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Accountable care

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Abstract

Although accountable care may have been around for many years, the concept has moved to the forefront with health reform. Accountable care is care which is measurable and reportable that seeks to foster quality and cost-effective care.

Providers should be accountable for the care they provide. Some of the critical aspects of accountable care include patient-centered medical homes, a cross-collaborative team approach to care, and a strong foundation of high-performing primary care. It is important to be able to measure quality, employ evidenced-based medicine in a transparent environment, and to have a robust health IT system, with appropriate use of telemedicine and e health, in a culture of accountability.

Much can be learned from a review of some of the major healthcare integrated delivery systems in the United States that practice and excel at accountable care. A number of forms of accountable care are likely to be key to health reform including value-based purchasing, episode-based performance measurement, and payment for quality and improved efficiencies.

Accountable care likely will lead to a crossroads in quality, where there will be shared governance, and physician leadership. There will be a performance-based concept of competence with engaged extended hospital medical staffs, and knowledge management. Patients will be engaged to a greater extent in their healthcare. Purchasers of healthcare will adopt new compensation strategies to influence the quality of care. More accountable care systems will emerge, and the Medicare Shared Savings, Accountable Care Organization alternative might be an important one for provider participation.

Clinical integration will be important for most successful healthcare systems that want to develop accountable care models. Finally, the principles of biomedical informatics will be a key to accountable care under health reform.

Introduction

The origins of accountable care may be thousands of years old in the United States. Some health systems began to employ accountable care models a hundred years or so ago. Accountable care is providing quality and cost-effective care which is capable of being measured and reported. It requires substantial physician involvement. This paper discusses what it takes to truly achieve accountable care, what it involves, its critical aspects, and what it takes to be successful in accountable care.

Origins of Accountable Care

The origins of accountable care might emanate as far back as 1772 B.C. with Hammurabi's Code. The Code provided that in certain instances when a surgeon operated on an individual and the operation was unsuccessful, the surgeon's hand would be cut off [1, 2]. Although such a result might seem draconian, the Code certainly held the surgeon accountable for his or her actions. Many centuries later in the early 1900s, a physician, Dr. Ernst Codman, who was a pioneer in the area of accountable care and an author, "proposed standardizing the way medicine is practiced through what he called an 'End Result System.'"[3] Although his colleagues did not adopt this notion, his End Result System seems clairvoyant and a hundred years before its time. The End Result System called for each "hospital to follow every patient to see if the best care was given."[3] In addition, perhaps he recognized one of the first cross-collaborative team models, when he "envisioned everyone in the hospital working together to achieve this end, resources assigned according to their importance, and physicians welcoming the exposure of their errors."[3]

Although many early health systems achieved success in accountable care, the Mayo Clinic (Mayo), Kaiser Permanente (Kaiser), the Henry Ford Health System (Henry Ford), and Group Health Cooperative of Puget Sound (Group Health) might be some of the first ones to have done so. Mayo, which is a physician-led, multispecialty group practice that also owns hospitals[4] "has been ranked as one of the top medical institutions in the world"[5] for many

decades. The Mayo Clinic quality construct includes many dimensions, including a culture of safety, outcomes, and service, an infrastructure to raise reliability, promoting improvement efforts, and superior execution and accountability for actions[6]. Mayo has a "Value Creation System" which focuses on alignment, discovery, managed diffusion, and measurement "in the pursuit of a single high-value practice . . . to reduce health care costs and improve quality."[7]

Kaiser has long had a system of accountable care through the Permanente medical groups' exclusive relationship with the Kaiser Foundation Health Plan and its hospitals, and by having the quality of care as a factor in physician bonus payments[8]. Kaiser is one of a number of "integrated, accountable care systems," like Mayo[9]. As a large group practice, it is better suited "to use performance and outcome measurement for quality improvement." [10]

Physicians and executives at Henry Ford have been practicing integration since 1915[12]. Henry Ford consists of "a tightly integrated network of hospitals, community clinics, laboratories, pharmacies, nursing homes and hospice . . . ."[12] Its physicians "are employed in the tradition of the Mayo Clinic,"[12] and its business systems allow it to reduce costs and improve clinical quality measurements at its hospitals.

Group Health "'began delivering a new kind of healthcare" in 1947[13]. Not only did members pay a flat monthly fee for comprehensive care, they elected the board of trustees, and bought bonds to fund the facilities. Most importantly, however, the clinicians "devoted as much energy to promoting wellness as they did to treating illness."[13] The founders of Group Health built accountability into its charter "by designing it as a prepaid group practice that integrates care and coverage. Without the inflationary pressure of fee-for-service arrangements, Group Health's salaried doctors have an incentive to provide the most appropriate treatment for patients and to keep them well."[13] Their patient-centered medical home model provides cost-savings and improves the quality of care[13].

Many have sought to take credit for the concept of accountable care or its definition.

One particularly good observation of being accountable is the following: "To be accountable is to understand that care will be measured and reported and that quality must improve, all while costs are controlled, or at least monitored."[15] An outgrowth of the notion of accountable care is the accountable care organization (ACO). One author posits that this term "originally was coined by researchers and policy experts to describe entities that consist of integrated providers that are jointly held accountable for achieving measured quality improvements in care and reductions in the rate of spending growth for a defined patient population."[16] Although regulators, government officials, and others appear to disagree as to whether or not ACOs will reduce costs and improve the quality of care, [17] such entities and the discussion about them have moved to the forefront of healthcare in the United States.

Underpinnings of What Accountable Care Was Thought to be and What it is Becoming

Now termed a fad, Total Quality Management (TQM) or Continuous Quality Improvement (CQI) may be seen as the accountable care concept of the 1990s.(3) The thought was that managers could identify problems, form committees, identify and solve healthcare problems. However, where there was no control over physicians and their involvement in the process, it was not possible to achieve true accountability. One author who notes the focus on CQI also notes that there are many definitions of quality that have evolved over time. She notes definitions by Donabedian, a widely recognized expert in healthcare quality, the Institute of Medicine (IOM), and Donald Berwick, a Centers for Medicare & Medicaid Services (CMS) Administrator[18]. Thus, many have tried to define quality and accountable care. One observation that does appear to be true is that accountable care is becoming increasingly important in the emerging healthcare market. It is not merely a pilot project, and providers must develop skills to implement it successfully [19].

In determining what accountable care might have been or what it is becoming, it is important to consider in accountable care, for what are individuals and entities accountable,

and to whom, and how are they accountable[20]. In addition, a number of accountability mechanisms for quality care have emerged in managed care systems[21]. Many early lessons can be gleaned from accountable care models in the private sector, particularly relationships between health plans and providers where there are efforts to improve quality, efficiency, and accountability for care[22]. "Providers' ability to be successful in these new accountable care arrangements will depend upon their capacity to organize their delivery of care to achieve performance and accountability requirements."[22] Quality programs have emerged that employ measures which track quality, and where physician groups have to meet certain quality scores to begin receiving bonuses, and optimal quality scores that translate to even higher bonuses[23].

