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Naloxone training programs in corporately-owned versus independently-owned Alabama community pharmacies: A pilot cross-sectional survey

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HIGHLIGHTS

- Community pharmacists in Alabama, USA, were surveyed regarding naloxone training.
- Less pharmacists received naloxone training in independent versus chain pharmacies.
- Naloxone education was mandated by employers more frequently in chain pharmacies.
- Chain pharmacies more often provided naloxone education in-house.

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ABSTRACT

Introduction: Alabama community pharmacists have the ability to furnish naloxone. The purpose of this study was to identify the differences between naloxone training, policies, procedures, and preferences in corporately-owned (chain) versus independently-owned pharmacies in Alabama.

Methods: An online cross-sectional survey was distributed to Alabama community pharmacists via email. Outcome measures included: 1) in-house versus outsourced naloxone education/training topics (13-item multiple-choice); 2) naloxone training preferences (5-item multiple-choice); and 3) perceived usefulness of naloxone education sources (14-item Likert scale from 1 =strongly disagree to 5 =strongly agree). Data were analyzed using descriptive statistics, 2-sided Fisher's Exact tests for categorical and Mann Whitney U tests for continuous/ordinal outcomes.

Results: Among the respondents (N = 64), 37 % were female, 95 % White, with an average age of 42 years. Less pharmacists received naloxone training (77 % vs 98 %, $p = 0.016$), naloxone education mandated by employers (7 % vs 97 %, $p < 0.001$), and mean[SD] in-house naloxone education topics (3.7[4.9] vs 8.5[4.2], $p = 0.003$) in independent versus chain pharmacies. Most independent and chain pharmacies preferred naloxone training in an online self-study format (53 % vs 45 %, $p = 0.529$). However, mean[SD] perceived usefulness of training sources was lower for employer-based training (2.93[0.96] vs 3.90[1.01], $p = 0.003$), the Alabama Department of Public Health (2.87[1.19] vs 3.66[0.90], $p = 0.024$), and the Veterans Affairs Administration (1.60[0.91] vs 2.41 [0.98], $p = 0.013$) amongst independents versus chains.

Conclusions: Findings suggest that pharmacists are not all receiving the same training in independent versus chain pharmacies. Targeted training efforts, including development of educational programs tailored to preferences in pharmacy settings, may lead to more efficient and informed provision of naloxone.

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1. Introduction

Opioid misuse remains a major public health crisis globally and in the United States, with around 60 million individuals with past opioid use worldwide (World Health Organization, 2023). In the United States, there were 125 million prescriptions written in 2023 and nearly 107,000 overdose deaths annually (American Medical Association, 2024). This epidemic underscores the important role of U.S. pharmacies, which are highly accessible and positioned to engage directly with communities (Green et al., 2015). In the U.S. state of Alabama, opioid misuse is particularly concerning, as the state had one of the highest per capita prescription rates in the nation in 2023, with 71.4 prescriptions per 100 residents (Centers for Disease and Control Prevention, 2024). Moreover, Alabama reported approximately 1100 opioid-related overdose deaths in 2023, which reflects a significant public health issue for the people of Alabama (Alabama Department of Public Health, 2024). Further, the state experienced a substantial increase in fentanyl-related overdose deaths, escalating from 121 deaths per year in 2018 to 835 deaths per year in 2022 (Alabama Department of Public Health, 2024). This reveals the urgent need for effective harm reduction strategies within the state.

Research on why Alabama's opioid prescribing rates are higher than other states is limited, but empowering local communities—especially those with limited access to healthcare—can help mitigate the issue. Naloxone is one tool that may enhance this community empowerment. Naloxone is a medication used to rapidly reverse opioid overdoses and is available in several prescription dosage forms including nasal sprays, prefilled syringes, and injection vials with syringes or nasal atomizers (Alaei and Omidian, 2022). Furthermore, in 2023 the U.S. Food and Drug Administration (FDA) approved Narcan® nasal spray to be sold over the counter (OTC) (Harris, 2023), offering an additional avenue for access among those without prescription insurance or unable to obtain naloxone through a harm reduction organization or public health department (Marley et al., 2024).

Community pharmacists, uniquely positioned as accessible healthcare providers, have the potential to impact the opioid epidemic significantly by providing naloxone (Hohmann et al., 2022). Recently, there have been initiatives to utilize pharmacists to implement personalized pain management strategies to reduce opioid overuse, educate patients and community members about naloxone and implement take home naloxone programs in vulnerable communities (Akers et al., 2017; Manzur et al., 2020; Wilkerson et al., 2020). Despite their multifaceted role, community pharmacists, like other healthcare professionals, face challenges such as workforce shortages and issues with naloxone supply, which can limit the effectiveness of harm reduction programs compared to other initiatives targeting people who inject drugs (Nielsen and Van Hout, 2016). Pharmacists report barriers to community-based naloxone provision which include a lack of financial resources, time constraints, obstacles with reimbursement, and lack of training on how to effectively communicate with patients and caregivers (Carpenter et al., 2018; Nowlan et al., 2021; Zalmai et al., 2023). While attitudes and intentions towards providing naloxone in community pharmacies are generally positive, some pharmacists hesitate due to concerns about liability, discomfort discussing overdose risk with patients, and insufficient knowledge (Nielsen et al., 2016; Zalmai et al., 2023). This lack of naloxone knowledge and skills makes training and education on this topic a critical issue among pharmacists.

While all 50 U.S. states have implemented policies for naloxone distribution, Alabama is not among the 19 states that require standardized training for pharmacists who prescribe or dispense naloxone (Moore and Fink, 2023; Roberts et al., 2019). This has resulted in significant differences between pharmacies' naloxone training requirements and implementation methods across the state. Further, while naloxone training and education programs for pharmacists exist, training availability as well as policies surrounding naloxone training and provision may differ between corporately-owned and independently-owned pharmacies. Carpenter and colleagues reported that existing naloxone education programs cover information on how naloxone functions, its duration of action, and immediate care following an overdose (Carpenter et al., 2018). However, little is known regarding the availability and preferences for types (content, format) of naloxone training and education for pharmacists in corporate- versus independently-owned pharmacies. Further, pharmacists at independent pharmacies are more likely to provide naloxone counseling compared to those at chain pharmacies (Lai et al., 2022). However, chain pharmacies are more likely to stock naloxone and dispense it without a prescription (Lai et al., 2022). A key difference between these two types of pharmacies is ownership: independent pharmacies are typically owned by a single proprietor or a small group, which allows for more localized decision-making. In contrast, chain pharmacies are governed by corporate policies that may limit flexibility. A greater understanding of potential disparities in the naloxone training landscape across pharmacy settings may lead to identification of opportunities for enhancement of pharmacist-led opioid harm reduction efforts that can be leveraged in future studies. Therefore, this study aims to explore differences in naloxone training, policies, procedures, and preferences between corporately-owned and independently-owned pharmacies in Alabama.

