

Addressing Medication Costs During Primary Care Visits: A Before-After Study of Team-Based Training

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Background: Medications contribute to patients' out-of-pocket costs, yet most clinicians do not routinely screen for patients' cost-of-medication (COM) concerns.

Objective: To assess whether a single training session improves COM conversations.

Design: Before-after cross-sectional surveys of patients and qualitative interviews with clinicians and staff.

Setting: 7 primary care practices in 3 U.S. states.

Participants: In total, 700 patients were surveyed from May 2017 to January 2018: 50 patients per practice before the intervention and another 50 patients per practice after the intervention. Eligibility criteria included age 18 years or older and taking 1 or more long-term medications. Qualitative interviews with 45 staff members were conducted.

Intervention: A single 60-minute training session for clinicians and staff from each practice on COM importance, team-based screening, and cost-saving strategies.

Measurements: Patient data (demographics, number of long-term medications, total monthly out-of-pocket medication costs, and history of cost-related medication nonadherence) were obtained immediately before and 3 months after the intervention. Practice staff were interviewed 3 months after the intervention.

Results: A total of 700 patient surveys were completed. Frequency of COM discussion improved in 6 of the 7 practices and remained unchanged in 1 practice. Overall, COM conversations with patients increased from 17% at baseline to 32% postintervention ($P = 0.00$). There was substantial heterogeneity among sites in before-after differences in patient-reported out-of-pocket COM. Qualitative analyses from key informant interviews showed wide variation in implementation of screening approaches, workflow, adoption of a team-based approach, and strategies for addressing COM.

Limitation: It is not known whether improvements in COM conversations were sustained beyond 3 months.

Conclusion: A single team training to screen and address patients' medication cost concerns improved COM discussions over the short term. Further research is needed to assess sustained effects and impact on patient costs and medication adherence and to determine whether more intensive, scalable interventions are needed.

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Americans rank the high cost of prescription medications as a national priority (1). One in 3 Americans is financially burdened by medical expenses, and out-of-pocket costs are rising for many families (2, 3). Inability to afford medications is a common and potentially underrecognized cause of poor adherence. The United States leads 11 developed countries in the rates of cost-related nonadherence, at nearly 17% (4), and rates are continuing to climb over time (5). Feasible office-based strategies exist to assist patients in reducing their medication costs (6, 7).

Previous literature has shown that patients would like physicians to discuss ways to reduce medication costs (8–10). Most patients are comfortable with their clinician or

nurse asking questions about medication costs and affordability. However, few patients mention their cost concerns to their physicians, and thus these conversations are infrequent and cost-related nonadherence goes unrecognized (10–12). Team-based interventions are needed to promote conversations about appropriate cost reduction strategies in order to minimize competing demands on the clinician during busy office visits.

Medication reconciliation (ensuring that the medications listed in the medical record match the medications patients are actually taking) reduces medication errors by reconciling medication information (13). Medication reconciliation is a standard of care that is widely implemented in primary care. Thus, it is a natural entry to asking patients whether their medications pose a financial burden. Integrating cost-of-medication (COM) screening into a team-based workflow minimizes operational burdens while affording clinicians an opportunity to quickly address these concerns (14). Such a team approach is analogous to depression screening in primary care, where practice staff administer screening and the clinician reviews the screening, assesses the

See also:

Editorial comments S33, S36

Web-Only

Visual Abstract

Supplement

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Table 1. Components of Primary Care Training for Addressing Patient Medication Costs

Component	Team Member Responsibility
Screening questions	Nursing staff asks several brief questions to screen patients for patient cost concerns. Potential examples include “Do any of these medications represent a significant financial burden for you? If, so which ones?” and “May I let your provider know?”
Communication of patient cost concern to the clinician	Nursing staff communicates concern to the clinician. Examples, depending on practice and electronic health record, include medication record documentation (e.g., chief complaint or note on medication reconciliation), electronic health record message or secure intraoffice message, paper note, or face-to-face communication.
Conversation with patient regarding options	The clinician/designee confirms patient concerns and presents the patient with potential options depending on the medication and available resources.
Assisting patients with implementing strategies	Many strategies will not require additional assistance, such as generic, drug class substitution, or 90-day prescription. Some strategies will require minimal assistance from office staff (e.g., use of a pill splitter or referral to a retail discount program). A few strategies require moderate or more assistance (e.g., enrollment in insurance, change in drug plan, or enrollment in a pharmaceutical assistance program).

patient, and provides treatment or makes a referral (15).

