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Supporting community health workers during extreme heat events: A CFIR-ERIC guided scoping review of implementation strategies in low- and middle-income countries

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Systematic Review

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Abstract

Background

Community health workers (CHWs) are essential to healthcare delivery in low- and middle-income countries (LMICs) yet face increasing threats from extreme heat events (EHEs) due to climate change. Occupational health policies for CHWs remain fragmented globally, with CHWs receiving less attention than workers in other industries despite their critical frontline role. This scoping review aimed to identify barriers and facilitators affecting CHWs during EHEs and determine implementation strategies to support heat safety.

Methods

We conducted a scoping review by performing a systematic search across PubMed, Scopus, Web of Science, and grey literature published between 2000 and 2024, yielding 1,386 records. After screening, 20 studies met the inclusion criteria. Data synthesis applied the Consolidated Framework for Implementation Research (CFIR) to categorize barriers and facilitators, while the CFIR-ERIC matching tool mapped these to implementation strategies from the Expert Recommendations for Implementing Change (ERIC) taxonomy.

Results

CHWs in LMICs are central to climate-health responses, and also uniquely vulnerable to heat exposure. Widespread barriers to safe and effective service delivery during EHEs include physical challenges (such as dehydration, heat stress, and exhaustion), psychological stress linked to community expectations, inadequate infrastructure (notably poor cooling and inconsistent utilities), chronic underfunding restricting salaries and supplies, insufficient climate-health training, limited policymaker awareness of heat-health issues, and poor community health-seeking behaviors. Key facilitators that support CHWs include their strong community commitment and trust, deep contextual knowledge, disaster preparedness capabilities, and growing grassroots engagement in heat resilience efforts. However, CHWs remain frequently excluded from intervention design and strategic decision-making. The review identified 43 ERIC implementation strategies tailored to address the unique challenges and opportunities for supporting CHWs during EHEs. Of these, 65% served dual functions: mitigating barriers and reinforcing facilitators. Top-priority cross-cutting strategies included resource-sharing agreements, continuous training, promoting system adaptability, offering clinical supervision, creating educational materials, and coalition-building among stakeholders.

Conclusions

Many implementation strategies exist to both facilitate CHWs' responding during EHEs and to protect them during those events. However, success depends on contextual adaptation, with interventions addressing local heat-health risks and socio-political contexts. These findings underline the need to take action to support CHWs during EHEs.

BACKGROUND

In 2024, high temperatures alone caused approximately 22.85 million work-related injuries, 18,970 fatalities, and a loss of 2.09 million disability-adjusted life years (DALYs) (1). In response, the 'United Nations Secretary-General's Call to Action on Extreme Heat' urges countries and communities to support vulnerable populations and safeguard workers (2). The International Labour Organization (ILO) emphasizes the importance of paying special attention to workers performing physically demanding work in hot environments or during Extreme Heat Events (EHEs), such as heat waves, droughts, or the effects of a heat dome (1). The ILO notes: "Workers are among those most exposed to climate change hazards yet frequently have no choice but to continue working, even if conditions are dangerous" (1).

Across the world, Community Health Workers (CHWs) and other frontline health workers are key actors in responding to extreme weather events and other health emergencies. From flooding, to cyclones, to extreme heat, CHWs are frequently at the critical frontlines of immediate response (3–9). Sometimes, CHWs are integrated into formal workplans, responsible for public communication regarding heat waves and other weather crises (9, 10). But more often, CHWs find themselves addressing emergency situations in ad hoc ways, struggling to assist their neighbors in the midst of extreme weather events due to climate change, which often include attendant livelihood, mental health and violence crises (3, 4, 9).

This position, although a critical part of disaster response, can place CHWs in danger. By the nature of their work, CHWs spend long hours outdoors, often traveling considerable distances to reach the communities they serve, with little to no protection from extreme heat. In the face of climate change and increasingly frequent EHEs, their responsibility is expected to expand further, balancing community needs with their own survival (11). Across the world, CHW jobs are frequently considered voluntary, and not provided with basic job supports like HR protections, minimum wage, or worker's compensation (12–24). Structurally, gender dynamics within communities and government health systems, as well as the contingent nature of their work, can place CHWs at significant risk (14, 25, 26)

Worldwide, occupational health policies remain fragmented and insufficient in safeguarding health workers generally, despite growing evidence that extreme heat poses a significant threat to worker health and productivity. Meanwhile, there is minimal guidance provided by United Nations agencies, mostly guided by the United States Centers for Disease Control and Prevention (CDC), which primarily focuses on the physiological impact of heat on health workers (27). The United States Occupational Safety and Health Act and Occupational Safety and Health Administration (OSHA) Standards cited over 40 standards, none of which explicitly address frontline healthcare workers, except one on nursing personnel (28).

CHWs have not received the same kind of policy attention as their counterparts in other industries, like garment, construction, and agriculture, to protect them from extreme heat. For instance, Germany, France, Spain, United Arab Emirates, China, Australia and the United States have adopted some form of laws or guidelines that set workplace temperature limits, ranging from 68–76°F (20–24°C) in the U.S. to 99–104°F (37–40°C) in China, and ensure other benefits in the form of access to shade, hydration, and work-rest cycles (29). Such efforts can be beneficial in many ways, especially by saving lives, improving worker health and safety, boosting economic returns through increased workforce productivity and efficiency, and enhancing climate resilience. (30). In most LMICs, CHWs aren't part of the formal healthcare workforce and lack protections under the same occupational health policies (31).

This review aimed to map and synthesize the existing literature on how EHEs affect CHWs and their community-level frontline health services in LMICs by answering three interlinked questions:

1. What is the current evidence on the impact of EHEs on CHWs in LMICs?
2. Which facilitators and barriers, categorized under the CFIR domains and constructs, influence CHWs' ability to deliver services during EHEs?
3. What implementation strategies can be policy options to support CHWs, as mapped through the CFIR–ERIC matching tool?

METHODOLOGY

We conducted this scoping review following the methodological guidance proposed by Arksey and O'Malley (32) and aligned our approach with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) checklist to ensure transparency and rigor (33). The complete checklist is provided in **Online Supplemental File 2**.

Framework for Exploring Community Healthcare Workers During Extreme Heat Events

As a determinant framework in implementation science, CFIR is one of the most widely used meta-theoretical frameworks (34, 35). Recent applications of CFIR in climate and environmental health research are emerging (36–39), and the application of CFIR to service delivery models for CHWs is well established (40–42). For our review, we operationalized CFIR's five domains (Individuals, Inner Setting, Outer Setting, Innovation, and Implementation Process) to identify barriers and facilitators faced by CHWs, detailed in **Fig. 1**.

To bridge the CFIR-based barriers and facilitators to practical policy options and implementation strategies, we used the CFIR-ERIC matching tool, which systematically links the CFIR domains and constructs to the ERIC strategies (43). Expert Recommendations for Implementing Change or ERIC is a compilation of 73 discrete implementation strategies with standardized definitions (44). Recent studies have highlighted that CFIR-ERIC recommended strategies were more likely to be positively associated with implementation outcomes compared to randomly selected strategies (45–48).

Identifying Relevant Peer-reviewed and Grey Literature

We executed systematic searches for peer-reviewed and grey literature published between January 2000 and December 2024. For journal articles, a comprehensive search strategy was developed with a wide range of keywords and search terms, including "community health worker" (49), "extreme heat" (50), and "extreme weather event," and "low- and middle-income country", which were applied across PubMed/MEDLINE, Scopus, and Web of Science. Searches were restricted to English-language records. The complete PubMed/MEDLINE strategy is provided in **Online Supplemental File 1**. The title, abstract, and citation details of the searched articles were uploaded into the Covidence systematic review software (covidence.org), eliminating duplicate entries for the next phase of abstract and full-text screening. Complementary grey-literature searches were undertaken with Advanced Google Search, using the phrases "community health worker" AND "extreme weather event" in two Boolean combinations. We screened the first ten results pages (~ 100 hits) for each combination, retaining documents that addressed CHW roles or experiences in LMICs under heat-related climate stress. To capture institutional and program reports not indexed elsewhere, the same terms were applied to the WHO Institutional Repository for Information Sharing (IRIS) and the United Nations Evaluation Group (UNEG) repository.

Selecting Eligible Records

Screening was conducted in two sequential stages—(a) title and abstract screening and (b) full-text review—based on predefined eligibility criteria outlined in Table 1. These criteria were developed using the Population–Concept–Context (PCC) framework to ensure alignment with the research objectives. Two researchers (EM and DK) independently reviewed the titles and abstracts. If they could not reach an agreement on including a study, a senior researcher (MZH) made the final decision. The same senior researcher (MZH) conducted full-text reviews of all articles that passed the initial screening.

Table 1
Eligibility criteria for examining the role of community health workers amid extreme heat events

Criteria	Inclusion	Exclusion
Study population	We adopted the WHO's description of CHWs as local, less formally trained providers with the potential to extend health services to vulnerable, remote, and marginalized populations. They aim to meet unmet health needs, improve access, address health inequities, and boost health system performance (49).	Healthcare providers and professionals with advanced training and education—such as doctors, nurses, midwives, and paramedics
Extreme heat events	Extreme Heat Events (EHEs) are summertime weather conditions “substantially hotter and/or more humid than average for a location at that time of year,” defined by the United States Environmental Protection Agency (EPA). EHEs are commonly known in literature as heat waves, droughts, high temperature event, extreme temperature event, acute or prolonged heat exposure, heat hazard or heat spells, and heat dome. Because perceived heat stress during EHEs results from the interaction of multiple meteorological variables (temperature, humidity, cloud cover, wind, and others), precise EHE thresholds vary by place and season. Therefore, we have used qualitative categorizations reported by the included studies in this review rather than imposing a uniform quantitative cutoff (50).	Events include geophysical (earthquakes, volcanic activity), biological (epidemics, insect infestations), and planetary health issues (pollution, biodiversity loss, soil degradation, toxic chemicals).
Geographic context	Countries classified as low-income and lower-middle-income based on the World Bank classification	Countries classified as upper-middle-income high-income according to the World Bank List of Economies.
Type of source	Primary research published in peer-reviewed journals; government or non-governmental organization (NGO) documents and reports; civil society publications; research reports.	Secondary sources, conference proceedings, field notes, blogs, newsletters.
Language of publication	English	Any language other than English.
Date of publication	Sources published between January 2000 to December 2024	Sources published outside this data range

Layout: Table 1 goes here. (See Large Tables at end)

Charting of Evidence

After completing the full-text screening, all eligible articles were re-evaluated, and relevant data were systematically gathered using a standardized data charting template created in Microsoft Excel. The data charting process was designed to capture bibliographic information (e.g., title, authors, year, country, citation), study characteristics (e.g., document type, study method, study objective, and CHW program description), and key CFIR-based themes. Specifically, we mapped findings onto the CFIR domains and constructs, including Inner Setting, Outer Setting, Intervention Characteristics, and Implementation Process, along with the Individual roles (e.g., innovation deliverers, facilitators) and behavioral characteristics (e.g., need, motivation, opportunity, capability) of CHWs. During the charting process, two researchers (TKD and MZH) independently extracted data from three articles as a pilot to align our interpretations and ensure consistency. Once the full extraction was completed, all entries were reviewed together by the entire team.

