After the fire: A qualitative study of the role of long term recovery organizations in addressing rural community social determinants of health

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Abstract

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Background: Wildfire activity in the United States has increased in intensity and duration over the past several decades, disrupting housing, employment, and other social determinants of health in impacted communities. As the cumulative burden of wildfire damage is projected to increase in the coming decades, understanding what constitutes an effective community recovery process is of critical importance. Through qualitative interviews with leaders of long term recovery organizations (LTROs), a key component of wildfire recovery, we explored barriers and facilitators to LTROs' ability to meet post-wildfire needs related to social determinants of health in rural communities.

Methods: We conducted brief surveys and semi-structured interviews with 18 current and former leaders from six LTROs from February to May 2022. Participants held leadership positions on

LTROs serving rural communities in Washington, Oregon, and California impacted by wildfire disasters that occurred between 2015-2020. The Robert Wood Johnson Foundation's (RWJF) Culture of Health Action Framework guided the creation of the semi-structured interview guide and *a priori* codebook, to examine LTROs' ability to address social determinants of health from a health equity perspective. Additional codes were added through an inductive approach, and emerging themes were identified.

Results: Findings from this study indicate that LTROs face many barriers in meeting post-wildfire community needs related to social determinants of health, including the policies that govern access to key recovery resources and information, the slow arrival of those key resources, the COVID-19 pandemic's impacts such as rising home prices and shortages of mental health resources, the intertwined nature of community economic health and the restoration of the built environment, and the challenge of forming a functional LTRO structure. However, participants also identified factors that facilitated the ability of LTROs to meet community health needs, such as flexible LTRO governance structure and policies, funding to hire at least one employee, the ability of county, state, and federal government officials to adapt policies and procedures, and close collaboration with other organizations present in the community.

Conclusions: Policies and other factors at the societal level, community-level recovery barriers, and organizational characteristics of LTROs themselves influence LTROs' ability to address the social determinants of health in the aftermath of a wildfire disaster. The findings of this study suggest the need for policy improvements to promote more equitable access to key recovery resources, that economic recovery of individuals and the community should be seen as a core LTRO function, and that recovery planning should be incorporated into community disaster

preparedness activities. Future research should focus on the role of LTROs in other contexts and in response to other disasters.

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Background

Wildfire activity in the United States, particularly in western states, has increased in intensity and duration over the past several decades.[1–3] In 2020 alone, nearly 59,000 wildfires occurred in the United States, cumulatively burning over 10.1 million acres.[4] Beyond the direct impacts to human health such as toxicant exposure and smoke inhalation, wildfires have massive economic and social consequences that can reverberate throughout impacted communities for years to come, disrupting housing, employment, and other social determinants of health.[3] If the trend towards hotter, drier, and longer summers continues, as current and projected data suggest it will, the cumulative burden of wildfire damage is expected to increase over the coming decades.[1] Additionally, a growing number of residences are being built in areas vulnerable to wildfire damage.[5] These combined factors indicate that it is of critical importance to understand what constitutes an effective community recovery process after a wildfire, as well as barriers and facilitators to implementing that process.

Despite the importance of understanding what constitutes an effective post-wildfire recovery process, and what constitutes an effective disaster recovery process more broadly, research concerning the recovery phase of the emergency management cycle has received less attention relative to the mitigation, preparedness, and response phases.[6–8] Methods by which the completeness or success of disaster recovery can be assessed have been proposed; these methods tend to suggest some combination of measures of the health of communities' economic, built, natural and social environments be included in studies of disaster recovery.[6,9,10] However, there is not yet consensus among researchers on an overarching framework to assess the degree to which a community has recovered from a disaster, or even how various factors that are nearly universally agreed to influence the recovery process, such as social capital, economic development, and the politics and policy governing disaster recovery management, can best be measured.[9] In part, the lack of consensus arises from the difficulty of studying disaster recovery, as many complex and intertwined factors, such as federal, state, and local policies, pre-existing issues within communities, and the scope of the disaster itself, influence the trajectory of a community's recovery, and the impacts of shifts in these factors on the overall recovery process may not be evident for years.[6] There is a need for further exploratory and longitudinal research to disentangle the multitude of factors that can influence the post-disaster recovery process, leveraging the experience of local stakeholders who can provide the long-term perspective that the effective study of disaster recovery necessitates.

Leaders of long term recovery organizations (LTROs) or long term recovery groups (LTRGs), collaborative groups that form to serve the recovery needs of a community in the wake of a disaster,[11] can provide such a longitudinal perspective. In contrast to other organizations supporting disaster recovery, whose presence in a community may wane within months after the disaster as they shift resources to support other more recent events, LTROs remain dedicated to the communities whose recovery they originally formed to support, operating for years after the disaster. LTRO leadership may consist of community members, representatives from organizations involved in the recovery process, or a mix of both. LTROs can be structured in numerous ways, depending on the resources and needs of the communities they serve, but the typical LTRO model includes a board and/or executive director overseeing various committees, each tasked with a particular aspect of the community's long term recovery. Recent examples of LTROs formed in response to a wildfire include the Larimer Long Term Recovery Group,[12] which serves those impacted by both the 2020 Cameron Peak and the East Troublesome Fires in

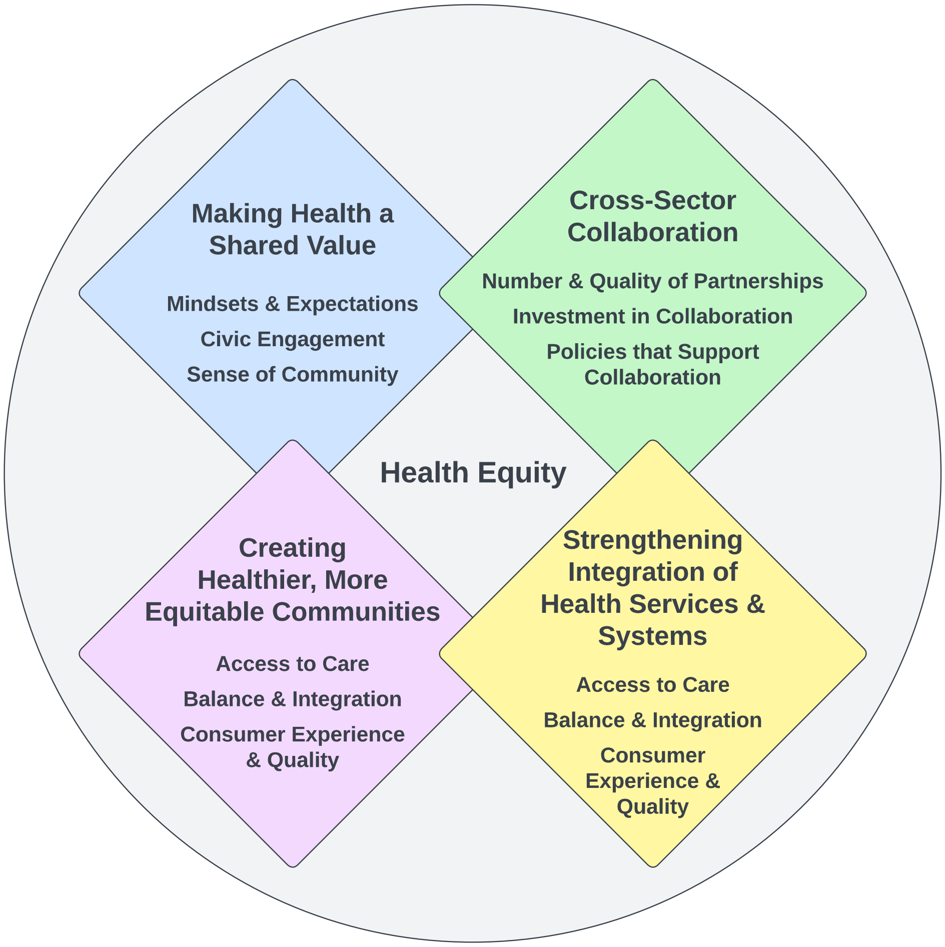
Colorado, and the Santa Cruz County Long Term Recovery Group,[13] which serves those impacted by the 2020 CZU Lightning Complex Fires in California.

