regarding implementation, operationalization, sustainability, and transferability of the resulting model to other underserved rural communities, before the final validation by the county-level co-designers.

Phase 6: Mixed-Methods Stakeholder Evaluation

Following completion of all community-engaged co-design activities, participants were invited to participate in a mixed-methods evaluation of their experiences with the process.

Quantitative evaluation data were collected through anonymous surveys, distributed via Qualtrics, assessing perceptions of the overall co-design process and tools. Surveys incorporated the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM) (Weiner et al., 2017). All participants evaluated the community-engaged process experiences, whereas experience evaluations of the co-design toolkit were completed only by county-level Codesigners.

Qualitative evaluation data were collected through separate focus group discussions with Steering Committee Members and Codesigners. To facilitate scheduling and encourage interaction, Steering Committee Members participated in two virtual focus groups (approximately one hour each), whereas Codesigners participated in a single, 50-minute in-person focus group immediately following the final workshop. Discussions explored participants' experiences of stakeholder roles, the whole community-engaged process, its facilitation, strengths, limitations, and recommendations for refinement.

Aligned with community-engaged participatory research principles, this evaluation was conducted by the same principal investigator and research assistant who had attended and/or facilitated the preceding Steering Committee meetings and co-design workshops. Participants were informed that the purpose

was to outline experiences and identify any strengths, limitations, and opportunities to improve future iterations of the co-design process rather than to validate it.

Participation in the evaluation was voluntary and distinct from participation as a Steering Committee Member or Codesigner. Participants received a separate $40 incentive for the evaluation activities.

Data Synthesis

This study employed a qualitative-dominant convergent mixed-methods design (QUAL+quan). Quantitative and qualitative data were analyzed separately and integrated during interpretation.

Quantitative AIM, IAM, and FIM data were summarized using descriptive statistics such as percentages of "completely agree" ratings. Qualitative data were analyzed using inductive thematic analysis (Braun & Clarke, 2006), within an interpretivist perspective. It aimed to understand how participants experienced and made sense of the engagement with the community-engaged co-design.

Focus group transcripts were read repeatedly and independently by the two investigators to achieve familiarity with the data. Initial codes were generated inductively from participants' accounts and iteratively refined through constant comparison across transcripts and stakeholder groups. Related codes were subsequently organized into candidate themes, which were reviewed, discussed, and refined until a coherent thematic structure was developed. The two primary analysts' experiential familiarity with the evolving process informed interpretation throughout the analysis and helped contextualize participant narratives within the broader co-design journey. Participants provided final validation of the qualitative findings. Reporting followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (Tong et al., 2007).

Following development of the thematic structure, the research team undertook an additional interpretive synthesis to examine relationships among themes and identify a higher-level explanatory pathway. This process explored how themes interacted sequentially and conceptually, culminating in a proposed context-mechanism-outcome (CMO) pathway (Wong et al., 2016) explaining how participation became meaningful within the studied community context. Consistent with realist principles of context-sensitive theory development (Wong et al., 2016), the resulting pathway was treated as an initial program theory intended to inform future theory testing and refinement.

RESULTS

We present the results of our stakeholders' experiences being involved in our community-engaged co-design process, which were assessed through a mixed-methods evaluation.

Quantitative Findings

Survey findings indicated favorable perceptions of both the community-engaged co-design process and the supportive tools (Table 2). Across all AIM, IAM, and FIM process items, no disagreement responses

were observed, and all received either *agree* or *completely agree* ratings. The process items *"This community-engaged process is appealing to me"* and *"I welcome this community-engaged process"* received unanimous *completely agree* ratings.

Table 2
Summary of AIM, IAM, and FIM Survey Findings reported by Steering Committee Members (SCMs) and Co-Designers (CDs).

Indicator	Community-Engaged Co-Design Process (SCMs + CDs)	Supportive Co-Design Tools (CDs only)
Items with no disagreement responses	100% (12/12 items)	100% (12/12 items)
Items receiving ≥ 80% "completely agree" ratings	100% (12/12 items)	66.7% (8/12 items)
Items receiving ≥ 60% "completely agree" ratings	100% (12/12 items)	100% (12/12 items)
Items receiving > 1 neutral response	0% (0/12 items)	8.3% (1/12 items)
Range of item endorsement (% completely agree)	71.4%-100% (5–7/7 respondents)	60%-100% (3–5/5 respondents)

Note. Percentages of "completely agree" ratings were calculated using valid responses for each item (excluding no-response [NR] values). One SCM had missing responses for three AIM items.

