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A Roadmap for Value-Based Payment Models Among Patients With Cirrhosis

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Healthcare reimbursement is shifting from fee-for-service to fee-for-value. Cirrhosis, which costs the U.S. healthcare system as much as heart failure, is a prime target for value-based care. This article describes models in which physician groups or health systems are paid for improving quality and lowering costs for a given population of patients with cirrhosis. If done correctly, we believe that such frameworks, once adopted, could help reduce burnout by freeing physicians of the burden of checking boxes in the electronic medical record so that they can devote their energies to managing populations. *Conclusion*: Value-based payment models for cirrhosis have the potential to benefit patients, physicians, and healthcare insurers. (Hepatology 2019;69:1300-1305).

Cirrhosis Is a Common and Costly Condition

Cirrhosis is the final common pathway for most chronic liver diseases, afflicting approximately 0.27% of the adult population and accounting for over 60,000 deaths in the United States each year.[1,2] Although the general public perceives liver disease to be rare, cirrhosis-attributable mortality surpasses that from diabetes or kidney disease.[2,3] Cirrhosis is also a resource-intensive and costly condition. In the United States, the number of emergency department visits for complications of cirrhosis increased from 411,869 in 2006 to 548,092 in 2011, and the number of hospitalizations increased in parallel; from 436,901 in 2006 to 576,573 in 2011.[4] Nearly 70% of patients with cirrhosis who survive their hospitalization experience readmission, at a cost of >$20,000 each time.[5] In 2015, the total cost of medical care for patients with cirrhosis in the employer-sponsored insurance population was more than $9.5 billion.[6] Because employer-based insurance covers roughly half of the U.S. population, the medical costs for all patients with cirrhosis in the United States likely approximates the $21 billion spent on congestive heart failure.[7]

Cost Drivers in Cirrhosis Care

Many studies show that patients with cirrhosis experience preventable readmissions, as well as numerous expensive tests (such as endoscopy and imaging), which may be unnecessary or duplicative.[8] In addition, as with most chronic diseases, the majority of the costs are driven by a small fraction of the patient population. The per-capita cost of care for privately insured patients with cirrhosis in the top decile of cost was $113,316 for the first year after index cirrhosis diagnosis (obtained from the MarketScan database of privately insured patients; Fig. 1). The clinical factor most strongly predictive of higher costs was hepatic encephalopathy, a condition known to be responsible for frequent readmissions and high healthcare

Abbreviations: APM, alternative payment model; MACRA, designated Advanced Alternative Payment Model; CDM, chronic disease management; MACRA, Medicare Access and CHIP Reauthorization Act.

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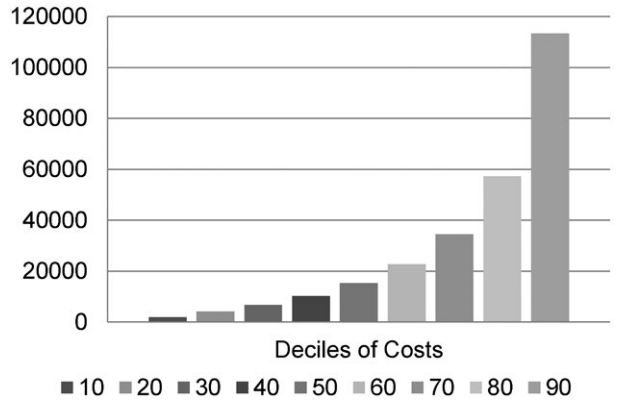

FIG. 1. Cost of medical care per patient with cirrhosis per year, with the patient population divided into deciles. This demonstrates that the top decile of patients costs nearly as much as all the others combined. Unpublished data obtained from the MarketScan database of commercially insured population (Truven Analytics).

utilization, but one that may be preventable with better education, care coordination, and close monitoring.