Analyzing and Synthesizing the Findings

In the final stage, the charted data were analyzed using a hybrid deductive-inductive thematic analysis (51). Two researchers (TKD and MZH) independently examined the data, deductively coded study-level information with pre-specified CFIR constructs, and then inductively clustered any emergent concepts that did not initially fit the framework. Through iterative discussion, barriers and facilitators that influence CHWs during EHEs in LMICs were consolidated into a harmonized matrix spanning the five CFIR domains and their relevant sub-constructs. Next, every barrier and facilitator was matched with the complete set of 73 ERIC implementation strategies using the CFIR–ERIC Matching Tool. We ranked the strategies based on the conceptual alignment of each barrier and facilitator and selected the three most relevant implementation strategies for each. This allowed us to identify cross-cutting strategies (i.e., those repeatedly recommended across multiple CFIR constructs) and detect highly specialized strategies that can be used as leverage points to yield the greatest gains for CHWs during HEHs. Finally, we converted the ERIC strategies into a list of practical policy options for each identified barrier or facilitator. These suggested actions function as a flexible menu for policymakers, program managers, and donors aiming to address barriers or promote facilitators.

RESULTS

The search yielded 1,380 records, with 773 from electronic databases and 607 from additional sources, including Google, WHO IRIS, and the UNEG repository. After removing 314 duplicates, 1,066 records were screened, with 27 full-text articles assessed for eligibility. Of these, 13 were excluded, resulting in 20 articles included in the final synthesis, which also included an additional six articles identified through a targeted citation search. The process is summarized in **Fig. 2**, following the PRISMA guidelines (52).

The majority of studies included in this review were from South Asia, with India contributing the largest number of studies (n = 6) (53–58), followed by Nepal (n = 3) (58–60), and Pakistan (n = 3) (58, 61, 62). Other studies reported findings from the African region, including Ethiopia (n = 3) (58, 63, 64), Kenya (n = 2) (65, 66), Zimbabwe (n = 1) (67), and two articles covering multiple African countries, covering Malawi, Mozambique, and South Sudan (68, 69). Several documents presented global perspectives with a special focus on LMICs (58, 69–72). In terms of document type, most were original research articles (n = 13) (53, 54, 56, 57, 59–67), along with one review (70), two program or implementation reports/guides (58, 68), two training guidelines (55, 71), and two communication and advocacy reports (69, 72).

The included studies in the review presented a wide range of themes (Table 2). Several studies investigated community-level resilience strategies and the role of CHWs in adapting and responding to climate stressors (61, 64, 65). Several qualitative studies explored the lived experiences of CHWs and their community during heatwaves and other climate events, emphasizing social context, workload, and infrastructure limitations (57, 66, 69). Another set of studies indirectly reported the impact of heat on CHWs, while their primary aim was to understand how such extreme weather events affect maternal and child health services, nutrition, and healthcare access in vulnerable communities (53, 54, 60, 63). Educational and training-focused studies developed tools and manuals to equip CHWs and other health professionals with the knowledge to address climate-sensitive health outcomes, especially heat-related illnesses (55, 71, 72). Lastly, multi-country reviews and implementation guide documents synthesized the features of existing CHW models for climate-resilient health systems (58, 70).

Table 2
Records included in scoping review and CHW characteristics during extreme heat events

Citation	Location	Document Type	Study Objective	Role	Need	Capability	Motivation	Opportunity for Improvemer
Balakrishnan et. al., 2024 (65)	Kenya	Original research	Explore the multidimensional impacts of extreme weather events (EWEs) on the daily lives of women in informal settlements in Nairobi, Kenya, through the lens of socio-ecological theory	The community health volunteers (CHVs) are responsible for conducting monthly household surveys, collecting data on EWEs and their impacts on women in informal settlements in Nairobi. They also ensure ethical research practices, follow safety protocols for addressing sensitive topics, and assist in the ongoing analysis of gathered data.	Health and well-being of CHVs are impacted by the same extreme weather events (EWEs) affecting the communities they serve	CHVs were trained in ethical research practices, quantitative data collection, and study protocols, enabling them to perform data collection under challenging conditions.	None reported	None reported
Diamond-Smith et. al., 2023 (59)	Nepal	Original research	Analyze the associations between exposure to drought and excess rainfall during different time points in pregnancy (preconception and trimesters) and birth outcomes, including low birth weight, in rural Nepal, while also examining potential impacts on infant sex and delivery with a skilled birth attendant	No description of any CHW program.	None reported	None reported	None reported	None reported
Domingo et. al., 2024 (70)	Multiple low- and middle-income countries (LMICs)	Review	Synthesize the literature on the roles of CHWs during EWEs in LMICs, identify barriers and facilitators to implementing these roles, and explore program supports to strengthen CHW capacity and health system functions for building climate-resilient health systems	CHWs are responsible for delivering diagnostic, treatment, and clinical services; facilitating community education and health promotion; supporting access to health services and referrals; conducting data collection and health surveillance; providing psychosocial support; and responding to weather-related health emergencies	CHWs faced challenges with psychological stress and mental health shocks from EWEs, impacting their well-being and their ability to provide care.	CHWs were equipped with disaster preparedness training and tools to respond to emergencies, including flood risk communication and prevention of heat-related illnesses.	None reported	Limited training, supervision, career advancemer opportunitie and inadequate resources hindered CHWs' effective response to EWEs.

Citation	Location	Document Type	Study Objective	Role	Need	Capability	Motivation	Opportunity for Improvemer
				during extreme weather events				
Irenso et. al., 2022 (63)	Ethiopia	Original research	Explore how El Niño-triggered drought influenced complementary feeding practices in a food-insecure community in eastern Ethiopia, focusing on maternal time allocation, coping strategies, and community health services	Health Development Army (HDA) leaders act as volunteers responsible for delivering health messages, supporting birth preparedness, promoting institutional delivery, and providing counseling on maternal and child health services, including nutrition education and infant feeding practices, in rural Ethiopia.	HDA experienced increased burdens on its workload during the El Niño-triggered drought, highlighting the need for additional support to manage community health demands and sustain caregiving activities.	None reported	None reported	HDA had insufficient resources and infrastructur including limited access to food and water, which hindered the ability to perform thei roles effectively during the drought.
Khan et. al., 2021 (61)	Pakistan	Original research	Understand the perceptions and practices of community members and healthcare professionals regarding the recognition and management of heat emergencies in Karachi, Pakistan	CHWs assist in managing heat emergencies by raising community awareness, promoting early recognition of symptoms, and supporting the use of preventive measures like hydration and home-based remedies.	CHWs reported experiencing psychological stress and physical challenges, including dehydration, while working in extreme heat.	CHWs noted limited training in managing heat-related illnesses, which affected their ability to respond effectively to emergencies.	None reported	Insufficient access to water and cooling facilities, an lack of adequate infrastructur limited CHW ability to operate safely durin extreme hea events (EHEs).
Kumar & Bhawani, 2005 (53)	India	Original research	Describe professional approach to managing child malnutrition during a drought in the Baran district of Rajasthan, India, by conducting a rapid nutritional assessment, establishing Nutrition Care Centres (NCCs) for targeted feeding and care, and implementing community-based interventions to improve child nutrition and survival.	CHWs, predominantly local women from the Sahariya tribal community, are responsible for operating NCCs, providing growth monitoring, targeted feeding, immunization support, health and nutrition education, and managing malnourished children per WHO guidelines. They also conduct home visits to ensure frequent feeding and care and facilitate the referral of severely malnourished children to hospitals.	CHWs faced challenges related to limited resources and community expectations during the prolonged drought, underscoring the need for additional support systems to manage the increased demands of caregiving activities.	CHWs were trained in targeted feeding, growth monitoring, and health education, enhancing their ability to effectively manage severe malnutrition among children.	Working at the NCCs offered the local Sahariya women an alternative job opportunity at a time when their traditional work had been suffering due to rapid environmental degradation.	Poor infrastructur and inadequate outreach of health and nutrition services limited CHW ability to meet the community's needs durin the drought.
Mukherjee & Batta, 2024	India	Original research	Conduct a situation	ASHAs are responsible for	None reported	None reported	None reported	Limited infrastructur

Citation	Location	Document Type	Study Objective	Role	Need	Capability	Motivation	Opportunity for Improvemer
(54)			analysis to estimate the risk-informed monitoring and evaluation production frontier with the least inefficiency, identify supply-side vulnerabilities, and assess risks in accessing child health services in disaster-prone districts of West Bengal, India.	supporting the monitoring and evaluation system in disaster-prone districts of West Bengal, including assisting with child-specific health service delivery, participating in data collection, and implementing preparedness plans to ensure healthcare access during and after natural disasters.				insufficient training, and suboptimal institutional capacity restricted CHWs' abilit to respond effectively tc extreme hea
National Programme on Climate Change & Human Health and Ministry of Health & Family Welfare, 2024 (55)	India	Training manual	Develop a training manual for Accredited Social Health Activists (ASHAs) in India to enhance their capacity in identifying, preventing, and managing heat-related illnesses, as part of the National Programme on Climate Change and Human Health.	ASHAs are responsible for community-level health promotion and awareness, including identifying and managing heat-related illnesses during heatwaves. Their tasks include organizing training sessions, increasing awareness, providing first aid, referring severe cases to healthcare facilities, and conducting post-heat evaluations to ensure preparedness for future heatwaves.	ASHAs themselves are at risk of heat-related illnesses when carrying out their responsibilities.	ASHAs are trained to manage heat-related illnesses, with a focus on vulnerable populations, and a phase-wise implementation, using IEC materials.	None reported	None reported
Perry et. al., 2013 (58)	Bangladesh, Brazil, Ethiopia, India, Iran, Nepal, and Pakistan	Guide	Analyze case studies of large-scale CHW programs in Bangladesh, Brazil, Ethiopia, India, Iran, Nepal, and Pakistan to identify key lessons learned that can guide policymakers and program implementers in designing, scaling up, and strengthening CHW programs globally.	This study provides detailed case studies of large-scale CHW programs, including the roles and responsibilities of CHWs such as Shasthya Shebikas (Bangladesh), Community Health Agents (Brazil), Lady Health Workers (Pakistan), and Health Extension Workers (Ethiopia). These CHWs deliver primary healthcare services,	CHW programs are struggling with an insufficient and ageing workforce.	CHWs were trained to treat common medical conditions, promote health behaviors, and refer patients to necessary services.	The introduction of a sales component allowed CHWs to earn small profits, providing them with an additional incentive to continue their work.	Limited infrastructur and lack of career advancemer opportunitie affected CHWs' abilit to fully engage with their roles.