Ratings of the supportive co-design tools were similarly positive, although responses showed slightly greater variability. All tool-related items were endorsed positively, with no disagreement responses observed. All items received *completely agree* ratings from at least 60% of respondents. The only item receiving more than one neutral response concerned the ease of using the tools to facilitate the co-design process.

Qualitative findings helped explain how participants experienced the co-design process and provide context for these overall favorable ratings.

<Table 2 here>

Qualitative Findings

An overarching theme, **"Oh, You Want My Input?": From Recipients to Solution Shapers**, captured participants' experiences of the community-engaged co-design process. Across interviews, both regional SC and county-level Codesigners (CDs) described the process as different from previous initiatives in which these communities were typically solution recipients or consulted only after solutions had already been developed elsewhere. Instead, participants described a process that recognized local expertise, fostered community ownership, translated community knowledge into tangible outputs, and generated a willingness for continued engagement.

Four interrelated themes captured key dimensions of this experience, as outlined below.

Theme 1: “We Already Know the Gaps”: Local Expertise as the Foundation for Design

Participants consistently described local knowledge and lived experience as essential forms of expertise for addressing rehabilitation access inequities. The co-design was valued because it created opportunities for these forms of knowledge to shape service development. SCMs described their role as helping identify an appropriate community and providing strategic perspectives, while Codesigners contributed lived experience and detailed understanding of local realities. Participants perceived these roles as distinct yet complementary.

One SCM reflected positively on this structure:

“I like how you started with the steering committee to select [the target community].” […] Having that [Steering Committee] role completely separate [from the Local Codesigner role] is smart.”(SCM5)

Similarly, participants consistently described local knowledge as an essential source of expertise for designing a meaningful community-based service innovation. Codesigners emphasized that the process was successful because it acknowledged knowledge developed through lived and professional experiences. As one participant explained:

“Yeah […] I think that [the community-led co-design] was really great! […] because we’ve been living in it. And I think part of [what is different about this co-design] is the people in this room, we already know what the gaps are.”(CD2)

Participants viewed these experiences not merely as opinions about community needs but as a legitimate and valued form of expertise derived from living and working within the local context. This perspective was shared by SCMs; for example one member emphasized the following:

“I definitely see the benefit of having people that are doing more of the boots on the ground, and the work, and are living in the communities. […] If you had a bunch of therapists in the room [i.e. those already working in traditional health facilities], [they] would come up with all the reasons why we couldn't bill for it and why it wouldn't work. And so putting [community servants] in the room to come up with a good idea, that is a good idea.”(SCM5)

Together, these accounts suggest that participants viewed local expertise not as an adjunct to professional knowledge, but as a foundational source of evidence for identifying priorities and shaping community-relevant service innovations.

Theme 2: “This Time, We Were First”: Finally Being Invited to Shape and Own Solutions

Participants repeatedly contrasted the co-design process with previous experiences in which rural communities received programs developed elsewhere. Being selected as the focus of the project generated feelings of pride, recognition, and ownership, particularly within a community that participants felt had historically been overlooked in decision-making capacity, self-determination, and ownership. Participants described this co-design process as distinct because it invited community stakeholders to help shape solutions from the outset rather than adopt or adapt interventions developed elsewhere. One Codesigner's description was illustrative with that regard:

"We sometimes get the trickle-down money—and we're told, 'Hey, there's a program in [the State's capital], and we did this [program], and now we're giving money to all the counties, and you're going to do this.' And we're like… Well, first, we don't need that. Second, that's not going to work for us the way it is [designed]."(CD2)

Another participant emphasized the importance of local tailoring:

"[Our county] is not a cookie-cutter set up."(CD3)

These accounts suggest that participants viewed local tailoring not simply as a matter of adaptation, but as a prerequisite for early developing service-delivery solutions that reflected community realities and priorities. Some participants also expressed frustration with what they perceived as externally driven decision-making processes, in which communities were expected to implement solutions while having little influence over how programs or resources were designed or allocated. As one Codesigner explained:

"*You got your businessmen at the [centralized institutions], 'we want to do this.' And then you've got your workers down here. You know, that money stays up there, to keep control […] That's so frustrating*."(CD3)

This participant contrasted centralized planning and control with a desire for solutions that emerged from, and responded directly to, local community needs and priorities.