In 1996, two physician-authors sought to describe their concept of accountability as containing the following three essential components of who, what, and how?[24] They described the locus of accountability, noting that at least 11 distinct parties can be held accountable or hold others accountable, including at least patients, physicians, hospitals, managed care plans, and others. They also defined a domain of accountability, with at least six domains, noting that it is "an activity, practice, or issue for which a party can be legitimately held responsible and called on to justify or change its action."[24] The domains included "professional competence, legal and ethical conduct, financial performance, adequacy of access, public health promotion, and community benefit."[24] Finally, the authors discussed the how, or the procedures for accountability, which include evaluation of adherence to criteria and dissemination of the evaluation by the accountable parties[24].

The emergence of accountable care and a system's ability to embrace it today seems to require the ability to manage risk, effectively employ electronic health records (EHR), report performance measures, implement standardized care management protocols, and balance the interests of hospitals, primary care physicians and specialists in creating governance and management processes to adjudicate differences, the ability to engage patients in self-care

management and self-determination, and a number of other considerations[25]. With the emergence of health reform, two authors note that there are several guiding principles for reform which embrace the concept of accountability, including:

> First, there is increasing agreement on the need for *local accountability* for quality and cost across the continuum of care . . . .
>
> Second, a successful approach to achieving greater accountability must be viable across the diverse practice types and organizational settings . . . and should be sufficiently flexible to *allow for variation in the strategies that local health systems use to improve care.*
>
> Third, successful reform will require a shift in the payment system from one that rewards volume and intensity to one that *promotes value* (improved care at lower cost), encourages collaboration and shared responsibility among providers, and ensures that payers—both public and private—offer a consistent set of incentives to providers.
>
> Finally, with increased accountability on the part of providers must come greater transparency for all parties. Measures of overall quality, cost, and other aspect of performance relevant to consumers will facilitate informed choices of both providers and services and increase consumers' confidence in the care they are receiving as their providers face different incentives[26].

Thus, local accountability, across diverse practice types and organizational settings, aligned payment incentives, and transparency are keys to what accountable care is becoming.

In fact, as early as 1998, two other authors recognized that accountability "has become the new fact of life."[27] They noted that "accountability requires an understanding of responsibilities, the scrutiny of services, efficacy of delivery, effective performance, customer satisfaction, and outcomes assessment, all of which are part of the accountability continuum."[27] With the stage set for the emergence of true accountable care, it is important to consider what are the critical aspects of accountable care, how different health systems address accountable care, its key in health reform, and what it may mean for the future of healthcare.

Critical Aspects of Accountable Care

Patient-Centered Medical Home

In l967, the American Academy of Pediatrics proposed the concept of the patient-centered medical home, which became more accepted in the early 1990s, and embraced by the

American Academy of Family Medicine in 2002[14]. The National Committee for Quality Assurance (NCQA) defines the patient-centered medical home as "a model of care in which 'patients have a direct relationship with a provider who coordinates a cooperative team of healthcare professionals, takes collective responsibility for the care provided to the patient, and arranges for appropriate care with other qualified providers as needed.'" Patient-centered medical homes are a key to accountable care and "are supposed to improve quality outcomes and lower costs."[14] "Practice transformation on the level of the patient-centered medical home is a critical first step to improving care of the patient . . . ."[28] One clinician who is a senior medical director of a health plan commented in late 2011, "'Pretty much everybody recognizes that the medical home has to be the foundation of any accountable care organization . . . .'"[29]

Patient-centered medical homes provide coordinated care. "For patients, coordinated care means more 'quality time' with their physician and care team . . . ."[30] It is becoming increasingly important to be responsive to the desires of patients. Patients want patient-centered care, in at least four areas: "'whole person' care, comprehensive communication and coordination, patient support and empowerment, and ready access." The fragmentation of the healthcare industry and independence of many physicians have made the movement toward patient-centered medical homes difficult in many respects. However, there is a movement toward models such as Kaiser and Mayo and their highly structured organizational models that include a form of patient-centered medical home[32].

Cross-Collaborative Team Approach to Care

The cross-collaborative team approach to care can be part of the patient-centered medical home concept. Basically, this team approach to care is a form of case management. One author contends that case management is a foundation for an accountable care organization and describes today's case management team as follows:

- Collaborates with the interdisciplinary team to provide strategic

oversight for the plan of care (clinical, financial, operational, and satisfaction outcomes),
- Conduct utilization review/management and variance tracking,
- Manages cost per case, resource use, and length of stay (LOS),
- Collaborates with the patient and the health care team to develop and manage the discharge plan,
- Facilitates timely communication of patient-specific care information to third-party payers to expedite the receipt of full and timely reimbursements,
- Mentors the health care team on case management and managed care concepts, and
- Documents accurately and clearly all interventions in one electronic system. [33]

In a hospital setting, case managers should collaborate with home care liaisons in a dynamic process[34]. Case management contemplates accountability for safe, smooth, and sustained transitions in what one author calls a "'wraparound case management' service.'"[35] Clinical community health workers can serve an important function in case management[36]. Community involvement can be an important aspect of providing high quality care. Group Health has long provided for community involvement[37]. In fact, community health workers "are well positioned to help people receive timely care and preventive services and by improving the coordination, quality, and cultural competence of medical care[38]. The move to accountable care has truly put case managers in the spotlight[39].

Strong Foundation of High-Performing Primary Care

It is generally accepted that accountable care organizations require "a strong foundation of high-performing primary care." [40] Such physicians can serve as the focus for the patient-centered medical home and will be instrumental in the cross-collaborative team approach to delivering healthcare. To encourage primary care physicians to participate in such models, however, health plans and provider groups are going to have to provide the appropriate aligned incentives to such primary care physicians.

Ability to Measure Quality

Given that accountable care needs to be measured, it is important that "a common set of primary care performance measures be developed," [40] and payment mechanisms align incentives to facilitate meeting those performance measures. Much work must be done to be able to advance the science of measuring quality[41]. One author posits recommendations to advance the field of measuring quality, especially patient outcomes. Some of those recommendations include ensuring the validity and transparency of the measures, developing standard surveillance systems to identify events and those at risk for events, evaluating performance change over time, and building tools to prioritize measures [41]. Although the lack of measurement tools may be a function of the evolution of the healthcare system which is focused on acute care, [42] the movement to accountable care will require greater performance measures for quality.

Evidence-Based Medicine

In implementing patient-centered medical homes, cross-collaborative team approaches to the provision of healthcare, with a strong foundation of high-performing primary care, with measurable quality indicators, evidence-based medicine will be a key. To convince clinicians to embrace these concepts, it will be important that the healthcare services provided be based on scientific evidence through studies, empirical data, and clinical trials. Health systems employing these concepts will want their healthcare teams to treat similar patients in similar ways.

