

By Robert J. Reid, Katie Coleman, Eric A. Johnson, Paul A. Fishman, Clarissa Hsu, Michael P. Soman, Claire E. Trescott, Michael Erikson, and Eric B. Larson

DOI: 10.1377/hlthaff.2010.0158
HEALTH AFFAIRS 29,
NO. 5 (2010): 835-843
©2010 Project HOPE—
The People-to-People Health
Foundation, Inc.

The Group Health Medical Home At Year Two: Cost Savings, Higher Patient Satisfaction, And Less Burnout For Providers

ABSTRACT As the patient-centered medical home model emerges as a key vehicle to improve the quality of health care and to control costs, the experience of Seattle-based Group Health Cooperative with its medical home pilot takes on added importance. This paper examines the effects of the medical home prototype on patients' experiences, quality, burnout of clinicians, and total costs at twenty-one to twenty-four months after implementation. The results show improvements in patients' experiences, quality, and clinician burnout through two years. Compared to other Group Health clinics, patients in the medical home experienced 29 percent fewer emergency visits and 6 percent fewer hospitalizations. We estimate total savings of \$10.3 per patient per month twenty-one months into the pilot. We offer an operational blueprint and policy recommendations for adoption in other health care settings.

The patient-centered medical home has emerged rapidly as the main policy vehicle to reinvigorate U.S. primary care. The widely endorsed 2007 joint principles of the patient-centered medical home, developed by a coalition of professional organizations, emphasize the attributes of primary care. These include access to care, long-term relationships with health care providers, and comprehensiveness and coordination of care. The principles also embrace a health professional team orientation grounded in evidence-based medicine and quality improvement. They support the use of advanced electronic health records to enable, and a payment system to reward, these activities.¹ Many demonstrations of the patient-centered medical home are under way, and preliminary evidence is starting to emerge.²⁻⁵

Despite agreement on the organizing principles for patient-centered medical homes, no consensus exists on an operational definition of the components of the model or investments required.^{6,7} These components include enhanced

staffing, key electronic health record features, and optimal methods for transformation to this new practice model.

Several questions about medical homes remain unanswered. These include how quickly the anticipated improvements emerge and how operational definitions apply to practices with different settings, patient mixes, and cultures.

Since 2006, Group Health Cooperative, a non-profit, consumer-governed, integrated health insurance and care delivery system based in Seattle, Washington, has pioneered a medical home redesign that relies on its existing electronic health record technology. The one-year evaluation of a prototype clinic redesign revealed early and broad improvements compared to control groups in patients' experiences with care, provider burnout levels, and clinical quality.² The up-front investments in redesign were recouped in the first year, largely because of fewer emergency department and urgent care visits compared to controls.

In this paper we present longer-term results—at twenty-one to twenty-four months—to track

Robert J. Reid (reid.rj@ghc.org) is an associate investigator with the Group Health Research Institute in Seattle, Washington.

Katie Coleman is a research associate with the Group Health Research Institute.

Eric A. Johnson is a biostatistician with the Group Health Research Institute.

Paul A. Fishman is an associate investigator with the Group Health Research Institute.

Clarissa Hsu is a research associate with the Group Health Research Institute.

Michael P. Soman is president of Group Health Permanente and chief medical executive of Group Health in Seattle.

Claire E. Trescott is medical director of primary care at Group Health Permanente.

Michael Erikson is vice president of primary care services at Group Health Cooperative in Seattle.

Eric B. Larson is executive director of the Group Health Research Institute.

progress in meeting multiple objectives of improving quality, creating a sustainable work environment, and reducing costs. This analysis highlights considerations for organizations contemplating medical home transformations and for policy makers interested in facilitating the successful adoption of medical homes.

Group Health's Medical Home Prototype

Historically, Group Health has linked patients with primary care physicians working in multidisciplinary teams and supported by specialists and ancillary health care personnel.⁸ Salary-based pay has shielded physicians from the perverse, volume-driven incentives of fee-for-service medicine.

In the early 2000s, Group Health implemented a series of reforms to improve access, physician productivity, and financial performance, including “advanced access,” with ability for patients to make same-day appointments; productivity-based physician salary adjustments; and an electronic health record that lets patients securely message their providers and view portions of their record.⁹ Although successful at improving access and productivity,^{10–12} these reforms had the unintended consequences of physician burnout and relative declines in clinical quality, and they actually caused increases in use of services downstream of primary care.^{12,13} Many of the challenges faced at Group Health were similar to those faced in less structured and supported settings.

In 2006, Group Health piloted a whole-practice transformation, aligned with the medical home vision, at one Seattle-area clinic. The prototype clinic was chosen as a “proof of concept” because it was of modest size (approximately 9,200 adult patients) and had a stable workforce, strong leadership, and history of successful quality improvement.

