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DOI: 10.1111/1475-6773.12455  
RESEARCH ARTICLE

# A Randomized, Controlled Trial of a Shared Panel Management Program for Small Practices

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**Objectives.** To determine whether a shared panel management program was effective at improving quality of care for patients with uncontrolled chronic disease.

**Data Sources.** Data were extracted from electronic health records.

**Study Design.** Randomized controlled trial of a panel management program initiated by New York City Department of Health and Mental Hygiene. Patients from 20 practices with an uncontrolled chronic disease and a lapse in care were assigned to the intervention (a phone call requesting that the patient schedule a physician appointment) or usual care. Outcomes were visits to physician practices, body mass index measurement, blood pressure measurement and control, use of antithrombotics, and low-density lipoprotein measurement and control.

**Principal Findings.** Panel managers were able to successfully speak with 1,676 patients (14.7 percent of the intervention group). There were no significant differences in outcomes between the intervention and usual care groups. Successfully contacted patients were more likely to have an office visit within 1 year of randomization (45.6 percent [95 percent CI: 22.8, 26.9] vs. 38.1 percent [95 percent CI: 36.8, 39.3]) and more likely to be on antithrombotics (24.4 percent [95 percent CI: 17.7, 31.0]) versus those in the usual care group (17.0 percent [95 percent CI: 13.9, 20.0]) but had no other difference in quality.

**Conclusions.** A shared, low-intensity panel management program run by a city health department did not improve quality of care for patients with chronic illnesses and lapses in care.

**Key Words.** Chronic disease management, disparities in health care, public health, panel management, population management

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More than half of Americans have at least one chronic health condition (Centers for Disease Control and Prevention 2011, 2012). Chronic disease accounts for approximately 75 percent of health care spend-

ing and 70 percent of mortality in the United States (Bodenheimer, Chen, and Bennett 2009; Centers for Disease Control and Prevention 2010, 2013). One possible reason for the high burden of uncontrolled chronic illnesses is the health care system's reactive approach to patients (Wagner, Austin, and Von Korff 1996; Wagner 1998; Bodenheimer, Wagner, and Grumbach 2002a,b; Bodenheimer 2008). Physicians treat patients who come to their offices but rarely identify and contact patients who miss recommended care; these patients may fall through the cracks.

Panel management is a proactive approach to identify patients who have health needs that are not being adequately addressed and to reach out to them (Neuwirth et al. 2007; Chen and Bodenheimer 2011; Agency for Healthcare Research and Quality 2013). The purpose of panel management is to change care from reactive (i.e., providing care only when a patient is in the office) to proactive (i.e., anticipating care needs and reaching out to patients). To perform panel management, practices need to identify their population of patients, identify the specific care needs for this population, and reach out to them.

Outreach can range from case management, which focuses on personalized care for individual patients by highly trained staff, to low-intensity interventions for larger groups of patients by nonclinical staff (Case Management Society of America 2009). These low-intensity interventions include telephone calls and other forms of reminders and education by nonclinical staff that can be applied to many patients with little personalization. Several studies have improved chronic disease and preventative care using a less intensive approach for larger groups of patients (Neuwirth et al. 2007; Loo et al. 2011).

In 2010, the New York City Department of Health and Mental Hygiene's (NYC DOHMH) Primary Care Information Project (PCIP) started

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a panel management program for small practices located in New York City. PCIP was founded in 2005 to help small practices adopt and optimize the use of electronic health records (EHRs). After the program started, PCIP administrators noticed that although practices had the ability to create registries of patients through their EHRs, practices did not have sufficient staff to use these registries to drive proactive care, such as patient outreach. The PCIP panel management program employed panel managers who went to participating practices, identified patients with chronic diseases and lapses in care, and performed telephone outreach to schedule follow-up appointments. The program was unique because it was run by a city health department, deployed panel managers who were shared by several small, private practices in underserved areas of New York City, and is an intervention that could be superimposed on existing practices. This particular low-intensity intervention was chosen because PCIP wanted to reach more patients than possible with a more intense program without necessarily impacting the day-to-day functions of the practices. PCIP also anticipated that practices in the program would eventually be able to train nonclinical staff to perform the panel managers' activities in the future.

