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A community-engaged public health research and outreach program for immigrant and racialized workers in meat processing during the COVID-19 pandemic

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Abstract

Background COVID-19 caused major outbreaks among immigrant and racialized workers in meat processing plants in North America, but trust barriers limited engagement with public health and research. This study investigates how community-based participatory research (CBPR) methods were employed to create a Community Scholar (CS) program to facilitate research and public health outreach among immigrant and racialized workers.

Methods We conducted a qualitative case study of a CS program to describe its co-creation, failures, successes and experiences working across multiple Canadian meat processing plants affected by mass COVID-19 outbreaks. We hired six CSs from racialized ethnocultural minority groups, trained them in research ethics, public health protocols, survey tools, and vaccine operations, then embedded CSs within academic–public health teams. We used administrative document analysis to describe the project setting, training, and roles across research and vaccine operations between March 2020 and February 2022. CSs completed reflexivity activities using narrative analysis to summarize their experiences and impacts on themselves, immigrant and racialized workers, and their communities. Narrative analyses were triangulated with administrative, quantitative, and time-series data.

Findings We summarize three study phases: (1) CS recruitment and training, (2) early engagement, and (3) outreach vaccination. Initial recruitment attempts lacked engagement, seemingly due to mistrust and fear of reprisals. Trust between workers and CSs appeared to increase over time as indicated by increased study engagement. CSs played key roles in nine onsite meat processing plant occupational and community outreach COVID-19 vaccine clinics. They also facilitated 191 surveys and 43 in-depth interviews across 11 meat processing plants in eight languages. CSs described their roles, successful outreach strategies, prerequisite skills and motivations. Key learnings included the skillset of empathetic listening, a greater understanding of meat processing plant workplaces and the role

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community presence plays in them, and how to empower workers through translating worker stories into advocacy. CS involvement appeared to increase trust, facilitate vaccine access through vaccine outreach clinics, and enable multilingual participation in research.

Interpretation During public health crises, community-academic-healthcare partnerships can rapidly implement multicultural CBPR strategies to engage immigrant and racialized workers concurrently in research and public health outreach.

Keywords COVID-19, meat processing plant workers, immigrant and racialized workers, newcomers, public health inequities, vaccine outreach, precarity, community-based participatory research, community engagement

Background

The COVID-19 pandemic disproportionately impacted frontline workers in meat processing plants, leading to numerous outbreaks, community spread, and fatalities. [1, 2] The occupational setting, entailing large, closely packed workforces operating in poorly ventilated, physically demanding, noisy and humid conditions, creates environments conducive to rapid viral transmission. [1, 3–5] In high-income countries, these industries predominantly employ immigrants and racialized workers, including refugees, temporary and undocumented foreign workers [6] and racialized national staff. [7, 8] Structural barriers, including language proficiency, cultural differences, communal or low-quality housing, reliance on shared transport, and financial insecurity, increase infection risks and constrain access to health services. [2, 4, 7, 9, 10] The COVID-19 pandemic exacerbated these challenges, with repeated outbreaks, lockdowns, and emergency public health measures. [1, 11] These factors, combined with institutional mistrust and fear of employer reprisals, have hindered efforts to engage immigrant and racialized workers in health-related research and public health campaigns, making their lived experiences and perspectives largely unheard. [8, 12, 13].

Community-based participatory research (CBPR) methods offer potential solutions to overcome these barriers and provide tools for meaningful representation, inclusion, and engagement of marginalized communities, such as immigrant and racialized workers, in public health research and outreach campaigns. [14] These methods foster reciprocal trust, codesign, and minimized power hierarchies between researchers and community members. However, community participation exists on a spectrum of control, with researchers on one end and community members on the other. [14, 15] The knowledge co-produced by community-research partnerships aims to reduce health inequities and improve health system and public health operations. [16, 17] CBPR emphasizes equitable partnerships that include community members from the earliest stages of research conceptualization and governance. In contrast, Participatory Action Research centers on collective, reflective inquiry linked directly to action, with the aim of understanding and

improving real-world practices through iterative change. [18] The World Health Organization (WHO) recently highlighted migration health research as a global priority, specifically to improve knowledge on response to health emergencies, and inclusive research partnerships as critical to advancing the Global Action Plan on promoting the health of refugees and migrants, 2019–2030, and to achieving the health-related Sustainable Development Goals. [19].

While CBPR has been successfully applied in immigrant health research, studies typically emphasize long-term partnership building prior to implementation. [14, 15] Moreover, these methods are often pursued sequentially not concurrently (i.e., research first), and fundamentally require time to build trust, identify, train, and integrate immigrant community members into existing research and operational teams. Public health emergencies, like mass COVID-19 outbreaks in meat processing plants, necessitate urgent mobilization of both participatory public health research and outreach operations without time to develop meaningful community relationships, nor conduct research before implementing emergency operations. [14] To our knowledge, no studies have reported on the rapid, concurrent application of CBPR methods among immigrant and racialized workers in immigrant-dense workplaces such as meat processing plants for both public health research and operational outreach during a health emergency.

Our study team undertook an investigation of meat processing plants in Western Canada, two of which experienced among the largest COVID-19 outbreaks in North America (April–July 2020), making this region a critical case context. [1, 20–22] As part of this broader study, we conducted a case study of an action research program based on CBPR principles and using a collective sense making approach to data collection, that was rapidly co-developed under pandemic conditions to investigate whether such a program could be successfully integrated across both public health research and urgent outreach operations during the first two years of the COVID-19 pandemic. [22, 23, 24, 25] Here, we present this case study to guide jurisdictions facing similar challenges to

engage immigrant and racialized workers and respond to future public health emergencies.

