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RESEARCH

Survey of CDC-recognized community pharmacies providing the National Diabetes Prevention Program and impact of the COVID-19 pandemic on program delivery

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ABSTRACT

Background: The Centers for Disease Control and Prevention (CDC) established the National Diabetes Prevention Program (NDPP) to prevent type 2 diabetes using an evidence-based lifestyle intervention program provided by community- and health care-based organizations, including community pharmacies.

Objectives: This study aimed to characterize CDC-recognized community pharmacies offering NDPP and determine the impact of the coronavirus disease 2019 (COVID-19) pandemic on program delivery.

Methods: A list of CDC-recognized community pharmacies offering NDPP was obtained from the CDC Registry of Recognized Programs on September 19, 2020. A 23-question cross-sectional survey was created to obtain information about program inception, delivery, recruitment, enrollment, program evaluation, reimbursement, and the impact of the COVID-19 pandemic. Each pharmacy was contacted via telephone using a standardized script and invited to complete the survey over the phone or online. A follow-up e-mail was then sent approximately 2 weeks later to pharmacies that had not responded.

Results: A total of 73 community pharmacies were identified in the CDC registry. Of the 64 eligible community pharmacies, 42% (n = 27) completed the survey. Most community pharmacies offering NDPP were in the Southeastern (41%) and Midwestern (22%) regions of the United States. A majority were independent pharmacies (78%) and had “pending” CDC recognition status (74%). Program delivery primarily occurred in the pharmacy (48%) or in a hybrid model (26%). Most programs were not submitting reimbursement claims (74%) and did not charge participants (82%). Nearly two-thirds of pharmacies (63%) strongly agreed that COVID-19 had significantly affected their programs, yet most (67%) continued to offer NDPP during the pandemic.

Conclusion: To our knowledge, this is the first characterization of CDC-recognized community pharmacies providing NDPP. Best practices for implementing NDPP at community pharmacies warrant further exploration and models to ensure long-term sustainability. COVID-19 affected most community pharmacies providing NDPP, but the majority continued to offer NDPP during the pandemic.

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Background

Prediabetes affects more than 1 in 3 American adults and up to 70% of individuals with prediabetes are diagnosed with type 2 diabetes (T2D) during their lifetime.¹ In addition to increasing the risk of developing T2D, prediabetes is associated with a 13% increased risk of all-cause mortality and 15% increased risk of cardiovascular disease.¹ Evidence-based strategies to slow or prevent the development of T2D in those with prediabetes include lifestyle modification and pharmacologic therapy (e.g., metformin).² In 2002, the

Key Points**Background:**

- The Diabetes Prevention Program (DPP) study demonstrated that lifestyle change is the most effective means of preventing type 2 diabetes.
- The Centers for Disease Control and Prevention (CDC) established the National DPP (NDPP), a 12-month change program based on the original DPP study.
- Community pharmacies are highly accessible locations for individuals to access NDPP, but the extent to which community pharmacies offer NDPP is unknown.

Findings:

- A modest number of community pharmacies are CDC-recognized providers of NDPP.
- Recruitment and retention remain barriers to implementation, and innovative approaches to addressing these issues are warranted.
- Reported program effectiveness was suboptimal, and sustainability remains questionable given that most programs were not obtaining reimbursement for NDPP services.

Diabetes Prevention Program (DPP) trial demonstrated that a structured, intensive lifestyle modification program resulted in a statistically significant reduction in the incidence of T2D by 58% compared with metformin, which reduced the incidence of T2D by 31%.³

In 2010, the Centers for Disease Control and Prevention (CDC) established the National DPP (NDPP), which was based on the original DPP trial, to address a growing number of individuals with prediabetes in the United States.⁴ The NDPP is a change program that helps patients learn to eat healthy, incorporate physical activity into their daily routines, handle stress, and recenter their focus if they veer from their plans.⁵ Completion of this program usually occurs after 24 total hours of education provided over 1 year.⁶ CDC grants preliminary recognition to programs that use a CDC-approved NDPP curriculum, whereas full recognition is reserved for programs that provide data demonstrating program effectiveness. Despite proven benefit, uptake of the NDPP has been poor, partly caused by inadequate access, especially in areas with low socioeconomic status.^{7–9} Community pharmacies are in a unique position to offer the NDPP because they are widely distributed throughout geographic regions and considered highly accessible.¹⁰ However, the characteristics of CDC-recognized community pharmacies providing the NDPP are unknown.