In rural communities, where social service delivery infrastructure may be limited even pre-disaster,[14,15] LTROs serve the vital function of compiling recovery resources, ideally providing a coordinated entry point where impacted community members may turn to seek the support they need. In the wake of a wildfire that causes extensive damage to community infrastructure, housing, and local industry, community members' enduring recovery needs are for resources that address social determinants of health. Previous research has documented the severe and lasting impacts of wildfires, and of disasters more broadly, across all five primary domains of social determinants of health: economic stability, education, health and health care, neighborhood and built environment, and social and community context.[3,16,17] Post-disaster impacts on one of these domains can compound negative impacts others. For instance, many survivors face extended difficulty securing new permanent housing after a wildfire; this housing instability in turn is associated with increased mortality.[3] Families who struggle to find permanent housing post-disaster may relocate multiple times to different communities; this, combined with the destruction of local schools, disrupts children's school attendance and eventual educational attainment.[18] The displacement of the limited local medical providers that a rural community had available pre-wildfire, as well as the destruction of local medical facilities, further curtail healthcare access.[3,16] Those with the least resources pre-disaster are the most likely to experience lasting, even permanent, impacts to social determinants of health, exacerbating pre-disaster inequities.[19] Given these documented long term impacts, an LTRO's ability to provide access to resources that address social determinants of health is vital to community recovery and to the facilitation of an equitable recovery process.

However, despite the centrality of LTROs to long term community recovery, little is understood about the role these organizations play in meeting community needs related to social determinants of health during the recovery process, or what contextual determinants impact their ability to meet those needs. Few studies on community recovery have investigated the role of LTROs in this process, and those that have primarily focused on recovery processes in urban areas impacted by hurricanes.[11,20,21] Further research on LTROs is clearly needed, with a particular focus on the unique challenges faced by LTROs striving to address social determinants of health in rural contexts impacted by wildfires.

This study explored barriers and facilitators to LTROs addressing community social determinants of health in the wake of a wildfire disaster through qualitative interviews with LTRO members in wildfire-affected communities. These questions were explored through a health equity lens, adapting the Culture of Health Framework developed by the Robert Wood Johnson Foundation (RWJF), which identifies four domains of action needed to work towards health equity: 1) Making health a shared value, 2) Fostering cross-sector collaboration, 3) Creating healthier, more equitable communities, and 4) Strengthening integration of health services and systems.[22] Figure 1 provides an overview of the subdomains included in each of the four overarching domains. Previous research has applied the RWJF framework to examine health equity in a variety of contexts, including the incorporation of health equity into health care delivery models,[23] to explore the impact of health promotion initiatives,[24] and to develop instruments to measure investment in workplace incentives for healthy behavior.[25] This study applied the RWJF framework to LTROs' community recovery work in order to elucidate facilitators and barriers at the organizational, community, and societal levels to addressing community social determinants of health across each of the four domains, identifying both strengths of current LTRO models, and areas for potential improvement.

Figure 1. Robert Wood Johnson Foundation's Culture of Health Action Framework[22]


Making Health a Shared Value
Mindsets & Expectations
Civic Engagement
Sense of Community
Cross-Sector Collaboration
Number & Quality of Partnerships
Investment in Collaboration
Policies that Support Collaboration
Health Equity
Creating Healthier, More Equitable Communities
Access to Care
Balance & Integration
Consumer Experience & Quality
Strengthening Integration of Health Services & Systems
Access to Care
Balance & Integration
Consumer Experience & Quality

This study aimed to answer the question: What are the barriers and facilitators affecting the ability of LTROs to address social determinants of health through each stage of the recovery process (i.e., short-, medium-, and long-term)[26] in rural communities impacted by wildfires? Additionally, this study had two secondary aims: 1) to identify barriers and facilitators at the organizational-level (i.e., within the LTRO), the community-level (i.e., within the area of the

LTRO's service), and/or the societal-level (i.e., outside the control of the community) throughout the recovery process, and 2) to describe if intra-community inequities in access to LTRO-facilitated recovery resources occur throughout the recovery process, and if so, how and why.

Methods

Study Design

In this qualitative study, we conducted a brief pre-interview survey and semi-structured interviews with 18 current or former leaders of LTROs. A semi-structured interview guide was developed and used to interview study participants about their experiences as leaders of an LTRO, as well as their perceptions about the successes and challenges associated with the LTRO's community recovery work. Interview transcripts were coded and thematically analyzed to identify emerging themes in response to the study's primary and secondary aims.

Sampling

Purposive and snowball sampling was used to identify former and current LTRO leaders for participation in the study. Inclusion criteria were having held or currently holding a leadership position within an LTRO for at least six months, either as an employee or board member, and serving a rural community or communities (i.e., each community had a population of 50,000 or less) in Washington, Oregon, or California impacted by a wildfire disaster between 2015-2020. In this study, a wildfire disaster was defined as an unplanned fire in a natural area[27] that destroyed greater than or equal to 200 residences and/or important community structures (e.g., schools, government buildings, and/or businesses). All study participants were adults (i.e., at least 18 years of age) who were comfortable being interviewed in English.

Long term recovery organizations meeting the study inclusion criteria were identified via a web search and prior study team contacts. If direct contact information (i.e., an email address or phone number) for a current or former member of an eligible LTRO could be identified, the study team reached out directly to that LTRO member to confirm their eligibility for the study and invite them for participation, as well as to solicit recommendations for other potential study participants from their LTRO. In the case that no direct contact information was available for an LTRO member, an email and/or phone message was sent to the general LTRO contact information provided on the LTRO's website. The study included at least two participants from each LTRO represented in the study.

Data Collection

The semi-structured interview guide (Appendix 1) included questions and prompts that can be categorized under the RWJF's four domains of health equity action: 1) Making health a shared value, 2) Fostering cross-sector collaboration, 3) Creating more equitable communities, and 4) Strengthening integration of health services and systems.[22] Semi-structured interviews were conducted with study participants individually; all interviews were conducted in English. Verbal consent was obtained from each participant prior to commencing the interview. All interviews were conducted remotely via Zoom or telephone, depending on the preference of each study participant. Interviews lasted between 30-90 minutes and were conducted from February 22 to May 10, 2022. All interviews were audio recorded and transcribed by a professional transcription service for later qualitative analysis; each interview transcript was reviewed by a study team member to ensure accuracy of transcription.

Data Analysis

Thematic coding was used to analyze interview transcripts. The health equity action areas outlined by the RWJF Culture of Health Action Framework[22] guided the development of *a priori* themes and codes; an inductive approach was used to build upon the initial codebook to capture concepts not covered by these *a priori* themes and codes. Before finalizing the coding scheme, a co-coder analyzed approximately 10% of the interview transcripts using NVivo 12 qualitative analysis software to ensure clarity of the qualitative codebook and replicability of its application. After merging the coding files from each coder and conducting a coding comparison query, we discussed codes that were below 90% agreement and made agreed upon revisions to the codebook. After the codebook was finalized (Appendix 2), the first two transcripts were re-coded and the remaining 16 transcripts were coded by one study team member.

After the coding process was complete, analysis memos were created for each of the RWJF health equity domain codes, summarizing the key barriers and facilitators pertaining to each domain. The frequency of joint coding of each health equity domain with the parent barrier and facilitator codes was explored, as well as the code application frequency of barrier and facilitator child codes for the organizational, community, and societal levels. These analyses were used to identify key emerging themes in the data. Analysis of code application frequency was completed using NVivo software.

Human Subjects Approval

The University of Washington Human Subjects Division (UW HSD) determined this study to be human subjects research that qualified for Category 2 exempt status (Study ID: STUDY00014909). All study procedures were approved by the UW HSD prior to participant recruitment and data collection.

