



Primary Prevention of Prescription Drug Misuse Among Culturally and Linguistically Diverse Suburban Communities

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Abstract

Comprehensive strategies for prescription drug misuse must reach culturally and linguistically diverse suburban populations to effectively combat the ongoing opioid epidemic. The purpose of this study was to conduct a community needs assessment and inform the development and implementation of culturally appropriate primary prevention strategies for community-based interventions, specifically related to medication disposal practices. Three data collection techniques were utilized: key informant interviews ($n = 4$), intercept surveys ($n = 71$), and focus group discussions ($n = 8$; 61 participants). To accommodate linguistically diverse subpopulations, surveys and focus groups were available in English, Spanish, Arabic, Russian, and Hindi. Participants were overwhelmingly female (survey: 70%/FGD: 84%), ethnic minorities (survey: 61%/FGD: 66%), and, on average, middle-aged [survey: 52 years (SD: 19)/FGD: 54 (15)]. Approximately one in three survey respondents (30%) had heard of drug-take back events, and one in ten (10%) had participated. Non-English speakers were less likely to both perceive a community problem with prescription drugs ($\beta = -.35$; $p < .001$) and be aware of take-back opportunities ($\beta = -.23$; $p = .038$). Focus group participants expressed confusion about appropriate medication disposal methods, identifying potential sources of conflicting information. Recent media coverage and political events have heightened stigma towards non-English speaking and non-native peoples, increasing their fear of law enforcement and other perceived threats. To encourage community engagement in take-back events, we identified multiple ways, such as multilingual materials and marketing campaigns, which may help marginalized suburban subpopulations feel less threatened and more included in prescription drug misuse prevention activities.

Keywords Prescription drug misuse prevention · Culturally diverse populations · Drug take-back

Prescription drug misuse is a national epidemic [1]. In 2017 Pennsylvania (PA), where this study took place, had the 4th highest rate of drug-related overdose deaths in the nation [2]. This is up from the 5th highest rate in 2016, when the overdose age-adjusted death rate in PA was 37.9 per 10,000 people, and higher than the 2016 national average of 19.8 per 100,000 people [2]. The epidemic in PA continues to grow each year, as PA was one of only seven states with a statistically significant increase in drug overdose deaths

from 2013 to 2014, from 2014 to 2015, and from 2015 to 2016 [3, 4]. Prescription drug misuse is also associated with increased illicit drug use, including heroin and fentanyl, as many persons begin misusing prescription drugs and transition to illicit drugs in part due to greater availability and potency [5–7].

Prescription drug misuse is an evolving epidemic and impacts urban, suburban, and rural communities. To address unique and emerging challenges that arise in this rapidly changing epidemic, comprehensive strategies across primary, secondary, and tertiary prevention are needed [8]. Such strategies may include but are not limited to drug take-back events (primary prevention), opioid replacement therapy (secondary prevention), and overdose reversal (tertiary prevention). For targeted prevention strategies to be most effective and to meet the growing and changing needs of diverse communities and populations, prevention efforts

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must also incorporate culturally and linguistically competent strategies.

For the greatest immediate impact, and considering finite resources, prevention efforts should focus on populations most at high risk for prescription drug misuse. High risk groups for prescription drug misuse have shifted from predominantly older to younger age groups and urban minority populations to whites living in suburban areas [3, 9]. However, in communities that have relatively low rates of prescription drug-related overdose deaths and prescription drug misuse, primary prevention strategies must be considered, to avoid the development of addictive behaviors. This is in contrast to secondary prevention that would focus on early diagnosis and relapse prevention (e.g., opioid replacement therapy), and tertiary prevention that would focus on treating the medical consequences of drug misuse (e.g., overdose reversal). Despite an expansion in the breadth of prevention programming and the public will to offer it, limited information is available about the effectiveness of these primary prevention programs in non-white suburban populations who include both foreign- and native-born residents, as well individuals who primarily speak languages besides English. While proportionally smaller relative to whites, the number of immigrant and minority populations living in suburban communities continues to grow due rising urban costs and demographic shifts [10, 11].

One promising primary prevention approach is the “drug take-back” strategy, a key component in large-scale comprehensive supply and demand drug reduction strategies. Through a range of take-back options, people can anonymously dispose of unused or excess medication at designated locations where drugs can be collected and incinerated. Prescription drug take-back bins, events, and mail-back options have emerged as primary prevention strategies for properly removing prescription drugs from the community—and thereby preventing them from harming both the environment and potential misusers—in North Carolina [12], Hawaii [13], Maine [14], and rural Appalachia [15]. Studies of consumer preferences have shown that people are willing to not only dispose of unused medication [16, 17], but seek proper methods for doing so [18]. Nevertheless, awareness and participation in regulated collection activities is frequently low, limiting the impact of the programs on a community-level [19, 20].

To inform ongoing and future primary prevention strategies, ranging from drug take-back to education and outreach, in a community setting among culturally diverse populations, we conducted a needs assessment among culturally and linguistically diverse communities in Bucks County, a suburb of Philadelphia. Surrounding suburbs of Philadelphia have experienced similar increases in prescription drug misuse, overdoses, and deaths as observed across the nation, and Bucks County has experienced disproportionate

increases relative to the state and nation, although lower than Philadelphia increases [2–4]. The county’s population has historically been majority white, yet ethnically and culturally diverse enclaves exist and their unique needs may be overlooked by one-size-fits-all drug prevention efforts. The goal of this study was to assess the knowledge, understanding, and awareness of prescription drug misuse to inform culturally appropriate prevention services, in particular surrounding primary prevention strategies such as prescription drug disposal.