With measures defined in advance, a two-group, quasi-experimental, before-and-after evaluation over two years was used to gauge the prototype clinic's impact on cost, quality, and experience. The intent was to spread lessons learned to other clinics. Group Health leaders recognized that investment in primary care was required to realize the medical home vision.¹⁴ They acknowledged the need to downsize primary care patient panels at the prototype clinic from the existing 2,300 patients per physician to the target of 1,800 by hiring more physicians and other clinical staff. For every 10,000 patients, the enhanced staffing model comprised 5.6 physicians, 5.6 medical assistants, 2.0 licensed practical nurses (LPNs), 1.5 physician

assistants or nurse practitioners, 1.2 registered nurses (RNs), and 1.0 clinical pharmacist. With these additional personnel, the goal was to promote stronger relationships with patients, address care needs more comprehensively, and provide time to coordinate care.

Consistent with research linking time constraints with poorer quality and satisfaction,^{15,16} standard in-person visit times increased from twenty minutes to thirty minutes, with time allocated each day for teams to plan and coordinate care. Guided by a set of design principles derived from the attributes of primary care, the Chronic Care Model, and the medical home, two workshops—involving front-line physicians and staff, patients, managers, and researchers—identified the redesign components that care teams refined and implemented during the first year.

Exhibit 1 details these components. The underlying premise is that care teams, led by primary care physicians, retain accountability for delivering primary care to patients in their practices. The expanded staffing model assumes greater care management by RNs and clinical pharmacists, as well as previsit, outreach, and follow-up activities by medical assistants and LPNs. Standard management practices were also adopted, including the use of “team huddles”—short, all-team daily planning meetings—and visual displays to identify and track issues. To encourage care activities outside in-person visits, Group Health exempted the physicians in the prototype clinic from the productivity-based salary adjustments described above.

Results: Medical Home Effects

We analyzed and described differences at the medical home prototype compared to controls for patient experience, provider burnout, quality of care, and costs at baseline, twelve months, and twenty-one to twenty-four months (Exhibits 2–5). Additional details on the methods, survey response rates, and statistical analyses are available elsewhere.² Compared with patients at nineteen other Group Health clinics in the Puget Sound area, adults enrolled at the prototype clinic were older (average age fifty-three versus fifty-one) and more likely to be female (57 percent versus 55 percent), but their burden of disease, as measured with Diagnostic Cost Groups (DxCGs),¹⁷ was similar ($p = 0.34$, which means that these results were not likely to be due to chance).

PATIENT EXPERIENCE We surveyed a random sample of 6,187 adults, ages 21–85, at the prototype clinic and two control clinics at baseline (response rate = 55 percent). We surveyed respondents again at twelve months and twenty-

EXHIBIT 1

Practice Changes At The Group Health Medical Home Prototype Clinic

Component	Description
CARE DELIVERY CHANGES	
Virtual medicine	Secure e-mail messages and telephone encounters to enhance access and to prepare for, follow up from, or substitute for in-person visits Promotion of EHR to promote patient engagement, including lab test results review, electronic health risk appraisal, and online Rx refills Consistent use of "after visit summaries" made accessible to patients following their visits through the EHR
Chronic care management	Use of electronic registries, health maintenance reminders, best-practice alerts Use of motivational interviewing and brief negotiation skills by care team Creation of collaborative care plans to guide patient and care-team activities Promotion of self-management support resources, including group visits, behavior-change programs, and peer-led chronic illness workshops
Visit preparation	Patients contacted in advance of visits to clarify concerns and visit expectations Review record for follow-up tests, referral notes, and outside records Review quality-deficiency reports for unmet care needs Prepare the physician with education materials and other resources for visit
Patient outreach	Outreach and follow-up for all discharges and emergency or urgent care visits Quality outreach using quality-deficiency reports for unmet care needs Outreach for medication monitoring and abnormal test results New patient outreach
PRACTICE MANAGEMENT CHANGES	
Telephone call management	Redesign of telephone call intake system to bypass administrative options and connect patients directly with their care teams
Care-team huddles	Short, all-team meetings to collectively plan day, balance supply and demand, distribute tasks, and troubleshoot problems
Standard management practices	Use of visual display systems to track team performance, regular workplace rounds, root-cause analysis, and plan-do-check-act improvement cycles

SOURCE Group Health Cooperative. **NOTE** EHR is electronic health record.

four months, using seven scales from the Ambulatory Care Experiences Survey–Short Form¹⁸ and the Patient Assessment of Chronic Illness Care.¹⁹ The control clinics were chosen because of similar enrollment and leadership stability.

Among the twelve-month respondents (80 percent response rate), medical home patients reported better care experiences on six scales, after age, education, self-reported health status, and baseline status were adjusted for.² At twenty-four months, patient surveys (70 percent of baseline respondents responding) showed that most effects continued (Exhibit 2). Patients at the prototype clinic continued to report better values in three scales (coordination, access, and goal setting) and modestly improved values in two others (quality of doctor-patient interactions and patient activation and involvement), even though the precise clinical meaning of these changes is unclear.