Quality Gaps and Delivery System Barriers

The past three decades have seen tremendous advances in treatment and prevention of cirrhosis. Data from numerous randomized trials now exist to guide management in cirrhosis.[9] Adherence to these guidelines may delay complications, improve quality of life, and prolong survival among patients with cirrhosis. For example, nonselective B-blockers or variceal ligation reduce the risk of variceal bleeding and mortality.[10] Similarly, enrollment in a hepatocellular carcinoma (HCC) surveillance program may be associated with increased detection of early-stage cancer and increased utilization of potentially curative therapies.[11] However, numerous studies have found that evidence-based guidelines are frequently not followed (Fig. 2).[12] Furthermore, clinical experience suggests that even when guidelines are followed, patients and their caregivers are often not provided adequate education on how to follow through with often complex plans of care.[13]

A number of systems-based barriers exist that likely explain many of the observed gaps in care. The first barrier is access to outpatient care—patients with cirrhosis are more likely than the general population to be poor and uninsured.[14] Among U.S. patients, approximately one quarter of insured patients are covered by Medicaid, which lapses easily and has a limited provider network owing to low reimbursement rates. Even among those with premium insurance, access to specialty care may be difficult. There are only 560 board-certified transplant hepatologists in the United States, and perhaps another several hundred physicians without that certification who focus their practice on liver disease.[15] Most of these hepatologists tend to be clustered at liver transplant centers, and, as a result, much of the care for patients with liver disease is provided by gastroenterologists and primary care physicians (PCPs). In an analysis of the Nationwide Inpatient Sample, 82% of hospitalizations occurred at nontransplant hospitals.[16] In another study, only 45% of elderly hospitalized patients with cirrhosis had an encounter with a gastroenterologist in the year after discharge.[17] These access problems are

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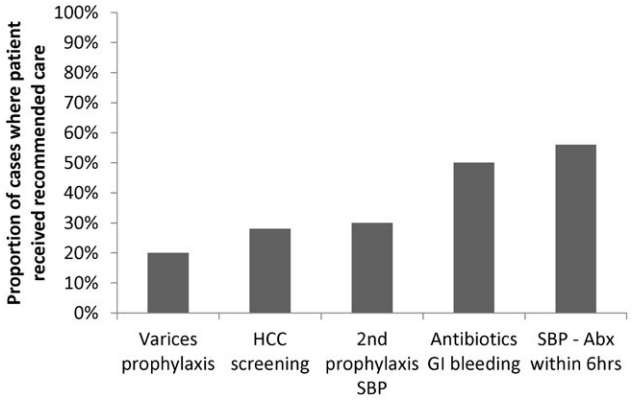

FIG. 2. Proportion of patients with cirrhosis who received recommended care in various studies.[12] Abbreviations: Abx, antibiotics; GI, gastrointestinal.

partly related to low reimbursement rates for office-based evaluation and management of such complex patients, and lack of incentives for providers to prevent hospitalization.

These access barriers exacerbate difficulty in coordinating care among multiple different providers working in different offices and healthcare systems. The associated confusion and diffusion of responsibility can lead to undertesting, overtesting, and even conflicting interventions. One real-life example we have encountered more than once is a patient who is prescribed diuretics for ascites by one provider and salt tablets for hyponatremia by another. This lack of coordination can also occur between the provider and other members of the care team. For example, in a study on predictors of timely antibiotics for spontaneous bacterial peritonitis (SBP), delays occurred because providers were not notified when laboratory results were posted, and then nurses were not notified when antibiotic orders were placed.[18] Finally, lack of coordination frequently exists in transitions between different sites of care, such as when a patient is discharged from the hospital.[5] These examples highlight the "Swiss cheese" model of medical errors: Both errors and quality gaps tend to be caused by multiple small holes in a system, rather than one large gaping hole in care by one individual. Most reimbursement structures lack incentives for care coordination.

Even when providers and their systems of care function perfectly, optimal management still relies on the patient following through on medical recommendations. Medical encounters last for a small fraction of a patient's course of illness. Much of the "management" (taking medications, proper diet, exercise, and travel to appointments) is done outside the presence of a healthcare provider. Standard approaches to patient education are inadequate. A study of 150 patients with cirrhosis followed in a specialty clinic found woefully poor knowledge about basic topics: 54% thought that nonsteroidal anti-inflammatories were safer than acetaminophen, and 58% thought that sea salt is low in sodium.[13] Patients with cirrhosis also depend heavily on their caregivers (friends and family) to manage their care between visits.[19] Once again, most reimbursement structures do not provide adequate incentives for patient and caregiver education.

A Changing Reimbursement Structure

The days of fee-for-service medicine may soon be over, and the healthcare market is steadily moving toward value-based payment models.[20] In most of the country, insurance carriers are increasingly assembling narrow provider networks to try and rein in costs.[21] By "narrow," this means that a patient covered under one of these plans will only be allowed to choose from a small number of gastroenterologists, for example—those who can demonstrate value. Capitation, where a provider or medical group is paid a fixed sum to provide all medical care for an individual patient, is experiencing a resurgence in some regions. Value, by contrast, entails providing the highest-quality medical care for the lowest cost and includes an emphasis on patient-centered value as well.