Transparency

Transparency will be of the utmost importance in accountable care. Providers will have to know what is the evidence-based medicine they should employ. They will have to know what the incentives are, the performance measures by which their performance will be judged, the nature of the communications they must have, the reporting they must do, and not

feel that everything is being conducted behind a veil of secrecy.

Health Information Technology (IT), Infrastructure, and Connectivity

Many organizational leaders, such as Chief Executive Officers, recognize the value of health IT. Chief Information Officers (CIOs) agree that health IT is a necessary component of accountable care and accountable care organizations[43]. Not only will EHR be important, but also computerized physician order entry (CPOE), national standards for health information exchanges (HIE), and connectivity of IT systems will be important. A senior vice president of healthcare informatics of a large hospital alliance described healthcare IT's transformative role in accountable care as follows:

> Healthcare IT will play a pivotal role in supporting the evolution of organizations from the current fragmented, transaction-oriented care delivery model to a fully accountable, coordinated model. To appropriately take responsibility for a population, providers need a complete understanding of the care and services they provide. Integrating data from inpatient and outpatient settings will help providers produce the actionable information around quality and cost improvement opportunities that are so essential to organizations' success[44].

Culture of Accountability

Building a culture of accountability will be very important in a successful accountable care system[45]. Some have observed that the difference between top performers and non-starters is cultural in nature[45]. It is important to build confidence and self-esteem, communicate expectations of collaboration and participation from a multi-disciplinary perspective, and build an accountable change model[45]. The components of such accountability structure include shorter cycles for correction and implementation than one year, clear communication of objectives, metrics, and milestones, access to necessary data and education, a real time implementation tracking process, and appropriate documentation[45].

Integrating Independent Physicians

Independent physicians cannot be left on the sidelines. Not all physicians will want to become employees of hospital and health plans. They, however, will be needed in developing many accountable care systems. Perhaps, an example of a health system which best integrates independent physicians is Advocate Health Care (Advocate), a nonprofit faith-based health system based in Northern and Central Illinois, which has a number of hospitals and healthcare services and employs approximately 1,000 physicians[46]. Independent physicians, however, on the medical staffs of the Advocate hospitals participate in a joint venture-type arrangement for the management of patient care and managed care contracting with Advocate through clinical integration. The independent physicians participate in governance and a structure which "enables physicians and hospitals to work together to improve care with common quality and cost-effectiveness goals. Physicians and hospitals are collectively accountable for quality and cost during negotiations with payers, because the partnership negotiates on behalf of both the Advocate hospitals and physicians and signs single-signature contracts."[46] Health system across the country increasingly will find the need to embrace independent physicians on the medical staffs of their hospitals and to include them into accountable care models.

Telemedicine and E-Health

The move to accountable care models and accountable care organizations must include telemedicine, telehealth monitoring, EHR, and other technology instrumental in improving the quality of care[47]. Managing chronic patients can be facilitated by telemedicine, particularly telemonitoring to encourage better self-care[47]. Although patient acceptance and responsibility will become increasingly important, not only have patients become more familiar with smartphones, the internet, and other technology, increasingly they want to be involved in their own care[47]. Whether a patient's blood sugar or blood pressure is the subject of the monitoring, such information about a patient in real time will be a key to accountable care and the advancements and evolution of telemedicine and e-health supporting these areas will

become increasingly important.

How Different Health Systems Embrace Accountable Care

Not all health systems have embraced accountable care. The many that have done so have approached it in different ways, given their history, and make up of their providers and resources. A brief survey of ten such systems reveals many similarities, including a number of the critical aspects of accountable care as noted above. Further, such review and observations of others provide a glimpse into what accountable care may mean for the future, and how certain principles of biomedical informatics will facilitate the transition to the future.

Johns Hopkins Health System

Johns Hopkins Health System (John Hopkins), based in Baltimore, Maryland, is generally regarded as one of the most preeminent academic medical centers in the United States. Two physicians from Johns Hopkins offered their perspective on the steps the institution has taken toward providing accountable care, and how it participates in accountable care. Realizing the importance of ensuring that patients have access to timely preventive care and follow-up after hospitalizations, its physician arm, Johns Hopkins Community Physicians, expanded beyond 250 physicians and the hospital arm acquired two additional regional hospital centers[48]. Its faculty practices are linked with its hospitals and clinics virtually to ensure effective coordination[49].

Johns Hopkins owns and operates Johns Hopkins HealthCare, a payer for approximately 280,000 patients, and the organization has embraced capitation. It also "has developed and studied disease-management and care-delivery models that have helped to generate . . . profits and improve access to services."[48] Johns Hopkins is working on developing a robust health IT "platform that allows providers to share information, facilitates decision support, and permits quick analysis of and action on data."[48] The authors note that

clinical integration is important with its attendant meaningful interdepartmental coordination, and patient-centered approaches to care[48]. Other factors which will move Johns Hopkins further into accountable care include the development of "standards to demonstrate and reward achievement with respect to patient safety, quality of care, and innovation in care delivery. . . ."[48] What truly distinguishes academic medical centers, like Johns Hopkins, however, is its focus on educating healthcare leaders and the workforce of tomorrow[48]. The authors note: "Transforming the delivery system must start in our medical and nursing education programs, with an emphasis on delivering and assessing high-quality, patient-centered care, and continue throughout residency programs."[48]

Group Health Cooperative of Puget Sound

In 1947, Group Health began delivering healthcare in the state of Washington to consumers who paid flat monthly dues. Group Health is a consumer-governed health plan with about 600,000 members in Washington State and Northern Idaho, nearly two-thirds of whom obtain "care through an integrated network of facilities owned and operated by the co-op . . . ."[13] The other third of the members receive care through contracted providers. Group Health integrates care and coverage. Its salaried physicians "have an incentive to provide the most appropriate treatment for patients and to keep them well."[13] Group Health has adapted to its changing market[13]. Some of the essential characteristics of a health care cooperative, such as Group Health, which seeks to be an accountable provider of health care, by improving outcomes and controlling costs are:

1. Be a nonprofit organization, state licensed to provide health insurance or health coverage.
2. Be governed by its members, who elect a board of trustees from its membership to provide guidance and oversight.
3. Work directly with organized medical groups so that care facilities are integrated and members receive high-quality, coordinated care.
4. Encourage high quality and value—not high volume—of care through financial incentives for well-coordinated and effective

health care.