2. Methods

2.1. Study design and participant recruitment

Conducted in 2021, this cross-sectional pilot study targeted pharmacists, aged 19 and above, who were registered practitioners in the state of Alabama and were employed in community (retail) pharmacies. Recruitment efforts utilized the Alabama Board of Pharmacy (ALBOP) email listserv, comprising a comprehensive roster of registered pharmacists within the state. Potential participants were contacted via email with a maximum of three contact attempts, inviting pharmacists to participate in an anonymous online survey via Qualtrics, with recruitment spanning a window of 1–2 months including the initial invitation plus two reminders. Recruitment emails included an Information Letter detailing the study's purpose, benefits, minimal risks, and instructions for participation, alongside a link to the online survey. Given that the ALBOP email listserv does not specify pharmacy employment setting (community, hospital, etc), participant eligibility was ensured at the beginning of the survey via two screening questions, including *"Are you a registered pharmacist in the state of Alabama? (Yes/No)"* and *"Are you employed in a community pharmacy located in Alabama? (Yes/No)."* Informed consent was inferred through participants' voluntary submission of survey questions. Upon survey completion, participants had the opportunity to enter a raffle for one of two $50 gift cards as compensation. The study received ethical approval from the corresponding authors' Institutional Review Board (protocol number 21–264 EX 2106).

2.2. Data collection and measures

An anonymous online survey was distributed via email to assess naloxone training and education, policies, procedures, and preferences in corporately-owned versus independently-owned Alabama community pharmacies. The survey instrument was developed by the investigators and informed by previous work regarding naloxone education and training (Hohmann et al., 2023) and in-house versus outsourced program inputs (Hohmann et al., 2020). The survey was pre-tested for face and content validity among subject matter experts (n = 2) in the corresponding author's department, and the survey was revised according to feedback prior to distribution. Primary outcome measures encompassed several domains: 1) naloxone training history (6-item multiple-choice, 1-item free-response); 2) in-house versus outsourced naloxone education/training topics (13-item multiple-choice); 3) naloxone training preferences (5-item multiple-choice); and 4) perceived usefulness of naloxone education sources (14-item Likert scale

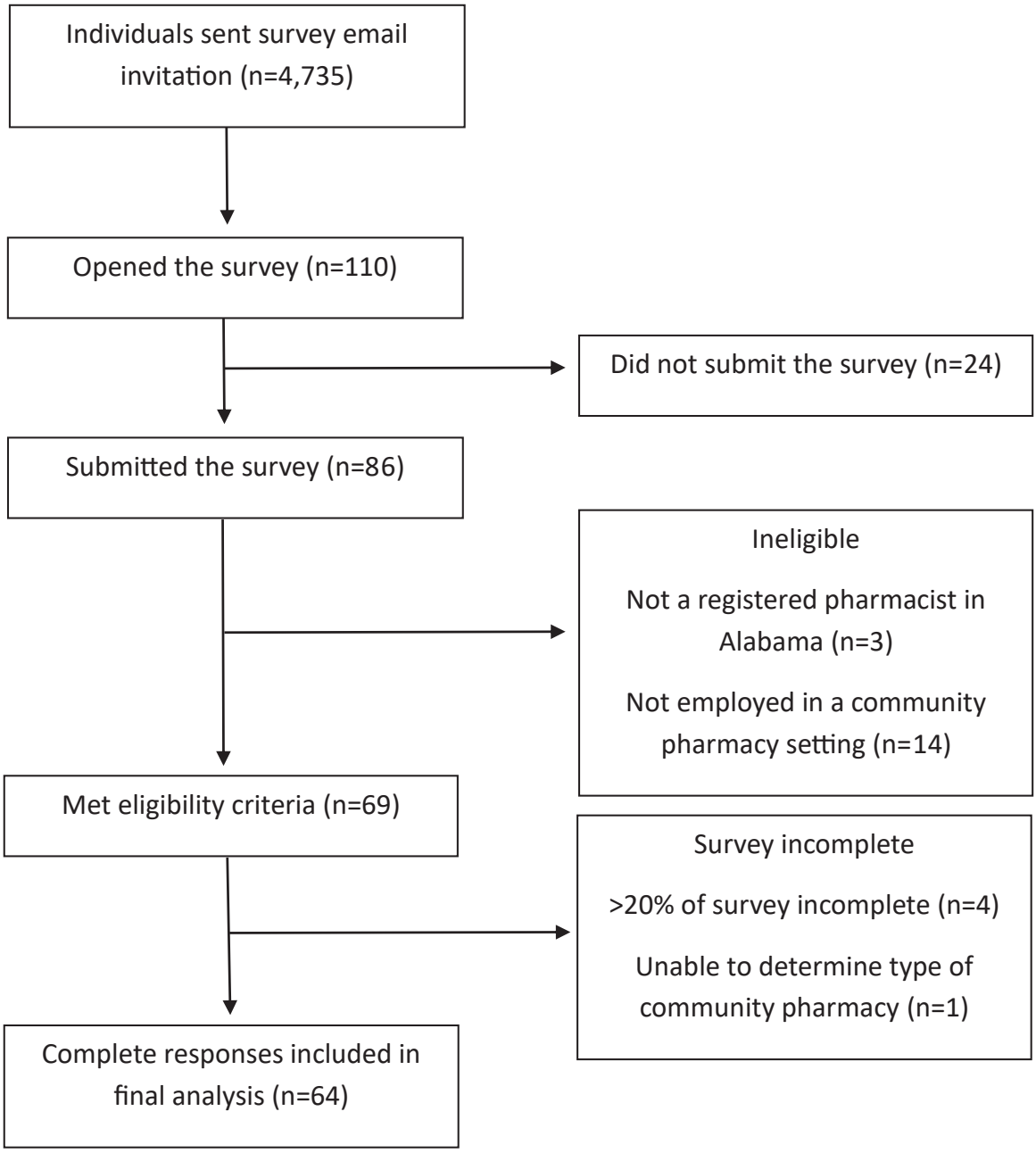

Fig. 1. Participant flow.

