A Measure of Care Coordination?

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Care coordination is a centerpiece of how we will improve healthcare among people with chronic illness. Yet what we mean by the phrase in clinical practice remains elusive despite many efforts to define care coordination. The Agency for Healthcare Research and Quality (AHRQ) proposed a definition that captures the multidimensionality of "care coordination":

> "Care coordination is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services. Organizing care involves the marshaling of personnel and other resources needed to carry out all required patient care activities, and is often managed by the exchange of information among participants responsible for different aspects of care."[1]

The definition developed for AHRQ made an explicit effort to incorporate the concepts from 40 different definitions of care coordination found in the literature. Not surprisingly, our inability to measure this complex construct has persistently limited our ability to study improvements in care coordination or assess its potential effect on outcomes.

As part of AHRQ's efforts to better formalize care coordination, the Agency developed the Care Coordination Measures Atlas, a comprehensive compendium of measures of care coordination from the perspectives of patients, caregivers, health care professionals and even health systems.[2] The Atlas was an early effort in an emerging field to identify appropriate measures for assessing care coordination interventions in research studies and demonstration projects, particularly those measures focusing on care coordination in ambulatory care. A framework was adopted for the Atlas that describes each of the measures, according to whose perspective it reflects (patient/family, healthcare professional, or systems) and by the type of activity or approach to care coordination being assessed.

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As can be seen in the Table 1, some measures focus on specific activities, such as communication or facilitating transitions, while others assess a general approach that facilitates coordination but is not coordination itself (such as having a health care home or encouraging teamwork).[2] However, these measures are limited in their practical utility today, because they involve time-intensive surveys that cannot be used to assess the function of the health care system on a large scale. In today's measurement environment, which is built largely on administrative claims data, care coordination has simply been impossible to measure.

In this issue of *JGIM*, a team of investigators explore a surrogate measure of care coordination they call "care density." "Care density" attempts to evaluate a feature of physician practice readily measured using claims data, which the authors propose as a marker for better communication and information sharing between physicians.[3] Pollack et al. define "care density" as the amount an individual's doctors share other patients, taking into account the total number of pairs of doctors seen.[3] This measure is akin to the recently published work of Landon et al. that defined professional "networks" using adapted social network analysis methods based on patient sharing, which also take into account connectedness beyond pairs of physicians and physician position in the network relative to his/her peers.[4]

Both approaches share the same underlying idea: through indirect contact—having visits with the same patients—physicians develop relationships that create opportunities for direct communication and information sharing that may lower barriers to care coordination and ultimately lower costs. Yet Landon's group recently demonstrated that for care in the last 2 years of life hospitals whose doctors who have higher numbers of shared patients (implying greater number of referrals but not necessarily greater care density) have higher costs and more intensive care, whereas hospitals with primary care–centered networks have lower costs and care intensity.[5] Moreover, close physician relationships have also been suggested to have the inverse effect on referral rates, whereby physicians "over" refer to other physicians with whom that have strong relationships (and presumably a strong care density), leading to overutilization of physicians services, diagnostic imaging, and so on.[6]

There are several methods by which greater care density and stronger physician relationships could reduce costs. The

Table 1. The Agency for Healthcare Research and Quality's (AHRQ) Care Coordination Measures Atlas Identified Mechanisms for Achieving Care Coordination[2]

COORDINATION ACTIVITIES
Establish Accountability or Negotiate Responsibility
Communicate
Facilitate Transitions
Assess Needs and Goals
Create a Proactive Plan of Care
Monitor, Follow Up, and Respond to Change
Support Self-Management Goals
Link to Community Resources
Align Resources with Patient and Population Needs
BROAD APPROACHES
Teamwork Focused on Coordination
Health Care Home
Care Management
Medication Management
Health Information Technology–Enabled Coordination

most direct way is through reduction of duplicative services and fewer errors. But in addition, care density may also lead to increased informal consultations, reducing the need for formal specialty referrals. The cost effects would be most evident in the ambulatory care setting, with reduced use of testing and imaging. Interesting, the findings of Pollack et al. suggest that high care density was associated with lower total costs, driven largely by lower hospitalization costs, with little effect on ambulatory or pharmaceutical spending.[3]

The physician networks themselves, through their influence on physician behavior, may offer an alternative explanation for the association between patient sharing and reduced costs. High patient sharing may affect costs through development of different practice norms or greater opportunity for the diffusion of best practices. There are several lines of evidence to support the notion that doctors develop these norms. For years, variations in regional practice patterns have been the subject of the Dartmouth Atlas, and these difference are not entirely explained by differences in patient population or preferences.[7–10] Additionally, studies show that for discretionary care, physicians within regions demonstrate similar preferences about intensity of services.[11,12]

Nevertheless, patient sharing represents a plausible mechanism by which care coordination occurs, and the association with lower costs found using both Pollack's and Landon's approaches is encouraging,[3,5] although we should be cautious about the conclusions we draw from this early work. First, more information is needed on how care density is related to other potential confounding measures, such as geography (rural vs. urban settings) and number of total visits. In addition, the formal relationships between physicians were not accounted for, and it is possible that those who share more patients also participate in the same group practices that could include other cost containment efforts or different pricing frameworks. Landon et al. demonstrated a high degree of homophily between physicians closer to each other in the patient-sharing network, which means, in this instance, that they tend to treat similar patients.[4] To the degree that unmeasured patient-level differences exists, the tendency of similar patients to choose the same physicians could confound the relationship between patient sharing and costs.

Second, in the fully adjusted models focused on costs, the hypothesized relationship between higher care density and lower ambulatory care and pharmaceutical costs was not observed. Instead, higher care density was associated with lower inpatient costs, which is more difficult to explain, since "care density" was defined based upon ambulatory care networks. Patients cared for within the highest care density networks had only slightly lower hospitalization rates and numbers of hospitalizations than patients cared for within the lowest care density networks, leaving unanswered the mechanism by which higher care density may have led to significantly lower inpatient costs. Perhaps savings were captured through shorter length of stays or lower costs per day; further work on this issue is required.

Finally, these analyses were limited to two conditions, diabetes and heart failure, for which primary care physicians often play a pivotal role, largely managing care with some coordination of referrals across specialists care. The relationship between care density and costs and outcomes of care requires further study in conditions for which coordination among primary care physicians and specialty physicians is even more critical, such as cancer care, severe pulmonary disease, or acute myocardial infarction.

The use of care density in an effort to better understand care coordination is in its infancy, but the concepts have important implications for improving quality of care. We know little about how practice norms form or how diffusion of best practices occurs across these physicians. Newer methods to identify networks of specific provider groups, as opposed to regional grouping, are creating opportunities to study and ultimately identify opportunities to improve care. In addition to the patient sharing methods of defining networks, physician–hospital networks have also been created, using patient flows for primary and hospital care.[13] These physician–hospital networks are stable and demonstrate consistent spending over time,[13] which suggests if we intervene at the level of the network we will be able to study and follow the impact of those changes.

The new focus on networks of physicians, whether defined through geography, primary care and hospital use, or patient sharing, is an important "lever" on which to influence cost and quality of care—that is, intervene on practice norms at the level of the network of physicians who together provide the complex care chronic disease patients require. This opportunity underlies the movement toward accountable care organizations, which in addition to altering payment incentives, identifies a group of physicians who will work together toward a shared aim. It may be that networks most able to develop and foster the spread of positive practice norms will be the most successful at providing improved quality and lower costs.

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