Objective

The purpose of this study was to characterize CDC-recognized community pharmacies offering the NDPP.

Furthermore, given the overlap of the study with the coronavirus disease 2019 (COVID-19) pandemic, we also sought to determine the impact of COVID-19 on program delivery.

Methods

In this cross-sectional study, we surveyed community pharmacies using a list obtained online from the CDC Registry of Recognized Programs.¹¹ The list was obtained in September of 2020 and sorted to include only locations described as community pharmacies. To be eligible for the survey, the site needed to be a CDC-recognized NDPP, operate primarily as a community pharmacy (regardless of type), and have enrolled and completed at least one cohort of participants.

A 23-question survey was developed to obtain information about program inception, delivery, recruitment, enrollment, evaluation, and reimbursement ([Supplementary Material](#)). The survey questions aimed to provide a holistic view of community pharmacies providing NDPP and to characterize how these programs generally operated at the time of the survey and some historical information (e.g., date of program inception). Two individuals with experience offering NDPP and who were certified lifestyle coaches reviewed the survey and provided feedback. In total, the survey consisted of 23 questions with a variety of question types including fill in the blank, multiple choice, and select all that apply. Because the survey was administered during the COVID-19 pandemic, it was believed important to gauge the impact of the COVID-19 pandemic on NDPP delivery; therefore, a Likert scale question was included in the survey to determine the level of agreement with the statement “COVID-19 has significantly impacted my Diabetes Prevention Program.” A forced-choice format was used to minimize missing data. The online survey was created using Google Forms (Google LLC).

Each community pharmacy was contacted via telephone using the phone number provided from the registry or from a Google search if the listed number was incorrect. Each call used a standardized script that introduced the interviewer, the purpose of the survey, overview of the questions and what we aimed to learn, how we found their information, an estimated time frame to complete the survey, and the option to complete the survey over the phone or online. If the participant selected to complete the survey online, a standardized e-mail with the survey link was sent to the pharmacist responsible for operating the NDPP or a colleague who was suited to answer the survey questions. If there was no response for approximately 2 weeks after the original phone call, a follow-up e-mail was sent, again using a standardized e-mail.

The analysis was descriptive with categorical data described using proportions and continuous data described as mean \pm SD. All analyses were performed using IBM SPSS Statistics for Mac, version 27.0.

Results

From the complete list of 1754 CDC-recognized NDPP programs, as of September 2020, 73 programs were listed as a community pharmacy. Of these 73 community pharmacies listed in the registry, 64 were eligible for the survey. Reasons for exclusion included not yet enrolling a cohort of participants ($n = 7$), duplicate entry ($n = 1$), and one that was later

found not to be a community pharmacy after they were contacted about the survey ($n = 1$). A total of 27 of 64 pharmacies responded to the survey, yielding an overall response rate of 42%. All representatives from each pharmacy selected to complete the survey online instead of over the telephone.

Geographically, most community pharmacies offering NDPP were in the Southeast (41%), followed by the Midwest (22%). The majority of surveyed community pharmacies (78%) were independent. Less than one-quarter of community pharmacies (22%) had “full” CDC recognition status. Community pharmacies delivered NDPP classes primarily in person (48%), but a hybrid model, including a combination of in person and virtual, was offered by 26% of community pharmacies. Some programs offered virtual only (15%), whereas others provided their program at sites outside of the community pharmacy, including libraries, fire stations, group homes, or via telephone call. More than one-third of programs (37%) collaborated with medical offices for recruitment and enrollment. Pharmacists overwhelmingly (85%) served as the lifestyle coach delivering the program, but other individuals were also involved, including pharmacy technicians (26%), student pharmacists (19%), pharmacy residents (15%), nurses (15%), and dietitians (7%). Other lifestyle coaches included wellness specialists, personal trainers, and community health care workers. Complete characteristics of responding pharmacies are provided in Tables 1 and 2.

