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Guidance for Structuring Team-Based Incentives in Health Care

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Abstract

New payment methods designed to incentivize more efficient care delivery are accelerating the movement of health care providers into organized provider groups. More efficient health care delivery requires explicit structuring of care delivery processes around teams of clinicians working toward common patient care goals. Provider organizations accepting new payment methods will need to design and implement compensation systems that provide incentives for team-based care. While lessons from studies performed both outside and inside health care provide some guidance on designing and implementing team-based incentives, organized delivery systems face several significant barriers to designing and implementing them.

As health care spending continues to grow, provider payment reform remains a priority for policymakers. Both public and private sector policies have focused on the payment system as a central tool for delivery system reform. Federal examples include Value Based Purchasing and the Shared Savings Program for Accountable Care Organizations.(1, 2) At the same time, the Center for Medicare and Medicaid Innovation (CMMI), commercial plans, and Medicaid programs are testing new delivery models and payment incentives.(3)

As provider organizations sign these contracts they must grapple with how best to organize care processes and change the incentives within their own organization.(4–7) Provider organizations need to examine and modify existing compensation systems to better align provider incentives with the cost containment goals created by the new payment methods and new care delivery models they will put in place to achieve them. For example, new compensation systems are needed for distributing global or bundled payments, distributing shared savings, and encouraging team based care across provider specialties.

It is widely understood that future efforts to improve patient outcomes and system efficiency are likely to rely heavily on increased teamwork.(8) However, little attention has been given

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to how to best structure financial incentives *within* an entity such as an accountable care organization (ACO) to maximize cooperation in achieving improved quality and lower spending. While teamwork has been shown to improve clinical outcomes and provider satisfaction in a variety of ambulatory and inpatient settings, discussion of how best to incent medical teams has been limited. (9–18) In this paper, we focus on the design of reward systems and performance evaluations for teams.

We begin our analysis with a clinical vignette to highlight the relevance and complexity of team-based incentives. Drawing from the literature on organizational behavior, we then define teamwork and present evidence that workers' interdependence—the degree to which each worker impacts the outcomes of his/her colleagues' work—affects how work should be evaluated and rewarded.(19) We discuss the implications of this evidence for teamwork in health care generally, and the use of teams to promote shared accountability for clinical outcomes and health care spending in particular. Finally, we highlight challenges associated with implementing team-based performance measurement and reward systems.

Team Based Care for Diabetes: A clinical Vignette

Mrs. Smith, a 70-year-old non-smoking woman with type II diabetes mellitus, hypertension, and obesity, goes to see her primary care physician (PCP) for a new patient visit. She is insured through Medicare, and her new PCP's practice recently joined an ACO that is eligible for shared savings and quality performance bonuses through the Medicare Shared Savings Program. In this program, the ACO is given a yearly spending target for its population of patients. If the ACO meets performance thresholds for certain quality measures, and total medical spending for all included patients is below target, then the ACO shares the savings with Medicare.

Mrs. Smith was discharged from the hospital two weeks ago following a three-day hospitalization for pneumonia. Prior to discharge, Mrs. Smith's inpatient care team scheduled her for a post-discharge follow up appointment with her PCP. The hospital discharge summary, discharge medication list, and test results from the hospitalization were forwarded to the PCP's office. Labs sent during this hospitalization were notable for an elevated hemoglobin-A1C of 10.2, reflecting poor control of her diabetes.

Today, the practice's nurse practitioner (NP) evaluates Mrs. Smith's vital signs and finds that her blood pressure is elevated above the goal for diabetic patients. The NP reconciles Mrs. Smith's current and pre-hospitalization medication lists and the PCP performs a full physical examination. While testing for sensation in her feet, the PCP diagnoses diabetic neuropathy—or decreased feeling—in both feet and a grade I diabetic ulcer on the right foot. At the end of their visit, Mrs. Smith and her PCP discuss a plan to better control her diabetes and blood pressure. The PCP increases the dose of Mrs. Smith's blood pressure and diabetes medications, starts a low dose aspirin, and refers her to a dietician for medical nutrition therapy, an ophthalmologist for a dilated eye exam, and a podiatrist for additional management of her ulcer and peripheral neuropathy. Mrs. Smith is also assigned a care manager, who will help organize the patient's appointments with each provider and facilitate communication of important information between them. All providers are part of the same ACO.