from 1 =strongly disagree to 5 =strongly agree). Naloxone training history included dichotomous (yes/no) questions assessing past receipt of naloxone training, employer-based training mandates, naloxone education topics received (e.g., state and federal naloxone laws), training sources, format, and types of personnel trained by the pharmacy employer. Hours of naloxone education received was also assessed. Among those who responded "Yes" to receiving naloxone training, provision of training topics in-house (the pharmacy employer) or via an outsourced provider (e.g., a professional society) was assessed via three response options (in-house, outsourced, or not applicable) for each of 13 educational topics. Further, naloxone training preferences were measured by asking participants to select their single most preferred naloxone education source, provider (in-house versus outsourced), format, setting, and duration. Perceived usefulness of naloxone education sources was evaluated by asking participants to respond to the prompt, *"This is my 'Go-To' source about naloxone"* for each of 14 potential information sources. Additionally, demographic information was collected including participants' gender, age, race, ethnicity, type of community pharmacy practice, pharmacy location (county), and employment position within the pharmacy, e.g., full-time, part-time, managerial. Pharmacy location was classified as either rural or urban based on the Alabama Rural Health Association (ARHA) designations by county (Alabama Rural Health Association, 2018). The full survey instrument can be found in Supplemental File 1.

2.3. Data analysis

Descriptive statistics were used to summarize participant characteristics, including demographic information and pharmacy affiliation. Demographic characteristics between pharmacist respondents from corporate and independent pharmacies were compared using Fisher's exact tests for categorical variables, as well as Mann-Whitney U-tests for continuous variables. To evaluate differences in naloxone training history, preferences, and perceived usefulness of naloxone education

sources between corporate and independent pharmacies, Mann-Whitney U-tests and Fisher's exact tests with post-hoc z-test of proportions were utilized when appropriate. All statistical analyses were conducted using SPSS Statistics version 29 software (IBM Corp, Armonk, New York) (IBM Corp, 2023) with a priori significance set at $p < 0.05$.

3. Results

Of the 4735 pharmacists emailed, 110 clicked on the survey, and 86 submitted the survey (1.82 % response rate) (Fig. 1). Of submitted surveys, 69 met the eligibility criteria, with 64 complete responses (1.35 % useable response rate; 92.75 % completion rate). Analyses were conducted on a final sample of N = 64, with incomplete responses omitted from analysis. The majority of respondents were female (67.2 %), White (95.3 %), with a mean (SD) age of 41.9 (8.6) years, and employed as a staff pharmacist (39.1 %) or pharmacy manager (39.1 %) (Table 1). Forty-two (65.63 %) were located in corporately-owned (chain) community pharmacies with 22 (34.38 %) in independently-owned (independent) community pharmacies. The majority of chains were located in urban areas (71.4 %), while independents were evenly split between rural (50.0 %) and urban (50.0 %) locations. A greater proportion of females were employed in chain (78.6 %) versus independent pharmacies (45.5 %; $p < 0.05$). No other statistically significant differences existed between pharmacy types.

Table 1
Participating pharmacist demographics (N = 64).

Item	n (%)[a]		
	All (N = 64)	Chain (N = 42)	Independent (N = 22)
Gender			
Male	21 (32.8)	9 (21.4)	12 (54.5)
Female[b]	43 (67.2)	33 (78.6)	10 (45.5)
Race			
Asian	1 (1.6)	1 (2.4)	-
Black or African American	2 (3.1)	2 (4.8)	-
White	61 (95.3)	39 (92.9)	22 (100.0)
Ethnicity			
Hispanic	2 (3.2)	1 (2,4)	1 (4.8)
Non-Hispanic	59 (93.7)	40 (95.2)	19 (90.5)
Position in the Pharmacy			
Pharmacy manager or	25 (39.1)	19 (45.2)	6 (27.3)
pharmacist-in-charge	2 (3.1)	2 (4.8)	-
Assistant pharmacy	16 (25.0)	12 (28.6)	4 (18.2)
manager	9 (14.1)	6 (14.3)	3 (13.6)
Full-time staff pharmacist	4 (6.3)	3 (7.1)	1 (4.5)
Part-time staff pharmacist	1 (1.6)	-	1 (4.5)
Floater pharmacist	7 (10.9)	N/A	7 (31.8)
Clinical pharmacist			
Pharmacy owner			
Type of community pharmacy			
Independently-owned single	15 (23.4)	N/A	15 (68.2)
store	7 (10.9)	N/A	7 (31.8)
Independently-owned	20 (31.3)	20 (47.6)	N/A
multi-store	16 (25.0)	16 (38.1)	N/A
Corporately-owned chain	6 (9.4)	6 (14.3)	N/A
(e.g. CVS)			
Mass merchandiser (e.g.			
Target)			
Grocery (e.g. Publix)			
Pharmacy Location			
Rural	23 (35.9)	12 (28.6)	11 (50.0)
Urban	41 (64.1)	30 (71.4)	11 (50.0)
	Mean (SD)		
Age, years	41.9 (8.6)	40.43 (6.8)	44.6 (11.0)

Abbreviations Used: N/A = Not Applicable.
[a] Frequencies and percentages may differ due to item non-response.
[b] Chain and independent pharmacies differ significantly from each other at the alpha= 0.05 level.

3.1. Naloxone training, policies, and procedures

3.1.1. Receipt of naloxone training

Overall, 90.6 % of respondents reported receiving naloxone training, while 9.4 % did not (Table 2). A statistically significant difference was found in the receipt of naloxone training between independent and chain pharmacies ($p = 0.016$), with pharmacists in chain pharmacies more likely to have received naloxone training (97.6 %) compared to those in independent pharmacies (77.3 %). Pharmacists received an average of 3.8 hours (SD = 3.1) of naloxone education overall with an average of 4.2 hours (SD = 3.1) in chain pharmacies and 2.8 hours (SD = 3.0) in independent pharmacies ($p = 0.072$). Respondents reported that the majority of pharmacy personnel receiving naloxone training at their organizations were pharmacists (54.7 %), followed by technicians (26.6 %), student pharmacists (23.4 %), residents (3.1 %), and cashiers (3.1 %).

3.1.2. Employer-mandated training

Overall, 68.9 % of respondents reported that naloxone training for pharmacy personnel was mandated at their workplace (Table 2). There was a statistically significant difference between naloxone training requirements between chain and independent pharmacies. Specifically, 96.8 % of respondents at chain pharmacies reported mandated training, compared to only 7.1 % at independent pharmacies ($p < 0.001$).