Although the study was not large enough for us to statistically detect changes from twelve months to twenty-four months, the effects for five scales are smaller at two years. Thus, the improvements may have slightly diminished, but the prototype clinic continues to provide

better patient experiences in most aspects measured.

STAFF BURNOUT Burnout was measured with the Maslach Burnout Inventory (MBI, health services version),²⁰ a standard tool that measures aspects of workplace stress. We used an online survey sent to all staff with care responsibilities at the prototype clinic and two control clinics at baseline, twelve months, and twenty-four months. Response rates for these cross-sectional surveys were 79 percent, 83 percent, and 71 percent, respectively. Although small staff numbers ($n = 48$) and response rates make firm conclusions difficult, we found large differences that were both statistically and clinically meaningful, despite similarity at baseline.

At twenty-four months, the mean emotional exhaustion scores for the prototype clinic medical home and control staff were 12.8 and 25.0, respectively ($p < 0.01$, and therefore not likely to be due to chance), and the same scale depersonalization scores were 2.0 and 4.4, respectively ($p = 0.03$, also not likely to be due to chance). Differences in the third scale, personal accomplishment, were not statistically significant. We cannot rule out so-called Hawthorne effects—

EXHIBIT 2

Comparison Of Surveys Of Patient Experience At The Group Health Patient-Centered Medical Home Prototype And Two Control Clinics, At Baseline, Twelve Months, And Twenty-Four Months

Interval	No. of survey respondents	Ambulatory care subscales ^a					Chronic care subscales ^a	
		QI	SDM	CC	AC	HO	PA	GS
MEDICAL HOME PROTOTYPE CLINIC								
Baseline	1,232	85.4	85	80.7	86.6	91.1	77.3	69.8
12 months	1,024	86.8	86.6	83.1	87.6	91.4	81.2	74.3
24 months	888	86.6	84.1	83.9	87.1	91.5	80.1	74.4
2 CONTROL CLINICS								
Baseline	2,121	80.8	82.5	77.4	81.5	88.8	73.8	65.1
12 months	1,662	81.6	82.3	77.9	81.6	89	75.5	67.4
24 months	1,452	82.1	81.8	78.9	82	89.1	75.6	67.3
ADJUSTED DIFFERENCES								
12 month vs. baseline ^b		2.30****	2.93***	3.32****	3.71****	1.1	3.28***	3.74***
24 month vs. baseline ^b		1.63**	1.03	3.06****	2.84****	1.14	2.10**	3.96****

SOURCE Authors' analysis of survey data collected for the prototype evaluation. **NOTES** Ambulatory Care Experiences Survey (Short Form) (ACES-SF) is the measure of ambulatory care experiences. Subscales include quality of doctor-patient interactions (QI), shared decision making (SDM), coordination of care (CC), access to care (AC), and helpfulness of office staff (HO). The Patient Assessment of Chronic Illness Care (PACIC) is a patient-reported measure of chronic illness care. Subscales used in this study include patient activation and involvement (PA) and goal setting or tailoring (GS). ^aThe ACES Short Form and PACIC questions (scored on 6- and 5-point Likert scales, respectively) were totaled within the subscales and then transformed to 100-point summary scores. Missing responses were addressed by multiple imputation. ^bAdjusted mean difference and p value from generalized linear estimating equation regressions comparing average 12- and 24-month scores adjusting for age, educational attainment, self-reported health status at baseline, and baseline patient experience between the patient-centered medical home and control clinics. **p < 0.05 ***p < 0.01 ****p < 0.001

EXHIBIT 3

Comparison Of Quality Composite Measures For The Group Health Patient-Centered Medical Home Prototype Clinic And Nineteen Other Clinics, At Baseline, Twelve Months, And Twenty-Four Months

Period	Quality-of-care composite measure (%) ^a			
	Patient average	All or none	75% performance	50% performance
MEDICAL HOME PROTOTYPE CLINIC (n = 4,747)^b				
2006 rating	68.7	51.0	57.2	76.8
2007 rating	72.4	54.5	61.3	80.4
2008 rating	75.9	58.6	65.9	83.3
12-month difference (2006-7) ^c	3.8****	3.5****	4.1****	3.7****
24-month difference (2006-8) ^c	7.3****	7.6****	8.8****	6.5****
19 OTHER CLINICS (n = 132,330)^b				
2006 rating	64.3	44.5	51.3	72.9
2007 rating	66.8	46.2	53.9	75.4
2008 rating	70.3	50.2	58.4	78.5
12-month difference (2006-7) ^c	2.5	1.7****	2.5****	2.5****
24-month difference (2006-8) ^c	6.0	5.7****	7.1****	5.6****
Difference of changes at 12 months between clinics ^d	1.3**	1.8**	1.6**	1.2
Difference of changes at 24 months between clinics ^d	1.3**	1.9**	1.7**	1.0

