

The Effect of Implementing a Care Coordination Program on Team Dynamics and the Patient Experience

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Healthcare systems transitioning toward value-based models of healthcare delivery often focus on redesigning primary care as a means of achieving better access and quality at a lower cost.¹⁻³ The patient-centered medical home, a common model that aims to revamp the role of primary care, emphasizes population health and integration across the care continuum.^{4,5} Coordination of care is one of the key tenets of the patient-centered medical home, and practices adopting the model frequently implement a care coordination program as part of their practice transformation. These programs, which typically empanel high-risk patients based on prior utilization or comorbidities,^{6,7} can result in significant reductions in acute care utilization.⁸⁻¹⁰

The health system for the University of California, Los Angeles (UCLA Health) implemented an innovative care coordination program as part of its primary care redesign. The intervention embeds nonlicensed care coordinators (CCs) in primary care practices to work with physicians in real time. Program details including coordinators' backgrounds, the program's training processes, and operations are described elsewhere.¹⁰ Although other components of the redesign focused on technology or ancillary services across all practices, the introduction of the care coordination program was the most significant and potentially disruptive change in the operations of the existing primary care system, and it was applied differentially to practices over time. The CCs focus on patients discharged from an acute care episode, high-complexity patients, and patients referred by physicians, totaling approximately 10% of patients in a primary care physicians' panel. The primary purpose of the CCs was to improve care and reduce utilization for the most complex patients. Practices in the health system with CCs have been shown to be associated with a 20% reduction in emergency department visits compared with practices without CCs in the health system.¹⁰

However, practice redesign is disruptive, and the mixed results of primary care transformation efforts^{11,12} suggest that one size does not fit all.¹³ As a result, it is important to understand how CCs and other "transformative" interventions impact patients' experiences and the overall structure and function of the team.

ABSTRACT

OBJECTIVES: Care coordination programs are frequently implemented in the redesign of primary care systems, focused on improving patient outcomes and reducing utilization. However, redesign can be disruptive, affect patient experiences, and undermine elements in the patient-centered medical home, such as team-based care.

STUDY DESIGN: Case-controlled study with difference-in-differences (DID) and cross-sectional analyses.

METHODS: The phased implementation of a care coordination program permitted evaluation of a natural experiment to compare measures of patient experience and teamwork in practices with and without care coordinators. Patient experience scores were compared before and after the introduction of care coordinators, using DID analyses. Cross-sectional data were used to compare teamwork, based on the relational coordination survey, and physician-perceived barriers to coordinated care between clinics with and without care coordinators.

RESULTS: We evaluated survey responses from 459 staff and physicians and 13,441 patients in 26 primary care practices. Practices with care coordinators did not have significantly different relational coordination scores compared with practices without care coordinators, and physicians in these practices did not report reduced barriers to coordinated care. After implementation of the program, patients in practices with care coordinators reported a more positive experience with staff over time (DID, 2.6 percentage points; $P = .0009$).

CONCLUSIONS: A flexible program that incorporates care coordinators into the existing care team was minimally disruptive to existing team dynamics, and the embedded care coordinators were associated with a small increase in patient ratings that reflected a more positive experience with staff.

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Team-based care, another central tenet of the medical home, facilitates primary care's expanded role as a medical home.^{6,14-16} At a minimum, practice redesign should support the team's ability to provide cohesive care. Relational coordination has emerged as a dominant method of measuring how various actors in a healthcare setting work together¹⁷ and focuses on the relationships between team participants fulfilling specified roles.¹⁸

Practice redesign efforts must also consider the impact on patients' experiences as a health-related outcome. Furthermore, patient experience scores are a common feature of quality metrics used in various accountable care payment models, directly affecting the redesign's return on investment. The scores also indirectly reflect the success of primary care redesign: patients with better experiences are more adherent to physician recommendations, more loyal to their physicians, and more engaged in their care, all desirable outcomes in value-based models of care.^{19,20} Finally, publicly reported patient experience scores can affect a health system's reputation.