Methods

Community based approach, frameworks, and study context

We employed a qualitative case study design using collective sense making to examine the development and application of a Community Scholar (CS) program that had concurrent dual roles in both public health research and operations among immigrant and racialized workers during the COVID-19 pandemic. The CSs were deployed in research and outreach roles across multiple meat processing plants in Western Canada between March 2020 and February 2022. In this study, we define Community Scholars (CSs) as community leaders from selected ethnocultural minority communities, with relevant linguistic and cultural competencies, who were hired and integrated into the research team. CSs supported collaborative engagement with immigrant and racialized workers in the COVID-19 Meat Processing Plant Study while actively participating in the research process. We present our experiences, including early challenges, failures, and successes as defined by our CSs, as well as key lessons from the CS program. We detail the processes required to recruit, train, integrate, and empower a CS team to concurrently conduct research and facilitate COVID-19 vaccine outreach among immigrant and racialized workers during a public health emergency. [22, 23] Finally, we present the CSs' personal reflections, impacts, lessons learned, and recommendations. This descriptive case study does not evaluate comparative effectiveness, but documents the processes, experiences, and impacts of embedding the CSs concurrently in public health research and outreach. In this operational context, we defined "success" as the development, deployment, and refinement of a dual research–operational role for the CS program during an active public health emergency, including effective worker recruitment for the study and community-based support roles during onsite occupational mass vaccination clinics.

We adopted Sanchez et al.'s CBPR implementation framework that emphasizes community-based, participatory approaches to improve health conditions by reducing social and structural determinants and injustices. [17] We define meaningful engagement as per O'Reilly de Brun et al.'s definition as, "an experience of research [and operational] engagement that is collegial, inclusive and active for participants and which enables their perspectives to emerge clearly in research outcomes".[22] We used the International Organization for Migration's definition of *immigrants* as, "a person who moves into a country other than that of his or her nationality or usual

residence, so that the country of destination effectively becomes his or her new country of usual residence." [6].

We implemented our community-academic-health system partnerships early in the pandemic during public health restrictions through Canada's initial mass COVID-19 vaccination campaign. The first confirmed case of COVID-19 in Canada was reported on January 25, 2020, with the first documented community transmission occurring on March 5, 2020. [26, 27] Between March 12 and March 22, 2020, every Canadian province and territory declared a state of emergency; non-essential travel was restricted, international borders were tightened, and all arriving travelers were required to quarantine for 14 days. [26, 27] By the end of April 2020, Canada had recorded more than 50,000 cumulative cases and over 2,000 deaths. [26, 27] A second national wave was declared in September 2020, and by the end of January 2021 cumulative cases exceeded 700,000. [26, 27] The third wave emerged in April 2021, coinciding with the rapid expansion of vaccination efforts following the approval of the Pfizer-BioNTech and Moderna vaccines in December 2020. [26, 27] During this period, Alberta implemented a staged reopening strategy that adjusted public health restrictions over time (Supplement 1). On March 1st, 2022, most health restrictions were lifted in Alberta, and the last COVID-19 border and travel measures in Canada were removed October 1st, 2022. [26, 27, 28].

Throughout the study, our team was concurrently involved in public health research and operational efforts that included: disseminating health information, facilitating healthcare and social services access, and implementing mass occupational COVID-19 vaccine outreach clinics at various meat processing plants and in socially deprived urban neighborhoods with high proportions of immigrants and racialized people. [22, 23] These operational roles depended on partnerships between the provincial health system, and various stakeholders and entities detailed previously. [22].

The investigative team includes clinicians, health researchers, and health practitioners with longstanding commitments to refugee and immigrant health in Canada. Several team members are immigrants themselves or have worked extensively alongside newcomer communities facing the structural barriers described in this study. This shared context informs our commitment to research conducted with rather than on marginalized communities, while recognizing that perceived distance from academic institutions may have influenced how workers engaged with the program.

Community scholar selection and training – November 2020 to January 2021

CSs first met the study team during the public health response to mass COVID-19 outbreaks in several meat processing plants, where they were volunteering with community organizations supporting immigrant and racialized workers. [22] Potential CSs were identified through these community networks and selected based on their existing engagement with immigrant communities, language capacity, cultural familiarity with the affected populations, and interest in participating in community-engaged research and public health outreach (Supplement 2). Selection prioritized individuals whose ethnocultural and linguistic backgrounds reflected several of the most represented immigrant and racialized communities in the meat processing workforce at participating facilities, including Filipino and East African communities. CSs were not recruited to represent all ethnocultural groups present, but to facilitate culturally and linguistically concordant engagement for marginalized communities in the workforce. [2] Individuals who expressed interest were interviewed by the research team to assess their availability, community connections, and willingness to undertake research training and outreach activities. Selected CSs were then hired as part-time research staff and participated in a structured training program designed to introduce key principles of community-based participatory research, research ethics, participant recruitment, and qualitative interviewing.

Study tools, co-design, data sources, and study phases

CSs were integrated into the research team upon study launch and were involved in all study phases, including co-design, refinement, recruitment, data collection, analysis, interpretation, and knowledge mobilization. The study team and CSs co-designed operational research team documents, tools, CS training materials, and reflexivity exercises. Our data sources include: (1) CS training curriculum and materials; (2) research instruments and tools (surveys and interviews); (3) study recruitment strategies, materials and outreach tracker; and (4) CS reflexivity exercise. A detailed list of sources used in survey creation can be found in Supplement 3. The survey is available in Supplement 4, and the interview guide is available in Supplement 5. To equalize power relations between the study team and CSs, we structured the collaboration around mutual respect for each member's expertise, particularly during interpretation of the data. CSs were deeply involved in all phases of the research process after their recruitment, met all ICMJE authorship criteria, and therefore co-authored the resulting manuscripts. CSs also presented study findings through poster and oral presentations at local and international

conferences, with conference participation supported by the study team.

We conducted this research across three study phases; Phase 1) Initial CS engagement, recruitment, personal motivation, training and research team integration (March 2020–December 2020; Phase 2) Early meat processing plant worker recruitment efforts marked by low engagement and heightened mistrust (January–March 2021); and, Phase 3) Outreach vaccinations and revitalized worker engagement integrated with vaccine clinics (April 2021–February 2022).

Community scholar reflexivity

We conducted reflexivity activities, inviting CSs to reflect on their experiences, their impacts on community members, the CS program's key learnings, and their recommendations for future public health research and outreach operations. Each CS first documented their reflections by individually writing their experiences as essays guided by a reflexivity guide. CSs then met to discuss their experiences together. Using these essays and discussion, they collaboratively highlighted reflections they felt were most representative of their lived experiences, then collectively summarized their key learnings. The reflexivity guide used to structure these essays is outlined below.

