

HealthGroup

W E S T

*Advisors to
Cardiovascular
Management*

Gaining a Competitive Advantage through CVIS

*An Executive Guide to the Top Strategic Uses of
Cardiovascular Information Systems*

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An Executive Guide to the Top Strategic Applications of Cardiovascular Information Systems

Introduction

Considered as a whole, the annual cost of treating Americans with CVD currently exceeds US\$240 billion, which is the most spent on any single disease category. The indirect cost of CVD is just as staggering—each year the morbidity and early mortality attributed to CVD represents a drain of over US\$150 billion from the U.S. economy in the form of lost worker productivity. This is a huge burden borne by U.S. employers and reduces American competitiveness around the world. With these resources at stake, any technology that can aid in improving quality and reducing cost of cardiovascular care stands to make an important contribution to both the health and the economy of the nation.

Now more than ever providers of cardiovascular care need to be able to document that their actions improve the health of their patients and save the country money in terms of increased worker productivity.

Fortunately, there are a growing number of information management tools proven to help hospitals and physicians reap these rewards.

Credible, Defensible Data

In cardiovascular care, whether you are linking costs to outcomes, establishing fair-market compensation for a joint venture or other economic partnership with physicians, or negotiating performance-based compensation, a common element of all of these

efforts is the need to build a foundation of credible and actionable information. The key to assembling and maintaining this information is the effective deployment and management of a CVIS—cardiovascular information system. Unfortunately, less than 15% of hospitals in the U.S. have a robust, integrated CVIS solution for their cardiovascular programs, which (next to radiology) is the largest producer of patient clinical and financial data. This effectively handcuffs many decision makers and exposes an institution to significant risk if it acts upon faulty data in its dealings with physicians, insurers companies, government agencies, and other entities.

Identifying Your Solution

In response to the need for sound advice and analysis on how hospitals and physicians can use CVIS technology to improve the quality and profitability of cardiovascular care we are publishing this white paper. Our intent is to provide cardiovascular leaders with a framework to evaluate the appropriateness—and the cost—of pursuing a variety of different CVIS strategies in their own institutions. There are numerous

opportunities for hospitals and physicians to use CVIS to improve the quality of their services and their competitiveness. But it does require an up-front investment of time, money and effort. Those that make this investment will inevitably control their markets and become more profitable as a result. We have

observed in many instances that through CVIS-driven initiatives hospitals can increase market share while simultaneously reducing their cost per case. Proper application of CVIS tools can make the difference between generating a profit and running in the red.

Dramatic Underuse of IT in Cardiovascular Healthcare

Healthcare information technology offers the potential to address one of the most critical issues facing the nation today: rising health care costs that are spiraling out of control and endangering the soundness of the overall economy. Healthcare information technology also promises to dramatically improve patient safety by preventing unnecessary deaths and medical errors, thus leading to hundreds of billions of dollars in cost savings and reduced litigation.

Single Most Important Category

In U.S. healthcare no other single disease category exceeds CVD in terms of financial impact. The total cost of cardiovascular diseases and stroke in the United States in 2005 is estimated at \$393.5 billion. This figure includes health expenditures (direct costs, which include the cost of physicians and other

professionals, hospital and nursing home services, the cost of medications, home health care and other medical durables) and lost productivity resulting from morbidity and mortality (indirect costs). By comparison, in 2004 the estimated cost of all cancers was \$190 billion (\$69 billion in direct costs, \$17 billion in morbidity indirect costs and \$104 billion in mortality indirect costs). In 1999 the estimated cost of HIV infections was \$28.9 billion (\$13.4 billion direct and \$15.5 billion indirect). Clearly, any initiative that can directly improve the delivery and management of cardiovascular care has the potential to deliver dramatic financial and clinical results. These benefits accrue at various levels—to patients, providers, and payers (public and private)—and reflect a real need for collaboration among the various parties. This collaboration is only just beginning to occur, as policies and software capabilities continue to evolve and adapt