Results

Participant Characteristics

Of the 22 current or former LTRO leaders from eight LTROs who were contacted for participation, 18 participants from six LTROs participated in the study. Two of the participating LTROs served communities in Washington state, three served communities in Oregon, and one served a community in California (Table 1). Four of the six wildfire disasters that the LTROs formed in response occurred in 2020. While all the wildfire disasters eventually received a Presidential Major Disaster Declaration, only four were granted both individual[1] and public assistance[2] from the Federal Emergency Management Agency (FEMA).[28,29] All participating LTROs had at least one employee at some point in their existence, and a majority of the LTROs were comprised primarily of community members. All LTROs had access to multiple types of funding sources (Table 1).

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[1] Financial assistance and other services for individuals and households that can include a range of services such as housing assistance, disaster case management, and mental health counseling.

[2] Financial assistance for state, tribal, and local governments and some nonprofits to support emergency work and the repair/replacement of disaster-damaged facilities and/or infrastructure.

Table 1. Characteristics of Participating Long Term Recovery Organizations (LTROs) and the Communities They Served (N = 6)

Community Characteristics	**n (%)**
State	
WA	2 (33.3%)
OR	3 (50.0%)
CA	1 (16.7%)
Year of Wildfire	
2015	1 (16.7%)
2018	1 (16.7%)
2020	4 (66.7%)
FEMA Assistance Provided	
Public Assistance Only	2 (33.3%)
Individual & Public Assistance	4 (66.7%)
LTRO Characteristics	**n (%)**
Number of Board Members	
Less than 5	1 (16.7%)
5-10	3 (50.0%)
11-15	1 (16.7%)
More than 15	1 (16.7%)
Highest Number of Employees	
1	3 (50.0%)
2	1 (16.7%)
3 or more	2 (33.3%)
Composition of LTRO	
Primarily Community Members	5 (83.3%)
About an Equal Mix of Community Members & Disaster Relief/Recovery Professionals	1 (16.7%)
LTRO Funding Sources	
Individual Donations	6 (100.0%)
Federal Recovery Assistance	5 (83.3%)
Other Government Grants	5 (83.3%)
Grants from NGOs	6 (100.0%)
Other	3 (50.0%)

Five of the 18 individual study participants were wildfire survivors themselves, four of whom had lost their home in the wildfires (Table 2). Over half the participants were current board members, while just under 40% were current employees. Around 45% of the participants had served on the LTRO for between one to two years, although a quarter of the sample had served for three or more years. The majority of participants had no prior disaster relief or recovery experience before joining the LTRO (Table 2).

Table 2. Individual Participant Characteristics (N = 18)

Characteristic	n (%)
Survivor of Wildfire	5 (27.8%)
Position on LTRO	
Current Board Member	10 (55.6%)
Current Employee	7 (38.9%)
Former Employee	1 (5.6%)
Length of Service with LTRO	
6 months – less than 1 year	4 (22.2%)
1 year – less than 2 years	8 (44.4%)
2 years – less than 3 years	1 (5.6%)
3 or more years	5 (27.8%)
Disaster Relief/Recovery Experience Prior to LTRO Service	
No prior experience	11 (61.1%)
Less than 1 year	2 (11.1%)
1 year – less than 3 years	3 (16.7%)
3 years – 5 years	1 (5.6%)
Greater than 5 years	1 (5.6%)

Barriers to LTROs' Ability to Address the Social Determinants of Health

Participants described a number of barriers they experienced throughout the recovery process in their work to meet community needs related to social determinants of health. An overview of the themes that capture the most frequently described barriers is provided in Table 3. Each of these themes is described in greater detail below.

Table 3. Barriers & Facilitators to LTROs' Ability to Meet Post-Wildfire Community Needs at the Societal, Community & Organizational Levels

Theme	Key Examples	Level
Barriers		
Policies that Govern Access to Key Recovery Resources & Information Exacerbate Inequities	*Those with informal housing arrangements unable to be served by FEMA or standard DCM models* *Multigenerational households receive less FEMA assistance* *FEMA denial & appeal process difficult to navigate*	Societal
Creating an LTRO Structure Matched to Community Capacity and Needs	*Interpersonal conflicts among LTRO leaders during the first 1-2 years of existence* *Standard LTRO model does not always match community needs*	Organizational
Impacts of the COVID-19 Pandemic & Associated Societal Response	*Collective trauma of wildfire & the pandemic* *Rapid inflation of home & building material prices* *Supply chain issues create construction delays*	Societal
Slow Delivery of Recovery Resources	*FEMA trailers arrive up to 9 months post-disaster* *Delayed Major Disaster Declaration delays recovery* *Recovery resource delays slow the distribution of Unmet Needs Roundtable funds*	Societal
The Intertwined Nature of Community Economic Health & the Built Environment	*Loss of affordable housing for the workforce, leaving businesses unable to operate without a workforce* *Loss of revenue source for town leaves lack of funding to rebuild infrastructure or community spaces*	Community
Facilitators		
Flexible LTRO Governance Structure & Policies	*Relaxing policies governing the DCM intake process* *"Dual" case management process that allows those without standard DCMs access to recovery resources* *Extending the length of the time after the disaster that residents can enter the DCM process*	Organizational
Collaboration with Partners with a Local Presence	*Pre-existing structures can deliver recovery services* *Maximizes recovery funding* *Facilitates more equitable resource access*	Societal, Community & Organizational
Funding Capacity to Hire at Least One Employee	*Prevents burnout of volunteer board* *Improves management of time-intensive recovery projects*	Organizational

Flexibility in Policies & Procedures Created at the County, State & National Level	*Relaxing land use & building regulations*	Societal
	FEMA representatives dressing in plain clothes to better engage mixed documentation status families	
	Activating SBA assistance prior to a Major Disaster Declaration when this declaration was delayed	

Policies that Govern Access to Key Recovery Resources and Information Exacerbate Inequities. Participants described numerous ways in which the policies governing access to key recovery resources, as well as the standard procedures community members were required to follow to access these resources, left many residents without this key source of help. Speaking about the process of accessing FEMA individual assistance specifically, participants described a lengthy, confusing application process that required large swaths of time and a level of technology literacy that many community members impacted by the wildfire lacked. Participants also noted that this process was not "trauma-informed," indicating that it failed to treat applicants with the respect and kindness that facilitate empowered choices among those who have recently experienced a traumatic, destabilizing event.[30] For instance, harsh language in FEMA communication such as “denial” and “eviction” created alarm and obscured the ability of recipients to appeal these decisions. As one participant noted,

> *“It's that blunt. And so just a lack of understanding that maybe someone's at a 6th grade literacy level, English is their second language, and all they read is, ‘Eviction April 1st.’ Right? They don't hear, ‘Hey. It's going to be okay. We just want to let you know--’”*

Additionally, FEMA’s narrowly prescribed definitions of a community resident, which excluded undocumented immigrants and those who had informal rental agreements, couch-surfed, or otherwise lacked the required documentation, left the most vulnerable community members without access to individual assistance. Even among those who were able to access individual assistance, inequities persisted; for instance, the allocation of assistance by household, without accounting for multiple generations living in a single household, meant that many low-income and Hispanic/Latinx families received proportionally less assistance than White, wealthier households.

Policies about who qualified for a disaster case manager (DCM) under standard models provided a similar barrier to LTROs' ability to serve the most vulnerable members of their communities. For instance, one participant spoke of initially requiring community members to provide a FEMA number, which FEMA assigns to applicants for individual assistance, as proof that they were impacted by the disaster, which excluded many community members who had not felt comfortable or had the opportunity to receive FEMA individual assistance. Other DCM models applied strict definitions that mirrored FEMA policies of who qualified as a community resident, declaring large numbers of community members who did not meet these requirements "pre-disaster homeless." The standard DCM goal of returning community members to their pre-disaster state was poorly matched to the needs of those who were living in substandard housing conditions prior to the disaster. In the words of one participant,

> *"We've got [...] lots of different, unique relationships between people and how they found housing and food and sustain themselves, which has been an interesting challenge with recovery because, as you know, with FEMA models and a lot of other kind of DCM models, the kind of core goal is to return people back to their pre-disaster living situation. But when you have an entire town and all of those networks and communities gone, that's not an easy thing to just replace. We can't put people back in the shed in exchange for caregiving services."*

Policies governing the LTROs' access to identifiable information of community members who had applied for assistance from FEMA, the American Red Cross (ARC), or other organizations were also identified as a major barrier. For instance, participants described being promised a list of all those who had applied for FEMA assistance, which would then allow the LTRO to easily identify members of the community who had been impacted by the disaster. Importantly, this would allow the LTRO to offer recovery resources to survivors without necessitating a separate, retraumatizing intake to capture the same information they had already provided to the ARC, FEMA, and other agencies. However, they reported that this list had never materialized, leaving the LTRO to attempt to identify impacted community members on their own, often many months after the wildfire. This delay further complicated attempts to locate fire survivors, many of whom had temporarily or permanently relocated out of the community.