In this pilot study, we aimed to integrate screening for COM concerns into the medication reconciliation process in 7 primary care practices. We developed and implemented a focused training session for clinicians and staff at each practice and evaluated its impact on screening for COM concerns and patients' out-of-pocket medication costs.

METHODS

Study Design

This study used a before-after cross-sectional design. We surveyed patients before and after the intervention and performed qualitative interviews with clinicians and nursing and reception staff after the intervention to assess the implementation process. At each practice, cross-sectional samples of patients completed surveys immediately before and approximately 3 months after intervention. The intervention used a single session to train staff in a team-based approach to leverage brief cost-saving strategies (6, 7). We used mixed quantitative and qualitative methods to evaluate the impact of the intervention and the process of implementation (16).

The University of Rochester Human Subject Review Board and the American Academy of Family Physicians Institutional Review Board approved the study, and participants provided informed consent.

Setting and Participants

We conducted the research in 7 primary care practices. The practices were diverse in geography (New York, Georgia, and California), urban and suburban location, and primary care specialty (family medicine, internal medicine, and medicine-pediatrics). Practices varied from independent to members of a health care system and included both nonresidency and residency practices.

Patients were eligible to participate in the study if they were aged 18 years or older, reported taking 1 or more long-term medications, and had basic English-language proficiency. Before a regularly scheduled clinic visit, practice staff introduced the study to eligible patients to determine interest. Patients who expressed

interest were approached by a study research assistant (RA), who provided them with an informational letter and addressed any questions or concerns the patients may have had. Patients who agreed to participate were invited to complete the survey and were paid \$10 for their participation. Other than completing a before and/or after survey, the study activities, by design, did not target or involve patient participation in the intervention. All clinicians and staff at each practice were invited to participate in the study.

We conducted purposive sampling for key informant interviews. Key informants were provided \$20 for their participation.

Intervention

The intervention consisted of a single 60-minute interactive training session at each practice for clinicians, nurses, receptionists, and practice managers. One investigator (K.F.) conducted 5 training sessions in person; another investigator (J.K.C.) conducted 2 training sessions via webinar. Each training session occurred approximately 2 weeks after the baseline patient surveys were completed at each practice, with the date and time of day based on the preference of the practice leadership. Attendance at the training varied from roughly 50% to 100% for some practices. In some instances, reception staff did not attend the training in order to answer phone calls.

At residency training sites, training varied. At one site, training focused on faculty, given the challenges associated with assembling residents at one time. Faculty were asked to incorporate the training into their resident teaching. At another, all residents and faculty were present, but implementation occurred in only 2 of 6 teams (2 faculty and 6 residents total).

The training sessions were delivered in a 20- to 30-minute slide presentation (materials are described in the **Supplement** [available at [Annals.org](https://annals.org)]), followed by group discussion. The presentation addressed the importance and impact of patient medication costs and included baseline survey findings for each practice. The training session also included a recommendation for incorporating a team-based approach to screening and management of patient medication costs (**Table 1**). Cli-

nicians and nursing staff were encouraged to incorporate medication screening into the medication reconciliation workflow by asking every patient which, if any, medication presented a financial burden. Presenters explicitly recommended that screening results be relayed to the prescribing clinician immediately after the patient's completion of their screening, for discussion during the visit that day. Practices were encouraged to develop their own workflow processes to support these objectives. An algorithm provided guidance for addressing patient cost concerns and included specific strategies that could be completed during the office visit. As shown in **Table 1**, strategies included changing to a lower-cost alternative, enrolling in insurance or patient assistance programs and/or referral to a case manager or social worker in the practice or the community for other assistance (17–19). We also shared relevant resources, such as \$4-per-month medication programs, discount coupon programs, and phone apps for determining COM copayment and finding the lowest-cost pharmacy.