In this paper, we report findings from a randomized controlled pragmatic trial of PCIP's panel management program. By pragmatic, we mean that the trial measured the effectiveness of an intervention that was incorporated into the routine clinical processes of each practice (Roland and Torgerson 1998). We specifically address the following research questions: (1) How effective was the program at contacting patients? (2) How effective was the program at improving process and outcome measures of chronic disease care for patients with gaps in care? (3) How effective was the program among patients who were successfully contacted?

## METHODS

### *Setting and Participants*

Established in 2005, PCIP has facilitated the adoption of EHRs by primary care practices in underserved, ethnically diverse New York City neighborhoods. Most of these practices are small (i.e., less than 10 providers). The initial program targeted practices that served Medicaid and uninsured patients to receive a software subsidy and technical assistance (Mostashari, Tripathi, and Kendall 2009). In 2010, PCIP established NYC REACH, the city's regional extension center and currently assists over

10,000 primary care providers in over 1,000 independent practices, making it the largest community-based EHR extension project in the United States (Mostashari, Tripathi, and Kendall 2009). The assistance to practices focused on achievement of Meaningful Use standards as defined by the Centers for Medicaid and Medicare Services, including facilitating the interpretation and incorporation of clinical preventive service guides, such as blood pressure control, identifying smokers and cessation intervention, and diabetes management as part of the practice's routine clinic workflow.

In 2010, PCIP started a shared panel management program. To be eligible for this program, practices must have been using the EHR for at least 6 months, cared predominantly for adult patients, had adequate space and equipment for a panel management staff to use (computer and telephone), and could not be concurrently enrolled in PCIP's pay-for-performance program (Ryan et al. 2013). Practices included in this study were those that enrolled before October 31, 2012.

During the study period, 26 practices enrolled. Practices dropped out of the program because of technical issues with the EHR ( $n = 1$ ) or closure of the practice ( $n = 3$ ). We were unable to access data from practices because of technical problems ( $n = 2$ ) or because the practice refused ( $n = 1$ ). This analysis is based on data from the remaining 20 practices.

To be eligible for the study, patients in these practices must have been identified as having one of the target conditions (overweight and diabetes, heart disease, uncontrolled hypertension, and hyperlipidemia) and also had lapses in care at that practice. Lapses in care were defined separately for the different target conditions (Table 1). Study eligibility was determined by queries that were executed within each practice's EHR.

### *Intervention*

Six panel managers were hired by the NYC DOHMH. All the panel managers had bachelor's degrees but none had formal health care training or higher level degrees. The panel managers underwent at least 2 weeks of training before going into practices and met with program leadership weekly for additional training and troubleshooting. Topics included using the EHR, chronic disease care, and telephone training. The panel managers' only responsibility was to try to get patients with lapses in care to schedule an appointment, not to perform care management functions such as discussing medications or self-care.

Table 1: Clinical Measures

<i>Quality Measure</i>	<i>Eligible Population</i>	<i>Achievement Criteria</i>	<i>Time Frame</i>
Process measures			
BMI documentation	Overweight and diabetes not seen in past 3 months	BMI documented in EHR	At least once within 1 year of randomization
Antithrombotic therapy	Heart disease not seen in past 6 months and with no documentation of aspirin or another antithrombotic drug	Documented use of aspirin or another antithrombotic drug in their current medications	At least once within 1 year of randomization
Blood pressure monitoring	Uncontrolled hypertension (BP > 140/90 in nondiabetics or BP > 130/80 in diabetics) not seen in past 3 months	Blood pressure checked	At least once within 1 year of randomization
LDL monitoring	Hyperlipidemia not seen in past 6 months	LDL Measured	At least once within 1 year of randomization
Intermediate outcome measures			
Blood pressure control	Uncontrolled hypertension (BP > 140/90 in nondiabetics or BP > 130/80 in diabetics) not seen in past 3 months	sBP < 140 and dBp < 90 in nondiabetics; sBP < 130 and dBp < 80 in diabetics	Controlled at least once during 1 year after randomization
LDL control	Hyperlipidemia not seen in past 6 months	LDL < 130	LDL at goal at least once during 1 year after randomization

BMI, body mass index; dBp, diastolic blood pressure; LDL, low-density lipoprotein; sBP, systolic blood pressure.