CS reflexivity exercise – in addition to their logs, each CS was asked to respond to the following points in their essay:

- From the perspective of a CS, how would you describe the work you did in this study?
- How would you describe the conversations you had?
- Describe any experiences that stood out to you.
- Describe what you did in the community and/or at the clinics (ex: Village Square [a COVID-19 vaccine outreach clinic], meat plants, etc.).²⁹
- Share any comments on how you or others demonstrated leadership within the newcomer/immigrant community.
- Share any comments on your approach to community engagement activities, such as bringing people together, building trust, fostering collaboration, or strengthening relationships.

Narrative analysis and visualization

Two study team members independently reviewed and coded CS reflections following a structured narrative framework: (1) Narrative summary; (2) Orientation - who, when, where?; (3) Complicating Action - what happened?; (4) Evaluation - CS interpretation; and (5) Result - key themes and learnings. [22, 30] The study team then pursued a collective sense-making approach to review the initial codes, finalize the narrative analysis,

and summarize the key learnings. Collective sense-making refers to a process through which members of a group collaboratively interpret experiences and construct shared meaning within dynamic social contexts. [31] Drawing on this approach, the study team met iteratively to discuss coded narratives, compare interpretations, and co-develop shared analytic themes grounded in both individual reflections and group dialogue. Any discrepancies identified through this process were resolved through discussion until consensus was reached. Throughout the study, the CSs actively tracked recruitment milestones, outreach activities, and pandemic-related policy changes as part of documenting the participatory research process. [32]

Narrative synthesis and contextual mapping

Following narrative coding and collective sense-making, the study team synthesized CSs' qualitative reflections with study recruitment milestones and outreach activities to better understand how engagement evolved over time. Rather than conducting formal quantitative analysis, recruitment data (registrations, completed surveys, and interviews) were used descriptively to contextualize shifts in engagement across the three study phases. [16].

To support this interpretive process, the team developed visual timelines mapping recruitment trends and CS activities alongside key public health measures and meat processing plant outbreaks. These figures were constructed iteratively in Microsoft Excel to aid collective reflection on how operational and research activities intersected during the study period. The visualizations served as analytic tools to deepen understanding of the

evolving CBPR processes within the broader COVID-19 pandemic context. [17]

Recruitment data were collected and managed using REDCap (Vanderbilt University, Nashville, Tennessee, USA) [33] electronic data capture tools, and Microsoft Excel (Redmond, Washington, USA). [34] We analyzed qualitative data with NVivo Version 12 data analysis software (QSR International, released March 2018; Burlington, Massachusetts). [35] The study was approved by the University of Calgary research ethics board (REB20-1153). To summarize the study, we utilized the Guidance for Reporting Involvement of Patients and the Public (GRIPP2) reporting guidelines (Supplement 6). [36]

Results

The community scholars

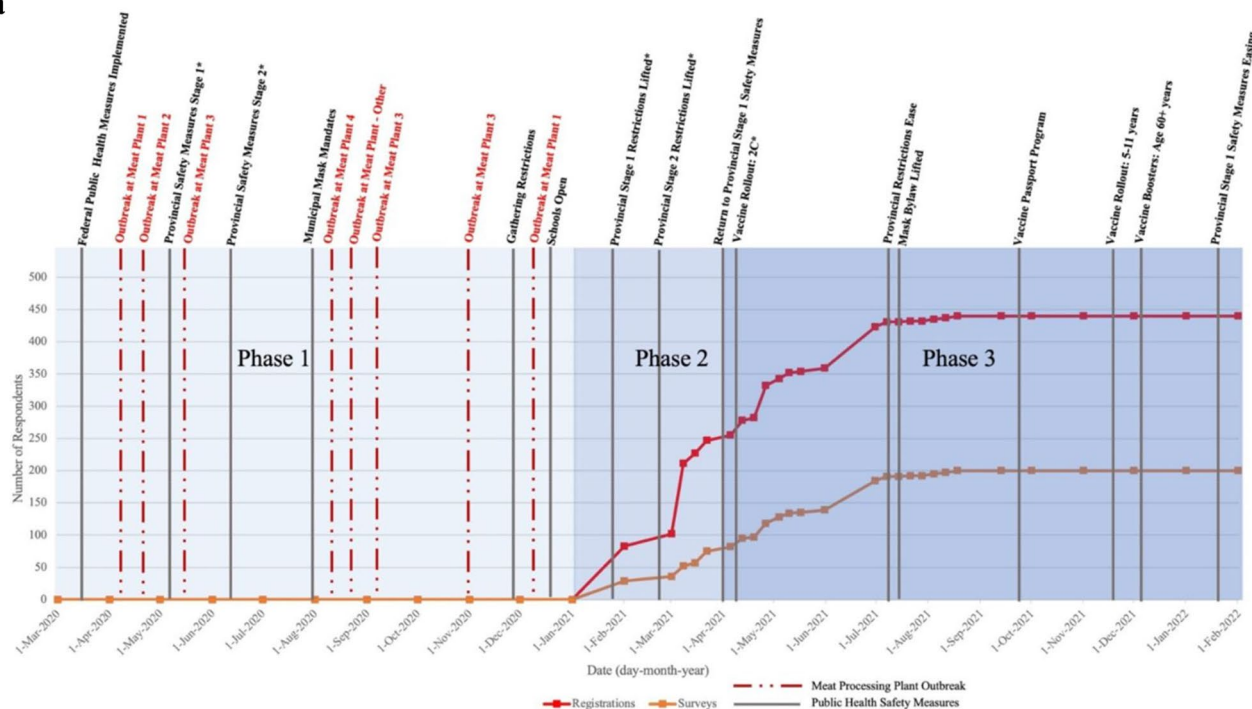
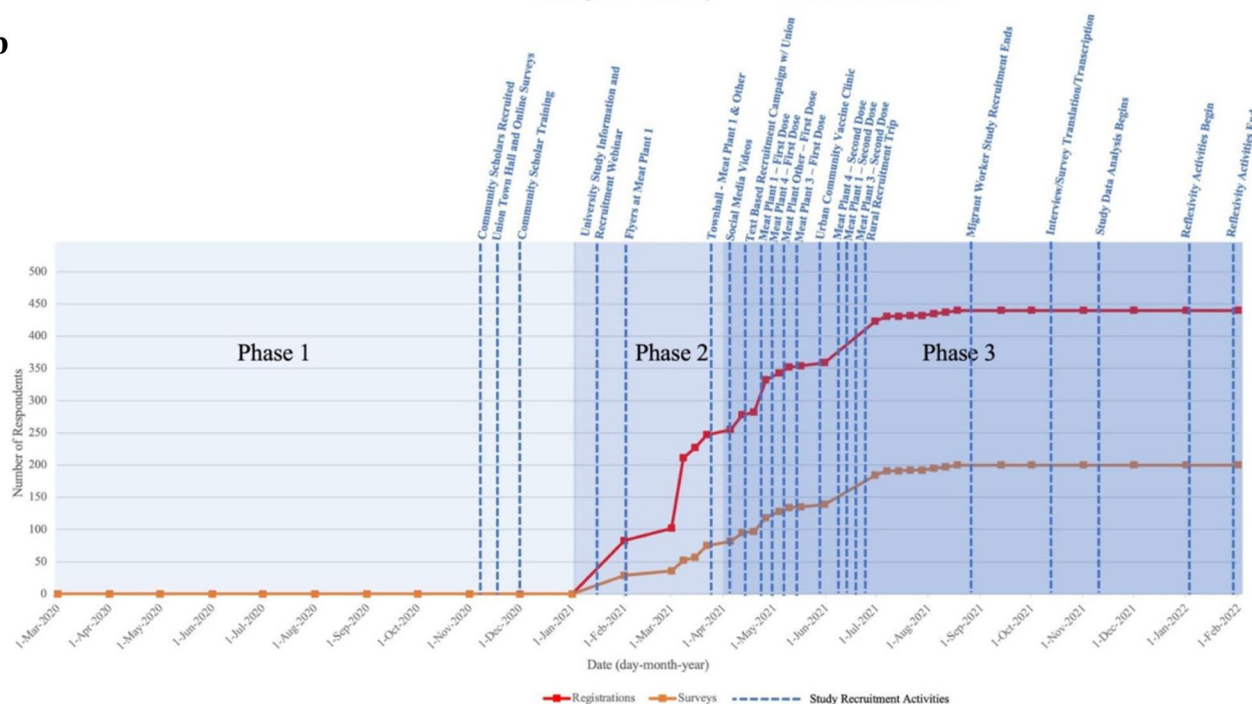
We hired CSs from six minority ethnocultural communities. Collectively, they spoke eight primary languages: English, Amharic, Oromo, Spanish, Tagalog, Arabic, Tigrinya, and Dinka. One CS, a Sudanese male who spoke Dinka and Arabic, did not complete the program and was therefore excluded from the demographic summary. Table 1 summarizes the demographics, training, education, and community engagement experience of the remaining CSs.

