

Full Healthcare Integration through Updated Payment Systems, Low-Cost Technologies, and
Multidisciplinary Caregivers

CURTIS L. LOWERY, MD

University of Arkansas for Medical Sciences

4301 West Markham Street, #518 · Little Rock, Arkansas 72205

Telephone: (501) 686-5847 · lowerycurtisl@uams.edu

Background Analysis

It has been said the hospital is the doctor's playground and has been for at least the past 100 years. Yet, after this millennium of experimentation and progress, a creeping problem has boiled to a head: *a payment crisis in healthcare delivery*. Almost every American healthcare dollar spent comes to the hands of the healthcare provider by means of patient care through orders, prescriptions, and therapies. This current payment structure suffers a major flaw: volume-based reimbursement. In essence, the more procedures and interventions a healthcare provider facilitates, the greater the reimbursement. Alternatively, since the introduction of the Diagnosis-Related Group (DRG) payment system, hospitals have been partially locked into per diem payments that only indirectly link with consumption. Running concurrently, volume-based payment and DRG payment have created a disconnection between physicians and hospitals. Physicians may opt for costly and oftentimes unnecessary tests, procedures, and prolonged hospitalizations to increase reimbursements and protect against potential litigation. At the same time, hospitals seek to shorten stays to within DRG-covered days while simultaneously decreasing expenditures per hospital stay. The two payment structures are in conflict.

Healthcare payers have voiced the need to dissolve separate payments by linking provider and hospital payments. By doing so, providers would suffer consequences for costly, unwarranted patient care. Reacting to their fear of linking payments and the resultant reduced income, some hospital networks have purchased physician practice groups; however, without a solid plan to align provider and hospital care, it is unlikely consumption will be easily reduced nor efficiency easily increased. Historically, providers have not considered how to work collaboratively with hospitals to evaluate costs and efficiency. Healthcare providers have all been trained to treat disease rather than maintain health, of which providers are only paid for the former.

Hospital organizational structure reflects the current disconnected payment system, as hospital employees answer indirectly to providers through hospital management structures and boards. To change such circumstances, physicians must interact with upper level hospital administration rather than directly with the employees working at the service level. However, with more focus on service lines, hospital systems could consider structural changes to better understand costs, improve efficiency, and act upon service lines that yield the greatest benefits.

Linking the provider and hospital payment systems is imperative to solving the payment crisis. To do so, the healthcare system could form a coalition of healthcare stakeholders and decision-makers to understand which service line costs are sound and which require refinement.

The creation of "Efficiency Intervention Groups" (EIG) could unite healthcare system providers, hospital employees, and consumers to oversee the evaluation of cost and care efficiency within the hospital. Each group would benefit from the insight and involvement of health economists, informatics specialists, healthcare system engineers, nurses, physician providers, hospital administrative staff, and members of patient advisory groups. This non-traditional group would help the clinical staff to identify and understand system inefficiencies and to plan corrective interventions. The groups' evaluations would initially focus on the hospital system's financial reports, identifying those service lines and practices that carry heavy costs to the system. Such analyses would define the actual, necessary costs associated with care delivery for common diagnoses.

Reducing the product line production costs should be done before those products are delivered. In the American healthcare system, the costs of healthcare treatment and prevention are rarely analyzed prior to their integration within the system; however, by doing so, the healthcare system could seize an opportunity to treat patients in the most efficient manner possible, logistically and financially, with aims to reduce hospitalization time and frequency. (See **Figure 1.**) Using the 4-step industrial model of

systems improvement, the EIG will identify production inefficiencies, plan systems corrections, implement corrections, and evaluate the systems interventions for each product line. This cyclic improvement process will better integrate healthcare providers and hospital inpatient and outpatient

clinical systems. It will be necessary for the management structure to function at the product level, under this new integrated system. Simultaneously it will be necessary to look beyond the traditional delivery system and begin to link delivery networks down to the level of each individual patient.