In this study, we sought to expand the understanding of CC interventions by evaluating the downstream effects on patients and other members of the care team. Because this program affected only a small number of patients, we hypothesized that the overall set of patients in practices with CCs would report no change in access to care, care coordination, and their overall rating of their experience compared with patients in practices without CCs. Regarding team dynamics, we hypothesized that CCs would not change the relational coordination within a practice and that physicians in practices with CCs would perceive a lower burden of coordinating care for their patients.

METHODS

A phased implementation of the UCLA Health Care Coordinator Program within UCLA Health allowed for a natural experiment comparing practices with CCs already embedded (CC practices) with the practices that had not yet introduced CCs (non-CC practices). Because the health system continuously collects patient experience data for all practices, we used a difference-in-differences (DID) approach to compare preintervention and postintervention patient experience between the 2 cohorts. Data on relational coordination and physician-perceived barriers to care were collected only in the postintervention period and were compared between CC practices and non-CC practices.

Description of Health System and Primary Care Practices

UCLA Health is an urban academic system that had 26 primary care practices caring for adult patients at the time of the study encompassing internal medicine, family medicine, and geriatrics.

TAKEAWAY POINTS

A care coordinator program was implemented as part of primary care redesign. This study examined the intervention's effects on patients' experiences and team dynamics.

- ▶ Teamwork scores in practices with care coordinators were not significantly different than scores in practices without care coordinators.
- ▶ Overall patient experience with staff in practices with care coordinators improved significantly after program implementation, although the care coordinators worked with only a fraction of patients.
- ▶ Our findings suggest that embedded care coordinators improved the primary care experience for patients; they integrated themselves in the care teams without disruption of the existing team's function.

Primary care practices within UCLA Health are primarily traditional community-based practices with full time physicians; 4 practices also have trainees. The first CCs were introduced into 5 practices in May 2012, and another 9 were introduced in November 2012; half of all practices had CCs by December 2012. The other half of primary care practices incorporated CCs starting in March 2014. The rollout of the primary care redesign was set up to represent the wide range of practices within the UCLA Health System: practices belonged to 1 of 4 "pods" corresponding to the management structure of the ambulatory care network. Each pod had semi-autonomous management. The first practices to receive CCs were selected by UCLA Health System leadership to encompass a representative sample from each pod and to include sites with, and without, trainees.

The CCs were embedded members of the primary care team, working with all physicians within their assigned practice, and were tasked with addressing nonmedical barriers to care. Our prior work showed that the majority of the work of the CCs related to transitions of care, including such physician-directed tasks as scheduling appointments, providing self-management support services, and monitoring and following up with patients between visits.¹⁰ As a result, a CC served as a dependable point person for a subset of patients in order to complete tasks that were typically done by a variety of receptionists and clerks, or not performed at all.

Patient experience survey. The health system used the Clinician and Group Survey by Consumer Assessment of Healthcare Providers and Systems 12-Month Survey to measure and track patient experience.²¹ The survey evaluated 6 categories of each patient's experience, detailed in [eAppendix A](#) (eAppendices available at [ajmc.com](#)). Four categories used multiple questions to form composite measures: quality of patient–doctor interaction, access to care, care coordination, and courteous and helpful office staff (defined as clerks and receptionists). The last 2 categories covered 2 global rating questions: 1) overall rating of the doctor and 2) whether the respondent would be willing to recommend the doctor to their family and friends.

Patient experience data were split into 2 periods: the preintervention period ranged from May 2011 through February 2012 and the postintervention period ranged from May 2013 through February 2014. Because the last CC in the intervention group was introduced

in December 2012, this allowed a minimum of 4 months for CCs to become established team members of their primary care practice. Two CC practices were excluded because they were in a transition period between CCs at the time of the study, and the newly hired CCs had not had time to form relationships with their colleagues.

Relational coordination and physician burden surveys. Relational coordination is a tool initially developed in the airline industry²² that was, subsequently validated in multiple healthcare settings.^{18,23,24} It is defined as a mutually reinforcing web of communication and relationships carried out for the purpose of task integration.¹⁸ In primary care, higher relational coordination has been associated with higher-quality chronic care delivery,^{25,26} and improvement in relational coordination predicts improvements in chronic care delivery.²⁷ The measure is computed by having respondents rate the quality of working relationships with their colleagues based on 3 relational dimensions (shared goals, shared knowledge, and mutual respect) and 4 dimensions of communication: frequency, accuracy, timeliness, and whether the communication seeks to solve problems or assign blame (see [Appendix B](#) for details).