Citation	Location	Document Type	Study Objective	Role	Need	Capability	Motivation	Opportunity for Improvemer
				facilitate health education and promotion, provide treatment for common illnesses, and mobilize community engagement in national health programs.				
Poudel et.al., 2024 (60)	Nepal	Original research	Examine the immediate and long-term impacts of climate change on the sexual and reproductive health and rights (SRHR) of women and girls in the Khutiya and Banganga River Basins in Nepal, and establish connections between climate change vulnerabilities and SRHR outcomes in these climate-vulnerable communities.	Female community health volunteers (FCHVs) are responsible for providing sexual and reproductive health services, including antenatal and postnatal care, to women in remote areas of Nepal. They play a critical role in ensuring access to healthcare despite challenging terrains and climate-induced disasters, while also serving as the primary healthcare contact within the community.	FCHVs faced challenges accessing health services during flooding and landslides, which impacted their ability to provide maternal and neonatal care, leading to increased risks for complications and mortality.	None reported	None reported	Flooding anc poor infrastructur such as lack of roads anc bridges, limited CHW ability to reach patients, especially during labor emergencie: contributing to service delays and adverse health outcomes.
Rawat et. al., 2022 (64)	Ethiopia	Original research	Identify salient factors that can improve health system resilience by exploring the successes and challenges experienced by a community-based health system during the drought response in Ethiopia, with a focus on barriers and facilitators to community engagement, participation, and the effectiveness of HEWs.	HEWs are responsible for providing community-based primary health care in rural Ethiopia, including prevention, health promotion, selective curative services, immunizations, treatment of childhood illnesses, and community mobilization. They are also central to coordinating emergency response during droughts, offering data collection, community engagement, and health service delivery.	CHWs faced increased workload pressures and mental strain during the El Niño drought, highlighting their need for additional support systems to sustain caregiving activities.	CHWs received training to perform tasks such as immunizations, managing acute illnesses, and community mobilization, enabling them to respond to health emergencies effectively.	None reported	CHWs facec insufficient supplies, inadequate infrastructur and over-reliance on their roles, which limite their ability t perform effectively during the drought response.

Citation	Location	Document Type	Study Objective	Role	Need	Capability	Motivation	Opportunity for Improvemer
Razzak et. al., 2022 (62)	Pakistan	Original research	Evaluate the impact of a CHW-led educational intervention, known as the Heat Emergency Awareness and Treatment (HEAT) program, on reducing all-cause mortality, unplanned hospital visits, and improving heat-related knowledge and practices among low-income communities in Karachi, Pakistan	CHWsc conducted household visits and community awareness sessions to deliver services, educating communities on heat-related illnesses, preventive measures, and early recognition of symptoms.	None reported	CHWs were trained in heat prevention, recognition, and management, as well as communication strategies, enhancing their ability to deliver the HEAT intervention effectively.	None reported	CHWs operated within communitie with limited resources, including inadequate water and electricity, which posec challenges t implementir heat-mitigating strategies.
Sambath et. al., 2022 (56)	India	Original research	Assess the knowledge, attitudes, and practices related to climate change and its health aspects among the healthcare workforce in India; identify gaps and inform the development of group-specific learning materials on climate change and health.	ASHAs are responsible for serving as community-based liaisons between the healthcare system and rural populations, raising awareness about the health impacts of climate change, and participating in government-led initiatives such as the National Programme on Climate Change and Human Health (NPCCHH) to address climate-sensitive health challenges.	CHWs recognized the need for climate-resilient infrastructure and health systems to manage the impacts of climate change, including extreme heat and health emergencies.	None reported	CHWs expressed interest in learning more about their role in addressing climate change and its health effects.	CHWs had inadequate training and limited access to resources, such as wat and energy supplies, to address the challenges posed by climate change.
Save the Children, 2012 (68)	Malawi, Mozambique, and South Sudan	Report	Address childhood illness and mortality in Malawi, Mozambique, and South Sudan by training CHWs to provide life-saving treatments for common illnesses such as pneumonia, diarrhea, and malaria among children under the age of five.	CHWs are trained to provide life-saving treatments for common childhood illnesses, such as pneumonia, diarrhea, and malaria, for children under five. They are responsible for assessing children's conditions, administering medications like antibiotics and antimalarial drugs, and referring severe cases to health facilities.	None reported	CHWs were trained in community case management, including treating common childhood illnesses like pneumonia, diarrhea, and malaria, enabling them to provide life-saving interventions.	None reported	CHWs faced limited access to infrastructur and resources, such as medications and transpo which affected the ability to deliver services effectively.
Scorgie et.al., 2023 (66)	Kenya	Original research	Explore the lived experiences of pregnant and postpartum	CHVs provide pregnancy and lactation support to	CHVs reported the need for additional support to	CHVs were trained to support pregnant	None reported	CHVs had limited resources, including

Citation	Location	Document Type	Study Objective	Role	Need	Capability	Motivation	Opportunity for Improvemer
			women in rural Kilifi County, Kenya, regarding the impacts of extreme heat exposure on their health and well-being, and to situate these experiences within the context of local gender dynamics, poverty, and environmental challenges.	women in rural Kilifi County, Kenya, while also promoting health education and offering assistance to address heat-related health challenges in the community.	manage their workloads during extreme heat, as the expectations placed on them by their communities were high and physically demanding.	women and manage community-level health issues, which included addressing heat-related health challenges.		inadequate access to water, coolir facilities, an climate-resilient infrastructur
Singh et. al., 2018 (57)	India	Original research	Assess the spectrum of service delivery, time utilization, work planning, and factors affecting the functioning of Auxiliary Nurse Midwives (ANMs) in South India	ANMs are responsible for providing primary promotive and curative healthcare services, including maternal and child health, immunizations, school health programs, and management of seasonal diseases, while also handling administrative tasks such as maintaining records, reporting, and participating in community mobilization activities.	ANMs reported physical strain and challenges during fieldwork in extreme climates, such as extreme heat and monsoons, highlighting the need for better support systems and infrastructure.	ANMs received limited training in testing for communicable diseases and emergency care, which limited their ability to respond effectively to climate-related health issues.	None reported	ANMs had insufficient transport, poor road infrastructur in rural area: and limited availability o male health workers to support ther in remote or unsafe locations.
Skovdal et. al., 2013 (67)	Zimbabwe	Original research	Explore how community volunteer groups in rural Zimbabwe act as 'critical enablers' in the HIV response by facilitating prevention, care, treatment, and mitigation efforts; examine the barriers, resources, and dynamics that shape their role.	Community volunteers in this study, mobilized through indigenous community groups, act as adherence support workers and caregivers for people living with HIV. They provide psychosocial support, facilitate community-based health dialogues, and help in managing HIV prevention, treatment adherence, and care services.	Community volunteers note frequent droughts, insufficient rainfall, and long walking distances for water as a key barrier, which leads to food insecurity, increasing poverty, and impairing local response to HIV.	None reported	Community groups recognize their critical role in providing HIV services to the population, advocating for ways to capitalize on their knowledge and local resources to provide more efficient care.	Community volunteer groups note that to be more efficient, it would be useful to partner with resourceful organization improving service delivery.
The Geneva Learning Foundation, 2023 (69)	Asian and African countries	Report	Document and amplify the lived experiences of frontline health workers in LMICs regarding the health impacts of climate change.	No description of any CHWs program.	Frontline health workers exposed to extreme heat while delivering care face physical and mental exhaustion, reducing their ability to serve effectively.	Frontline health workers recognize their role in sensitizing and educating the community about the health impacts of climate change.	Many frontline health workers independently educate communities about staying hydrated and managing heat stress, despite	None reported

Citation	Location	Document Type	Study Objective	Role	Need	Capability	Motivation	Opportunity for Improvemen
							resource constraints.	
WHO, 2015 (72)	Global	Training guide	The objective of the study is to provide a training framework for public health professionals that enhances their understanding of the health impacts of climate change, equipping them with knowledge and skills to develop and implement adaptation and mitigation strategies in health systems.	No description of any CHWs program.	None reported	CHWs' roles in extreme heat interventions include public education, with a targeted focus on vulnerable populations.	None reported	None reported
WHO, 2024 (71)	Global	Commun-ications toolkit	The objective of the study is to provide health professionals with a toolkit to effectively communicate the health risks associated with climate change and the health benefits of climate solutions, empowering them to become advocates and educators for climate action within their communities.	No description of any CHWs program.	None reported	CHWs have several responsibilities, including educating communities, distributing heat action plans, and advising on local resources for heat-related health risks, which may influence implementation complexity. Additionally, engaging CHWs in the development and execution stage of climate-resilient strategies ensures active participation and ownership of the intervention.	None reported	None reported

Layout: Table 2 goes here. (See Large Tables at end)

Community Health Workers and Extreme Heat Events

Role of Community Health Workers

Across the studies analyzed, CHWs consistently emerged as critical in delivering services within the CFIR's Individual Domain. Table 2 outlines the range of critical roles that CHWs play in responding to extreme heat and other climate-induced health threats across LMICs, encompassing additional service delivery activities, community engagement, and emergency response. During heatwaves and drought, their work often extended beyond operating health and nutrition centers, offering targeted feeding, immunization, and curative services for vulnerable populations, including children and pregnant women (53, 58, 60, 68). Health promotion and awareness activities (such as educating communities about heat-related illness and hydration), early symptom recognition, and triage were reported most frequently (55, 61, 62).

Only a few articles highlighted CHWs' roles beyond delivering interventions, such as surveillance, data collection, and coordination (54, 64, 65), and only two studies reported that CHWs were engaged in designing and fine-tuning the heat-safety interventions and their implementation. In Pakistan, a cluster-randomized controlled trial was designed to expand the role of CHWs from organizing home visits and counselling to integrating health literacy and community-education initiatives. During the final design phase, CHWs participated in focused group discussions and in-depth interviews to ensure the contextual accuracy of the messaging content (62). A training manual prepared by India's Ministry of Health & Family Welfare for CHWs to treat heat-related illnesses illustrates a phase-wise implementation process, where the last phase (post-heat) includes ASHA workers reviewing and providing feedback on the information, education, and communication (IEC) materials to higher authorities (55).

Needs of Community Health Workers During Extreme Heat Events

Our review identified a clear need for interventions that safeguard the physical and mental health of CHWs while they work under extreme environmental stressors. Exposure to extreme heat, dehydration, and heat-related illnesses was frequently reported, especially during community visits and outdoor activities (55, 57, 61). These threats are compounded by shared environmental vulnerabilities, as CHWs often live in the same heat-affected communities they serve (65). Psychological stress and emotional fatigue were also prevalent due to increased workloads, exposure to community suffering, and the high-stakes nature of their responsibilities during climate crises (63, 64, 70). CHWs consistently identified the need for mental health support systems in combination with occupational health safeguards for more sustainable working conditions during climate emergencies (66, 69). Many reported struggling to meet the heightened health demands of their communities with limited resources and infrastructure (53, 63). These issues were exacerbated by infrastructural problems, including inaccessible roads, limited transportation, and flooding (60, 67).