SC members recognized these dynamics as well. One reflected on how attention and resources in Southeast Ohio often gravitate toward larger communities:

"*[Other larger institutions/communities in the region] casts a very large shadow unintentionally; […] when things went to happen in that part of the state, they automatically went [elsewhere]. So Meigs probably is proud to be first this time*."(SCM3)

Participants therefore interpreted being "first" not only as symbolic recognition but also as an opportunity to influence how solutions were designed for their community.

Participants also emphasized that ownership emerged because the process positioned community members as Codesigners themselves rather than program recipients. Reflecting on this approach, one Codesigner noted:

“People like to feel like they're being talked to… it's a conversation, not someone talking down to or telling them what they think is best.”(CD5)

Another described how unusual this experience felt:

“*[We] are not always used to being part of the conversation, so it might take people a minute to even wrap their heads around, ‘Oh, you want my input?’*”(CD6)

Together, these findings suggest that ownership emerged not merely through participation, but through being invited early to shape decisions and contribute to solutions that reflected community priorities. Participants described the process as one in which their perspectives were genuinely valued, creating a sense of shared responsibility and ownership over the resulting co-designed innovation.

Theme 3: “They Heard That”: Seeing Community Ideas Take Shape

Participants valued the structured nature of the co-design as it transformed discussions into tangible outputs. Although some participants initially felt overwhelmed by the amount of information handled, particularly given that they were not rehabilitation professionals, they generally described becoming increasingly engaged as the workshops progressed. One Codesigner recalled:

“I came into this kind of completely, everything being unknown, and I remember thinking, ‘Well, this is a lot,’ […] but I feel like as the time went on, I mean, I found it pretty engaging.”(CD6)

As the process evolved, Codesigners saw their ideas synthesized, organized, and reflected back to the group in outputs that remained recognizable as their own. One participant reflected:

“We show up today [second co-design session], and you have the entire map [of our ideas] already [put together], you know, and I thought… They heard that, they heard that, they heard that. I was impressed!”(CD2)

Participants highlighted the value of integrating multiple forms of evidence and representation throughout the process. Personas helped participants connect abstract challenges to familiar individuals and lived experiences, while county-level maps provided data and contextualized observations they already made in their communities. Reflecting on the combined use of these tools and their enabling for the community-based codesign, one participant explained:

“Those personas were really helpful to me, and I think what happens is we all know someone. We all know someone that's one of those personas, right? […] You're like, ‘Oh, there's my mom right there, I see that,’ right? […] Seeing actual numbers for me was [also] really helpful.”(CD6)

Rather than privileging one form of evidence, participants appreciated the opportunity to combine personas’ narrative and quantitative information when shaping solutions. As the same participant summarized:

“Everyone's got a different brain, right? And so we all interpret data differently. I lean more towards the qualitative, so, like, I love having the personas… but there's that part of me that knows, like, but you can't get the work done without the data. […] I need both”(CD6)

All these experiences suggest that structured co-design facilitated collective sensemaking by making community knowledge visible, organized, synthesized, and actionable. Participants valued not only being enabled to contribute ideas, but also being able to see those ideas reflected in tangible outputs that remained recognizable as their own and ultimately informed the development of a community-owned service innovation.

Theme 4: “What Began Here Seems So Big”: Building Momentum for What Comes Next

While participants were highly positive about the co-design and its primary focus on co-ideation, many viewed it as the beginning of a larger effort rather than a completed endeavor. Rather than signaling closure, the workshops appeared to generate momentum, optimism, and a desire to carry the work forward.