Methods

Study Design

This mixed-methods study utilized three data collection techniques: key informant interviews, intercept surveys, and focus group discussions. Responses from the key informant interviews facilitated development of items for the community intercept survey and focus group discussion guide. Approval for this study was obtained from Drexel University’s Institutional Review Board (IRB). All data were collected in the spring of 2017.

Setting and Participants

Using a purposive sampling method that aimed to recruit culturally and linguistically diverse participants from suburban subpopulations, four community locations in Bucks County, PA were identified and selected as study sites, in large part through collaboration with the community partner organization. Each site was a multi-family residential development that included diverse ethnic, cultural, and linguistic subpopulations, in particular relative to the surrounding suburban area, as well as an on-site office for the community partner organization. Interviews and focus group discussions took place in the community office at each site. Intercept surveys were conducted at each of the community site offices and adjacent locations within the residential development.

All participants in this study were volunteers who did not provide personally identifiable information. Participants provided their verbal consent and a waiver of written documentation of consent was obtained from the university IRB; prior to their participation in either the survey or focus group discussions, participants received information sheets that contained all elements of consent disclosure.

Participants in the key informant interviews were site coordinators. For the focus group discussions and intercept surveys, eligible participants were ages 18 years or older and lived in one of the four residential developments. Survey participants had to be able to complete the survey independently in either a print or electronic format using a

tablet computer purchased for this study. The survey questionnaire was translated into Spanish, Hindi, Russian, and Arabic. Focus group discussion participants had to speak one of the four languages in which the discussions were conducted: English, Arabic, Spanish, or Russian. Based on findings from key informant interviews and resource constraints related to translation and transcription, we did not conduct a focus group in Hindi but did offer the community survey in Hindi. Intercept survey participants were approached by a member of the study team and asked if they wanted to participate; recruitment was conducted at community offices located at each residential development and was based on a convenience sample approach. Site staff were responsible for recruiting study participants for the focus group discussions.

Data Collection

Quantitative Data

A 19-item intercept survey asked participants about their experiences with community programming, substance misuse in their community, and knowledge of prescription drug take-back programs. Participants completed the survey in approximately 15 min. A series of standard questions about attitudes toward prescription drug, alcohol, and tobacco use were also adapted from the Pennsylvania Youth Survey [21] to address adults rather than youth. Questions were also included from the Program Evaluation for Prevention Community-Level Instrument [22]. Although some items in our survey asked about alcohol and tobacco, our primary focus was prescription drugs, and response options allowed us to disaggregate prescription drug misuse in some cases; going forward, we will largely refer to prescription drug use and, when necessary, “substance use” if responses could not be disaggregated.

Qualitative Data

Eight focus group discussions were conducted with an average of eight participants each. Site coordinators moderated the focus group discussions and were trained by members of the study team during a one-hour webinar. Materials were provided to use during the discussions, such as a summary of ground rules and key strategies for managing focus group discussions. Discussions lasted approximately 30–90 min and were audio recorded.

Data Analysis Techniques

Quantitative Data

Survey responses were analyzed using Qualtrics for descriptive statistics and Stata IC (Version 15) for multivariate

analysis—structural equation modelling (SEM). This was a cross-sectional needs assessment, as such there were no a priori dependent or independent variables. Nevertheless, we decided to consider which demographic characteristics were associated with which measures of participant practices and perceptions, with the former set of variables ultimately being considered as predictors of the latter set of variables. That said, we were also interested in knowing whether or not certain practices or perceptions were related to each other, and thus decided to utilize a statistical technique that simultaneously assessed correlations with three key measures (communication, awareness, and problem perceptions) as our dependent variables.

Unlike traditional regression techniques, SEM has the advantage of “generality and flexibility of model specification” [23], which was well-suited for the diverse set of demographic independent variables (i.e. race, language, gender) and correlated psychosocial dependent variables (i.e. communication, awareness, and perceptions), as well as the overall exploratory nature of this community needs assessment. To facilitate our SEM analysis of survey data, some categorical variables of interest were dichotomized, including 30-day communication with children about drugs or alcohol (yes/no), awareness of prescription drug take-back events (yes/no), perception of prescription drug problem in community (yes/no), gender (male/female), race (white/all other races), and language (English/all other languages). Findings from SEM are interpreted similarly to regression techniques using the β coefficient, along with indicators of model fit [23–26]. Indicators of model fit used in this analysis include the Chi square statistic, root mean square error of approximation (RMSEA), Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC).

Qualitative Data

Each recording was transcribed verbatim and, if necessary, translated into English by a third-party translation service. As the survey and focus group instruments included several similar or verbatim items, the study team sought to develop a coding scheme that maximized comparability of findings between the two data collection methods. Guided by our a priori topics of community perceptions, prescription drug misuse, and prescription drug disposal, the study team broad-coded all transcripts and expanded on each topic to reflect emergent themes from focus group discussions. Over several in-person meetings, the team met to develop, define, and identify emergent themes from open readings of focus group transcripts. Response options from the survey guided definition of emergent themes in the focus group transcripts, yet unexpected or contradictory findings were also identified and thus included to further highlight the range of perspectives for a given theme.

Through our analysis and collaboration with community partners, we determined to organize our qualitative findings as either facilitators or barriers towards prescription drug misuse prevention (e.g. drug take-back, education). Given that this was a community-based needs assessment, we also summarized key takeaways that related to the goals of this study and provided these in plain language to inform actual community programming at our study sites.