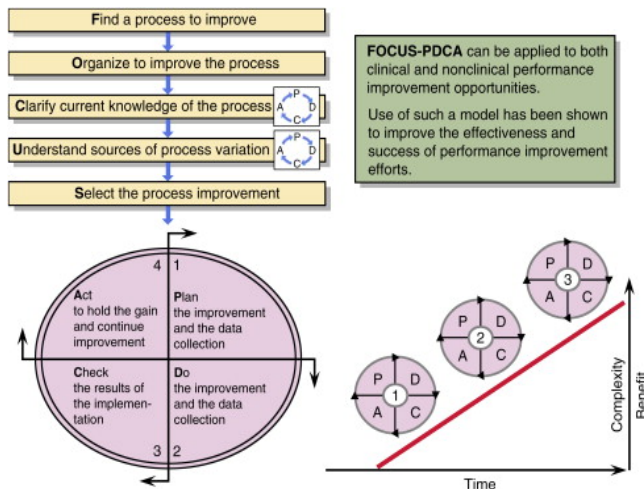


Figure 1: Process Improvement Cycle

Available Tools for a Long-term, Low-Cost Solution

Once product line production costs are analyzed and exorbitant expenses are identified, it becomes essential to inventory tools that may provide alternatives to care delivery that will lower costs among essential practices prior to hospitalization and even prior to face-to-face provider contact. These tools should leverage existing infrastructure and resources to keep costs low and production high. Under the new bundled care or network per patient payment structures the healthcare system is now incentivized to prevent unnecessary hospitalizations must focus on early patient interventions and even on preventative healthcare.

A simple fact that is often forgotten or brushed away in the healthcare environment: The primary role of the caregiver is to identify patients in need, diagnose those needs, and facilitate an intervention that will restore the health, productivity, and happiness of that patient to the extent possible. In fulfilling this mission, traditionally, providers have depended on face-to-face patient contact; however, new technologies have revolutionized healthcare delivery to allow providers to transcend distance to care for patients outside of traditional, face-to-face contacts through telemedicine and mobile health technologies. In this new healthcare model, the expert clinician becomes the manager of a complex healthcare system within his or her discipline. We will create a healthcare networks that will resemble a branching tree like pattern with the clinical experts using systems to manage the patient's within their discipline across this network and across distance. This control system will allow for more efficient management of patients within this network and will allow for corrective measures to occur earlier in the unstable patient. The concept of real-time data collection from patients has now moved from the ICU into the patient's everyday life. Sensors can now be deployed on ambulatory patients and are capable of wirelessly reporting physiological information to a central monitoring site. In this new system the definition of the primary care provider now transcends the physician directly to the patient. Also the new multidisciplinary system will rely heavily on APNs, physician assistants, pharmacists, paramedical personnel, community healthcare workers working closely with the patient. The key to maintaining the quality within this new system is through the use of new technologies that form an information nervous system capable of surveillance and communication at all levels of care delivery.

Telemedicine

In striving to attain decreased healthcare costs and spending, there exists a tool that can cut costs, serve more patients, and bring revenue into hospitals: *Telemedicine*. Specifically, at the University of Arkansas for Medical Sciences (UAMS), we have created an information system that manages and maintains a vast statewide telemedicine network, over which myriad programs deliver clinical interventions and education to patients and providers from any distance, whether in rural Arkansas or a medical university in India. This system allows providers across the state to provide real-time interactive video consults with and examinations of patients in order to collect the information needed for collaboration with remote providers to devise and deliver an individualized care plan to meet patient needs. Telemedicine enables UAMS to spread the influence of expert specialists across the healthcare continuum, with the capacity to monitor and care for patients within their hometown clinics and even their homes. As payment reform continues to become a reality in healthcare, telemedicine systems will be a vital part of reducing expenditures while maintaining quality.

Mobile Devices

The concept of technology integration is not limited to robust telemedicine systems but should also include low-cost devices that can be affordably placed in the hands of patients and their providers. Markets exist for low-cost monitors and sensors that can use wireless networks to transmit information to the data warehouse for signal processing analysis. For example, congestive heart failure patients may be equipped with remote monitoring devices that attach to their bodies, which transmit useful health data to a remote nurse who will be virtually alerted when vitals are unfavorable for any given patient. Another added benefit is that now, this level of care can be provided from any distance. A simple, low-cost technological monitoring device can help prevent hospitalizations while also strengthening communication between providers and patients outside of office visits. Such streaming, real-time data could be used to identify patients with deteriorating conditions by empowering the provider to plan and implement interventions prior to adverse symptoms and outcomes, hospitalization, unnecessary doctor visits, or a compromised quality of life. Mobile health interventions also foster a unified multidisciplinary approach to care delivery in which a care team can review patient vitals and develop plans of care that comprehensively address patient needs.