Panel managers were integrated into the practices, working in each practice 1 day a week or every other week, depending on the practice size. Each time they were in an office, they called patients who were randomized to the intervention group. If the panel manager was able to reach the patient, he or she used a standard script to encourage each patient to make an appointment. The panel managers were trained on the reasons why patients needed follow-up for their chronic medical conditions but were expected to only help patients make follow-up appointments without providing the patient with a specific reason why follow-up was necessary. The panel managers were able to immediately schedule appointments. If a patient could not be reached by phone, the panel manager left a voicemail message asking the patient to schedule an appointment but, to ensure patient privacy, did not state the specific reason why an appointment was necessary. If a patient had not scheduled an appointment after three voicemails, the panel manager mailed the patient a letter suggesting they schedule an appointment and did not attempt additional phone calls. Panel managers logged telephone calls to patients in the EHR; however, the specific gap in care was not included in the EHR telephone encounter note. The telephone encounter simply stated that an outreach call had been made. Office staff were able to view this information in the EHR.

### *Study Arm Assignment*

Panel managers in every practice accessed new lists of patients who were eligible for assignment every 6–8 weeks, depending on the patient volume (longer intervals were used for practices with more patients). Each time the panel manager generated a list, the list was securely transmitted to *Sharepoint* (Microsoft Corp., Redmond, WA, USA) to perform automated randomization of patients to the intervention and usual care groups. Two-thirds of the patients were randomized to the intervention group and one-third to usual care.

Patients who were randomized to the intervention group were then prioritized so that patients who had more conditions were at the top of the call list and patients who had only one condition were at the bottom. Practices were able to remove names of patients who they believed were no longer part of the practice or should not be called for other reasons.

Usual care differed by practice. For example, some practices did not track patients or reach out to patients with lapses in care. Some practices had staff review appointment books to reschedule patients who missed visits. None of the practices regularly used the EHR's registry function to track patients for follow-up.

### Variables

The outcome variables were classified as operational measures, clinical process measures, or intermediate outcome measures. Operational measures were whether a patient had an office visit within 3 months or 1 year of randomization (Table 1).

Process measures included body mass index (BMI) documentation for overweight patients with diabetes, documentation of antithrombotic therapy for patients with heart disease, blood pressure measurement in patients with hypertension, and LDL measurement for patients with hyperlipidemia. Intermediate outcome measures were blood pressure control for patients with hypertension (i.e., systolic blood pressure [sBP] <140 and diastolic blood pressure [dBP] <90 in nondiabetics; sBP <130 and dBP <80 in diabetics) and LDL control for patients with hyperlipidemia (i.e., LDL <130 in nondiabetics; LDL <100 in diabetics). We considered a process measure to be achieved if the process was documented at least once during the 1 year postrandomization and an intermediate outcome measure to be met if the patient achieved that outcome at least once during the 1 year postrandomization. We dichotomized all measures as either achieved or not achieved.

Data on attempts to call patients that were assigned to the intervention, as well as the result of these calls, were obtained from program records.

### Analysis

We performed an intention-to-treat analysis with patients analyzed in the group to which they were randomized. We used the Pearson chi-squared test to test for unadjusted differences between the usual care and intervention groups and multivariable logistic regression to test for differences between the usual care and intervention groups while controlling for patient age, gender, and clustering at the practice level. We considered a *p*-value of <.05 to be significant. Because panel managers were able to speak with only a small percentage of patients, we performed a subgroup analysis comparing patients in the intervention group who were successfully contacted within 1 year (i.e., the panel manager spoke with the patient) versus patients in the usual care group.

All analysis was performed using *Stata 12.0* (Stata Corp, College Station, TX, USA).

## RESULTS

### *Patient Characteristics*

Of the 17,598 patients eligible for panel management, patients were excluded because there was an error in the randomization ( $n = 273$ ), call information was not available ( $n = 437$ ), gender was not available ( $n = 1$ ), or eligibility criteria was not available ( $n = 1$ , Figure 1).

Among the 16,886 patients who had complete data, the mean age was 53.5 (SD: 16.4) and 49.2 percent were male. Most patients were eligible because of hyperlipidemia (72.1 percent) and most met the eligibility criteria for only one condition (86.3 percent). Of the eligible patients, 11,409 were assigned to the intervention group and 5,477 were assigned to the usual care group. There were no significant demographic differences between patients in the two study arms (Table 2).