SOURCE Authors' analysis of survey data collected for the prototype evaluation. ^aComposites aggregate twenty-two quality indicators from the Healthcare Effectiveness Data and Information Set (HEDIS; see the online Appendix, which can be accessed by clicking on the Appendix link in the box to the right of the article online). The "patient average" is the average of the percentage of qualifying indicators that were achieved by each patient; "all or none" is the percentage of patients achieving success on all qualifying indicators; "75 percent performance" is the percentage of patients achieving success on at least 75 percent of qualifying indicators; and "50 percent performance" is percentage of patients achieving success on at least 50 percent of qualifying indicators. ^bIncludes continuously enrolled patients (2006-2008) who qualified for at least one of the twenty-two indicators in each year. ^cp value from paired t-test for the average change in percentages between baseline and implementation years across patients qualifying for the measures in the clinic. ^dp value from two-sample t-test assuming unequal variances for the average difference in changes from baseline to implementation years between the prototype and other clinics. **p < 0.05 ****p < 0.001

EXHIBIT 4

Comparison Of Adjusted Utilization (Per 1,000 Patients Per Month) At The Group Health Patient-Centered Medical Home Prototype And Nineteen Other Clinics, Over Twelve, Eighteen, And Twenty-One Months

Interval	Medical home prototype (n = 7,018)	Other clinics (n = 200,970)	Relative difference (%)	p value
PRIMARY CARE^a				
12 mo.	247 (241, 252)	256 (255, 257)	97 (94, 99)	p = 0.002
18 mo.	239 (234, 244)	254 (253, 255)	94 (92, 96)	p < 0.001
21 mo.	236 (232, 241)	251 (250, 252)	94 (92, 96)	p < 0.001
SPECIALTY CARE^a				
12 mo.	191 (186, 197)	181 (180, 182)	106 (103, 109)	p < 0.0001
18 mo.	196 (191, 201)	189 (188, 190)	104 (101, 107)	p = 0.004
21 mo.	197 (192, 202)	191 (190, 192)	103 (101, 106)	p = 0.017
EMERGENCY DEPARTMENT AND URGENT CARE^a				
12 mo.	26 (24, 27)	36 (36, 36)	71 (67, 74)	p < 0.001
18 mo.	27 (26, 28)	38 (38, 38)	71 (68, 74)	p < 0.001
21 mo.	27 (26, 29)	39 (38, 39)	71 (68, 74)	p < 0.001
INPATIENT ADMISSIONS (AMBULATORY CARE-SENSITIVE CONDITIONS ONLY)^a				
12 mo.	0.22 (0.20, 0.24)	0.26 (0.25, 0.27)	84 (78, 90)	p < 0.001
18 mo.	0.25 (0.23, 0.26)	0.28 (0.27, 0.29)	88 (82, 94)	p < 0.001
21 mo.	0.24 (0.23, 0.26)	0.28 (0.27, 0.28)	87 (81, 93)	p < 0.001
INPATIENT ADMISSIONS (ALL CAUSES)^a				
12 mo.	4.7 (4.5, 5.0)	4.8 (4.7, 4.8)	99 (94, 104)	p = 0.605
18 mo.	5.1 (4.8, 5.3)	5.3 (5.2, 5.4)	96 (91, 101)	p = 0.091
21 mo.	5.1 (4.8, 5.3)	5.4 (5.4, 5.5)	94 (89, 98)	p = 0.007

SOURCE Authors' analysis of Group Health Cooperative health care utilization data. **NOTES** Adjusted rates and rate ratios estimated from generalized linear models run using a log link; Poisson error; correcting for overdispersion; and adjusting for age, sex, and Diagnostic Cost Group (DxCG Score) at baseline (2006). 95 percent confidence intervals are in parentheses. ^aIn-person visits or admissions per 1,000 members per month by patients at Group Health facilities and with external providers and facilities.

where people change behavior merely because they are being studied—or selection biases in the samples. However, these results suggest continued reductions in burnout seen at twelve months, particularly as gauged by emotional exhaustion.

CLINICAL QUALITY To measure clinical quality, we extended our previous analysis using twenty-two indicators from the Healthcare Effectiveness Data and Information Set (HEDIS),²¹ aggregated into four composites, with the patient as the unit of analysis. Because these measures rely on administrative and clinical data available for all Group Health patients, we expanded the comparison from two control clinics to all eligible adults enrolled at nineteen other Puget Sound-area Group Health clinics. We used four composites because interpreting many individual indicators is unwieldy and different composites can lead to different conclusions.²²

Across the three measurement periods (baseline, twelve months, and twenty-four months), 4,747 study and 132,330 control patients (adults) qualified for at least one of the twenty-two indicators—including screening, chronic illness care, and medication monitoring—at the prototype clinic and other clinics.

