Optimizing Huddle Engagement Through Leadership and Problem Solving Within Primary Care: Results from a Cluster-Randomized Trial

Michelle A. Lampman, PhD^{1,2} , Aravind Chandrasekaran, PhD³,
Megan E. Branda, MS^{1,2,4}, Marc D. Tumerman, MD⁵, Peter Ward, PhD³,
Bradley Staats, PhD⁶, Timothy Johnson, MD⁷, Rachel Giblon, MS¹, Nilay D. Shah, PhD^{1,2},
and David R. Rushlow, MD⁷

¹Division of Health Care Policy and Research, Department of Health Sciences Research, Mayo Clinic, Rochester, MN, USA; ²Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, Mayo Clinic, Rochester, MN, USA; ³Department of Operations, Fisher College of Business, The Ohio State University, Columbus, OH, USA; ⁴Department of Biostatistics and Informatics, Colorado School of Public Health, University of Colorado Anschutz Medical Campus, Aurora, CO, USA; ⁵Department of Family Medicine, Mayo Clinic Health System, Sparta, WI, USA; ⁶Kenan-Flagler Business School, University of North Carolina, Chapel Hill, NC, USA; ⁷Department of Family Medicine, Mayo Clinic Health System-Franciscan Healthcare, La Crosse, WI, USA.

BACKGROUND: Leaders play a crucial role in implementing and sustaining changes in clinical practice, yet there is limited evidence on the strategies to engage them in team problem solving and communication.

OBJECTIVE: Examine the impact of an intervention focused on facilitating leadership during daily huddles on optimizing team-based care and improving outcomes.

DESIGN: Cluster-randomized trial using intention-to-treat analysis to measure the effects of the intervention ($n = 13$ teams) compared with routine practice ($n = 16$ teams).

PARTICIPANTS: Twenty-nine primary care clinics affiliated with a large integrated health system in the upper Midwest; representing differing practice types and geographic settings.

INTERVENTION: Full-day leadership training retreat for team leaders to facilitate of care team huddles. Biweekly coaching calls and two site visits with an assigned coach.

MAIN MEASURES: Primary outcomes of team development and function were collected, pre- and post-intervention using surveys. Patient satisfaction and quality outcomes were compared pre- and post-intervention as secondary outcomes. Leadership engagement and adherence to the intervention were also assessed.

KEY RESULTS: A total of 279 pre-intervention and 272 post-intervention surveys were completed. We found no impact on team development (-0.98 , 95% CI $[-3.18, 1.22]$), improved team credibility (0.18 , 95% CI $[0.00, 0.35]$), but worse psychological safety (-0.19 , 95% CI $[-0.38, 0.00]$). No differences were observed in patient satisfaction; however, results were mixed among quality outcomes. Post hoc analysis within the intervention group showed higher adherence to the intervention was associated with improvement in team coordination (0.47 , 95%

CI $[0.18, 0.76]$), credibility (0.28 , 95% CI $[0.02, 0.53]$), team learning (0.42 , 95% CI $[0.10, 0.74]$), and knowledge creation (0.74 , 95% CI $[0.35, 1.13]$) compared to teams that were less engaged.

CONCLUSIONS: Results of this evaluation showed that leadership training and facilitation were not associated with better team functioning. Additional components to the intervention tested may be necessary to enhance team functioning.

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KEY WORDS: teamwork; huddle; training; practice transformation.

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INTRODUCTION

Team-based care delivery has been identified as a core component for improving primary care practice.^{1,2} Furthermore, effective communication within care teams has been identified as a key element for successful primary care transformation.^{3,4} Practices such as daily huddles are effective strategies for enhancing communication and improving efficiency and staff satisfaction among primary care teams.^{4–6} During daily huddles, the care team comes together to discuss clinic schedules, opportunities to improve access, shift appointments to the most appropriate level of care, coordinate visit-related needs, and other clinic related issues.⁷ They may also include simple problem solving approaches such as Plan-Do-Study-Act (PDSA) cycles to identify, escalate, and assign problems to care team members.⁸

Several studies have found physician engagement and leadership to be critical facilitators to daily huddling.^{9,10} Stewart et al. (2007) report physician buy-in to be a key element for