3.1.3. Naloxone education topics received

The most frequent naloxone-related education topics received by pharmacists overall included patient counseling tips (59.4 %), Alabama's statewide naloxone standing order (57.8 %), naloxone administration techniques (57.8 %), and naloxone dosage forms (56.3 %), while the least frequent topics included evaluation of naloxone dispensing activities for quality improvement (17.2 %) and reimbursement for naloxone provision (14.1 %) (Table 2). Pharmacists employed in chain versus independent pharmacies more often received training related to the statewide standing order (71.4 % vs 31.8 %; $p < 0.001$), naloxone dispensing workflow procedures (59.5 % vs 18.2 %; $p = 0.001$), how to respond to an opioid overdose (64.3 % vs 36.4 %; $p = 0.012$), naloxone administration techniques (66.7 % vs 40.9 %; $p = 0.005$), naloxone dosage forms (64.3 % vs 40.9 %; $p = 0.013$), counseling tips (66.7 % vs 45.5 %; $p = 0.015$), patient communication strategies (57.1 % vs 31.8 %; $p = 0.019$), and strategies to enhance implementation of naloxone services (50.0 % vs 9.1 %; $p = 0.001$).

3.1.4. Sources and formats of naloxone training received

Overall, 42.2 % of survey respondents reported receiving some type of naloxone training from their pharmacy employer. Other common sources of education included pharmacy continuing education organizations such as *Pharmacy Times* (31.3 %), pharmacy professional associations (29.7 %), and the naloxone drug label or monograph (23.4 %) (Table 2). The least frequent sources of education included the Veterans Affairs Administration and not-for-profit naloxone education coalitions, each at 1.6 %. Interestingly, pharmacists employed in chain versus independent pharmacies more often received training through their employer (59.5 % vs 9.1 %; $p < 0.001$) and less often utilized online blogs, articles, or websites for naloxone education (0 vs 13.6 %; $p = 0.034$).

In terms of training format, online self-study was most common across pharmacy types (70.4 %), followed by live online webinars (31.3 %), paper-based continuing education (10.9 %), and live in-person training (6.2 %). Chain pharmacy employers more often provided online self-study training related to naloxone (57.1 %) compared to their independent counterparts (4.5 %; $p < 0.001$).

3.1.5. In-house versus outsourced naloxone education topics received

Respondents were asked about 13 naloxone education topics and whether they received training for these topics through their employer

Table 2
Alabama pharmacists' naloxone training history (N = 64).

Question	n (%)[a]			p-value[b]
	All (N = 64)	Chain (N = 42)	Independent (N = 22)	
Received naloxone training				0.016*
Yes	58 (90.6)	41 (97.6)	17 (77.3)	
No	6 (9.4)	1 (2.4)	5 (22.7)	
Naloxone education mandated by employer				< 0.001*
Yes	31 (68.9)	30 (96.8)	1 (7.1)	
No	14 (31.1)	1 (3.2)	13 (92.9)	
Naloxone education topics received†				
State and federal naloxone laws / regulations	31 (48.4)	22 (52.4)	9 (40.9)	0.172
Criminal and/or civil liability laws (e.g. good Samaritan Law)	28 (43.8)	20 (47.6)	8 (36.4)	0.200
Alabama's statewide naloxone standing order	37 (57.8)	30 (71.4)	7 (31.8)	< 0.001*
Dispensing workflow procedures	29 (45.3)	25 (59.5)	4 (18.2)	0.001*
How to respond to an opioid overdose, e.g. CPR	35 (54.7)	27 (64.3)	8 (36.4)	0.012*
Naloxone administration techniques	37 (57.8)	28 (66.7)	9 (40.9)	0.005*
Naloxone dosage forms	36 (56.3)	27 (64.3)	9 (40.9)	0.013*
Naloxone mechanism of action, pharmacology, or pharmacokinetics	30 (45.9)	23 (54.8)	7 (31.8)	0.067
Naloxone counseling tips	38 (59.4)	28 (66.7)	10 (45.5)	0.015*
Patient communication strategies	31 (48.4)	24 (57.1)	7 (31.8)	0.019*
Strategies to enhance implementation of naloxone services	23 (35.9)	21 (50.0)	2 (9.1)	0.001*
Reimbursement for naloxone	9 (14.1)	8 (19.0)	1 (4.5)	0.223
Evaluation of naloxone dispensing activities for quality improvement	11 (17.2)	10 (23.8)	1 (4.5)	0.122
Sources from which naloxone education was received†				
Your pharmacy employer	27 (42.2)	25 (59.5)	2 (9.1)	< 0.001*
Alabama Board of Pharmacy	8 (12.5)	6 (14.3)	2 (9.1)	1.000
Alabama Department of Public Health	12 (18.8)	10 (23.8)	2 (9.1)	0.271
Centers for Disease Control and Prevention (CDC)	8 (12.5)	6 (14.3)	2 (9.1)	0.694
Veterans Affairs Administration (VA)	1 (1.6)	1 (2.4)	-	1.000
Pharmacy professional association(s)	19 (29.7)	11 (26.2)	8 (36.4)	0.753
Not-for-profit naloxone education coalitions, e.g. PrescribetoPrevent	1 (1.6)	-	1 (4.5)	0.324
Pharmacy continuing education organizations; e.g. *Pharmacy Times*	20 (31.3)	14 (33.3)	6 (27.3)	0.744
College(s) of pharmacy	10 (15.6)	8 (19.0)	2 (9.1)	0.693
Naloxone drug label or monograph	15 (23.4)	8 (19.0)	7 (31.8)	0.310
Drug representative	-	-	-	-
Naloxone manufacturer website(s)	8 (12.5)	4 (9.5)	4 (18.2)	0.402
Online blogs, articles, or websites	3 (4.7)	-	3 (13.6)	0.034*
Books or journal articles	3 (4.7)	2 (4.8)	1 (4.5)	1.000
Other	4 (6.3)	3 (7.1)	1 (4.5)	1.000
Format of naloxone education provided or suggested by pharmacy employer†				
Online or computer-based self-study provided by your pharmacy	25 (39.1)	24 (57.1)	1 (4.5)	< 0.001*
Online or computer-based self-study from an outside organization	20 (31.3)	14 (33.3)	6 (27.3)	0.741
Online or computer-based live webinar provided by your pharmacy	9 (14.1)	8 (19.0)	1 (4.5)	0.225
Online or computer-based live webinar provided by an outside org.	11 (17.2)	10 (23.8)	1 (4.5)	0.060
In-person training provided by your pharmacy	2 (3.1)	2 (4.8)	-	1.000
In-person training provided by an outside organization	2 (3.1)	2 (4.8)	-	1.000
Paper-based continuing education provided by your pharmacy	5 (7.8)	4 (9.5)	1 (4.5)	1.000
Paper-based continuing education provided by an outside org.	2 (3.1)	1 (2.4)	1 (4.5)	0.538
No training provided or suggested by your pharmacy	9 (14.1)	1 (2.4)	8 (36.4)	< 0.001*
Types of employees provided or suggested naloxone education†				
Pharmacists	35 (54.7)	28 (66.7)	7 (31.8)	< 0.001*
Technicians	17 (26.6)	12 (28.6)	5 (22.7)	1.000
Cashiers	2 (3.1)	-	2 (9.1)	0.099
Interns or student pharmacists	15 (23.4)	12 (28.6)	3 (13.6)	0.294
Residents	2 (3.1)	-	2 (9.1)	0.099
No training provided or suggested by your pharmacy	9 (14.1)	1 (2.4)	8 (36.4)	< 0.001*
	Mean (SD)			**p-value**[c]
Hours of naloxone education received	3.8 (3.1)	4.2 (3.1)	2.8 (3.0)	0.072