In order to assess physician-perceived burdens of coordinating care, we asked primary care physicians within the health system and not directly involved in this research to describe the tasks that do not require clinical training or licensure but are needed for patients to receive well-coordinated care. We overlaid these responses with tasks documented by CCs as part of their workflow to identify areas in which CCs might reduce the physician burden of care coordination. Five questions assessed physicians' perceived burden of nonmedical care coordination tasks; each was scored on a 5-point scale where 5 was the lowest perceived burden.

The survey was pilot tested in a non-primary care practice. All staff and physicians in non-CC practices were instructed to fill out the survey between January 2014 and April 2014 (prior to adding a CC). Staff and physicians in CC practices completed their surveys between May 2014 and August 2014. The project received institutional review board exemption as a quality improvement initiative.

Statistical Methods

For the patient experience survey data, χ^2 tests were used to evaluate differences in categorical variables between patients in the CC practices and non-CC practices. The Wilcoxon Rank Sum test was used to evaluate differences in the number of staff, number of MDs, and percent of full-time physicians between CC and non-CC practices. Because some physicians did not practice full time, potentially affecting their coordination with other team members, we determined the mean "percent clinical time" for physicians in a practice. This was defined as the sum of clinical half-days worked by all physicians in the practice divided by a total possible 10 clinical half-days per week (eg, if a practice had 2 physicians and 1 worked 3 half-days and the other worked 8 half-days, the practice's percent clinical time would be 11/20, or 55%).

The pre- and post differences in the 6 patient experience outcomes between the CC practices and non-CC practices were compared using a linear mixed-effects model with fixed effects for the presence of a CC, time period (pre- or post), and CC by time interaction, and a random clinic effect. Models were adjusted by age group, race/ethnicity, gender, self-health rating, and education level; whether the clinic was a training site; total number of clinic staff; and average percent of full-time physicians at each clinic. Estimates were produced using modeled contrasts.

For the provider surveys, χ^2 and Fisher exact tests were used to evaluate differences in the respondent characteristics between CC practices and non-CC practices, as appropriate. Based on summary statistics, physician age was collapsed into 3 categories (aged <35 years, 35-54 years, or >55 years) and physician work experience was collapsed into 3 categories (<5 years, 5-10 years, >10 years).

A composite measure of relational coordination was computed as the mean of the individual relational coordination survey questions. Composite relational coordination was compared between CC practices and non-CC practices using a linear mixed-effects model with a practice-level random effect and a fixed effect for the presence of a CC. Models were adjusted by job role, gender, age, experience working at the site, and total number of employees (including physicians) at that site.

Differences in scores of the barriers to coordinated care between the CC practices and non-CC practices were compared using a linear mixed-effects model, with a clinic random effect and a clinic having a CC as the fixed effect. Models were adjusted for physician age, gender, number of years working at the clinic, number of years of total experience; number of doctors at the clinic, total staff at the clinic, and average percent of physician clinical time. SAS version 9.4 (SAS Institute; Cary, North Carolina) was used for all statistical analyses.

RESULTS

Patient, Physician, and Practice Characteristics

Of 13,441 patient experience surveys, 40% were from patients surveyed during the baseline (preintervention) period, and the remainder were after the introduction of CCs (postintervention period) ([Table 1](#)). Out of the entire group, most were female (64%) and predominantly white (66%), and 12% reported a Hispanic or Latino ethnicity. Patient characteristics between the pre- and postintervention cohorts did not differ significantly in self-reported overall health rating, or proportion with hypertension (43%), diabetes (13%), or depression (19%). Several variables (age, gender, race, and education) were statistically different between these relatively large cohorts, but absolute differences between the temporal cohorts were small.

The 12 CC practices and the 12 non-CC practices were similar across the variables examined, with the exception of the number of physicians ([Table 2](#)). Physicians were about equally split

by gender, age range, and work experience, although experience at their practice site differed between cohorts (Table 2).

