

ORIGINAL RESEARCH

Challenges of Medical Home Transformation Reported by 118 Patient-Centered Medical Home (PCMH) Leaders

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Background: Little is known about the most important organizational factors and strategies for transforming primary care clinics into patient-centered medical homes (PCMHs), so we studied this in newly certified medical homes in Minnesota.

Methods: We collected the following information from the first 120 clinics serving adults to be certified: (1) a 105-item survey about the presence and function of practice systems now and 3 years ago; (2) standardized composite clinic performance measures for diabetes and cardiovascular disease; and (3) a 44-item survey about PCMH transformation derived from 31 qualitative interviews about barriers, facilitators, and change strategies with participants from 9 diverse clinics.

Results: The response rates for the systems survey was 92.5% and was 98.3% for the survey about transformation. Nearly all the items from the qualitative interviews identified as potentially important for transformation were strongly endorsed. Eighteen items in this survey also correlated significantly ($P < .01$) with change in practice systems at the level of $r \geq 0.20$. However, there was little relationship between these items and either absolute levels of systems or performance on composite measures of diabetes or vascular disease quality outcomes.

Conclusions: Many items in the survey about transformation seem to have face validity for leaders of certified PCMHs and to be associated with the extent to which their clinics have made systems changes. While clinics may need to find their own unique path to transformation, the items identified here should be considered in those decisions. (J Am Board Fam Med 2014;27:449–457.)

Keywords: Medical Home, Organizational Innovation, Patient-Centered Care, Primary Health Care, Quality of Health Care

Although the concept of a medical home for coordinated care of patients with complex medical conditions has been around since at least 1967, it has attained high visibility and vigorous support only in

the past 5 years.^{1,2} This heightened attention has been driven largely by support from both primary care leaders and national policy makers who believe what is now called the patient-centered medical home (PCMH) will rejuvenate essential primary care services while reducing health care costs and improving quality, equity, and patient experience.^{3–6} As of 2010 there were 26 large demonstration projects in 18 states, and many more have begun since then.⁷ This attention also has led to a large number of commentaries, descriptions, and studies in the literature, although until recently few of them addressed the transformation process.^{8–17}

This article was externally peer reviewed.

Submitted 25 November 2013; revised 10 March 2014; accepted 20 March 2014.

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Funding: This project was supported by grant number R18HS019161 from the Agency for Healthcare Research and Quality.

Conflict of interest: none declared.

Disclaimer: The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

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Although there are now several national and many state and local programs recognizing primary care practices as medical homes, they use a variety of definitions and standards.⁸ Moreover, studies of clinics suggest that transformation is a slow process, with large differences in both clinical processes and outcomes among those that have achieved PCMH status.^{18–21} The transformation process seems to continue even after achieving PCMH recognition. Previous studies have neither identified the maximum level of function and outcomes nor determined what specific actions are needed to most effectively drive transformation.

For those familiar with quality improvement, there should be nothing surprising about the need for ongoing transformation, but this need highlights the importance of identifying the organizational factors that inhibit or facilitate those changes as well as the most effective and efficient strategies for change. Published studies of the PCMH transformation process largely come from the evaluation of the National Demonstration Project, a clustered randomized trial of 36 practices sponsored by the American Academy of Family Physicians in 2006.²² Their mixed methods evaluation found that while transformation is feasible, it “requires tremendous effort and motivation, and benefits from external support. Most practices will need additional resources for this magnitude of transformation.”²³ They provided a series of recommendations, most aimed primarily at external sponsors and policy makers. These included the need for disruptive innovations, a systems perspective, and work on building supportive culture, leadership, and teamwork.^{18,19,23,24} Homer and Baron²⁵ supported and extended these observations by identifying some critical success factors: leadership, financial resources, personal and organizational relationships, engagement with patients and families, competence in management, improvement methods and coaching, properly applied health information technology, care coordination support, and staff development. A few other qualitative and mixed methods studies focusing on the transformation process in various settings appeared in the past year.^{11,13,16,17,21,26–28} However, few of these studies provide specific factors and strategies needed for success.

Therefore, we sought to supplement these conclusions and recommendations by identifying the specific factors and strategies that differentiated the most transformed medical homes from the least transformed within the first 132 primary care clin-

ics in Minnesota to achieve certification as *health care homes* (HCHs), the term used for the PCMH in Minnesota. Our goal was to assist all primary care clinics in understanding some of the main areas that these transforming clinic leaders believe need particular attention.

