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***Briefing Notes:***  
**Improving MCO Information Systems to Enhance  
Clinical Management**

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**Introduction**

*Managed care would be impossible without computers.  
It's barely possible with computers—Edmund X. DeJesus  
(1999)*

As most businesses in the private sector have become increasingly information based, the health care industry has yet to fully catch up. The long-term sustainability of the industry, however, demands that current information-technology (IT) systems begin to capitalize on the recent technological advances. Most notably, the systems used by managed-care organizations, hospitals and providers must establish a plan to link their information systems with the delivery of clinical care. Although financial and organizational investments may be large in order to implement real change, it is clear that to truly improve patient care in the industry, these investments are needed now.

Medical directors from across the country met at the Empower Summit in Dallas to discuss challenging, pertinent questions about their roles as physicians within managed health care organization. They focused on what they as medical directors could do to develop strategies and explore possible solutions to the problems—or at least start discussions that will someday lead to a solution. This briefing note summarizes the results of conversations that occurred at the Summit and continuing on-line dialogues on this important topic.

This briefing note addresses the topic of health-plan information systems and their link to clinical-care management. The first two sections outline the importance of this issue and describe what medical directors said about it at the recent Empower Summit. The following section focuses on some of the factors pushing toward success or failure. The last section describes a few proposed strategies that MCOs, medical directors and the health care industry as a whole could employ to implement a workable information system that facilitates delivery of high-quality clinical care.

## Overview of the Issue

There are four key issues that highlight this topic's importance:

- Health care IT development has not been used to its full potential.
- Implemented IT systems are not providing increased efficiency and productivity.
- Diversity in systems has led to high levels of complexity.
- MCOs are also lagging behind in IT development.

Information technology has grown in leaps and bounds over the last few decades. For the most part, health care organizations have embraced at least some of this growth. Surprisingly, managed care has not fully capitalized on the IT revolution despite the industry's need for integration, flexibility and efficiency in information systems. Health care IT investment has "more than tripled during the '90s, with annual expenditures for products and services rising from \$6.5 billion in 1990 to a projected \$20.4 billion in 2000" (Dorenfest, 2000). Yet this investment may only have produced "a highly redundant system that added substantial cost, produced little benefit and could be said to be analogous to going to a plastic surgeon to treat liver cancer" (Dorenfest, 2000).

In a world where time equals both money and lives, moving from a paper-based system to an electronic system is critical. Some researchers suggest that physicians' fear of technology is the major obstacle to wide-scale adoption of new technology. This proposed phobia may be part of the problem, as is evident in the numerous paper records systems that remain intact even while new IT systems and procedures emerge. Redundant processes play a greater role here, as "work processes that required one step when carried out manually now require two or three steps" (Dorenfest, 2000). The continuing use of old legacy systems adds layers of further complexity as a whole. Rather than use IT to simplify procedures and create efficiencies, new investments have often resulted in higher costs without increased productivity—about 25 to 50 percent of a typical hospital's operating costs come from these redundant work processes.

The diversity of the systems used also adds to the increasing inefficiency in IT systems. Dave Garets and Matt Duncan (1999) state, "just about everyone in our industry has a different definition for 'enterprise system' or 'computer-based patient record' (CPR) or 'electronic medical record' or many other terms." Extrapolating this kind of diversity from the conventions of one IT instrument to the divergent needs of hospitals, providers and MCOs reveals the intense complexity that pervades the entire health care industry.

MCOs are not as fully IT-developed as might be expected. Mark Hagland finds that while one might expect MCOs to be "far ahead of their hospital counterparts in the information-technology race," this is not the case. MCOs are "just beginning to push beyond traditional technology claims-processing functions and move toward capabilities to support efforts at member- and operational-data analysis, population health management, member segmentation, disease management, outcomes

reporting and personalized service” (Hagland, 1998). The technological “growing pains” experienced by hospitals and clinicians are occurring in MCOs as well.

**Case Study in IT Systems and Clinical Data**

A major facility contacted its large, Southern contracted MCO to investigate denial rates at their institution. They contacted the MCO in order to drill down to the root cause of these denials by investigating denial rates by doctor and diagnosis and to find each doctor’s ratio of admissions with denials to their total admissions. The MCO did have a standard report, which identified admission records that contained denials of either increased numbers of days in the hospitals or admissions to the facility. Thus, it seemed that the data request should not have been too unreasonable to complete. Nevertheless, the MCO could only do a partial analysis, as the MCO was unable to locate the exact data requested given the IT system capability. Without executive reporting or specific querying abilities, the root cause of the problem remained an unanswered question for the MCO and the interested facility.