Patient experience. After adjusting patient experience scores for patient- and clinic-level factors, there was a decline in all 6 scales of the patient experience for the non-CC practices between the preintervention and postintervention periods, whereas change over time was mixed in the CC practices. Although changes in scores were small in absolute terms, some were statistically significant. For example, among non-CC practices, patient ratings of access decreased by 1.6 points ($P = .03$) and coordinated care decreased by 2.7 points ($P = .002$); for the CC practices, ratings of coordinated care decreased by 2.2 points ($P = .01$) (Table 3). DID analysis was not statistically significant. Patient perception of staff, which asks patients about experience with clerks and receptionists, increased by 1.9 points in CC practices ($P = .0005$), and there was a statistically significant interaction between CC and time, with a net adjusted difference of 2.6 percentage points regarding experience with clerks and receptionists favoring CC practices compared with non-CC practices ($P < .001$).

Relational coordination. Response rates were 86% for nonphysicians (327 of 382) and 75% for physicians (132 of 177), for an overall response rate of 82%. Relational coordination scores, measured on a 1-to-5 scale, ranged from 3.8 in the lowest-scoring practice to 4.5 in the highest-scoring practice (mean = 4.1; standard deviation [SD] = 0.20). After adjusting for respondent- and clinic-level factors, relational coordination was not significantly different in practices with a CC compared with those without a CC (mean scores = 4.06 and 4.00, respectively; $P = .39$). Subset analysis of physician responses using the same method, and further adjusting for years of work experience, found that physicians in practices with CCs reported a small but significantly higher relational coordination (difference = 0.27; $P = .01$).

Nonmedical care coordination tasks. Physicians working with CCs did not report a different level of burden concerning tasks associated with coordinating care compared with physicians without CCs (Table 4). Physicians reported the greatest burden being filling out forms, and 4 of the 5 measures had group estimates below 3.0 for both CC- and non-CC practices (Table 4).

TABLE 1. Patient Experience Survey Respondent Demographics

Characteristic	Total Cohort		Pre-intervention ^a		Post intervention ^a		P
	n	%	n	%	n	%	
Overall	12,496	100	4869	100	7627	100	
Gender (male)	4554	36	1708	35	2846	37	.01
Age group, years							
<25	618	5	220	5	398	5	.0002
25-34	1464	12	518	11	946	12	
35-44	1436	11	551	11	885	12	
45-54	1804	14	695	14	1109	14	
55-64	2331	19	920	19	1411	19	
65-74	2449	20	941	19	1508	20	
≥75	2394	19	1024	21	1370	19	
Race							
White	6579	66	2579	65	4000	68	<.0001
African American	990	10	453	11	537	9	
Asian	892	9	398	10	494	8	
Other	1438	15	546	14	892	15	
Ethnicity							
Hispanic or Latino	1234	12	467	12	767	13	.08
Not Hispanic or Latino	8803	88	3559	88	5244	87	
Education							
Less than high school graduate	226	2	79	2	147	3	.52
High school graduate or GED	834	9	342	9	492	8	
Some college or 2-year degree	2520	26	1022	26	1498	25	
4-year college graduate	2414	25	958	24	1456	25	
More than 4-year college degree	3805	39	1513	39	2292	39	
Overall health rating							
Excellent	2014	20	764	19	1250	21	.07
Very good	3457	34	1356	34	2101	34	
Good	2939	29	1187	29	1752	29	
Fair	1351	13	567	14	784	13	
Poor	365	4	159	4	206	3	
High blood pressure	4389	43	1792	44	2597	42	.13
Diabetes	1352	13	564	14	788	13	.14
Depression	1880	19	717	18	1163	19	.06

GED indicates general education diploma.

^aPreintervention period: May 2011 to February 2012; postintervention period: May 2013 to February 2014.