The practice's NP administers influenza and pneumonia vaccines, sees Mrs. Smith two weeks later to check her blood pressure, and then every three months for hemoglobin-A1C measurements and counseling. The clinic's administrative assistant forwards Mrs. Smith's clinic notes and recent lab work to the dietician, ophthalmologist, and podiatrist and uploads them into the ACO's Electronic Medical Record (EMR). The NP then contacts each

provider to clarify Mrs. Smith's management goals, and introduces them to the other providers who will be caring for her. The NP makes clear that all of Mrs. Smith's providers will be working together to care for her, and will be collectively responsible for achieving the ACO's quality standards, some of which will include those developed by the Centers for Medicare and Medicaid (CMS). (1)

After a patient visit, each provider posts a note in the shared EHR and forwards this note to other members of the care team. The case manager creates a group-wide email list so that the providers can discuss management decisions and share patient updates. When Mrs. Smith returns to see her PCP one year later, her hemoglobin-A1C and blood pressure are improved, and she has lost fifteen pounds. She has not been hospitalized in the past year. The ACO receives a CMS performance bonus for exceeding several ACO quality performance standards including: performing post-discharge medication reconciliation, influenza and pneumococcal vaccine administration, hemoglobin-A1C and blood pressure targets in diabetic patients, and rates of screening for micro-albuminuria, retinopathy, and foot ulcers for diabetic patients. Moreover, the ACO's total spending was less than its Medicare target, so it is eligible to receive shared savings.

This vignette raises at least two questions about teamwork and performance incentives: In what sense do the providers caring for Mrs. Smith constitute a team? And how should the ACO structure these providers' performance incentives to promote the achievement of ACO performance goals?

Teamwork: Definitions and theory

Before considering how to optimally compensate this patient's providers, we must first decide if they are a team. Teams are commonly defined by the work process they are engaged in and have been characterized as having four distinct types: work teams, parallel teams, project teams, and management teams.(20) Because the individuals delivering our patient's care are the ones actually doing the work, her providers are a work team.(21) Work teams have some defining features, including: 1) A clearly defined goal requiring multiple individuals working interdependently; 2) boundaries that differentiate between team members and non-team members; 3) authority and autonomy to manage work processes;4) stable membership over a reasonable time period; and 5) they possess the essential resources necessary to achieve their goals.(22–24) Ms. Smith's providers meet these criteria for a work team.

Teams are best suited to complete highly interdependent and complex work—tasks for which an individual's work product and performance depend upon the performance and expertise of others.(22) Three forms of work interdependence impact teamwork outcomes: task interdependence, outcomes interdependence, and behavioral interdependence.(19) Task interdependence refers to characteristics of work that necessitate that it be performed by multiple individuals (see Exhibit I). Outcomes interdependence refers to whether work performance is evaluated and/or compensated at the level of the team or the individual. For example, Mrs. Smith's providers would have high outcomes interdependence if they were evaluated as a team for meeting certain ACO quality and spending benchmarks. Behavioral interdependence is a function of how well a group of individuals actually work as a team. (19) Well-functioning teams are more likely to demonstrate higher levels of achievement(21, 23, 25) and group functioning is influenced by a range of factors. (Exhibit II).(21)

Organizational research has identified several key lessons about how the structure of a team's work, its compensation, and performance evaluation systems influence teamwork quality and work outcomes. First, team effectiveness appears to be highest when task

interdependence and outcomes interdependence are congruent. In other words, when multiple individuals need to work together to complete a task, team rewards and performance evaluations can motivate team members to work together more effectively. Conversely, individual performance assessments and compensation for work requiring a team can undermine team effectiveness and impede team performance.(19, 26, 27) Second, the motivational effects of team-based rewards will be blunted, if not lost entirely, if they are not supported by team training and performance feedback systems. Team-based performance incentives improve team performance if team members understand how to build effective teams and how to be good team members, and can see their progress toward a goal.(12, 15, 21, 23, 25, 28, 29) Third, overly complex rewards and performance evaluation systems lack motivational power because employees lose sight of the links between work and rewards.(26) Fourth, members of work teams appear to derive greater satisfaction from team-based performance incentives than individual incentives.(23, 24, 30, 31)