As previously reported,² the prototype clinic performed better at baseline and showed greater improvements at twelve months, regardless of the composite chosen (Exhibit 3). Over twenty-four months, while gains at other clinics appeared to be accelerating, the improvements at the prototype clinic continued to be 20–30 percent greater in three of four composites.

USE AND COST Data on use and costs were obtained from Group Health's costing system, which allocates use and costs for all services provided at its facilities and from external claims. We compared use and costs of 7,018 continuously enrolled adults at the prototype clinic with those of 200,970 adults enrolled at other Puget Sound-area clinics. Primary care included visits to primary care physicians, physician assistants, and nurse practitioners. Specialty care included visits to all other physicians except emergency physicians, which were allocated to the emergency department.

Generalized linear models were used to adjust for baseline differences and estimate the independent effects of the medical home redesign. We estimated differences in per member per month use using Poisson regression and empirical standard errors, adjusting for overdispersion and

EXHIBIT 5

Comparison Of Adjusted Costs (Dollars Per Patient Per Month) At the Group Health Patient-Centered Medical Home Prototype And Nineteen Other Clinics Over Twelve, Eighteen, And Twenty-One Months

Interval	Prototype clinic, \$ (n = 7,018)	Other clinics, \$ (n = 200,970)	Cost difference, \$	p value
PRIMARY CARE				
12 mo.	50 (49, 51)	48 (48, 48)	1.81 (0.66, 2.96)	p = 0.002
18 mo.	50 (49, 51)	48 (48, 48)	1.72 (0.75, 2.70)	p = 0.001
21 mo.	50 (49, 51)	48 (48, 48)	1.63 (0.71, 2.55)	p = 0.001
SPECIALTY CARE				
12 mo.	93 (90, 97)	91 (90, 92)	2.34 (-1.24, 5.93)	p = 0.200
18 mo.	96 (92, 99)	92 (91, 93)	3.37 (0.11, 6.62)	p = 0.042
21 mo.	99 (95, 104)	93 (93, 94)	5.78 (1.13, 10.42)	p = 0.015
EMERGENCY DEPARTMENT AND URGENT CARE				
12 mo.	20 (19, 21)	23 (23, 24)	-3.67 (-4.71, -2.63)	p < 0.001
18 mo.	21 (20, 22)	25 (25, 25)	-3.98 (-4.91, -3.04)	p < 0.001
21 mo.	22 (21, 23)	26 (25, 26)	-4.02 (-4.92, -3.12)	p < 0.001
INPATIENT ADMISSIONS (ALL CAUSES)				
12 mo.	126 (115, 138)	136 (131, 141)	-9.59 (-20.50, 1.32)	p = 0.085
18 mo.	129 (120, 138)	143 (138, 147)	-13.94 (-21.91, -5.96)	p = 0.001
21 mo.	132 (124, 140)	146 (142, 151)	-14.18 (-21.26, -7.11)	p < 0.001
TOTAL COSTS				
12 mo.	466 (453, 480)	477 (471, 483)	-10.20 (-22.85, 2.45)	p = 0.114
18 mo.	480 (468, 491)	490 (485, 495)	-10.40 (-21.19, 0.38)	p = 0.059
21 mo.	488 (476, 500)	498 (493, 503)	-10.31 (-21.69, 1.08)	p = 0.076

SOURCE Authors' analysis of Group Health Cooperative health care costing data. **NOTES** Costs represent per patient per month nominal costs for patient care incurred at Group Health facilities and from external claims. Costs exclude those not directly related to providing health services and patient out-of-pocket costs. Costs annualized for those patients not enrolled for the entire year. Costs reported as 2005 inflation-adjusted U.S. dollars using the local Medical Price Index from the U.S. Bureau of Labor Statistics. Adjusted costs estimated from generalized linear models run using an identity link; gamma error; and adjusting for age, sex, and baseline costs (2006). 95 percent confidence intervals are in parentheses.

case-mix with age, sex, and morbidity scores.¹⁷ For costs, we estimated differences per member per month among patients at the prototype clinic and other clinics using an identity gamma model and iterative reweighted least-squares estimation, adjusting for age, sex, and baseline (2006) costs.

We analyzed changes in health care use and costs for twenty-one months because of accounting changes in Group Health's method for assigning costs for services in its integrated group practice. Thus, to ensure compatibility over time, we included data on use and costs only through twenty-one months, rather than twenty-four months.

The adjusted utilization results (Exhibit 4) reveal that differences in primary care use at twelve months persisted through twenty-one months and translated to 6 percent fewer visits. However, despite fewer in-person visits, prototype clinic patients used 80 percent more secure message threads and 5 percent more telephone encounters than other patients, which suggests greater total communication across all modalities.