Evidence of Success

In Arkansas, UAMS has integrated technology into patient care through a range of disciplines, with the most notable successes evidenced through the ANGELS high-risk obstetrical telemedicine program. ANGELS has led the development of a statewide telemedicine network that enables UAMS specialists to remotely deliver real-time consults with high-risk obstetrical patients and their providers that lack specialty obstetrical training. Additionally, ANGELS has allowed UAMS providers to plan interventions through a system of co-management with rural providers, while dually reducing expenditures from unnecessary visits, transports, hospitalizations, and misdiagnoses by increasing access to specialty expertise in areas otherwise lacking such support. Through the use of technology, ANGELS has reduced perinatal mortality and increased appropriate interventions at earlier gestational ages of high-risk pregnancies throughout Arkansas.

Future Replication and Translation of the Solution

Replication to All Subspecialty Clinical Areas

These low cost, technology-based concepts can be applied to most clinical specialties and sub-specialties to facilitate interventions and monitoring that would greatly reduce the burden upon patients to travel away from their hometown hospitals and clinics for care. In effect, this technology offers a constant link between the rural provider, specialist, and/or patient to foster close management and stabilization of high-risk conditions. Telemedicine and mobile health devices can provide the data and technological platform

needed to enable multidisciplinary teams to work collaboratively in treating complex patients, especially when such patients can be managed locally without the need for transportation to a tertiary center. The replication of this idea will employ a top-down approach that links highly trained specialists in tertiary centers to individual care providers and patients living in rural areas. This top-down structure allows expert interventions to be channeled throughout the network utilizing a single specialist to see many patients. Moreover, an established network can plug into other support systems, such as provider and patient education, to gain more efficiency across the healthcare continuum. Also, as we have demonstrated at UAMS, this approach has extended our catchment area to include practices and hospitals which have not been previously in our referral network. Another benefit from the clinical videoconferencing is that the physician productivity has been increased since the drive times to remote clinics have been eliminated.

A Systems Approach to Personnel Management

To maximize cost effectiveness, physician assistants, pharmacists, APNs, nurses, paramedics, and even lay healthcare workers should be incorporated in the delivery of care. Healthcare technology, such as telemedicine and mobile health, can be bolstered through the involvement of these professionals who can lend skills and cost-effective manpower into this design. Care coordination across a multidisciplinary care team can allow the team to plan interventions across any distance, utilizing real-time technologies to unite healthcare professionals anywhere in the world. Such teams can provide stable, regular communication; evidence-based care as planned by multidisciplinary teams; and the capacity to devise treatment plans that will identify patients in need and respond to those needs through rapid, comprehensive, and aggressive interventions to maintain quality of life while cutting healthcare costs. As the Affordable Healthcare Act brings more covered patients into the healthcare system, healthcare providers and payers must develop multidisciplinary care delivery networks coupled with distance technologies.

Efforts toward a systems-based approach could be centrally managed and overseen through a “Health Care Innovation Center” designed to identify and study low-cost alternatives in healthcare. Creative thinking and strategy as embodied through the use of an Innovation Center will help providers, hospitals, and payers navigate this ever-changing healthcare environment. Changes in payment structures are just one essential initial step toward identifying needed improvements in the way providers and hospitals deliver care. When these practices are scrutinized and technological resources are leveraged, our healthcare system can redirect its focus toward lowering costs and serving the most important mission of all...improving patients’ lives. Our focus in the new healthcare system will be on the patient and keeping the patient healthy rather than treating the disease individual. With the reform of the payment structure it will be necessary for us to develop new ideas that will deliver efficient and effective care to our patients. I believe The Health Care Innovation Center should be developed by engaging industry, venture-capital companies, and key individuals who are interested working to develop new companies. Consideration should be given to allowing a portion of this company to reside as a stand-alone entity outside the traditional healthcare structure. New technologies should be explored and developed, such as iPad apps and monitoring systems capable of delivering healthcare to the individual anytime and anywhere. The Health Care Innovation Center should evaluate new technologies, select those that work, and deploy the new systems within the healthcare network.