Results

Findings are presented in a mixed-methods approach. Accordingly, quotes from focus group discussions are used to help interpret survey data.

Participant Demographics

Table 1 shows that the majority of participants for both intercept surveys ($n = 71$) and focus group discussions ($n = 61$) were female, with an average age of 54 and 52 years old, respectively. The racial and ethnic composition of all

Table 1 Characteristics of intercept survey and focus group participants

	Community survey respondents ($n = 71$)		Focus group participants ($n = 61$)	
	n	%	n	%
Language				
English	39	54.9	24	39.3
Arabic	1	1.4	6	9.8
Russian	16	22.5	9	14.8
Spanish	9	12.7	22	36.1
Hindi	6	8.4	–	–
Gender				
Female	19	70.4	51	83.6
Male	50	26.7	9	14.8
Other/declined to respond	2	2.8	1	1.6
Participant age				
Mean (SD), range	54.0 (18.9)	27–85	52.5 (15.1)	21–67
Number of children/grandchildren				
1	17	23.9	11	18.0
2	23	32.4	27	44.3
3+	21	29.6	21	34.5
0/declined to respond	10	14.1	2	3.3
Age of children/grandchildren				
Mean (SD), range	21.7 (16.6)	1–63	19.8 (14.0)	1–56
Race				
White	28	39.4	21	34.4
Black or African American	5	7.0	7	11.5
Asian	19	26.8	10	16.4
Native Hawaiian/Pacific Islander	2	2.8	1	1.6
Mixed race	5	7.0	12	19.7
Other	10	14.1	10	16.4
Declined to respond	2	2.8	0	0.0
Ethnicity				
Non-Hispanic	44	62.0	26	42.6
Hispanic	13	18.3	23	37.7
Unknown/declined to respond	14	19.7	12	19.7

No significant differences were detected between participants in the community survey compared to the focus group discussions. Standard deviations appear in parentheses next to means

participants was diverse, and most had two or more children or grandchildren.

Structural Equation Model

Figure 1 presents the structural equation model (SEM) including dependent variables (i.e. communication, awareness, perception) and independent variables (i.e. race, gender, age). Individuals who spoke a foreign language were significantly less likely to perceive a substance use problem in their community ($\beta = -.345; p < .001$) as well as to be aware of drug take-back options in their community ($\beta = -.232; p = .038$) but were significantly more likely to have communicated about substance use issues with their children in the previous 30-days ($\beta = .269; p = .014$). Notably, individuals who perceived a problem were also more likely to be aware of drug take-back ($\beta = .333; p = .002$). Model fit diagnostics indicated good fit ($\chi^2 = 43.62, p < .001, RMSEA < .001, AIC = 634.32, BIC = 573.22$).

Prescription Drug Misuse

Table 2 presents findings on participant perceptions, awareness, and family communication about prescription drug misuses. Data from the intercept survey are accompanied by focus group participant quotes.

Perceptions and Awareness

The majority of intercept survey respondents (55%) perceived that there was a problem with prescription drugs in their community. Of the 41 respondents who perceived

there was a problem, 30 of them (73%) felt the problem was with alcohol as well. Survey participants were asked whether there was a need for, and if there would be support for, substance use prevention programs in their community. A majority of respondents (53%) felt that there would be a lot of support for prescription drug or alcohol programs in their community, while 19% felt that there would be little support for it. Focus group participants discussed how community programming had increased their awareness about substance use and misuse issues, and how this had positively impacted their ability to discuss drug prevention with their children and grandchildren. Some women felt that they were the primary caregivers responsible for such talks within their household, and community programs provided the education to allow them to fulfill that role.

Family Communication

More than half of respondents talked to their child at least one time (68% combined) about the dangers or problems associated with the use of tobacco, alcohol and other drugs. However, nearly a third (32%) of parents/grandparents had not spoken to their child/grandchild at all about dangers or problems associated with these substances. Participants of the focus group discussions had similar thoughts regarding attitudes and family communication related to prescription drugs.

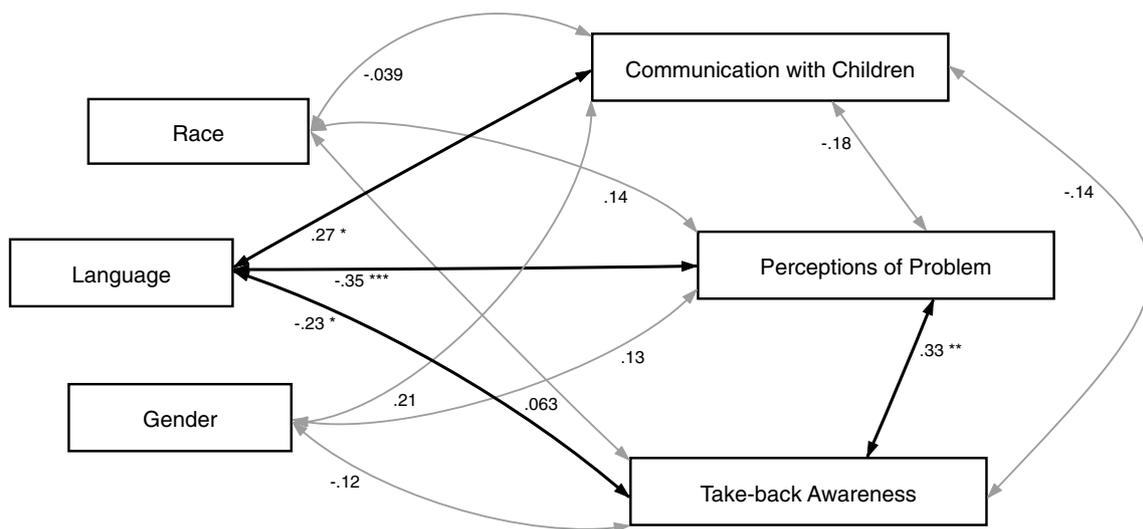


Fig. 1 Structural equation model (“trimmed”) exploring demographic and psychosocial associations with standardized path coefficients ($*p < .05; **p < .01; ***p < .001$). Bolding is used to further indi-

cate significant associations, whereas insignificant relationships are included for context in grey