While participants recognized that the workshops had achieved their intended purpose:

“If the goal was [to co-ideate on a new service model, the time in the task] was appropriate.”(CD4)

Yet, another Codesigner captured the willingness for more:

“What begun here seems so big, and the amount of time that we have spent together seems so minuscule [for making this solution fully operational].”(CD1)

While another Codesigner framed their desire for additional engagement because of becoming invested in the process:

“I want to know everything about every fall risk program [in the Menu of Options], so I can give you great feedback on it.”(CD2)

Participants also expressed interest in broadening participation and bringing additional community perspectives into future phases. As one Codesigner noted:

“It could benefit from more voices from the community.”(CD1)

Interestingly, the desire for continued involvement was not limited to Codesigners. Reflecting on the intentional separation between SCM and Codesigner roles, one SCM remarked:

“Having that role completely separate is smart. [However], I would have loved to sit in this discussion [i.e., community-level codesign]. It sounds very fascinating.” (SCM5)

Another SCM reflected on both the excitement and hope for the operationalization of the co-ideated model:

"The one thought that keeps coming into my head is that if we could crack this nut, it would be amazing!" (SCM3)

Collectively, these accounts suggest that participants viewed the co-design process not as a completed activity, but as the beginning of a broader community effort. Rather than simply generating a service model idea, the process appeared to build momentum for further co-production, generating optimism, continued interest in engagement, and a shared vision for operationalizing, and ultimately implementing the resulting community-designed service innovation.

Proposed Context-Mechanism-Outcome (CMO) Pathway of Meaningful Place-Based Community Engagement

Taken together, the four themes suggest a coherent pathway through which participation in the community-led codesign became meaningful within this historically underserved and disenfranchised Appalachian community. Figure 2 presents a proposed context-mechanism-outcome (CMO) pathway derived from the qualitative findings that illustrate how participation became meaningful within this context. As illustrated in Fig. 2, participants described local expertise as a legitimate foundation for identifying needs and shaping priorities ("We Already Know the Gaps"), experienced recognition and inclusion in setting priorities ("This Time, We Were First"), and observed their contributions visibly influencing decisions ("They Heard That"). Within the context of a community characterized by histories of externally driven service development, centralized decision-making, and limited local influence over service priorities, these mechanisms appeared to foster ownership of the resulting service innovation and generate momentum for continued engagement and future collaboration ("What Began Here Seems So Big").

<Figure 2 here>

DISCUSSION

This study examined how stakeholders in a medically underserved, historically disenfranchised Appalachian community experienced participation in the development of a locally tailored service-delivery response to local rehabilitation access inequities. Although participants rated the process as highly acceptable, appropriate, and feasible, the qualitative findings suggest that its significance extended beyond process and toolkit evaluations. Rather than simply describing a co-design process, participants described how local expertise, recognition, visible influence over decision-making, and community ownership supported their transition from recipients of externally developed solutions to co-designers of locally owned responses grounded in community experience. Viewed collectively, the findings suggest that community engagement may contribute to health equity not only through the interventions it produces but also through expanding opportunities for community participation and

influence over decisions affecting community wellbeing. In this study, participants' accounts repeatedly linked those opportunities to the historical and contextual characteristics of their community. From this perspective, a historically disenfranchised and underserved place may shape not only the distribution of services and resources but also opportunities for participation, recognition, knowledge legitimacy, and influence over how services are designed, prioritized, and governed. The community-led co-design process appeared to redistribute influence by expanding whose voices were heard, whose expertise was treated as legitimate, and whose priorities shaped local service development.

A central finding was the importance of recognition within a community that participants perceived as historically overlooked. The theme *"This Time, We Were First"* reflected more than enthusiasm for participation; it reflected the novelty and significance of being invited to shape priorities rather than receiving solutions developed elsewhere. Participants repeatedly contrasted the co-design process with previous experiences in which programs were developed outside the community and subsequently introduced for local implementation. For participants, being included in shaping priorities appeared to constitute a meaningful outcome in its own right (Aguilar-Gaxiola et al., 2022). This interpretation resonates with theories of recognition, which emphasize that participation becomes meaningful when people experience their knowledge, identities, and contributions as legitimate and capable of influencing collective decisions (Honneth, 1995). It also aligns with scholarship suggesting that meaningful community engagement extends beyond consultation to include genuine influence over decisions and community-led approaches affecting community wellbeing (Aguilar-Gaxiola et al., 2022; Nickel & Hunt, 2024). Participants' accounts suggest that recognition was experienced not simply as interpersonal validation but as inclusion in processes that shape local health-service priorities.