***What Do Medical Directors Think About This Issue?***

This issue presents a “different kind of challenge” for the health care industry. The group suggested that there are five main elements that must be addressed and understood in order to move forward and increase the efficiency of health care IT systems:

- The Acquisition of Data
- The Organization of Data
- The Standardization of Data
- The Delivery of Data
- The Use of Data

Medical directors clearly envision this topic in terms of data rather than in terms of systems. Data is the main driver toward success or failure of health plan information systems as even quality systems cannot be efficient if data is inadequate.

***What Gets in the Way?***

The group noted a list of obstacles or barriers in establishing effective information systems to help improve clinical care. These obstacles were identified because taking action to weaken them could lead to progress. Obstacles include the following:

***Limited Connections***

One barrier that became evident was the lack of clear connections among the various stakeholders in the industry. MCOs face incredible difficulties integrating and connecting the various players, as each provider uses a different system with a unique way of categorizing, collecting and reporting data. It will take large

investments of resources—time, energy and finances—to bring all the parts together.

#### Case Study in Disparate Data

After a recent article in the *Journal of the American Medical Association* investigated the use of psychotropic drug use in children under the age of 5 years, a medium-sized health plan in the Midwest requested data from the pharmacy database. The data pulled from the pharmacy system suggested that there was an issue to investigate, yet the data itself led to additional questions, and required additional data requests from the linked database to dig deeper into the issue. Furthermore, the more data that was gathered, the more it became clear that there were underlying issues in the actual data—e.g., it was found that some prescriptions were written for parents or older siblings. Overall, a “data pull” request for a simple hypothesis became a larger, more complicated process taking several months and needing an extensive amount of data cleaning simply to make any sense to move forward.

### ***Up-front Investment***

At the same time, any kind of investment in IT reform requires a large up-front investment of cost and capital resources, which most health care players do not have readily accessible. These investments carry a large risk and must be made carefully, which may lead some stakeholders wary of committing any resources until clear benefits have been proven—something that will definitely take some time. Thus, this large capital cost may cause some more risk-adverse institutions to act much more slowly than the situation requires. Furthermore, engagement of the top is critical for any reform to happen. The investment has to be an “all-or-none” endeavor, as failure is guaranteed if insufficient funds are allocated.

### ***Coordination of Data***

Not only does the coordination of stakeholders and systems have to occur, but the coordination of data will also be required. Data standardization will be a significant step, albeit a highly difficult one. As many medical directors have stated, “We’re data rich, but information poor.” With all of the diversity of systems and uses for data, a large amount of data is available. Nevertheless, right now the data is not being used effectively, and it does not lend itself easily to integration or action by physicians or MCOs. The simple infrastructures necessary to coordinate data are lacking—inadequate, insufficient, legacy systems exist in many institutions. Without a streamlined pathway on which data can travel, it will be impossible to use that data to improve clinical care.

While medical directors might aim to create a perfect system, there are also immediate data issues that need to be handled. The issues described above require that action be taken as soon as possible, even using the inadequate systems that are currently in place. Nevertheless, the end goal of optimization must always be in sight, for some of the problems with the current system are a result of players using existing systems rather than adopting systems that are new and those that have been proven to work.

### ***Clinical Versus Claims Data***

One of the biggest challenges to standardizing both data and systems will be the coordination of the two most significant data sources—clinical and claims data. As one medical director described, there are two flows of data, “One is the clinical—tests ordered, results, communication with the patient and a result that the patient felt served and the physician was of service. The second is transactional—the bill, claim and collection data.” In his view, the first flow of data adds value to the service being provided (i.e., care), and the second does not. Currently, however, MCOs use the second set of data to arrive at clinical decisions and conclusions, using a non-value-added process to add value to the process. As he states, “we got it backwards.”