Among patients in the intervention group, the mean number of call attempts per patient was 1.4 (SD: 1.3). Panel managers did not call 4,058 patients (36.5 percent of the intervention group). Among these patients, the

Figure 1: Patient Study Arm Assignment

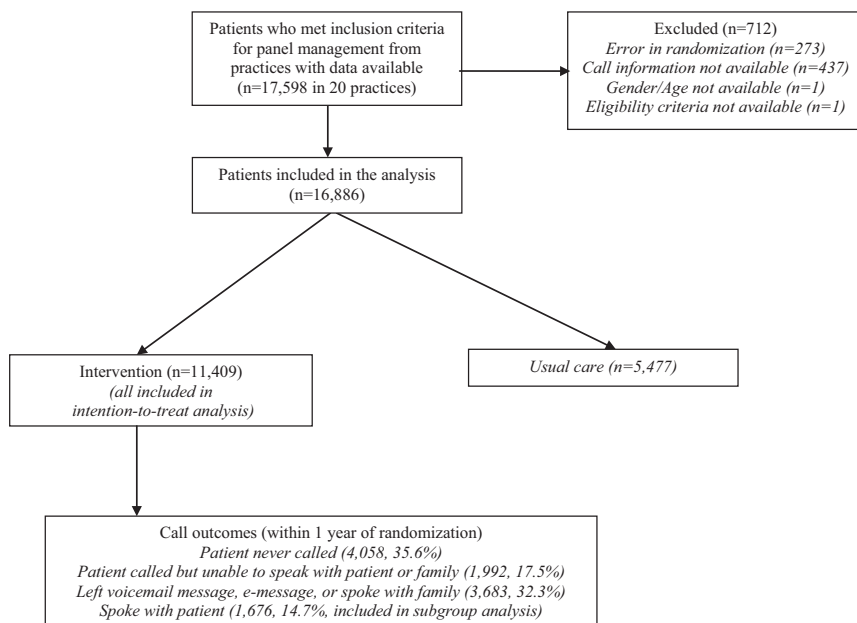




Table 2: Characteristics of the Usual Care and Intervention Groups

	<i>Usual Care</i>	<i>Intervention</i>	<i>p-value</i>
No. of practices	20	20	–
No. of patients	5,477	11,409	–
Age, year (mean)	53.7	54.4	.59
Male sex (%)	50.3	48.7	.06
Reason for eligibility (%)			
Overweight and diabetes	9.9	10.6	.20
Heart disease	10.6	10.9	.60
Uncontrolled hypertension	23.0	22.4	.34
Hyperlipidemia	71.6	72.4	.28
No. of reasons for eligibility (%)			
1	86.7	86.0	.50
>1	13.3	14.0	

*Note.* Of patients within each practice, 66.7% were assigned to treatment and 33.3% were assigned to usual care.

most often cited reasons for not calling were (1) that the patient had an appointment scheduled by the time the panel manager planned to call (19.8 percent of patients not called); (2) the physician requested not to call (12.9 percent of patients not called); and (3) the patient did not meet clinical criteria after the panel manager reviewed the chart (8.7 percent of patients not called). For the remainder of patients who were not called, there was no documented reason. Among patients in the intervention group who were called at least once, the mean number of call attempts per patient was 2.1 (SD: 1.2). Panel managers called but were unable to speak with or leave a voicemail for 1,992 patients (17.5 percent of the intervention group). They were able to leave a voicemail message or speak with a family member for 3,683 patients (32.3 percent of the intervention group). They were able to successfully speak with 1,676 patients (14.7 percent of the intervention group).

### *Quality Measures*

Among patients in the usual care group, 20.7 percent (95 percent CI: 19.7, 21.8) had an office visit within 3 months of randomization compared with 21.0 percent (95 percent CI: 20.2, 21.7) in the intervention group ( $p = .72$ , Table 3). The percentage of patients with office visits within 1 year of randomization was also similar in the usual care and intervention groups (38.1 percent [95 percent CI: 36.8, 39.3] vs. 38.6 percent [95 percent CI: 36.8, 39.3],  $p = .53$ ).

