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Redesigning Care For Patients At Increased Hospitalization Risk: The Comprehensive Care Physician Model

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Abstract

Patients who have been hospitalized often experience care coordination problems that worsen outcomes and increase costs. One reason is that hospital care and ambulatory care are often provided by different physicians. However, interventions to improve care coordination for hospitalized patients have not consistently improved outcomes and generally have not reduced costs. We describe the rationale for the Comprehensive Care Physician model, in which physicians focus their practice on patients at increased risk of hospitalization so that they can provide both inpatient and outpatient care to their patients. We also describe the design and implementation of a study supported by the Center for Medicare and Medicaid Innovation to assess the model's effects on costs and outcomes. Evidence concerning the effectiveness of the program is expected by 2016. If the program is found to be effective, the next steps will be to assess the durability of its benefits and the model's potential for dissemination; evidence to the contrary will provide insights into how to alter the program to address sources of failure.

Delivery-system innovations are critical to reducing health care costs and improving outcomes. Because health care spending and poor health outcomes are concentrated among a relatively small fraction of the population,¹ these innovations will improve outcomes and produce savings that exceed their cost only if they address the needs of these high-risk patients. Hospital costs are a key focus for such efforts because they are a large fraction of total health care costs, especially for these high-cost patients.²

Efforts to reduce hospital costs have a long history in the United States. They include the implementation of Medicare's inpatient prospective payment system in 1983, which attempted to contain spending by establishing fixed reimbursement levels for hospitalization based on diagnosis-related groups. Beginning in the 1990s there was a rapid shift from a traditional primary care model, in which primary care physicians provided both hospital and

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ambulatory care for their patients, to the current model, in which primary care physicians limit their practice to ambulatory care and hospitalists—physicians who specialize in the care of hospitalized patients—provide inpatient care. One reason for this shift was the belief that hospitalists would have greater inpatient expertise and presence in the hospital than traditional primary care physicians and thus would improve outcomes and reduce costs for hospitalized patients.³

Unfortunately, subsequent studies have found that the use of hospitalists led to reductions in hospital costs and improvements in outcomes that were modest at best.⁴ The largest study to compare longer-term costs and outcomes of patients receiving inpatient care from hospitalists to those of patients receiving inpatient and out-patient care from the same doctor could not identify any differences between the two groups of patients.⁵ One reason for this may be the greater discontinuities in care when patients receive hospital care from hospitalists instead of from traditional primary care physicians.⁶

Recognition of the potential adverse effects of discontinuities between inpatient and out-patient care led to the development of various care coordination interventions such as the Transitional Care Model⁷ and the Care Transitions Model,⁸ which use care coordinators or advanced-practice nurses to enhance continuity. These interventions have been found to improve care in some instances and to reduce certain costly forms of utilization, including hospital readmission. Unfortunately, these interventions often fail to recoup their costs, leaving the total costs of care generally unchanged.⁹ This suggests that if effective strategies to improve care coordination at a low cost could be identified, they might have strong potential to reduce total costs and improve outcomes.

The Center for Medicare and Medicaid Innovation (CMMI) was created under the Affordable Care Act to support and evaluate delivery-system innovations. This article describes the rationale for and structure of the Comprehensive CarePhysician (CCP) model, which seeks to improve care at low cost for patients at increased risk of hospitalization by providing them with a physician who will care for them in both the inpatient and outpatient settings. The article also describes the design and implementation of a study supported by CMMI to test the effects of the model on costs and outcomes.

Ambulatory And Hospital Care

The remarkable increases in medical specialization in the past century¹⁰ are at least partially an understandable response to the rapid increases in medical knowledge over the period. However, the value of specialization¹¹ is limited by the costs of coordinating multiple providers and discontinuities in the doctor-patient relationship. Coordination costs include time spent communicating, errors that occur when communication fails, and agency problems that arise when responsibility for outcomes is diffuse. Discontinuities in the doctor-patient relationship can impair physicians' knowledge of their patients and communication, trust, and interpersonal relationships between doctors and patients, all of which have been associated with a range of outcomes.¹²