The Innovation Center would provide a competitive edge for the University Medical Healthcare Systems as we move from a fee-for-service system to a more bundle care and/or networked delivery system. Technology should help in treating the patient rapidly and early and thus reduce the need for more costly healthcare delivery. If we are smart and have the will to change we will lead this revolution and position ourselves to fund our new systems by capitalizing on our knowledge to make little off of a lot patient interactions rather than a lot off of a few acutely ill and hospitalized patients. We can no longer afford to

be the tip of tip of the iceberg since this position has been constantly eroded as more and more clinicians and hospitals take these acute patients away from the Medical Universities.

Translational Research

The National Institute of Health funds research that is expected to improve the health of individuals. With the formation National Center for Advancing Translational Sciences (NCATS) and with the relocation of the Clinical and Translational Science Awards (CTSA) programs to NCATS, there is continued focus on movement of healthcare breakthroughs from the bench the bedside. By using a more centralized video conference-controlled recruitment of patients, the healthcare system can efficiently include patients in geographically and socially isolated areas never included in most trials. At present, new funding sources for studies of healthcare systems change through Centers for Medicare and Medicaid Services (CMS) innovations and through Patient Centered Outcomes Research Institute (PCORI). The new funding sources will allow funding for planning and evaluation of such aggressive healthcare changes. It is important to monitor healthcare system interventions to ensure that these low-cost alternatives do not compromise the quality of care delivery and our healthcare networks.

Considerations for the Medical School Hospitals and Healthcare Sciences Systems

As healthcare reform increases the need for integrated systems both internally and externally, it will also become essential for providers to compete effectively. To improve efficiency, providers need information and to communicate effectively internally and across distances and across the connected system. It is very important that university healthcare systems engage and embrace new technologies capable of leading this change. Beyond simple network healthcare programs, technology allows university medical centers to reach out to practices without formal relationships and to each individual patient regardless of their healthcare contract affiliations. Telemedicine and mobile health devices allow us to explore new markets in distant areas in ways that would not be possible before such advances.

The traditional organizational structure which has been focused in a top-down fashion will need to be reconsidered: how can local health care product line managers can be empowered to work together and change the care delivery framework in an ongoing constantly improving fashion through corrective feedback? Traditionally, power-driven managers will share leadership and learn to work efficiently with one another to aid in this change. Teamwork and sharing of leadership roles and finances will be necessary to accomplish change, and there must be strong transparent, two-way communication at all levels of the healthcare system. It will be beneficial to engage all members of the healthcare system during these unstable and rapidly changing times. Insightful ideas often come from personnel working at the level of production. The healthcare networks that can become more adaptable and undergo rapid change will develop a competitive edge during this transition period.

It would be a good idea to begin dialogue with the prison systems. The State and Federal prisons spend a great deal of money supplying two guards per each prisoner as they seek healthcare outside the walls of the prison. Also violent criminals are always a threat to society when removed from the protective confines of the prison system and so the leadership is often supportive of telehealth based care delivery. Also local jails struggle with the evaluation of prisoners acutely within their walls. Correctional systems at all levels benefit from the use of low-cost evaluations using technology and they're willing to contract with healthcare systems that can supply this resource.

It is important to select champions for distance health and empower these individuals to engage faculty and evaluate potential programs for distance care delivery. At the present state of healthcare reform, contracts with payers and other hospitals are the best funding source for specialty medicine. Healthcare providers should not hesitate to consider other healthcare professionals such as speech pathologists,

genetic counselors, ultrasonographers, pharmacologists, and diabetic teaching experts in these contracts. These healthcare professionals are in short supply in remote areas.

Medical Universities stand to benefit from healthcare reform if we can position ourselves to lead the development of a low-cost high-quality healthcare system. The nature of our systems provides us with many subspecialists all working in one physician hospital organization (PHO). Our scientific cores provide us with cutting edge research and technology, tools, that most traditional private healthcare networks lack. If we can take advantage of this competitive platform we stand to profit from the upheaval that the systems will face over the next 3-5 years. It will be necessary that we restructure our organizations so that we can respond at a more local level to these opportunities. Change always results in death but simultaneously there is opportunity for new and often different forms of life to flourish. It is important for Medical Universities to be part of that new life and for us all to focus on the patient as we lead the change in a positive way. I am sure that our future can be bright if we do this.