The biggest recent change to healthcare reimbursement resulted from the Medicare Access and CHIP Reauthorization Act (MACRA) passed in 2015.[22] MACRA provides direct financial incentives for providers to demonstrate value-based care. One of the most important features of MACRA is the push for providers and healthcare systems to share in the responsibility to lower the total cost of care by sharing in financial risk with payers through the development of *alternative payment models* (APMs).[23] These models could include bundled payments for discrete procedures or care pathways, partial capitation for

chronic disease management (CDM) or shared savings for population-level health management.

The ultimate goals of any value-based care program will be to deliver appropriate and high-quality care, minimize unnecessary and duplicate care, and keep patients out of the hospital, all while keeping costs manageable.

Alternative Delivery Models in Cirrhosis

Whereas there are no formal alternative payment models in cirrhosis care, there are two alternative delivery models that have been proven effective among patients with cirrhosis and could be further developed into APMs.

CDM

Cirrhosis is a chronic disease, yet most healthcare is provided on an episodic and reactive basis. The idea behind CDM is to convert care from an encounter-based model to a continuous one based on the chronic care model. This means care between visits, provided by nurse educators, peer mentors, or the patients themselves and their informal caregivers—with appropriate ongoing education and care coordination.[24] The only randomized pilot trial explicitly focused on CDM in cirrhosis demonstrated improved patient satisfaction and adherence, but no change in outcomes such as hospitalization.[25] An important lesson from this study is that interventions intended to decrease hospitalization need to provide alternatives to hospitalization, such as access to urgent subspecialty clinic visits or paracentesis slots.

SUBSPECIALTY MEDICAL HOME

Building on the chronic care model, medical homes have become common among PCPs, who serve as both the "captain" for a team of allied health professionals as well as "conductor" for the various subspecialists. Each time a new test or medication is recommended, the medical home performs reconciliation to ensure the test has not already been done or the medication does not conflict with a preexisting one. For many patients with decompensated cirrhosis, however, the bulk of their care relates to their liver disease. Therefore, Morando et al. have developed a "day hospital," which serves as a subspecialty medical home where patients see a physician and other team members, receive education, and can get testing and paracentesis.[26] Although not a randomized design, their study found lower costs and improved survival among the group receiving this intervention rather than usual care. As such, if reproduced, this model could represent the epitome of value-based care. In addition, this model provides incentives for team-based care, which could offload some tasks from the hepatologist, thus potentially improving access to subspecialty care. A certification is available through the National Center for Quality Assurance.

Key components of these and other value-based models are summarized in Fig. 3.

Alternative Payment Models: Aligning Incentives

Despite the strong justification and evidence base for value-based care in cirrhosis, implementation will not be easy and may need to be done in stages representing increased risk sharing by healthcare providers (hospitals, physicians), as shown in Fig. 4. The first step could be based on a per-member-per-month

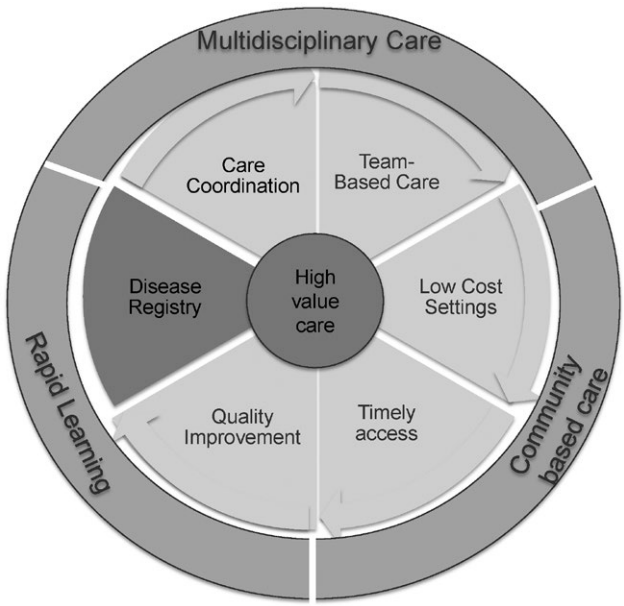

FIG. 3. Key components of value-based care.

