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Original Study

Engaging Long-Term Care Workers in Research: Recruitment Approaches and Participant Characteristics From a Randomized Controlled Trial to Improve COVID-19 Vaccine Confidence

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A B S T R A C T

Objective: To describe and compare the recruitment methods employed in a randomized controlled trial targeting long-term care workers, and resulting participant baseline characteristics.
Design: We used a multifaceted recruitment process to enroll long-term care workers in our 3-arm randomized controlled trial comparing 2 interventions to enhanced usual practice, for improving COVID-19 vaccine confidence and other outcomes.
Setting and Participants: Adult long-term care workers living in the United States employed within the last 2 years were invited to join the study. Participants also had to meet specific screening criteria related to their degree of worry about the vaccine and/or their vaccination status.
Methods: We used a participatory approach to engage our long-term care stakeholders in codesigning and executing a combination of recruitment methods, including targeted e-recruitment, paid e-recruitment, and in-person recruitment. Participants were screened, consented, and enrolled online. We implemented a participant verification process to ensure the integrity of our study data, and used a tailored participant management platform to manage enrollment.
Results: We enrolled 1930 long-term care workers between May 2022 and January 2023. We met our enrollment target, despite each recruitment method having limitations. Total variable costs of approximately $102,700 were incurred and differed on a per-enrolled participant basis across methods: $25.73 for targeted e-recruitment, $57.12 for paid e-recruitment, and $64.92 for in-person methods. Our sample differed from the national population in age, gender, race/ethnicity, education, and role in long-term care. Differences were also observed between online and in-person recruitment methods.
Conclusions and Implications: Our results support the feasibility of enrolling a large number of long-term care workers in a randomized controlled trial to increase COVID-19 vaccine confidence. Findings build upon the evidence base for engaging this important population in research, a critical step to improving long-term care resident health and well-being. Results from our trial are anticipated in 2024.

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Long-term care workers (LTCWs) are on the front line of health services and care for some of the most vulnerable members of the population. For a variety of reasons, they are historically underrepresented in research, and this is also true for the older adult nursing home residents for whom they care.[1-3] However, it is critically important to understand the most effective ways to engage LTCWs in clinical research—for the health of the LTCWs themselves, the residents they care for, and the communities in which they work and live. Consider the Coronavirus Disease of 2019 (COVID-19) pandemic: at the onset, LTCWs experienced significant distress related to resident deaths (more than 168,000 nursing home residents in the United States have died from COVID-19[4]), fear of getting infected or infecting others, lack of protective equipment, and staffing shortages or increased workload.[5,6] Yet, LTCWs have lacked confidence in the vaccines that have shown efficacy in preventing serious illness, hospitalization, and death.[7-10] Vaccine hesitancy is complex and multifaceted; however, early reasons reported among LTCWs included concerns about safety, effectiveness, adequate testing in people of color, and speed of vaccine development.[7-10] Other factors have included concerns regarding interactions with preexisting conditions, lack of trust in the government, and misinformation about the vaccines.[9,10] In this context, it became essential to find ways to improve LTCW confidence in the COVID-19 vaccines.

In May 2022, we began recruitment efforts to enroll 1800 LTCWs in a randomized controlled trial (RCT) to test 2 online interventions designed to increase their confidence in the vaccines.[11] Because our interventions and survey follow-up were delivered online and were not associated with their long-term care (LTC) place of work, we *directly* recruited LTCWs to the study. We opted for this approach despite minimal information available about the efficacy of recruitment methods for directly engaging this population in research.

The literature, however, does contain many studies that have recruited and/or delivered interventions at the LTC health system or facility level to gain access to LTCW participants.[5,6,12-19] For example, in 2022, Berry et al[7] conducted a large-scale RCT to increase COVID-19 vaccine uptake among residents and LTCWs, partnering with 4 health care systems to randomize 133 LTC facilities to either an intervention or control arm. Further, in some of these studies, once approval was granted by the nursing home administrator, research teams used traditional methods (eg, flyers, announcements at staff meetings, word of mouth, and emails) to engage LTCWs directly.[5,6,12-14,18] However, gaining access to LTC facilities poses many barriers.[2] Fewer studies in LTC have reported using online methods, including social media, to directly recruit participants,[8,20] despite recent literature pointing to its widespread use for research study recruitment.[21-23] Although, as has been reported and discussed in other research,[24-26] when study activities occur online, researchers have encountered eligibility fraud, creating significant challenges. Lastly, several recruitment papers encourage the use of both traditional and e-recruitment methods to ensure success in reaching and enrolling participants in research studies,[27-30] although descriptions of large studies that directly recruited LTCWs via both methods are rare.

In this article, we aim to fill this gap and contribute to the evidence by describing and comparing the combination of recruitment methods we employed to specifically target and enroll LTCWs in our RCT. We also present the resulting participant baseline characteristics, overall as compared to the national population of LTCWs, as well as by recruitment method.

Methods

Trial Design

The "CONFIDENT Study: A randomized trial to increase COVID-19 vaccine confidence in long-term care workers" is detailed in our published protocol.[11] To briefly summarize, 2 online interventions (a dialogue-based webinar and a social media website) were co-created with LTCWs and specifically designed to increase LTCW confidence in the COVID-19 vaccines, as compared to an enhanced usual practice arm (the Centers for Disease Control and Prevention website). Data were collected via online surveys at 4 time points: baseline and 3 weeks, 3 months, and 6 months post baseline. The CONFIDENT study was approved by the Dartmouth Committee for the Protection of Human Subjects (STUDY00032340).