5. Use health information technology in the care-delivery system—such as electronic-medical-record system that permits secure e-mailing between patients and providers and offers online access to laboratory, benefits, information, and prescription refills.
6. Offer health coverage and care to people in Medicare and Medicaid, as well as individuals and groups of employees.
7. Be accredited by a major independent quality-assurance organization such as the National Committee on Quality Assurance.
8. Hold itself accountable to performance standards and share its performance data, and those of its providers, with the public.
9. Have an active community presence to promote broader public health, disease prevention, and well being.
10. Support unbiased public-interest research on health care systems and treatment options[13].

Although some might view Group Health as unique, its over a half a century success is a testament to its ability to embrace accountable care in a most effective manner.

Aurora Health Care

In 1989, Aurora Health Care (Aurora), a nonprofit, integrated health system in Wisconsin, established a new model for shared governance based on the principles and processes of shared-decision making. Aurora was created with the following guiding principles: "(1) a vision for constantly finding better ways to provide healthcare and (2) a mission to promote health, prevent illness, and provide state-of-the-art diagnosis and treatment, whenever and wherever to best meet individual and family needs."[50] Aurora developed a key goal "to create effective and efficient interdisciplinary [point-of-service] decision-making processes to achieve better access, better services, and better results for patients."[50] Aurora's shared-decision making process established new relationships based on the principles of accountability, partnership, ownership, and equity[50].

A key to Aurora's success is its focus on accountability, a cornerstone of accountable care. The principle of accountability is described as follows:

Accountability: foundational concept including elements of authority

(power to make decision), autonomy (right to make it), and control (ability to act on it).

- Accountability is internally defined by the person in their role.
- Accountability defines roles, not jobs.
- Accountability is based on outcomes, not process.
- Accountability is defined in advance of performance.
- Accountability leads to desired and defined results.
- Performance is validated by the results achieved.
- Processes are generally loud and noisy. [50]

Aurora presents an example of how a focus on shared decision-making with accountability can make it possible for an integrated delivery system to better manage care.

Geisinger Health System

Founded in 1915, Geisinger Health System (Geisinger), which began as a regional hospital to be modeled after the Mayo Clinic, is today, "a physician-led system engaged in health care, education, and research . . . ."[51] It employs 800 physicians, serves 2.6 million people, with up to 500,000 active patients annually, and has 240,000 member health plan[50]. Geisinger is an open integrated delivery system located in central and northern Pennsylvania. [52] Unlike closed systems such as Kaiser Permanente, Geisinger serves both its own health plan enrollees and other patients in its area [52]. Geisinger adopted a commercial EHR platform in 1995 and it uses it across the system for ambulatory services and certain of its hospitals. In 2005, Geisinger began "to focus on innovation, leading to targeted strategies around care coordination and transitions, chronic care optimization and illness prevention, transformation of acute episodic care, and engagement of patients."[52] Geisinger is a highly collaborative model.

Perhaps one of its best known innovation examples is the Geisinger Personal Health Navigator, which is its patient-centered medical home initiative[52]. The Personal Health Navigator includes 24 hour primary care and specialty care access, a nurse care coordinator at each practice site, predictive analytics which can identify risk trends, virtual care management

support, and a person who serves as a personal care navigator. This navigator responds to beneficiary inquiries, and there is a "focus on proactive, evidence-based care to reduce hospitalizations, promote health, and optimize management of chronic disease. Other features include home-based monitoring, interactive voice-response surveillance, and support for end-of-life decisions[52].

EHR access is available to all clinicians, care managers, and the consumers. "Consumer EHR features include Internet-based lab results display and results trending over time, clinical reminders, self-scheduling, secure e-mail with providers, prescription refills, and educational content."[52] Geisinger supported the physicians financially for the costs of the transformation to the new system. There is an incentive pool based on the differences between the costs of care for medical home enrollees actually incurred, compared to the expected costs[52]. These "incentive payments from this pool are conditional upon performance in meeting quality indicators, with actual payment amounts prorated based on the percentage of targets met for ten quality metrics"[52] Other aspects of the Geisinger program include detailed monthly performance reports addressing quality and efficiency results which are provided to each medical home[52]. The chronic disease care optimization program seeks to "provide a systematic approach to coordinated, evidence-based care for patients with high-prevalence chronic diseases, including diabetes, congestive heart failure (CHF), chronic kidney disease, coronary artery disease, and hypertension."[52]

Geisinger also has adopted Geisinger ProvenCare to manage acute episodic care[52]. ProvenCare is a provider-initiated, collaborative model, which is full-episode based. The program includes significant incentives and disincentives, and is generally electronically managed[52]. Geisinger's model is one of rapid-cycle innovation, which is dynamic and is constantly being modified, in the context of an advanced medical home[53].

Scott & White Healthcare

Scott & White Healthcare (Scott & White) is a fully integrated nonprofit physician-operated organization, based in Temple, Texas, which has managed healthcare costs for over 100 years[54]. It manages all aspects of medical care, and has hospital, physician, and other healthcare services, along with a health plan[54]. It has developed healthcare coordination and payment incentives to foster cost-effectiveness in central Texas[54]. Its employed physicians do not have the incentive to see as many patients as possible. "Their incentive is based on treating patients and keeping them well." [54]

Scott & White employs a robust EHR . Its mission, vision, and culture emphasize patient care, education, and research, with a group mentality in the context of a learning culture[54]. Although it is a physician employment model, it is physician run and led, which employs quality improvement, integrated with its health plan[54]. It performs quality monitoring and peer review[54]. Patients experience continuity of care in a primary care home setting[54]. Initially, Scott & White operated as a closed system, in which the Scott & White hospitals only treated Scott & White health plan members and those members could only access care at Scott & White hospitals. The system now operates as an open model where its health plan is open to other providers and its providers are open to other health plans[54].

Scott & White's stated mission is telling: "To provide the most personalized, comprehensive, and highest quality health care, enhanced by medical education and research."[54] To address quality, Scott & White physicians are periodically given a "report card" which is based on certain metrics[54]. It monitors quality at the system, departmental, and division level, and is trying to better monitor quality at the individual clinician level[54]. It recognizes that "evidence-based medicine is the key to developing standardized protocols."[54] Physician leadership and input at every level is a key to its success, along with system-wide integration[54]. Although Scott & White had the components of an accountable care organization for many years, its true test came when it moved beyond the closed system from

which it started because now its patients had the option to go to other delivery systems. It had to demonstrate that it was putting the interests of its patients first[54].