Operational Definition of CVIS

The healthcare and information technology fields are both awash with acronyms and jargon—and the CVIS field is no exception. In this paper we adopt the term CVIS (Cardiovascular Information System) to refer to a combination of software, hardware, and management processes designed to systematically collect, store, organize, retrieve, and analyze data relative to the care of patients with cardiovascular conditions. As such, our focus here is on the organization of clinical, financial, and operational data across multiple care settings—primarily in hospitals. While there is some overlap in these processes with the storage and retrieval of images produced for diagnostic purposes (i.e. PACS), our focus in this paper is chiefly on the non-imaging intensive functions of cardiovascular information systems.

to the needs of the marketplace. Over the long term, the potential productivity improvements created by healthcare information technology could flatten the growth curve for health care expenditures, which would also save hundreds of billions of dollars. Even modest gains in productivity could produce dramatic savings. Unfortunately, even though cardiology departments provide a major source of hospital revenue throughout the country, implementation of CVIS has been considerably slower than past projections. The results of our research indicate that as of June 2005 less than one-third of U.S.

hospitals had any type of CVIS system deployed—and even many of those are of limited capability and poorly supported.

Low Spending Priority

A study compiled by a prominent international consulting firm estimates that if medical organizations spent \$50 billion each year on information technology, they would save \$270 billion each year. Historically, healthcare organizations have spent fewer dollars on information technology relative to other industries in the US. According to a recent hospital survey by Modern Healthcare and PriceWaterhouseCoopers, the majority of respondents selected the range of 2.1% to 2.5% as the percentage of an organization's total operating budget allocated for information systems, which pales in comparison to other industries which invest a significantly larger portion of their operating budgets on information technology. In this environment of scarcity, in order to decide where to begin the

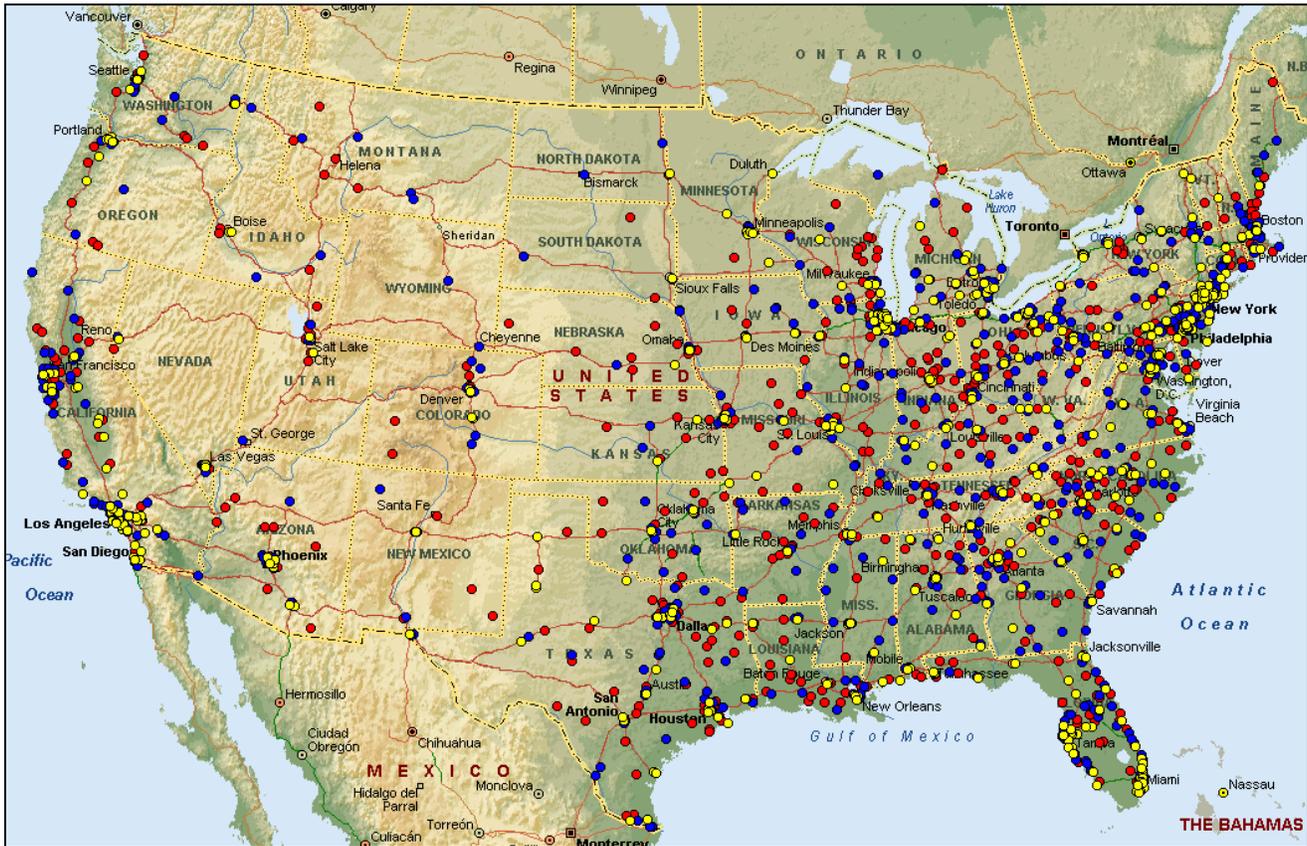
If CVIS-driven initiatives can reduce the acute treatment costs and associated morbidity of CVD by just 5% over five years, a positive impact of over \$175 billion would be realized by the overall economy.