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successful implementation into practice, along with having a designated huddle leader, structured agenda, and a local champion.¹⁰ Training physicians to be influential leaders can both improve and sustain the quality of huddles.^{6,7} In fact, studies in healthcare and organizational development point to the role of leaders in maintaining quality improvement initiatives^{11,12}, facilitating patient-centered care¹³, and reducing staff burnout.¹⁴

Other evidence supports ways healthcare leaders play a critical role in implementing practice change and spread of innovation.^{15–18} In a mixed methods study, Giannitapini et al. (2018) found that supportive leadership was positively associated with team function and highlighted the importance of interprofessional training.¹⁵ However, there is minimal evidence on the strategies used to engage leaders in opportunities for problem solving and team communication such as daily huddles. Therefore, we chose to test if an intervention focused on facilitating leadership and problem solving during daily huddles through training and ongoing support would result in greater team function compared to standard implementation of huddles. Secondly, we assessed the impact of the intervention on key primary care outcomes including burnout, patient satisfaction, and quality of care that were consistent with organizational performance indicators.

METHODS

This study was conducted as part of a larger multi-year effort to transform primary care practice throughout a large integrated health system serving as a Practice Transformation Network within the Transforming Clinical Practice Initiative (TCPI) through the Centers for Medicare and Medicaid Services Innovation Center.¹⁹ A primary goal of the TCPI program is to build an evidence base for effective practice strategies that facilitate the transformation of healthcare teams toward better performance that emphasizes value over volume. We conducted a pragmatic cluster-randomized trial to build an evidence base among a sample of care teams before spreading the intervention across an entire network of practices.

This trial is registered at [Clinicaltrials.gov](https://clinicaltrials.gov) (registration number NCT03062670) and was approved by the Mayo Clinic Institutional Review Board; a detailed description of the study protocol has been published elsewhere.²⁰ The trial was randomized at the care team level, where teams consisted of multiple physicians as well as advanced practice clinicians, rooming staff, registered nurses, social workers, behavioral health specialists, pharmacists, scheduling staff, and clinical/operational leadership. The size and composition of member roles varied across the care teams.

Sample

This study was conducted in a large integrated multispecialty group practice located in the North Central United States. This system consists of over 70 primary care practices representing

diverse settings including academic medical centers and community practices, with urban and rural locations, as well as different organizational and payment structures. Teams within all family medicine (FM), internal medicine (IM), and pediatric practices were eligible for participation if they had already adopted huddling into routine practice.

Sample Size/Randomization

Care team recruitment relied on voluntary enrollment and was limited to 30 teams. The maximum number of care teams included was based on the availability of coaches and their capacity to facilitate implementation throughout multiple sites. As we have reported elsewhere, we determined a maximum of 15 care teams could be randomized into the intervention arm to have adequate power (> 80%) to detect one standard deviation difference in a continuous outcome with an intra-cluster correlation estimated at 0.05.²⁰ Using a computer-generated randomization, our lead statistician (MB) randomized units using a minimization algorithm balancing on type of practice (FM, IM, and pediatrics) and panel size.²¹ We use the term randomization units to define team boundaries regarding exposure to the intervention, meaning one randomization unit can represent one team with no shared membership or a cluster of one or more teams identified to share one or more team members.

Intervention

All care teams consented and randomized to the intervention were asked to identify a lead physician, a lead nurse, and a clinic administrator to attend a full-day retreat. This retreat provided leadership training on how to effectively utilize daily huddles to improve teamwork, enhance engagement, and solve problems through rapid-cycle PDSA. Following the training retreat, members of the study team (DR, AC, MT, PW, BS, TJ) served as coach and primary contact for 2–3 care teams over 6 months. The coach and members of care team leadership held phone calls every 2 weeks to review progress and address any concerns or questions that arose during the implementation phase. They also conducted site visits (at 50 and 100 days post-retreat) with the care teams to directly observe the care team's huddle and provide feedback regarding the huddle process. The control care teams were instructed to continue their established huddling practices.

Outcomes

Team Development and Team Function Outcomes. The primary outcome to assess greater team function was the Team Development Measure (TDM) which is a validated instrument that assesses cohesion, communication, roles/goals, and team primacy.²² Several other validated scales were used to collect secondary measures reported by staff; these included coordination and credibility of transactive memory systems (TMS) (i.e., how much the teams coordinated and worked together during care delivery);²³ psychological safety

(ability to speak freely without concerns of repercussions);²⁴ team learning (degree to which processing of team experience changes the nature and range of potential team interactions);²⁵ knowledge creation (process for defining new ideas, improving understanding, and capability of a team completing a quality project);²⁶ and burnout (possessing feelings of emotional exhaustion and depersonalization from work).²⁷ See Appendix A for a detailed list of measures.