Participants

A diverse sample from across the United States, both demographically and occupationally, was desired to align with national statistics.[31] To recruit a wide array of LTCWs, the study was available to anyone currently employed (or within the last 2 years) in an LTC setting who met basic screening criteria (ie, at least 18 years, a US resident, able to understand English, not pregnant/breastfeeding, and able to verify their status as a LTCW). A LTC setting was broadly defined to include nursing homes, skilled nursing facilities, assisted living facilities, home health care, hospice care, and retirement communities. LTCWs also had to be at least somewhat worried about the COVID-19 vaccines and/or had not received a COVID-19 booster vaccine.

Preparatory Activities

Participatory approach to collaborative partnerships

We drew on elements of a community-based participatory research approach,[32] engaging some of our key stakeholders from the field of LTC to assist with our recruitment efforts. Colleagues from the National Association of Health Care Assistants (NAHCA) and East Carolina University (ECU) and a core group of 4 LTCWs served as study co-investigators (Co-Is). We also engaged 5 additional LTCWs who served on the Stakeholder Advisory Group, along with a medical director who served on the Trial Steering Group. We contracted with the participating organizations to enable colleagues to devote a percentage of their time to the study, and compensated our LTCW partners and medical director at an hourly rate for their involvement. Virtual standing and ad hoc meetings and emails were our primary modes of communication and engagement. We intentionally involved our LTC stakeholders throughout the recruitment process, from developing and providing critical feedback on our recruitment strategy and materials to leading and/or managing our site visits and Facebook ad campaign. Their involvement was critical to ensuring our recruitment efforts appealed to the LTCW population.

Online information page and baseline survey

We developed an online information page to provide LTCWs with details about the study and to supplement the purposefully brief information in our recruitment messaging and materials. To increase accessibility, the information page featured written, image-based, and video-based plain-language descriptions of the study, including

eligibility criteria. The video (real-life and animated) featured 2 of our LTCW study partners. Those interested could click on a "Join Now" link, which navigated them to a Qualtrics[33] baseline survey that included electronic screening and consent, collection of demographic and outcome data, and randomization to a trial arm.

Participant management system

We worked extensively with a third-party vendor to tailor the Salesforce (SF) platform to create a robust participant management system. Through a Qualtrics-SF integration function, certain information from each participant's baseline survey flowed from Qualtrics into SF. This integration was crucial to our ability to track participants on a real-time basis and consistently communicate with them via text, email, and/or phone calls throughout the course of their study journeys. It also enabled the study team to monitor daily recruitment activity, as well as the timely execution of a multistep participant verification process.

Verification Process

We implemented a participant verification process to ensure the integrity of our study data.[11] Our verification process was informed by previously reported methods[26] and recommendations[24,25] for dealing with fraudulent study enrollment. Broadly speaking, we (1) utilized built-in survey software fraud-detection features,[24,26,34,35] (2) requested information to confirm LTCW status (eg, an image of workplace badge or CNA certification number), (3) verified identities using an online public records search service,[25] and (4) conducted detailed survey data cleaning (including metadata) to identify irregularities.[24,26]

Recruitment Methods

Three distinct recruitment strategies aimed directly at LTCWs were used and are described below. Compensation of a $30 Amazon gift card for each survey completed and for possible participation in an interview following the study (for up to $150) was offered and disclosed in the recruitment materials. Sample recruitment materials for each method are provided in Supplementary Material 1.

Targeted e-Recruitment

Emails (personalized with the recipient's name) were sent via NAHCA's listserv with an introduction from NAHCA's CEO and links to the study information page and Qualtrics baseline survey. Concomitantly, recruitment messages were posted to NAHCA and select NAHCA–affiliated Facebook groups. This method was designed to leverage NAHCA's national membership of >26,000 certified nursing assistants (CNAs) and >18,000 Facebook followers.

Paid e-Recruitment

We set up and distributed paid Facebook ads through NAHCA's Facebook account. Because Facebook owns Instagram, the same study ads appeared on both platforms.[36] Ad copy was created with input from our NAHCA and LTCW partners, and used plain language, bright study colors, inviting stock photos of LTCWs, and minimal text. Ads were static and appeared as posts on Feeds, Stories, and Reels.

In-Person Methods

Site information sessions were conducted primarily by our ECU collaborator who had established relationships with LTC organizations and settings in the North Carolina area. At each site, a table was set up in a break room or other location easily accessible to employees to display recruitment materials (see Supplementary Material S1) and provide refreshments. The materials contained a QR code that could be scanned to direct interested LTCWs to the study information page. Our ECU collaborator was available to discuss and answer any questions about the study. This approach was also replicated by a research team member at LTC settings in New Hampshire. Additional in-person methods included stakeholder distribution of study materials at industry-specific conferences and at LTC facilities in New York and Tennessee.

Data Preparation and Statistical Analysis

Consolidation and/or recoding of several survey responses (including free-text responses) relevant to recruitment and enrollment characteristics were required, as detailed below.

Recruitment Method

Participants were asked how they heard about the study, which included 8 response choices with an additional open-text option. We condensed responses to this question into a new 5-category variable to facilitate interpretation and analysis (Table 2).