Indeed, observational and experimental studies suggest that greater continuity in the physician-patient relationship leads to improved outcomes.¹³ For example, patients with

lung cancer are less likely to receive intensive care unit (ICU) services in their terminal hospitalization if they are cared for by their primary care physician in that hospitalization.¹⁴ Additionally, Medicare patients have 15 percent lower costs when they have received primary care from the same doctor for more than ten years.¹⁵ And in a remarkable study, John Wasson and coauthors found that patients with complex conditions who were cared for by Department of Veterans Affairs providers had 38 percent fewer hospital days and 74 percent fewer ICU days when they were randomly assigned to receive primary care from the same physician in each ambulatory visit, as compared to seeing a different physician in each visit.¹⁶

Questions about the value of having hospital care provided by hospitalists compared to traditional primary care physicians reflect these trade-offs between the advantages and disadvantages of specialization, especially for patients at increased risk of hospitalization.¹⁷ Hospitalists have greater focus on and experience in caring for hospitalized patients. However, they may be less likely to adequately appreciate a patient's medical history or changes in his or her condition or to address end-of-life issues when they lack a preexisting relationship with the patient. These differences may be why the use of hospitalists has not consistently been found to produce savings or improve outcomes.

Extensive efforts have been made to improve handoffs between primary care physicians and hospitalists. However, such efforts are costly, difficult to disseminate, and unlikely to fully eliminate these problems.¹⁸

The fact that the use of hospitalists has substantial disadvantages as well as advantages and the mixed evidence on hospitalists' effects on costs and outcomes raise questions as to why the use of hospitalists has increased so greatly. An important set of hypotheses focuses on the incentives faced by primary care physicians. One of the hypotheses is that the increasing severity of illness among hospitalized patients has made primary care physicians less comfortable providing inpatient care than in the past.¹⁹ However, the growing use of intensivists to staff ICUs since the 1980s argues against this explanation for the withdrawal of primary care physicians from hospital care.

A related, but stronger, hypothesis to explain the growing use of hospitalists is that primary care physicians were willing to relinquish in-patient care of their patients to hospitalists because they no longer had enough patients in the hospital to justify their daily presence there. One major reason for the decline in the number of hospitalized patients is changes in ambulatory care.

Patients historically visited primary care physicians primarily for acute illnesses. However, since the 1980s the number of visits to these physicians for ambulatory care has increased rapidly, while rates of hospitalization have been stable. These changes have resulted in an 80 percent decline in hospital visits relative to ambulatory visits.²⁰ As a result, the number of acutely ill patients that primary care physicians see in a typical clinic day has declined, so that they have fewer patients in the hospital and less incentive to travel to the hospital to see their hospitalized patients.

These changes have also made primary care physicians' daily inpatient census more variable and decreased the time they can spend in the hospital each day, making it harder for them to care for their hospitalized patients. Decreasing physician work hours, rising time costs of transport between clinics and hospitals, and improving technologies for communication between hospitalists and primary care physicians also have made it economically attractive for the latter to relinquish inpatient care of their patients to hospitalists.²¹ Increasing use of intensivists may also have decreased inpatient volumes for primary care physicians.

These findings about the advantages and disadvantages of having separate providers for ambulatory and hospital care suggest a dilemma. Patients might benefit from receiving hospital care from their primary care physician, with whom they have a relationship, but it is increasingly difficult for primary care physicians to have enough inpatient volume to be effective in that role.

Recent “adaptive organization” theories of specialization suggest strategies that organizations could apply to adapt to the challenges they face in situations such as this, in which both the benefits and the costs of specialization are high.²² For example, if it is not possible to efficiently provide a service that addresses multiple objectives, it may make sense to separate those objectives. In health care, this echoes a recommendation by Clayton Christensen and coauthors in *The Innovator's Prescription: Clinical pathways that standardize care can sometimes improve the effectiveness and efficiency of medical practice, but some care is better provided in “solution shops” that recognize the need for variability in practice and the increased need for care coordination of patients with complex conditions.*²³

Our CCP model follows this approach. It does not emphasize costly—and often imperfect—efforts to coordinate the provision of inpatient and outpatient care by separate people. Instead, the model seeks to improve coordination of care by making it possible for a single physician to provide care in both the inpatient and outpatient settings, which reduces the need for costly efforts to coordinate care and strengthens the doctor-patient relationship and the physician's “ownership” of the patient's care across settings. Following the adaptive organization approach, primary care physicians or other providers who care for patients only in ambulatory settings can devote themselves to providing primary care to the broader population at low risk of hospitalization.