All participating members, both intervention and control, completed online surveys to assess each of the outcomes listed above. All outcomes were assessed at baseline, prior to the start of the intervention, and 6 months post-intervention; except burnout which was only measured at 6 months.

Patient Satisfaction and Quality Outcomes. Other secondary outcomes included patient satisfaction and clinical quality. Patient satisfaction was collected as part of the Press Ganey® Medical Practice survey, which is conducted routinely among patients receiving care within the health system. This measure represents the proportion of completed responses for which patients selected the highest score, divided by the total number of completed responses. Clinical quality measures reflecting performance related to chronic disease management and preventive screening were assessed at the care team level (see Appendix B). These measures reflect the proportion of eligible patients meeting each criterion for each of the measures.

Adherence to the Intervention. Leadership engagement and adherence to the intervention were monitored during and after the implementation period. This included the collection of detailed minutes from each coaching call recorded by the project manager as well as a post hoc survey administered to each coach to assess their impressions of their assigned team's engagement towards the intervention (Appendix C). Results from the analysis of the engagement level of the care team were only used for hypothesis generation and were not intended to assess the effectiveness of the intervention.

Statistical Methods

All analysis conducted is based on the intention-to-treat principle,²⁸ where each care team is analyzed to the arm they were assigned regardless of adherence to the intervention. Continuous outcomes measuring team behavior and patient satisfaction were modeled using hierarchical generalized linear models with random main effects specified at the randomizing unit level. The model is adjusted by the baseline assessment.

Analysis of the quality measures examined the proportion of paneled patients. Each measure was assessed separately using Poisson's regression with a team-level random effect at 3 different time points (6 months prior, 6 months during, and 6 months post). Each model was adjusted by arm, time period (pre, during, and post), and interaction between arm

and time. Analyses were conducted in SAS (SAS version 9.4, Cary, NC) and Stata (Version 15, College Station, TX) with all *p* values less than 0.05 considered statistically significant.

RESULTS

Care teams were recruited in March 2017. As shown in Figure 1, 164 eligible care teams were sent an email invitation and given 2 weeks to respond. By design, 30 care teams (22 randomization units) were enrolled. Of the 22 randomization units, 11 were randomized to serve as controls (16 care teams) and 11 were randomized to receive the intervention (14 care teams). One team randomized to the intervention arm withdrew from the project due to staffing issues before the intervention retreat. A total of 13 care teams participated in the intervention.

At baseline, 485 staff members assigned to the 29 participating teams were enrolled in the study (221 intervention, excluding the site that withdrew). Of these staff members, 279 (58%) responded to the baseline survey (111 intervention). At 6 months post baseline, 46 staff members had left the participating teams (24 intervention). Of the remaining staff, 272 (62%) responded to the 6-month survey request (121 intervention arm). Table 1 shows the participating team and survey respondent characteristics.

Impact on Team Development and Team Function Outcomes

Across all outcomes, the two arms were similar at baseline (Table 2). The 6-month assessment found no difference in TDM. Across all other outcomes related to team function and burnout, results were similar at the 6-month time point with the exception of the TMS credibility subscale, which showed a marginal improvement over the control arm (0.18, 95% CI (0.00, 0.35)). Exposure to the intervention had a positive impact on team member's beliefs about the reliability of other member's knowledge. However, we also saw evidence of a marginal decline in psychological safety within the intervention arm over the control arm (−0.19, 95% CI (−0.38, 0.00)), indicating a lower ability to speak freely without concerns of repercussions. Burnout was on average lower in the control arm at 6 months compared to the intervention arm; however, no differences were detected.

The range across the intra-correlation coefficient (ICC) was greater at baseline (range 0.17–0.33) than at the 6-month time point (range 0.01–0.14), indicating that responses within teams became more similar over time.