Nearly three-fourths of community pharmacies reported they were not submitting for reimbursement from Medicare, Medicaid, or commercial insurance plans, and most (82%) reported offering the program to their patients at no cost (Table 3). A small number of programs did report charging a participation fee ranging from \$1 to \$50 (7%), \$50 to \$100 (4%), or > \$100 (7%). When looking at the program outcomes measured, nearly all community pharmacies included change in body weight from baseline (96%), whereas others also measured change in hemoglobin A1c (HbA1c) (33%) or change in physical activity (15%). One community pharmacy also measured achievement of patient-derived goals. Although 40% of responding community pharmacies reported that less than 25% of their participants achieved the weight loss goal of at least 5% from baseline, 34% reported that more than half of their participants achieved the desired weight loss goal. At the time of completing the survey, community pharmacies reported a median of 1 (interquartile range: 1–4) currently ongoing cohort including a median of 3 participants (interquartile range: 0–22).

As for the impact of COVID-19 on their program, 88% either strongly agreed or somewhat agreed that COVID-19 had significantly affected their program (Table 4). Although more than two-thirds of programs reported continuing to offer NDPP despite the pandemic, the most cited reason for how the pandemic adversely affected their program was related to challenges with recruitment and retention. Additional challenges related to the pandemic included loss of location or space where classes were held, being too busy with administering COVID-19 vaccines, and technology barriers (including those related to the patient and the pharmacy). For programs that were no longer offering NDPP at the time of the survey, all had put their programs on hold because of the pandemic.

Table 1
Characteristics of responding community pharmacies

Pharmacy characteristic	Pharmacies (n = 27)
Geographic region, n (%)	
Southeast	11 (41)
Midwest	6 (22)
Southwest	4 (15)
Northeast	3 (11)
West	3 (11)
Pharmacy type, n (%)	
Independent	21 (78)
Regional chain	3 (11)
National chain	1 (4)
Other	2 (7)
CDC recognition status, n (%)	
Pending	20 (74)
Full	6 (22)
Preliminary	1 (4)

Abbreviation used: CDC, Centers for Disease Control and Prevention.

Discussion

To the best of our knowledge, this is the first characterization of CDC-recognized community pharmacies providing NDPP. Most community pharmacies offering NDPP were independent pharmacies and located primarily in the Southeast and Midwest regions of the United States. As expected, there is wide variation in how these programs are being implemented and reimbursement success is limited. The impact of the COVID-19 pandemic was significant for most programs; however, many continued to offer NDPP during the pandemic, at least at the time of the survey, but struggled with recruitment and retention.

Overall, only a small number of the nearly 70,000 community pharmacies in the United States were found in the CDC Registry of Recognized Programs.¹² However, it seems highly likely that there are community pharmacies offering diabetes prevention education programs that are simply not registered with CDC or do not follow a CDC-approved curriculum. Another important factor is that 78% of community pharmacies in the registry were independent community pharmacies. It is possible that adoption of NDPP by more national chain pharmacies would significantly increase the number of recognized programs. Another key question is whether the public believes community pharmacies are acceptable settings for NDPP. A mixed-methods study of individuals with prediabetes conducted in England found that respondents found community pharmacies as an acceptable setting to receive diabetes prevention services and was preferred among those who regularly use a pharmacy and who had work and social commitments.¹³

Importantly, CDC recognizes pharmacists as important partners to promote screening for prediabetes and diabetes, referring patients to NDPP, or delivering NDPP themselves,¹⁴ yet the available evidence supporting the effectiveness of pharmacist-delivered NDPP is quite limited, with no evidence of program effectiveness reported in the community pharmacy setting. Overall, 34% of community pharmacies reported that more than half of their participants achieved at least 5% weight loss goal. However, 40% of community pharmacies reported that less than 25% of their participants achieved the