analysis of CVIS deployment organizations need to make a careful prioritization of how to achieve the maximum impact for the lowest initial cost. While all aspects of the care of patients with cardiovascular conditions can benefit from the appropriate application of CVIS technology, there are logical reasons to focus on two primary points of care—cardiac cath lab procedures and adult open-heart surgery. This is because these two areas represent the highest cost and highest volume areas of cardiovascular care delivery. They are also both examples of very complex and data-intensive clinical programs—which continue to grow rapidly.

Explosive Growth in CV Care

In the 20-year period from 1984 to 2004 the number of hospitals offering heart surgery increased by 76%. The number of hospitals operating cardiac cath labs increased by over 94% (see Figure 1 for the geographic distribution of the programs). The information technology marketplace has noted the potential for benefit derived from improving the financial and clinical performance of cardiovascular services and responded with products specifically tailored to this market niche. While many of these products have historically overpromised on what they could actually deliver, we now appear to be entering a phase of rapid improvement and innovation in this field. In this paper we attempt to provide healthcare leaders with a snapshot of the current status quo, as well as an indication of what they should be preparing for in the future.

Figure 1 – Distribution of U.S Hospitals with Heart Surgery Programs and/or Cardiac Cath Labs—2005



Legend

- 300+ Bed Hospitals w/CCL
- 151-300 Bed Hospitals w/CCL
- 0 - 150 Bed Hospitals w/CCL

Source: Publicly available Medicare cost report data.

CVIS Customers—An Evolving Marketplace

Both the providers and the users of CVIS are undergoing an evolutionary process. As seen on Figure 2, hospitals dominate the customer base of CVIS providers. While certain versions of CVIS applications are available (and more are being developed) for other care settings—mostly large single-specialty physician practices—most CVIS vendors continue to view the hospital market as the

primary source of revenue growth for the future. According to HIMMS Analytics, standalone (31%), urban (28%), and academic hospitals (42%) have higher rates of cardiology any-type CVIS application installations (or components of such systems) than system (24%), rural (13%) and non-academic hospitals (24%). With this as a backdrop, CVIS vendors are targeting the less-wired segments of the market for

growth while also developing expansion efforts designed to: 1) further grow the cardiovascular market through development of new data modules and features; 2) enhance the connectivity of their products by tighter integration into other hospital systems; and, 3) expand into new service lines that share many characteristics with the cardiovascular market (e.g., orthopedics and some chronic disease management markets like diabetes care).