Table 2 Participant perceptions of community prescription drug problem, need for programming, and communication with family

In your community, do you think there is a problem with prescription drugs or alcohol?			
No there is no problem	Yes, both	Yes, but only prescription drugs	Yes, but only alcohol
34%	48%	7%	11%
I just think that drugs and alcohol are a problem within itself and I think the problem is nowadays children, little kids, are able to get their hands on the stuff. Even if their parents, or grandparents are on medication if they're not keeping it in a safe place then [kids are able to get their hands on the stuff] Many parents can hardly imagine and know that some issues and things even exist			
In your community, do you think there is a need for prescription drug or alcohol programs?			
No	Yes, I think there would be a lot of support for it	Yes, but it is not talked about	Yes, but there would be little support for it
11%	53%	16%	19%
I participated in a program about drugs. It enables you to know if children took drugs I think [education for parents] is a nice program, because it provides the parents with the very important knowledge. [...] For example, it is important to spend 10–15 min. at home and communicate with children. [...] Children discuss their problems and find their solution with parents, not somewhere else or with their friends			
During the past 30 days, how many times have you talked with your child about the dangers or problems associated with the use of tobacco, alcohol, or other drugs?			
No times	Once a week	One time	
32%	48%	20%	
Yeah. This is—that's the need—the program for the children. They need—the children—yeah, they think—because the father doesn't care. The mother doesn't care. That's why they get too much drug and alcohol – teenage [...] because the parents is not involved.			
I was just talking to my granddaughter this morning about drugs and she was telling me, she's 14, she was just telling me, she said, "Grandma I have a couple of my friends and their parents allow them to smoke and use drugs at home." And she said that they think at their school so I asked her, "Well have you ever tried with them?" Because I wanted to know. She said, "Oh, no. No, grandma, not me." She said, "But I do know some people that live in this area."			

Data from community survey participants (n=71) are presented above, and representative quotes from focus group participants (n=61) are provided below

Table 3 Knowledge about prescription drug disposal practices in Bucks County, Pennsylvania

Have you ever heard of a prescription drug take-back event?				
Yes, and I have gone	Yes, but I have not gone	No		
11%	22%	68%		
Yeah, I have [a drug take-back event brochure] from actually last week to be honest with you What I did with my back pills was the first thing is put them up in a shelf high up or in a secure place that the kids don't get their hands on. [...] Because we are told that if you're not using the drug, take it back to the pharmacy We didn't know of a program like this				
Why would you go to a prescription drug take-back event?				
I wanted to clean out my medicine cabinet	I don't want to flush prescription drugs down the toilet	I don't want others to be accidentally poisoned	I don't want others to steal the prescription drugs	Other
27%	23%	26%	16%	8%
I think that I had seen in the news that it's not okay to throw them away in the trash because other people might end up using it. I don't remember the news story well, but they recommended to dispose of it down the toilet They stay in the cabinet, and sometimes they expire, and when I'm cleaning, I say, "Oh, this expired!" and I throw it away It's better to do it that way [flush down toilet] because then that way it just vanishes and it's no more. But if you throw it—that's what I'm trying to compare it – that if you throw it in the trash and you take the trash out, there's trash pickers out there that for—that go through and say "Mm-hmm, look at this". And they take it and then either try to sell it or whatever and then it hurts somebody else and what not				

Data from community survey participants (n = 71) are presented above, and representative quotes from focus group participants (n = 61) are provided below

Prescription Drug Disposal

Knowledge, Awareness, and Motivation to Participate

Survey participants were asked about their awareness of prescription drug take-back events. Table 3 shows that a majority of survey respondents had not heard of a drug take-back event (68%), while 22% had heard of the events but had not gone. Focus group participants talked about a similar lack of awareness of such programming. Survey participants indicated that a desire to clean out old medications and prevent others from poisoning themselves were top reasons why they would go to a drug take-back event. Many focus group participants expressed positive attitudes and were interested in disposing of medication, generally because it had expired, or they no longer needed it. In some cases, participants did not want others getting into their medications, and this motivated them to dispose of them either through the garbage or flushing medications down the drain.

Facilitators and Barriers

Figure 2 details facilitators and barriers which could be targeted to increase awareness of and participation in prescription drug take-back events. Facilitators were characterized as existing psychosocial, familial, and community assets that could be leveraged for promoting participation, whereas barriers were characterized as unmet needs that could be addressed to promote participation. Multiple participants described how they flushed drugs down the toilet because of a fear that their medication could be stolen out of the trash and made multiple recommendations about how, when,

and where to place advertisements. Despite some awareness of other options, the majority of participants had not heard of local drug take-back events, or if they were aware of them did not participate. Based on feedback from focus group participants, police officers at drug take-back events should dress in plain clothes instead of police uniforms, although most participants felt that the presence of police would increase their perception of safety. At one site, participants expressed hesitation to participating in drug take-back events, even those sponsored through their pharmacy, based on stories and other misinformation they heard from friends.