It is clear that even with the depth of information available as mentioned above, some of the most important data are still inaccessible to MCOs. Improving clinical care requires access to patient information, something that MCOs do not currently have access to with any consistency or regularity. As explained above, MCOs mainly handle payment data, while physicians deal primarily with clinical information. It is unclear whether these two sets of information can be integrated, or whether the existing set of information can be used for cross-purposes. Some believe that claims data holds the promise to be standardized enough to be usable for clinical decisions, but most medical directors are certain that clinical data are necessary to make fully informed decisions. As one stated, “If we don’t know clinical parameters and only have claims data, it’s hard to reconcile with patients and outcomes.” Cost data from the claims system are still critical and cannot be fully divorced from data-collection systems as a whole. One medical director believes that two “universes” of data need to be created and maintained in parallel—a claims data set and a clinical data set—and that both should be complete and accessible to all major players in the industry.

In addition, the claims data that are used may not be optimal for even the most elementary uses. MCOs may not have access to the data they need for decisions until it is too late because of the lags inherent in the insurance industry.

### ***Ownership of Data***

MCOs need to decide who produces the data and for what purpose. There is an assumption that health plans should be responsible for data production and the building of the data warehouses and that doctors do not have any reason or incentive to engage in this task. Nevertheless, there are benefits for doctors to produce and store data, particularly if data can be available on a real-time basis. If an incentive can be created to engage physicians in this effort, then some of the issues of connectivity and diversity may be less difficult to handle in the long run.

One medical director believes that health plans will never be able to meet the clinical data needs of physicians in their offices. They may be able to standardize clinical systems and support the doctor's data creation efforts, and then through this process receive the data they care about. Concurrently, each physician's office may be connected with several different MCOs. If each MCO created a different standard system, then each provider would be responsible for any number of reporting mechanisms. He noted, "If each health plan supported a different [IT system] for the doctor, it could be envisioned that a row of computers longer than a parking lot would be necessary" for them to complete their clinical data reporting requirements. Thus, the two stakeholders are intertwined, and the responsibility for the data and the system remains unclear.

### ***Defining the Business of MCOs***

MCOs will need to define themselves clearly in the health care industry. Right now, they straddle two disparate roles—one of insurance costs and claims and the other of health delivery and clinical management—and neither one fits very well. If MCOs are mainly insurers, then they must ask themselves if they should be getting in the business of clinical care. By determining exactly what business they are in, MCOs can better define the data that they need to collect. For example, health plans that want to focus on health delivery should concentrate on physicians and clinical data, while an insurer should focus on risks and costs.

In addition, internal communication within health plans can complicate efficient reform of data systems. Some have noted that physicians and CEOs have different styles of communicating, which can create unnecessary tension between the two. These different communicating styles can lead to heightened tension and a lack of action, as medical directors view investment in technology as essential, while CEOs tend to be less enamored with the capabilities and possibilities of desktop population analysis. Further, medical directors believe that their CEOs may not see the value in such a large investment and think that data and IT systems issues are as critical as they are on the frontline. In the end, it is less likely that quality information systems will be successfully implemented. Defining the business of MCOs may help to convince CEOs of the potential value of these efforts.

### **What Can Help?**

The group also discussed a set of helpers or driving forces that could work to develop high-quality integrated information systems that improve patient care. Some driving forces are mentioned below.

### ***Standardization is Necessary***

Increasingly, the industry will require the development of actionable guidelines, which is a major impetus for reform. There are a few different standardization movements that are beginning to transform the industry. For example, the lab

industry has standardized their coding systems so that any data imported to a provider or an MCO system are understandable nationwide. In order to translate dollars into disease, a standard way of communicating about outcomes and costs must be developed. As one medical director stated, “with guidelines for data, you’d have actionable stuff. Theoretically, if we all measured in the same way, we’d all be getting the same data.” As a result, both costs and clinical outcomes will be clarified.

The standardization effort that Health Insurance Portability and Accountability Act of 1996 (HIPAA) is undertaking can also serve to drive the health care IT systems to increased efficiency. These guidelines for coding will help the industry speak in a more unified voice and can potentially simplify the creation of data warehouses and querying applications. HIPAA should be the minimum standard, however, as many medical directors feel that the bar must be set much higher and must include other core elements of clinical management for a full integration of pertinent data sets.

### ***Harnessing Market Power***

While there may currently be lower than optimal incentives for providers to implement quality information systems, it appears that market forces are changing and are indicating an increased need to innovate and use technology efficiently. The old system rewarded inefficiency, such that there were few incentives to become more efficient. For example, the fee-for-service system decreases incentives to practice medicine more efficiently and thus implement clinical information systems. Things are changing, however, such that the market is creating new incentives and pressures to improve efficiency. In this new system, as clinical information systems begin to show increases in revenue and efficiency gains, most industry players will move immediately toward implementation.