Methods

In 2008, the Minnesota legislature requested the state Departments of Health and Human Services to establish a process for certifying primary medical clinics as HCHs for those wanting to become eligible for special payments for people covered by Medicaid or other state insurance programs. Standards and a certification process were established with community input, and the first clinics were certified in July 2010. Certification standards focused on 5 areas:

1. Continuous *access* and *communication* between the HCH and the patient and family
2. An electronic searchable *registry* to identify care gaps and manage services
3. *Care coordination* for patient- and family-centered care
4. *Care plans* that involve patients with chronic or complex conditions and their families
5. *Continuous improvement* in experience, health outcomes, and cost-effectiveness

By October 2011, 120 family and/or internal medicine and 12 pediatrics clinics of the >700 primary care clinics in the state were certified, and all agreed to participate in this study.

Data Collection

Practice systems for consistent delivery of medical home services were measured using a questionnaire completed by the lead physician at each clinic. This instrument, the Physician Practice Connection–Research Survey (PPC-RS) is a modified version of the survey used by the National Committee for Quality Assurance in its national PCMH recognition program. It has been tested for reliability and validity and demonstrated to be as accurate when completed by the lead physician as when combining various respondents within a clinic.²⁹ It contains 105 questions, most of which ask whether a particular system is present and works well, is present but needs improvement, or is not present (eg,

Does your clinic have a systematic approach to identify and remind patients with chronic illnesses who are due for a follow-up visit?). Following prior methods of PPC-RS scoring, each item receives a 1.0-, 0.5-, or 0-point score, depending on the answer, and the overall score represents an unweighted percentage of the total possible score of 105 points, resulting in a score ranging from 0 to 100. Respondents were asked to complete each question on the survey twice: once for the current time (2010 to 2011) and again for the same time period 3 years earlier. For ease of interpretation and to focus on systems, we analyzed change in terms of a simple arithmetic difference.

Performance measures for each clinic were obtained from Minnesota Community Measurement, a public reporting organization sponsored by all the health plans in the state. It creates standardized measures that are reported at the individual clinic level on a public website (<http://www.mnhealthscores.org>). We selected the all-or-none composite measures for vascular disease and diabetes, which combine 4 or 5 separate quality measures into 1 score that represents the proportion of patients with a condition who have accomplished all the measurement goals.³⁰ For patients with diabetes, this means each patient needs to have an A1c <7%, blood pressure <130/80 mmHg, low-density lipoprotein <100 mg/dL, and documented nonsmoking and aspirin status. No partial credit is given for attaining less than the full set of goals for each patient. The optimal vascular composite measure is similar except that no A1c level is needed. These data were obtained, when available, for 2008, 2009, and 2010 dates of service so that change over time could be measured during a period similar to that of the systems change.

Potential transformation factors were identified from qualitative interviews of 31 individuals in 9 clinics that were recruited from a group of 10 clinics chosen to reflect diverse organizational types, locations, number of physicians, specialty mix, and performance scores on the practice systems and performance measures. The interviews with physician leaders, administrators, care coordinators, and change leaders at these clinics were designed to identify barriers, facilitators, and strategies that they believed to be most important in transforming into medical homes (not limited to attaining certification). The interviews were audio recorded and transcribed for analysis. Based on the

transcripts of these interviews, 5 investigators independently coded key factors (barriers, facilitators, and strategies) identified by respondents as important for transformation and that seemed to differentiate clinics at different levels of achievement. A final coding structure was developed using a constant comparative method and organized the coded data into 7 topic categories of quality improvement, organizational change, culture, leadership, information technology, finances, and patients. The individual items within these categories then were translated into brief statements with 5 response options, ranging from strongly disagree to strongly agree; each statement was scored on a 5-point Likert scale. The final questions were pilot-tested with clinic leaders, revised, and sent for electronic completion by the physician and administrative leads at each participating certified clinic in 2012, with regular E-mail and phone follow-up later to attain a high response rate.

Descriptive characteristics were obtained from the questionnaire that was completed by the administrative lead at each clinic. This and all other aspects of research design and methods were reviewed, approved, and monitored by the HealthPartners Institutional Review Board.