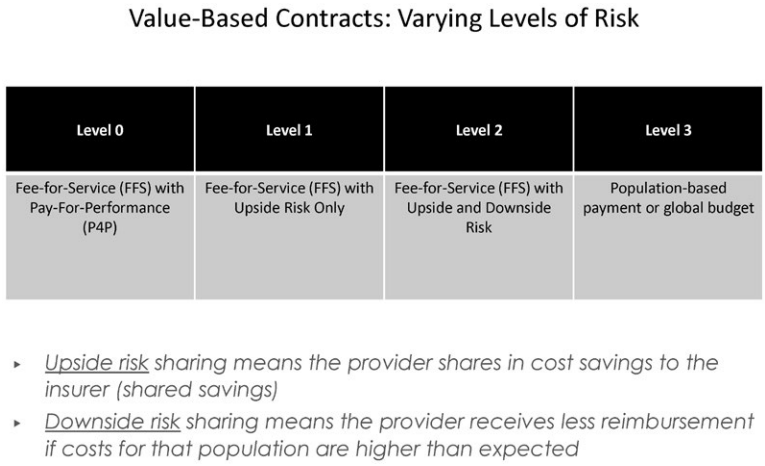

FIG. 4. Levels of financial risk sharing by providers in value-based contracts.

membership fee superimposed on the current fee-for-service structure. This would cover the cost of case management, disease education, and other interventions—which should theoretically then reduce overall costs as shown in Table 1. This is the model of Project SONAR for inflammatory bowel disease (www.sonarmd.com). A membership-based payment model such as this would have the broadest reach, because it would be more scalable and could be implemented by small gastroenterology practices with limited downside risk. Although it would not meet requirements for a MACRA-designated advanced APM, private insurers may be willing to fund a demonstration project and provide ongoing sustainable funding if value improvements could be demonstrated compared to historical controls. The tools created and data gathered could then be used to move to the next step, which would involve both up- and downside risk for physicians and hospitals. This would require clear delineation of inclusion and exclusion criteria. For example, would all patients with cirrhosis be included or just those who are decompensated? Would patients with major defined comorbidities, such as end-stage renal disease, cardiovascular disease, or cancer, be excluded? In addition to patient inclusion/exclusion, it remains to be determined what costs would be included. All costs or just liver related? How about the costs of transplant workup testing? There would need to be financial risk adjustment models, with accurate discrimination and calibration. Finally, there would need to be a clear understanding of up- and downside risk sharing between physicians and hospitals, particularly in cases where these are legally distinct entities—in the managed care world, this is called a division of financial responsibility.

TABLE 1. Opportunities for Reducing Costs While Maintaining or Improving Outcomes in Cirrhosis

Cost Drivers	Interventions
(Re)hospitalizations	Improved discharge process
	Patient/caregiver education regarding lactulose titration
	Availability of urgent clinic and paracentesis slots
Duplicative testing	Subspecialty medical home
Unnecessary testing	Identify and reduce variation by sharing best practices
	Disseminate "Choosing Wisely" topics
High utilization patients	Intensive case management
	Palliative care

Next Steps

The Practice Metrics Committee of the American Association for the Study of Liver Diseases (AASLD) is spearheading an initiative that will develop an APM for cirrhosis. This work is co-led by two of the authors (F.K., M.V.). The first step includes gathering more-detailed data on the cost drivers in cirrhosis. For example, to efficiently target interventions, it will be important to prospectively identify which patients are expected to incur the highest costs. Additionally, although accurate prediction models exist for medical

outcomes, development of accurate financial models is needed. Next, we plan to convene a Stakeholder Summit, including representatives of healthcare systems, insurance companies, and experts in cirrhosis care and value-based care. The framework developed at that meeting would then be used to conduct two to three pilots, each involving a single center and single insurer. Our vision is that the Cirrhosis APM would eventually be incorporated as part of the Cirrhosis Quality Collaborative (CQC), a multicenter quality improvement network funded by the AASLD that is expected to launch in early 2019 and is based on successful collaboratives in other disease states (e.g., www.improvecarenow.org). A Cirrhosis APM would provide an incentive for healthcare providers (hospitals, physician groups, and healthcare systems) to participate in the CQC, thus improving the quality and value of cirrhosis care nationwide.

Summary

In summary, cirrhosis is a common and expensive condition. Existing data indicate unwarranted variations and gaps in appropriate medical care for populations with cirrhosis. With the organization and delivery of healthcare in the United States moving from fee-for-service with no link to quality to a value-based payment system, it is time to develop and implement models that provide high-quality cirrhosis care while simultaneously controlling the cost associated with that care. We have outlined the initial steps that we believe will facilitate this transition.

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