Immature Market

Because the CVIS market is evolving and immature (with periodic implosions by former market leaders)

many decision makers have found little first-mover advantage in acquiring CVIS capabilities. In this environment there have been large swings in market share and no clear winner in the field has yet emerged. While it is certainly just a matter of time before these issues sort themselves out and a degree of consolidation occurs, CVIS customers do have to consider issues related to the risk of losing the vendor support of their system in an environment of mergers and acquisitions. As new products and capabilities are developed, many will also choose to voluntarily switch to a new vendor. All of these scenarios add significant cost to the client—so careful planning has the potential to save significant resources for careful adopters.

Figure 2 – Distribution of CVIS Users

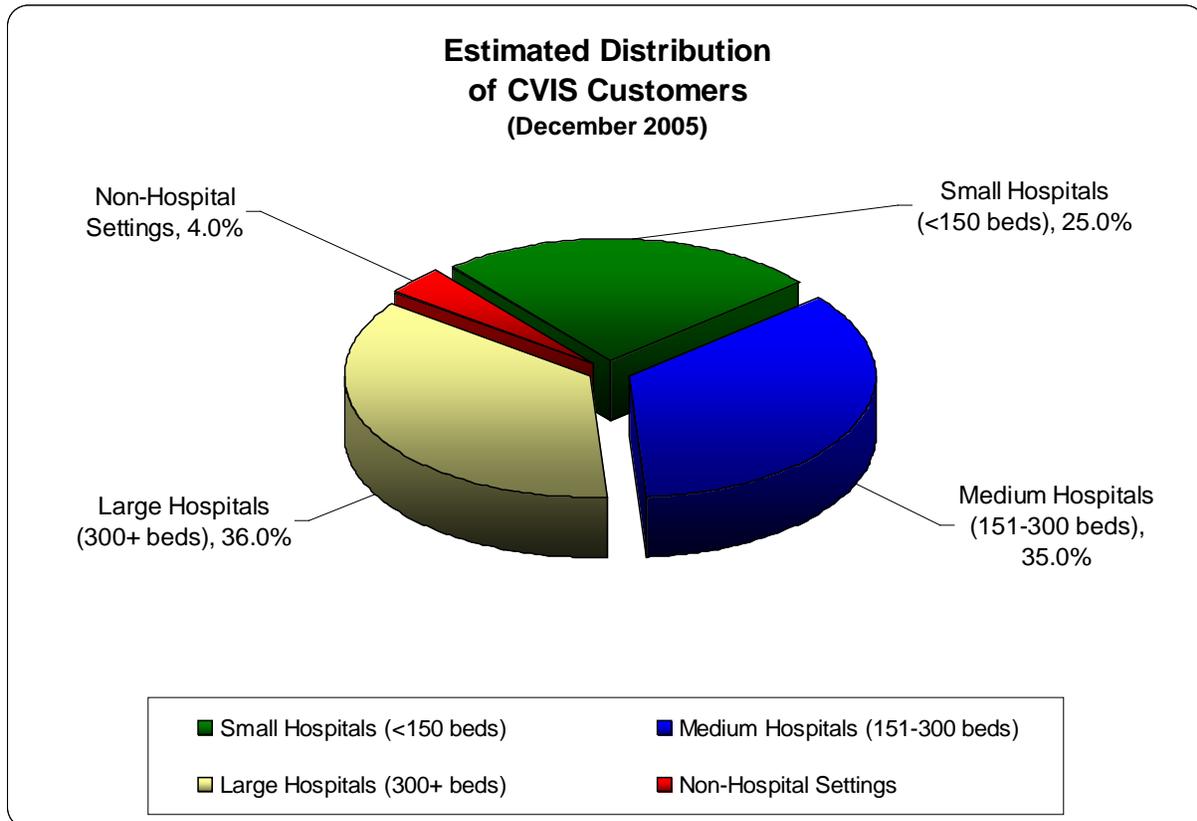
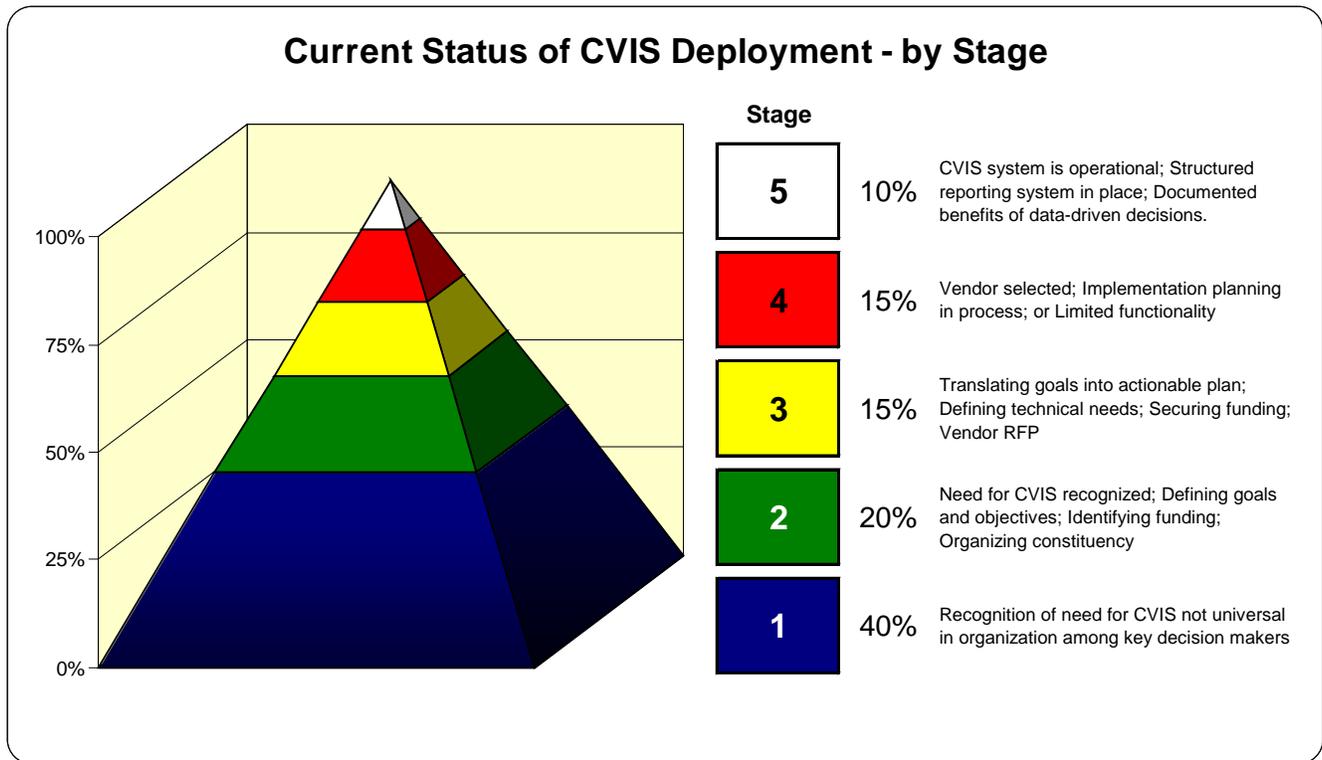