LTC Role

Participants selected their job title(s) from a list of 15 response choices with an additional open-text option. We consolidated and recoded these responses to conform to KFF's 5 categories or types of LTCWs[37] to facilitate national comparisons. These categories range from most to least contact with LTC patients—from "aides and personal care workers" (eg, CNAs and medical assistants) on one end to "other support workers and managers" (eg, human resources and payroll) on the other.[37]

US Region

Participants provided their zip codes in the baseline survey, and we used the US Census Bureau's classification[38] to group states into 4 regions.

Descriptive statistics were used to summarize participant characteristics overall and by recruitment method. Chi-square and Fisher exact tests were performed to detect differences in participant characteristics as compared to national data and by recruitment method.

Results

A total of 14,984 prospective participants began the baseline survey. Of those, 62% (n = 9285) did not meet inclusion criteria, with the majority excluded as not being sufficiently worried about the COVID-19 vaccines as well as having received a booster vaccine (n = 4398), unable to provide a way to confirm their LTCW status (3341), and not having worked in LTC in the past 2 years (n = 968); 9% (n = 1354) did not consent, 11.4% (n = 1711) dropped out before they were randomized to a trial arm, and 0.8% (n = 121) were duplicate records. Information from 2513 randomized participants flowed from Qualtrics into the SF platform and required LTCW and identity verification. A total of 583 (3.9%) participants were excluded from the study sample after failing verification. This resulted in a final enrolled trial sample of 1930 (12.9%) LTCWs.

Recruitment Journey

The final trial sample took approximately 9 months (May 5, 2022–January 24, 2023) to enroll. As depicted in Figure 1, paid

e-recruitment was the largest contributor (68.1%; n = 1315), followed by in-person methods (18.4%; n = 354) and targeted e-recruitment (9.3%; n = 179). Word of mouth, online other, and missing data accounted for the remainder (4.2%; n = 82).

Targeted e-Recruitment Enrollment

Early efforts to leverage NAHCA's membership base via listserv emails and Facebook group posts (during a pretrial period in February-March 2022[11]) yielded unexpectedly low results. Consequently, this method was used somewhat sparingly during the subsequent 9-month trial recruitment period and yielded only 9% of the trial sample. Five email blasts (with varied messaging) were sent from May to October 2022, to a total of 26,290 NAHCA members. Total email opens were 11,276 (42.9%), with 654 clicks reported (2.5%).

Paid e-Recruitment Enrollment

As a result of the low yield from targeted e-recruitment efforts, we shifted our primary strategy to paid e-recruitment methods, which ultimately yielded 68% of our trial sample (n = 1315). However, we experienced early difficulties in optimizing our Facebook advertising spend. During the first 2 months of trial recruitment (May-June 2022), we spent approximately $28,000 on Facebook and Instagram ads and enrolled 161 participants, resulting in an e-recruitment cost of $174 per participant. This cost was not sustainable, and in July 2022, we contracted with a social media marketing expert for assistance.

The social media marketing expert configured our settings to leverage Facebook's algorithm, which tests combinations of ad copy (text and photos) to determine which combinations lead to the highest volume of impressions and click rates, at the lowest cost.[39] As a result, we witnessed an exponential increase in reach, impressions, and clicks, while dropping the cost per click from $1.89 to $.48 (Table 1). Most importantly, our enrollment trajectory changed immediately. The cumulative number of enrolled participants from paid e-recruitment more than tripled in one month, from 161 in June 2022 to 490 by the end of July, and the click-to-enrolled rate doubled from 1.1% to 2.2% (Figure 1).

Although paid e-recruitment contributed the largest yield, we unfortunately encountered some downsides. We chose to allow comments to our Facebook ads, which required regular monitoring and moderation to address any questions and concerns about the study. We also faced ongoing limitations in adjusting Facebook ad parameters to target certain demographics (eg, Hispanic LTCW population), as well as LTCW roles beyond the CNA role.

In-Person Recruitment Enrollment

We added in-person recruitment efforts at a time when COVID-19 restrictions started to lift (June 2022), primarily to diversify the roles/occupations of the trial sample (beyond largely the CNA role). Overall, in-person methods yielded 18% of our trial sample (n = 354).

Our ECU collaborator conducted information sessions in the North Carolina area, visiting 27 LTC facilities and performing one virtual