The Comprehensive Care Physician Model

The idea of having the same physician care for patients in both clinic and hospital settings may seem like a reversion to a historical model of care that may no longer be practical for providers. However, the key difference between the CCP model and the traditional model is that the CCP model focuses on patients at high risk of hospitalization. Limiting patient panels in this way is intended to give CCPs enough hospitalized patients to have a meaningful daily physical presence in the hospital while still allowing them to provide ambulatory care for their patients.

Providing these physicians with a high volume of inpatients and locating their clinics in or near the hospital can allow them to offer many of the same benefits that hospitalists provide

in terms of inpatient experience and physical presence and to offer the additional benefit of continuity across settings and over time. Patients at low risk of hospitalization can receive ambulatory care from providers who provide only ambulatory care. In the unlikely event that they require hospitalization, they can receive hospital care from a hospitalist.

The CCP model promises a range of advantages compared to the traditional model. Perhaps the most obvious is that high-risk patients can receive hospital and clinic care from the same physician, reducing the likelihood of lapses in care around a hospitalization and providing other benefits of an established physician-patient relationship while avoiding the added costs of care coordination interventions.¹

The model may also have advantages for the physician, because it is easier and often more psychologically rewarding for a doctor to care for a patient he or she already knows. Most patients appropriate for care within the CCP model might have multiple conditions, so generalists would typically be the most suitable providers to serve as CCPs for them. However, specialists might be the ideal CCPs for patients whose reasons for hospitalization mostly fall within the domain of a single medical specialty.²⁴ For payers, and for providers in reimbursement systems with incentives to decrease utilization, the CCP model may also reduce hospitalizations and other major components of spending.

Implementing The CCP Model

In 2011 CMMI awarded the first round of its Health Care Innovation Awards. These awards are designed to support “applicants who propose compelling new models of service delivery/payment improvements that hold the promise of delivering the three-part aim of better health, better health care, and lower costs through improved quality for Medicare, Medicaid, and Children’s Health Insurance Program (CHIP) enrollees.”²⁵ We submitted a proposal to implement the CCP model at the University of Chicago Medical Center with a focus on Medicare beneficiaries. Our proposal was funded, and implementation began in July 2012.

Our CCP model has as its centerpiece a single physician providing inpatient and outpatient care for each patient. Other elements of the model are being developed based on our understanding of the needs of the population of patients we are serving.

Exhibit 1 summarizes our implementation plan. One important early decision we made concerned how to identify an eligible patient population that would allow our CCPs to have enough patients in the hospital while still having a manageable and efficient panel size. Our goal was to have a panel size that the physician could manage with the support of an interdisciplinary team constructed with the goal of meeting the needs of each patient effectively and efficiently, instead of the goal of increasing the number of patients that each physician could manage in his or her panel.

We assumed that patients would average about five clinic visits annually with their CCP. We also assumed that if a CCP saw an average of about five patients in the hospital per day (which would amount to 2,000 patient-days per year), it would be economically viable for the CCP to spend several hours in the hospital each morning. We then calculated that we

could achieve this average daily census with a manageable and efficient panel size of 200 patients who would be expected to average ten days in the hospital per year.

To identify such a patient population, we considered a range of statistical models that use administrative, clinical, or patient-reported data to predict risk of hospitalization.^{26–29} A key finding was that a past hospital admission is a strong predictor of future admission. Based on data from our institution that patients admitted to our hospital’s general medical services averaged ten days in the hospital during the year following their admission, and considering the advantages of having simple study inclusion criteria for subject recruitment, we defined the eligible population as Medicare patients who had been admitted to the hospital at least once in the past year.

Despite the emphasis of the CCP model on the patient’s physician, we also emphasized the importance of the care team in developing our CCP program (Exhibit 1). For example, to allow for efficient daytime coverage and a sustainable number of weekend days worked, we designed the program to include five CCPs. Each CCP covers the inpatient service during the afternoon and the weekend for one of every five weeks.