Impact on Patient Satisfaction and Quality Outcomes

We found no differences in patient satisfaction after 6 months. Both arms experienced variation in patient satisfaction over time, but consistently stayed within a range of 80 to 88% over

Figure 1 Participant flow diagram by randomization group.

a 2-year timeframe. Similarly, when assessing the quality measures related to chronic disease management and cancer prevention, changes were seen among some of measures over time. Within the intervention arm, cervical cancer screening showed an increase over time and a decrease in adult and pediatric asthma care compared to the control arm. See Appendix B for results for all secondary outcomes related to patient satisfaction and quality.

Adherence to the Intervention: Highly Engaged Versus Less-Engaged Teams

To better understand adherence to the intervention, we conducted a post hoc assessment of adherence to the intervention, grouping care teams within the intervention arm into highly engaged versus less engaged. We performed this analysis to understand how the intervention worked among assigned care teams. Teams were scored by coaches based on their degree of

provider engagement, use of daily huddles, review of clinic schedules to optimize patient flow, use of standardized problem identification and documentation practices, occurrence of organized problem solving efforts, and use of visual management. Six teams were determined to be adherent to the protocol per the criteria above and considered to be highly engaged in the intervention (Table 3).

Compared to the highly engaged teams, less-engaged teams experienced lower huddle attendance from their lead physician or had turnover within this role during the implementation phase based on data collected during the coaching calls. Lead physician champion attendance among highly engaged teams averaged 90%, whereas lead physician attendance was less than 40% among the less-engaged teams (Table 3).

Comparisons of team development and team function between the highly engaged and less-engaged teams found that highly engaged teams scored significantly higher than less-

Table 1 Participating Team and Survey Respondent Characteristics

Participating team characteristics	Control (N = 16)	Intervention (N = 13)	Total (N = 29)	p value
Practice type				0.96
Family medicine	13 (81.3%)	10 (76.9%)	23 (79.3%)	
Primary care internal medicine	2 (12.5%)	2 (15.4%)	4 (13.8%)	
Pediatrics	1 (6.3%)	1 (7.7%)	2 (6.9%)	
Panel size				0.22
Large	11 (68.8%)	6 (46.2%)	17 (58.6%)	
Location				0.20
Urban	10 (62.5%)	5 (38.5%)	15 (51.7%)	
Survey respondent characteristics	Control (N = 152)	Intervention (N = 120)	Total* (N = 272)	
Gender				0.49
Female	123 (80.9%)	101 (84.2%)	224 (82.4%)	
Position				0.09
Administration/operations manager	11 (7.2%)	6 (5.0%)	17 (6.3%)	
Advanced practice clinicians	9 (5.9%)	10 (8.4%)	19 (6.9%)	
Clerical—scheduling staff	10 (6.6%)	19 (15.8%)	29 (10.7%)	
Interpreter	0 (0.0%)	2 (1.7%)	2 (0.7%)	
Lab technician	2 (1.3%)	3 (2.5%)	5 (1.8%)	
Medical assistant	16 (10.5%)	5 (4.2%)	21 (7.7%)	
Pharmacist	2 (1.3%)	1 (0.8%)	3 (1.1%)	
Physician	32 (21.1%)	16 (13.3%)	48 (17.6%)	
Psychologist	1 (0.7%)	0 (0.0%)	1 (0.4%)	
RN—care coordinator	6 (3.9%)	2 (1.7%)	8 (2.9%)	
RN—diabetes educator	1 (0.7%)	1 (0.8%)	2 (0.7%)	
Social worker	0 (0.0%)	1 (0.8%)	1 (0.4%)	
Team nurse (RN/LPN)	62 (40.8%)	54 (45.0%)	116 (42.6%)	

* Only those that completed the 6-month survey included

engaged teams for both TMS subscales (coordination and credibility), team learning, and knowledge creation (Table 4). When comparing highly engaged teams to the control arm, TMS credibility and knowledge creation were significantly higher whereas the less-engaged teams were significantly lower than the control practices in psychological safety, team learning, and knowledge creation.

DISCUSSION

This cluster-randomized trial examining the impact of a 6-month intervention consisting of leadership training and facilitation intended to optimize primary care team huddles showed limited impact on team development, measures of team function, staff burnout, patient satisfaction, and quality performance between the intervention and control groups. We

found marginal evidence that exposure to the intervention had a positive impact on team member's beliefs about the reliability of other member's knowledge. We also found evidence of a marginal decline in psychological safety. We found no impact on TDM scores, our primary outcome of interest. Our secondary assessment of patient satisfaction showed no significant impact from this intervention, whereas we found mixed results among the quality outcomes over time. While we understood the limitations on seeing a change in these outcomes during the short timeframe, we believe that assessing them is necessary as any intervention on team huddles needs to also examine the potential impact it could have on patients. More research is needed to understand the potential impact of huddling practices on patient-related outcomes.