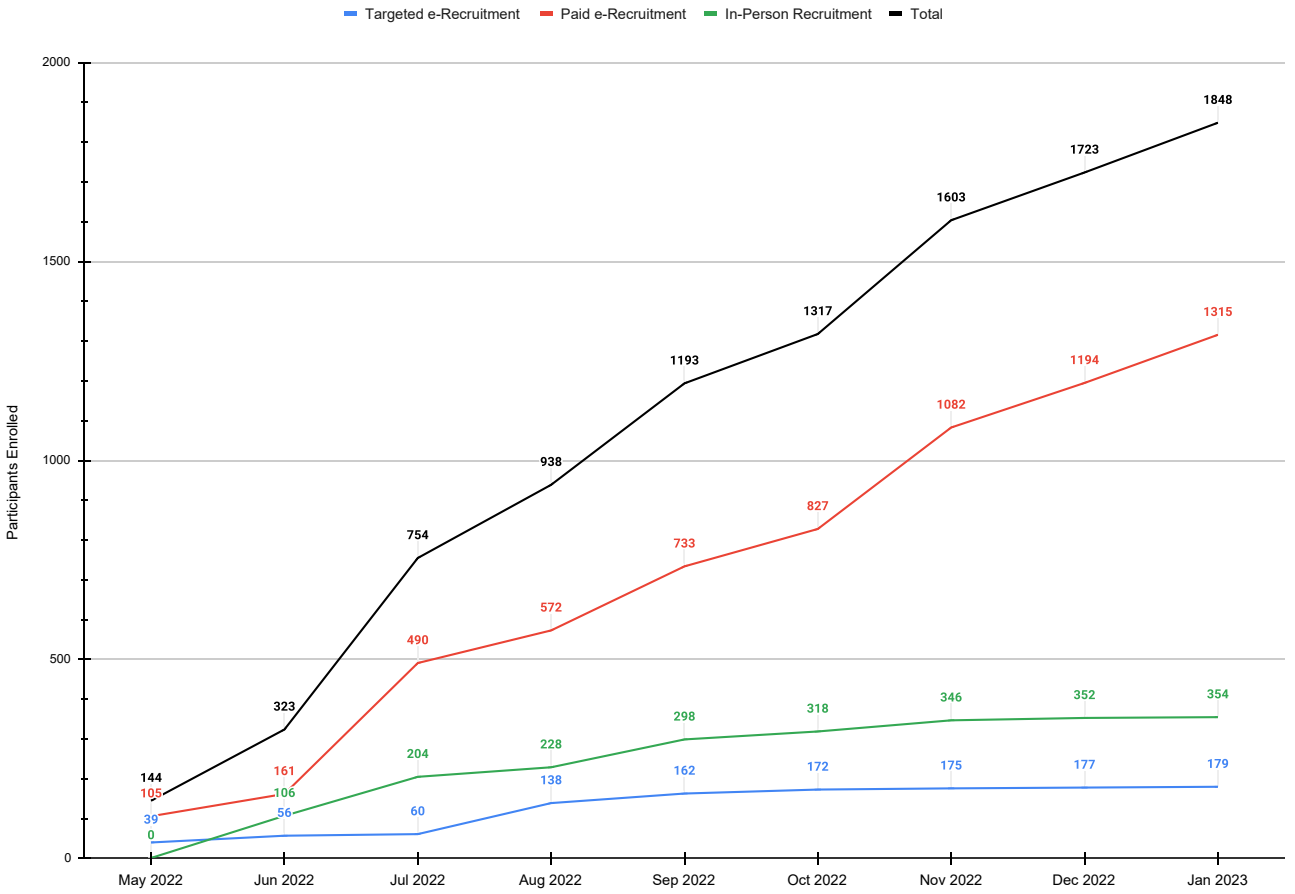

Fig. 1. Monthly enrollment by recruitment method. This figure is a line graph that depicts the number of participants enrolled in the study on a monthly basis by recruitment method and in total. The graph excludes Other (word of mouth, online other, and missing; n = 82). The average rates of participant monthly enrollment were 20, 146, and 39, for targeted e-recruitment, paid e-recruitment, and in-person, respectively. Differences in these rates were a function of the method itself, duration deployed, and adaptations made to increase yield.

Table 1
Paid e-Recruitment Impact Summary

	Clicks	Reach	Impressions	Amount Spent, US$	Cost per Click, US$	Click to Enrolled, %
Pre-hire of marketing expert, May-June 2022	14,698	214,576	2,939,686	27,742	1.89	1.1
Post-hire of marketing expert, July 2022–January 2023	51,979	2,748,362	5,180,104	25,136	0.48	2.2
Total	66,677	2,962,938	8,119,790	52,878	0.79	2.0

session. Twenty-six in-person visits were made from June-September 2022 and 1 in November 2022. The research team supplemented these visits with 2 additional recruitment sessions at nursing homes in New Hampshire in November 2022. Lastly, stakeholders distributed study materials at 2 industry-specific conferences and at 3 LTC facilities in New York and Tennessee.

Recruiting LTCWs in person enabled our ECU collaborator to hear feedback first-hand about the general climate in LTC facilities and attitudes about a research study on COVID-19. Some staff reported that the negative media coverage about COVID-19 and nursing homes belied the positive work that they do to care for the frail older adults. When our ECU collaborator shared that the study was for and about them, LTCWs responded favorably, and also appreciated that the refreshments were for the entire staff, as opposed to select staff (which is more typical). Lastly, many LTCWs were appreciative of learning about the study from someone who had experience working in a nursing home and who understood their specific challenges.

Participant Characteristics

Participant baseline characteristics as compared to national LTCW statistics[31] differed significantly ($P < .001$) for age, gender, race/ethnicity, education, and role in LTC (Table 2). Within our study population, participant baseline characteristics also differed