Capability and Motivation of Community Health Workers to Respond to Extreme Heat Events

We identified considerable variation across contexts in support provided to CHWs to adapt or to respond to the health needs of the community during EHEs. In many LMICs, including India and Pakistan, CHWs received targeted training that enhanced their ability to deliver services in climate-stressed environments. These included competencies in heat illness prevention, symptom recognition, and risk communication (55, 62, 70). However, limitations of such training approaches become evident without systemic support. Studies from Pakistan and India reported insufficient preparation to manage sudden heat-related illnesses or emergency care (57, 61). Though less frequently reported, the motivation of CHWs is a critical enabler for engaging them in climate-responsive care delivery, especially when it is linked with financial incentives or alternative livelihood opportunities. For example, CHWs working at Nutrition Care Centres during droughts in India gained stable incomes amid environmental job losses (53), while other cadres of CHWs earned small profits through integrated sales programs within their communities (58). In addition, CHWs demonstrated intrinsic motivation to expand their role in addressing climate-related health impacts by learning more about the link between climate change and health (56), and many of them often independently initiate community education on heat safety despite limited institutional support (69).

Barriers and Facilitators Community Health Workers Face During Extreme Heat Events

We mapped barriers and facilitators that influence CHWs' ability to safely deliver effective health services during extreme heat events by the CFIR domain and construct reported in the included studies in Tables 3 and 4. These barriers and facilitators encompass factors that either hinder or enable CHWs' capacity to protect their own health while continuing to provide essential care to their communities during periods of extreme heat.

Table 3
Barriers reported in the studies and matched ERIC strategies and policy options across the CFIR domain and construct

CFIR Construct	Barriers	ERIC Strategies	Policy Options
Domain: Individuals			
Needs of CHWs	Experiencing physical health challenges such as heat stress, dehydration, and physical exhaustion during extreme weather events. (55, 57, 60, 69–72)	• Provide clinical supervision • Conduct ongoing training • Develop resource-sharing agreements	**CHW Physical Health Support During Extreme Weather**: Regular clinical supervision to offer guidance and monitoring, establish resource-sharing agreements to provide hydration, cooling, and rest facilities, and implement ongoing training that educates CHWs on self-care and early detection of heat-related symptoms to protect their health during extreme weather events.
	Coping with psychological stress, emotional strain, and mental health shocks due to high community expectations and limited emotional support. (57, 60, 69–72)	• Provide clinical supervision • Conduct ongoing training • Create a learning collaborative	**Mental Health Support for CHWs During Extreme Weather**: Offer regular clinical supervision to provide CHWs with emotional support and professional guidance, deliver ongoing training focused on mental health self-care and stress management, and establish peer learning collaboratives to share coping strategies, to help CHWs navigate psychological demands and high community expectations
	Facing overwhelming workloads, limited access to health services, and inadequate workload management systems. (54, 56, 57, 60, 64, 70)	• Revise professional roles • Provide local technical assistance • Develop resource-sharing agreements	**Workload Optimization and Resource Access for CHWs**: Revise CHW role definitions to balance responsibilities, deliver localized technical assistance to improve task coordination and access to support, and create resource-sharing partnerships that help distribute staff and essential services more equitably across health facilities and communities.
Domain: Inner Setting			
Structural Characteristics	Poor-quality infrastructure, including structurally unsound facilities, which fail to protect people from extreme heat or meet growing community demands. (57, 62, 70)	• Change physical structure and equipment • Centralize technical assistance • Develop resource-sharing agreements	**Infrastructure Enhancement for Heat-Resilient Health Facilities**: Upgrading health facility infrastructure with heat-resilient materials and cooling systems, supported by centralized technical assistance to guide retrofitting efforts. It should also establish resource-sharing agreements with partner organizations to supply essential equipment and ensure facilities can safely accommodate CHWs and patients during extreme heat events (EHEs).
	Inconsistent access to essential utilities, such as water and electricity. (60–62, 69, 70)	• Change physical structure and equipment • Provide local technical assistance • Develop resource-sharing agreements	**Sustainable Utility Solutions for Health Facility**: Equip health facilities with sustainable systems like solar panels and water storage units, provide local technical assistance for setup and maintenance, and establish resource-sharing agreements with agencies or providers to secure reliable utility access during extreme heat, ensuring uninterrupted operations and CHW support
Compatibility & Relative Priority	The lack of policy alternatives underscores the importance and prioritization of interventions addressing the heat-health nexus. (56, 60, 62, 69, 70)	• Develop a formal implementation blueprint • Use advisory boards and workgroups • Involve executive boards	**Strategic Planning to Address Climate-Health Policy Gaps**: Establish expert advisory groups and executive engagement to co-develop a formal implementation plan focused on protecting CHWs from extreme heat, filling the policy void, and ensuring sustained institutional commitment.
Incentives and Mission Alignment	Financial and non-financial incentives, such as bonuses, training, and supplies, drive CHW motivation; however, their growth has not kept pace with expanding responsibilities. (57, 58, 64, 65, 72)	• Alter incentive/allowance structures • Conduct ongoing training • Distribute educational materials	**Realigning Incentives and Support for CHWs' Expanded Roles**: Revise financial incentives to reflect CHWs' increased workload, provide regular training opportunities to enhance skill development, and distribute targeted educational materials as practical, non-financial support tools to help CHWs manage heat-related responsibilities effectively.
Available Resources	Inadequate systems for risk monitoring, early warning, and physical resources, such as dehydration management supplies, impede preparedness for EHEs. (54, 55, 61, 69, 70)	• Develop and implement tools for quality monitoring • Provide local technical assistance • Develop resource-sharing agreements	**Monitoring Preparedness Tools and Resource Coordination for CHWs**: Developing tools to monitor heat exposure and related risks, offering localized technical assistance for implementing early warning systems, and forming resource-sharing agreements to ensure availability of critical supplies like dehydration management kits.

CFIR Construct	Barriers	ERIC Strategies	Policy Options
	Transportation challenges, including limited public transport and poor access to remote or hilly regions, hinder CHW operations. (57, 60, 61, 64, 68, 69, 72)	• Change service sites • Provide local technical assistance • Develop resource-sharing agreements	**Improving CHW Access to Remote Communities**: Establish or relocate service delivery points closer to underserved areas, provide logistical support such as route planning and transport solutions, and create partnerships with local entities to share vehicles and improve CHWs' mobility in hard-to-reach regions.
Access to Knowledge & Information	Limited research and a lack of access to information on the health impacts of extreme heat and climate change constrain evidence-based decision-making. (62, 69–71)	• Distribute educational materials • Develop academic partnerships • Use data experts	**Evidence Support for CHWs**: Distribute research-informed materials on heat-health impacts to CHWs, establish partnerships with academic institutions for data generation and sharing, and engage data experts to synthesize and translate findings into accessible formats for CHW use.
	Variability in standards of care across the system reduces consistency and effectiveness. (54, 57, 61, 72)	• Develop a formal implementation blueprint • Conduct ongoing training • Audit and provide feedback	**Standardizing CHW Care Protocols**: Develop formalized care protocols, deliver ongoing training to ensure consistent implementation, and utilize structured audit and feedback cycles to ensure alignment across the health system.
Domain: Outer Setting			
Local Attitudes	Poor health-seeking behaviors and community misconceptions about appropriate actions during EHEs hinder effective response. (61, 62, 66, 69, 70)	• Conduct educational meetings • Use mass media • Intervene with patients/consumers to enhance uptake & adherence	**Community Education to Improve Heat-Health Behaviors**: Organize community educational meetings to address misconceptions, utilize mass media to deliver consistent and accurate heat-health messages, and implement direct engagement with individuals and families to promote adherence to preventive and responsive behaviors during EHEs.
	Limited community awareness of the health impacts of climate change and the role of CHWs in addressing them. (56, 60, 61, 65, 66, 69, 70)	• Use mass media • Conduct educational outreach visits • Promote network weaving	**Community Awareness of Climate-Health using CHWs**: Deploy mass media campaigns to inform the public about climate-related health risks, complement this with CHW-led outreach visits for direct education and trust-building, and strengthen community networks to support collective awareness and recognition of CHWs' contributions to climate change response.
	Low acceptance of CHWs, specifically young women, due to social and cultural biases. (58, 69, 72)	• Identify and prepare champions • Conduct local consensus discussions • Involve patients/consumers and family members	**Community Engagement to Address CHW Acceptance Barriers**: Recruiting respected local champions to advocate for young female CHWs, facilitating inclusive discussions with community stakeholders to confront cultural biases, and incorporating patients and families into decision-making processes to raise collective acceptance and support.
	Competing priorities during droughts and heavy workloads on women due to gendered norms affect community engagement. (53, 59, 60, 63, 64, 66, 69)	• Conduct local needs assessment • Promote adaptability • Build a coalition	Gender-**Sensitive Engagement Strategies**: Local needs assessment to understand gendered burdens and competing priorities, incorporate flexible engagement approaches that adapt to shifting community demands, and establish collaboration with local leaders and health facilities to support equitable workload distribution and improve sustained CHW participation
Local Conditions	EHEs disrupt employment, businesses, and daily life, including the loss of privacy. (60, 62, 65, 66, 69)	• Conduct local needs assessment • Develop resource-sharing agreements • Promote adaptability	**Adaptive Community Support for Heat-Related Disruptions**: Identify how extreme heat affects livelihoods and privacy, establish agreements to share resources like cooling spaces and alternative work locations, and promote adaptable work and service delivery models that help communities and CHWs adjust to disruptions while preserving daily function and dignity.
	Adverse socioeconomic and gender-based impacts of extreme heat, such as worsening mental health and increased intimate partner violence, exacerbate vulnerabilities. (60, 65, 66, 69)	• Intervene with patients/consumers to enhance uptake & adherence • Build a coalition • Provide clinical supervision	**Integrated Response to Socioeconomic and Gender-Based Heat Impacts**: Engage affected individuals with tailored education and support resources, establish coalitions with local organizations to coordinate responses to gender-based and socioeconomic vulnerabilities, and offer clinical supervision to CHWs to help them recognize and address mental health concerns and safety risks during EHEs.
Partnerships and Connections	Limited integration and weak linkages between primary care and higher	• Develop resource-sharing agreements	**Linkage Strengthening Between Health System Levels**:

CFIR Construct	Barriers	ERIC Strategies	Policy Options
	levels of health services hinder effective care delivery. (54, 61, 72)	• Promote network weaving • Organize clinician implementation team meetings	Establish formal resource-sharing agreements between primary care and higher-level facilities, build stronger inter-provider connections to improve coordination, and facilitate regular joint meetings among care teams to ensure integration of strategies and seamless care delivery during EHEs.
Policies & Law	Limited awareness among policymakers about heat-related illnesses reduces policy support. (56, 62, 69, 70)	• Conduct educational meetings • Involve executive boards • Use mass media	**Policy Advocacy for Heat-Health Awareness**: Targeted workshop for policymakers on heat-related illnesses, formation and direct engagement with technical working groups to embed heat-health into institutional priorities, and mass media campaigns to elevate public and policymaker awareness
Financing	Chronic underfunding of CHW initiatives restricts access to adequate salaries, supplies, and training materials. (57, 58, 62, 64, 69, 70, 72)	• Access new funding • Develop resource-sharing agreements • Fund and contract for clinical innovation	**Sustainable Financing for CHW Program**: Securing new funding streams to address financial shortfalls, establishing resource-sharing agreements with partners to supplement materials and support, and dedicating funds to pilot and sustain innovative approaches that enhance the capacity and effectiveness of heat safety programs for CHWs.
	Inadequate financial resources lead to poor health-seeking behaviors and limit the effectiveness of CHW programs. (58, 61, 67, 69, 70)	• Access new funding • Alter incentive/allowance structures • Develop resource-sharing agreements	**Comprehensive Financial Support for CHWs and Communities**: Secure new funding to support CHWs and extend assistance to the communities they serve, revise incentive structures to fairly compensate CHWs for their expanding roles, and establish partnerships to share financial and material resources that improve healthcare delivery and access in resource-limited settings during EHEs.
Domain: Innovation			
Design	CHW training programs lack a focus on climate-specific capacity-building. (56, 69, 70)	• Develop educational materials • Conduct ongoing training • Use train-the-trainer strategies	**Climate-Focused CHW Capacity-Building Program**: Develop targeted educational materials to support CHWs' learning, incorporate ongoing training modules specifically on climate-health topics, and apply train-the-trainer strategies to enable skilled CHWs to disseminate climate-specific knowledge among peers, expanding the program's reach and effectiveness.
	Weak monitoring and evaluation (M&E) systems hinder program accountability and impact assessment. (54, 57, 58, 72)	• Develop and implement tools for quality monitoring • Audit and provide feedback • Develop and organize quality monitoring systems	**Strengthening M&E Systems for Program Accountability**: Develop practical tools for consistent quality monitoring, conduct regular audits paired with constructive feedback, and build comprehensive M&E systems to systematically track performance, identify gaps, and assess the effectiveness and accountability of CHW programs.
Adaptability	Inadequate consideration of community resource constraints and sustainability in proposed solutions. (60, 63, 70)	• Promote adaptability • Conduct local needs assessment • Develop resource-sharing agreements	**Sustainable, Resource-Aligned Heat Safety Plan**: Conduct a local needs assessment to understand resource constraints, design a flexible service delivery strategy that can be adapted to local contexts, and establish resource-sharing agreements to ensure that CHWs' scope of work is realistic and well-supported within the community.
	Information, Education, and Communication (IEC) efforts lack longevity and adaptation to local contexts. (57, 62, 69, 70)	• Tailor strategies • Conduct ongoing training • Promote adaptability	**Locally Responsive and Sustainable IEC Programming**: Customize IEC content to local cultural and contextual realities, deliver ongoing training for implementers to ensure message consistency and responsiveness, and embed adaptability into program design to allow timely updates and sustained effectiveness of communication efforts.
Complexity	Customized and contextualized IEC materials aim to address diverse needs but add layers of complexity. (62)	• Develop educational materials • Tailor strategies • Facilitation	**Contextualized IEC Development and Support**: Tailor IEC strategies to reflect community-specific needs, design clear and accessible educational materials to ease complexity, and include facilitation support throughout development, and deploy
	Phase-wise guidelines for managing heat-related illnesses add clarity but increase implementation complexity. (55)	• Develop a formal implementation blueprint • Conduct cyclical small tests of change • Facilitation	**Structured Rollout of Phase-Wise Heat Illness Guidelines**: Develop a comprehensive blueprint to guide the full rollout; test the phase-wise guidelines through small, iterative pilots to refine implementation steps; and provide facilitation support to ensure the guidelines are followed effectively despite their complexity.

Table 4
Facilitators reported in the studies and matched ERIC strategies and policy options across the CFIR domain and construct

CFIR Construct	CFIR Facilitators	ERIC Strategies	Policy Options
Domain: Individuals			
Role of CHW	Supporting community during extreme heat and promoting climate-resilient healthcare practices, such as hydration practices and advising on home-based heat remedies to the community. (55, 56, 61, 62, 69, 70)	• Conduct educational outreach visits • Distribute educational materials • Use train-the-trainer strategies	**Community Education on Climate-Resilient Health Practices**: CHW-led educational outreach visits to households, especially targeting vulnerable groups, to share guidance on hydration and home-based heat remedies; providing CHWs with tailored educational materials; and using a train-the-trainer model to equip them to teach peers and expand community-level heat resilience practices.
	Identifying vulnerable groups during extreme heat, recognizing and managing early symptoms of heat-related illnesses and providing first aid during emergencies. (55, 61, 62, 69, 70)	• Develop educational materials • Conduct ongoing training • Provide clinical supervision	**Enhancing CHW Capacity for Heat Illness Response**: Regular, structured training sessions for CHWs on identifying and managing heat-related illnesses, supported by practical educational materials such as symptom checklists and first-aid guides. Additionally, it should incorporate routine clinical supervision to provide CHWs with real-time feedback and guidance.
	Using tools like surveys and mapping for assessing extreme weather impacts and coordinating health services (59)	• Develop and implement tools for quality monitoring • Provide local technical assistance • Capture and share local knowledge	**CHW-Led Climate Impact Assessment**: Equip CHWs with structured tools for conducting surveys and mapping extreme weather impacts. It should include localized technical assistance to support tool usage and interpretation, and establish processes for capturing and sharing insights gained to improve coordination of health services during climate-related events
Capability of CHWs	Ability to provide heat-related illness prevention services, symptom management, and disaster preparedness. (55, 61, 62, 69, 70)	• Develop educational materials • Conduct ongoing training • Provide clinical supervision	**Enhancing CHW Capacity for Heat Illness Response**: Regular, structured training sessions for CHWs on identifying and managing heat-related illnesses, supported by practical educational materials such as symptom checklists and first-aid guides. Additionally, it should incorporate routine clinical supervision to provide CHWs with real-time feedback and guidance.
	Capacity for climate risk communication and impact management. (55, 56, 62, 69–71)	• Develop educational materials • Conduct educational outreach visits • Use train-the-trainer strategies	**CHW-Led Climate Risk Communication**: CHWs conduct outreach visits to engage communities in climate-risk discussions, supported by tailored educational materials that simplify complex climate-health concepts. A train-the-trainer model can be implemented to enable CHWs to train peers, expanding the reach and consistency of climate risk communication across communities.
	During extreme weather events, spearhead community-level health impact management. (55, 62, 69, 70)	• Conduct ongoing training • Capture and share local knowledge • Create a learning collaborative	**CHW Leadership for Extreme Weather Health Management** Continuous training for CHWs on managing health impacts during extreme weather events, systems for documenting and sharing local experiences, and the formation of collaborative learning platforms where CHWs exchange strategies and solutions to strengthen collective response capabilities.
Motivation of CHWs	Interest in gaining knowledge about climate change and its impacts on health. (56, 65, 69)	• Develop educational materials • Conduct ongoing training • Create a learning collaborative	**Building CHW Knowledge on Climate and Health**: Offer regular training sessions focused on climate change and health, provide easy-to-understand educational materials tailored for CHWs, and establish a collaborative platform where CHWs can engage with peers and experts to exchange knowledge and strengthen collective
	Strong commitment to protecting community health and well-being. (54, 56, 61, 65–67, 69, 71, 72)	• Identify and prepare champions • Provide clinical supervision • Create a learning collaborative	**Reinforcing CHW Commitment through Support and Collaboration** Selecting and preparing CHWs as role models, offering ongoing supervision to provide guidance and acknowledgment, and establishing a learning collaborative for peer support and shared problem-solving.
Domain: Inner Setting			

CFIR Construct	CFIR Facilitators	ERIC Strategies	Policy Options
Structural Characteristics	Adoption of climate-resilient and sustainable infrastructure as a critical facilitator for adaptation. (56, 70)	• Change physical structure and equipment • Promote adaptability • Stage implementation scale-up	**Climate-Resilient Health Facility Upgrades**: Upgrade health facilities with climate-resilient infrastructure, including heat-reflective materials and solar-powered cooling, utilizing adaptable, modular designs. Implementation is phased to ensure sustainable resource use and long-term protection of CHWs against extreme heat stress
Tension For Change	Growing evidence, including scientific studies and media reports, highlights the health impacts of extreme heat, creating pressure for action by authorities. (56, 60, 69–71)	• Use mass media • Conduct local consensus discussions • Involve executive boards	**Stakeholder Mobilization for CHW Heat Protection**: Mobilize public and institutional support through media campaigns, evidence-driven stakeholder dialogues, and engagement with executive leadership to accelerate policy actions protecting CHWs from extreme heat impacts.
Compatibility & Relative Priority	CHW-led programs are widely accepted due to their alignment with local leadership, resource constraints, and focus on vulnerable populations. (54, 57, 58, 62, 66, 68–70, 72)	• Build a coalition • Promote network weaving • Tailor strategies	**Community-Aligned Support for CHW Programs**: Build partnerships with local leaders and organizations, enhance stakeholder networks, and adapt program strategies to local needs, ensuring CHW-led health services remain responsive, accepted, and sustainable amid extreme heat challenges
Incentives and Mission Alignment	The CHW-led program's goals resonate with community health needs, reinforcing alignment with the overall mission. (54, 62, 69, 72)	• Develop a formal implementation blueprint • Identify and prepare champions • Promote adaptability	**Mission-Aligned and Adaptive CHW Program Planning**: Create a structured implementation plan that reflects community health priorities, empowers CHWs as champions, and integrates adaptable strategies to maintain strong alignment with evolving climate change needs and the program mission.
Domain: Outer Setting			
Local Attitudes	Emerging community interest in addressing structural problems independently, reflecting a potential for grassroots initiatives against extreme heat events (EHEs). (65, 67, 69)	• Build a coalition • Promote network weaving • Conduct local consensus discussions	**Community-Led Heat Resilience Initiatives**: Support the formation of local coalitions that connect community members, leaders, and organizations to develop grassroots solutions to extreme heat. Facilitate ongoing collaboration and structured dialogue to align independent efforts with broader heat-health strategies, ensuring community ownership and sustainable, context-driven implementation
Policies & Law	Opportunities exist to align local interventions with national programs like the National Programme on Climate Change and Human Health. (55, 56, 69)	• Develop resource-sharing agreements • Use advisory boards and workgroups • Stage implementation scale-up	**Integrating Local Initiatives with National Climate Health Programs**: Facilitate collaboration between local health interventions and national climate-health programs through formal resource-sharing agreements and joint advisory platforms. This coordinated approach allows phased scaling of local actions, ensuring alignment with national priorities and sustained support for CHWs addressing extreme heat
Domain: Innovation			
Design	CHW programs design prioritizes vulnerable populations and includes task-shifting and teamwork to build resilience. (55, 58, 62, 67–70, 72)	• Revise professional roles • Create new clinical teams • Promote adaptability	**Adaptive CHW Team Models during Weather Emergencies**: Revise CHW roles to support task-shifting, establish dedicated clinical teams to enhance collaboration, and incorporate flexible program designs that allow CHWs to adapt service delivery approaches in response to the needs of vulnerable populations during extreme heat and other climate-related events.
	Regular community-health system meetings promote participatory approaches and enhance accountability. (55, 57, 58, 69)	• Organize clinician implementation team meetings • Build a coalition • Conduct local consensus discussions	**Strengthening Health System–Community Collaboration**: Involve regular meetings between CHWs and health system teams to coordinate actions, facilitate structured discussions with community stakeholders to align priorities, and build coalitions that connect health system actors and community members to promote shared accountability and participatory decision-making.
	Policy contextualization involves CHWs in the design and execution steps, ensuring community ownership. (62, 69)	• Involve patients/consumers and family members • Conduct local consensus discussions • Develop a formal implementation blueprint	**Co-Designing Contextualized Health Policies with CHWs**: Actively involve CHWs and community members in strategy design and execution, facilitate consensus-building discussions to align efforts with local priorities, and develop a formal implementation plan that integrates CHW input to ensure contextual relevance and strong community ownership.