It is important to note, however, that change is difficult for any organization. Further, in this industry, the more tradition-based elements have been defining the rules of the game, rather than allowing the market forces to drive toward innovation. As noted above, medical directors will need to demonstrate that the old system is not optimal and that moving to a new paradigm will be necessary. Some medical directors believe that “those who think MCOs only do sales and claims will be gone in ten years. It’s easy, if you don’t use the clinical data for what it can do, then you won’t be a player.” Medical directors can take the lead in realigning physicians, providers and their MCOs in designing systems that respond to market challenges.

### ***Power of Metrics***

Standardized, clarified data can also help drive toward the implementation of clinical information systems, as the data can be used to show metrics and outcomes for actionable causes. The industry can capitalize upon data’s primary uses to help move the industry forward to a more optimal situation. For example,

clear outcome data can help with decisions about hiring physicians—they will prove their value through actual facts about pertinent variables. Marketing the health plan to employers can be improved with solid metrics, as MCOs can say with confidence, “If you get sick, you’ll get the best care through us.” Without these metrics, it is hard to determine which physicians are better than others and to prove to employers that your health plan is the best value in the market. Furthermore, usable data can help with benchmarking and credentialing in establishing meaningful guidelines for the industry.

Actionable, clear data can also be used to determine root causes—either in clinical care or in business management. With the current data, only the first-level causes can be identified, but an improved data system will let you take the next step and dig deeper into problems. This has large implications in the investigation of return on investment (ROI). Comprehensive disease management has promise, but it has been difficult to show its real value in terms of outcomes and costs. Managing systems and data will help to evaluate ROI and assist in long-term cost reduction.

#### Case Study in Usage of Data

Any investment in clinical-care processes requires an identification of the return on the investment, particularly because the original investment requires significant up-front capital from the MCO, and the return itself is usually indirect and difficult to measure. As a result, MCOs are wary of investing in disease-management programs, and this slows the implementation of key initiatives. One MCO experienced this dilemma firsthand when it tried to adopt a new model of care—group patient appointments.

The model’s intent was for patients to spend more time with their doctors and thus improve patient and doctor satisfaction with the interactions. To implement the model, however, required a financial investment in marketing costs and the addition of a behaviorist. Outcomes of patient and physician satisfaction were measurable, and in a pilot program, were found to be positive. Yet costs of the program (measured in dollars) and benefits (measured in satisfaction) were not comparable with each other; thus, the MCO had major difficulties bringing the pilot to scale.

### ***Switching the Locus of Power to the Member***

One potential driver that is often overlooked is the payers themselves—the patients and employers that are purchasing health care insurance. Members with access to reliable and complete information can change the rules of the game and begin to move the industry in new directions. As the rules change and new systems are demanded in this member-centered world, provider networks may be reduced or eliminated, and the primary responsibility of care management may shift to the payer. For example, patients may demand access to their patient records, forcing the creation of an electronic record or a portable patient history—something that MCOs have an interest in helping to create.

A current iteration of this new paradigm is the “defined-contribution model.” In this model, payers choose their level of involvement and decide how much care they want to purchase by using information in a published directory of doctors and services. If this system is more universally adopted, physicians will have to prove their value and their prices through outcomes and metrics, thus increasing the demand for an integrated, workable data system.

## Strategies for Change and Managing Dilemmas

The group identified a number of options for overcoming obstacles and making progress. Although there are no easy answers, and taking action steps both small and large will be a major challenge, there are some strategies that the industry can implement to start moving in a positive direction. The major strategies identified and the background literature are organized by level of complexity and cost and discussed in detail below:

Lower Complexity or Cost	Higher Complexity or Cost
<ul style="list-style-type: none"> <li>■ Focus on both the details and the big picture—clarify the mission.</li> </ul>	<ul style="list-style-type: none"> <li>■ Bring the data to the doctor's desktops and begin to collect data at the point of care.</li> </ul>
<ul style="list-style-type: none"> <li>■ Create dialogues and conversations between key stakeholders, including CEOs.</li> </ul>	<ul style="list-style-type: none"> <li>■ Build an actionable database/data warehouse/data mart.</li> </ul>
<ul style="list-style-type: none"> <li>■ Use new technologies to create innovative solutions.</li> </ul>	<ul style="list-style-type: none"> <li>■ Move from a cost-management orientation to a care-management orientation.</li> </ul>
<ul style="list-style-type: none"> <li>■ Find external resources for financial support.</li> </ul>	