Creating a Functional LTRO Structure Matched to Community Capacity and Needs. Participants highlighted the numerous challenges of trying to form, structure, and staff a brand-new organization in the aftermath of a major disaster. Participants from three of the six participating LTROs described interpersonal conflicts among members of LTRO leadership or key partners involved in the creation of the LTRO as a barrier to LTRO functioning in the first one to two years of LTRO operation. These conflicts arose from pre-existing tensions in the community, lack of clarity about communication channels and decision-making structures, and the stress and burnout that commonly accompany navigating the complexities of the community recovery process. The process was particularly stressful for those who volunteered for LTRO leadership on top of their own full-time employment or who were simultaneously navigating their own personal wildfire recovery. These conflicts often led LTRO leaders to step down and/or necessitated a restructuring of the LTRO. Many participants highlighted a desire to include fire survivors on the LTRO board or in another leadership role, as they expressed that including survivors’ voices in decision-making was a key component of providing equitable service to the community. However, they also noted concern that serving in this role would be traumatic for the survivors who had not yet had time to heal.

Participants had divergent perspectives, depending on which LTRO they led, about whether the standardized LTRO model they had received from FEMA trainers was the best fit for their particular communities' recovery processes. Leaders of the longest operating LTRO in the study shared their perspective that the FEMA-endorsed model was useful, and the structure of their organization still essentially matched that model. Other participants described how the smaller size of their community and/or limited volunteers available to engage in leadership of the LTRO made staffing such a model unsustainable. In the words of one participant, whose LTRO had initially tried to form in the traditional model,

> *"We're supposed to have a public affairs committee. Our public affairs committee is the fact that the president and I both have the personal cell phone numbers of our two government representatives. […] We didn't need a committee. We needed a phone. […] I'm the one who pushed for this mechanism, this bureaucracy as much as anyone. […] That's what I thought we were going to need. We really haven't. It would have been nice. But in a town this size, this tapped out, it was never going to happen."*

Several participants also noted that the traditional LTRO model did not suit their organizations' needs for a different reason—the standard focus on individual service provision did not utilize the many non-profits, social service agencies, and other entities who already had a strong presence and relationships in the community. They described a more appropriate primary role for the LTRO as a facilitator of the collaboration of these various groups that could each provide individual services to residents under the umbrella of recovery.

The early and often continued uncertainty surrounding future funding for LTROs also was reported as complicating the creation of a functional LTRO structure. Some LTROs lacked funding to hire an employee initially, which left an entirely volunteer leadership team to create and run an organization in what often became a second fulltime job. Participants reported hoping to hire more employees to support various key LTRO activities, but that the LTRO only had guaranteed funding for such positions for a year, which made it difficult to attract candidates with the skills necessary for the positions. Some participants described worrying that funding agencies' priorities could shift away from their organization and community as soon as the next disaster occurred. Such a funding loss would also impact the resources available to meet community needs via the Unmet Needs Roundtable, a committee comprised of representatives of organizations that can provide financial, in-kind, or other resources to survivors whose recovery needs cannot be met through traditional programs.[26] As one participant noted,

> *"I think that the biggest concern right now for me* and I think some other people-- *I sit in on other Unmet Needs Round Tables for other LTRGs [...] as we get further along in this process, funders don't have the funds for it anymore. They're running low. It's not as high of a priority because now in their minds, it's been almost two years, and why are these people not recovered? And I'm kind of concerned that with this next wildfire season, if any fires come up, any of the major funders are going to start diverting their funding towards the newer things, which obviously they should."*

These financial uncertainties made establishing a stable governing structure for the organization extremely complex.

Impacts of the COVID-19 Pandemic. Four of the six LTROs included in this study were formed in response to wildfire disasters that occurred during the COVID-19 pandemic, whereas the other two LTROs only experienced the pandemic's impacts during the communities' recovery processes. Nearly every participant noted at least one detrimental impact of the pandemic on their ability to serve the community, and on the progression of the community's recovery more generally. Participants described the compounding impacts of the pandemic on community members' trauma, while simultaneously placing further strain on the already limited mental health services available to help cope with that collective trauma. Additionally, some community members who lacked the ability or necessary technology to engage virtually with services lost contact with the LTRO or other sources of recovery support. Often, these community members were among the most vulnerable, challenging the LTROs' efforts to provide equitable access to recovery resources. Stay-at-home orders and pandemic burnout also limited the workforce and volunteers available to support recovery efforts; social service agencies had difficulty retaining staff, and the groups of volunteers that normally assist with recovery projects such as home rebuilds did not materialize during the pandemic.

Additionally, the soaring home prices and building material costs that emerged as secondary impacts of the pandemic were reported to dramatically increase the price tag of restoring impacted community members to permanent housing. Even those who were adequately insured at the time of the fire were potentially priced out of the local housing market by the time they received the insurance payout. One participant described how the cost of building a home in the area, even with volunteer labor, nearly doubled during the pandemic:

> *"So when we first started this a volunteer rebuild, [...] They could rebuild, maybe a two-bedroom, one-bathroom house for about $85,000. That cost is now $140,000."*

Beyond the rising cost of rebuilding or securing permanent housing, the supply chain issues throughout the pandemic also delayed the arrival of key materials, further complicating the rebuilding process.

Slow Delivery of Recovery Resources. Beyond the supply chain issues that delayed home rebuilds, participants identified a variety of other delays in the delivery of key recovery resources. For instance, several participants described how a delayed presidential Major Disaster Declaration left the communities they served without much needed and expected resources to kickstart the recovery. A critical way state and local governments used FEMA public assistance was for reimbursement of the cost of hazardous material cleanups, particularly important for wildfires that may leave behind chemicals that are quite toxic to human health. In addition to the funds available via public assistance, a Major Disaster Declaration typically brings technical support and resources to a community, both from FEMA and other agencies, that help organize the response phase and facilitate the transition into disaster recovery. Without this technical support and the promise of federal reimbursement, necessary activities such as property cleanup were delayed, and residents could not return to their property without great risk to their health. One participant described having to turn away volunteers who wanted to assist residents with the final stages of property cleanup, because the properties had yet to be inspected and removed of toxic waste. Delayed Major Disaster Declarations also cause delays in the activation of Small Business Administration (SBA) assistance in a community, a key resource for business and property owners that provides these groups with very low interest loans to facilitate their rebuilding process.

Even if the Major Disaster Declaration occurred very quickly, certain key elements of the individual assistance program were very slow to arrive in the community. Neither of the Washington wildfire disasters had received FEMA individual assistance, but participants from

LTROs in Oregon and California described delays in the placement of FEMA Transportable Temporary Housing Units (TTHUs),[28] commonly referred to as "FEMA trailers," of up to nine months after the disaster. This delay meant that those who needed a TTHU as a temporary housing solution were left for months without this source of temporary stability. Due to the 18-month limit on TTHU use, a timeline that began the day the wildfires received Major Disaster Declarations, a good portion of their time to actually live in the TTHU evaporated. As one participant described it,

> *"[...] this magical clock starts counting the day after our disaster for a limit on how long we can have your housing units. [The units] didn't roll into our community until nine months after the disaster. We get four months use of these units [...] And now we have these extensions, and you have these people living in limbo of, instead of knowing they have 18 months to work on their recovery, now they have to wonder every six months if they are. And then now we're starting to charge them rent because we've exhausted what our normal extensions were."*

The multi-round denial and appeal process that community members often endured to access the financial component of individual assistance also delayed the arrival of this resource.