* Statistically significant at the alpha= 0.05 threshold. †Respondents were instructed to select all options that applied. Response options dichotomized (Yes/No).
[a] Frequencies and percentages may differ due to item non-response.
[b] Results of 2-sided Fisher's Exact test.
[c] Results of 2-sided Mann-Whitney *U* test.

(in-house) or through an outside source (outsourced) (Table 3). On average, respondents received 6.9 (SD = 4.9) topics in-house and 4.0 (SD = 4.8) topics through outsourcing. Notably, chain pharmacies received more naloxone education topics in-house (mean [SD] topics: 8.5 [4.2]) than independent pharmacies (3.7 [4.9]; p = 0.003), while independents received more topics via outsourcing compared to chains (6.3 [5.9] vs 3.0 [4.1]; p = 0.045). Specifically, chain pharmacists versus independent pharmacists were more likely to receive training in-house on Alabama's statewide naloxone standing order (74.2 % vs 27.3 %; p = 0.011), how to respond to an opioid overdose (69.0 % vs 33.3 %; p = 0.045), naloxone dispensing workflow procedures (96.6 % vs 44.4 %; p = 0.001), strategies to enhance implementation of naloxone services (76.9 % vs 33.3 %; p = 0.038), and evaluation of naloxone dispensing activities for quality improvement (85.0 % vs 33.3 %; p = 0.028).

3.2. Naloxone training preferences

3.2.1. Preferences for and perceived usefulness of naloxone training sources

Overall, the most preferred source for naloxone training across

pharmacy types was pharmacy continuing education organizations such as *Pharmacy Times* (24.0 %), followed by pharmacy professional associations (16.0 %), the Alabama Board of Pharmacy (10.0 %), and the naloxone drug label or monograph (10.0 %) (Table 4). While there were no statistically significant differences in the most preferred training sources across pharmacy types, chain pharmacists more often preferred in-house naloxone education providers (58.6 %) compared to independent pharmacists (13.3 %; $p = 0.005$). Likewise, more independent versus chain pharmacists preferred outsourced naloxone education providers (86.7 % vs 41.4 %; $p = 0.005$). Furthermore, mean [SD] perceived usefulness of training sources was lower for employer-based training (2.93 [0.96] vs 3.90 [1.01]; $p = 0.003$), the Alabama Department of Public Health (2.87 [1.19] vs 3.66 [0.90]; $p = 0.024$), and the Veterans Affairs Administration (1.60 [0.91] vs 2.41 [0.98]; $p = 0.013$) amongst independents compared to chains (Table 5).

3.2.2. *Preferences for naloxone training format, setting, and duration*

Pharmacists, regardless of pharmacy type, preferred one-hour naloxone training sessions (61.4 %), with the most favored format being online self-study (47.7 %). This was followed by live in-person training (29.5 %), live webinars (15.9 %), and paper-based self-study (6.8 %) (Table 4). Further, while most pharmacists overall preferred to complete naloxone training outside of work during paid professional development time (43.2 %), 58.6 % of chains versus 13.3 % of independents preferred this option ($p = 0.015$). In contrast, 46.7 % of independents preferred to complete naloxone training outside of work on their own time compared to 17.2 % of chains ($p = 0.015$).

4. Discussion

Notably, chain and independent pharmacies contrast in their training requirement mandates. While most pharmacists surveyed reported receipt of naloxone training, over 96 % of chain pharmacists reported that training requirements were mandated compared to 7 % for independent pharmacists. This highlights a clear policy difference between chain and independent pharmacies. This finding may affect the quality of naloxone education for patients, as studies have shown that mandated training can enhance pharmacists' confidence and willingness to dispense naloxone (Freeman et al., 2017; Thornton et al., 2017). However, given recent reports of pharmacist burnout and stress in the workplace (Schommer et al., 2022), careful consideration should be given before any naloxone training mandates are enacted within pharmacies. Additionally, the common topics included in naloxone education for Alabama pharmacists were consistent with those identified in a previous literature review (Carpenter et al., 2018). These included patient counseling information, administration, and standing order information. Chain pharmacists received a more robust training that more often included dispensing workflow procedures and patient communication strategies, as well as strategies to enhance implementation of naloxone services. One reason for the more extensive training in chain pharmacies may be the higher frequency of naloxone dispensing compared to independents, which creates a greater perceived need for thorough training (Freibott et al., 2024; Sisson et al., 2019). Independent pharmacies may wish to consider developing standardized naloxone training for their pharmacists, particularly focused around workflow and communication strategies. Furthermore, the recent approval of OTC naloxone (Harris, 2023) presents an opportunity for additional training topics across both chain and independent pharmacies, especially in light of potential changes to workflow and communication.

Approximately half of the respondents received employer-provided training, but the source and format varied between pharmacy types. Chain pharmacies were more likely to receive training from their employer (in-house), and the most common type of training provided was online self-study programs. Potential explanations for this finding include potential financial concerns for independent pharmacies when paying for employee naloxone training, as well as time concerns. Chain pharmacies may have more ability within their corporate infrastructure to pay for online naloxone training programs compared to independent businesses. Furthermore, corporate pharmacies have a greater ability to distribute training videos made from their national sites, as evidenced by Walgreens' naloxone dispensing program (Shafer et al., 2017). A similar study found that chain pharmacy training often consisted of verbal and written instructions, while independent pharmacies more often provided no training or verbal instructions only (Sisson et al., 2019). This adds validity to the claim that independent pharmacies may

Table 3
In-House versus Outsourced Naloxone Education / Training Topics (N = 58) †.