The findings further highlight the role of local expertise in shaping perceptions of participation and legitimacy. Through the theme *"We Already Know the Gaps,"* participants emphasized that community members did not need external experts to identify unmet needs because they lived and worked within those realities. This observation aligns with community-based participatory research traditions (Jull et al., 2017; Ramanadhan et al., 2024) and broader discussions of epistemic justice, which question the privileging of professional or institutional knowledge over lived experience (Fricker, 2007; Ohta & Ichinose, 2026). Participants did not reject scientific or professional expertise; rather, they challenged assumptions that it should take precedence over community knowledge in defining local needs, problems, and priorities. The co-design process appeared meaningful because it created opportunities for scientific and community knowledge to inform one another, establishing local experience as a legitimate source of evidence within decision-making. Within the present process, local knowledge was not merely consulted; it informed needs identification, evaluation of evidence-informed options, and service-development decisions.

The theme *"They Heard That"* suggests that recognition and knowledge legitimacy alone were insufficient. Participants emphasized that they could see their contributions reflected in concept maps, service models, and subsequent workshop activities. This observation is consistent with procedural justice theories, which posit that perceptions of fairness depend not only on opportunities for

participation but also on evidence that participation influences outcomes (Abelson et al., 2003; Tyler, 2000). Participants appeared to judge the authenticity of engagement according to whether their contributions visibly informed decisions, consistent with scholarship emphasizing that meaningful community engagement requires influence over decision-making rather than participation alone (Aguilar-Gaxiola et al., 2022). These findings suggest that visible connections between stakeholder input and decision-making may represent a critical mechanism through which trust, ownership, and meaningful engagement become established in community-engaged initiatives.

The findings also provide insight into how ownership emerged. Participants frequently described the resulting service model using language suggestive of collective responsibility, investment, and pride. These accounts resonate with theories of psychological ownership, which describe how people come to perceive initiatives as “ours” rather than imposed by others (Pierce et al., 2001). Ownership appeared to emerge when participants experienced recognition, saw local knowledge treated as legitimate, and observed their contributions visibly incorporated into decisions. Viewed in this way, ownership may represent a social mechanism through which communities become invested in addressing local inequities and sustaining collective action.

The theme *“What Began Here Seems So Big”* suggests that participants viewed co-design not as a discrete event but as the beginning of an ongoing partnership. Rather than signaling completion, the process generated momentum for continued refinement and operationalization of the resulting service innovation. Participants' desire for broader participation, deeper engagement with evidence-informed options, and involvement in future phases suggests that co-design may serve not only as a mechanism for generating locally relevant solutions but also as a catalyst for sustained collective action and a foundation for continued partnership development (Cunningham-Erves et al., 2024; D'Agostino et al., 2026; Pearce et al., 2020). Continued engagement appeared to reflect investment in the resulting innovation rather than dissatisfaction with the process.

Finally, as a preliminary program theory, the pathway proposed in Fig. 2 is intended not as a definitive explanation but as a transferable and testable proposition. The findings suggest that meaningful engagement depends not simply on opportunities for participation, but on opportunities for recognition, knowledge legitimacy, and visible influence over consequential decisions. Importantly, the proposed pathway highlights how these mechanisms operated within an Appalachian context characterized by histories of disenfranchisement, externally driven development, and limited local influence over service priorities (Keefe, 2009; Peine et al., 2020).

Future realist evaluation research (Wong et al., 2016) should examine whether similar mechanisms operate in future co-production and co-implementation phases, and across different underserved communities, health-service contexts, and implementation settings, and how contextual factors such as partnership history, governance structures, community readiness, resource availability, and power relationships shape subsequent outcomes. Such work could refine, expand, or challenge the proposed pathway and contribute to a more generalizable theory of meaningful community engagement and

community-led health-service innovation. Consistent with realist approaches to theory development, the pathway provides an initial explanation of how meaningful participation may become translated into ownership, continued engagement, and future co-production within historically underserved communities.

LIMITATIONS

Several limitations should be considered when interpreting these findings.