Each CS had volunteered or worked with community organizations during the COVID-19 outbreaks, including several that supported immigrant meat processing plant workers. All were first- or second-generation immigrants themselves and were fluent in multiple first languages, with cultural familiarity with several of the ethnocultural communities represented in the meat processing workforce.

Table 1 Community Scholars Characteristics

Pseudonym	Gender	Age Band (5-yr)	Ethnicity/ Country of Origin	Languages spoken	Education/ Occupational Experience	Pre-COVID-19 Community Engagement & Leadership Experiences
Scholar A	Male	50–55	Eritrea	Tigrinya, Amharic, English	Economist; MSc, Agricultural Economics and Agribusiness, MA and BA Honors in Economics	Former President of Eritrean Canadian Community Association
Scholar B	Female	35–40	Ethiopia	Amharic, Tigrinya, English	BA in Education and Teaching diploma, Certified in DBt, Trauma Informed Care and Community Mental Health	Founder of immigrant serving agency, City Police Anti-Racism Action Committee
Scholar C	Female	30–35	Mexico	Spanish, English	MD; International Medical Graduate	Member of Health & Wellness team - [Province] International Medical Graduates Association
Scholar D	Male	35–40	Egypt	Arabic, English	MD; International Medical Graduate	Member of Health & Wellness team - [Province] International Medical Graduates Association
Scholar E	Female	25–30	Philippines	Tagalog, English	BComm, certificate in Social Innovation	Volunteer with various ethnocultural community organizations. Community broker during COVID-19 pandemic. Community engagement coordinator for local businesses

Six Community Scholars were initially recruited; however, one participant voluntarily did not complete the program, he returned to his country of origin due to personal reasons and therefore is not included in the characteristics summarized in this table

a**b****Fig. 1** (See legend on next page.)

Once hired, CSs received training in CBPR practices and vaccine outreach, and were deployed to meat processing plants across Southern Alberta. [29, 37, 38].

Beyond this study, several CSs continued to engage in community-based public health initiatives. Their backgrounds included graduate training, clinical practice as a primary care physician, and leadership of community

health organizations. All remain active in the Migration Humanitarian Health Collective CS program, now in its third cohort, which trains new CSs and connects them with communities to conduct CBPR.

(See figure on previous page.)

Fig. 1 Number of registrations and survey respondents (**a**) and Community Scholar public health research recruitment and outreach activities (**b**) across three phases of study recruitment, within the context of public health measures and meat plant outbreak data from March 2020 to February 2022. Background shading distinguishes the three study phases: Phase 1 (March 1–December 31, 2020; light grey shading) – Community Scholar recruitment, training, and early engagement during initial COVID-19 outbreaks and strict public health restrictions; Phase 2 (January 1–April 15, 2021; light blue shading) – early recruitment efforts characterized by limited worker engagement amid workplace precarity and uncertainty; and Phase 3 (April 16, 2021–February 1, 2022; darker blue shading) – revitalized worker engagement and integration of research recruitment with occupational and community COVID-19 vaccine outreach clinics. In panel **a**, red vertical dashed lines indicate major meat processing plant outbreaks and solid vertical lines denote key provincial public health safety measures. In panel **b**, blue vertical dashed lines indicate key Community Scholar research and outreach milestones, including recruitment activities, training completion, vaccine clinic implementation, and study data collection. *Stages 1 and 2 refer to the stages of the provincial re-opening plan to loosen public health measures: Stage 1: Some businesses and services re-opened, continued physical distancing, public face masks encouraged. Stage 2: Additional businesses and services re-opened; continued physical distancing, public face masks encouraged, increased gathering limits. **Vaccine 2C: Within the provincial COVID-19 immunization schedule, the 2C category prioritized meat plant workers (and other high-risk employees) to receive vaccinations. **eTable 1** presents additional information regarding Alberta's COVID-19 public health measures and immunization schedule