Item	n (%)[a]						
	All (N = 58)		Chain (N = 41)		Independent (N = 17)		p-value[b]
	In-house	Outsource	In-house	Outsource	In-house	Outsource	
State and federal naloxone laws / regulations	21 (53.8)	18 (46.2)	17 (60.7)	11 (39.3)	4 (36.4)	7 (63.6)	0.285
Criminal and/or civil liability laws (e.g. good Samaritan Law)	19 (54.3)	16 (45.7)	16 (64.0)	9 (36.0)	3 (30.0)	7 (70.0)	0.132
Alabama's statewide naloxone standing order	26 (60.5)	17 (39.5)	23 (74.2)[c]	8 (25.8)[d]	3 (27.3)[c]	8 (72.7)[d]	0.011*
Dispensing workflow procedures	32 (84.2)	6 (15.8)	28 (96.6)[c]	1 (3.4)[d]	4 (44.4)[c]	5 (55.6)[d]	0.001*
How to respond to an opioid overdose, e.g. CPR	24 (58.5)	17 (41.5)	20 (69.0)[c]	9 (31.0)[d]	4 (33.3)[c]	8 (66.7)[d]	0.045*
Naloxone administration techniques	25 (58.1)	18 (41.9)	21 (67.7)	10 (32.3)	4 (36.4)	7 (63.6)	0.086
Naloxone dosage forms	25 (61.0)	16 (39.0)	21 (72.4)	8 (27.6)	4 (36.4)	7 (63.6)	0.065
Naloxone mechanism of action, pharmacology, or pharmacokinetics	20 (55.6)	16 (44.4)	17 (63.0)	10 (37.0)	3 (33.3)	6 (66.7)	0.146
Naloxone counseling tips	27 (64.3)	15 (35.7)	22 (73.3)	8 (26.7)	5 (45.5)	6 (54.5)	0.140
Patient communication strategies	29 (70.7)	12 (29.3)	23 (76.7)	7 (23.3)	6 (54.5)	5 (45.5)	0.247
Strategies to enhance implementation of naloxone services	23 (65.7)	12 (34.3)	20 (76.9)[c]	6 (23.1)[d]	3 (33.3)[c]	6 (66.7)[d]	0.038*
Reimbursement for naloxone	17 (70.8)	7 (29.2)	14 (82.4)	3 (42.9)	3 (17.6)	4 (57.1)	0.134
Evaluation of naloxone dispensing activities for quality improvement	19 (73.1)	7 (26.9)	17 (85.0)[c]	3 (15.0)[d]	2 (33.3)[c]	4 (66.7)[d]	0.028*
	Mean (SD)						p-value[e]
	All		Chain		Independent		
Number of Naloxone Education Topics Provided In-House	6.9 (4.9)		8.5 (4.2)		3.7 (4.9)		0.003*
Number of Naloxone Education Topics Provided via Outsourcing	4.0 (4.8)		3.0 (4.1)		6.3 (5.9)		0.045*

† These items were only displayed to participants who responded "Yes" to receiving naloxone training.
* Statistically significant at the alpha= 0.05 threshold.
[a] Frequencies and percentages may differ due to item non-response.
[b] Results of 2-sided Fisher's Exact test.
[c] In-house chain and independent pharmacy proportions differ significantly from each other at the alpha= 0.05 level (z-test of proportions).
[d] Outsourced chain and independent pharmacy proportions differ significantly from each other at the alpha= 0.05 level (z-test of proportions).
[e] Results of 2-sided Mann-Whitney *U* test.

Table 4
Alabama pharmacists' naloxone training preferences (N = 64).

Question	n (%)[a]			p-value[b]
	All (N = 64)	Chain (N = 42)	Independent (N = 22)	
MOST PREFERRED source for naloxone education				0.527
Your pharmacy	3 (6.0)	3 (9.7)	-	
employer	5 (10.0)	2 (6.5)	3 (15.8)	
Alabama Board of	3 (6.0)	2 (6.5)	1 (5.3)	
Pharmacy	3 (6.0)	3 (9.7)	-	
Alabama Department of	-	-	-	
Public Health	8 (16.0)	5 (16.1)	3 (15.8)	
Centers for Disease	-	-	-	
Control and Prevention	12 (24.0)	5 (16.1)	7 (36.8)	
(CDC)	2 (4.0)	1 (3.2)	1 (5.3)	
Veterans Affairs	5 (10.0)	4 (12.9)	1 (5.3)	
Administration (VA)	-	-	-	
Pharmacy professional	4 (8.0)	3 (9.7)	1 (5.3)	
association(s)	2 (4.0)	1 (3.2)	1 (5.3)	
Not-for-profit naloxone	1 (2.0)	-	1 (5.3)	
education coalitions, e.	2 (4.0)	2 (6.5)	-	
g. PrescribetoPrevent				
Pharmacy continuing				
education				
organizations; e.g.				
Pharmacy Times				
College(s) of pharmacy				
Naloxone drug label or				
monograph				
Drug representative				
Naloxone manufacturer				
website(s)				
Online blogs, articles, or				
websites				
Books or journal articles				
Other				
MOST PREFERRED naloxone education provider				0.005*
In-house	19 (43.2)	17 (58.6)[c]	2 (13.3)[c]	
Outsourced	25 (56.8)	12 (41.4)[c]	13 (86.7)[c]	
MOST PREFERRED format for naloxone education				0.529
Online self-study	21 (47.7)	13 (44.8)	8 (53.3)	
Online live webinar	7 (15.9)	5 (17.2)	2 (13.3)	
Paper-based self-study	3 (6.8)	1 (3.4)	2 (13.3)	
Live in-person	13 (29.5)	10 (34.5)	3 (20.0)	
MOST PREFERRED setting for completing naloxone training / education				0.015*
At work during business	11 (25.0)	6 (20.7)	5 (33.3)	
hours	2 (4.5)	1 (3.4)	1 (6.7)	
At work before or after	12 (27.3)	5 (17.2)[c]	7 (46.7)[c]	
business hours	19 (43.2)	17 (58.6)[c]	2 (13.3)[c]	
Outside of work on your				
own time				
Outside of work during				
paid professional				
development time				
MOST PREFERRED duration / length of naloxone education activity				0.824
< 1 hour	9 (20.5)	6 (20.7)	3 (20.0)	
1 hour	27 (61.4)	17 (58.6)	10 (66.7)	
2 hours	6 (13.6)	5 (17.2)	1 (6.7)	
3 hours	-	-	-	
> 3 hours	2 (4.5)	1 (3.4)	1 (6.7)	