Data from the key informant interviews (n=4) confirmed important themes identified in community surveys and focus group discussions, including: barriers to program participation (lack of transportation and low awareness), challenges to medication disposal (police presence and infrequency of events), and opportunities for improvement (multilingual marketing materials and integrating with existing prevention programs).

Discussion

Through our mixed-methods analysis of primary data, we highlighted important factors related to knowledge, communication, and awareness to build off of and inform prescription drug primary prevention among a culturally and linguistically diverse suburban sample. First, though overall awareness may be low, there are strong positive attitudes towards primary prevention and against substance misuse in general. Second, this strong positive attitude of primary prevention is personalized and amplified when considering

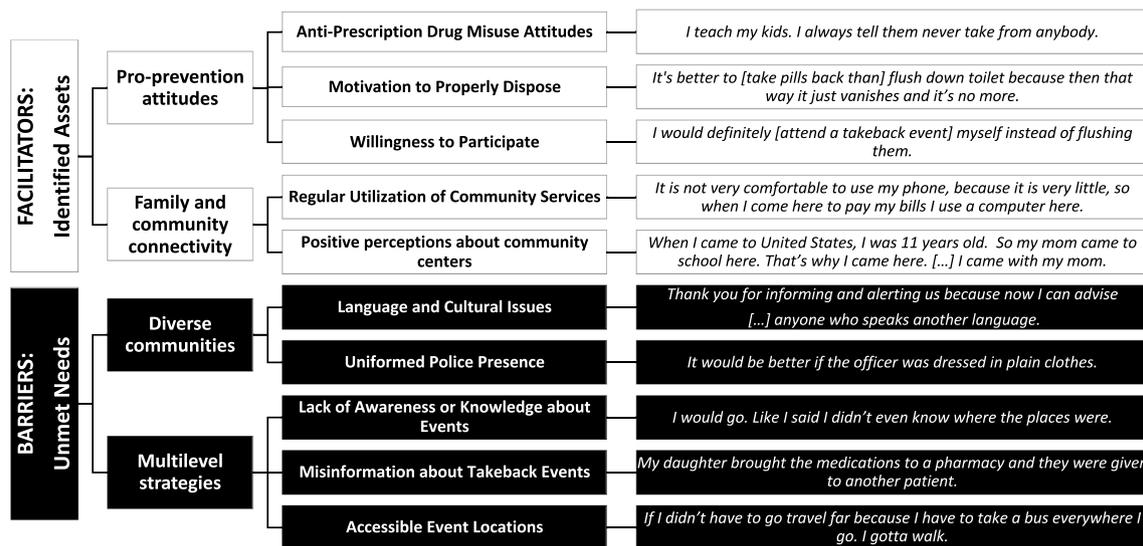


Fig. 2 Facilitators and barriers to community participation in drug take-back events are presented with representative quotes from focus group participants (n = 61)

the benefits for one's own family unit, and could be further leveraged for action by targeting influential relationships and communication channels within the family (e.g. mother—daughter) as well as outside the family (e.g. mother—community organizer). Third, there are unique needs for primary prevention strategies among culturally diverse communities, including language barriers and fears related to U.S. documentation status. Forth, primary prevention strategies must consider multi-level approaches including structural barriers such as transportation and access to reliable information.

Pro-Prevention Attitudes

The desire to get rid of excess medication in the home presents an opportunity to modify behavior and use primary prevention strategies to reduce improper disposal or risk of medications falling into the wrong hands, such as garbage pickers or adolescents [16, 20, 26]. Participants in both the survey and focus groups understood the importance of disposing of prescription drugs to prevent others from obtaining and ingesting it, either accidentally or intentionally (e.g., recreationally, drug-seeking behavior), and this understanding was reflected in their interest in participating in events. While we did not directly quantify interest in participation, in a similar community needs assessment, Lystlund and colleagues [19] found that six in ten participants were interested in drug take-back as a means of drug disposal, primarily for the same reasons that we identified: cleaning out medicine cabinets, protecting household members from accidental or intentional ingestion, and protecting the environment (i.e., not flushing medications down the toilet). In both Lystlund's and our study samples, the majority of participants were middle-aged women, and a study evaluating drug take-back programs in Rural Appalachia similarly described the majority of their participants as middle-aged women [15]. Limited demographic information is available from other published reports, likely a result of the anonymous nature of take-back events, but this emerging trend demonstrates that more attention must be paid both to who is participating in these events and the reasons why they are participating.

While evidence suggests prescription drug misusers are increasing in age, adolescents are still a priority prevention population who may initiate use of prescription drugs if excess medication is present in the home. Therefore, parents and caregivers are advised to properly dispose of unused medication and focus group participants expressed a variety of methods for medication disposal. The US Food and Drug Administration (FDA) guidance advises flushing unused prescription medication, including opioids and other controlled narcotics, down the toilet [27, 28]. However, the US Environmental Protection Agency (EPA) presents conflicting information that prescription drugs should be primarily disposed of through regulated collection, secondarily

disposed of within the household, such as grinding up medication and mixing it with other garbage, and never flushed down the toilet [29]. This discrepancy reflects the divergent missions of the two agencies: the EPA wants to prevent drugs from entering the environment and the FDA wants to prevent drugs from entering the wrong hands. While both agencies seek to encourage medication disposal, our study participants made clear the need to provide clear information, which may result from efforts to resolve this and other sources of discrepancy.