Funds from pending settlements with entities that bore responsibility for the fire, such as utility companies, also were delayed, and sometimes took many years to arrive. In turn, the slow arrival of these settlements and the FEMA funds delayed the distribution of funds from Unmet Needs Roundtables. Funders with a seat at these tables were often hesitant to provide financial support to survivors until they had exhausted FEMA funding options, received pending settlement money, and utilized other community resources, as they were attempting to be good stewards of donated dollars and to stretch recovery funds as far as possible. However, because these resources were slow to arrive or reach a final funding decision, survivors might remain in limbo for multiple years before their unmet needs were addressed, greatly slowing their recovery process. Because of the rapidly increasing housing costs as the years passed, one participant also pointed out that

> *"as people are waiting for these settlement funds, the ability of those settlement funds to complete their plan diminishes."*

The Intertwined Nature of Community Economic Health and the Built Environment. Participants from all six LTROs expressed that a large proportion of those impacted by the wildfire had been members of vulnerable communities (e.g., elderly, undocumented immigrants, those of lower socioeconomic status, those with physical or intellectual disabilities) who relied on the housing destroyed by the fire to have an affordable place to live. Rebuilding the affordable housing stock of these communities will likely take years, if it can be replaced at all. Many participants shared their perspective that building apartments, usually the most efficient method of expanding affordable housing options in a community, was inappropriate for their specific community for a variety of reasons. Each wildfire disaster had impacted a rural community, and residents of these communities had often chosen to live there because they preferred to be away from other people, to live off the grid, or to have the additional freedom and flexibility that came with living outside of a municipality. Many participants shared that relocation to an apartment would be extremely detrimental to many impacted community members' well-being.

Building apartments also required infrastructure that some communities currently lacked, and also lacked the revenue/tax base to construct and maintain, especially post wildfire. As one participant said,

> *"Without sewer systems, large public sewer systems, which again need a tax base to maintain, you won't be able to build affordable housing. You can't put an apartment complex on a drainage system. You need a sewer system."*

Participants also spoke more generally about the public revenue challenges communities faced after the wildfire, with residents displaced and no longer paying for water and other public utilities that rural communities used to fund public services, such as trash pickup. This problem was exacerbated if greater numbers of residents permanently moved away, or the longer residents temporarily stayed outside of the community. The communities whose Major Disaster Declarations were delayed also lacked FEMA public assistance in the early phase of their recovery that would have replaced some of the lost funding for public services or rebuilding public infrastructure, further challenging the communities' recoveries.

The disappearance of affordable housing stock meant that much of the workforce was displaced and forced to reside, at least temporarily, outside of the community. Without these residents, local businesses and industry lacked the workforce they needed to rebuild and reopen. But residents also needed employment or other income generating opportunities to be able to return to the community and remained stably housed. This created what one participant described as "a chicken and the egg" problem. No residents meant no businesses, and no businesses meant no jobs, which meant limited income opportunities for those returning to the community.

Facilitators to LTROs' Ability to Address the Social Determinants of Health

Participants also described numerous facilitators to their ability to meet community needs related to social determinants of health throughout the recovery process. An overview of the themes that capture the most frequently described facilitators is provided in Table 3. Each of these themes is described in greater detail below.

Flexible LTRO Governance Structure and Policies. Many participants described how their LTROs' policies, standard operating procedures, and even governance structure had been adjusted throughout the recovery process to facilitate broader community access to resources and enhanced collaboration with partners. The flexibility to adjust allowed LTROs to mitigate the harmful impacts of the policies governing access to FEMA assistance and the DCM process described above. For instance, LTROs that controlled the DCM intake process could shift the rules governing that process when they realized that they were excluding community members whom the LTRO wanted to serve. One participant described how their LTRO had done away with the parameter that they inherited from standard DCM models to require a FEMA number as proof that someone was a survivor when they realized that this was excluding populations who had not interacted with FEMA. Leaving the DCM intake process open longer than their LTRO had originally intended was identified by participants as a facilitator of broader access as well, as some of the most vulnerable community members often did not request services until many years into the recovery process. Participants also described adjustments to offer flexible funding via the Unmet Needs Roundtable to better serve survivors whose needs did not neatly fit into the qualifications for other resources. As one participant said,

> *"As we've evolved, there are so many nuances and Unmet Needs that we've had to become more flexible. So what about the renter that takes his FEMA money and uses it to buy a piece of land hoping to rebuild, and none of the grants, federal or state, help that kind of a survivor, right? But yet, they're trying to wisely make some decisions to recover."*

Some LTROs did not control the DCM intake process in their community, but still found creative ways to provide recovery resources to those who could not access DCMs. As mentioned previously, leaders of one LTRO had discovered that the narrow definition the DCM process in their community was using to define residency had declared many community members “pre-disaster homeless,” and thus ineligible. These leaders then advocated to local partners and secured funding for community-based DCMs who could guide these community members in their recovery and present their cases to the Unmet Needs Roundtable, access to which is normally limited to those who have a DCM.

Collaboration with Partners with a Local Presence. Each participant described numerous LTRO partners who had been key facilitators of their community recovery work. Partnerships with organizations or groups that had a local presence in the community were highlighted as particularly important. Structures created by social service agencies operating in the area pre-disaster, such as teams providing wrap-around case management services for patients with high medical needs, were key collaborators of the LTRO and provided scaffolding on which DCM services could be built. This was helpful not only because it allowed the LTRO and partners to avoid building the DCM program entirely from scratch, but also because these agencies already had relationships and trust built with the local community members. These relationships meant that community members were likely to feel more comfortable working with these local organizations, and also that the organizations could act as “boots on the ground” in the local community, providing the LTRO key information about pockets of unmet need that might have otherwise been difficult to identify.

Close collaboration with community partners also lessened the chance that the LTRO or community partners would accidentally duplicate services or that community members might miss accessing a resource that could have benefited their recovery, and often enabled the LTRO to provide a coordinated entry point to these services. Such collaboration also provided a mechanism for the LTRO to receive feedback from community members about their experiences, including barriers to accessing various recovery resources, and to facilitate improvements in that access. One participant identified this as a key part of enhancing health equity during the recovery process, saying,

> *"[...] we have this opportunity to work both at the grassroots level through our partnerships and also at the highest echelons of decision-making, we're able to sew those two together. And so even this weekend [...] I heard some stuff that was fairly concerning, and so, I've been able to escalate it over the last couple of days and get it to a point where we're going to convene partners-- we're going to have a listening session-- we're going to come up with a strategy for moving this forward, because perception is reality. Whether or not we're designing a system that's equitable, if that's not the experience on the ground, then we have work to do. And so building it again is that culture of quality improvement [...]"*

As this participant noted, the collaborative structure the LTRO created provided a forum for key recovery partners to be made aware of any barriers to recovery resource access in the community and for solutions to those issues to be incorporated into high-level recovery planning decisions. Collaborative work with community partners also allowed LTROs to achieve greater impact with fewer funds, stretching the recovery funds they stewarded further. As one participant, whose LTRO had undergone a structural transformation to a collaborative organizational model made up of committees that were groups of community partners, noted,

> *"[...] they've changed it to that collaborative model so that it wasn't so staff-heavy because there's this recognition that the more work we can do with less people, the more funding*

> *can go towards the Unmet Needs Roundtable and other programs that are going to help recovery."*

Funding Capacity to Hire At Least One Employee. Though collaboration allowed LTROs to perhaps function effectively with fewer internal resources, all participating LTROs had at least one paid employee. Typically, this employee was an executive director, assistant director, or in a similar overarching leadership role. Several LTROs also had a staff member, or several, who oversaw a specific aspect of the recovery process that was a particularly heavy lift, such as the DCM process or the construction of new homes. As one participant said,

> *"[...] we have a reconstruction project manager on staff, and that makes all the difference in just the logistics of things. I mentioned earlier we have a bookkeeper on staff. That is imperative if you're going to be trying to rebuild folks."*

Though a few participants expressed it was initially difficult to find someone that was the right fit for these positions, the importance and numerous benefits of having a paid staff member were highlighted by participants from each LTRO.