Table 2
Description of program delivery

Program characteristics	Pharmacies (n = 27)
No. years offering NDPP, mean (SD)	2.4 (2.1)
Location(s) of classes, n (%)	
Pharmacy (in person)	13 (48)
Hybrid (virtual/in person)	7 (26)
Community health center (in person)	6 (22)
Virtual only	4 (15)
Other	5 (19)
Individuals involved in delivery, n (%)	
Pharmacists	23 (85)
Pharmacy technicians	7 (26)
Pharmacy students	5 (19)
Pharmacy residents	4 (15)
Nurse	4 (15)
Dietitian	2 (7)
Other	6 (22)
No. certified lifestyle coaches per pharmacy, mean (SD)	1.9 (0.9)
Partners and collaborators, n (%)	
None	13 (48)
Medical office	10 (37)
Community health center	2 (7)
Grocery store	1 (4)
Health system	1 (4)
Other	7 (26)
Advertisement method(s), n (%)	
Word of mouth	22 (82)
Flyers	19 (70)
Electronic media	16 (59)
Other	9 (33)
Most effective advertisement method, n (%)	
Word of mouth	10 (37)
Medical office collaboration	4 (15)
Electronic media	4 (15)
Flyer or newsletter	4 (15)
Other	5 (18)

Abbreviation used: NDPP, National Diabetes Prevention Program.

weight loss goal. Reasons for this variation could not be derived from our survey but warrant further study. To put this into perspective, an analysis of nearly 15,000 individuals enrolled in NDPP between 2012 and 2016 reported that 35.5% achieved the desired at least 5% weight loss goal.¹⁵ A descriptive study¹⁶ reported screening 740 individuals in a pharmacist-led ambulatory care clinic located within a school of pharmacy and identified 69 (9.3%) with confirmed prediabetes. Of the 69 individuals invited to participate in NDPP, only 12 attended at least 1 session, and the mean number of sessions attended overall was only 3. The authors reported those who attended at least 1 session had nonsignificant decreases in body weight (0.34%) and body mass index (0.11 kg/m²). In a cluster-randomized trial¹⁷ of 20 primary care clinics, a pharmacist intervention using a decision aid significantly increased the uptake of NDPP or use of metformin for prediabetes compared with controls (38% vs. 2%, $P < 0.001$). However, the pharmacist was not involved in delivering NDPP. In 2018, Project IMPACT: Diabetes Prevention was launched as a collaboration among CDC, American Pharmacists Association Foundation, The Kroger Co, and Solera Health to build out the infrastructure for NDPP in Kroger pharmacies.¹⁸ The target population is at least 7,500 adults in underserved communities over a 5-year period, and the program will be a hybrid of face-to-face, telehealth, and digital technology solutions. This will

Table 3
Reimbursement and program evaluation

Characteristics	Pharmacies (n = 27)
Reimbursement, n (%)	
None	20 (74)
Medicare	5 (19)
Commercial	2 (7)
Patient cost to participate, n (%)	
None	22 (82)
\$1–\$50	2 (7)
\$51–\$100	1 (4)
> \$100	2 (7)
Outcomes measured, n (%)	
Change in body weight	26 (96)
Change in hemoglobin A1c	9 (33)
Change in physical activity	4 (15)
Other	1 (4)
Proportion of participants achieving $\geq 5\%$ weight loss, n (%)	
0%–25%	11 (40)
26%–50%	3 (11)
51%–75%	5 (19)
76%–100%	4 (15)
Unsure	4 (15)

hopefully provide more robust evidence regarding the effectiveness of NDPP provided by community pharmacies.