DISCUSSION

This study evaluated the effects of a care coordination program beyond its effect on utilization. In addition to reducing acute care utilization, the CC intervention we studied also preserved patient

TABLE 2. Practice and Physician Characteristics

Characteristic	Total Cohort		CC Practices		Non-CC Practices		P
Practice Characteristics							
Total: N, %	24	100%	12	100%	12	100%	
Training site: n, %	4	17%	2	17%	2	17%	.99
Total staff: median, IQR	12.5	10, 16.5	13.5	11, 19	10.5	9, 14	.12
Total physicians: median, IQR	4	4, 7	6.5	4.5, 8	4	3, 4	.007
Percentage of physician clinical time: n, IQR	0.86	0.53, 0.93	0.87	0.63, 0.94	0.84	0.59, 0.90	.60
Physician Characteristics							
Total: N, %	128	100%	57	100%	71	100%	
Gender, female: n, %	61	52%	28	49%	33	48%	.88
Age, years: n, %							
25-34	20	16%	9	16%	11	15%	.29
35-44	28	22%	10	18%	18	25%	
45-54	43	34%	24	42%	19	27%	
≥55	37	29%	14	25%	23	32%	
Work experience: n, %							
3-5 years	10	8%	2	4%	8	11%	.10
6-10 years	11	9%	2	4%	9	13%	
>10 years	97	82%	43	92%	54	76%	
Experience in practice: n, %							
<1 year	11	6%	9	16%	2	3%	.02
1-2 years	13	10%	7	12%	6	8%	
3-5 years	29	23%	7	12%	22	31%	
6-10 years	18	14%	7	12%	11	16%	
>10 years	57	45%	27	47%	30	42%	

CC indicates care coordinator; IQR, interquartile range.

experience amid a downward trend within the health system. The lack of statistically significant association in relational coordination with the addition of CCs suggests that intercalation of a CC into primary care practices does not produce a disruptive effect on teamwork. Practice redesign is a long, difficult process, and these secondary outcomes ensured attention to the broader impact of the transformation beyond utilization.

The lack of a statistically significant change in relational coordination may have reflected the design of the UCLA Health Care Coordinator Program as a flexible intervention to improve the care of the most complex patients. Although one may have expected improvement in relational coordination with the addition of the CC, interrupted teamwork was also possible. Disruptions to workflow and team dynamics can be barriers to primary care practice transformation.^{28,29} These findings suggest that the integration of the CCs into the existing primary care team was minimally disruptive to the existing team's function. Furthermore, a baseline measure of relational coordination can serve as a benchmark to monitor continuous efforts to improve team-based care, a frequently cited goal of the medical home, but a component rarely measured directly.

The positive association between CC practices and patient ratings of experience with office staff has several possible explanations. First, patients may have perceived the CCs as part of the staff in their medical home. The integration of the CCs in the medical home team was an intentional goal of the program's design, and built on prior research supporting the effectiveness of embedded CCs.⁸ Second, CCs worked on nonmedical tasks for patients, the completion of which was often communicated to patients by clerks and receptionists, who remained the patient's touchpoint to the practice. Finally, the CCs focused on complex nonmedical tasks that may have otherwise fallen to the clerks and receptionists, thereby unburdening them to provide a better patient experience for the full complement of their patients. These hypotheses require further evaluation to understand the link between the observed improvement in patient ratings of staff and the implementation of CCs.

Overall, in the studied health system, patient-reported access and care coordination decreased by a small, but statistically significant, amount over time. The cause of this trend is unclear, but may have reflected difficulties experienced at the time in which the

TABLE 3. Relationship of Care Coordinator to Patient Experience^a

Characteristic	Preintervention Estimate (SE)	Postintervention Estimate (SE)	Difference ^b (SD)	Estimated DID (SE)
Access composite				
Care coordinator	80.6 (1.6)	79.4 (1.6)	-1.2 (0.71)	0.41 (1.00)
No care coordinator	80.6 (1.8)	79.0 (1.7)	-1.6 ^c (0.75)	<i>P</i> = .69
Coordinated care composite				
Care coordinator	85.3 (1.8)	83.1 (1.7)	-2.2 ^d (0.84)	0.55 (1.20)
No care coordinator	85.3 (1.9)	82.6 (1.9)	-2.7 ^d (0.88)	<i>P</i> = .65
Doctor composite				
Care coordinator	92.9 (0.6)	92.8 (0.6)	-0.06 (0.41)	0.09 (0.59)
No care coordinator	93.6 (0.7)	93.5 (0.66)	-0.16 (0.43)	<i>P</i> = .88
Staff composite				
Care coordinator	88.1 (1.1)	90.0 (1.0)	1.9 ^d (0.55)	2.6 [†] (0.80)
No care coordinator	90.6 (1.2)	89.9 (1.1)	-0.69 (0.58)	<i>P</i> = .001
Overall doctor rating				
Care coordinator	91.3 (0.7)	91.5 (0.6)	0.22 (0.42)	0.94 (0.60)
No care coordinator	92.4 (0.7)	91.6 (0.7)	-0.72 (0.43)	<i>P</i> = .12
Likelihood of recommending doctor				
Care coordinator	93.2 (0.91)	93.0 (0.85)	-0.11 (0.56)	0.16 (0.81)
No care coordinator	93.5 (1.0)	93.3 (0.9)	-0.16 (0.81)	<i>P</i> = .84