Family and Community Connectivity

We observed that family communication is an intrinsic strength—particularly among non-English speakers—and this may be leveraged for changing attitudes and behaviors to misuse prevention. To increase participation in prescription drug take-back events, it may be necessary to augment traditional outreach efforts by educating residents and engaging whole families. Based on our findings of the connections between culturally diverse communities and local organizations, local organizations could readily tap into pre-existing networks of community members who regularly utilize, appreciate, and are satisfied with ongoing community event and service offerings. For example, family-based prevention programs offer a comprehensive and effective way to reduce adolescent drug use [30] and increase parent–child communication [31], both feasible strategies based on our study findings.

Whether through family or community sources, it is clear that avenues exist to reach individuals within households who control access to sources of potential drug misuse and increase their knowledge about household primary prevention. Family-based programming could promote primary prevention through multiple pathways by addressing household participation in drug take-back as well as strategies to communicate effectively about the harms of prescription drug misuse. Furthermore, households of first generation and newly immigrated families are frequently intergenerational, with immediate and extended family members cohabitating and, given the strong intergenerational connections that we observed between community sites and our participants, programs could take advantage of these household structures by designing family-focused interventions that account for intergenerational rearing by tailoring information for elder caregivers.

Diverse Communities

Language was identified as a consistent and significant barrier towards awareness of prevention options, as well as perceptions about community substance use. By using a multilingual approach, people who speak languages

besides English may better understand the issue of prescription drug misuse and have greater awareness of take-back events in their community, both significant deficiencies that we observed. Creating recruitment and educational materials in a variety of languages and literacy levels, as well with culturally-relevant messages and images that resonate with each community, is particularly important for engaging minority populations [32, 33], as well as when focusing on families and caregivers [34, 35].

Perhaps more importantly, once community residents are motivated to participate in take-back events, law enforcement must be proactively engaged so as not to intimidate community members, such as undocumented immigrants who may avoid contact with law enforcement for fear of deportation. Police could consider wearing plainclothes and using the take-back events as opportunities to build relationships with residents. Participants in focus groups appreciated the necessity of having law enforcement present during take-back events, while still expressing a desire for a less overt police presence.

Multi-Level Strategies

Barriers to disposing of unused prescription drugs spanned multiple levels of the socio-ecological model, including community (e.g., transportation) and individual (e.g., lack of awareness). Our results suggest that a dual strategy focused on increasing community members' agency to participate in take-back events and mitigating structural barriers to their participation could increase the success of prevention programs. To promote primary prevention structurally, it is worth exploring opportunities to bring take-back events to the community. Marketing must be effective, and signage could be placed in multiple locations throughout the community site and surrounding areas using diverse media formats, appropriate literacy levels, and multiple languages. On-site take-back events could be coupled with an awareness campaign about proper and improper ways to dispose of medication further enhance recruitment and boost participation. If on-site events are not feasible to implement, then community-based organizations must provide transportation to authorized take-back locations; encouragingly, these could be coupled with events scheduled through other programs to take advantage of already-engage individuals.

Programs should aim to increase individuals' agency to participate in take-back events as another means of promoting primary prevention. We found that participants who were aware of drug take-back events were more likely to perceive a prescription drug problem in their community, suggesting that community-based drug prevention programming could motivate individuals to participate in drug take-back events by increasing residents' knowledge about prescription drug misuse. The proposed approach aligns with prescription

drug misuse prevention efforts, particularly among youth and diverse populations, which often focus on a risk-reduction model at multiple levels of intervention, including the individual, family, and community [34–36]. For example, in Philadelphia, the Mayor's Task Force to Combat the Opioid Epidemic recently recommended such an approach, advocating for broad-based education via targeted media campaigns, primary prevention through drug take-back options, and community-based events to destigmatize prescription drug misuse [37].

Strengths and Limitations

Based on our study design and implementation, there was potential for selection and instrumentation bias during our community needs assessment. The demographic characteristics for both the community survey and focus group discussion populations were skewed heavily towards middle to older aged women and did not include anyone under the age of 21. That being said, we were able to focus on household decision-makers, such as parents, who assumedly dispose of unused medications. Furthermore, we solicited direct input from community members, identifying valuable intentions and attitudes that inform both the development and implementation of future substance use prevention programming. The majority of participants in both the community survey and focus group discussions had already attended programming at their community site, which may have limited our ability to identify barriers to program participation among individuals who had not attended any programs and contributed to the potential for selection bias. Also, due to resources constraints, the survey questionnaire was not back-translated to help assess content validity. However, community site coordinators who translated the questionnaires were fluent not only in the language at-hand, but also idiomatic nuances in English and each foreign language. We used instruments in several languages to increase the breadth of our sample beyond English-speaking participants, but some participants could have interpreted the wording of survey questions and response categories differently due to materials being translated into four different languages, which may have resulted in bias with our instrumentation. However, our instrumentation was developed through an iterative, feedback-oriented process between university and community partners, and native translators from each site translated survey materials to mitigate this threat.