Narrative summary and study visualizations

As CSs completed training and began engaging meat processing plant workers, they developed two visual timelines to contextualize the study within the evolving pandemic environment and their community engagement activities. Figure 1a outlines major public health measures and meat processing plant COVID-19 outbreaks alongside cumulative study registrations and completed surveys from March 2020 to February 2022. Figure 1b depicts the corresponding CS recruitment and outreach activities over the same period. Together, these figures situate the study within the rapidly shifting public health landscape and illustrate how community engagement and research recruitment unfolded across three study phases. CSs were initially trained to engage meat processing plant workers in research; however, their role expanded to community engagement, operational support, and COVID-19 vaccine outreach. Early study recruitment was marked by extremely low recruitment due to heightened workplace precarity and fears amplified by COVID-19 outbreaks. As shown in Phase 2 of Fig. 1b, early recruitment strategies relied primarily on institutional outreach and public messaging, which generated limited engagement with workers. CSs persevered, leading community engagement even during difficult public health restrictions. By spring 2021, the study team and CSs began co-leading onsite occupational COVID-19 vaccination outreach activities at several meat processing plants. The integration of vaccination outreach with research engagement marked a turning point in recruitment, reflected in the sharp increase in registrations and survey participation beginning in Phase 3 (Fig. 1a). By leveraging community relationships, plant-level partnerships (including union and employer coordination), and the study team's onsite presence, these outreach clinics facilitated access to COVID-19 vaccination for meat processing plant workers who may otherwise have had limited access. [23] This period also coincided with greatly increased research engagement (Fig. 1b).

Orientation: meat processing plants, community scholars, and communities

The CS team recruited workers from 11 meat processing plants across Western Canada whose workforce comprised largely of immigrant and racialized workers, along with other national staff. These plants were classified as essential food services and remained mostly operational despite large COVID-19 outbreaks. [8, 9].

Phase 1: community scholar recruitment and engagement March 2020–December 2020

Prior to joining the CS team, these community leaders conducted contact tracing, provided social support such as food and emergency housing to help infected workers isolate, helped translate and navigate complex social programs, and translated public health information into first languages using accessible formats such as videos, infographics, and flyers. Through this work, they became familiar with meat processing plant workers and the communities connected to them. Several of these volunteers were referred to the research team and were subsequently interviewed and hired as CSs.

Phase 1: community scholar personal impact and motivations March 2020–December 2020

CSs shared their motivations to participate in research, deeply influenced by their experiences supporting immigrant and racialized workers. They felt an immediate need to act at the COVID-19 pandemic's onset as it affected immigrant communities from the mass outbreaks associated with meat processing plants, with the first mass outbreaks occurring in June–July 2020 (Fig. 1a/b):

“When COVID hit, the East African community was severely impacted economically, socially, and emotionally. I was frustrated and cried so many nights when I got multiple calls from the community members.” – Scholar B.

“I heard many, different genders, different countries of origin, different meat processing plants, but the story kept repeating itself. The mistreatment, the

harassment, the use of power to manipulate...” – Scholar E.

“I heard that COVID had swept thousands of people in Italy, Europe, North America, especially USA, and to an extent Canada. I was very much terrified. Then, to my shock, I myself first heard about COVID through the media (rather than through the meat packaging company’s internal information channels) that about 950 workers have caught COVID. Then, I immediately quit my job the next day, in the interest of my personal and family safety, though it was too late.” – Scholar A.

These interactions with community members motivated CSs to act and join the research team.

“The more people I spoke to the more I felt we needed to do something to help them.” – Scholar C.

“My frustration led me to mobilize my resources and create a [community] group.” – Scholar B.

“When the first COVID-19 outbreak happened at [Meat Plant] I was providing support to those affected... When this [research] project started, I knew I wanted to be involved...” – Scholar C.

Table 2 Early and Unsuccessful Meat Plant Worker Engagements

Community Engagement Strategy	Community Scholar Identified Barriers	Illustrative Quotes
Labor union townhalls	Fear of repercussions from their employers	<i>“The lack of trust in any figure of authority or institution, and fear of consequences such as losing their work visas or losing their jobs, was a reality for them.” – Scholar E</i>
Partner agencies study advertisement	Corporate, managerial mistrust and mistrust of health systems and authorities	
Multilingual flyers	Perceived discrimination and racism	<i>“Meat processing plant employees seemed especially baffled as to why they were... praised for being ‘essential workers’ [that] feed the province but were subsequently blamed for the outbreaks that they had no control over and they themselves were victims to.” – Scholar E</i>
Research team social media advertisement		
Study webpage		
University study information online seminar		<i>“The beginning was an attack aiming a certain group of people accusing them of neglect and lack of awareness and the main reason for spreading the epidemic for not following the safety measures and unwilling to take the vaccine.” – Scholar D</i>
Text (SMS) based study advertisement campaign		
Online multilingual informational videos		

Community scholar training and integration November 2020 - December 2021

The CS team training was deployed between November 2020 to December 2021 and involved: (1) an introduction to the study’s objectives and population; (2) global health competencies such as cross-cultural communication, advocacy, and leadership (through an e-learning model) [30]; and, (3) technical research training including research ethics and certification, data security and privacy, informed consent and participant recruitment, survey data collection, qualitative interview facilitation, and analysis methods. CSs were explicitly instructed to maintain a clear separation between research activities and vaccination outreach. They were trained not to provide medical advice, endorse specific health decisions, or link research participation to access to vaccination services. Participation in the study was voluntary, and consent procedures emphasized that decisions regarding vaccination and research participation were independent of one another. In January 2022 the CS team began a formal 1-year university-based research certificate training program, Patient and Community Engagement Research (PaCER). [39] CS public health research recruitment and outreach activities are detailed in Fig. 1b.

Complicating action

Phase 2: early study recruitment and community engagement January–March 2021

Despite employing various outreach techniques to encourage research participation among meat processing plant workers such as joint townhalls with the union, SMS-based study advertisements, and an online seminar with study information, these methods yielded nearly no study recruitment (Fig. 1b), and are summarized in Table 2. These early outreach efforts largely relied on institutional channels and public advertisements, which did not yet benefit from the trust and relationships CSs would later develop with workers. At this stage, CSs were still newly integrated into the research team and had not yet established the trust necessary for workers to feel comfortable engaging with the study.