Throughout the 6-month implementation stage, the biweekly coaching calls and multiple site visits revealed varying levels of adherence and engagement from the participating

Table 2 Results for Team Development and Team Function Outcomes

Outcome	Control*		Intervention*		Mean Diff (95% CI) [†]	ICC	
	Baseline N = 212	6-month N = 153	Baseline N = 132	6-month N = 119		Baseline N = 344	6-month N = 272
Team Development Measure (TDM)	51.7 (26.1)	51.4 (14.9)	47.3 (19.9)	48.1 (13.4)	− 0.98 (− 3.18, 1.22)	0.33	0.06
TMS: coordination	4.3 (1.5)	4.2 (1.5)	4.2 (1.3)	4.1 (1.3)	0.01 (− 0.25, 0.28)	0.18	0.14
TMS: credibility	4.5 (1.1)	4.3 (0.9)	4.5 (1.0)	4.5 (0.9)	0.18 [‡] (0, 0.35)	0.17	0.04
Psychological safety	4.2 (1.5)	4.2 (1.0)	4.1 (1.3)	4.0 (0.9)	− 0.19 [‡] (− 0.38, 0)	0.25	0.04
Team learning	4.4 (1.3)	4.1 (1.2)	4.3 (1.1)	4.0 (1.2)	− 0.04 (− 0.28, 0.20)	0.17	0.10
Knowledge creation	4.1 (1.7)	4.0 (1.6)	3.9 (1.5)	3.8 (1.5)	− 0.02 (− 0.31, 0.27)	0.21	0.11
Burnout [§]	—	4.4 (3.3)	—	4.8 (3.2)	0.43 (− 0.46, 1.33)	—	0.01

* Unadjusted mean (standard deviation)

[†] Adjusted for baseline response and clustering on randomization unit

[‡] $p < 0.05$, statistically significant

[§] Collected at 6-month survey only

Table 3 Intervention Adherence and Huddle Attendance by Lead Physician Among Intervention Arm

Intervention team	Protocol adherence score*	Average huddle attendance of lead physician†
Team 1	20	25%
Team 2	30	20%
Team 3	40	30%
Team 4	40	50%
Team 5	40	Physician left the practice
Team 6	40	20%
Team 7	50	Physician left the practice
Team 8	60	100%
Team 9	75	95%
Team 10	80	100%
Team 11	80	90%
Team 12	80	95%
Team 13	85	85%

* Based on final coach survey (Appendix B)—ranges 1–100

† Reported by practice leadership during coaching calls

Italics indicated teams identified as highly engaged

teams. Designated leaders from some teams were present for every call and showed active efforts toward improvement, while some leaders from other teams frequently missed calls and showed less effort toward improvement. Practices that were highly engaged did show improvement over the practices that were less engaged in regard to team functions that reflect team member interaction and communication. When compared to the control group, highly engaged teams showed improvement in credibility and knowledge creation whereas the less-engaged teams showed lower psychological safety, team learning, and knowledge creation. While we were unable to show an effect of the intervention overall, the challenges with fidelity among our intervention group seem to highlight both the positive impacts from engaged leadership and the disruptive impacts potentially caused by lack of leadership on team function. Without engaged and facilitative leadership, at various levels, staff struggle with implementing change on their own.^{15,16,29} These trends among the practices with greater adherence highlight the importance of fidelity to the intervention and indicate the need for further exploration.