Table 3: Effect of Panel Management on Performance Measures

Measure	Usual Care (n = 5,477)		Intervention (n = 11,409)		Unadjusted p-value	Adjusted OR* (95% CI)
	No. Eligible Patients	Met Measure, % (95% CI)	No. Patients	Met Measure, % (95% CI)		
Operational process measures						
Office visit within 3 months of randomization	5,477	20.7 (19.7, 21.8)	11,409	21.0 (20.2, 21.7)	.72	1.01 (0.95, 1.09)
Office visit within 1 year of randomization	5,477	38.1 (36.8, 39.3)	11,409	38.6 (36.8, 39.3)	.53	
Process measures						
BMI measured within 1 year of randomization in patients with diabetes	543	10.9 (8.2, 13.5)	1205	9.1 (7.5, 10.8)	.26	0.82 (0.60, 1.13)
Anthrombic therapy documented within 1 year of randomization in patients with heart disease	583	17.0 (13.9, 20.0)	1,245	17.3 (15.2, 19.4)	.88	1.03 (0.75, 1.41)
Blood pressure measured within 1 year of randomization in patients with hypertension	1,261	21.3 (19.0, 23.5)	2,552	20.7 (19.1, 22.2)	.67	0.97 (0.80, 1.18)
LDL measured within 1 year of randomization in patients with hyperlipidemia	3,919	23.9 (22.6, 25.3)	8,254	24.2 (23.3, 25.2)	.72	1.02 (0.93, 1.11)
Intermediate outcome measures						
Blood pressure controlled within 1 year of randomization†	1,261	12.9 (11.1, 14.8)	2,552	13.2 (11.9, 14.6)	.78	1.03 (0.76, 1.40)
LDL controlled within 1 year of randomization	3,919	5.0 (4.4, 5.7)	8,254	5.0 (4.5, 5.4)	.86	0.98 (0.84, 1.15)

\*Adjusted OR is adjusted for patient age, gender, and clustering at the practice level. BMI, body mass index; LDL, low-density lipoprotein; OR, odds ratio.

There were no differences in scores on process measures in the intervention group versus the usual care group. Among patients with obesity and diabetes, 10.9 percent (95 percent CI: 8.2, 13.5) had their BMI measured within 1 year of randomization in the usual care group compared with 9.1 percent (95 percent CI: 7.5, 10.8) in the intervention group ( $p = .26$ ). Among patients with heart disease who were not on antithrombotic therapy, 17.0 percent (95 percent CI: 13.9, 20.0) went on antithrombotic therapy in the usual care group versus 17.3 percent (95 percent CI: 15.2, 19.4) in the intervention group ( $p = .88$ ). Among patients with uncontrolled hypertension, 21.3 percent (95 percent CI: 19.0, 23.5) had their blood pressure measured within 1 year of randomization in the usual care group compared with 20.7 percent (95 percent CI: 19.1, 20.7) in the intervention care group ( $p = .67$ ). Among patients with uncontrolled hyperlipidemia, 23.9 percent (95 percent CI: 22.6, 25.3) had their LDL measured within 1 year of randomization in the usual care group compared with 24.2 percent (95 percent CI: 23.3, 25.2) in the usual care group ( $p = .72$ ).

There were no significant differences in attainment of the intermediate outcome measures between the usual care and intervention groups. Among patients with uncontrolled hypertension, 12.9 percent (95 percent CI: 11.1, 14.8) had blood pressure control within 1 year of randomization in the usual care group compared with 13.2 percent (95 percent CI: 11.9, 14.6) in the intervention group ( $p = .92$ ). Among patients with uncontrolled hyperlipidemia, 5.0 percent (95 percent CI: 4.4, 5.7) had LDL control within the usual care group versus 5.0 percent (95 percent CI: 4.5, 5.4) in the intervention group ( $p = .86$ ).

Among patients in the intervention group, 1,676 (14.7 percent) were successfully contacted within 1 year of randomization (Table 4).

Patients who were successfully contacted were more likely to have an office visit within 3 months of randomization than patients in the usual care group (24.8 percent [95 percent CI: 22.8, 26.9] vs. 20.7 percent [95 percent CI: 19.7, 21.8],  $p < .001$ ) and were more likely to have an office visit within 1 year of randomization (45.6 percent [95 percent CI: 22.8, 26.9] vs. 38.1 percent [95 percent CI: 36.8, 39.3],  $p < .001$ , Table 5). Among patients with heart disease, patients who were successfully contacted were more likely to be on antithrombotic therapy within 1 year of randomization (24.4 percent [95 percent CI: 17.7, 31.0]) versus those in the usual care group (17.0 percent [95 percent CI: 13.9, 20.0],  $p = .03$ ). We found no other significant differences in quality measures between the group of patients who were successfully contacted and those in the usual care group.