Patients at the prototype clinic used specialty

care more often than controls but less so after twelve months. Differences in use of emergency department and urgent care services also persisted: Prototype-clinic patients made 29 percent fewer visits than others at twenty-one months. After accounting for case-mix, a key new finding is that all-cause inpatient admissions were 6 percent less ($p = 0.007$) over twenty-one months among patients at the prototype clinic compared to controls—a finding not apparent in a year.

As expected, the cost trends mirror the utilization findings (Exhibit 5). Primary care continued to be more expensive at the prototype clinic. It cost \$1.60 more per member per month. The greater use of specialty care cost approximately \$5.80 more per member per month. These costs were recouped, however, by fewer emergency department and urgent care visits, at a savings of \$4 per member per month, and by fewer inpatient admissions, at a savings of \$14.18 per member per month.

When costs are totaled across all types of care and adjusted for case-mix and baseline costs, we estimate a total savings of approximately \$10.30 per member per month, a result that approaches statistical significance ($p = 0.08$, meaning that

the difference could still be due to chance). Thus, while these results may have occurred by chance or from unmeasured confounding, this suggests an emerging return on investment for the prototype clinic.

Group Health had already made systemwide infrastructure investments, including the electronic health record, but substantial additional resources were nonetheless required to achieve this practice transformation. The majority of these incremental costs were personnel—recruiting and hiring additional clinical staff. Based on these additional costs and the reduction in health care costs, we can estimate return on investment associated with the prototype at twenty-one months at 1.5:1. That is, for every dollar spent to implement the medical home, Group Health received \$1.50 in return. This return on investment is based on savings in health care use achieved from personnel investments. Group Health had previously invested in various systemwide organizational and information technology (IT) improvements that facilitated the medical home; these were not included in medical home–specific return-on-investment estimates.

Lessons Learned

Group Health's experience demonstrates that primary care investments in the form of the medical home can improve patients' experiences with care, quality of care, and providers' work environment, and, at the same time, save money. The main limitations to the data presented here relate to variable response rates to our surveys and possible residual selection biases.

Based on the favorable outcomes of the prototype at one year and now up to two years, Group Health is spreading the redesign across all of its clinics. The differences in burnout are particularly notable, given that burnout among primary care physicians is associated with declines in the available workforce, which is a problem for Group Health and other organizations.

The prototype clinic was chosen as “proof of concept” because it had a stable workforce and strong leadership—attributes not consistently seen across Group Health's other practices. However, if similar investments and practice supports were made available and key redesign elements were consistently applied, leaders believe that positive results are likely. For organizations considering such transformations, Group Health's prototype experience suggests the key elements discussed below.

INVESTING IN PRIMARY CARE The medical home introduces new types of work and care expectations to primary care. Previous staffing

levels at Group Health, and probably many other organizations, were inadequate and relied on tremendous individual effort. Physicians and care teams require reasonable-size practice populations to allow physicians to know their patients better, comprehensively address their needs, and avoid burnout. Although we present our enhanced staffing ratios and mix as an example of the resources needed, we believe that staffing levels and mix should derive from the care needs of local populations.

ADAPTIVE LEADERSHIP AND PATIENT VOICES To be successful, we believe that leaders must anchor teams with a compelling vision for primary care with changes in the ways patients and physicians interact, tasks are distributed, and population-based care is deployed. In creating the vision and designing the activities, we believe that patients' desires are powerful organizing forces and that recognizing this helps ensure patient-centeredness.

In our experience, clinicians who experience high burnout and dissatisfaction are receptive to transformation, but only if leaders can clearly articulate the vision, ensure adequate resources, and let teams take charge of the process of change. Technical solutions for improving primary care, such as payment incentives, can be instrumental in shaping change, but not without strong leadership.

PAIRING LEADERSHIP WITH STRONG CHANGE MANAGEMENT Clinical staff feel understandably fatigued by the volume of changes that accompany medical home transformation.²³ Effective management is necessary to counter fatigue and resistance. Managers should assist care teams in breaking the changes into manageable parts so the teams are not overwhelmed. Careful staging can also increase the team's capacity for change as each new element is deployed. By using visual display systems, care teams can see how changes directly affect their patients and work flows. When processes are suboptimal, managers should work with teams to adjust them.

PATIENT-CENTERED ELECTRONIC RECORDS At Group Health, promoting patients' use of the shared electronic health record, including electronic communication, has been a main strategy for engaging patients, maintaining continuity, and improving access.^{9,11} Electronic health record functions used by clinicians also empower the delivery of primary care by including patient registries, care reminders, and decision-support tools to aid providers. Our experience is, however, that focused attention is needed to embed these resources carefully in medical home work flows, so that their full potential can be reached.²⁴

1.5:1

Return On Investment

For every dollar Group Health spent to implement the patient-centered medical home, it received \$1.50 in return.