These four lessons clearly apply to health care settings. Indeed, many large integrated health systems—including Kaiser Permanente, Virginia Mason, Geisinger Health System, and The Massachusetts General Hospital—have used team-based incentives and team-based feedback systems to help drive significant improvements in process outcomes, including rates of screening mammography, adherence to protocols for managing diabetes, and hand-washing.(32–35)

Given this guidance, what are our options for structuring incentives for individuals and groups that will optimize patient health? Answering this question requires an understanding of the types of measured performance indicators available for incenting group and individual performance. Useful performance measures possess some common features, which are outlined in the National Quality Forum measure selection criteria, and include importance, validity, reliability, and feasibility.(36) These indicators should be easy to understand and applied in a fair and objective manner. Furthermore, employees need to understand why part of their compensation is tied to the indicator. Additionally, employees must feel that they have control over their measured performance and can improve it if necessary.(23, 37, 38) Good performance indicators for teams reflect the work of all, or at least a majority of, the team's members, and should not be linked to the actions of only a few team members. Comprehensive sets of team performance indicators should include measures of teamwork quality, and customer or patient satisfaction.(1, 23, 38)

Applying these lessons to the vignette helps illustrate how measures can be used with incentives. Appropriate targets for incenting Mrs. Smith's care team include average HbA1c levels, blood pressure, and LDL levels for all diabetic patients. These commonly used measures are impacted by the work of the PCP, nutritionist, NP, and by specialists who reinforce medication compliance, and nutrition, exercise, and weight loss goals. In contrast, hospital admission rates for all patients or certain subsets, another common quality measure, is more difficult for individual team members to see as being under their control, and might therefore be a less desirable target for team incentives. Other measures—including rates of pneumonia vaccination, yearly dilated eye exams, and screening for micro-albuminuria—could be built into a composite measure which all team members contribute to achieving. Team-based performance incentives might also motivate Mrs. Smith's providers to address specialty-specific and overall goals of care, including medication compliance, adherence to dietary recommendations, and regular exercise.(33, 34) Provider organizations could also tailor incentives towards less-traditional quality measures, including: appropriate utilization of CT scans and trans-thoracic echocardiograms, and rates of discharge summary completion within 24 hours of discharge. [Tim: I added the above sentence in response to your comment: "reading this now it occurs to me that we have simply used common HEDIS measures – the same ones used by payers – to structure the incentives for our team in the

vignette. Would be good to point to some measures that payers could not use – ones that use data they do not have access to”]

Individual-level and organization level performance incentives also have a role in health care systems with team-based health care delivery models. Individual level incentives are particularly effective for encouraging individual skill building and organization-level incentives promote attention to organization-wide priorities. However, neither of these kinds of incentives directly encourages teamwork. Holding some, but not all, members of a team financially responsible for the group’s outcomes is problematic because the excluded individuals may be less motivated to improve team outcomes, and may resent their colleagues eligibility for additional compensation. For example, the NP in our vignette could feel frustrated if the PCP received incentive payments for meeting performance targets that the NP contributed to achieving. Conversely, team members who are eligible for performance rewards will feel frustrated if they are held accountable for team outcomes that they cannot control, a common problem with organization-level performance incentives.(23, 26)

Implications for Health Systems Design and Management

Implementing team-based incentives alone without systematic efforts to redesign the work of care delivery to be highly interdependent is unlikely to result in transformational performance improvement. Indeed, in organizations dominated by individual provider care delivery models, instituting team-based rewards alone is unlikely to create highly functioning teams. Instead, team based incentives are likely to lead to “free riding,” and other problems noted above, undermining the goals of using teams to deliver care.(23) Providers will need to see that cooperation will improve work performance.