CFIR Construct	CFIR Facilitators	ERIC Strategies	Policy Options
Adaptability	Interventions tailored to address the specific needs of the contexts, as well as different community groups. (53–56, 58, 60–62, 65, 69, 70, 72)	• Tailor strategies • Conduct local needs assessment • Promote adaptability	**Context-Specific Intervention Design for Diverse Communities** Localized needs assessment to gather data from different community groups, followed by designing customized strategies that reflect those insights. It should also embed adaptable elements in the intervention framework to allow continuous adjustments in response to evolving local conditions and community-specific needs
Evidence-base	Heat-health education efforts are grounded in evidence, focusing on supporting vulnerable communities. (62, 65, 69–71)	• Distribute educational materials • Conduct educational meetings • Develop academic partnerships	**Evidence-Based Heat-Health Education for Vulnerable Communities**: Distributing research-informed educational materials, organizing regular training and informational meetings for CHWs, and establishing partnerships with academic institutions to ensure all educational content remains current, accurate, and targeted to the specific needs of vulnerable populations affected by extreme heat.
Domain: Implementation Process			
Reflecting and Evaluating	Establishing a feedback mechanism with both innovation recipients and deliverers to monitor and improve implementation processes. (58, 69, 72)	• Develop and implement tools for quality monitoring • Audit and provide feedback • Obtain and use patient/consumer and family feedback	**Feedback-Driven Heat Safety Interventions**: Establish a structured feedback system using quality monitoring tools to collect input from both CHWs and community members. It should include regular audits and review sessions that provide actionable feedback to refine implementation processes and ensure alignment with local needs and expectations.
Adaptability, Teaming, and Engaging	CHWs adapting their roles by shifting bases to manage both facility-based and outreach care. (57, 58, 69, 72)	• Revise professional roles • Promote adaptability • Organize clinician implementation team meetings	**Role Adaptation for Integrated CHW Service Delivery**: Revising CHW role definitions to support dual responsibilities across facility-based and outreach care, embedding flexibility for context-specific role shifts, and organizing regular team meetings to ensure coordination and smooth transitions between care settings.
	Leveraging media to build community awareness and create a supportive environment for effective intervention implementation. (53, 56, 58, 69)	• Use mass media • Conduct educational outreach visits • Promote network weaving	**Integrated Media and Outreach for Community Awareness**: Employ local media to disseminate key messages on climate-health topics; coordinate CHW-led outreach visits to reinforce and personalize these messages; and build connections between media platforms and community networks to amplify awareness and build a supportive environment for intervention uptake.
Innovation (Service) Deliverers	Government-led initiatives to establish a supportive cadre that assists frontline workers in delivering effective care. (53, 55–58, 69)	• Identify and prepare champions • Recruit, designate, and train for leadership • Provide clinical supervision	**Dedicated Human Resources for Supporting CHW for Frontline Care Delivery**: Establish a dedicated human resource by identifying and preparing committed individuals as champions, training them in leadership roles to assist frontline workers, and implementing ongoing clinical supervision to ensure consistent guidance, coordination, and reinforcement of effective care delivery practices.

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Individual Domain

CHWs faced a number of individual-level barriers, including (a) experiencing physical health challenges such as heat stress, dehydration, and exhaustion (55, 57, 60, 69–72); (b) coping with psychological stress, emotional strain, and mental health shocks (57, 60, 69–72); and (c) facing overwhelming workloads, limited access to health services, and inadequate workload management systems (54, 56, 57, 60, 64, 70). Individual-level facilitators related to CHWs' *roles* spanned identifying vulnerable individuals during EHEs (55, 61, 62, 69, 70); supporting them and the broader community during such crisis events (55, 56, 61, 62, 69, 70); and conducting surveys and mapping exercises to assess the impacts of EHEs and coordinate health services (59). Individual-level facilitators related to CHW *capability* (55, 61, 62, 69, 70), including their competencies in risk communication(55, 56, 62, 69–71), were numerous. Lastly, CHWs' strong commitment to protecting community health (54, 56, 61, 65–67, 69, 71, 72) and their willingness to learn more about climate change and health links (56, 65, 69) were reported as critical *motivation*-linked facilitators.

Inner Settings Domain

Barriers within the Inner Setting domain spanned five CFIR constructs. Under *Structural Characteristics*, poor-quality infrastructure and limited access to utilities (e.g., water, electricity) were frequently reported (57, 60–62, 69, 70). Barriers related to *Available Resources* included weak early warning systems,

supply shortages, and transportation challenges (54, 55, 57, 60, 61, 64, 68–70, 72). The absence of climate-responsive policy alternatives was another key barrier under *Compatibility & Relative Priority* (56, 60, 62, 69, 70). Misalignment between CHWs' increasing responsibilities due to climate crises and stagnant support was identified as a major barrier under the *Incentives and Mission Alignment* construct (57, 58, 64, 65, 72). Finally, *Access to Knowledge & Information* was constrained by the limited availability of climate-health data to CHWs and inconsistent heat-safety care standards (54, 57, 61, 62, 69–71).

We also identified four facilitators in the Inner Settings domain. We found countries like India, Pakistan, the Philippines, and South Sudan adopting climate-resilient infrastructure, such as mobile clinical units, emergency transport systems, and community-based care models (56, 70). Widespread acceptance of CHW programs in the LMICs and their alignment with community and country leadership priorities are major facilitators (54, 57, 58, 62, 66, 68–70, 72), which can be further leveraged by the growing scientific and public acknowledgement of heat-health risks, as highlighted in the *Tension for Change* construct (56, 60, 69–71).

Outer Settings Domain

Barriers and facilitators in the Outer Setting domain reflect the broader economic, political, and social context's impact on CHWs' work and performance. The most reported construct was *Local Attitudes* with four distinct barriers: (a) community health-seeking behaviors during EHEs (61, 62, 66, 69, 70); (b) limited community awareness of CHWs' role during climate crisis (56, 60, 61, 65, 66, 69, 70); (c) gendered household roles of CHWs that affect their engagement during such events (53, 59, 60, 63, 64, 66, 69), and (d) low acceptance of young female CHWs due to sociocultural norms (58, 69, 72). Barriers under the *Partnerships and Connections* construct included weak integration between primary and higher-level health services (54, 61, 72), which is further exacerbated by low awareness about heat-health issues among policymakers, identified as a *Policies & Law* barrier (56, 62, 69, 70). Finally, *Financing* barriers, such as chronic underfunding and inadequate resources for health systems, were frequently reported under the Outer Setting domain (57, 58, 61, 62, 64, 69, 70, 72).

Among the two facilitators, under *Local Attitudes*, studies reported growing community interest in addressing local structural challenges related to heat safety, indicating increased grassroots engagement (65, 67, 69). Also, alignment with national initiatives was a facilitator *under Policies & Law* (55, 56, 69).

Innovation Characteristics Domain

Here, we identified six barriers mapped across *Design*, *Adaptability*, and *Complexity* constructs. The first major challenge was the lack of heat safety-specific content in existing CHW training programs (56, 69, 70). Four articles highlighted poor monitoring and evaluation in CHW programs, limiting health systems' ability to assess, adapt, and ensure accountability (54, 57, 58, 72). Under *Adaptability*, barriers included inadequate consideration of community resources (60, 63, 70), and lack of contextual adaptation of IEC materials (57, 62, 69, 70). Some innovations were contextually adapted and implemented in phases (55, 62), which could introduce burdens due to increased operational *Complexity*.

Conversely, facilitators fell under three key constructs—*Design*, *Adaptability*, and *Evidence Strength and Quality*. CHW programs targeting vulnerable populations can integrate task-shifting to optimize CHW performance, and build participatory design that enhances accountability and ownership for CHWs during EHEs (55, 57, 58, 62, 67–70, 72). The *Adaptability* of interventions, tailoring them based on geographic, gender, or socioeconomic context, was highlighted in 12 studies (53–56, 58, 60–62, 65, 69, 70, 72). Lastly, programs grounded in evidence can enhance credibility and policy traction, particularly in efforts supporting vulnerable communities (62, 65, 69–71).

Implementation Process Domain

Within the Implementation Process domain, we identified four facilitators. Three studies report structured feedback involving CHWs and community members, enabling ongoing reflection and evaluation (58, 69, 72). Under the *Adaptability, Teaming, and Engaging* construct, CHWs showed adaptability by switching between facility and outreach care during heat emergencies (57, 58, 69, 72). Government-led efforts to establish supportive cadres further enabled adaptation for the CHW programs, allowing them to be effective *Innovation Deliverers* of heat-responsive care (53, 55–58, 69). Finally, we found that local and central governments often used media campaigns to increase public awareness for implementing interventions (2, 5, 7, 18).

Mapping Implementation Strategies Using the CFIR-ERIC Matching Tool

A total of 43 distinct implementation strategies, drawn from the ERIC taxonomy, were identified and mapped across the CFIR constructs (Fig. 3), which can be applied to either mitigate specific barriers or reinforce existing facilitators under extreme heat conditions in LMICs (Tables 3 and 4).