Barriers to real-world NDPP implementation have been well documented in the literature.^{7,8,13,19} A descriptive, qualitative study consisted of interviews with 12 organizations within Los Angeles County.²⁰ All respondents stated that both recruitment and retention of participants were one of the largest barriers to program success. Half of the respondents agreed that a lack of physician awareness and willingness to support the NDPP was the largest barrier to program recruitment. Interestingly, we found that only approximately a third of community pharmacies partnered or collaborated with a medical office, which would seemingly be a potential pipeline for recruitment. Community pharmacies responding to our survey reported using various advertisement methods and word of mouth was believed to be the most effective method, followed by medical office collaboration, electronic media, and flyer or newsletter. Program retention is another often cited issue, which we found to be true for community pharmacies providing NDPP given that the median number of participants in each cohort during the time of the survey was only 3. The low number of participants was likely caused by the COVID-19 pandemic, which was reported to adversely affect 88% of the responding community pharmacies. Enrollment and retention are often cited challenges of these programs, and the pandemic only made this even more challenging. However, it did create opportunities for pharmacies to explore delivering the classes virtually using video conferencing platforms. In fact, 15% of community pharmacy programs offered only virtual sessions and another 26% reported a hybrid approach offering both in-person and virtual sessions. However, some pharmacies also reported technology challenges owing to either poor digital literacy among their participants or technology limitations at the pharmacy itself. Comparative effectiveness studies to determine the optimal delivery model for NDPP in the community pharmacy setting are much needed.

Sustainability is a valid concern with any clinical service provided by pharmacists. Currently, NDPP reimbursement is

Table 4
Impact of COVID-19 on program delivery

Survey item	Pharmacies (n = 27)
COVID-19 has significantly impacted my Diabetes Prevention Program, n (%)	
Strongly agree	17 (63)
Somewhat agree	7 (25)
Neither agree nor disagree	1 (4)
Somewhat disagree	1 (4)
Strongly disagree	0 (0)
I do not know	1 (4)
Currently offering the NDPP, n (%)	
Yes	18 (67)
No	9 (33)
No. current cohorts, median (range)	1 (0–4)
No. current participants, median (range)	3 (0–22)

Abbreviations used: COVID-19, coronavirus disease 2019; NDPP, National Diabetes Prevention Program.

available through Medicare and some commercial payers, and some states are exploring expanding NDPP to Medicaid participants.²¹ The maximum allowable payment per Medicare beneficiary is \$704, but this is performance based and dependent on participant achievement of at least 5% weight loss from baseline combined with number of sessions attended.²¹ Almost three-fourths of the surveyed community pharmacies were not seeking reimbursement, and more than 80% offer NDPP to participants at no charge. Demonstrating program effectiveness is a requirement for NDPP providers to receive “full” recognition status from CDC, a rating which only 22% of community pharmacies had attained. Measures of effectiveness includes at least one of the following: (1) at least 5% weight loss at 12 months, (2) at least 4% weight loss and at least an average of 150 minutes per week of physical activity 12 months, or (3) at least a 0.2% reduction in HbA1c.⁵

This study is not without limitations. Our survey was designed to capture what we believed to be useful information to characterize community pharmacies offering NDPP, but additional questions could have been included to capture additional specifics; however, given that we conducted the survey during the COVID-19 pandemic, we chose to keep the survey as brief as possible. Nonresponse bias is another limitation because those who did not respond may not have been as successful with their programs or had possibly discontinued them altogether; however, our response rate was a respectable 42%. We also cannot rule out the possibility of recall bias because it was unclear how much of the provided information was being actively collected and reported by each of the community pharmacies; therefore, inaccuracies in reporting may have occurred. Finally, all survey respondents opted to complete the survey online, which prevented them from potentially providing additional insight or explanation for some of their responses if they had completed the survey over the telephone.

Conclusion

A modest number of community pharmacies were listed in the CDC registry of recognized NDPP providers. A survey of these community pharmacies identified that most are in the southeastern and midwestern United States, primarily identify

as independent pharmacies, and have “pending” CDC recognition status. Community pharmacies are likely increasing access to NDPP; however, recruitment and retention remain an issue. Identification of effective strategies to overcome barriers to recruitment and retention should be a subject of future research. Furthermore, 55% of programs are not achieving weight loss goals necessary for reimbursement by Medicare; however, this may have been caused by the COVID-19 pandemic. Studies evaluating innovative approaches to improve NDPP effectiveness in the community pharmacy setting are needed.

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