“I did lots of cold calling to people like the Philippine Consulate and to organizations like [a list of six immigration services organizations has been redacted] but [there was] no response” – Scholar E.

One CS also highlighted the role of language barriers and education in vaccine hesitancy.

“In the meat processing plant, employee vaccine hesitation was due to language barrier, there were misunderstanding and trust issue. I believe as community scholars we broke [solved] the trust issue by

speaking their language and explaining the pros and cons of the vaccine.”
– Scholar D.

Community scholar evaluation

Phase 3: community scholar reflections April 2021– February 2022

CSs were asked to keep a log with the outreach strategies they each used and their reflections on their effectiveness. In addition, they met weekly to discuss what they had recorded in their individual logs. CSs reported getting along well with each other and with participants but reported concerns from meat processing plant workers over what information was and was not being shared by their employers and government.

“Some of the meat processing plant employees claim when the COVID-19 outbreak started, their employer didn’t tell them right away or withheld the information, and as a result, about two thirds of the employees were infected by COVID. Our employer failed us on updating about COVID within our working site.” – Scholar A.

“It was like a spy mission to uncover the disaster ... this was [our] main role as a community scholar (spy-eye) ... we put a spotlight on the government’s weaknesses on handling crisis.” – Scholar D.

Because participants trusted the CSs, they were able to elicit honest and vulnerable realities uncovering the unjust treatment immigrant meat processing plant workers perceived by both their employers and by the provincial government during the interviews. CSs reflected on the workers’ fears, difficult social and working conditions, perceived exploitation, and racial discrimination. CSs also described how temporary workers’ employment was tied to job security and immigration status. At times, workers sought out CSs specifically because they felt safer speaking with them than with researchers or officials.

“Some of them did not want to participate in the study and when listening to them, it was understandable that they would not want to be part of it. The lack of trust in any figure of authority or institution, and fear of consequences such as losing their work visas or losing their jobs, was a reality for them.” – Scholar C.

“Many felt unsafe and scared going to work every day, some with no choice other than to carpool as they did not have their own vehicles and with many also living in the provided shared housing of their employer. Many meat plant employees had to con-

tinue working because their immigration status relied on their ability to work despite how terrifying it was...” – Scholar E.

“[One worker told me] ‘Last year and prior to that, in 8 hours we used to kill 2,000 to 2,050, but now we are killing 2,200 to 2,300 cows. The job is getting harder...[Meat Plant] has a structure the same like the socialist dictator government we had in Ethiopia’...” – Scholar A.

“The employees I spoke to say the main reason for the spread of COVID in 2020 and beyond was the working conditions in the meat processing plant. They work on lines, stand shoulder-to-shoulder, making the same cuts over and over” – Scholar A.

“Several [of] the employees believe that there is a hierarchy based on race and there is a divide and rule mechanism in the meat processing plants.” – Scholar A.

“I distinctly remember one woman who called me crying, we spoke for two hours, she told me how her job was unbearable and how she had been psychologically harassed by her employers... Her case was full of mistreatment and injustice. It was the first time I heard someone saying, ‘it is like we are slaves in the 21st century.’ This was shocking to me being an immigrant myself. Understandably, she did not want to complete a survey or have an interview recorded as she was afraid. She wanted her voice to be heard so badly, but she was afraid of the repercussions this could have.” – Scholar C.

CSs described the personal impacts they experienced engaging with immigrant and racialized workers and their communities.

“Being part of the research team inspired and motivated me to continue to support essential workers.”
– Scholar B.

Resolution

Phase 3: Worker Recruitment and Integration with Occupational and Community COVID-19 Outreach Vaccine Clinics (April 2021–February 2022)

Despite early challenges, CSs remained highly motivated, completed their training, and pursued multiple engagement strategies. They identified various recruitment barriers and led iterative improvements in recruitment methods to address them. These entailed online multilingual informational videos, partnering with community leaders directly, multicultural social media group engagement, and onsite vaccination coupled with reassurance (Table 3). CSs became further empowered to lead engagement efforts, using weekly team meetings to discuss engagement activities and track study recruitment (Fig. 1b).

Table 3 Iteratively refined immigrant and racialized worker outreach strategies

Community Engagement Strategy	Community Scholar-Identified Facilitator	Illustrative Quote
Online multilingual informational videos	Providing information in first language; increasing accessibility	"After we posted our videos as part of the outreach strategy, I started getting multiple calls from people working at different meat processing plants, people who just wanted someone to listen to them and their experience." – Scholar C
Multicultural social media group engagement	Leveraging existing trusted online community networks	"Facebook has been the main social media for connecting with other Latino community members... I initially joined 14 groups..., by the end I was part of 27 groups..." – Scholar C
Partnering with community leaders directly	Personal introductions increased trust more than formal organizational outreach	"Best bet was to reach leaders personally, not organizations, and get them to introduce you personally." – Scholar E
Empathetic listening and validation	Creating safe spaces for immigrant and racialized workers to share experiences	"It was crucial for these newcomer communities to be heard, to know that they were not alone and that someone cared for them." – Scholar C
Collaboration with social agencies and community webinars	Embedding study invitations within trusted informational sessions	"I was simultaneously working with [Agency] and offering COVID-19 vaccine evidence-based information to the Latino community in first language, and at the end of the webinars I would invite people to share about the study with other community members or to participate themselves." – Scholar C
Direct recruitment during occupational vaccine clinics	Dual operational and research presence increased engagement	"I was invited to participate as a Spanish interpreter for [Health System] Town-halls... Every time I was invited... I asked the organizers if it was possible to invite participants to join our study, and the answer was always yes." – Scholar C
Addressing vaccine hesitancy through language concordance	Breaking mistrust by speaking workers' primary language	"In the meat processing plant, employee vaccine hesitation was due to language barrier... I believe as community scholars, we broke the trust issue by speaking their language..." – Scholar A
Onsite vaccination coupled with reassurance	Providing both vaccination and emotional reassurance	"Just within a few weeks, we were able to give meat processing plant employees not only their first dose of the Pfizer vaccine, but also peace of mind..." – Scholar E
Community-based vaccine clinics	Bridging trust between community and healthcare system	"We brought people together and built trust between the community and healthcare workers." – Scholar A
Facilitating vaccine access through trusted intermediaries	Brokering access in a complex health system	"It seemed almost like a secret club where you had to know somebody... One thing was for sure though, and it was that people wanted the vaccine." – Scholar E
Reinforcing community protection and collective safety	Framing vaccination as protecting loved ones	"One common theme... in all these clinics is that [attendees] finally felt cared for, safe and confident that they can protect their loved ones and community members." – Scholar E

"We were experiencing failure, for...interviews and surveys. We didn't surrender, we continued and ultimately achieved success." – Scholar D.