Most strategies (28 of 43, ~ 65%) can serve dual roles (purple bubbles), both reinforcing facilitators and reducing barriers. Some strategies, like "developing resource-sharing agreements," are broadly applicable, matching 12 times across four CFIR domains. This strategy can be vital in addressing resource and infrastructure deficits (e.g., providing drinking water, cooling equipment, transportation, or other material support to CHWs) and equally in strengthening partnerships and resource pooling where supportive networks exist. Among other frequently matched strategies, conducting ongoing training (10 occurrences), promoting adaptability (9 occurrences), providing clinical supervision (7 occurrences), and developing educational materials (6 occurrences) have strong potential to support CHWs during extreme heat events.

Policy Options to Support Community Health Workers Facing Extreme Heat

The last column of Tables 3 and 4 presents the policy options that were developed from the matched ERIC strategies for each barrier and facilitator. To support CHWs' physical, mental, and occupational health, workplaces should provide clinical supervision, hydration support, rest facilities, and regular training on heat-illness management and emotional resilience; revise professional roles and improve workload distribution to prevent burnout during EHEs; and develop learning collaboratives and peer-support mechanisms across PHC cadres while integrating train-the-trainer models and climate-health capacity-building to enhance CHWs' roles as trusted frontline educators and responders

Within the health system, upgrading infrastructure and utilities is critical, such as equipping facilities with heat-resilient materials, solar-powered cooling, and sustainable water systems. On the service-delivery side, standardized care protocols, consistent training, and localized transportation solutions can improve CHW performance and reach during the climate crisis. CHWs' essential roles, alongside growing institutional recognition of climate-health risks, can provide a strong basis to mobilize stakeholders and embed heat-health strategies in policy. And beyond the health system, mitigating Outer Setting barriers will create opportunities for community- and system-level action to support CHWs. Targeted community education, mass-media campaigns, and mobilizing local champions can raise heat-health literacy, nurture inclusive support, and build trust in CHWs, counteracting negative local attitudes and expectations. To buffer socioeconomic pressures and coercive gender norms, the government should provide gender-sensitive support, flexible work arrangements, and mental-health services, especially during heatwaves and other climate-related crises. Effective climate-health initiatives require strong cross-sector coordination, sustainable financing, and alignment of broader health policies with national climate and disaster plans, all while harnessing grassroots momentum.

Our review identified limited evidence on intervention that protects CHWs from extreme heat, and existing efforts face design, adaptability, and complexity constraints that impede scale-up. Addressing these gaps requires tailored heat-health education/training for CHWs and locally grounded monitoring and evaluation mechanisms. Effective implementation depends on an enabling environment—systems and culture that reflect, adapt, and coordinate across health and non-health stakeholders—with feedback loops (routine audits, participatory review, and role transitions) to drive continuous improvement, alongside public awareness and outreach to build community ownership. Finally, LMICs should designate dedicated human resources—through leadership training, clear role definitions, and sustained supervision—to ensure institutional support and accountability and strengthen health-system resilience to climate risks.

DISCUSSION

This review examined published evidence on how extreme heat affects CHWs in LMICs, focusing on contextual barriers and facilitators and potential policy options and implementation strategies. We found very few studies (N = 20) exploring this relationship. The limited evidence stands in stark contrast to the growing body of research from high-income countries, where heatwaves have been shown to disrupt healthcare delivery systems similarly (73–75). For example, during the 2021 Pacific Northwest heat dome in the United States, providers reported severe fatigue, infrastructure failures, and surges in emergency visits (76); in Germany, PPE use during heatwaves increased heat strain and reduced care quality (77); and in rural Australia, community providers faced dehydration and barriers to reaching isolated patients (78).

Our results showed widespread barriers, including physical challenges (dehydration, heat stress, exhaustion), psychological stress from high community expectations, inadequate infrastructure with poor cooling systems and inconsistent utilities, chronic underfunding limiting salaries and supplies, insufficient climate-health training, limited policymaker awareness of heat-health issues, and poor community health-seeking behaviors during EHEs. Key facilitators included CHWs' strong community commitment and established trust, local contextual knowledge, existing disaster preparedness capabilities, and emerging grassroots interest in addressing structural heat challenges. Despite being recognized as key innovation deliverers, CHWs were often excluded from intervention design and decision-making.

Understanding the heat–health nexus and addressing the challenges CHWs face in LMICs—where they often work in resource-limited settings—is urgent. Evidence from developed economies and non-health sectors can provide transferable solutions. These include personal cooling vests to reduce physiological strain (79) (80); practical field measures like portable water supplies and mobile shaded rest areas (81); and wearable, sensor-based monitoring for real-time risk assessment and timely interventions (82). However, the applicability and feasibility of these approaches for CHWs in LMICs remain to be explored.

Moreover, beyond personal interventions, workplace and organizational adaptations are also critical. From Ahmedabad's Heat Action Plan, two strategies may translate well to CHWs: (1) reduce heat exposure by installing "cool roofs"—highly reflective surfaces that limit heat absorption and re-emit most absorbed heat—on facilities where CHWs work, providing relief between field visits (83, 84); and (2) adapting organizational policies through heat-responsive scheduling and early-warning systems to guide workload and deployment during EHEs (85, 86)

This review also illustrates how extreme heat exposes intersecting social, cultural, and gender norms that shape both inner and outer health-system settings. Studies reported barriers including poor health-seeking behavior, limited understanding of CHWs' roles during climate crises, gender bias against young female workers, and competing economic priorities that disproportionately burden female CHWs. These vulnerabilities are compounded by gendered divisions of labor that intensify caregiving and force women to juggle unpaid domestic work with professional duties (87). Extreme heat can also exacerbate domestic violence, creating unsafe working conditions amid rising community demand (88). Studies from LMICs document sexual harassment, threats, and assault from supervisors, colleagues, and household members—risks rarely addressed in program design (89, 90)—a pattern echoed across other climate disasters (91). As a result, young female CHWs must navigate hostile public spaces, negotiate access to male decision-makers, and absorb more unpaid care when family members fall ill from heat, reducing time for paid work (89). Safeguards like gender-transformative training, paid leave during or after EHEs, and incorporating gender-based violence prevention into heat-action plans are crucial for protecting CHWs in such settings.

CHWs are essential in linking health innovations to communities, yet marginalization often limits their ability to shape and sustain the interventions they deliver. Although institutionalizing heat safety requires CHWs to help design, facilitate, and lead, our review found they are typically treated only as *Service Deliverers*. Their intrinsic motivation can be leveraged to enhance their capabilities and elevate them to effective *Implementation Team Members*—an approach already emerging in LMICs like India and Pakistan (55, 62). These are early steps toward much-needed institutional change. The facilitators identified in this review—such as ongoing training, opportunities to adapt educational and training materials, existing participatory program designs involving CHWs and the community, and the adaptation of existing heat-safety interventions to local contexts—can, when paired with enabling policy options, offset systemic and contextual barriers.

Globally, heat-specific occupational health policies remain fragmented and underdeveloped, despite clear risks to the human resources for health. Few countries have comprehensive, enforceable standards, while others rely on piecemeal or sector-specific measures. In the United States, only a handful of states—e.g., California and Washington—have binding rules, while OSHA relies on general provisions and non-mandatory exposure guidance (92). Guidance across other regions is similarly variable (93, 94) (95–97). As climate change speeds up, urgent policy innovations are essential to incorporate heat safety into occupational health, particularly for CHWs. The practical list of policy options provided here is helpful to that end.

Among other strengths, combining both CFIR and ERIC frameworks helped us achieve analytical depth, supported systematic mapping of barriers and facilitators, and enabled direct linkage to actionable strategies. Our broad search across databases and inclusion of study designs improved comprehensiveness but limits critical appraisal of individual study quality, a known limitation of scoping reviews (98). We also recognize that the limited evidence from only 20 studies reflects the emerging nature of this research area, which may restrict its generalizability across different LMIC contexts. This could be due to excluding non-English regional studies, although it is also likely that there is overall simply very little literature in this space. Lastly, the CFIR framework, originally designed for high-income settings, may overlook LMIC-specific implementation factors (99). We addressed this by conducting a thorough contextual analysis of EHEs in LMICs.

CONCLUSION

Our findings align with existing literature work but add nuance to CHWs' roles in LMICs as the global temperatures continue to rise. Treating CHWs solely as *Service Deliverers* limits their contributions to health system strengthening and providing culturally responsive care. Thus, two paradoxes emerge – *CHWs are central to service delivery yet peripheral to decision-making, and essential human resources yet highly vulnerable*. Furthermore, CHWs are among the least responsible for causing climate change, yet—alongside their communities—they remain at the frontlines of its most dangerous and destabilizing impacts. Neglecting these dualities risks care for vulnerable populations and erodes health-system resilience during EHEs and other climate crises. The impacts of a changing climate and extreme heat are no longer a "future" concern, and delaying action will only intensify the risks CHWs face. The policy options we identified can serve as a resource for policymakers, program managers, and the donor community seeking to address the barriers or strengthen facilitators identified in our review. Repositioning CHWs as proactive stakeholders—not passive implementers—will better leverage their role as the conduit between health systems and communities worldwide.

Abbreviations

ANM: Auxiliary Nurse Midwife

ASHA: Accredited Social Health Activist

CDC: Centers for Disease Control and Prevention

CFIR: Consolidated Framework for Implementation Research

CHV: Community Health Volunteer

CHW: Community Health Worker

DALY: Disability-Adjusted Life Year

EHE: Extreme Heat Event

ERIC: Expert Recommendations for Implementing Change

FCHV: Female Community Health Volunteer

HDA: Health Development Army

HEAT: Heat Emergency Awareness and Treatment (program in Pakistan)

IEC: Information, Education, and Communication

ILO: International Labour Organization

IRIS: Institutional Repository for Information Sharing (WHO)

LMIC: Low- and Middle-Income Country

M&E: Monitoring and Evaluation

NGO: Non-Governmental Organization

NCC: Nutrition Care Centre

NPCCHH: National Programme on Climate Change and Human Health

OSHA: Occupational Safety and Health Administration

PCC: Population–Concept–Context (framework)