First, this study was conducted within a single medically underserved Appalachian county and involved a relatively small number of SC Members and Codesigners. The findings therefore reflect a specific community-engaged process situated within a particular social, historical, and service-delivery context. Their transferability may depend on the extent to which other settings share similar characteristics, including histories of rural disadvantage, service fragmentation, and limited participation in health-service decision-making.

Second, participants evaluated a specific community-engaged process conducted within an established network of relationships and local contextual conditions. Experiences of recognition, ownership, participation, and influence may depend on community readiness, partnership history, facilitation approaches, and stakeholder composition.

Third, although the co-design toolkit incorporated service-user perspectives through personas informed by prior work involving older adults with disabilities and caregivers, end users did not directly participate in the county-level co-design workshops. Consequently, the resulting service model was co-designed primarily by community stakeholders and service-system representatives rather than intended service users. Future research should include a wider range of stakeholders as co-designers.

Fourth, this study evaluated perceptions of the co-design process rather than downstream implementation outcomes. Although participants reported highly favorable perceptions of the process, these findings do not necessarily translate into successful implementation, sustainability, or improvements in rehabilitation access and aging-in-place outcomes.

Finally, the researchers were closely involved in facilitating the community-engaged process. Consistent with the interpretivist orientation of the study, this involvement provided contextual understanding but may also have influenced data collection, interpretation, and participant responses. Although the process sought to expand community influence over decision-making, important forms of influence remained with the research team and affiliated academic institutions. The redistribution of influence described by participants should therefore not be interpreted as the elimination of power asymmetries, but rather as an effort to create more equitable opportunities for community influence within an ongoing community-academic partnership. Efforts to enhance rigor included anonymous surveys, participant validation of qualitative findings, and iterative discussion of interpretations among the research team.

CONCLUSION

Taken together, the findings suggest that community engagement may contribute to health equity not only through the generation of locally relevant services but also through the redistribution of influence within service-development processes. The findings indicate that health inequities may involve not only unequal access to services, resources, and outcomes, but also unequal opportunities to influence the decisions through which those services and resources are designed, prioritized, and governed. In this medically underserved and historically disenfranchised Appalachian context, participation became meaningful when community members experienced recognition, saw their local knowledge treated as legitimate, and observed their contributions shaping tangible decisions and outcomes. The progression observed across themes, from local expertise, to recognition, to epistemic legitimacy, to decision-making influence, and ultimately to ownership, partnership development, and collective action, informed a preliminary program theory explaining how participation becomes meaningful within historically underserved communities. The findings further suggest that place may shape not only the distribution of health services and resources, but also the distribution of opportunities for participation, recognition, knowledge legitimacy, and decision-making influence. Community-engaged co-design may therefore contribute not only to the development of locally relevant service innovations, but also to strengthening community capacity and community-academic partnerships capable of supporting future implementation, adaptation, and community-led action. The case therefore contributes not simply to the co-design literature, but to broader debates concerning participation, power, place, equity, and the role of community partnership in the translation of evidence into health-service innovation.

Declarations

Conflict of interest statement:

The authors declare no conflicts of interest.

Authors contributions:

Kaleb Masterson

Investigation; Data Curation; Formal analysis; Validation; Writing - Review & Editing

Lisa Juckett

Methodology; Writing - Review & Editing

Cory Cronin

Conceptualization; Methodology; Writing - Review & Editing

Tiago S Jesus: Conceptualization; Methodology; Investigation; Formal analysis; Writing - Original Draft; Supervision; Project administration; Funding acquisition

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Data Availability Statement

Qualitative data supporting the findings of this study are not publicly available because they contain information that could reasonably identify individual participants, organizations, or the study setting within a small rural community, even after de-identification. Access to selected de-identified materials may be available from the corresponding author upon reasonable request, subject to ethical, institutional, and community-partnership considerations.