Analysis

Current and previous practice systems scores (PPC-RS) were calculated for each clinic as the proportion of practice systems that were reported to be present and functioning, and the proportions of clinic patients with diabetes or cardiovascular disease who accomplished all measurement goals appropriate for their condition were calculated. Change in practice systems was calculated as the arithmetic difference between current and previous systems scores. Finally, the 3 practice system scores (current, prior, and change) were standardized by the range of scores of all clinics studied to sharpen the focus on each clinic's transformation relative to that of the others.

Responses to negatively worded statements on the survey about transformation were reverse coded so that higher scores always reflected more positively valenced responses. We averaged the responses from each clinic's administrator and physician leader to represent the clinic's score for each question.

Measures of central tendency and dispersion were calculated to describe PPC-RS scores, perfor-

mance measures, transformation factors, and clinic characteristics in a manner appropriate to the distribution of each variable. Change over time was described as the arithmetic difference between measures, with the significance of that change assessed using a paired samples *t* test. Spearman rank correlation coefficients quantified bivariate relationships between transformation survey questions and PPC-RS change. In a sample of 100, a paired samples *t* test is sufficiently powered to detect mean differences of Cohen's $d \geq 0.283$, and a Pearson correlation coefficient to detect $r \geq 0.275$ (power = 0.80; 2-sided $\alpha = 0.05$), although a Spearman coefficient may detect smaller relationships in non-normally distributed data. Rather than rely solely on statistical significance, the threshold of $r \geq 0.20$ was considered practically meaningful and therefore used to identify more important relationships. As such, the interpretation of results focuses on the qualitative distinctions between factors on the survey about transformation that may be associated with systems change rather than the strength of the quantitative relationships.

Results

The PPC-RS survey was completed by 111 of the 120 adult clinics (92.5%). Performance measures for 2010 dates of service were available from 114 clinics for diabetes and 116 clinics for vascular disease. Nearly all these clinics had prior years' diabetes and vascular disease data so that change over time could be calculated (109 for diabetes, 106 for vascular disease). The survey about transformation was completed by 107 physician leaders and 113 clinic managers for at least 1 response from 118 clinics (98.3%), but in only 101 clinics did both respondents complete the survey (87.2%).

Table 1 describes these 120 clinics. Nearly all are part of multiclinic systems, 3 of 4 are part of 3 large systems with at least 21 clinics, and most have at least some specialty services in the clinic. All 120 clinics have electronic medical record information systems to some degree and an average of one third of their patients have Medicare or Medicaid insurance.

The mean percentage of potential medical home practice systems was $67.2\% \pm 14.4\%$ currently versus $38.5\% \pm 16.4\%$ 3 years before. The average change in practice systems among the 109 clinics with current and previous scores was both practi-

Table 1. Characteristics of Adult Certified Health Care Homes in Minnesota (n = 120)

Variable	No.	%*
Location		
Metro	75	62.5
Non-metro	45	37.5
Ownership		
Health system	112	93.3
Health plan	4	3.3
Physicians	2	1.7
Medical services		
PC only	49	40.8
PC and some specialty	14	11.7
Multispecialty	55	45.8
Primary care MDs (n)		
1-3	22	18.3
4-7	47	39.2
8-10	23	19.2
≥ 11	24	20.0
NP/PAs (n)		
0	8	6.7
1-3	67	55.8
≥ 4	24	20.0
Clinics in medical group (n)		
1	6	5.0
2-4	6	5.0
5-10	11	9.2
11-20	2	1.7
≥ 21	90	75.0
Patient visits/week (n)		
<350	31	25.8
350-550	30	25.0
550-1000	28	23.3
>1000	29	24.2
Patient insurance		
Commercial	116	63.6 ± 22.6
Medicare	117	17.3 ± 10.9
Medicaid	117	14.8 ± 16.3
Uninsured	115	3.4 ± 6.0
Medical records		
Fully electronic	110	91.7
Paper + electronic	6	5.0
Paper only	0	0

*Data are % except for Patient insurance, which are presented as mean \pm standard deviation.

MD, medical doctor; NP, nurse practitioner; PA, physician assistant; PC, primary care.

cally and statistically significant ($29.0\% \pm 16.5\%$; $P = <.001$). However, there was large variation across clinics in systems presence at both time points (range, 10-81% 3 years ago to 28-97% currently) and in the amount of net change ob-

served within these clinics (range, -1% to $+63\%$), including clinics that were part of large groups.