PHC: Primary Health Care

PRISMA-ScR: Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews

SRHR: Sexual and Reproductive Health and Rights

UNEG: United Nations Evaluation Group

WHO: World Health Organization

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Figures

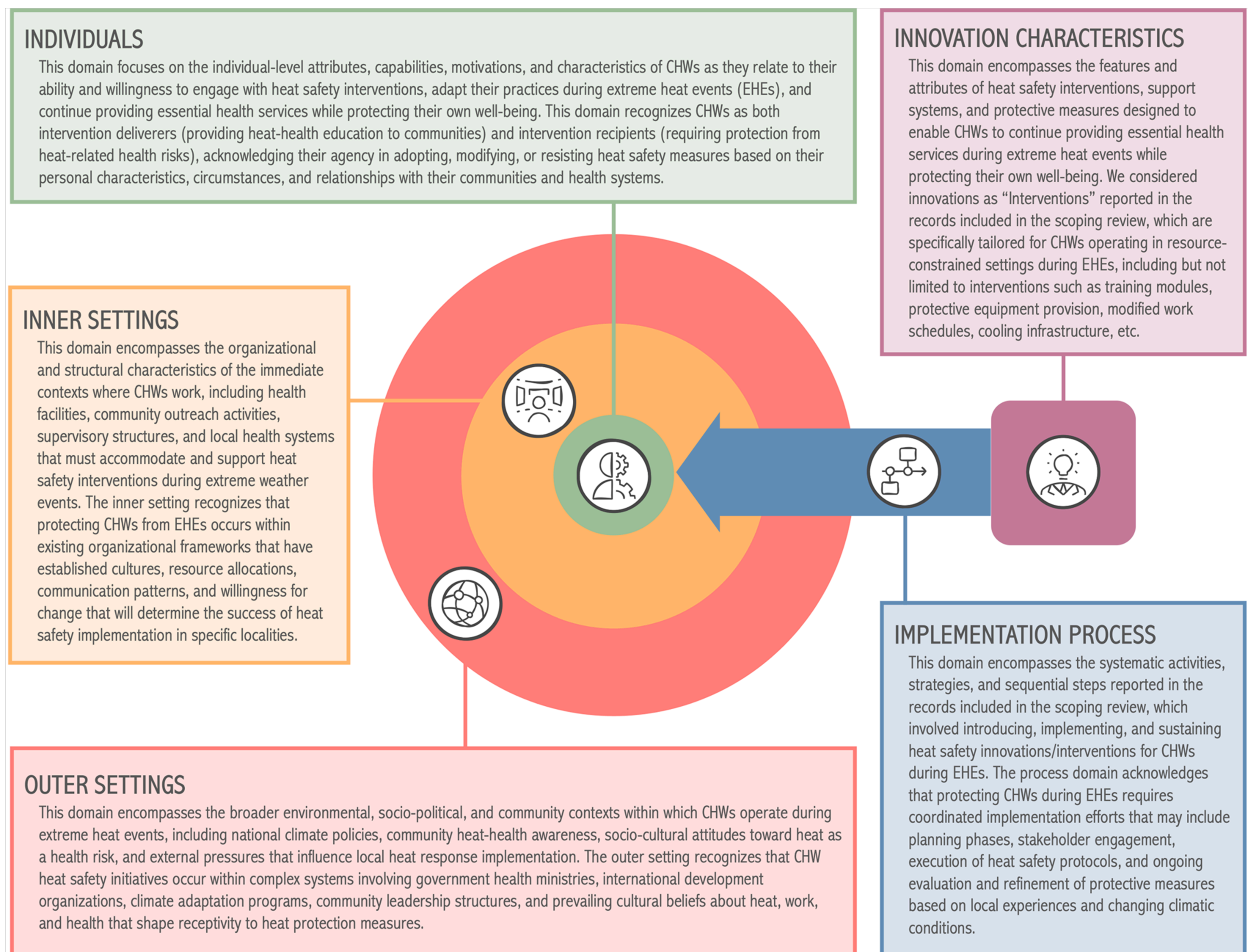

Figure 1

Theoretical framework based on the Consolidated Framework for Implementation Research

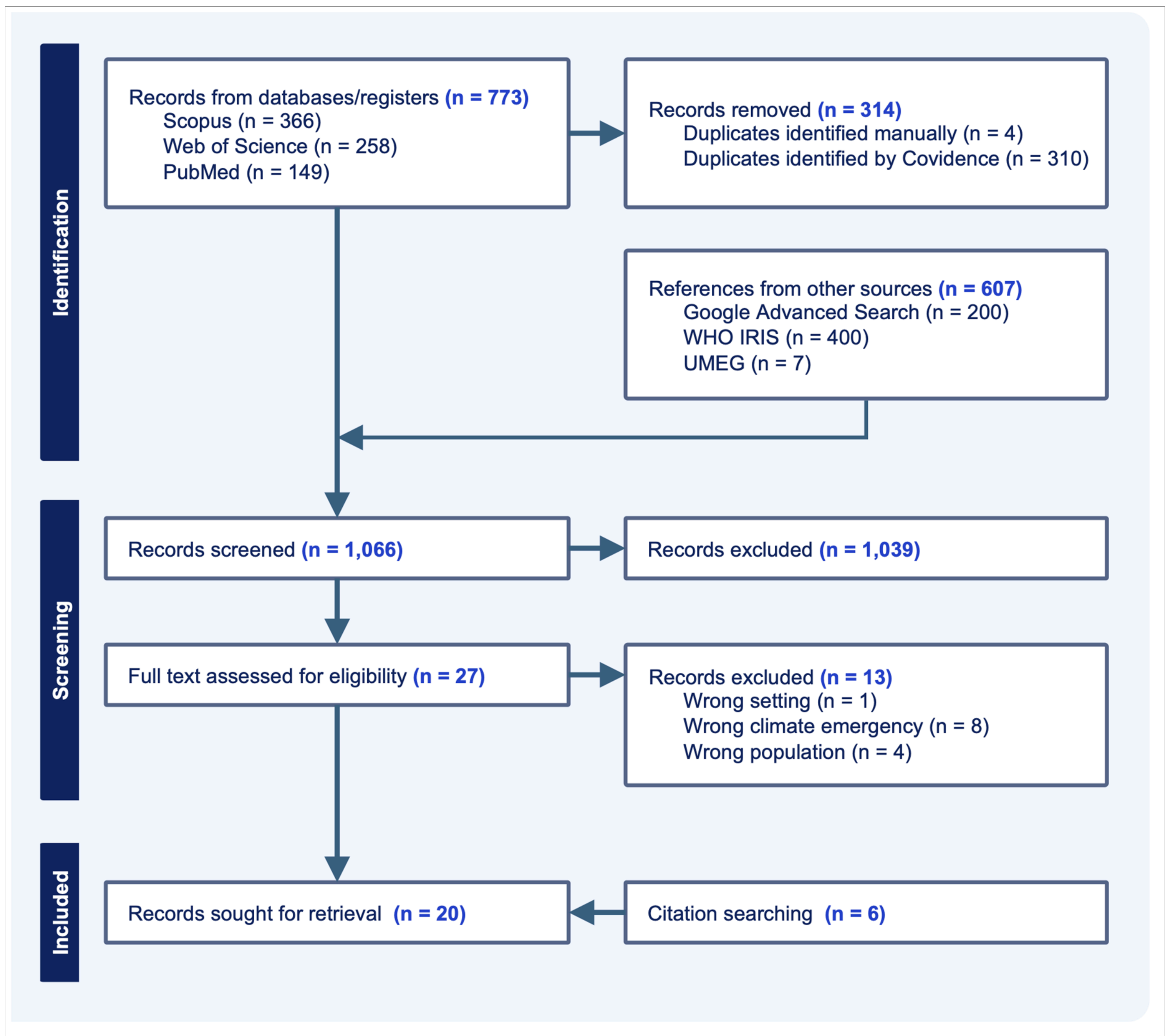

Figure 2

Preferred Reporting for Systematic Reviews and Meta-Analyses

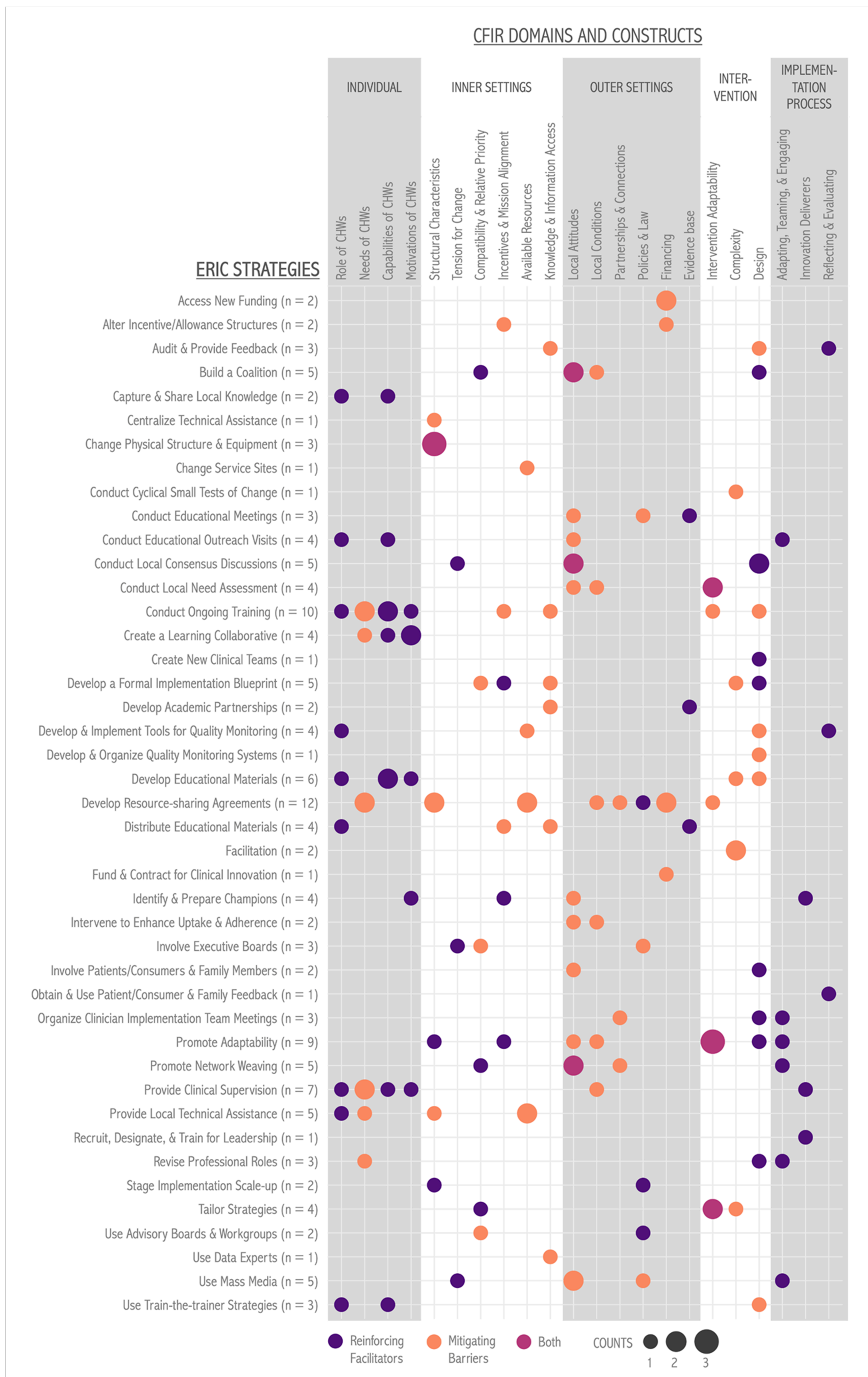

Figure 3

Mapping of ERIC strategies with CFIR constructs

Supplementary Files

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- SupplimentaryMaterial1PRISMAScRFillableChecklist.docx
- SupplimentaryMaterial2.docx