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Figures

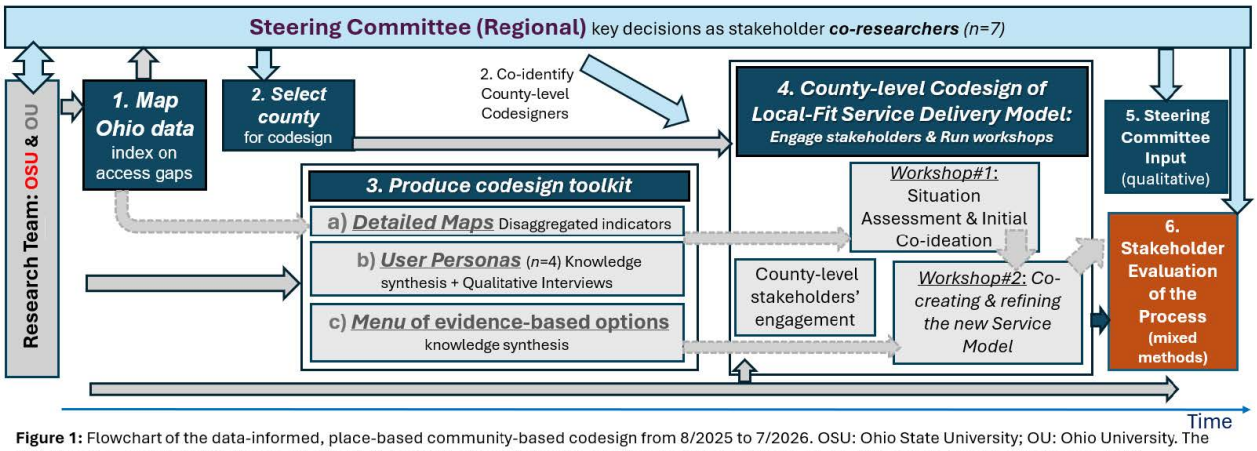


Figure 1: Flowchart of the data-informed, place-based community-based codesign from 8/2025 to 7/2026. OSU: Ohio State University; OU: Ohio University. The step #6 is the one whose results are reported in this paper, on evaluating the experiences with the whole community-engaged process that preceded it.

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Figure 1

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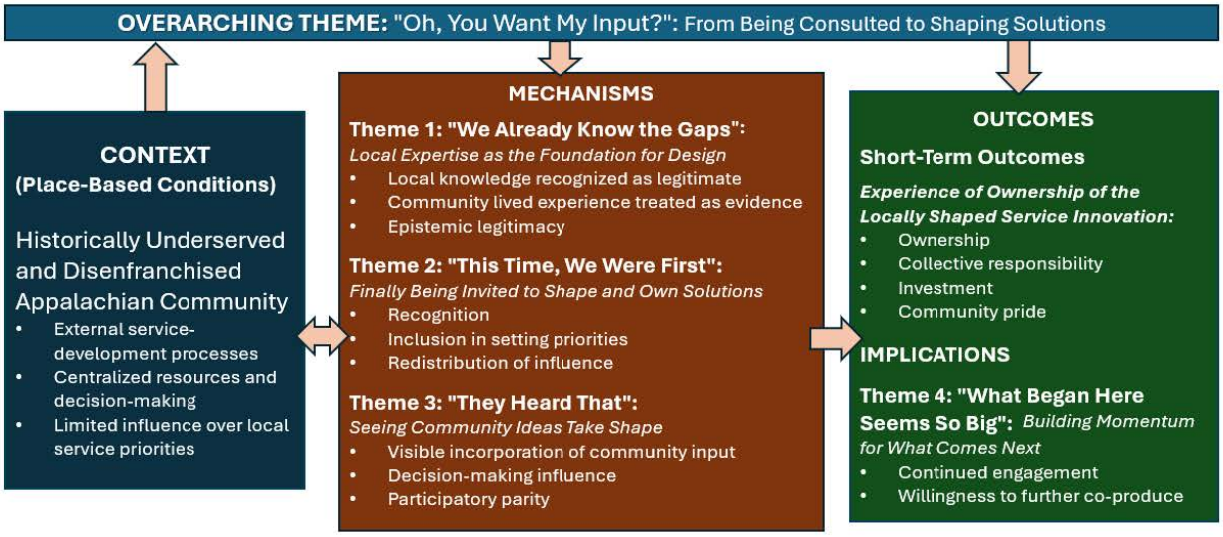


Figure 2: Proposed context-mechanism-outcome (CMO) pathway through which a community-led service innovation became meaningful and fostered ownership and continued engagement in a historically disenfranchised and medically underserved and Appalachian community.

Figure 2

See image above for figure legend

Supplementary Files

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- SupAppendix1FINALTOOLKIT.pdf