The Mayo Clinic

The Mayo Clinic is a physician-led, multispecialty group practice that also owns hospitals.(4) It "is the first and largest integrated, not-for-profit group practice in the world."(5) Operating for more than a century, Mayo has over 3,300 physicians, scientists and researchers, along with 46,000 allied health staff, with locations in Rochester, Minnesota; Jacksonville, Florida; and Scottsdale/Phoenix, Arizona.(5) "Mayo's mission is to 'provide the best care to every patient every day through integrated practice, education and research.'"(5) One of the cornerstones of the Mayo Clinic is the Mayo College of Medicine. "The fundamental elements of the Mayo Model of Care include:

> A team approach that relies on a variety of medical specialists working together to provide the highest-quality care
> An unhurried examination of each and every patient with time to listen to the patient
> Physicians taking personal responsibility for directing patient care in partnership with the patient's local physician
> The highest-quality care delivered with compassion and trust
> Respect for the patient, family and the patient's local physician
> Comprehensive evaluation with timely, efficient assessment and treatment
> Availability of the most advanced, innovative diagnostic and therapeutic technologies and techniques[5]

The Mayo Clinic has a focus on quality and its innovative approach to medicine is based on developing teams and a culture of teamwork. It has introduced collaborative team methods into all forms of healthcare[5]. Its focus is on the patient and attracting and retaining employees through an effective compensation system which supports "the attitudes and behaviors that fit with the Mayo Model of Patient Care."[5] Its human resources group is considered a key to its success. It seeks to attract and retain long-term employees who are

motivated team players[5]. Mayo has implemented a four-part approach to quality, focusing on its culture for safety, enhancing a supportive infrastructure, streamlined coherent engineering efforts, and delivering disciplined effective execution[6]. Accountability is fostered by "a systemwide electronic dashboard with common data definitions and targets for each measure. The use of standardized reporting across entities with targets, external benchmarks, and drilldown capabilities serves as a basis to track progress and build will."[6] Evidence-based medicine is important at Mayo as it insists "on *P* values and control charts . . . ."[6] Transparency also is important at Mayo.

Mayo employs a Value Creation System which addresses alignment, discovery, managed diffusion, and measurement, which it believes is part of the solution of how to reduce health care costs and improve quality[7]. "Alignment establishes which clinical processes will be prioritized for improvement and ensures adequate resources for [its] strategic priorities."[7] Discovery "involves identifying the optimal outcome, safety, service, and cost over time for a given service line or process."[7] Managed diffusion is the spread, replication, and dissemination "of standardized practices throughout an organization and health care system . . . ."[7] "Measurement is a key to the maintenance and control of embedded process and system improvements."[7] Mayo is a group practice environment which has tended to produce higher-quality and more efficient care[9].

Henry Ford Health System

As noted above, Henry Ford Health System has been practicing clinical integration since l915, when its first hospital opened in Detroit, Michigan[12]. The system provides comprehensive and coordinated medical care, and is focused on patient care, medical research and education. It consists of "a tightly integrated network of hospitals, community clinics, laboratories, pharmacies, nursing homes and hospice . . . ."[12] It has a health plan. One of its more recent challenges in terms of integration has been to align its more than 1,000

independent physicians who are affiliated with its regional hospitals[12]. One clinician at Henry Ford has suggests that the challenges to integration are greater at Henry Ford than Mayo or Geisinger because the latter each have a "'hierarchical medical group structure.'"[12] Clinical quality measures and highly integrated business systems are assisting Henry Ford in becoming accountable for the care it provides.

Kaiser Permanente

Kaiser Permanente is a California-based, closed integrated delivery system which consists of hospitals, a health plan, and physicians practicing as part of Permanente medical group practices. A study conducted for the period 2001–2002 revealed that California Permanente physicians were much more likely to participate in disease management programs than physicians participating in small group practices whether or not they were affiliated with an Independent Physician Association[8], a loose affiliation of clinicians practicing together to primarily access managed care contracts. Permanente physicians believe they are held accountable for the care they provide as evidenced by the belief by more than half of them reporting, that quality of care and patient satisfaction was a factor in their bonus payments[8]. Kaiser's group practice environment tends to produce higher-quality and more efficient care than other fragmented and disaggregated forms of practice[9]. Such systems foster accountability and bring other benefits to reducing costs. Kaiser makes extensive use of EHR, and clinical decision support systems. It is a system with physician leadership and accountability[10]. Many believe that its innovations are possible because of the closed nature of its system.

Health IT is a cornerstone of Kaiser's success. Its "Kaiser Permanente HealthConnect is recognized as the world's largest privately funded [EHR]."[11] HealthConnect "is a comprehensive health information system that securely connects member records across both ambulatory and inpatient settings; integrates billing, scheduling, and registration; and provides

members with access to personal health records . . . ." [11] It has made it possible for Kaiser to manage the health of populations while redesigning primary care practices in care teams in a manner that optimizes the value of the EHR through a patient-centered delivery model[11].

Intermountain Healthcare

Based in Utah and Idaho, Intermountain Healthcare (Intermountain) is an integrated delivery system, with a "network of twenty-three hospitals and 160 clinics," [55] providing more than half the healthcare in its region. Intermountain has an employed physician group and a health plan, but "the majority of its care is performed by independent, community-based physicians and is paid for by government and commercial payers." [55] Intermountain's improvements in clinical quality that have lowered the cost of care are the result of primarily two factors. "First, Intermountain developed an ability to measure, understand, and feed back to clinicians and clinical leadership detailed clinical variation and outcome data. Second, the system created an administrative structure that uses robust clinical information to oversee the performance of care delivery and to drive positive change." [55] Intermountain focused "on the processes of care delivery that underlie particular treatments, rather than on the clinicians who executed those processes—the 'measurement for improvement' approach . . . ." [55]

Most of the changes at Intermountain were led by physicians. Intermountain introduced process management theory in 1988. In implementing evidence-based clinical practice guidelines, Intermountain did not rely on teaching the guidelines to the clinicians and asking them to remember them. Rather, Intermountain, in implementing one guideline, "blended the guideline into the flow of clinical work at the bedside, adding it to the checklists, order sets, and clinical flow sheets---which track each patient's physiologic pulmonary information over time—that the clinicians already routinely used to deliver care, so that it became a normative default." [55] What is perhaps most important, Intermountain recognized that its physicians' clinical experience with the guideline was that it almost never worked

perfectly for a patient. As a result, the physicians adapted the guideline to each particular patient's need.

Intermountain continued to work on clinical process guidelines and found that "104 clinical processes . . . accounted for 95 percent of all of Intermountain's care delivery."[55] Having previously implemented two failed attempts at clinical management systems which attempted to use Intermountain's existing administrative data systems to achieve clinical management, it finally launched a third attempt in 1995. Intermountain changed its approach by adapting "measurement design methods originally designed for large, multicenter randomized controlled trials."[55] What may be particularly interesting is that the majority of the physicians involved in developing these key clinical processes were independent, community-based practitioners.

Intermountain did not try to control the clinicians and introduce a "top-down command and control through an employment relationship."[55] It "relied on a solid process and outcomes data, professional values that focused on patients' need, and a shared culture of high quality."[55] Thus, accountability could be achieved without the employment model, but the alignment of financial incentives was important as part of this model fostering accountability. Intermountain saved money for the citizens of Utah, but as its costs fell, so did its reimbursement and it experienced significant losses on its operating margins.[55] Thus, lessons were learned that might be applied to the current transition in health reform.