Measurements and Outcomes

We adopted clear, simple language for our patient surveys by using wording adapted from national surveys—for example, “out-of-pocket costs.” We adopted previously validated measures for cost-related nonadherence behavior (20). We adopted key informant questions used by others (21). Copies of the patient survey and key informant interview questions are shown in the **Supplement**.

We surveyed 50 patients from each practice before the intervention and surveyed another 50 patients again 16 to 20 weeks after the intervention. Typically, patients were asked by the front desk staff whether they would be willing to complete a brief survey after their visit. Those who agreed (78%) were referred to an RA, who obtained written informed consent from the patient; then, the patient completed the survey. Patients answered questions about their demographic characteristics, number of long-term medications they were prescribed, their total monthly out-of-pocket costs for these medications, any cost-related nonadherence behaviors during the past 12 months (20), and whether anyone in the practice asked about these costs. Data were entered into REDCap, a secure Web-based application for managing surveys and data (22).

The primary outcome was change in the means of patient-reported discussion of any COM among those surveyed before or after the intervention. The secondary outcome was change in monthly out-of-pocket medication costs.

At the end of the study, we conducted 45 key informant semistructured interviews with practice staff. Working in conjunction with practice leadership, RAs purposively recruited from 3 groups within the practices: clinicians (primarily physicians), nursing staff (nurses and medical assistants), and reception staff. All key informants consented. The RA set up a time to meet and provided them with an informational letter

outlining the study procedures, answered questions, and conducted the interviews. Six of the 7 practices had at least 1 key informant from each of the 3 groups. The RAs asked key informants about their role in the practice, how patients were identified, COM concerns in their practice, which strategies and resources from the training session were used and which were successful, and suggestions to improve the process. Each interview lasted approximately 20 minutes.

Interviews were audiorecorded, transcribed, and de-identified, and text was entered into an Excel (Microsoft) spreadsheet to facilitate coding by the team. We used an iterative, immersion-crystallization process to analyze the codes and interpret the process of implementation for each practice (23, 24). The primary investigators, project managers, statistician and research assistants participated in coding and interpretation of the themes generated.

Statistical Analysis

We aimed to survey 700 patient participants: 350 before the intervention and 350 after the intervention. We used G*Power to estimate sample size requirements (25). On the basis of an estimated baseline proportion of discussions of roughly 10% (10), we estimated that a total of 428 completed patient surveys, split evenly before and after, would provide 80% power to detect a doubling of conversations, assuming a type 1 error (2-sided) of 0.05. In the absence of reliable data on the intraclass coefficient regarding such conversations, we inflated the total number of surveys to 700 or 100 for each of 7 practices (that is, 50 surveys before and 50 after per practice).

We compared changes in patient reports of being asked about their medications before and after the intervention by using a logistic regression model that included patient characteristics and site as a fixed effect. Patient characteristics included age, sex, race, ethnicity, educational attainment, and insurance. There were few missing data: age ($n = 1$), sex ($n = 1$), race ($n = 13$), ethnicity ($n = 13$), education ($n = 1$), and COM ($n = 3$). For race and ethnicity, missing values were mostly in the “refused to answer” category. We excluded patients with missing data from analyses.

We used SAS software, version 9.4 (SAS Institute), and Stata, version 12.0 (Stata Corp.), to conduct the statistical analyses.

Role of the Funding Source

The study received funding and support from the Robert Wood Johnson Foundation. The funding organization provided technical support but had no role in the conducting of the study, interpretation of the results, or decision to publish the findings.