Table 2
Baseline Participant Characteristics*

Characteristic	Targeted e-Recruitment, n (%) (n = 179; 9.3%)	Paid e-Recruitment, n (%) (n = 1315; 68.1%)	In-Person Recruitment, n (%) (n = 354; 18.4%)	*P* Value Recruitment Method	Trial Sample, % (n = 1930)†	Kaiser Family Foundation, % (2018 Survey)	*P* Value, National Statistics
Age							
<50 y	148 (83)	1146 (87)	255 (72)	**<.001**	84	62	**<.001**
50-64 y	28 (16)	162 (12)	91 (26)		15	30	
≥65 y	3 (1)	7 (1)	8 (2)		1	8	
Gender							
Female	167 (93)	1265 (96)	325 (92)	**<.001**	95	82	**<.001**
Male	12 (7)	43 (3)	29 (8)		4	18	
Other gender	0 (0)	7 (1)	0 (0)		1	0	
Race or ethnicity							
White non-Hispanic	99 (55)	807 (62)	208 (59)	.11	61	52	**<.001**
Black non-Hispanic	62 (35)	358 (27)	107 (30)		28	26	
Hispanic	9 (5)	76 (6)	12 (3)		5	13	
Other race or ethnicity	9 (5)	71 (5)	27 (8)		6	8	
Education							
Less than high school	5 (3)	50 (4)	12 (4)	**<.001**	4	10	**<.001**
High school graduate	54 (30)	481 (37)	81 (23)		34	29	
Associate's degree and some college	108 (60)	743 (56)	171 (48)		55	39	
Bachelor's degree and above	12 (7)	41 (3)	89 (25)		7	21	
Role in long-term care							
Aides and personal care workers	162 (90)	1288 (98)	100 (28)	**<.001**	84	53	**<.001**
Direct contact support workers	0 (0)	3 (0.3)	57 (16)		3	13	
Health care providers	5 (3)	15 (1)	128 (36)		8	14	
Social workers and other behavioral health workers	0 (0)	4 (0.3)	5 (2)		1	3	
Other support workers and managers	12 (7)	5 (0.4)	64 (18)		4	16	
US region							
Northeast	17 (9)	164 (12)	31 (9)	**<.001**	11		
Midwest	55 (31)	504 (38)	0 (0)		31		
South	89 (50)	520 (40)	323 (91)		50		
West	18 (10)	127 (10)	0 (0)		8		
Vaccine Confidence Index							
Confident	45 (25)	230 (18)	73 (21)		19		
Not confident	134 (75)	1084 (82)	281 (79)		81		
Vaccinated: any dose	152 (85)	1048 (80)	313 (88)		82		
Vaccinated: booster dose	42 (23)	189 (14)	98 (28)		18		

Boldface indicates significance ($P < .05$).

*Subgroup totals may differ owing to random cases of missing data on demographic questions.

†Not included in the table: participants recruited by word of mouth or other online methods (n = 81), who cannot be classified under one of the top 3 recruitment methods; and 1 participant with missing data on recruitment method.

Table 3
Summary of Variable Recruitment Costs by Recruitment Method

Direct Costs	Targeted Recruitment, US$ (n = 179)	Paid E-recruitment, US$ (n = 1315)	In-Person Recruitment, US$ (n = 354)	Total Cost, US$ (n = 1848)
Facebook ads	0	52,878	0	52,878
Social media marketing consultant	0	6250	0	6250
Catering, refreshments	0	0	3628	3628
Travel costs (mileage, accommodations)	0	0	5011	5011
Materials (business cards, posters, table tents)	0	0	2662	2662
Estimated FTE support: key collaborators	1946	12,603	10,770	25,319
Constant Contact consultant	2200	0	0	2200
TransUnion TLO subscription*	460	3380	910	4750
Total	4606	75,111	22,981	102,698
Estimated average cost per enrolled participant	25.73	57.12	64.92	55.57†

FTE, full-time equivalent.
*Subscription costs for TransUnion's TLO verification service were allocated across methods based on the number of participants enrolled.
†Excluded from total estimated average cost per enrolled participant of $55.57 are those recruited by word of mouth, online other, and missing data (n = 82); inclusion of them as a byproduct of our recruitment methods brings the average cost to $53.21 per enrolled participant.

significantly ($P < .001$) across recruitment methods, except for race/ethnicity. Notable differences are highlighted below.

Age

Overall, the trial sample was younger than the national population of LTCWs (84% of participants were aged <50 years as compared to 62% nationally). The largest proportion of those aged <50 years came from targeted (83%) and paid (87%) e-recruitment methods, as compared to in-person methods (72%).

Gender

A higher proportion of females participated in the trial (95%) as compared to the national population (82%). The highest rate of female participants was seen in the paid e-recruitment sample (96%), with the lowest in the in-person sample (92%).

Race or Ethnicity

Sixty-one percent of participants reported being white only as compared to 52% nationally, and 5% reported being Hispanic as compared to 13% nationally.

Education

More participants (55%) reported having an associate's degree and some college as compared to 39% nationally. Conversely, 7% reported having a bachelor's degree or higher level as compared to 21% nationally.

In-person methods generated the highest percentage of participants with a bachelor's degree or higher (25%, n = 89), as compared to 7% (n = 12) and 3% (n = 41) from targeted and paid e-recruitment methods, respectively.

Role in LTC

CNAs and personal care workers made up 84% of the trial sample as compared to 54% nationally. Targeted and paid e-recruitment yielded a similarly high rate of CNAs and personal care workers at 90% and 98%, respectively. Only 4% of participants were employed as other support workers and managers as compared to 16% nationally.

In-person methods generated the greatest diversity in participant roles: 28% aides and personal care workers, 16% direct contact support workers, 36% health care providers, 2% social workers and other behavioral health workers, and 18% other support workers and managers.