CC indicates care coordinator; DID, difference-in-differences [between CC practices and non-CC practices]; SD, standard deviation; SE, standard error.

^aModel adjusted for patient-, clinic-, and physician-level characteristics, including age, race/ethnicity, gender, self-health rating, education, whether the clinic is a training site, the total number of staff, and the average percent physician clinical time. For all questions, 100% is best. See eAppendix A for survey composite details.

^bDifference between postintervention and preintervention estimate.

^c*P* < .05.

^d*P* < .001.

TABLE 4. Association of Care Coordinator With Physician-Perceived Barriers to Coordinated Care^a

Perceived Barrier	CC Clinics Estimate (SE)	Non-CC Clinics Estimate (SE)	Difference (SD)	Adjusted <i>P</i> ^b
Difficulty scheduling specialists	2.43 (0.20)	2.55 (0.24)	-0.12 (0.26)	.64
Familiarity with outstanding gaps in quality	3.0 (0.20)	2.7 (0.22)	0.29 (0.21)	.16
Phone calls not requiring medical expertise	2.7 (0.15)	2.8 (0.18)	-0.10 (0.17)	.56
Filling out forms	2.1 (0.18)	2.2 (0.21)	-0.04 (0.21)	.87
Orders requiring prior authorization	3.3 (0.23)	3.6 (0.27)	-0.27 (0.26)	.31

CC indicates care coordinator; SD, standard deviation; SE, standard error.

^aEach item is scored individually. All questions are on a 5-point scale, where 5 is the lowest perceived burden for that barrier to care.

^b*P* value is for model comparing CC practices versus non-CC practices, adjusted for practice characteristics and physician characteristics.

health system implemented an electronic health record system,, which occurred during the observed period.³⁰

Finally, the low scores in all measures of physician-perceived burden of care coordination underscored the well-established difficulties in the daily work of primary care physicians.³¹⁻³⁴ This survey did not find a reduction in perceived barriers in practices with CCs compared with those without, but CCs only worked with a minority of each physician's patient panel, and these questions may not have adequately captured the impact of CCs on physician practice

patterns. More research is needed to identify practice design features that improve physician-perceived burdens of care coordination.

Limitations

This study has several limitations. Only 1 health system was evaluated, although 12 practices had CCs and 12 practices did not. The relational coordination and primary care burdens surveys were conducted only in a cross-sectional fashion, limiting inference of causality, but generating hypotheses for future research

(eg, potential interactions between practice size and adding a CC). Furthermore, the power to detect changes in relational coordination (beta = 0.8 to detect a difference of 0.07 points in mean relational coordination at alpha = 0.05) and the physician-perceived burden of care coordination (beta = 0.8 to detect a difference of 0.50 points for all of the questions at alpha = 0.05) limited our ability to state with certainty that teamwork or physician-perceived barriers of care coordination were not improved in the CC practices compared with non-CC practices.