Conversely, team-based care delivery models should not rely solely upon team-based rewards. Rewards systems in team-based organizations combine significant team-based payments with rewards for individual and organizational performance.(23) Ideally, team-based organizations will also have incentives and performance measurement systems that can account for the outcomes of multi-team collaborations.(24)

Barriers to Implementing Team-Based Incentives

Health care delivery organizations face three types of barriers to implementing team-based performance and rewards systems: structural, cultural and technical. The most important barrier to effective team-based reward systems in health care is the complexity of health care itself. The vast majority of health care is not delivered in focused factories where processes are linear and team members relatively easily tracked.(39) The inherent complexity of human biology and illness results in the frequent requirement to care for individual patients along non-linear care paths, dramatically increasing the degree of difficulty for building effective team-based incentives. Thus, certain team-based aspects of a clinician’s work will likely always remain outside of a specific incentive system. In addition, team-based performance incentives will be easiest to implement, and most effective, when team composition is stable over time.(23) However, some care teams have relatively rapid turnover, particularly in settings where health care professionals are being trained. Moreover, physicians and non-physicians often have different limitations on how financial incentives are managed in their compensation plans (e.g., unionized nurses). Furthermore, equitably measuring and incenting inter-team collaborations—which are common in clinical settings—can be challenging.

With regards to cultural barriers, clinicians often resist changes in practice patterns and reimbursement systems. Objections typically include concerns about decreasing

compensation, loss of control over work processes, and requirements for additional training. Clinicians' lack of familiarity and training with teamwork may also contribute to their resistance.(40, 41) Generating broad support for team-based performance incentives may be particularly difficult in organizations that have traditionally valued individual work performance.(23)

Finally, effective incentive systems require reliable and valid performance measurement tools. Hospitals and clinics will need performance evaluation systems that equitably assess team performance without adding onerous administrative processes. While performance measurement and consistent performance feedback are essential for performance-based compensation and improvement, instituting these systems appears to be more challenging in health care than in other industries due to the high number of different outcomes that must be tracked in order to thoroughly monitor health care service quality.(23, 34, 42)

Overcoming Barriers to Implementing Team-Based Incentives

Provider organizations can take a number of steps to address the structural, cultural, and technical barriers to implementing team-based incentives outlined above. Structural barriers can be mitigated by reducing team member turnover and ensuring that clinical work spaces are appropriately designed for teams. For example, hospitalists could be assigned to work on specific hospital floors and training programs could assign residents to a team that rotates together from service to service. ., Increased geographic admitting—in which one clinician or team admits all patients to one care unit—would improve team consistency by ensuring that physicians and non-physician staff work together over time. Importantly, a strong teamwork culture has been associated with higher nurse retention rates.(44, 45) As for clinical work-space, team-work is facilitated by having space that allows the team to convene and this may require some redesign and investment.

To address cultural barriers to team-based incentives, leaders of provider organizations should engage physicians and non-physician clinicians, in efforts to design team performance incentives and incorporate them into existing payment plans. Engaging clinicians in systems redesigns has been associated with increased provider support for redesign efforts. (46–48) In addition, clinicians are more likely to support initiatives that clearly benefit their patients, so leadership should include reviewing the evidence that teamwork is associated with higher quality care when engaging their clinicians. Ongoing education for clinicians about all aspects of the incentive program—including team training and performance assessment and feedback—is important for generating and maintaining clinician buy in. As with any performance incentive program, the organization needs to maintain a process by which employees concerns can be addressed.

To mitigate technical barriers, provider organizations will likely need access to robust information technology (IT) infrastructures. Modern EHRs, order entry programs, and complementary data extraction and analysis systems will help monitor and assess clinical work processes, including the work of clinical teams. EHR and administrative data can be used to construct performance measures, identify incentive targets, study the success of existing incentives, and monitor for inconsistencies in how outcomes are measured and rewarded. IT can also be used for delivering team training and performance assessment and feedback to clinical teams.