An obvious but very important function of paid staff was to prevent the burnout and overburdening of board members, who were nearly universally volunteers managing their leadership roles within the LTRO on top of other fulltime professions and numerous other life obligations. Their work with the LTRO, especially without the support of a paid employee, could easily turn into a second fulltime job. The presence of an executive director or employee in a similar leadership role also provided a clearer decision-making structure, eliminating pressure from the LTRO board. Paid staff also facilitated better tracking of the use of funds the LTRO had received as well, which helped the LTRO budget and also provided the financial accountability many funders sought from the organization.

Flexibility in Policies and Procedures created at the County, State, and National Level. In addition to internal flexibility being a facilitator of LTROs' ability to meet community health needs, flexibility from county, state, and national government partners was identified as a key facilitator as well. Some participants spoke of how county governments had given the community a temporary reprieve from land use regulations and building code requirements, lowering the barrier to reconstruct homes that had been built before these regulations were in place.

Participants also noted numerous ways in which state government officials had adapted to unusual circumstances surrounding their particular disaster. One participant, whose community's Major Disaster Declaration was delayed, described how the state activated SBA assistance to help fill the recovery funding void this delay created. This was described as a highly unusual act, as SBA assistance is always activated after a Major Disaster Declaration occurs, but incredibly helpful. Another participant described the logistical challenge of feeding families who had been placed in non-congregate sheltering due to the COVID-19 pandemic, and the creative solution that state officials designed to solve this issue. Rather than hiring a big food service contractor, the state created a coalition of local restaurants whose business had been decimated by the pandemic, paying them to cook and deliver food to the families. This had the added benefit of adding an infusion of food service job opportunities back into the community.

The adaptability of the FEMA representatives sent to their community was identified as a key facilitator for one LTRO in particular, whose community included a significant number of undocumented and mixed documentation status households that had been impacted by the wildfire. Because FEMA and Immigration and Customs Enforcement are both located within the Department of Homeland Security, meaning the two agencies' badges and uniforms bear a resemblance to each other, members of these populations who were eligible for FEMA assistance were understandably afraid to seek it. One participant described how FEMA representatives adapted to this concern:

> "*There were lots of questions about how undocumented or mixed-documentation-status families would be able to access individual assistance, and also whether or not they should […] So the experience on the ground is, 'ICE is here. Don't go anywhere near this. […] And so we were really fortunate that we had some very responsive FEMA partners on the ground who were like, 'We'll dress in plain clothes.''*"

The FEMA representatives also collaborated with local organizations, who had worked with these communities pre-disaster, to conduct outreach. These combined adjustments led to increased engagement of mixed documentation status households with FEMA, facilitating a more equitable distribution of FEMA assistance.

Discussion

The findings of this study elucidate key barriers and facilitators that LTROs face in addressing rural communities' needs related to social determinants of health during the post-wildfire recovery process. Barriers occur at the societal level, through inflexible policies that govern access to key recovery resources and information, the slow arrival of those key resources in the community, and the impacts of the COVID-19 pandemic; at the community level, such as the difficulty of restoring community economic health given the multiyear trajectory of restoring the built environment; and at the organizational level, via the challenge of forming a functional LTRO structure from scratch in the wake of a devastating wildfire and chaotic early recovery process. Facilitators include organizational-level facilitators, such as the ability of the LTRO to adapt the governance structure and policies to better serve the community and the funding to hire at least one paid employee;

societal-level facilitators, such as the ability of county, state, and federal government officials to adapt policies and procedures to meet the needs of the community; and multi-level facilitators, such as close collaboration of the LTRO with other organizations present in the community. This study also highlights the pathways through which inequities in access to recovery resources occur, leaving vulnerable populations such as undocumented and mixed documentation status households, those with precarious pre-disaster housing, and those with limited English proficiency to bear the worst of the wildfires' long term impacts. LTROs are aware that these disparities in disaster impacts and resource access exist and described numerous strategies that they employed to mitigate these inequities.

Some of the key barriers and facilitators participants identified build upon previous research into factors that impact the trajectory of community disaster recovery. Evidence pointing to the exacerbation of intracommunity inequities by FEMA policies and assistance approaches have been presented by numerous other studies,[31,32] which have shown the distribution of FEMA individual assistance to be correlated with increased wealth inequality[33] and have documented the increased post-disaster vulnerability of undocumented immigrants, who are excluded from FEMA individual assistance.[34] Other studies also support the finding of this study that extreme delays in the arrival of FEMA assistance and other recovery resources pose a major barrier for community recovery; this has been documented in the specific context of wildfires[3] as well as other types of major disasters.[32] The findings of this study, however, also indicate that standard DCM models can exclude many community members who would benefit from access to this resource. Little prior research exists on how the policies governing access to DCMs managed by entities other than FEMA can contribute to intra-community inequities in accessing those systems, indicating that further study of how DCM models can contribute to or detract from equitable recovery resource access is clearly warranted.

Prior research also aligns with the finding that the damage to community economic health is a key barrier to post-wildfire recovery. These economic impacts have been characterized at the individual level, such as the large-scale loss of employment in the wake of a wildfire[3]; and at the community level, as wildfires have been shown to have lasting negative impacts on local municipality budgets, reducing the funds available to provide public services.[35] This economic damage is often inflicted on communities that had limited economic resources even pre-wildfire. Participants in this study universally described the communities where homes were destroyed by the wildfires as housing a high proportion of vulnerable populations living on limited income, for whom the community had provided the only source of affordable housing in the area. Prior research confirms this is not only true for the communities included in this study population; a study that examined the frequency of wildfires in California between 2000-2020 found that census tracts with higher proportions of vulnerable populations, such as the elderly and those of lower socioeconomic status, were disproportionately impacted.[36]

The intersection of the COVID-19 pandemic with the impacts of climate change and associated disasters has been explored in prior research as well,[37] though these studies primarily focused on the impacts of the pandemic on the mitigation, preparedness, and response phases of the emergency management cycle. The pandemic led to a pause in key wildfire mitigation activities; for instance, the US Forest Service halted the controlled burn program, an important wildfire prevention tool, during the Spring of 2020 to allow agency employees to comply with stay-at-home orders, and out of fear that smoke could exacerbate vulnerability to respiratory illness.[38] The response to disasters occurring during the pandemic was complicated by the competing demands of pandemic safety measures, such as social distancing, and the congregate sheltering plans that are typically used to shelter displaced community members during and immediately following a disaster.[39,40] Research has also documented that the necessary alterations in disaster response strategies as a result of the pandemic required additional wildfire preparedness activities.[41] However, the long term impacts of the pandemic and its secondary effects on post-disaster recovery are just emerging. This is the first study, to our knowledge, to specifically document the impacts of the pandemic on rural communities' post-wildfire long term recovery processes.

Collaboration with partners and resource coordination has long been identified as a key aspect of the disaster recovery process; collaboration and coordination are included as two of the four "C's" that are part of the National Voluntary Organizations Active in Disaster's (NVOAD's) founding principles.[42] Despite widespread knowledge that the degree of collaboration between recovery organizations can greatly impact the trajectory of the post-disaster recovery process, effective collaboration remains difficult to implement.[43] Prior research has identified clarity of roles, trust between organizations, and governance structures that facilitate collaboration as key factors that impact ability to collaborate during the recovery process.[43] Participants in this study offered insights into how their own organizational structures had transformed to better facilitate collaboration with community partners. The contribution of this study to the existing body of literature is in demonstrating the specific ways in which LTROs are successfully able to work collaboratively with partners towards community recovery, as well as the areas where that collaboration could be strengthened.