Later CSs utilized their operational presence during eight on-site occupational meat processing plant and one urban COVID-19 vaccine outreach clinics to facilitate study recruitment. Throughout the data collection period, scholars registered 450 meat processing plant workers to complete surveys, facilitated 191 survey completions in first language (42.4% completion) and performed 43 qualitative interviews across eight different primary languages (Fig. 1b). While workforce denominators across all participating plants were not available to assess representativeness, these figures are presented as descriptive indicators of engagement activity rather than measures of population-level reach. This case study did not aim to survey or vaccinate a defined proportion of the workforce, but to document the feasibility and evolution of a dual research and outreach model during a public health emergency. Table 3 shows that the CS team iteratively improved immigrant and racialized worker

engagement methods and study recruitment integration with their involvement during COVID-19 vaccine outreach clinics. As shown in Fig. 1b, study enrollment steadily increased between phases 2 and 3, coinciding with increased CS leadership and engagement with immigrant and racialized worker communities, alongside broader COVID-19-related shifts as more information and safety protocols became established.

CSs also described their experience brokering access to COVID-19 vaccines for immigrant and racialized workers and their communities, finding this role particularly important when working with immigrant communities who experienced elevated levels of mistrust towards the health system and towards COVID-19 vaccines.

"To make matters worse, most immigrants from East Africa had vaccine hesitancy... Their suspicion comes from their disenfranchisement and isolation from the mainstream system." – Scholar B.

"The mobile meat plant clinics were incredibly convenient for the employees as they were able to get their vaccine before or after their shift and coopera-

tion with the employers made the process smooth and easy.” – Scholar E.

Key learnings (April 2021–February 2022)

“We cannot underestimate the power of community and feeling cared for and supported in someone’s life... It is true that we are stronger together, and trust can be built when we show with actions that we care for one another.” – Scholar C.

Several key insights emerged from the CSs’ experiences:

1. Validating workers’ experiences and empathetic listening synergistically facilitated both public health research and outreach efforts: CSs described how they believed creating space for workers to share their experiences helped build trust and foster meaningful relationships. Many workers had never spoken openly about workplace conditions or the social impacts of the pandemic, thus listening itself became a meaningful act of engagement. CSs realized the importance of bearing witness to immigrant and racialized workers’ challenges, grievances, and concerns.

“CBPR with essential workers gave them a chance to express and share their lived experiences, creating social connection and meaningful relationships among themselves. As such, the research was more than research, the research involvement was a validating experience for essential workers.” – Scholar B.
“Before [the] Community Scholars, people were very hesitant to take survey and do interviews. But as soon as Community Scholars joined, people joined the survey and interview because people look and talk like them.” – Scholar A.

“It was crucial for these newcomer communities to be heard, to know that they were not alone and that someone cared for them.” – Scholar C.

2. Translation of stories into support and awareness: As relationships developed, CSs shared information about workplace rights, encouraged workers to question unsafe or unfair practices, and helped them recognize that some challenges they experienced were not inevitable parts of immigrant work.

“We started to give hope to the employees...to learn about their rights and stopped normalizing the way they were treated...we talked to them, they realized that their experience is not every immigrant

experience...which encouraged them to speak up.” – Scholar C.

CSs also identified gaps in workers’ awareness of existing labor protections and representation. One CS noted that many workers were unfamiliar with the existence of unions, and those who were aware often had limited trust in them.

“Most of the employees do not know the Union existence and those who know about the union, while most of them don’t trust, very few of them trust the Union.” – Scholar A.

3. Community presence in the face of uncertainties: CSs emphasized that trust-building required ongoing presence in community spaces beyond formal research activities. Participating in everyday community events and maintaining relationships over time reinforced that engagement was not purely extractive but grounded in mutual support.

“I feel much closer to my community, I made many deep and meaningful connections... just keep showing up. Don’t just abandon them. [Keep going] to the BBQs, go to the potlucks. Don’t just take.” – Scholar E.

“Being at the receiving end of the trust of our community members is both a great honour and a great responsibility. This has been my motivation when I have felt tired or overwhelmed.” – Scholar C.

Discussion

In this study we describe how a CS program cultivated trust among immigrant and racialized workers in meat processing plants affected by COVID-19 outbreaks, facilitated through empathetic listening, onsite presence, and translation of worker narratives into advocacy during the COVID-19 pandemic. Our findings suggest the feasibility of rapidly deploying and refining CBPR strategies to engage immigrant and racialized workers to concurrently support both critical public health research and outreach operations during a public health emergency. Notably, although our intention from the outset was to implement CBPR, CSs were not involved in the initial study conceptualization and design. The study began during a rapidly evolving public health crisis, when the research team encountered CSs who were already independently volunteering and working with immigrant meat processing plant workers following the first mass COVID-19 outbreaks. Early collaboration emerged through these outbreak response efforts while the research team simultaneously applied for funding to formally study the crisis.

In this early phase, the project more closely resembled Participatory Action Research: action-oriented and collaborative but not yet grounded in shared governance. As CSs became fully integrated into research decision-making and vaccine outreach operations, the project aligned more clearly with CBPR principles, coinciding with marked improvements in engagement and recruitment. The study also describes how this community-engaged program was developed and evolved in real-time during the COVID-19 pandemic. Finally, our study captures the CSs' own reflections, key insights, and contextualized strategies that, when combined with the operational description, could inform rapid deployment and refinement of community engagement methods for public health and healthcare in other crisis situations.