Conclusion

While much remains to be learned about incentivizing performance in health care, the organizational behavior literature suggests that incentives systems should be used both to promote desirable work outcomes and to support and encourage particular work designs—

including effective teamwork. Such an approach may yield valuable insights into how to better leverage teamwork to create true shared accountability for health care quality and spending.

Citations

1. Berwick DM. Launching Accountable Care Organizations — The Proposed Rule for the Medicare Shared Savings Program. *New England Journal of Medicine*. 2011; 364(16)
2. Chernew ME, Rosen AB, Fendrick AM. Value-Based Insurance Design. *Health Affairs*. 2007; 26(2):w195–w203. [PubMed: 17264100]
3. Mechanic R, Altman S. Medicare's Opportunity to Encourage Innovation in Health Care Delivery. *New England Journal of Medicine*. 2010; 362(9):772–774. [PubMed: 20200381]
4. Lee TH, Casalino LP, Fisher ES, Wilensky GR. Creating Accountable Care Organizations. *New England Journal of Medicine*. 2010; 363(15)
5. Landon BE, Gill JM, Antonelli RC, Rich EC. Prospects For Rebuilding Primary Care Using The Patient-Centered Medical Home. *Health Affairs*. 2010; 29(5):827–834. [PubMed: 20439868]
6. Greaney TL. Accountable Care Organizations--The Fork in the Road. *The New England Journal of Medicine*. 2010; 364(1):2.
7. Fisher ES, Staiger DO, Bynum JPW, Gottlieb DJ. Creating Accountable Care Organizations: The Extended Hospital Medical Staff. *Health Aff*. 2007; 26(1):w44–w57.
8. Shortell SM, Casalino LP, Fisher ES. How the Center for Medicare and Medicaid Innovation Should Test Accountable Care Organizations. *Health Affairs*. 2010; 29(7):1293–1298. [PubMed: 20606176]
9. Kim MM, Barnato AE, Angus DC, Fleisher LF, Kahn JM. The Effect of Multidisciplinary Care Teams on Intensive Care Unit Mortality. *Arch Intern Med*. 2010; 170(4):369–376. [PubMed: 20177041]
10. Grumbach K, Bodenheimer T. Can Health Care Teams Improve Primary Care Practice? *JAMA*. 2004; 291:1246–1251. [PubMed: 15010447]
11. Manser T. Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. *Acta Anaesthesiologica Scandinavica*. 2009; 53(2):143–151. [PubMed: 19032571]
12. Stevenson K, Baker R, Farooqi A, Sorrie R, Khunti K. Features of primary health care teams associated with successful quality improvement of diabetes care: a qualitative study. *Family Practice*. 2001; 18(1):21–26. [PubMed: 11145623]
13. Stockwell DC, Slonim AD, Pollack MM. Physician Team Management Affects Goal Achievement in the Intensive Care Unit. *Pediatric Critical Care Medicine*. 2007; 8(6):540–545. [PubMed: 17906596]
14. Wells R, Jinnett K, Alexander J, Lichtenstein R, Liu D, Zazzali JL. Team leadership and patient outcomes in US psychiatric treatment settings. *Social Science & Medicine*. 2006; 62(8):1840–1852. [PubMed: 16214281]
15. Neily J, Mills PD, Young-Xu Y, Carney BT, West P, Berger DH, et al. Association Between Implementation of a Medical Team Training Program and Surgical Mortality. *JAMA*. 2010; 304(15):1693–1700. [PubMed: 20959579]
16. Dutton RP, Cooper C, Jones A, Leone S, Kramer ME, Scalea TM. Daily Multidisciplinary Rounds Shorten Length of Stay for Trauma Patients. *Journal of Trauma*. 2003; 55(5):913–919. [PubMed: 14608165]
17. Awad SS, Fagan SP, Bellows C, Albo D, Green-Rashad B, Garza MDL, et al. Bridging the Communication Gap in the Operating Room with Medical Team Training. *American Journal of Surgery*. 2005; 190:770–774. [PubMed: 16226956]
18. Reuben DB, Borok GM, Wolde-Tsadik G, Ershoff DH, Fishman LK, Ambrosini VL, et al. A Randomized Trial of Comprehensive Geriatric Assessment in the Care of Hospitalized Patients. *New England Journal of Medicine*. 1995; 332(20):1345–1350. [PubMed: 7715645]
19. Wageman, R. The Meaning of Interdependence. In: Turner, ME., editor. *Groups at Work: Theory and Research*. Mahwah, NJ: Lawrence Erlbaum Associates; 2001. p. 197-217.