* Statistically significant at the alpha= 0.05 threshold.
[a] Frequencies and percentages may differ due to item non-response.
[b] Results of 2-sided Fisher's Exact test.
[c] Chain and independent pharmacy proportions differ significantly from each other at the alpha= 0.05 level (z-test of proportions).

not have the means to furnish formal naloxone courses. Additionally, similar studies regarding implementation of pharmacist training programs found that finding time to complete the training within the workday was a barrier, which may result in less formal training being utilized to save time (Devries et al., 2017; Rodriguez et al., 2016). Indeed, the current study found that pharmacists completed roughly three to four hours of naloxone training on average, which is a considerable time commitment, perhaps driven by a required six hours of live general continuing education for pharmacist license renewal in Alabama (Alabama Board Of Pharmacy, 2025). Utilization of training videos and materials that are free to the public via harm reduction organizations like "Prescribe to Prevent" (Prescribe to Prevent, 2022) and "Respond to Prevent" (Green et al., 2022; Respond to Prevent, 2025) may be a feasible way for independent pharmacies to provide naloxone training to their pharmacists. Recent studies also found academic detailing, which consists of provision of evidence-based information to individual healthcare providers by trained educators (Christensen et al., 2025), to be a successful method to drive change related to naloxone and opioid harm reduction strategies in community pharmacies (Evoy et al., 2020; Irwin et al., 2023; Meyerson et al., 2024), suggesting that this may be a feasible outsourced option for incorporating naloxone training in pharmacies. Community pharmacies may consider partnering with local health systems, schools and colleges of pharmacy, and state pharmacy organizations to obtain these academic detailing services (Irwin et al., 2023). Partnerships with local health departments that offer regular naloxone education and training sessions may offer an additional free/low-cost opportunity for pharmacists to receive training (Alabama Department of Public Health, 2025). Interestingly, compared to chains, independent pharmacists perceived their employers, the Alabama Department of Public Health, and Veterans Affairs Administration as less useful sources of naloxone education, perhaps due to less experience with training from these organizations. Additional marketing or education to enhance awareness of public health resources may thus be beneficial prior to independent pharmacies engaging in training partnerships with local health departments.

Pharmacists in all settings preferred online training delivered in a self-study format, which is consistent with previous literature (Lai Joyce Chun et al., 2019). However, one analysis of online naloxone training in 13 states found that the online format contained limited content on how to communicate with patients and caregivers, which may result in reduced patient understanding (Carpenter et al., 2018). Further research should focus on the differences in patient knowledge and understanding for those dispensed naloxone from a pharmacist that was trained via online format versus in-person training.

Findings from the current study suggest that future educational programs could be developed to increase naloxone training availability in both chain and independent pharmacies. Specifically, focuses should be targeted towards independent pharmacies where there is more opportunity to implement training services. In previous research, it was found that pharmacies where pharmacists received naloxone continuing education in the past 2 years were 1.3 times more likely to stock naloxone than those without training (Meyerson et al., 2018). This sheds light on the importance of expanding naloxone training programs to increase the incidence of naloxone provision overall. Expanding and developing training programs that incorporate the preferences expressed by pharmacists in the current study may lead to greater uptake in chain and independent pharmacies, potentially resulting in greater naloxone distribution. Future studies may wish to investigate methods to enhance implementation of naloxone training programs as well as standardization of materials taught in both chain and independent pharmacies, given that it is widely variable across the state (Roberts et al., 2019).

4.1. Limitations

This cross-sectional survey design limits the ability to draw causal

Table 5
Perceived Usefulness of Naloxone Education Sources (N = 64).