There was a similarly large variation among these certified clinics in their scores on the performance measures. For diabetes control, mean performance was $24.5\% \pm 8.3\%$, with a range from 5.9% to 43.1% , whereas vascular disease control was $41.6\% \pm 11.5\%$, with a range from 10.6% to 63.6% . $+2.3\% \pm 5.5\%$ for diabetes (range, -12% to 21%) and $+4.3\% \pm 7.5\%$ for vascular disease (range, -16% to 27%).

Of the 44 items in the survey about transformation, 14 had a mean score of 4 to 4.99 (agree to strongly agree), 25 had scores from 3 to 3.99 (neutral to agree), and only 5 had scores <3.0 . The mean rating was 3.59 ± 0.23 . This limited variation reduced our ability to demonstrate correlations between these scores and the other measures, but it confirmed that most of these items were considered to be relevant by clinic leaders. The individual items and their scores are ranked in Table 2.

Few of these items were significantly correlated with current practice systems scores or 2010 performance measures. However, that was not true for change in systems scores over 3 years (the difference between systems score currently and 3 years earlier). In Table 3, survey items about transformation that were correlated with the change in systems at the level of ≥ 0.2 are listed in order of Spearman correlation coefficient. All but one of the items in the patient category are in this table; the rest come from the categories of culture, organizational change, and finance. Only one is from quality improvement and none are from leadership or informational technology.

Discussion

We identified 44 specific organizational factors and strategies from interviews in a diverse sample of clinics and using the transformation survey. Among the clinics that have achieved certification as medical homes, nearly all these factors and strategies were endorsed by these medical home leaders as important for transformation. However, few factors or strategies seem to be correlated with measures of either clinic performance or presence of practice systems important for patient-centered care, although nearly half are correlated with clinic change in practice systems over the previous 3 years. The latter finding provides support for the

idea that those factors and strategies have some objective importance for transformation as well as having face validity for the responding clinic leaders. We demonstrated in a previous publication that this practice systems measure is associated with changes in performance measures for patients with diabetes or cardiovascular disease.²¹

Many of the items in Tables 2 and 3 were suggested as important by others, usually based on expert opinion. In fact, some of them (patient engagement, care coordinator job description, focus on care plans, use of formal quality improvement techniques) are required by the certification process in Minnesota. This study contributes by (1) empirically identifying these items from those successfully engaged in PCMH transformation, and (2) verifying that some items have a quantitative relationship to transformation, even though we would expect difficulty demonstrating that relationship for individual items, since any changes are complex and multifactorial.

It is also interesting that the survey items that were correlated with systems change were nearly all from the categories of patients, organizational change, and culture. This suggests that clinics that made the greatest changes in their systems were those that paid a lot of attention to the change process, especially regarding their culture and patient-centeredness. Although there were fewer items for the other categories, only 2 (finance and quality improvement) were reported to be important. Our interpretation of the high levels of agreement with most items and their limited relationship to performance measures or absolute numbers of systems is that there are many factors and strategies that are important for transformation, but every clinic is different and may have varying ability to implement them or do so in different ways to address different barriers and changes. It also suggests that there is no small group of strategies that, if implemented, will improve performance measures. This would be in keeping with other findings in the literature. For example, the extensive scientific literature on guideline implementation seems to be finally abandoning its long search for single change strategies in favor of multifaceted ones. Prior et al³¹ reviewed 33 systematic reviews of guideline implementation strategies and concluded that success required multifaceted strategies. There is also growing recognition that context matters, and a variety of organizational factors affect the direction

Table 2. Transformation Survey Item Scores among Patient-Centered Medical Home (PCMH) Leaders (n = 118)