20. Cohen SG, Bailey DE. What Makes Teams Work: Group Effectiveness Research from the Shop Floor to the Executive Suite. *Journal of Management*. 1997; 23(3):239–290.
21. Lemieux-Charles L, McGuire WL. What Do We Know about Health Care Team Effectiveness? A Review of the Literature. *Medical Care Research and Review*. 2006; 63(3):263–300. [PubMed: 16651394]
22. Polzer, JT. *Leading Teams Note*. Boston, MA: Harvard Business School Publishing; 2009.
23. Hackman, JR. *Leading Teams: Setting the Stage for Great Performances*. Boston: Harvard Business Press; 2002.
24. Mohrman, SA.; Cohen, SG.; Allan, M.; Mohrman, J. *Designing Team-Based Organizations*. San Francisco, CA: Jossey-Bass Publishers; 1995.
25. Valentine, MA.; Nembhard, IM.; Edmondson, AC. *Measuring Teamwork in Health Care Settings: A Review of Survey Instruments*. Boston, MA: Harvard Business School; 2011. p. 1-24.
26. Wageman R. Interdependence and Group Effectiveness. *Administrative Science Quarterly*. 1995; 40(1):36.
27. Wageman R, Baker G. Incentives and Cooperation: The Joint Effects of Task and Reward Interdependence on Group Performance. *Journal of Organizational Performance*. 1997; 18(2):20.
28. Hackman, JR. *The Design of Work Teams*. In: Lorsch, JW., editor. *Handbook of Organizational Behavior*. Englewood Cliffs, NJ: Prentice-Hall; 1987.
29. Salas E, Almeida SA, Salisbury M, King H, Lazzarra EH, Lyons R, et al. What Are the Critical Success Factors for Team Training in Health Care? *Joint Commission Journal on Quality and Patient Safety*. 2009; 35:398–405. [PubMed: 19719075]
30. Proenca EJ. Team Dynamics and Team Empowerment in Health Care Organizations. *Health Care Management Review*. 2007; 32(4):370–378. [PubMed: 18075446]
31. LaFasto, F.; Larson, C. *When Teams Work Best*. Thousand Oaks (CA): Sage Publications; 2001.
32. Mimms A, Litton L, Thompson M, Tolsma D, Leatherwood K, Deckard D, et al. The Breast Health and Cancer Detection Program. *The Permanente Journal*. 2000; 4(2):66–77.
33. Bloom FJ, Graf T, Anderer T, Stewart WF. Redesign of a Diabetes System of Care Using an All-or-None Diabetes Bundle to Build Teamwork and Improve Intermediate Outcomes. *Diabetes Spectrum*. 2010; 23(3):165–169.
34. Paulus RA, Davis K, Steele GD. Continuous Innovation In Health Care: Implications Of The Geisinger Experience. *Health Affairs*. 2008; 27(5):1235–1245. [PubMed: 18780906]
35. Bohmer R, Bloom JD, Mort E, Demehin A, Meyer G. Restructuring Witin An Academic Health Center to Support Quality and Safety: The Development of the Center for Quality and Safety at the Massachusetts General Hospital. *Academic Medicine*. 2009; 84(12):1663–1671. [PubMed: 19940570]
36. 2011 Measure Evaluation Criteria. Washington, DC: National Quality Forum; 2011.
37. Landon BE, Normand S-LT, Blumenthal D, Daley J. Physician Clinical Performance Assessment. *JAMA: The Journal of the American Medical Association*. 2003; 290(9):1183–1189. [PubMed: 12953001]
38. Lawler, EE. *Creating Effective Pay Systems for Teams*. In: Sundstrom, ED., editor. *Supporting Work Team Effectiveness: Best Management Practices for Fostering High Performance*. 1st ed. San Francisco, Calif.: Jossey-Bass Publishers; 1999. p. 388xxiv
39. Porter, ME.; Teisberg, EO. *Redefining Health Care*. Boston, MA: Harvard Business School Press; 2006.
40. Davies HTO, Harrison S. Trends in doctor-manager relationships. *BMJ*. 2003; 326(7390):646–649. [PubMed: 12649243]
41. Blumenthal D, Bernard K, Bohnen J, Bohmer R. Addressing the Leadership Gap in Medicine: Residents' Need for Systematic Leadership Development Training. *Academic Medicine*. 2012; 87(4):513–522. [PubMed: 22361800]
42. Jacobs L. Using Performance Reports to Build a Winning Team. *Permanente Journal*. 2002; 6(2)
43. Hayes LJ, O'Brien-Pallas L, Duffield C, Shamian J, Buchan J, Hughes F, et al. Nurse turnover: A literature review – An update. *International Journal of Nursing Studies*. 2012; 49(7):887–905. [PubMed: 22019402]