While the goal of this intervention was to improve primary care team performance by teaching team leadership ways to optimize huddles, this was not found to be an effective strategy. A more effective approach for influencing team performance might have been to target the intervention at all

members of the care team rather than focusing only on team leadership, while training leaders to better support and facilitate practice transformation.¹⁵ Several studies have found team training to be an effective strategy for practice transformation.^{6,15,29–33} Shunk et al. (2014) found that team training, through a huddle-coaching program developed to teach teams how to huddle as a foundation for team-based care, led to improvements in TDM overtime; however, their results cannot be directly compared to ours due to the lack of a control group in their study.⁶

One very positive aspect of this study is the use of a randomized experimental design. Primary care practices are often described as complex adaptive systems with continually changing internal and external context. Changes in staffing, organizational support, and shifting priorities can all impact practice transformation efforts. Experimental research designs are less frequently used in these contexts because of challenges with randomization and difficulty controlling the internal and external factors influencing study outcomes. CMS's TCPI program¹⁹ and other national efforts working to build a body of evidence around primary care practice transformation, such as EvidenceNow³⁴, can benefit from studies using experimental pragmatic designs. Informed by this work, organizations participating in these transformation efforts should consider both internal (e.g., engaged leadership) and external

Table 4 Comparisons Among Highly Engaged and Less Engaged

Outcome	Highly vs. less engaged (intervention arm only)*	Highly engaged vs. control*	Less engaged vs. control*
Team Development Measure (TDM)	3.86 (− 0.96, 8.69)	− 1.11 (− 4.52, 2.31)	− 2.51 (− 5.56, 0.55)
TMS: coordination	0.47 (0.18, 0.76)†	0.23 (− 0.05, 0.50)	− 0.18 (− 0.48, 0.11)
TMS: credibility	0.28 (0.02, 0.53)†	0.31 (0.11, 0.50)†	0.05 (− 0.15, 0.24)
Psychological safety	0.22 (− 0.07, 0.51)	− 0.11 (− 0.31, 0.10)	− 0.29 (− 0.52, − 0.05)†
Team learning	0.42 (0.10, 0.74)†	0.16 (− 0.05, 0.38)	− 0.27 (− 0.51, − 0.04)†
Knowledge creation	0.74 (0.35, 1.13)†	0.29 (0.07, 0.52)†	− 0.44 (− 0.71, − 0.16)†
Burnout	− 0.55 (− 1.9, 0.76)	0.02 (− 0.01, 0.13)	0.11 (− 0.03, 0.26)

* Adjusted mean difference (95% CI), adjusted for baseline response and clustering on randomization unit

† $p < 0.05$, statistically significant

facilitation strategies (e.g., coaching) to promote fidelity to program implementation and evaluation and ensure that these approaches improve patient and clinician experience, as well as improve value for the healthcare system.

There are several limitations that warrant further discussion. The short timeline for this study limits the ability to assess outcomes that require more time to detect change, such as quality and patient satisfaction. This was a pragmatic study; therefore, we did not have full control over the implementation of the intervention within the setting. Furthermore, we are unable to assess whether the training retreat and coaching calls actually improved the leadership skills and level of engagement among the team leaders who participated directly in these components of the intervention. Finally, our post hoc assessment of adherence has the potential for bias; however, notes collected during the coaching calls conducted throughout the implementation phase provide evidence that supports the results of this assessment.

CONCLUSIONS

This study was conducted to assess the impact of an intervention consisting of a training retreat and facilitative coaching calls intended to optimize team huddles and subsequently improve team outcomes. While this particular intervention did not have the impact that we were hoping, this experience provided key learnings related to the importance of participant engagement and their potential impact on the overall success of an intervention on intended outcomes. Ongoing efforts to transform primary care practice through behavioral interventions directed at members of primary care teams should give more attention to strategies for engaging practice leaders to better facilitate successful improvement.

Corresponding Author: Michelle A. Lampman, PhD; Division of Health Care Policy and Research, Department of Health Sciences Research, Mayo Clinic, Rochester, MN, USA (e-mail: Lampman.Michelle@mayo.edu).

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Compliance with Ethical Standards:

Conflict of Interest: Dr. Shah reports grants from Centers for Medicare and Medicaid Services, during the conduct of the study; and in the past 36 months, Dr. Shah has received research support through Mayo Clinic from the Food and Drug Administration to establish Yale-Mayo Clinic Center for Excellence in Regulatory Science and Innovation (CERSI) program (U01FD005938); the Centers of Medicare and Medicaid Innovation under the Transforming Clinical Practice Initiative (TCPI); the Agency for Healthcare Research and Quality (R01HS025164; R01HS025402; R03HS025517); the National Heart, Lung and Blood Institute of the National Institutes of Health (NIH) (R56HL130496; R01HL131535); the National Science Foundation;

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