Teamwork is also critical in the ambulatory setting, where the five CCPs work with a clinic staff that currently consists of a clinic coordinator, social worker, registered nurse, and advanced-practice nurse. To improve the quality of teamwork and care coordination, we keep care teams small for each patient. We do this by selecting the providers for each patient’s care team and defining their roles within the team to address each patient’s particular needs.

We also seek to reduce coordination costs by helping providers understand that it is not always efficient for providers to practice at the “top of their license.” Accordingly, we train providers to perform simple tasks that might sometimes be performed by other members of the team. We also evaluate and adapt evidence-based tools to improve care coordination³⁰ and provide training in effective team functioning.³¹

Because inpatient-outpatient transitions in our model do not require changes in providers as they do in the hospitalist model, our care coordination plans focus on other care transitions. One example of a care transition is when a patient’s CCP signs out at the end of the morning and is replaced by the CCP who is covering the hospital in the afternoon. Another example is when a participating patient comes to the emergency department—an event that triggers an automated page to the patient’s CCP or the night-time covering physician.

We also enhance training for CCPs in areas critical to the care of the participating patients, such as addressing end-of-life issues and complex psychosocial needs. The cost of nighttime coverage and excess inpatient capacity as the program enrollment increases has been substantially reduced by managing the program as part of our larger hospitalist program.

CMMI engaged external contractors to formally evaluate the Health Care Innovation Awards. In addition, CMMI provided funding to our institution so that we could assess the program’s implementation and outcomes during the study period to allow for rapid-cycle improvement.

We expected that patients electing to join our study would be likely to have much greater utilization than other patients with similar diagnoses. Thus, we felt that traditional risk-adjustment techniques might perform poorly, and we designed our program as a randomized controlled trial with an expected enrollment of 2,000 patients. We chose to randomly assign half of the patients to the CCP model intervention and half to a control group that continues to receive care from different doctors in the inpatient and outpatient settings in our institution or the other medical practices they select.

For our internal evaluation plan, we worked with CMMI to develop a driver diagram (see Appendix Exhibit A1)³² to describe how the program's key elements could be expected to produce the desired improvements in patient care, outcomes, and costs.³³ For example, we hypothesized that increased continuity of care across the inpatient and outpatient settings could improve measures of the quality of the doctor-patient relationship (such as the doctor's knowledge of the patient, trust, interpersonal relationship, and communication) and improve ratings of care (for example, those measured by the Primary Care Assessment Survey³⁴ or the Consumer Assessment of Health Providers and Systems³⁵).

The key health outcome measures of our study are self-rated health status, limitations in activities of daily living and in instrumental activities of daily living, and mortality. The key cost measure is total cost of care to Medicare. Because of the need to measure resource use and total costs through claims data, our study excludes Medicare patients who are enrolled in Medicare Advantage plans.

In our program we are using all of the data available to us for rapid-cycle improvement at multiple levels, which include evaluating our progress toward program outcomes and identifying opportunities to benefit individual patients in the program (such as when evidence suggesting undiagnosed depression is found in a patient interview performed through our evaluation). For example, we discovered that many patients who were otherwise eligible for the program could not reliably travel to the clinic for ambulatory care, so we focused the ambulatory practice of one of our CCPs on providing home-based care. Similarly, we found that patients recruited in the context of acute illness (such as shortly after a hospital admission) had much greater short-term need for hospital and clinic care than other patients did, which limited our ability to increase CCP panel sizes rapidly. Accordingly, we started new CCP panels well before reaching the size of 200 patients per CCP that we eventually expect to reach. Additional lessons are summarized in Appendix Exhibit A2.³²

We are also using our driver diagram³² to address issues that could affect the eventual dissemination of our program. The costs of our CMMI program have been covered by the cooperative agreement and Medicare fee-for-service payments. However, improved care for these patients with high levels of health care utilization could produce large reductions in health care costs. In that case, the CCP model might be particularly attractive to payers or providers working under capitated payment, which produces incentives to reduce costs. For such incentives to be effective, risk adjustment would need to adequately reflect these patients' high levels of spending.

Unfortunately, it is not clear that current risk-adjustment methods can be effective in estimating costs for patients expected to have high levels of utilization.^{36,37} Our dissemination plan includes analyses both to assess and develop risk-adjustment models that could be used for the CCP model under prospective payment and to assess whether the population of eligible patients might be similar at other institutions.