Item	Category	Mean	SD
Providers were well accustomed to the EMR before PCMH.	Information technology	4.68	.43
Patient centeredness is a priority for us.	Patients	4.55	0.54
Providing performance results to everyone is important.	QI	4.42	0.53
We want PCMH because it fits our organization's mission.	Culture	4.39	0.69
We have extensive top leadership support for PCMH.	Leadership	4.31	0.56
We worked hard on patient centeredness.	Patients	4.30	0.55
We regularly use QI methods on other projects.	QI	4.26	0.59
We put much effort into making care teams functional.	Organizational change	4.21	0.63
A physician leader to strongly lead change is important.	Leadership	4.21	0.65
PCMH fits our desire to reduce unnecessary care.	Finances	4.11	0.70
Our care teams worked hard on trust and communication.	Organizational change	4.08	0.59
It was worth it to make the change to a PCMH.	Culture	4.06	0.68
We had a specific team to implement PCMH changes.	Organizational change	4.06	0.76
Our larger organization provided support and guidance.	QI	4.02	0.69
It is not critical to have the right person as coordinator.*	Organizational change	3.99	0.69
Creating care plans was a major part of our change.	Organizational change	3.94	0.59
If patients have to pay, they won't enroll in the PCMH.	Finances	3.91	0.70
We have the organizational resources we need.	Leadership	3.86	0.59
We already were doing most of the PCMH activities.	Culture	3.80	0.71
We could obtain needed resources for EMR barriers.	Information technology	3.78	0.71
We used formal QI techniques to develop the PCMH.	QI	3.68	0.76
We are expanding PCMH services to all our patients.	Culture	3.64	0.83
Our PCMH strategy focused on practice system change.	Organizational change	3.60	0.65
Patients report better experiences in our PCMH.	Patients	3.56	0.57
We have a process for using patients as PCMH advisors.	Patients	3.53	0.85
It was not difficult to modify our EMR for the PCMH.*	Information technology	3.43	0.90
MDH leadership was helpful to our PCMH change.	Organizational change	3.43	0.60
Patient partners are part of our change team.	Patients	3.41	0.72
We got input on PCMH changes from patient partners.	Patients	3.39	0.66
Changing our culture was important to become a PCMH.	Culture	3.39	0.75
We protected clinician income during the change.	Finances	3.39	0.88
The PCMH learning collaborative was helpful.	QI	3.32	0.59
PCMH reimbursement is a problem.	Finances	3.28	0.72
We still have a long way to go to become a PCMH.	Organizational change	3.23	0.69
The MDH PCMH certification process wasn't burdensome.	Organizational change	3.17	0.74
Care plan development was not difficult.*	Organizational change	3.13	0.79
Buy-in from everyone for the PCMH was a major challenge.	Culture	3.11	0.83
Public performance reporting wasn't an incentive for us.*	QI	3.10	0.75
Staff job satisfaction has increased with PCMH changes.	Culture	3.00	0.56
Physician satisfaction has increased with PCMH changes.	Culture	2.89	0.67
Few workflow changes were needed.*	Organizational change	2.85	0.77
Financial resources were adequate for added PCMH staff.	Finances	2.59	0.77
Care coordination fee income was a motivator for PCMH.	Finances	2.50	0.76
A care coordination job description isn't important.*	Organizational change	1.87	0.67

*Item is negatively worded and reverse-coded.

EMR, electronic medical record; MDH, Minnesota Department of Health; SD, standard deviation; QI, quality improvement.

and the chances of any change intervention succeeding.³² Powell et al³³ reviewed 205 sources for disseminating and implementing evidence-based treatments and identified 68 implementation strat-

egies that should be combined in multifaceted, multilevel plans tailored to local context.

In an earlier study, leaders of care systems and clinics successfully implementing guidelines con-

Table 3. Transformation Survey Items Correlated with System Change Score Over 3 Years ($r \geq 0.20$)

Transformation Category and Items	Mean	Spearman r	P Value
Organizational change*			
Our care teams worked hard on trust and communication.	4.08	0.32	<.001
We had a specific team to implement PCMH changes.	4.06	0.36	<.001
Creating care plans was a major part of our change.	3.94	0.33	<.001
Our PCMH strategy focused on practice system change.	3.60	0.25	.01
MDH leadership was helpful to our PCMH change.	3.43	0.36	<.001
A care coordination job description isn't important.	1.87	-0.40	<.001
Patients[†]			
Patients report better experiences in our PCMH.	3.56	0.29	.003
We have a process for using patients as PCMH advisors.	3.53	0.34	<.001
We got input on PCMH changes from patient partners.	3.39	0.28	.004
Patient partners are part of our change team.	3.41	0.34	<.001
Culture[‡]			
It was worth it to make the change to medical home.	4.06	0.34	<.001
We are expanding PCMH services to all our patients.	3.64	0.28	.003
Staff job satisfaction has increased with PCMH changes.	3.00	0.26	.01
Physician satisfaction has increased with PCMH changes.	2.89	0.28	.004
Finances[§]			
PCMH fit our desire to reduce unnecessary care.	4.11	0.30	.002
We protected clinician income during the change.	3.39	0.26	.008
Quality improvement			
We used formal quality improvement techniques to develop the PCMH.	3.68	0.46	<.001

MDH, Minnesota Department of Health; PCMH, patient-centered medical home.