44. Mohr DC, Burgess JF, Young GJ. The influence of teamwork culture on physician and nurse resignation rates in hospitals. *Health Services Management Research*. 2008; 21(1):23–31. [PubMed: 18275662]
45. Kivimaki M, Vanhala A, Pentti J, Lansisalmi H, Virtanen M, Elovainio M, et al. Team climate, intention to leave and turnover among hospital employees: Prospective cohort study. *BMC Health Services Research*. 2007; 7(1):170. [PubMed: 17956609]
46. Bowns, I.; McNulty, T. *Reengineering Leicester Royal Infirmary: an Independent Evaluation of Implementation and Impact*. Sheffield: School of Health Related Research, University of Sheffield; 1999.
47. Crosson FJ. Kaiser Permanente: A Propensity for Partnership. *British Medical Journal*. 2003; 326:1.
48. Light D, Dixon M. Making the NHS more like Kaiser Permanente. *BMJ*. 2004; 328(7442):763–765. [PubMed: 15044296]
49. Hoffman JR, Rogelberg SG. *A Guide to Team Incentive Systems*. *Team Performance Management*. 1998; 4(1):23–32.
50. Ryan R. Primary Care Redesign. *The Permanente Journal*. 1997; 1(2):33–36.
51. Cohen SG, Bailey DE. What Makes Teams Work: Group Effectiveness Research from the Shop Floor to the Executive Suite. *Journal of Management Studies*. 1997; 23(3):239–290.
52. Bohmer R. Managing the New Primary Care: The New Skills that Will be Needed. *Health Affairs*. 2010; 29(5):1010–1014. [PubMed: 20439899]
53. Meterko M, Mohr DC, Young GJ. Teamwork Culture and Patient Satisfaction in Hospitals. *Medical Care*. 2004; 42(5):492–498. [PubMed: 15083111]

Exhibit I

Types of Interdependence:(19)