Advocate Health Care

Advocate Health Care, based in Illinois, is a multi-hospital, physician integrated delivery system, which has made extensive use of health IT in its clinical integration efforts, and has an EHR with inpatient-outpatient connectivity[43]. What may distinguish Advocate from many other successful systems is its shared-savings agreement with Blue Cross Blue Shield of Illinois, and Advocate Physician Partners (APP), its care management and

contracting organization[43]. APP includes 3,600 physicians on the staff of Advocate hospitals[43]. Since Advocate is an open system, its "plans to incorporate claims data from the Illinois Blues in its ACO database," is particularly instructive[43]. Advocate is viewed as the model for integrating independent physicians into an Accountable Care Organization[46]. Advocate is aligned with 2,700 independent physicians who are in more than 900 solo or small practices[46] The independent physicians participate in governance in a structure that "enables physicians and hospitals to work together to improve care with common quality and cost-effectiveness goals. Physicians and hospitals are collectively accountable for quality and cost during negotiations with payers . . . ."[46] Physician leadership is important in the Advocate model.

An important part of the Advocate model is its performance payments, which are based on a number of factors, including "individual performance on a specialty-specific report card; the performance of a physician-hospital organization on all metrics; and other 'work' incentives."[46] Four executives of APP commented about the Advocate model as follows:

> The intended effect of these performance payment incentives is to increase individual accountability and focus physicians on population health as well as the health of individuals. The performance payment system is also intended to create accountability for group performance, which in turn creates peer pressure to improve; to increase collaboration across specialties; and to increase physicians' engagement with hospital goals.
>
> Funding for the pay-for-performance program, currently l0 percent of allowable billings, is established through negotiation with the insurance carriers[46].

Advocate has negotiated a common set of performance measure with all of the managed care organizations with which it contracts[46]. This "use of a single set of measures is a key reason that outcomes improvement has been realized."[46] Additionally, clinicians are rewarded "for activities not covered by the traditional fee-for-service system, such as patient outreach, reduced hospital length-of-stay, reduced emergency department use, and counseling of patients about optimum use of generic pharmaceuticals. At the same time, the partnership provides transparency of performance results to the public . . . ."[46]

The Senior Medical Director for APP has identified the following critical success factors for Advocate in the context of clinical integration, including physician leadership, a common set of metrics and thresholds across all health plans, payment to physicians for improving clinical performance and for certain services typically not compensated in a fee-for-service model, a robust electronic health record and IT infrastructure, and the alignment of physician and hospital incentives[56]. APP issues an annual Value Report which touts its benefits from clinical integration. Its 2011 Value Report cites its 2010 clinical integration results[57]. This Value Report is posted on its website for all to review.

Forms of Accountable Care That May Be Key to Health Reform

Value-Based Purchasing

Many believe that Accountable Care Organizations are the key to health reform, by offering "the clearest path to reaching the 'Three-Part Aim,' as espoused by the Centers for Medicare and Medicaid Services Administrative Donald Berwick (originally called the Triple Aim by the Institute for Healthcare Improvement): improved population health; high-quality experiences; and moderation of per capita health care cost increases." [58] Others believe that "hospital leaders would do well to focus first on value-based purchasing before turning their attention to developing an ACO." [59] An important concept of accountable care is that providers should only be accountable for what they can control[60]. One author noted that:

> Value-based purchasing is a concept that links payment directly to the quality of care provided. It is a strategy that can help to transform the current payment system by rewarding providers for delivering high quality, efficient clinical care.
> However, providers should only be accountable for components of clinical care over which they have control, while others are accountable for the components that they control[59].

Value-based purchasing can be an important consideration under health reform.

"Value-based insurance design (VBID) seeks to increase value in healthcare through insurance design and incentives, and includes various strategies and approaches that can be

used separately in different VBID models."[61] On May 6, 2011, the Centers for Medicare & Medicaid Services (CMS) issued its rules and regulations for its Hospital Inpatient Value-Based Purchasing Program, thus codifying that value-based incentive payments will be made to hospitals that meet performance standards with respect to performance periods on or after October, 2012[62].

Episode-Based Performance Measurement and Payment

Episode-based payment could be a component of health reform, but " [a]lthough there is great interest in moving to episode-payment and performance measurement, the proposed applications remain largely conceptual."[63] Episode of care analysis reveals sources of variation in costs[64]. Episode-based payment mechanism can be difficult to implement. "To reduce variation in its total cost of care, a risk-bearing organization must first understand the costs of its underlying episodes of care; the amount of variation in costs that is caused by differences in practice patterns (from severity-adjusted typical costs); and the variation caused by the frequency of [potentially avoidable complications] (related to provider performance)."[64]

Payment for Quality

Given providers' historical managed care contracting strategy to seek greater payments from managed care plans, and the plans resistance to same, providers may need to reconsider this "pay me more strategy." 65 One author suggests that providers and health plans "must collectively embrace concepts including premium payment for premium performance and shared accountabilities to reduce costs." 65 This "pay me right" 65 approach may be seen as payment for quality. Payment for quality might be cast as financial incentives for quality66.

Two authors posit a number of propositions regarding financial incentives and their effect on quality66. These forms of accountable care could be a key to health reform. Financial incentives for quality that are penalties will have a greater effect on quality than

those that are considered rewards66. Incentives at the group-level "will be more powerful as inducements to change in practice infrastructure or to stimulate changes in patient care processes and care coordination among clinicians." 66 Process-based incentives will be favored by providers over outcomes incentives, along with selective incentives in lieu of general incentives66. Not surprisingly, "financial incentives based on professionally accepted measures of clinical quality will exert more powerful incentive effects." 66 Both relative and absolute performance standards will be employed in payment for quality. Not surprisingly, the greater the incentive, the more motivating it will be66. The more certain and more frequent incentives are, the more they will have a motivating effect66.

Payment for Improved Efficiency

Health reform could bring payment for improved efficiency, but to do so, there undoubtedly will have to be some form of healthcare delivery system reform[67]. Such reform will require that providers "become accountable for the overall quality and cost of care for the populations they serve." [67] Providers incomes need "to be decoupled from the volume and intensity of services they provide." [67] In addition, there should be "fully transparent and meaningful performance measures on both quality and cost." [67]

Payment for Chronic Disease State Management

Health reform might also bring payment for chronic disease state management. One might envision payments for optimizing chronic disease management[52], and other forms of payments related to how clinicians manage disease states.

What Accountable Care May Mean for the Future

Crossroads in Quality

Successful health reform must involve accountable care and paying for quality. Three laudable policy objectives that should be considered are:

(1) developing the science base needed for better decision making in health care;

(2) structuring a combination of performance reporting and payment policies that would facilitate development of more–effective and –efficient models of care; and

(3) marshalling broad-based efforts, in the health care delivery system and beyond, to avert dire health and financial consequences from our looming population health problems (such as obesity) [67].