RESULTS

From May 2017 to January 2018, a total of 700 patient surveys and 45 key informant interviews were completed. The characteristics of patients varied by site, and characteristics of those who responded to the preintervention survey were generally similar to those who responded to the postintervention survey (**Table**

Table 2. Participant Characteristics Before and After the Intervention, by Site

Characteristic and Time Point	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
Participants, n							
Before	50	50	50	50	50	49	50
After	50	50	50	50	50	50	50
Mean age, y							
Before	67 (12)	49 (17)	63 (15)	51 (16)	62 (14)	46 (19)	66 (13)
After	66 (16)	52 (17)	59 (17)	52 (16)	61 (12)	42* (17)	62 (15)
Male, %							
Before	58	28	30	36	34	39	38
After	46	24	44	30	32	35*	48
Race, %†							
White							
Before	88	70	96	42	26	76	88
After	94	82	86	36	16	61	82
Black							
Before	2	22	0	34	70	2	12
After	2	10	8	44	80	2	12
Asian							
Before	0	0	0	0	2	2	0
After	0	0	0	0	0	9	4
Other/multiple							
Before	10	8	4	24	2	19	0
After	4	8	6	20	4	27	2
Latino/a							
Before	4	10	2	14	2	64‡	0
After	4*	8	4	14	4	58§	2
High school education or less, %							
Before	16	28	20	56	54	27	26
After	30	26	12	56	44	26	28
Monthly income <\$2000, %							
Before	12	36	6	60	58	53	20
After	26	36	18	74	72	38	26
Insurance, %							
Medicaid							
Before	4	16	10	40	28	0	15
After	10	14	14	31	28	2	10
Medicare							
Before	10	6	16	14	32	9	17
After	20	12	10	8	28	10	20
Private							
Before	56	58	54	26	16	54	54
After	51	52	44	37	22	53	70
Receiving ≥5 long-term medications, %							
Before	54	60	32	70	76	14	60
After	38	42	42	70	74	12	50
Cost-of-medication discussion, %							
Before	20	20	8	10	8	45	12
After	28	20	18	18	18	82	40
Median out-of-pocket costs, \$							
Before	25	54	30	30	20*	30*	41*
After	30	56	30	16	20	30¶	30

* Data were missing for 1 participant.