Conclusion

Tailoring primary prevention strategies will be an important approach to continue to prevent the onset of prescription drug misuse, especially among diverse populations as the

epidemic continues to evolve. Prescription drug misuse can be prevented through community efforts at both the individual and community levels, and should consider the best methods for delivering primary prevention programming, including the use drug take-back events that are accompanied by timely and accurate information, and recognize the symptoms of prescription drug misuse among members of their family or community. Among our culturally and linguistically diverse sample, we found a deep willingness to dispose of medication properly, but an overall lack of awareness that take-back events were an available option. We identified several modifiable structural barriers to participation, including advertisements directed towards white, English-speaking residents and the presence of police in uniforms. Immigrant parents may not be knowledgeable or comfortable enough talking about prescription drug misuse with their children, but their strong anti-drug attitudes and regular attendance in community programming are examples of facilitators that should be targeted to further enhance both intra-family communication and their participation in drug take-back events. While our focus is primary prevention, the findings from our study have implications for secondary and tertiary prevention because cultural and linguistic sensitivity is an essential component of tailored and targeted drug prevention programs. For example, naloxone is a medication that reverses the effects overdose from opioids and making materials and instructions culturally and linguistically competent could facilitate use among ethnically diverse populations. Prescription drug prevention efforts should continue to recognize the value of these culturally relevant factors if they are to effectuate change in minority and immigrant populations at any level.

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Compliance with Ethical Standards

Conflict of interest The authors report no conflict of interest.

References

- Compton, W. M., Jones, C. M., & Baldwin, G. T. (2016). Relationship between nonmedical prescription-opioid use and heroin use. *The New England Journal of Medicine*, 374(2), 154–163. <https://doi.org/10.1056/NEJMra1508490>.
- U.S. Drug Enforcement Administration (DEA), Department of Justice. (2017). *Analysis of Overdose Deaths in Pennsylvania, 2016*. Arlington: U.S. Drug Enforcement Administration (DEA), Department of Justice
- U.S. Centers for Disease Control (CDC). (2018). Drug Overdose Death Data | Drug Overdose. Retrieved September 4, 2018, from <https://www.cdc.gov/drugoverdose/data/statedeaths.html>.
- Rudd, R. A., Seth, P., David, F., & Scholl, L. (2016). Increases in drug and opioid-involved overdose deaths—United States, 2010–2015. *MMWR. Morbidity and Mortality Weekly Report*, 65(5051), 1445–1452. <https://doi.org/10.15585/mmwr.mm655051e1>.
- Mars, S. G., Bourgois, P., Karandinos, G., Montero, F., & Ciccarone, D. (2014). “Every ‘never’ I ever said came true”: Transitions from opioid pills to heroin injecting. *The International Journal on Drug Policy*, 25(2), 257–266. <https://doi.org/10.1016/j.drugpo.2013.10.004>.
- Becker, W. C., Sullivan, L. E., Tetrault, J. M., Desai, R. A., & Fiellin, D. A. (2008). Non-medical use, abuse and dependence on prescription opioids among U.S. adults: Psychiatric, medical and substance use correlates. *Drug and Alcohol Dependence*, 94(1–3), 38–47. <https://doi.org/10.1016/j.drugalcdep.2007.09.018>.
- Grau, L. E., Dasgupta, N., Harvey, A. P., Irwin, K., Givens, A., Kinzly, M. L., & Heimer, R. (2007). Illicit use of opioids: Is OxyContin a “gateway drug”? *The American Journal on Addictions*, 16(3), 166–173. <https://doi.org/10.1080/10550490701375293>.
- Compton, W. M., Boyle, M., & Wargo, E. (2015). Prescription opioid abuse: Problems and responses. *Preventive Medicine*, 80, 5–9. <https://doi.org/10.1016/j.ypmed.2015.04.003>.
- Cicero, T. J., Ellis, M. S., Surratt, H. L., & Kurtz, S. P. (2014). The changing face of heroin use in the United States: A retrospective analysis of the past 50 years. *JAMA Psychiatry*, 71(7), 821–826. <https://doi.org/10.1001/jamapsychiatry.2014.366>.
- Diarrassouba, N., & Johnson, S. (2014). Responding to demographic change: What do suburban district leaders need to know? *International Journal of Educational Leadership Preparation*, 9(1), 1
- Farrell, C. R. (2016). Immigrant suburbanisation and the shifting geographic structure of metropolitan segregation in the United States. *Urban Studies*, 53(1), 57–76. <https://doi.org/10.1177/0042098014558537>.
- Fleming, E., Proescholdbell, S., Sachdeva, N., Alexandridis, A. A., Margolis, L., & Ransdell, K. (2016). North Carolina’s operation medicine drop results from one of the Nation’s Largest Drug Disposal Programs. *North Carolina Medical Journal*, 77(1), 59–62. <https://doi.org/10.18043/nmc.77.1.59>.
- Ma, C. S., Batz, F., Juarez, D. T., & Ladao, L. C. (2014). Drug Take Back in Hawai‘i: Partnership Between the University of Hawai‘i Hilo College of Pharmacy and the Narcotics Enforcement Division. *Hawai‘i Journal of Medicine & Public Health*, 73(1), 26–31.
- Stewart, H., Malinowski, A., Ochs, L., Jaramillo, J., McCall, K., & Sullivan, M. (2014). Inside Maine’s Medicine Cabinet: Findings From the Drug Enforcement Administration’s Medication Take-Back Events. *American Journal of Public Health*, 105(1), e65–e71. <https://doi.org/10.2105/AJPH.2014.302207>.
- Gray, J. A., & Hagemeier, N. E. (2012). Prescription drug abuse and DEA-sanctioned drug take-back events: Characteristics and outcomes in rural appalachia. *Archives of Internal Medicine*, 172(15), 1186–1187. <https://doi.org/10.1001/archinternmed.2012.2374>.
- Gutierrez, J., Negrón, J., & García-Fragoso, L. (2011). Parental practices for prevention of home poisoning in children 1–6 years of age. *Journal of Community Health*, 36(5), 845–848. <https://doi.org/10.1007/s10900-011-9384-4>.
- Glassmeyer, S. T., Hinchey, E. K., Boehme, S. E., Daughton, C. G., Ruhoy, I. S., Conerly, O., et al. (2009). Disposal practices for