US Region

Nearly all US states were represented in our trial sample, with the exception of Hawaii and New Mexico. Despite our nationwide recruitment efforts, more than 80% of study participants came from the South and Midwest regions and just under 20% came from the Northeast and West regions. In-person methods were concentrated in the South (91%) and Northeast (9%) regions, a product of where the site visits were performed. Targeted and paid e-recruitment methods

Table 4
Summary of Advantages and Limitations Experienced by Recruitment Method

Method	Advantages	Limitations
Targeted e-recruitment	• Minimal logistics; time-efficient (facilitated by our NAHCA partner organization) • Greater geographic reach compared to in person • Provided anonymity for controversial research topic • Minimal cost per enrollee	• Lowest yield • Only targeted CNA role
Paid e-recruitment	• Minimal logistics; time-efficient • Greater geographic reach compared to in person • Provided anonymity for controversial research topic • Highest yield	• Social media marketing expert required to optimize reach • Difficult to target beyond the CNA role and specific racial or ethnic groups • High cost per enrollee
In-person recruitment	• Greater sociodemographic and LTCW role diversity, more closely representing national statistics • Ability to discuss the study and answer questions directly • Staff appreciated in-person attention and rapport with study team member	• Limited geographic reach • Maximal logistics; most time-consuming • Highest cost per enrollee • Site selection bias

both recruited across regions in proportions similar to the overall sample (a combined 78% from the South and Midwest regions and 22% from the Northeast and West regions).

Baseline Outcome Measures

Overall, vaccine confidence (as measured by an adapted Vaccine Confidence Index[11,40]) at baseline was 18.7%, a sufficiently low rate to reflect our target population. Approximately 82% of participants reported having received any dose of the COVID-19 vaccine, with only 18% reported having received a booster dose at baseline.

Recruitment Costs

Variable costs—those expenses directly attributable to specific recruitment efforts—of approximately $102,700 were incurred to recruit our trial sample of 1930 LTCWs (Table 3). Time spent by our collaborators from NAHCA and ECU on recruitment activities by method were retrospectively estimated based on recall and calculated using salary, fringe, and overhead rates from our subaward contracts. In-person methods had the highest variable cost per enrolled participant of $64.92, followed by paid e-recruitment at $57.12. Targeted e-recruitment had the lowest variable cost per enrolled participant at $25.73, which was primarily attributable to leveraging NAHCA's pre-existing listserv functionality and active email list.

Not included in Table 3 are costs of research staff time to develop recruitment ad copy and materials; verify participant identity and LTC status; and to lead, manage, and monitor the recruitment process over the 9-month recruiting period. We estimate based on recall that we spent 50% of a research coordinator's time and 20% of a research manager's time devoted to those activities.

Overall Comparison of Recruitment Methods

In Table 4, we summarize the relative advantages and limitations of each recruitment method based on our experience in reaching our target sample. Of note: because we used an online enrollment process, it necessitated verification of all participants—regardless of recruitment method. As such, it is not included in the limitations column in the table as it cannot be attributed to one method alone. However, we surmise that the majority of fraudulent activity stemmed from paid e-recruitment because of the sheer size of ad reach, which approached 3 million unique views. Further details regarding the fraudulent activity we encountered with this study will be included in our main study results manuscript to be published at a later date.

Discussion

The aims of this article were to describe and compare different methods used to recruit and enroll 1930 LTCWs into an RCT, and to present resulting baseline characteristics of participants enrolled. This work is timely and important given the need to increase research in LTC. In general, recruiting challenges for RCTs are well documented[41]; fortunately, we were able to reach our target sample, and credit our success to several key factors as outlined below.

First, we collaborated with our key partners to coproduce and deploy our recruitment methods throughout the study. Critical to our success was our partnership with NAHCA, given their reputation and knowledge of the CNA community and preexisting listserv infrastructure. Further, site visits were made possible by our ECU collaborator, who successfully connected with owners, administrators, and frontline workers, which has been cited as critical to engaging LTC settings in research.[2] Lastly, the involvement of our LTCW partners cannot be underestimated; they provided the lens through which to successfully recruit their peers.

Second, we deployed a combination of recruitment approaches, which is a recommended strategy by some studies.[27-30] Our ability and available resources to pivot to different recruitment strategies, both traditional and online, enabled us to overcome challenges in yield and sample diversity in ultimately reaching our final trial sample.

Third, we acknowledge the reach and relative ease of enrolling participants online—notwithstanding the assistance we received from a social media marketing expert, who was instrumental in our achievement of a 2% click-to-enrolled rate, which is similar to other RCTs that have used Facebook ads for recruitment.[23] We also acknowledge the significant investment of time and resources required to verify enrollees to ensure the integrity of our study data and manage fraudulent activity. We were fortunate to have the guidance of prior research[24-26] and strong collaboration with our stakeholder partners to assist in planning and making adaptations to verification processes as we went along.

Despite reaching our recruitment goal, we also acknowledge several limitations. Unfortunately, we were not able to capture a representative sample of all key demographics. Our sample was younger, more female, and more white, which other studies have experienced using Facebook as a primary means to recruit research participants.[42] Additionally, our English proficiency requirement contributed to an additional shortcoming in reaching more of the Hispanic population. Site visits, as compared to e-recruitment, did enable us to reach an older population, more males, and roles other than CNAs. Future studies could strategically target site locations that would offer more racial and ethnic diversity, such as urban settings.

Conclusion and Implications

Our results support the feasibility of enrolling a large number of LTCWs in an RCT focused on improving their confidence in the COVID-19 vaccines. Not only does this have important implications for studying and improving infection control in LTC settings but also in preparing for future pandemics, which experts deem inevitable.[43-45]

Furthermore, there is already heightened recognition in the LTC field of the imperative to do more research in LTC settings—both for the health and well-being of residents and LTCWs and to improve the climate and morale in LTC settings.[1] Engaging those on the front lines who are responsible for the care of the frail older adult population is critical to conducting this research. Our study offers experiences and findings for assisting others in performing future studies and building the evidence base for engaging this important population.