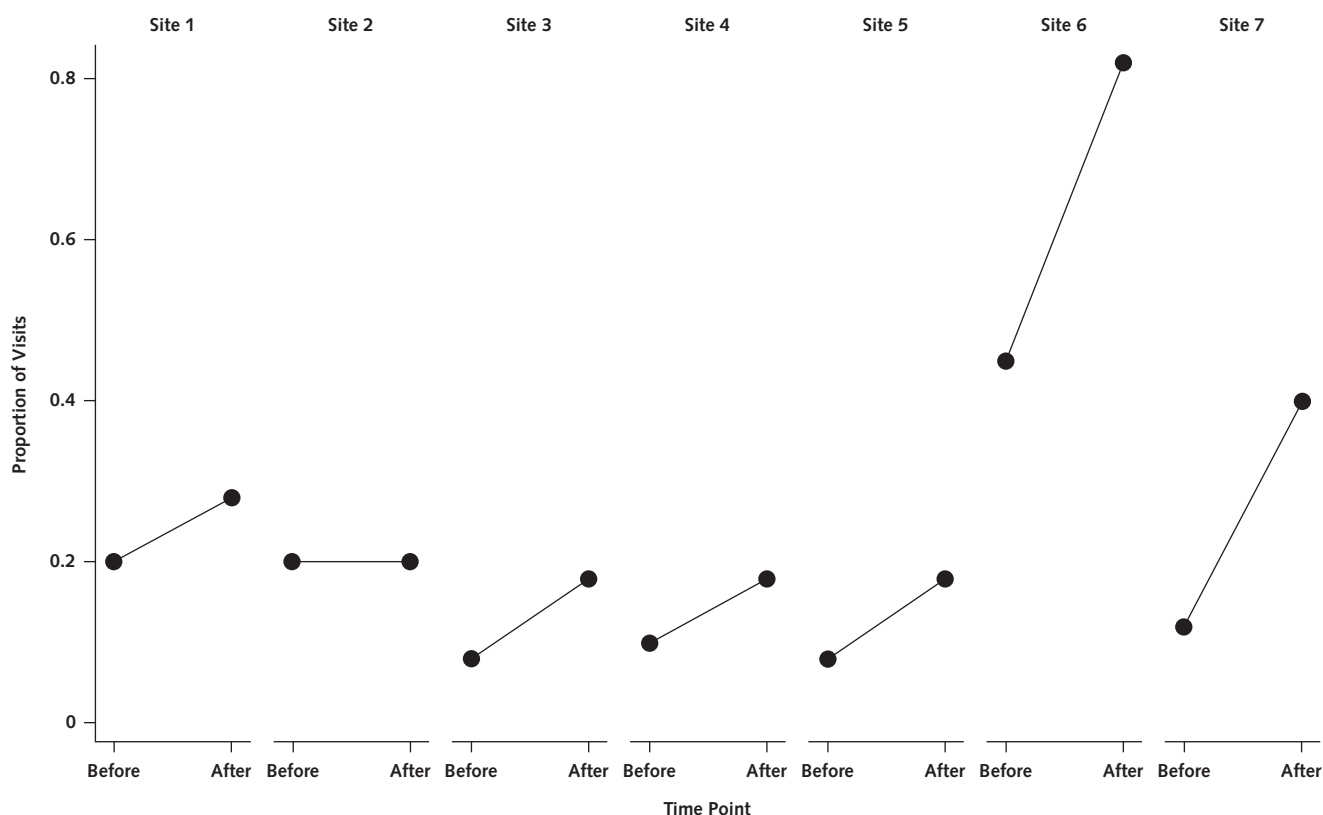
† For site 6, data on race were missing for 7 participants from the presurvey and 6 participants from the postsurvey.

‡ Data were missing for 5 participants.

§ Data were missing for 6 participants.

|| Data were missing for 9 participants.

¶ Data were missing for 2 participants.

Figure 1. Discussion of medication costs before and after the intervention, by site.

2). Across the 7 sites, the percentage of visits with COM discussions ranged from 8% to 45% before the intervention and 18% to 82% after the intervention. Frequency of COM discussion improved in 6 of the 7 practices and remained unchanged in 1 practice (Figure 1). Overall, 17% of patients reported COM discussion at baseline, which significantly improved to 32% after the intervention ($P = 0.00$) after adjustment for site, patient age, sex, race, ethnicity, and education. More patients reported receiving cost-reduction suggestions (25.1% vs. 15.5% [$P = 0.002$]), with roughly one half in each group trying out strategies when suggested (52.2% vs. 48.1% [$P > 0.20$]). There was wide variation in before-and-after patient medication costs by practice (Figure 2), with no difference between the before-and-after samples in terms of patient median medication costs.

Implementation of the model for COM screening and management varied among practices. Qualitative analyses of interviews with practices revealed significant variation in workflows, including patient populations screened, who conducted the initial screening, how clinicians or staff asked patients about COM concerns, how screening information was relayed to the clinician, which cost-saving strategies were primarily deployed, barriers to screening, and suggestions for future screening. An example of a specific question that

one practice used was, "Is the cost of medication something you would like to talk about with your provider today?"

Practices adopted systematic screening during the medication reconciliation process, through written questions posed during reception or as part of the nursing assessment in the exam room. As respondents reported from 2 different practices, "We usually ask the nursing staff to do that when they are rooming the patient," and "The initial screening is done by a nurse, and she will point out to me that there is an issue."