Thus, accountable care in the future should mean payment for quality.

Shared Governance and the Need for Physician Leadership

Accountable care will bring shared governance to the provider groups which are contracting to provide same because models, such as Advocate and others, which employ shared governance are the most successful[46]. In addition, it will require true physician leadership.

Performance-Based Concept of Competence

Society is increasingly recognizing the importance of competence because of public expectation and the testing of clinicians through their actual performance[69]. Thus, a performance-based conception of competence is starting to change physician behavior and will be an important component of accountability and health reform.

The Extended Hospital Medical Staff Will Have to be Engaged.

There are "potential advantages of the hospital and its extended medical staff as a locus of accountability for quality and costs . . . ." [70] Large numbers and percentages of physicians cannot be left out of health reform and accountability. Performance measurement should apply to an entire hospital's medical staff in some form. Focusing on the extended medical staff can help "establish accountability for local decisions about capacity." [69] In addition, hospitals in conjunction with their medical staffs, as larger organizations, can "invest

in improving quality and lowering costs. Most physicians remain in solo or small practices and have neither the capital nor organizational capacity to invest in health information systems, the implementation of care management protocols, or ongoing quality improvement initiatives."[70]

Knowledge Management

Knowledge management will become increasingly important as accountable care takes hold. There is more "clinical information affecting patient care decision making . . . ."[71] The globalization of healthcare through the application of "national standards of 'evidence-based medicine'"[71] is becoming increasingly important. As health reform demands more accountability "by drawing attention to the alarming rate of medical errors in hospitals, where mistakes are made because of inadequate processing of critical knowledge at the point of care," knowledge management will become a cornerstone of accountability and health reform[71].

Patient Engagement

Accountable care will mean greater engagement by patients through "the active participation of patients and their families in making medical decisions."[60] Care will be more patient-centered. There will be greater measures for promoting patient engagement. In addition, patients will have to undertake more responsibility for their health and the management of their healthcare.

Increased Implementation of Purchaser Strategies to Influence the Quality of Care

Health plans and other purchasers of healthcare have implemented various strategies in the past to influence the quality and safety of care[72]. Such strategies have included: "(1) quality based selective contracting; (2) payment differentials based on quality; and (3) public domain information on comparative provide performance."[72] These strategies likely will

continue, be further developed, and expanded upon.

Accountable Care Systems

With greater acceptance of the need for accountable care under health reform, more accountable care systems should emerge in different forms.[73] Many authors believe that large multispecialty medical group practices hold the key to quality improvement and accountability[74]. Not surprisingly, an executive of Kaiser Permanente believes the form of the delivery system matters, and believes that the IOM's description of key delivery system characteristics is a "virtual blueprint for the expansion of the multispecialty group practice model."[75] The IOM believes that these accountable care systems must be capable of meeting the following six challenges: "(1) evidence-based care processes; (2) effective use of information technology (IT); (3) knowledge and skills management; (4) development of effective teams; (5) coordination of care across patient conditions, services, and settings over time; and (6) use of performance and outcome measurement for continuous quality improvement and accountability."[75]

Medicaid Managed Care

Medicaid managed care will continue to be prevalent, and the move from cost savings to quality improvement and accountability will continue[76]. Health reform should only increase the number of individuals covered by Medicaid managed care.

Medicare Accountable Care Organizations

With the passage of the Affordable Care Act[77] authorizing Accountable Care Organizations under the Medicare program, certain healthcare delivery systems can participate as Medicare ACOs. CMS issued rules and regulations governing ACOs on November 2, 2011[78] "ACOs represent a dramatic departure from the status quo of healthcare delivery. They have the potential to overcome the fragmentation and volume orientation of the fee-for-service

system so that the right incentives are in place to foster health and wellness, instead of payment for treating illness."[79] The Medicare program will pay ACOs for care rendered to Medicare patients who participate in an ACO[78].

One group, Premier, developed the Accountable Care Implementation Collaborative in May 2010 to facilitate the development of ACOs by its members hospitals and health systems[79]. The criteria it set for participation was interesting in that it suggests that the member would have to achieve accountability. The criteria include executive sponsorship and participation, payer partner participation, a commitment to data transparency, a tightly aligned physician network, contracting capability, large enough population base, willingness to accept common cost and quality metrics, and sufficient data infrastructure[79].

Clinical Integration

Clinical integration will be a key to health reform and accountable care. The Federal Trade Commission (FTC) described clinical integration as:

> an active and ongoing program to evaluate and modify practice patterns by the network's physician participants and create a high degree of interdependence and cooperation among the physicians to control costs and ensure quality.
> This program may include: (1) establishing mechanisms to monitor and control utilization of health care services that are designed to control costs and assure quality of care; (2) selectively choosing network physicians who are likely to further these efficiency objectives; and (3) the significant investment of capital, both monetary and human, in the necessary infrastructure to realize the claimed efficiencies[80].

Clinical integration is further discussed in a number of FTC Advisory Opinions[81, 82 ,83, 84]. Many believe that clinical integration will be key component of health reform and will provide a platform for accountability[12, 46, 56] . It likely will be a part of most successful integrated delivery systems.

Role of Academic Medical Centers

Academic medical centers will play a role in accountable care and health reform in

many respects, but in large part, because "they educate the health care leaders and workforce of tomorrow."[48] The transformation of the delivery systems must commence with their medical and nursing education programs. Academic medical centers "are a reservoir of unparalleled biomedical research expertise."[85] One author notes: "Establishing ACOs at academic medical centers will be challenging, and creating appropriate governance for these organizations will present problems to many."[49] Other authors believe that ACOs and patient-centered medical homes "present strong opportunities for [academic medical centers]."[85] The authors further note: "ACOs are integrated delivery systems that provide organizing connections among disparate parts of the health system and, in so doing, theoretically create efficiencies and reduce redundancies resulting in improved cost controls."[85] However, the traditional academic medical center "educational model is expensive and inefficient . . . ."[86] It also generally lacks a "primary care and ambulatory infrastructure, coupled with a culture that values subspecialty and inpatient care . . . ."[86]

Rural Strategies

Rural healthcare strategies will have to be developed for accountable care and under health reform. Rural healthcare providers cannot be left out. One author suggests that the characteristics of a successful rural managed care organization "might suggest characteristics of a rural ACO in the near future."[87] These characteristics include local ownership, physician driven, and being nonprofit.[87] Rural provider participation most probably will require coordination and collaboration with larger, urban and suburban health systems, but opportunities exist in rural settings for accountable care through improved care and sharing in cost savings.[87]

Health IT Challenges for Accountable Care

There are many health IT challenges for accountable care. "Leadership and sponsorship make a difference. Senior leaders must be engaged directly in the project work."[11]

All too often, this is not the case. There must be involvement and ownership by the leaders. Standardization and consistency must be balanced with the need for local modifications[11].