CONCLUSIONS

Inertia and the barriers to change too often stymie primary care redesign. On the other hand, piecemeal solutions to individual problems without regard to the preexisting structure and function of practice are not sustainable, and can ultimately result in a chimeric system that is confusing for patients, complicated for physicians and staff, and costly to the system as a whole.³⁵ Although this care coordination program primarily sought to reduce utilization, primary care redesign must maintain a broader vision of population health through team-based care. The results of this study suggest that the flexible design of this program is minimally disruptive to overall teamwork and modestly improved the patient experience with staff for patients in CC practices. The findings support a sustainable transformation of primary care and an empirical benchmark for measuring improvement into the future. ■

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eAppendix A. CG-CAHPS Questions

Access Composite:

- How often did you get an appointment for urgent care as soon as needed?
- How often did you get an appointment for a check-up or routine care as soon as needed?
- How often did you get an answer to a medical question when you called during office hours?
- How often did you get an answer to a medical question when you called after office hours?
- How often did you see this doctor within 15 minutes of the appointment time?

Coordinated Care Composite:

- How often did this doctor seem informed about the care you received from other doctors?
- When this doctor ordered a test for you, how often did someone follow up?

Doctor Composite:

- How often did this doctor explain things in a way that was easy to understand?
- How often did this doctor listen carefully to you?
- How often did this doctor give easy to understand instructions for taking care of health issues?
- How often did this doctor know about your medical history?
- How often did this doctor show respect for what you had to say?
- How often did this doctor spend enough time with you?

Staff Composite:

- How often were the clerks and receptionists as helpful as you thought they should be?
- How often did the clerks and receptionists treat you with courtesy and respect?

Overall Doctor Rating:

- Using any number from 0 to 10, what number would you use to rate this doctor?

Likelihood of Recommending Doctor:

- Would you recommend this doctor to your family and friends?

Methods of scaling responses and reporting scores:

The health system contracts with an external company (Quality Data Management) to collect patient responses to the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) 12-Month Survey. The company calls patients starting 7-10 days after their visit to elicit survey responses; they can also make appointments for patients if requested, and can add sample if necessary to meet quotas. The survey categorizes a patient's experience of care into 5 categories of which 4 categories use multiple questions to form composite measures (quality of patient-doctor interaction, access to care, care coordination, and courteous and helpful office staff). The fifth category asks the respondent 2 global rating questions: (1) to rate the doctor and (2) whether the respondent would be willing to recommend the doctor to his or her family and friends. The overall assessment of the doctor is rated from 0 to 10, and the question regarding willingness to recommend the doctor is on a 4-point scale. All other questions were ranked on a 6-point scale until July 2012, whereupon the scales were changed to a 4-point scale, without any effect on precision or reliability (personal communication, with QDM manager, August 2014). Composite scores combine the responses attributed to the composite with equal weight.

eAppendix B.

The relational coordination survey consists of 7 question stems based on the seven dimensions of relational coordination. The survey asks respondents about each of the 7 dimensions, with respect to each of the job roles in their working environment. For positions with multiple people in that job role (eg, physicians), they also respond to how they work with people within their own job role; for positions with only one person in that job role within their working environment (eg, care coordinator), that job role is eliminated from the questions.

Relational coordination is a composite measure computed as the mean of the individual relational coordination survey questions. In this study, questions regarding the care coordinators and responses by care coordinators were excluded from the composite measure as half of the practices did not have care coordinators at the time of the survey. A sensitivity analysis was performed by including responses from and about care coordinators for the practices in the CC cohort; these did not result in relational coordination measures that were statistically significantly different than those without care coordinator responses.

Below are the 7 stem questions, for the first question we also include a sample table for responses (the job roles which remain the same throughout the survey).

Question 1: For each job category, do care providers in these groups communicate with you in a timely way about patients?

Health Care Provider/Staff	Never	Rarely	Sometimes	Often	Always
Physicians					
Patient Care team (eg, NP, RN, MA, LVN, x-ray tech)					
Front office staff (eg, AA, medical records, receptionist, call center, referral coordinator)					
Clinic manager					
PCIM Comprehensive Care Coordinator					

Question 2: For each job category, how frequently do you communicate with care providers in these groups about patients?

Question 3: For each job category, do care providers in these groups communicate with you accurately about patients?

Question 4: For each job category, when problems arise regarding patient care, do care providers in these groups blame others or work with you to solve the problem?

Question 5: For each job category, to what extent do care providers in these groups share your goals for the care of patients?

Question 6: For each job category, how much do care providers in these groups know about your role in caring for patients?

Question 7: For each job category, how much do care providers in these groups respect the role you play in caring for patients?