Our findings both contribute to and contrast with existing literature on CBPR. While CBPR emphasizes the necessity of building trust through academic-community partnerships, particularly in marginalized settings like meat processing plants, it also asserts the need for time to foster collaborative relationships that diminish pre-existing power imbalances between academia and communities [13, 14, 15, 17, 40]. However, public health emergencies such as mass COVID-19 outbreaks in large meat processing plants do not allow for the prerequisite time or optimal conditions. Early in the COVID-19 pandemic when little was known of "SARS CoV-2's" transmission dynamics, rapid research and concurrent public health and healthcare operations were urgently required to direct and coordinate health systems' responses but were often difficult without pre-existing trust among immigrant and racialized workers who faced significant structural barriers to healthcare and credible health information. [3, 4] Despite these conditions, our study suggests that a dual-purpose CBPR program integrating both research and public health operations can be rapidly launched and iteratively refined, even when the study team initially lacks established relationships with immigrant workers. This study also highlights the utility of CBPR as "action research", wherein the purpose of research is not only to acquire knowledge, but to address unmet needs. [41] Our approach aligns more with quality improvement literature that advocates starting and iteratively refining health system interventions to address identified issues than with traditional CBPR models that promote building trust first. [42] Our findings suggest that initiating urgent public health research and outreach, and trust building can occur simultaneously, indicating these concepts may not be mutually exclusive and indeed may be synergistic.

The pandemic exposed health inequities among racialized communities including immigrant and racialized workers and underscored the urgent need to improve community engagement across high-income countries.

[2, 9, 10, 43] Innovative community-engaged healthcare and vaccine outreach programs that emerged during the pandemic successfully increased community trust, engagement, and vaccine uptake. [23, 44, 45, 46] Nevertheless, these programs often depend on pre-existing partnerships and do not include research or data collection as a primary operational goal. [44] Unfortunately, lack of high quality health and health system data among socially marginalized immigrant communities in high-income countries and their relative absence in health research contribute to well described access and health outcome disparities between these communities and the general populations among host countries. [22] These persistent immigrant health research gaps are not confined to high income countries alone. The WHO highlights how "[p]ersistent research gaps in these areas greatly impact the health of people who have migrated or been forcibly displaced and the health of communities worldwide."¹⁹ Our study provides evidence that extends the community-engagement paradigm through incorporating CSs concurrently across participatory research and healthcare operations.

The CS reflections corroborate the synergies of their dual roles, revealing how their advocacy efforts were fueled by witnessing perceived injustices and how their research involvement ultimately led to empowerment to facilitate COVID-19 vaccine outreach and develop a deeper commitment to their communities. [29, 46] These experiences motivated CSs to pursue further formal research training in the Patient and Community Engagement Research (PaCER) program, [39] underscoring the integrative potential of CBPR principles in practice-based research networks, and providing a real world example amidst a public health crisis. [14] Future research could employ quantitative or mixed-methods study designs to evaluate health outcomes among communities served by similar programs or explore gaps in proactive public health engagement and their relationship to institutional trust and vaccine hesitancy. Although this study was set amidst a global pandemic that required an emergency response, the lessons from this dual-purpose CBPR model may extend beyond crisis settings and inform longer-term slow moving health promotion efforts. These findings are especially relevant, as trust in science since the COVID-19 pandemic has declined in many countries, and existing research points to community engaged partnerships with public health as key to rebuilding lost trust. [47, 48].

Our study must be interpreted within the limitations of its methods and context. First, conducted in a single Western Canadian province, the generalizability of our findings may be limited. However, the structural features we observed such as demanding physical work, power dynamics, and limited workplace protections are likely

prominent in other similarly intensive sectors that rely on immigrant labor, such as construction. [43] Second, while extensive, our inclusion of ethnocultural minority communities in Canada, is not exhaustive. Despite this, the immigrant communities represented in our study from Africa, Latin America, and Southeast Asia are similarly represented among immigrant and racialized workers in other Canadian jurisdictions. [49] Third, our community engagement methods were imperfect as our survey completion rate was 42.4%. This may be partially related to using an English-only survey; multilingual delivery was not feasible within the institutional REDCap implementation used for this study, which supported only a single survey link. While CSs facilitated most surveys in person and served as ad-hoc interpreters to support participants with limited English ability or digital literacy, this prompts further examination of engagement strategies for future studies. Further, one CS did not complete the program, resulting in a coverage gap for the Sudanese community and the loss of Dinka language capacity within the CS team. Additionally, although CSs were explicitly trained to separate research participation from vaccination outreach activities, the concurrent nature of these efforts may have introduced social desirability bias among participants, particularly regarding perceptions of vaccines or trust in the health system. Finally, we cannot establish causality between CS involvement in public health outreach operations and improved study recruitment among meat processing plant workers. However, qualitative data and insights from CSs suggest that the increase in participation may be attributed to the period when in-plant vaccine operations were underway and CSs were visibly active, though the relationship is undoubtedly interdependent and warrants further exploration.

Conclusion

Our study contributes to the limited peer-reviewed literature on the lived experiences of immigrant and racialized workers during the pandemic and illustrates the viability of initiating and iteratively refining a CBPR and outreach program amidst a public health emergency. CSs' authentic engagement and progressive integration into both research governance and frontline vaccine operations highlight the central importance of shared leadership in crisis-based participatory work. As their role evolved from action-oriented participation to full co-leadership, CSs helped overcome earlier recruitment failures coinciding with a surge in study participation. This operational model, embedding community leaders simultaneously within research and frontline public health response, may inform other health systems seeking to strengthen crisis preparedness and community engagement. In our context, this dual role allowed CSs

the opportunity to build trust in real time, overcome recruitment barriers, amplify worker voices, and facilitate timely access to vaccination for a predominantly immigrant and racialized workforce amidst the challenges of the COVID-19 pandemic.

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

GEF, KP, and EN led the conceptualization of this paper. MA, MY, AS, MY, MY, and ERC actively supported data collection, data analysis, and manuscript preparation. EN, NH, ZH, OM, RG, DA, and AS provided support with writing, revising, and editing. MS, AB, IN, AC, SE, and DS provided, subject-matter expertise, and supported manuscript writing, revising, and editing. GEF and KP take responsibility for the final manuscript and provided scientific oversight throughout. All authors approved the final manuscript.

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Data availability

Data available upon request.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and received ethics approval from the University of Calgary research ethics board (REB20-1153). Written informed consent was obtained from all participants prior to their participation in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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