The results of this study and prior research can be used to inform practical policy reforms in several domains. First, many improvements to the FEMA individual assistance program could be made to better facilitate the community recovery process. Two relatively low barrier changes that FEMA could implement would be to improve their communication to make it more trauma-informed (e.g., remove language such as “eviction” and “denial”) and to extend the length of time that community members can reside in FEMA TTHUs before they are forced to begin paying rent and/or leave. At a minimum, the 18-month timeline FEMA provides for use of the TTHUs could begin when the TTHUs are actually placed in the community and inhabited by residents, rather than starting the day the Major Disaster Declaration occurs.

Larger, structural changes to FEMA would facilitate broader access to individual assistance as well. Any real or perceived distance that FEMA representatives can create between themselves and the Department of Homeland Security, through uniform changes or by bureaucratically relocating the agency to another department entirely, would increase the comfort of communities wary of interacting with Homeland Security, such as mixed documentation status households, to seek FEMA assistance. Though more politically difficult to achieve, broadening access to FEMA individual assistance to include undocumented residents and those who have informal rental agreements or otherwise lack paperwork to prove their residency would greatly facilitate a more equitable recovery process. FEMA appears to be aware that prior restrictions on acceptable documentation to prove residency have excluded many community members, and as of September 2021, have expanded their list of proof of residence documents to include motor vehicle registrations, court documents, letters from local schools, federal or state benefit providers and social service organizations, signed statements from mobile home park owners, and self-certification for mobile homes and travel trailers.[44] These policy changes should be evaluated to determine whether they translate to improved access to FEMA assistance on the ground for vulnerable populations impacted by disasters.

The economic recovery barriers facing wildfire-impacted communities, such as the difficulties caused by the destruction of a natural resource key to pre-disaster industry (e.g., timber) or the destruction of all local affordable housing options for the workforce are difficult challenges that may take many years for communities to address. However, one tangible and actionable response to the immense challenges facing the economic recovery of the communities as a whole and the residents individually is for LTROs to incorporate providing employment and other economic resources as one of their core functions. At least half of the LTROs included in the study were already doing this, either through engagement with local workforce service agencies or the inclusion of a specialized economic and workforce committee into their overall structure. Disaster case managers, who ideally have built personal rapport with their clients and already connect them with local resources to meet other recovery needs, are naturally poised to serve as a liaison between clients and employment and/or other types of resources that can provide lasting economic support. Given the correlation between a stable source of income and housing stability, which was highlighted by participants, the incorporation of resources to address long-term economic needs is a necessary complement to the critical work many LTROs do in facilitating the return of community members to stable housing.

Many of the difficulties LTROs in the study faced were outside of the organizations' control, but the LTROs' ability to respond to some of these challenges in the earlier phases of the recovery process may have been inhibited by the internal growing pains they faced trying to create a functioning structure. Several participants highlighted that they wished a structure for the LTRO had existed in their community prior to the disaster, so that they did not have to identify leaders and create a functional organization from scratch amidst the chaos left in the wake of the wildfire. The longest functioning LTRO in the study served a community that had experienced several disasters since the initial wildfire that necessitated their formation, and had been able to use their existing structure to facilitate recovery resources for these disasters, as well as preparedness activities in the community. They also described an enormous wealth of partnerships formed with various agencies and community groups, built up over their more than seven years of operation. This suggests that LTRO formation, and recovery planning more generally, could actually be a key disaster preparedness goal of communities, rather than being confined to the recovery phase of the disaster cycle. These organizations could build enough flexibility into their policies to allow for an appropriate response to the specifics of each disaster. Establishment pre-disaster would better facilitate formation of the collaborative partnerships that are recognized as a key aspect of successful community disaster recovery. Preparedness phase LTRO formation would also allow adequate time to think through issues of equity without an unmet sea of post-disaster needs creating the pressure for quick, rather than thoughtful, action, and to build the diverse networks necessary to deliver recovery resources in the most equitable manner. In the words of one participant,

> *"This is the kind of work you have to do in non-emergency times. Because it's all relationally driven, so I'm going to go to the people that I trust. And if everyone I trust is white and middle-aged and wealthy like I am, well, that's my network [...] I'm going to nurture those relationships [outside my network] in the calm. I don't nurture them in emergency."*

Limitations

This study has several important limitations. First, all study participants are members or former members of LTROs who held leadership positions within those organizations; though five of the participants were wildfire survivors themselves, this study does not comprehensively describe the perspectives of the community members served by the LTROs. Additionally, the relatively small sample size of the study, 18 participants from six LTROs, does not account for the perspectives of all LTRO leaders. As a result, there may be facilitators and barriers to LTROs' ability to address community health needs or intra-community inequities that were not captured by this study. Because some of the experiences the participants reflected on occurred several years ago, recall bias related to participants' potentially incomplete or inaccurate memories of certain events may have impacted the study's results. Though participants from each LTRO discussed an adverse impact of the COVID-19 pandemic on their organization's community recovery work, participants in this study were more likely to serve a community that experienced a wildfire that occurred during the pandemic. As these disasters occurred more recently, this study did not capture longer term perspectives on these communities' recoveries, which may not have been as influenced by the pandemic. Finally, both the identification of potential participants and the subset of participants who agreed to participate were non-random samples of all those who potentially met the inclusion criteria. This may have resulted in selection bias. Though further studies will be needed to both confirm and expand upon the findings of this study in other contexts, it contributes to a foundational understanding of the factors impacting LTROs' ability to address rural communities' post-wildfire health needs. This important topic has been largely ignored in the scientific literature on post-disaster community recovery prior to this study.

Conclusion

This study provides insight into the barriers and facilitators of LTROs' ability to meet post-wildfire, rural community needs related to social determinants of health. The LTRO leaders who participated in this study, many of whom are community members and some of whom are wildfire survivors themselves, have a distinctive perspective among recovery organizations serving their community. As a central coordinating point for recovery resources whose presence in a community can last upwards of five years, members of LTROs have deep insight into the multitude of factors that impact the community recovery process, and how these factors shift throughout the multiyear recovery process. The findings of this exploratory study should be confirmed and expanded upon by future research focusing on these unique, community-based organizations in other communities and contexts. Additionally, the application of the RWJF Culture of Health Action Framework to the community disaster recovery context provides an example of how health equity in community recovery might be understood, an important contribution to the still developing repertoire of frameworks to measure the progression of community post-disaster recovery. Further research could expand the application of this framework to the broader disaster recovery context, examining other types of disaster recovery processes in other regions of the country.

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Appendix 1. Semi-Structured Interview Guide

Note: ** is used to indicate priority questions for participants short on time

Social Capital/Community Cohesion

****QUESTION 1:** **Do you or did you ever live in a community that was/is served by the LTRO?**

****QUESTION 2: If the participant either lived or used to live in the community:** Can you tell me a bit about the community culture prior to the fire? (**Prompts:** In other words, how did they connect socially? Would you describe the community as "close-knit" before the fire? Were there any pre-existing tensions?)

- ****Can you describe how the fire impacted the community culture?** Did this change throughout the recovery process?

****QUESTION 2: If the participant never resided in the community:** **Can you tell me a bit about the community culture during the initial recovery process?** (**Prompts:** In other words, how did they connect socially? Would you describe the community as "close-knit"? Were there any tensions? Did this change throughout the recovery process?)

Organizational Culture of LTRO

****QUESTION 3:** **To start, can you describe the LTRO's primary goals?** (**Prompts:** What were the focuses of its community recovery activities? Was the focus on a unified community recovery plan? Serving individuals in their recovery? Both?)

- How did/have these goals and priorities shifted throughout the recovery process?

QUESTION 4: Can you describe the process the LTRO used for making important decisions? (**Prompts:** Did employees, all board members, only those present at a meeting, etc. give input? How were any disagreements resolved?)

Community Involvement

QUESTION 5: In the survey, you indicated that the LTRO uses/used ***(insert communication methods here)*** to communicate with community members. What kinds of information is generally communicated by each of these methods?

- Are/Were some methods of communication more effective than others, and if so why? How have communication strategies shifted throughout the recovery process?
    - **If the community has residents who spoke a 1st language other than English:** Can you describe any approaches the LTRO takes/took to communicate with community

members unable to speak or understand English? How adequate are/were the language and translation resources that the LTRO has/had access to, if any?