Policy Implications

PRIMARY CARE FINANCING Observational evidence shows that when health systems emphasize primary care, patients achieve better health outcomes at a lower cost.²⁵ The Group Health prototype suggests that investments in primary care are likely to produce savings by reducing emergency department use and hospitalizations.

Financing reform is necessary to ensure that the benefits recouped align with the investments made. In addition to finding ways to shift downstream savings from reduced hospitalization and emergency department use upstream to primary care, other financing reform is required to support primary care infrastructures, particularly in staffing, electronic health records, and change management.

Consistent with the joint principles,¹ the Group Health demonstration confirms the importance of payment systems that value continuity of care, alternative communication forms, population management, team-based approaches, and evidence-based quality improvement.

Timing is another concern. Although the return on investment was relatively rapid at the prototype clinic, it is less clear how quickly Group Health will realize such a return in its other clinics. Ongoing evaluation and improvement efforts are obviously keys to achieving and locking in gains.

Given that community practices are positioned along the transformation spectrum, it is likely that the timing of returns will be variable. Policy makers should not expect every setting to realize the short-term savings seen at Group Health or other large systems. Savings in smaller independent practices with fewer supports may take much longer to achieve. Conversely, in some cases, existing inefficiencies and poor coordination may make gains more readily apparent.

EDUCATIONAL REFORMS Our results suggest that medical home transformation can improve job satisfaction and lessen burnout among primary care providers. Lack of satisfaction and burnout are cited by many providers as reasons for leaving the workforce or choosing other careers.^{26,27} However, successful models with enriched staffing ratios such as that used here may aggravate current shortages.

We believe that a concerted effort is needed to train more primary care physicians and other clinical staff. Training programs should also ensure that providers and clinical staff are prepared to function in their new roles. In particular, training should incorporate team perspectives,

Medical home transformation can greatly improve job satisfaction and lessen burnout among primary care providers.

use of the electronic health record, leadership and management skills, and quality improvement.

INVESTMENTS IN HEALTH IT Proposed federal standards for electronic health records are well aligned with primary care—for example, by allowing patients access to portions of their record and eventually by affording broad electronic messaging between patients and clinicians. Likewise, electronic health record functions for clinicians, such as patient reminders, can be helpful in ensuring the delivery of evidence-based care. However, installing certified electronic health records that meet proposed federal “meaningful use” criteria as called for in the 2009 stimulus legislation will not be enough. These tools must be thoughtfully integrated into primary care practice to promote transparency, communication, and coordination.

Conclusion

Group Health’s experience in a prototype clinic suggests that primary care enhancements, in the form of the medical home, hold promise for controlling costs, improving quality, and better meeting the needs of patients and care teams. We offer an operational blueprint, but success in other settings will depend on leadership, resourcing, electronic health records, change management, and aligned incentives.

Primary care transformation represents a complex system redesign that requires a policy environment that aligns payment and training to support this work. It also requires organizations in which leaders, managers, and care providers are highly engaged in achieving this change. ■

Katie Coleman, Eric A. Johnson, Paul A. Fishman, Clarissa Hsu, Michael Erikson, and Eric B. Larson receive salary support from Group Health Cooperative. Robert J. Reid, Michael P. Soman, and Claire E. Trescott are shareholders and receive salary support from Group Health Permanente, the physician group

affiliated with Group Health Cooperative. The authors thank Scott Armstrong, Alicia Eng, Suzanne Spencer, Harry Shriver, Gaguik Khatchaturian, Randall Ideker, Cheryl Wiese, Tyler Ross, Ellen Schartz, Dave McCulloch, Matt Handley, and Ted Eytan for their support of the implementation and this analysis.

They also thank the physicians, nurses, pharmacists, physician assistants, and other staff at the prototype and control clinics. They thank David Grossman and James Ralston for reviewing earlier drafts, Kelly Ehrlich for project management, and Rebecca Hughes for help with manuscript preparation.