Conclusion

Successful health reform requires innovative care models that can improve outcomes and lower costs. Patient-centered medical homes emphasize the role of the physician as the director of a team approach to care.³⁸ However, the failure of many care coordination models to reduce total costs of care provides a cautionary tale. In this context, the potential of the CCP model to improve coordination of inpatient and outpatient care of high-cost patients at lower cost deserves careful study.

Although the CCP model has unique elements, it shares overall objectives and some programmatic elements with several widely proposed models of care, including the Chronic Care Model.³⁹ It also resonates with the more specialized roles that general internists assume in the United Kingdom and, especially, New Zealand, where general internists mostly serve as consultants but sometimes care indefinitely for selected patients with complex conditions.^{40,41} The experiences of these countries with such models of care and of US physicians who still see their own patients in both the clinic and the hospital are worth further examination.

Evidence concerning the effectiveness of our CCP program is expected by 2016. If the program is found to have had the desired effects on care, outcomes, or costs, we hope there will be interest in assessing the durability of these benefits and the model's potential for dissemination. If the program does not accomplish its desired objectives, we hope its evaluation will provide insights into how to alter it to address the sources of its failure.

The continuous improvement process built into the program's design is already providing insights into how to improve future iterations of the program, such as including a home care practice. Because multiple aspects of the program and the context in which it is applied (including the practices selected by the control group) could influence its effectiveness, no set of findings—positive or negative—will be definitive. For the same reason, it may be particularly important to test core hypotheses that motivate the model, such as that outcomes improve as the physician-patient relationship lengthens and improves.

Evidence of efficacy is important to the CCP model's potential dissemination, but the model must also be profitable for providers and payers. The model's relatively low costs and potential for savings would seem to make it attractive for capitated payment models used for defined populations. Implementing the model becomes more challenging if the patient population is not well defined, since its focus on high-cost patients could create adverse-selection problems for providers or payers if risk-adjustment models underestimated costs for high-use patients. This is a problem within capitated payment models for many programs that target high-risk patients.

Better risk adjustment may help address such concerns, but other approaches should also be considered. These include blended payment models that combine fee-for-service reimbursement and care coordination fees, and shared savings based on salient measures of use. Future research should examine how the effectiveness of the CCP model is affected by the financial incentives under which it operates.

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EXHIBIT 1

Elements Of The Comprehensive Care Physician (CCP) Model Based On Lessons From The Literature

Lesson from the literature	Model element
Focus on high-cost patients	High-cost patients are those expected to spend about 10 days per year in the hospital; estimated Medicare spending for each patient is about \$100,000 per year. We identified high-risk patients as those with at least one hospitalization in the past year.
Maximize direct interaction between the CCPs and their patients	Each CCP's panel size is 200 patients. CCPs typically spend mornings on the wards and afternoons in the clinic, caring directly for their own patients in both settings. The 5 CCPs provide afternoon coverage in rotation.
Build an interdisciplinary team that is low cost and effective	Teams include an advanced-practice nurse, registered nurse, social worker, and clinic coordinator. Team composition is individualized for each patient's needs. To promote continuity in patient-provider relationships and minimize costs of coordination, emphasis is on having the smallest appropriate team for each patient and cross-training team members, instead of "practicing at top of license."
Support the care team	Weekend coverage is shared by the 5 CCPs; evening and night coverage is provided by hospitalists. CCPs are provided with training in key skills such as effective team care, culturally competent care, and palliative care; psychosocial support for team members caring for seriously ill and sometimes difficult patients; and career development opportunities for team members.
Focus on care transitions	The CCP or another member of the care team makes postdischarge calls to the patient; health IT is used (for example, a CCP is paged when one of his or her patients comes to the emergency department).
Use rapid-cycle innovation	We held frequent, data-driven meetings, with participation from key decision makers.
Use rigorous evaluation	We used randomized design, Medicare claims data, and internal and external evaluators.
Use financial incentives	We proposed shared savings, but they were not available through this award mechanism; we developed risk-adjusted estimates of predicted total costs from non-experimental data with comparisons to estimates from randomized treatment and control groups to prepare for reimbursement through shared-savings models.

SOURCE Authors' analysis. NOTES IT is information technology. CMMI is Center for Medicare and Medicaid Innovation.