In general, these strategies involve integration and linkages among players—and medical directors recognize that any action that needs to be taken cannot be accomplished alone. Interfaces between providers, hospitals, MCOs and patients can occur through data marts, technology solutions and deliberate discussions among major stakeholders, and these connections will provide the keys to action.

### ***Lower Complexity or Lower Cost Strategies to Implement***

#### *Clarify the Mission*

An easy first strategy will be for medical directors to focus both on the details and the big picture simultaneously. Medical directors should examine this issue from a larger perspective, determining what they want the future to look like and helping each health plan to come up with a clear, actionable mission that defines what it wants to do about data and information systems. Additionally, the larger vision should incorporate the details; figuring out what the ideal system looks like will help define and clarify the steps necessary to move toward that point. Incremental solutions will only happen if the endpoint is clearly and definitively defined. This requires both a clear definition of the big picture and a specific understanding of the detailed steps that are required along the way.

#### *Open Dialogues*

Another important strategy involves the creation of new conversations among key stakeholders in the industry—medical directors, providers, networks and the CEOs of health plans. The dialogue that was undertaken at the Summit served as a useful step in thinking about this issue, and the medical directors believed these dialogues could help the industry as a whole. This group suggested that a cross-

industry conversation among key players be a first step. Because one of the major barriers to this issue is the diversity of data sources and systems, there is an inherent advantage in bringing the stakeholders to the same table. Finding commonalities and discussing strategies for the future would help all players and serve to define both how data sets could be used and ways in which these data can be made more actionable. Among single players, these actions might be difficult; together, the capacity for change can be created.

The CEOs will be important in these dialogues. As mentioned above, internal negotiations are as important as external conversations. CEOs should engage in these discussions so they will fully understand the issues and the values at stake.

These dialogues should include discussions of standardization, similar to the work done by the pharmaceutical industry. It may be optimal to wait until the HIPAA standard coding system has emerged, as this will help with a preliminary clean up of data and data warehouses. The goal is to create full sets of standards that make sense for every player, and thus it will be important to engage as many of the players as is possible. This can also include the creation of a physician-executive taskforce that examines the impact of HIPAA on clinical management and decision support.

### *Capitalize on New Technology*

A major strategic step will be to start using the available technology to help find innovative solutions for the industry. Because the health care industry has not taken full advantage of the previous technology revolution, it is crucial that they do not miss the current one. There are a number of new, emerging technologies that can provide clear efficiencies for providers and MCOs and serve to integrate incompatible data, varied stakeholders and diverse IT systems.

The Internet is a technology that should be more fully used. As one medical director stated, "The Internet is the great interface engine." It is already linking the multitude of stakeholders in this industry, and differences among these players can be managed much more effectively through this widely available interface. For example, a universal application that is housed online (rather than in each provider's arena) can help bypass legacy systems and integrate disparate data sources. Suggestions about these applications include a Web-based, business-to-business site that links providers and plans to communicate data performance. The Web can make connections, create stronger linkages and facilitate a more efficient flow of data, and the group agreed that it might be one of the best places to focus immediate energy on, particularly as the technology revolution marches forward.

In addition, some of the newer technologies hold potential for innovative solutions. Wireless and hand-held technologies can help bring data into the hands of the providers in real time. Updated patient information, for example, can be shared between the various doctors and MCOs responsible for that individual's care through wireless hand-held computers.

Addressing the cost barriers involved is crucial to this strategy. It has been suggested that these issues may be less formidable than they appear. It is possible that the adoption of the technology will serve to reduce costs quickly, and thus the provided technology will more than pay for the initial investment. This, like return on investment in clinical care, is quite risky; therefore, the average provider or MCO may not be as apt to undertake these actions in the current environment. One proposition is to use transactional-based systems with applications on a common server. Physicians who use the system pay a fee per episode rather than a full up-front cost, sidestepping issues of initial capital expenses.