"Builders of accountable care models need to fully embrace EHRs and what they can do. Coupled with EHR use will be the mining of aggregate data over time by ACOs to become 'learning organisms' that continually identify what works best for the beneficiaries of their care."[88]

Merely having an EHR is not enough. Providers need to be able to create disease registries to help patients manage their diseases[89]. The health IT challenges are more than meaningful use of EHR. "There are three main layers of activity that will be required . . . baseline infrastructure needs, then, the transactional layer; and finally, the level of activity involving business intelligence and population analytics."[89] One of the most difficult challenges will be achieving interoperability "required for data sharing, reporting, and analysis."[89]

Delivery systems will need to develop a myriad of Health IT tools to successfully engage patients in four dimensions of Health IT.

1. Enable Patient Identification and Tracking
2. Promote Patient and Provider Interaction and Communication
3. Increase Patient's Access to Personal Information and Self-service Capabilities
4. Encourage and Support Patient Self-Care Activities[90]

Biomedical Informatics as a Key to Accountable Care

In considering what accountable care is becoming, its critical aspects, and how successful integrated delivery systems embrace accountable care, one can easily determine that in putting all the pieces together for a healthcare system to successfully function under health reform and accountable care, biomedical informatics will play a key role. Being accountable

for what one can track, value-based purchasing, episode-based performance and payment, payment for quality and efficiency, all require some form of informatics.

EHRs will be important, but they will not accomplish everything that will be needed for healthcare delivery systems to be truly accountable[91]. Coupled with clinical decision support systems, interoperable EHRs can facilitate the development of effective patient-centered medical homes, a cross-collaborative team approach to healthcare delivery, in the context of high-performing primary care. Electronic tools such as web-based tools with information for physicians coming from multiple sources will be important, along with disease registries, analytics, and electronic care management tools.

Clinician report cards and dashboards will be useful tools in accountable care. Their makeup will, in large part, be drawn from data obtained using principles of biomedical informatics. Clinicians will need additional training from academic medical centers which provide much of the biomedical research from which the principles of biomedical informatics are derived. In addition, academic medical centers will train many of the clinicians to participate in accountable care systems.

Successful accountable care requires:

- Clinical information and point-of-care automation
- Enterprise, master data management and integration
- Patient engagement
- Care management and coordination
- Performance management [92]

These concepts involve a transformation of delivery systems and health IT.

Health IT and interoperability will be key drivers in the establishment of patient-centered medical homes and a cross-collaborative team approach to healthcare. Patient populations will have to be managed and there will need to be self-care and community support, all of which can best happen with robust interoperable IT systems. Measurement will be important to improve performance. Thus evidence-based medicine and clinical decision

support systems will be necessary to benchmark and improve performance. Case management and individual care plans will become an increasingly greater part of accountable care, and the principles of biomedical informatics will rise in importance. Telemedicine and eHealth will be employed to a greater extent in the emerging models, and their success will depend on informatics.

Patients will need to take more responsibility for their care. They will need to access their laboratory results from the internet. Both they and their clinicians will need clinical reminders. Patients will need to participate in managing their own care through telemonitoring, education, and self-scheduling.

Financial monitoring and incentives will permeate successful integrated delivery systems providing accountable care under health reform. How the incentives are chosen, how they are implemented, and what actions they seek to encourage or discourage will in many instances determine the success or failure of systems. Informatics will provide much of the building blocks for these models. Transparent financial incentives will need to be aligned across clinicians and hospitals in the delivery system. Physicians will have to know what is expected of them with respect to performance measurement and quality. Certain incentive payments should be based on keeping patients well, and not for providing more care, as in the current fee-for-service system. Incentives should be applied across the health system as a whole, the hospital and medical group level, the medical group level, and the physicians responsible for the care of the patients and the individual outcomes.

Incentives should be aligned. Clinical practice guidelines should be blended into the flow of clinical work, including at the bedside, adding them to checklists, order sets and clinical flow sheets. Physicians should be able to adapt these clinical practice guidelines for a particular patient, and the financial incentives should be the same across all payers.

Clinical integration is about the principles of biomedical informatics, and clinical

integration is a key to the success of ACOs. As clinical integration involves an active and ongoing program to evaluate and modify practice patterns by clinicians, a high degree of interdependence and cooperation among physicians to control costs and ensure quality will be necessary.

Conclusion

As noted above, much can be learned from those health systems which effectively manage care for which they are accountable. Whether a system is anchored by an academic medical center, a nonprofit integrated health system, or a physician-led system with an effective patient-centered medical home model and an ability to manage acute episodic care, certain key elements for accountable healthcare delivery systems emerge. An accountable integrated health care delivery system may employ physicians, link them by clinical integration, or both.

Rather than having incentives for physicians to treat as many patients as possible, an accountable care system's physicians incentives should be treating patients and keeping them well. It should employ the alignment of incentives in which the clinical processes are evidence-based and standardized. The systems may be closed or open, but in either case, they need to hold their clinicians accountable for the care they provide and measure and monitor it in a transparent way. It cannot focus on maximizing physician compensation through fee-for-service medicine, but must focus on patient-centered care. Ideally, its incentive based system would align incentives among hospitals, health plans, and clinicians, and provide for a common set of performance measures across all payers.

Many forms of accountable care may be key to health reform, including value-based purchasing, episode-based performance measurement and payment, payment for quality and/or improved efficiency and payment for chronic disease state management. The United States healthcare system is at a crossroads in quality. As noted above, successful health reform must

involve accountable care and payment for quality. To facilitate this occurring, successful health systems will need to employ shared governance and have effective physician leadership. There will need to be a performance-based concept of medicine and the extended hospital medical staffs should be engaged. Knowledge management and patient engagement will be further keys to the successful implementation of accountable care by health systems.

Health plans and other purchasers of health care will have to implement innovative strategies to influence the quality of care. Merely continuing the current fee-for-service model will not suffice. Accountable care systems will take many forms, but most successful ones will have similar characteristics. All will have to incorporate principles of biomedical informatics. Medicaid managed care and the Medicare ACO program should further the movement toward accountable care. Clinical integration will be a key to the successful implementation of many of the concepts of accountable care.

Finally, the role of biomedical informatics in accountable care is paramount. EHR, clinical decision support systems, web-based tools, disease registries, analytics, and electronic care management tools will facilitate accountable care's implementation and adoption. Healthcare IT, financial monitoring and aligned incentives, and clinical integration all rely on principles of biomedical informatics. The future of the United States healthcare system depends upon the successful development of the principles of biomedical informatics to ensure greater quality and more cost-effectiveness in the delivery of healthcare.

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