- unwanted residential medications in the United States. *Environment International*, 35(3), 566–572. <https://doi.org/10.1016/j.envint.2008.10.007>.
18. Thach, A. V., Brown, C. M., & Pope, N. (2013). Consumer perceptions about a community pharmacy-based medication take back program. *Journal of Environmental Management*, 127, 23–27. <https://doi.org/10.1016/j.jenvman.2013.04.025>.
 19. Lystlund, S., Stevens, E., Planas, L. G., & Marcy, T. R. (2014). Patient participation in a clinic-based community pharmacy medication take-back program. *Journal of the American Pharmacists Association*, 54(3), 280–284. <https://doi.org/10.1331/JAPhA.2014.13132>.
 20. Lewis, E. T., Cucciare, M. A., & Trafton, J. A. (2014). What do patients do with unused opioid medications? *The Clinical Journal of Pain*, 30(8), 654–662. <https://doi.org/10.1097/01.ajp.0000435447.96642.f4>.
 21. State of Pennsylvania. (2016). *Pennsylvania Youth Survey: 2015 State Report*.
 22. U.S. Substance Abuse and Mental Health Services Administration (SAMHSA). (2014). Strategic prevention framework, partnerships for success—community-level instrument.
 23. Coker, A. L., Watkins, K. W., Smith, P. H., & Brandt, H. M. (2003). Social support reduces the impact of partner violence on health: Application of structural equation models. *Preventive Medicine*, 37(3), 259–267. [https://doi.org/10.1016/S0091-7435\(03\)00122-1](https://doi.org/10.1016/S0091-7435(03)00122-1).
 24. Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.
 25. Hoyle, R. (1995). The structural equation modeling approach basic concepts and fundamental issues. In R. H. Hoyle (Ed.), *Structural equation modeling, concepts, issues, and applications* (pp. 1–13). Newbury Park: Sage Publications.
 26. Gold, K., & Schumann, J. (2007). Dangers of used sharps in household trash. *Implications for Home Care*. <https://doi.org/10.1097/01.NHH.0000296119.71814.f7>.
 27. Food, U. S. & Drug Administration (FDA). (2018). Safe disposal of medicines—disposal of unused medicines: What you should know [WebContent]. Retrieved September 4, 2018, from <https://www.fda.gov/drugs/resourcesforyou/consumers/buyingusingmedicinesafely/ensuringsafeuseofmedicine/safedisposalofmedicines/ucm186187.htm>.
 28. Fass, J. A. (2011). Prescription drug take-back programs. *American Journal of Health-System Pharmacy*, 68(7), 567–570. <https://doi.org/10.2146/ajhp100559>.
 29. U.S. Environmental Protection Agency (EPA). (2018). *Collecting and disposing of unwanted medicine*. Washington DC: U.S. Environmental Protection Agency (EPA)
 30. Velleman, R. D., Templeton, L. J., & Copello, A. G. (2005). The role of the family in preventing and intervening with substance use and misuse: A comprehensive review of family interventions, with a focus on young people. *Drug and Alcohol Review*, 24(2), 93–109. <https://doi.org/10.1080/09595230500167478>.
 31. Coatsworth, J. D., Pantin, H., & Szapocznik, J. (2002). Familias unidas: A family-centered ecodevelopmental intervention to reduce risk for problem behavior among hispanic adolescents. *Clinical Child and Family Psychology Review*, 5(2), 113–132. <https://doi.org/10.1023/A:1015420503275>.
 32. Raber, M., Huynh, T. N., Crawford, K., Kim, S., & Chandra, J. (2018). Development and feasibility of a community-based, culturally flexible colorectal cancer prevention program. *Journal of Community Health*, 43(5), 882–885. <https://doi.org/10.1007/s10900-018-0497-x>.
 33. Watanabe-Galloway, S., Alnaji, N., Grimm, B., & Leypoldt, M. (2018). Cancer community education in Somali Refugees in Nebraska. *Journal of Community Health*, 43(5), 929–936. <https://doi.org/10.1007/s10900-018-0507-z>.
 34. Kumpfer, K. L., Magalhães, C., & Kanse, S. A. (2016). Impact of family structure, functioning, culture, and family-based interventions on children’s health. In M. R. Korin (Ed.), *Health Promotion for Children and Adolescents* (pp. 57–81). Boston: Springer. https://doi.org/10.1007/978-1-4899-7711-3_4.
 35. Kumpfer, K., Magalhães, C., & Xie, J. (2017). Cultural adaptation and implementation of family evidence-based interventions with diverse populations. *Prevention Science*, 18(6), 649–659. <https://doi.org/10.1007/s11121-016-0719-3>.
 36. Allen, M. L., Garcia-Huidobro, D., Porta, C., Curran, D., Patel, R., Miller, J., & Borowsky, I. (2016). Effective parenting interventions to reduce youth substance use: A systematic review. *Pediatrics*. <https://doi.org/10.1542/peds.2015-4425>.
 37. City of Philadelphia Department of Behavioral Health and Intellectual Disability Services (DBHIDS). (2017). The Mayor’s Task Force to Combat the Opioid Epidemic in Philadelphia: Final Report & recommendations. *City of Philadelphia*.