QUESTION 6: You also indicated that the LTRO uses/used ***(insert engagement methods here)*** to engage community members in the LTRO's recovery plans and activities. **Could you elaborate a bit on how each of these methods is/was used to engage the community in the LTRO's recovery plans and/or activities?**

LTRO Resources

QUESTION 7: You mentioned the LTRO had/has ***(insert funding sources here)*** as sources of funding. What was that funding primarily used for? Were there any challenges in accessing or administering this funding?

****QUESTION 8: If the fire received a Presidential Disaster Declaration: Can you talk a bit about how the Presidential Disaster Declaration determination and process impacted the LTRO's work?** (**Prompts:** individual, public, hazard mitigation, or multiple types)

- **If individual assistance was available:** Can you describe any challenges or successes community members have/had accessing individual assistance?
- **If public assistance was available:** Can you describe any challenges or successes your organization or response partners have/had faced using or accessing public assistance?

****QUESTION 8: If the fire did not receive a presidential disaster declaration:** I saw in my background research that ***(insert specific fire name)*** did not receive a Presidential Disaster Declaration. **Can you talk a bit about how that impacted the LTRO's work?** (**Prompts:** impact on LTRO operations, impact on individual community members, impact on recovery of public/shared spaces)

LTRO Partnerships

****QUESTION 9: What organizations did/does the LTRO collaborate with, and how?** (**Prompts:** recovery-specific organizations, pre-existing community organizations, local government)

Resources Offered to the Community

****QUESTION 10: Can you describe any other resources offered to individual community members by the LTRO or its partners, beyond those you've already discussed?** (**Prompts:** to those who either lost housing/experienced damage, lost income or employment, and/or experienced physical or mental health impacts caused by the fire?)

QUESTION 11: Did the LTRO or its partners support rebuilding community spaces, such as ***(reference any community structures, parks, government buildings, etc. impacted by the fire),*** beyond those examples you've already discussed?

****QUESTION 12:* Could you describe any significant unmet needs that remain in the community? What are/were the challenges in meeting these needs?**

Accessibility & Equity of Resources

****QUESTION 13:* Can you describe any policies or plans the LTRO has/had to ensure all community members and/or communities had equitable access to recovery resources?**

- Can you describe how the LTRO discussed and/or defined "equity"? (**prompts:** was it thought about in terms of race/ethnicity, socioeconomic status, preferred language, geographic location, etc.)

Closing Questions

QUESTION 14: Reflecting back on what you've shared with me already, it sounds as though ***(insert challenges the participant has mentioned)*** were challenging for the LTRO/community during the early stages of the recovery process, and as the recovery progressed ***(summarize new challenges or changes to early challenges)***. ***(Insert unmet needs)*** remain an unmet need in the community. Is there anything you would like to add? You can elaborate on challenges we've already discussed, or tell me about another important challenge in the community recovery process that we have not yet discussed.

QUESTION 15: You mentioned that ***(insert successes the participant has mentioned here)*** as aspects of the LTROs work/community that were successful early in the recovery process, and that later in the recovery process ***(summarize new successes or changes to early successes)***. Is there anything you would like to add? You can elaborate on successes we've already discussed, or tell me about another important success in the community recovery process that we have not yet discussed.

Closing Remarks: That concludes the questions I had planned to ask you. Is there anything else you'd like to add before we wrap up? Do you have any additional questions for me?

Appendix 2. Qualitative Codebook

Code ^{a,b}	**Definition**
History	Any information describing the pre-disaster history of the community or the interviewee's professional or personal history, especially with the community/communities served by the LTRO
COVID-19	Any information describing how the COVID-19 pandemic and associated societal responses to the pandemic impacted the progression of response and/or recovery activities
Community Recovery as a Shared Value (RWJF)	Statements describing the extent to which local community members and the LTRO facilitated and participated in a collective vision of community recovery
Collective Recovery Mindset	Statements describing the extent to which community recovery was viewed as a collective, intertwined process by both community members and LTRO leadership, and the willingness of community members and/or LTRO leadership to collaborate with each other or amongst themselves (e.g., Did interpersonal conflicts impact the LTRO's work?; Was there an understanding that each community member's recovery benefited the recovery of the community as a whole?; Was the recovery public and/or community resources seen as important to individual recovery?)
Civic Engagement	Statements describing the extent of community members' engagement and collaboration in the recovery process, as well as the LTRO's efforts to engage the community members; this includes participation in LTRO activities or leadership as a community member (e.g., collective efforts to clean up, attendance to community meetings about recovery, community members involvement with LTRO)
Sense of Community	Statements describing the evolution of community cohesion pre-disaster and post-disaster throughout the recovery process
Cross-Sector Collaboration (RWJF)	Statements describing the extent of cross-sector collaboration throughout the community recovery process, such as the number and quality of partnerships and financial, time, and personnel resources invested in collaboration (e.g., between local, state, and federal government, response and recovery organizations, local community organizations, and the LTRO)
Health and Equity of Communities (RWJF)	Statements describing social determinants of health or government/public policy's impact on social determinants of health in the community/communities served by the LTRO, both pre- and post-disaster (e.g., the availability of affordable housing, employment and education opportunities, transportation, discrimination, environmental pollution, healthcare access, etc.)
Built Environment	Statements describing aspects of the community/communities' built environment (e.g., housing, infrastructure, parks, etc.); can be either pre- or post-disaster

Social and Economic Environment	Statements describing aspects of the community/communities' social and/or economic environment (e.g., employment opportunities, educational opportunities, aspects of culture, funding for public services, political leanings of community members, etc.); can be either pre- or post-disaster
Policy and Governance	Statements describing laws, policies, and/or standard procedures' impact on community recovery and equity in recovery, including the policies of the LTRO (e.g., land use or building regulations, organizational policies about who qualified for access to a particular resource, etc.)
Integration of Recovery Systems (RWJF)	Statements describing the accessibility, degree of coordination, and appropriateness of the manner in which recovery resources were provided; can apply to integration at the organizational, community, or societal levels (e.g., whether communication about resources was available in community members' preferred language, if resources provided to community members matched their stated needs, whether community members had a clear access point to all available resources)
Balance and Integration	Statements describing the extent to which the organizations providing recovery resources integrated their activities to provide coordinated recovery services to impacted community members; likely to be co-coded with Cross-Sector Collaboration code above
Consumer Experience and Quality	Statements describing if and/or how recovery resources were provided in a manner that considered the needs and preferences of recipients; including the availability of communication in the preferred language of recipients
Barrier	Statements describing any barrier to community recovery encountered by the LTRO or its partners at any point during the recovery process; can be explicitly stated by interviewee or inferred from interviewee's description of events; co-coded with RWJF domain codes above
Organizational Level	Barrier occurring at the organizational level (i.e., within the LTRO); co-coded with RWJF domain codes above
Community Level	Barrier occurring at the community level (i.e., within the control of the community or communities served by the LTRO); co-coded with RWJF domain codes above
Societal Level	Barrier occurring at the societal level (i.e., outside the control of individual community members, community organizations, or local community government); co-coded with RWJF domain codes above
Facilitator	Statements describing any facilitator to community recovery encountered by the LTRO or its partners at any point during the recovery process; can be explicitly stated by interviewee or inferred from interviewee's description of events; co-coded with RWJF domain codes above
Organizational Level	Facilitator occurring at the organizational level (i.e., within the LTRO); co-coded with RWJF domain codes above
Community Level	Facilitator occurring at the community level (i.e., within the control of the community or communities served by the LTRO); co-coded with RWJF domain codes above

Societal Level	Facilitator occurring at the societal level (i.e., outside the control of individual community members, community organizations, or local community government); co-coded with RWJF domain codes above
Key Quote	Statements by participants that should potentially be highlighted in future papers and presentations; can be great examples of the other codes above, or simply powerful statements or recommendations

[a] Parent codes are bolded; associated child codes are located below bolded parent codes

[b] Codes adapted from the Robert Wood Johnson Foundation's Culture of Health Action framework are denoted with "RWJF"