Leadership (3 items) and Information Technology (3 items) items were not related to systems change scores at $r \geq 0.20$.

* $r \geq 0.20$ for 6 of 12 items.

† $r \geq 0.20$ for 4 of 5 items.

‡ $r \geq 0.20$ for 4 of 8 items.

§ $r \geq 0.20$ for 2 of 6 items.

|| $r \geq 0.20$ for 1 of 6 items.

cluded that it is essential to attend to many contextual factors and to use many strategies.³⁴ Those leaders identified 87 factors and 25 strategies that were clustered in 6 categories: organizational capabilities for change, infrastructure for implementation, implementation strategies, medical group characteristics, guideline characteristics, and external environment. All 6 categories were considered to be important, key, or essential by the experienced implementers, although variables within a medical group that directly affect its ability to undertake planned change were rated as much more important than either guideline characteristics or the external environment. They concluded that implementation efforts must use multiple strategies that take account of multiple characteristics of the guideline, practice organization, and external environment.

What we have learned here about heterogeneity of medical home transformation should also be

reflected in the limitations of this study. The practices that have applied for and achieved certification as HCHs in Minnesota, as described in Table 2, certainly are not typical of the whole country, and may not even be typical for this state. Their performance on quality measures may vary within the group of certified practices, but, on average, it is significantly higher than the average for noncertified clinics (although it was also higher 3 years before being certified.³⁵ Therefore, it is possible that these higher-performing clinics chose to be certified based on a longstanding goal of being leaders, with recognition and payment as collateral goals, rather than because the certification process documented the improvement. Only time will tell whether certification leads to an increase in their lead over noncertified clinics. The certification process in Minnesota is rigorous, although some of the many other demonstration projects nationally are rigorous as well. The specific transformation

questions also are subjective and capture only the impression of the clinic leaders responsible for the changes, so future studies will need to quantify and validate those impressions. Another limitation is the potential for recall bias in reporting practice systems 3 years ago, bias that might also vary by clinic and context. Despite these caveats, the factors endorsed by medical home leaders here should be useful to clinics elsewhere looking for guidance on how to approach the transformation process. Even if each clinic must find its own way to deal with its unique situation, these findings identify many considerations and specific areas to focus attention on that have been strongly endorsed by leaders of a diverse set of clinics. They highlight the importance of an organized quality improvement process; specific components of organizational change, clinic culture, leadership, information technology, and financial resources; and the role of patients.

This perspective on transformation (that every practice is different and requires its own approach to change that uses multiple strategies that fit its own situation) fits well with the conclusions from the evaluators of the National Demonstration Project. They concluded that the “developmental pathways to success vary by practice” and that there need to be local variations in the development and implementation of the PCMH model.²³ Despite the hundreds of published articles about the medical home, there is a surprising dearth of even descriptive information about how anyone built one or recommendations about how to do so. There are plenty of articles about the multiple visions of what a medical home should look like, about what is needed to foster the change from the outside, and even a few preliminary studies of effects. If there is no single best path forward, perhaps that dearth of process prescriptions is both understandable and desirable. But it does require individual clinics to assess carefully their own situation and identify those changes and strategies best suited to their situation and context. Perhaps we should all be more humble about our ability to know just what changes are needed in individual clinics and care systems and how others should go about making them. There may not be any silver bullets that will work for all or even most clinics.

The information and analyses presented in this article would not have been possible without the active cooperation of the medical and administrative leaders of the 120 certified medical homes in

Minnesota. The authors are especially indebted to the leaders and other personnel at the 9 clinics that completed the interviews from which the items in the transformation survey were created: Centra-Care Clinic–Becker; Essentia Health–Duluth Clinic–Pediatrics; Fairview Clinics–Maple Grove; HealthPartners–St. Paul Clinic; Lakewood Health System–Staples Clinic; Mayo Family Clinic–Northwest; Park Nicollet Clinic–St. Louis Park; United Hospital District–Blue Earth Clinic; University of Minnesota Physicians–Phalen Village Clinic.

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