Disclosure

Glyn Elwyn and Marie-Anne Durand have developed the Option Grid patient decision aids, which are licensed to EBSCO Health. They receive consulting and royalty income from EBSCO Health. Other authors report no competing interests.

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References

1. Gurwitz JH, Quinn CC, Abi-Elias IH, et al. Advancing clinical trials in nursing homes: a proposed roadmap to success. *Geriatr Nurs*. 2022;45:230–234.
2. Garcia C, Kelley CM, Dyck MJ. Nursing home recruitment: trials, tribulations, and successes. *Appl Nurs Res*. 2013;26:136–138.
3. Simmons S, Resnick B, Schnelle J, Ouslander JG. Clinical trials in nursing homes: challenges and practical solutions. In: *Clinical Trials in Older Adults*. West Sussex, UK: John Wiley & Sons, Ltd; 2016. p. 231–253.
4. Centers for medicare & medicaid services data. Accessed November 6, 2023. https://data.cms.gov/covid-19/covid-19-nursing-home-data
5. Titley HK, Young S, Savage A, Thorne T, Spiers J, Estabrooks CA. Cracks in the foundation: the experience of care aides in long-term care homes during the COVID-19 pandemic. *J Am Geriatr Soc*. 2023;71:198–205.
6. Reinhardt JP, Franzosa E, Mak W, Burack O. In their own words: the challenges experienced by certified nursing assistants and administrators during the COVID-19 pandemic. *J Appl Gerontol*. 2022;41:1539–1546.
7. Berry SD, Goldfeld KS, McConeghy K, et al. Evaluating the findings of the IMPACT-C randomized clinical trial to improve COVID-19 vaccine coverage in skilled nursing facilities. *JAMA Intern Med*. 2022;182:324–331.
8. Niznik JD, Harrison J, White EM, et al. Perceptions of COVID-19 vaccines among healthcare assistants: a national survey. *J Am Geriatr Soc*. 2022;70:8–18.
9. Harrison J, Berry S, Mor V, Gifford D. "Somebody like Me": Understanding COVID-19 vaccine hesitancy among staff in skilled nursing facilities. *J Am Med Dir Assoc*. 2021;22:1133–1137.
10. Berry SD, Johnson KS, Myles L, et al. Lessons learned from frontline skilled nursing facility staff regarding COVID-19 vaccine hesitancy. *J Am Geriatr Soc*. 2021;69:1140–1146.
11. Stevens G, Johnson LC, Saunders CH, et al. The CONFIDENT study protocol: a randomized controlled trial comparing two methods to increase long-term care worker confidence in the COVID-19 vaccines. *BMC Publ Health*. 2023;23:384.
12. Farrell TW, Butler JM, Towsley GL, et al. Communication disparities between nursing home team members. *Int J Environ Res Public Health*. 2022;19:5975.
13. Douglas JW, Jung SE, Noh H, Ellis AC, Ferguson CC. "If they Don't like You, they are not going to Eat for You": individual and Interpersonal factors affecting certified nursing assistants' ability to provide mealtime assistance to residents with dementia. *Gerontol*. 2020;61:552–562.
14. Eaton J, Cloyes K, Paulsen B, Madden C, Ellington L. Certified nursing assistants as agents of creative caregiving in long-term care. *Int J Older People Nurs*. 2020;15:e12280.
15. Hollingsworth EK, Long EA, Simmons SF. Comparison between quality of care provided by trained feeding assistants and certified nursing assistants during between-meal supplementation in long-term care settings. *J Appl Gerontol*. 2018;37:1391–1410.
16. Pillemer K, Meador R, Henderson C Jr, et al. A facility specialist model for improving retention of nursing home staff: results from a randomized, controlled study. *Gerontol*. 2008;48:80–89.
17. Franzosa E, Mak W, R Burack O, et al. Perspectives of certified nursing assistants and administrators on staffing the nursing home frontline during the COVID-19 pandemic. *Health Serv Res*. 2022;57:905–913.
18. Lathren C, Sheffield-Abdullah K, Sloane PD, et al. Certified nursing assistants' experiences with self-compassion training in the nursing home setting. *Geriatr Nurs*. 2021;42:1341–1348.
19. Bamonti P, Conti E, Cavanagh C, et al. Coping, cognitive emotion regulation, and burnout in long-term care nursing staff: a preliminary study. *J Appl Gerontol*. 2019;38:92–111.
20. White EM, Wetle TF, Reddy A, Baier RR. Front-line nursing home staff experiences during the COVID-19 pandemic. *J Am Med Dir Assoc*. 2021;22:199–203.
21. Darmawan I, Bakker C, Brockman TA, Patten CA, Eder M. The role of social media in enhancing clinical trial recruitment: scoping review. *J Med Internet Res*. 2020;22:e22810.
22. Darko EM, Kleib M, Olson J. Social media use for research participant recruitment: integrative literature review. *J Med Internet Res*. 2022;24:e38015.
23. Akers L, Gordon JS. Using facebook for large-scale online randomized clinical trial recruitment: effective advertising strategies. *J Med Internet Res*. 2018;20:e290.