Type of Interdependence	Definition and Determination in Clinical Setting:
<i>Task Interdependence</i>	<p><i>Definition:</i> Features of work inputs that necessitate that work be performed by multiple individuals. <i>Determining degree of task interdependence:</i> Task interdependence is a function of four aspects of the structure of work:</p> <ol style="list-style-type: none"> 1 Are workers given collective responsibility for completing work? 2 Are workers given explicit rules regarding whether they should complete the work as a group, or individually? 3 Does work require, or lend itself well to having multiple individuals working simultaneously to complete it? 4 Does group have to share physical resources and/or information to complete the work? <p>The more of these four elements that are present, the greater the need for collaboration and cooperative behavior in a group to complete work.</p>
<i>Outcomes Interdependence</i>	<p><i>Definition</i> The degree to which shared significant consequences of work are contingent on collective work performance. <i>Determining Degree of Outcomes Interdependence:</i> Outcomes interdependence is a function of the following features of work:</p> <ol style="list-style-type: none"> 1 Are members of a group held collectively accountable for work outcomes? Practically speaking, is work performance evaluated at the team or individual level?* 2 Do they receive work-related compensation or rewards from the same source (e.g. the same institution)?^{\$} 3 Are all group members financially accountable for work outcomes? That is, are all group members eligible for a share of the team's performance reward?^{\$}
<i>Behavioral Interdependence</i>	<p><i>Definition</i> The degree to which a group of individuals actually exhibit teamwork in practice. <i>Determining Degree of Behavioral Interdependence</i></p> <ol style="list-style-type: none"> 1 Do individuals complete work alone, entirely as a group, or largely alone, but with periodic interactions between team members to coordinate work?[#]

* Team level = greater interdependence; Individual level = lower interdependence

^{\$} Yes= greater interdependence; No = lower interdependence

[#] Entirely as a group = high; Periodic interactions between team members = moderate; Entirely alone = low

Exhibit II

Characteristics Associated with Work Team Effectiveness¹

Characteristic	Example From Opening Vignette
Task Features: <ul style="list-style-type: none"> a. <i>Autonomy</i>: *,# b. <i>Task interdependence</i>: *,# 	<ul style="list-style-type: none"> a. Care team given authority to manage patient care without constant oversight from management. b. Team aware of collective accountability for work outcomes.
Team Composition: <ul style="list-style-type: none"> a. <i>Team size</i>: Optimal size is task-dependent. Ensuring important contribution from each team member is critical. b. <i>Diversity of training and expertise</i>: *,# Generally improves team effectiveness unless impedes communication or development of shared values. c. <i>Multiple team affiliations</i>: May reduce commitment to any one team. 	<ul style="list-style-type: none"> a. PCP ensures that all members contribute meaningfully to team's clinical goals. b. Team includes mixture of generalists and specialists. c. Ophthalmologist's affiliation with multiple clinical teams limits commitment to any one team.
Team leadership :* Team leadership quality positively associated with team effectiveness.	Team leader (PCP) clarifies objectives, expectations, and individual roles to team members and facilitates improvement through consistent feedback and education.
Team Processes: <ul style="list-style-type: none"> a. <i>Development of core norms of conduct</i>* b. <i>Communication</i>: *,# Standardized terminology and communication processes. c. <i>High levels of participation in team's work</i>*,# d. <i>Collaborative decision-making</i> and shared mental models: *,# 	<ul style="list-style-type: none"> a. Team formulates core norms of conduct to help guide team's actions and decisions. b. Weekly team meetings to discuss Mrs. Smith's care; interim updates communicated via email. c. All team members have important, clearly specified team roles. d. Email updates from team members facilitate group decision-making.
Organizational Context: <ul style="list-style-type: none"> a. <i>Timely and Consistent Performance feedback</i>: *,\$,# b. <i>Rewards systems</i>*,\$ c. <i>Access to team training/coaching</i>*,# d. <i>Culture</i>:* Organizational emphasis on teamwork and innovation. e. <i>Information technology/management systems</i>*,\$ 	<ul style="list-style-type: none"> a. Team given monthly performance reports; reports used to identify improvement needs. b. Yearly performance bonus for meeting performance benchmarks. c. Team coach works with team on weekly basis. d. Senior level support for multidisciplinary teamwork. e. All practitioners have access to electronic health record (EHR) and secure, HIPAA-compliant email.

Note: Adapted from Lemieux-Charles and McGuire (2005) and Cohen and Bailey (1997). This table does not include an exhaustive list of variables that may influence team effectiveness.

* Indicates evidence of an association between this variable and team effectiveness in health care settings.

\$ Determinant of outcomes interdependence.

Higher levels associated with improved team effectiveness.

¹ Citations: (9–11, 13–16, 19, 21, 23, 33, 34, 38, 41, 42, 51–53)