NOTES

- 1 American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians, American Osteopathic Association. Joint principles of the patient-centered medical home [Internet]. Philadelphia (PA): 2007 Jun [cited 2010 Apr 12]. Available from: <http://medicalhomeinfo.org/Joint%20Statement.pdf>
- 2 Reid RJ, Fishman PA, Yu O, Ross TR, Tufano JT, Soman MP, et al. Patient-centered medical home demonstration: a prospective, quasi-experimental, before and after evaluation. *Am J Manag Care*. 2009;15(9):e71-87.
- 3 Steiner BD, Denham AC, Ashkin E, Newton WP, Wroth T, Dobson LA Jr. Community Care of North Carolina: improving care through community health networks. *Ann Fam Med*. 2008;6(4):361-7.
- 4 Paulus RA, Davis K, Steele GD. Continuous innovation in health care: implications of the Geisinger experience. *Health Aff (Millwood)*. 2008;27(5):1235-45.
- 5 Patient-Centered Primary Care Collaborative. Proof in practice: a compilation of patient centered medical home pilot and demonstration projects. Washington (DC): PCPCC; 2009.
- 6 Berenson RA, Hammons T, Gans DN, Zuckerman S, Merrell K, Underwood WS, et al. A house is not a home: keeping patients at the center of practice redesign. *Health Aff (Millwood)*. 2008;27(5):1219-30.
- 7 Friedberg MW, Lai DJ, Hussey PS, Schneider EC. A guide to the medical home as a practice-level intervention. *Am J Manag Care*. 2009;15(10):S291-9.
- 8 Crowley W. To serve the greatest number: a history of Group Health Cooperative of Puget Sound. Seattle (WA): University of Washington Press; 1996.
- 9 Ralston JD, Martin DP, Anderson ML, Fishman PA, Conrad DA, Larson EB, et al. Group Health Cooperative's transformation toward patient-centered access. *Med Care Res Rev*. 2009;66(6):703-24.
- 10 Conrad D, Fishman P, Grembowski D, Ralston J, Reid R, Martin D, et al. Access intervention in an integrated, prepaid group practice: effects on primary care physician productivity. *Health Serv Res*. 2008;43(5 Pt 2):1888-905.
- 11 Ralston JD, Carrell D, Reid R, Anderson M, Moran M, Hereford J. Patient Web services integrated with a shared medical record: patient use and satisfaction. *J Am Med Inform Assoc*. 2007;14(6):798-806.
- 12 Federowicz M. Improving access to improve quality: evaluation of an organizational innovation [Internet]. Findings Brief; Changes in Health Care Financing and Organization initiative. Princeton (NJ): Robert Wood Johnson Foundation; 2008 Aug [cited 2010 Apr 18]. Available from: <http://www.hcfo.org/files/hcfo/HCFOfindings0808.pdf>
- 13 Tufano JT, Ralston JD, Martin DP. Providers' experience with an organizational redesign initiative to promote patient-centered access: a qualitative study. *J Gen Intern Med*. 2008;23(11):1778-83.
- 14 Nutting PA, Miller WL, Crabtree BF, Jaen CR, Stewart EE, Stange KC. Initial lessons from the first national demonstration project on practice transformation to a patient-centered medical home. *Ann Fam Med*. 2009;7(3):254-60.
- 15 Chen LM, Farwell WR, Jha AK. Primary care visit duration and quality: does good care take longer? *Arch Intern Med*. 2009;169(20):1866-72.
- 16 Gross DA, Zyzanski SJ, Borawski EA, Cebul RD, Stange KC. Patient satisfaction with time spent with their physician. *J Fam Pract*. 1998;47(2):133-7.
- 17 DxCG Inc. DxCG RiskSmart Clinical Classifications guide. Boston (MA): DxCG Inc.; 2007.
- 18 Safran DG, Karp M, Coltin K, Chang H, Li A, Ogren J, et al. Measuring patients' experiences with individual primary care physicians: results of a statewide demonstration project. *J Gen Intern Med*. 2006;21(1):13-21.
- 19 Glasgow RE, Wagner EH, Schaefer J, Mahoney LD, Reid RJ, Greene SM. Development and validation of the Patient Assessment of Chronic Illness Care (PACIC). *Med Care*. 2005;43(5):436-44.
- 20 Maslach C, Jackson SA, Leiter MP. Maslach Burnout Inventory manual. 3rd edition. Mountain View (CA): Consulting Psychologists Press; 1996.
- 21 National Committee for Quality Assurance. HEDIS 2008, vol. 2, technical specifications. Washington (DC): NCQA; 2007.
- 22 Reeves D, Campbell SM, Adams J, Shekelle PG, Kontopantelis E, Roland MO. Combining multiple indicators of clinical quality: an evaluation of different analytic approaches. *Med Care*. 2007;45(6):489-96.
- 23 Nutting PA, Miller WL, Crabtree BF, Jaen CR, Stewart EE, Stange KC. Initial lessons from the first national demonstration project on practice transformation to a patient-centered medical home. *Ann Fam Med*. 2009;7(3):254-60.
- 24 Ralston JD, Coleman K, Reid RJ, Handley MR, Larson EB. Patient experience should be part of meaningful-use criteria. *Health Aff (Millwood)*. 2010;29(4):607-13.
- 25 Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Millbank Q*. 2005;83(3):457-502.
- 26 Lipner RS, Bylsma WH, Arnold GK, Fortna GS, Tooker J, Cassel CK. Who is maintaining certification in internal medicine—and why? A national survey 10 years after initial certification. *Ann Intern Med*. 2006;144(1):29-36.
- 27 Linzer M, Manwell LB, Williams ES, Bobula JA, Brown RL, Varkey AB, et al. Working conditions in primary care: physician reactions and care quality. *Ann Intern Med*. 2009;151(1):28-36.