Table 4: Characteristics of Patients Who Were Successfully Contacted versus the Usual Care Group

	<i>Usual Care (n = 5,477)</i>	<i>Successfully Contacted in Intervention (n = 1,676)</i>	<i>p-value</i>
Age, year (mean)	53.7	52.1	<.001
Male sex, no. (%)	50.3	51.7	.29
Reason for eligibility (%)			
Overweight and diabetes	9.9	12.1	.01
Heart disease	10.6	9.8	.31
Uncontrolled hypertension	23.0	24.6	.19
Hyperlipidemia	71.6	73.6	.11
No. of eligible categories (%)			
1	86.7	82.9	<.001
>1	13.1	17.1	

## DISCUSSION

In this randomized trial of a shared panel management program for small practices, we found that patients who were assigned to treatment were no more likely to achieve any of the study’s quality outcomes than patients who received usual care. Among patients who were successfully contracted in the program, we observed positive and significant effects for three of the eight study outcomes. The low rate at which panel managers were able to successfully contact patients may, in part, explain these results.

Our findings differ from a controlled trial of panel management in an academic geriatrics practice, which found that panel management significantly improved rates of preventive care and health care proxy designation (Loo et al. 2011). They also differ from a noncontrolled study of four Kaiser Permanente practices, which demonstrated improved quality of care after implementation of panel management (Neuwirth et al. 2007).

These different findings may stem from the fact that the practices enrolled in PCIP’s panel management study were a broad group of small practices in disadvantaged neighborhoods rather than practices under an umbrella system. The findings may also stem from the fact that it was difficult to contact patients—the panel managers were able to contact less than a third of the patients in the intervention group. This low contact rate may be because patients did not have telephones or frequently changed their phone number (prepaid cellular plans), which makes it difficult for the practices to maintain the most current number.

Table 5: Effect of Panel Management on Performance Measures between Patients Who Were Successfully Contacted versus the Usual Care Group

Measure	Usual Care (n = 5,477)		Successfully Contacted in Intervention (n = 1,676)		Unadjusted p-value	Adjusted OR* (95% CI)
	No. Eligible Patients	Met Measure, % (95% CI)	No. Patients	Met Measure, % (95% CI)		
Operational measures						
Office visit within 3 months of randomization	5,477	20.7 (19.7, 21.8)	1,676	24.8 (22.8, 26.9)	<.001	1.23 (0.96, 1.68)
Office visit within 1 year of randomization	5,477	38.1 (36.8, 39.3)	1,676	45.6 (43.3, 48.0)	<.001	1.36 (1.00, 1.85)
Process measures						
BMI measured within 1 year of randomization in patients with diabetes	543	10.9 (8.2, 13.5)	202	12.4 (7.8, 17.0)	.56	1.16 (0.60, 2.25)
Antithrombotic therapy documented within 1 year of randomization in patients with heart disease	583	17.0 (13.9, 20.0)	164	24.4 (17.7, 31.0)	.03	1.70 (1.04, 2.78)
Blood pressure measured within 1 year of randomization in patients with hypertension	1,261	21.3 (19.0, 23.5)	412	20.9 (16.9, 24.8)	.87	0.97 (0.68, 1.38)
LDL measured within 1 year of randomization in patients with hyperlipidemia	3,919	23.9 (22.6, 25.3)	1,233	25.5 (23.0, 27.9)	.27	1.06 (0.75, 1.50)
Intermediate outcome measures						
Blood pressure controlled within 1 year of randomization†	1,261	12.9 (11.1, 14.8)	412	13.1 (9.8, 16.4)	.78	1.00 (0.66, 1.50)
LDL controlled within 1 year of randomization	3,919	5.0 (4.4, 5.7)	1,233	4.1 (3.0, 5.2)	.19	

\*Adjusted OR is adjusted for patient age, gender, and clustering at the practice level. BMI, body mass index; LDL, low-density lipoprotein; OR, odds ratio.