Most practices asked patients during the medication reconciliation process whether any medication was a financial burden. Others phrased the question more broadly—for example, whether patients had any barriers to obtaining their medication. Estimates of patients screened varied from 5% to 100%.

Practices differed in whom they screened. One practice introduced screening during annual Medicare health visits and therefore the population primarily included older patients. Other practices ($n = 6$) explored medication costs only when an adherence issue was identified. Practices also varied in the extent to which they adopted team-based approaches, although most practices reported involving nonclinician staff to some extent. In general, screening information was conveyed

to the clinician through the medication record, electronic messaging, paper notes, or verbally.

The most common cost-reduction strategies involved the use of discount coupons and \$4-per-month prescription programs. One respondent reported, “We are aware of the low-cost medications. All physicians are aware of what pharmacies are offering \$4 meds. I use GoodRx to tell patients where to find the cheapest price for a medication whenever possible. We consider the patient’s formulary . . . I have an app on my phone for searching the formulary so I can make sure the med I’m prescribing is on the formulary and thereby reduce the patient’s coinsurance.” A few clinicians mentioned using a formulary app to determine medication copayment, as well as deprescribing.

Barriers reported by practices included lack of time to screen patients, overreliance on clinicians to conduct screenings, and difficulty establishing workflows. Suggestions for improvement included additional training on workflows and resources, mandated training, standardized protocols, optimization of the electronic medical record (for example, use of templates or alerts), and set workflow procedures for the entire clinical staff. Sixty-four percent of key informants indicated that it was very likely they would continue to screen, whereas 22% said it was likely.