Question *"This is my 'Go-To' Source about naloxone…"*	n (%)[a] Mean (SD)															p-value[b]
	All (N = 64)					Chain (N = 42)					Independent (N = 22)					
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
Your pharmacy employer	3 (86.8)	2 (4.5)	15 (34.1)	15 (34.1)	9 (20.5)	1 (3.4)	1 (3.4)	7 (24.1)	11 (37.9)	9 (31.0)	2 (13.3)	1 (6.7)	8 (53.3)	4 (26.7)	-	
	3.51 (1.14)					3.90 (1.01)					2.93 (0.96)					0.003*
Alabama Board of Pharmacy	1 (2.3)	4 (9.3)	9 (20.9)	23 (53.5)	6 (14.0)	1 (3,6)	3 (10.7)	6 (21.4)	14 (50.0)	4 (14.3)	-	1 (6.7)	3 (20.0)	9 (60.0)	2 (13.3)	
	3.68 (0.91)					3.61 (0.99)					3.80 (0.78)					0.637
Alabama Department of Public Health	4 (9.1)	4 (9.1)	10 (22.7)	23 (52.3)	3 (6.8)	1 (3.4)	2 (10.3)	6 (20.7)	17 (58.6)	3 (10.3)	3 (20.0)	2 (13.3)	4 (26.70	6 (40.0)	-	
	3.33 (1.11)					3.66 (0.90)					2.87 (1.19)					0.024*
Centers for Disease Control and Prevention (CDC)	5 (11.4)	4 (9.1)	13 (29.5)	15 (34.1)	7 (15.9)	2 (6.9)	3 (10.3)	9 (31.0)	9 (31.0)	6 (20.7)	3 (20.0)	1 (6.7)	4 (26.7)	6 (40.0)	1 (6.7)	
	3.29 (1.24)					3.48 (1.15)					3.07 (1.28)					0.365
Veterans Affairs Administration (VA)	17 (38.6)	7 (15.9)	17 (38.6)	3 (6.8)	-	7 (24.1)	6 (20.7)	13 (44.8)	3 (10.3)	-	10 (66.7)	1 (6.7)	4 (26.7)	-	-	
	2.11 (1.03)					2.41 (0.98)					1.60 (0.91)					0.013*
Pharmacy professional association(s)	1 (2.3)	3 (6.8)	4 (9.1)	24 (54.5)	12 (27.3)	1 (3.4)	3 (10.3)	4 (13.8)	13 (44.8)	8 (27.6)	-	-	-	11 (73.3)	4 (26.7)	
	3.91 (1.02)					3.83 (1.07)					4.27 (0.46)					0.269
Not-for-profit naloxone education coalitions, e.g. PrescribetoPrevent.org	8 (18.2)	6 (13.6)	16 (35.4)	13 (29.5)	1 (2.3)	6 (20.7)	5 (17.2)	10 (34.5)	8 (27.6)	-	2 (13.3)	1 (6.7)	6 (40.0)	5 (33.3)	1 (6.7)	
	2.80 (1.14)					2.69 (1.11)					3.13 (1.13)					0.243
Pharmacy continuing education organizations, e.g. *Pharmacy Times*	1 (2.3)	2 (4.5)	8 (18.2)	20 (45.5)	13 (29.5)	1 (3.4)	1 (3.4)	7 (24.1)	12 (41.4)	8 (27.6)	-	1 (6.7)	1 (6.7)	8 (53.3)	5 (33.3)	
	3.96 (0.93)					3.86 (0.99)					4.13 (0.83)					0.381
College(s) of pharmacy	4 (9.1)	4 (9.1)	8 (18.2)	20 (45.5)	8 (18.2)	4 (13.8)	3 (10.3)	4 (13.8)	12 (41.4)	6 (20.7)	-	1 (6.7)	4 (26.7)	8 (53.3)	2 (13.3)	
	3.9 (1.22)					3.45 (1.33)					3.73 (0.80)					0.778
Naloxone drug label or monograph	1 (2.3)	1 (2.3)	8 (18.2)	14 (31.8)	20 (45.5)	-	-	5 (17.2)	9 (31.0)	15 (51.7)	1 (6.7)	1 (6.7)	3 (20.0)	5 (33.3)	5 (33.3)	
	4.18 (0.96)					4.34 (0.77)					3.80 (1.21)					0.159
Drug representative	18 (41.9)	5 (11.6)	9 (20.9)	10 (23.3)	1 (2.3)	13 (46.4)	3 (10.7)	8 (28.6)	4 14.3)	-	5 (33.3)	2 (13.3)	1 (6.7)	6 (40.0)	1 (6.7)	
	2.30 (1.30)					2.11 (1.17)					2.73 (1.49)					0.134
Naloxone manufacturer website(s)	4 (9.1)	5 (11.4)	7 (15.9)	18 (40.9)	10 (22.7)	3 (10.3)	4 (13.8)	4 (13.8)	12 (41.4)	6 (20.7)	1 (6.7)	1 (6.7)	3 (20.0)	6 (40.0)	4 (26.7)	
	3.60 (1.23)					3.48 (1.27)					3.73 (1.16)					0.579
Online blogs, articles, or websites	6 (13.6)	10 (22.7)	13 (29.5)	11 (25.0)	4 (9.1)	6 (20.7)	6 (20.7)	9 (31.0)	5 (17.2)	3 (10.3)	-	4 (26.7)	4 (26.7)	6 (40.0)	1 (6.7)	
	2.89 (1.21)					2.76 (1.27)					3.27 (0.96)					0.182
Books or journal articles	5 (11.4)	4 (9.1)	11 (25.0)	21 (47.7)	3 (6.8)	2 (6.9)	4 (13.8)	8 (27.6)	14 (48.3)	1 (3.4)	3 (20.0)	-	3 (20.0)	7 (46.7)	2 (13.3)	
	3.31 (1.10)					3.28 (1.00)					3.33 (1.35)					0.630
Other	1 (5.3)	-	13 (68.4)	2 (10.5)	3 (15.8)	-	-	10 (71.4)	1 (7.1)	3 (21.4)	-	1 (20.0)	3 (60.0)	1 (20.0)	-	
	3.37 (0.83)					3.50 (0.86)					3.00 (0.71)					0.376
	Mean (SD)															p-value[b]
Avg. Total Scale Score	3.31 (0.54)					3.35 (0.54)					3.30 (0.48)					0.755

1 =strongly disagree; 2 =disagree; 3 =neutral; 4 =agree; 5 =strongly agree.
* Statistically significant at the alpha= 0.05 threshold.
[a] Frequencies and percentages may differ due to item non-response.
[b] Results of 2-sided Mann-Whitney *U* test.

conclusions. Future longitudinal studies could track changes in patient outcomes following pharmacist naloxone training. Additionally, while these findings are specific to Alabama, they may be applicable to other southern states with similar demographics. Future studies can expand participant eligibility to states beyond Alabama. Further, the gender demographics were similar to the United States population (67.2 % vs. 63.6 % female nationally), but the percentage of White respondents was higher than the national average (95.3 % vs. 77.4 % White nationally) (David et al., 2023). Findings may not be generalizable to pharmacists identifying with other racial groups, and future studies should explore multimodal recruitment strategies to ensure a more diverse sample of participants. Additionally, the response rate (1.82 %) was lower than desired, and the sample size (N = 64) was low, introducing potential issues of sampling bias and non-response bias (Jager et al., 2020). Thus, statistical significance of findings must be interpreted with caution, and repetition of this pilot survey study in a larger sample would provide additional confidence in the findings. Future surveys in this population may wish to use a guaranteed (individual) financial incentive rather than the lottery incentive used in the current study, as guaranteed financial incentives have been shown to enhance response rate in comparison to lottery incentives (Blaney et al., 2019). However, a guaranteed incentive was not financially feasible in the current study. Lastly, a larger percentage of chain pharmacists (65.6 %) responded to the survey; this percentage is slightly larger than the distribution of chain versus independent pharmacies throughout the state. As of April 2024, there were approximately 1110 community pharmacies in Alabama, of which 599 (54.0 %) were chains and 511 (46.0 %) were independents (Hayes Directories, 2024). This may have resulted in findings that favor chain pharmacies over independent pharmacies. Future studies may recruit a larger sample size with a larger proportion of independent pharmacies.

4.2. Conclusion

Despite the majority of survey respondents acknowledging receipt of naloxone training, pharmacists are not all receiving the same training in independent versus chain pharmacies. Differences in mandated trainings, topics covered, and types of training formats exist between independent and chain pharmacies. Standardization of training protocols and enforcement of mandatory training before dispensing naloxone would potentially result in a greater amount of naloxone dispensed, as well as deeper patient understanding and satisfaction with naloxone counseling. Future efforts should focus on implementing standardized naloxone training protocols in Alabama's community pharmacies to improve the quality and consistency of education.

Author contributions

All authors attest they meet the ICMJE criteria for authorship.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.dadr.2025.100326.

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