24. Stevens G, Washburn H, Theiler R, Woodhams E, Donnelly K, Thompson R. Enrolment fraud in online shared decision-making research: Lessons learned from an internet-based randomised controlled trial. Presented at: 10th International Shared Decision-Making Conference (ISDM); Quebec City, Canada. Accessed January 4, 2024. https://fourwaves-sots.s3.amazonaws.com/static/media/uploads/2019/06/28/isdm2019-oralsessionsbooklet-2019-06-28.pdf
25. Glazer JV, MacDonnell K, Frederick C, Ingersoll K, Ritterband LM. Liar! Liar! Identifying eligibility fraud by applicants in digital health research. *Internet Interv*. 2021;25:100401.
26. Teitcher JEF, Bockting WO, Bauermeister JA, Hoefer CJ, Miner MH, Klitzman RL. Detecting, preventing, and responding to "Fraudsters" in internet research: ethics and tradeoffs. *J Law Med Ethics*. 2015;43:116–133.
27. Powell K, Wilson VJ, Redmond NM, Gaunt DM, Ridd MJ. Exceeding the recruitment target in a primary care paediatric trial: an evaluation of the choice of moisturiser for Eczema Treatment (COMET) feasibility randomised controlled trial. *Trials*. 2016;17:550.
28. McRobert CJ, Hill JC, Smale T, Hay EM, van der Windt DA. A multi-modal recruitment strategy using social media and internet-mediated methods to recruit a multidisciplinary, international sample of clinicians to an online research study. *PLoS One*. 2018;13:e0200184.
29. Gaupp-Berghausen M, Raser E, Anaya-Boig E, et al. Evaluation of different recruitment methods: longitudinal, web-based, pan-European physical activity through sustainable transport approaches (PASTA) project. *J Med Internet Res*. 2019;21:e11492.
30. Wasfi R, Poirier Stephens Z, Sones M, et al. Recruiting participants for population health intervention research: effectiveness and costs of recruitment methods for a cohort study. *J Med Internet Res*. 2021;23:e21142.
31. True S, Cubanski J, Garfield R, et al. COVID-19 and workers at risk: examining the long-term care workforce - Tables. 2020. Accessed September 28, 2022. https://www.kff.org/report-section/covid-19-and-workers-at-risk-examining-the-long-term-care-workforce-tables/
32. Wallerstein NB, Duran B. Using community-based participatory research to address health disparities. *Health Promot Pract*. 2006;7:312–323.
33. Online survey platform. Qualtrics. 2019. Accessed December 7, 2023. https://www.qualtrics.com/lp/xm-survey-platform/
34. QualtricsXM. Security survey options. 2022. Accessed September 20, 2022. https://www.qualtrics.com/support/survey-platform/survey-module/survey-options/survey-protection/
35. QualtricsXM. Captcha verification question. 2015. Accessed September 20, 2022. https://www.qualtrics.com/support/survey-platform/survey-module/editing-questions/question-types-guide/advanced/captcha-verification/
36. Meta Business suite: manage Facebook and Instagram in one place. Meta Business suite. Accessed December 7, 2023. https://www.facebook.com/business/tools/meta-business-suite?content_id=dxR17TaPLmD3Sdl&refsem_smb&utm_termaud-1392154218169%3Adsa-1456248249043&gclidEAIaIQobChMI5srAxfv9ggMVySSzAB0pWwGGEAAYASAAEgJeQPD_BwE&gclid=EAIaIQobChMI5srAxfv9ggMVySSzAB0pWwGGEAAYASAAEgJeQPD_BwE
37. True S, Cubanski J, Garfield R, et al. COVID-19 and workers at risk: examining the long-term care workforce - Issue brief. KFF. 2020. Accessed January 4, 2024. https://www.kff.org/coronavirus-covid-19/issue-brief/covid-19-and-workers-at-risk-examining-the-long-term-care-workforce/
38. Census regions and divisions of the United States. US Census Bureau. Accessed January 4, 2024. https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf
39. Meta Business Help Center: About dynamic creative. Accessed December 5, 2023. https://www.facebook.com/business/help/170372403538781?id=244556379685063&content_id=OESWySYCNR5UDZX&ref=sem_smb&utm_term=dsa-1724838628021&gclid=Cj0KCQiAsburBhCIARIsAExmsu6NXdQv8Q25x6B-xUBdszX9iFm4PctP2jhJTrjyUFANKN0rwEZsM0caAoWxEALw_wcB
40. Larson HJ, Schulz WS, Tucker JD, Smith DMD. Measuring vaccine confidence: introducing a global vaccine confidence index. *PLoS Currents*. 2015;7:ecurrents.outbreaks.ce0f6177bc97332602a8e3fe7d7f7cc4.
41. Pinto BM, Dunsiger SI. The many faces of recruitment in a randomized controlled trial. *Contemp Clin Trials*. 2021;102:106285.
42. Whitaker C, Stevelink S, Fear N. The use of facebook in recruiting participants for health research purposes: a systematic review. *J Med Internet Res*. 2017;19:e290.
43. Shafaati M, Chopra H, Priyanka Khandia R, Choudhary OP, Rodriguez-Morales AJ. The next pandemic catastrophe: can we avert the inevitable? *New Microbes New Infect*. 2023;52:101110.
44. Mahase E. World must prepare for next "inevitable" pandemic, flu expert warns. *BMJ*. 2023:381.
45. May M. Tomorrow's biggest microbial threats. *Nat Med*. 2021;27:358–359.