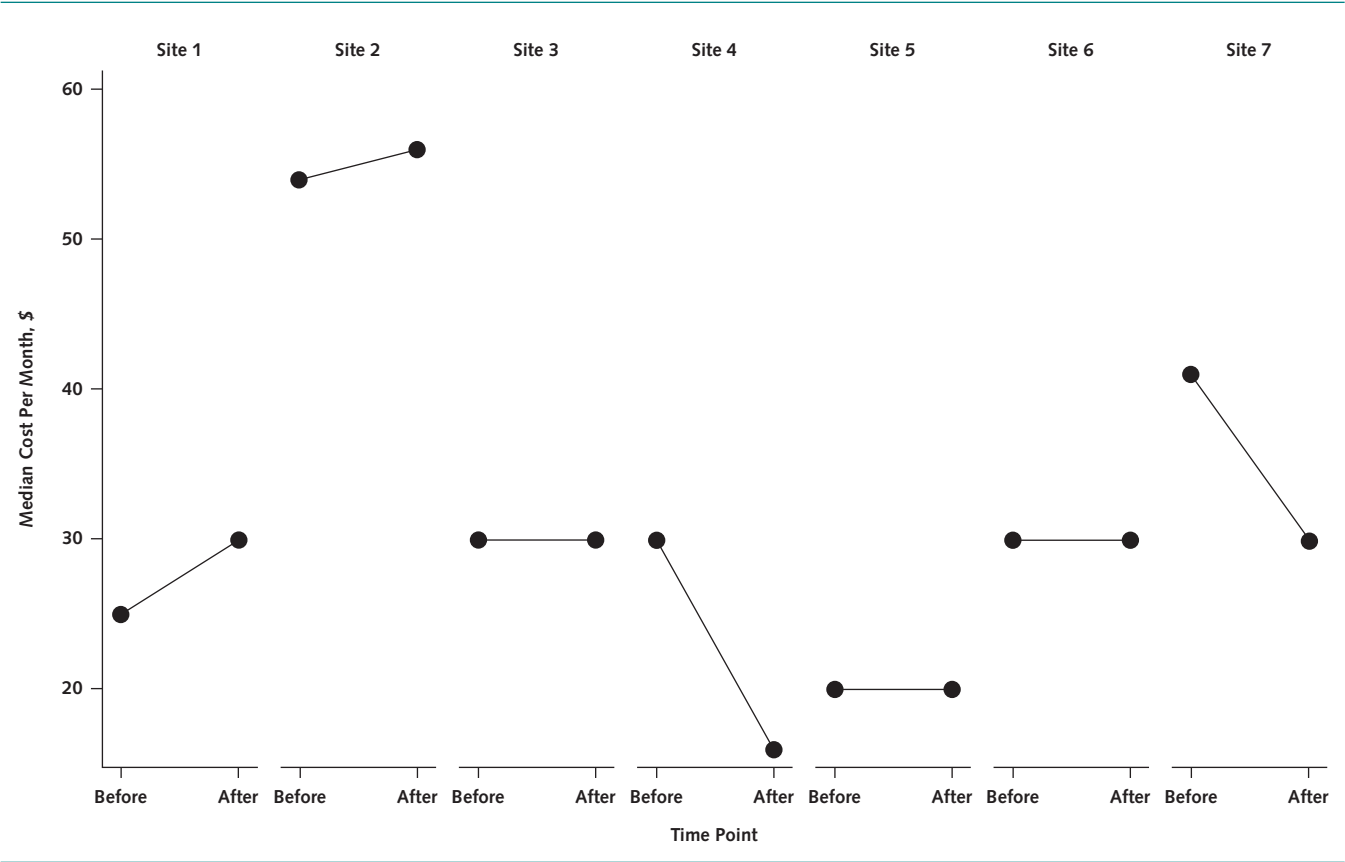
DISCUSSION

A single training session on team-based screening and management of cost-related nonadherence nearly doubled the number of patient-reported discussions about medication costs. All 7 practices adopted steps to improve screening for medication cost barriers.

To our knowledge, this is the first published intervention to promote discussion of medication costs between primary care patients and their clinicians and other team members. Our postintervention frequency (32%) of patient-reported cost-related conversations is similar to that which was previously reported in African American women with persistent asthma (9). Likewise, 44% of Medicare Part D beneficiaries with diabetes reported discussing drug costs with their physicians (26).

Over the short intervention (16 to 20 weeks), practices adopted a range of strategies to assist patients with medication cost concerns. Practices differed regarding which patients they screened, how patients were screened, which team members were involved in the screening, how screening workflows were operationalized, and what cost-saving strategies they used. There was general acceptance of a team-based approach given the time pressures on primary care clinicians; however, workflows were a commonly cited barrier. Many practices recognized the need for additional

Figure 2. Median out-of-pocket costs before and after the intervention, by site.



training, development of formal workflows, and optimization of prompts within the electronic health record. These qualitative findings are consistent with previously published reports of physician-reported barriers regarding the difficulty and complexity of navigating financial discussions and the need for generalizable tools to initiate conversations about medication cost (27, 28).

Findings from this pilot involving 7 practices are limited by the before-after cross-sectional design and wide variations across the practices in patient characteristics, implementation processes, and patient-borne costs. Clinician and staff participation in the training varied by site, probably contributing to further variation in outcomes. Moreover, the study was not powered to detect changes in patient medication costs for patients facing medication cost burdens. Most important, findings are limited by short-term (<6 months) follow-up.

A more intensive approach to promoting and sustaining a team-based approach to addressing patients' COM concerns may be needed, similar to approaches to depression screening in primary care. The collaborative care model for depression emphasizes leadership commitment, team building, defining the program's scope, assessing existing workflows, resources and training needs, creating an explicit team-based workflow, training staff, launching the program, and supporting continuous quality improvement (29). Despite these limitations, these pilot findings support further research designed to promote screening for medication cost concerns in primary care.

In conclusion, an intervention consisting of a single training session to screen and address patients' medication cost concerns significantly improved the frequency of COM discussions with patients. Further research is needed to replicate and extend these pilot findings. Such research should address the optimal intensity and duration of interventions needed to produce sustained effects on practices, with corresponding impact on patients' costs, adherence, and health outcomes.

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