Developing and utilizing these new technologies will take work and financial investment. The benefit in providing technology to doctors should be a stronger partnership between providers and MCOs. If the technology is made available to physicians, then physicians should make clinical care data available to MCOs. In this way, the investment can serve a number of purposes simultaneously.

#### *Locate External Resources*

A final strategy that may be less costly to implement is for MCOs and medical directors to begin looking for resources in different areas. Financial and organizational support may be available, but not in the usual places, particularly as belt tightening within the industry becomes more common. Because resources are limited, particularly those of providers and MCOs, it will be necessary to be innovative in finding potential investors for this costly process. It has been suggested that external stakeholders—those with intimate connections to the health care industry but with better access to resources—should be engaged in this process. Pharmaceutical firms are one such option.

### ***Higher Complexity or Higher-Cost Strategies to Implement***

#### *Data to the Doctor's Desktops*

The most attractive strategy to medical directors at the Summit was working to connect physicians to information systems at the point of care itself.

*What we need ... is a reporting mechanism that comes to our table that can help us to get answers to our immediate and ongoing queries. We need something that works like this: Successive approximation through successive queries.*

As previously described, current data-collection and dissemination systems are inefficient and inadequate in meeting the needs of doctors and MCOs. As one medical director stated:

“We want to get information and be able to delve into it more deeply. Right now the process is too slow, and I often get data that is not what I wanted. Right now we have to go to someone in IT, ask for a report, get the report weeks later, find out that its not what I wanted and then go back to IT over and over again.”

Medical directors agreed that a main priority for increased efficiency is to bring data directly to the doctor’s desktops. They pointed out that bringing the computer into the exam room is one step, but that connecting this system to medical directors at MCOs will also improve the process. Not only will this enable doctors to access data and use it in actionable ways, but it will also begin to forge connections on clinical data between doctors and MCOs. Each doctor can become a true researcher and can gain power with the ability to mine data across plans.

### *Building an Actionable Database*

The medical directors concurred with the literature: one of the most important steps in beginning to reform health care IT systems is to build a complete, standardized warehouse of data linked to as many of the major health care stakeholders as possible. Medical directors believe that this database can help to both 1) improve clinical management, and 2) document clear outcomes and return on investment for marketing purposes. Stated differently, MCOs want to demonstrate to providers that managed care and efficient data systems can improve outcomes and help to provide high-quality, cost-effective care. A data-warehouse system, as part of an integrated health care system, can be successfully used for many purposes—patient care, health-services research, resource utilization and feasibility studies (Myers et al., 2000). Using systems such as data warehouses, providers and MCOs can extract, manipulate and publish data in meaningful ways, helping to alter medical-treatment processes effectively and improving patient care (DeJesus, 1999).

Priorities for this data mart vary. A quality data mart should have a large volume of data; it must also be specific to clinical care and employ effective querying tools.

### **Conclusion**

For the health care industry to begin to accomplish many of its key goals, it will need to invest in technology and bring it much more fully into its operations. Improving clinical care, reducing costs, decreasing medical errors, improving efficiency—all will depend on a fully functioning, up-to-date, highly connected and appropriately standardized information system. MCOs will need to address the disparate data sources of clinical and claims data and ensure that they do not lose out on the merits of either. Medical directors will need to expand their discussion to include providers, CEOs and external audiences, as each stakeholder may have a different perspective, different requirements and different perceptions of the optimal solution.

An ideal information system for the health care industry is still a long-term goal. Because sound information systems provide the foundation for many of the necessary steps that the industry will be taking in the future, it is critical that work begin now.

## References

DeJesus, Edmund X. "Managing Managed Care." *Healthcare Informatics*, March 1999.

Dorenfest, Sheldon. "The Decade of the '90s." *Healthcare Informatics*, August 2000.

Garets, Dave, and Matt Duncan. "Enterprisewide Systems: Fact or Fiction?" *Healthcare Informatics*, February 1999.

Hagland, Mark. "Managed Care Systems: Putting the Pieces Together." *Health Management Technology*, April 1998.

Martin, Ross. "Values and the Application of Information Technology." *Managed Care Interface*, February 2000.

Myers, Dennis L., Kimberly Christie Burke, Jack D. Burke, and Kim S. Culp. "An Integrated Data Warehouse System: Development, Implementation, and Early Outcomes." *Managed Care Interface*, March 2000.

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