The difference may also stem from the fact that the panel management intervention was likely quite different from the interventions described in other panel management studies. The PCIP panel management intervention may have been problematic. For example, panel managers in this study only helped patients make follow-up appointments without providing the patient with a specific reason why follow-up was necessary. This differs from the role that panel managers have played in the previous panel management programs (Neuwirth et al. 2007; Chen and Bodenheimer 2011; Loo et al. 2011). In these programs, panel managers provided patients with concrete recommendations and often helped with care coordination. Patients may be less likely to follow up if they are not given a specific recommendation or rationale. In addition, the lack of clear specification of the care gap in the telephone encounter note could have had several repercussions: if a patient called back when the panel management was not present, others could not explain the reason for the call and the primary care provider who saw a patient in a resulting visit may not have actually known the driving reason for the visit, and thus may not have closed the care gaps that the research team had in mind.

Second, many patients may have had relatively weak ties with a given practice. This may have led to a large number of calls to patients who possibly changed their primary care physician or had never identified the physician as their primary care physician. Data from an accompanying qualitative evaluation of the panel management program suggest that this may be the case—many patients who were contacted stated that they had switched physicians and were no longer part of the practice.

Third, physicians were able to remove eligible patients from the call list. Thirteen percent of patients in the intervention group were not called because of physician choice. Physicians cited that patients were no longer part of the practice, were in long-term care facilities, and in some instances had passed away. Although physician engagement was an essential part of this pragmatic clinical trial and this engagement could be viewed a positive aspect of the intervention, their requests not to call patients may have diluted the impact of the intervention.

Fourth, there was a lag time from when lists were generated by the panel managers and when patients were called. A fifth of patients in the intervention arm were not contacted because they scheduled an appointment in the interval between being added to a call list and being called.

Finally, panel managers' lack of coordination with the practice may have undermined the program's impact. Although they physically went to the practices to make telephone calls, there was no systematic communication between the panel managers and the practices' staff or physicians. As a result, communication between panel managers and practice staff and physicians varied substantially across practices.

There are some limitations. First, our findings may not generalize broadly to physician practices in the United States. The practices in PCIP care for poorer patients who may not have access to phones compared with other populations. This may have decreased the effectiveness of the program. Second, we did not assess patient use of emergency departments, patient satisfaction, or personal barriers to reengagement in care. Future studies should address the patient perspective, particularly in poorer populations. Finally, our results from the subsample of patients that were successfully contacted may be biased by unobserved differences between these patients and the patients assigned to usual care.

In summary, we found that a shared panel management program run by a city health department did not improve quality of care for patients with chronic illnesses who had lapses in care. Our findings suggest that even with support from a well-established assistance program, a shared panel management model may not improve quality of chronic disease care. Organizations considering similar programs of telephone outreach for patients in community settings should consider other ways to engage patients such as the use of multiple modes of outreach (e.g., phone, email, mail, in-person), patient-specific recommendations tailored to the specific gap in care, or other motivational techniques and should do rigorous pilot testing to see if patients are reachable and respond to new programs. Organizations may also consider doing tiered interventions because a "one size fits all" approach as in this trial may not be effective. In addition, a call without context, coaching, or counseling likely will not lead to behavior change.

Finally, the findings may reflect the fact that patients who have lapses in care may need more than a telephone reminder to incentivize them to reengage in care. Interventions that use motivational techniques, such as economic incentives and noneconomic incentives, may be necessary to engage these patients (Volpp et al. 2008a,b, 2009, 2011; John et al. 2011; Halpern, Asch, and Volpp 2012; Kimmel et al. 2012; Long et al. 2012; Troxel and Volpp 2012; Kullgren et al. 2013).

## ACKNOWLEDGMENTS

*Joint Acknowledgment/Disclosure Statement:* This research project was funded by the Commonwealth Fund (grant no. 20110081). The panel management program and a portion of Mr. Gottlieb's support was funded by a grant from the Pfizer Foundation. Dr. Bishop is also supported by a National Institute on Aging Career Development Award (K23AG043499) and as a Nanette Laitman Clinical Scholar in Public Health at Weill Cornell Medical College. Dr. Ryan is supported by an Agency for Healthcare Research and Quality Career Development Award (K01 HS018546). Ms. Shih is supported in part by the New York City tax levy and the Agency for Healthcare Research and Quality Grant (R18HS18275). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. This protocol was approved by the Weill Cornell Medical College Institutional Review Board (protocol #1012011408).

*Disclosures:* None.

*Disclaimers:* None.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.