Figure 3 –Stages of Potential CVIS Customers

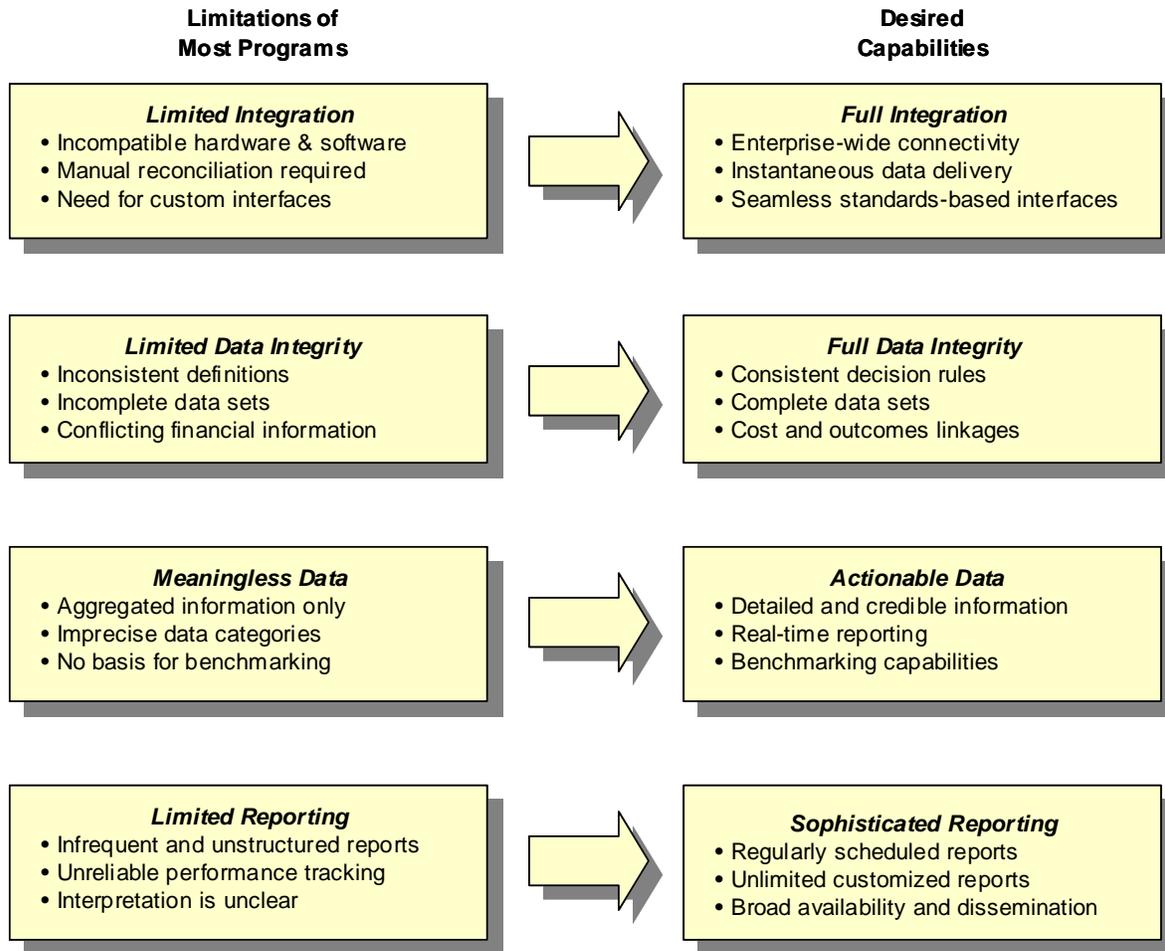


Transformational Needs

Vendor solutions—many of which have historically been very limited in terms of functionality--will need to demonstrate many characteristics to meet future requirements, such as: 1) easy physician access to evidence-based medicine content; 2) sophisticated rules engines to support quality and patient safety; and, 3) real-time and retrospective reporting to track performance against defined quality measures. In addition, health care organizations will be required to make significant technology investments to receive, analyze, report and pay health care providers based on their quality, productivity, and cost-saving targets. Errors in these systems will not be tolerated because provider payment will be based on this analysis. In essence, competitive market pressures will force

quality reporting to be a standard for those that want to be market leaders. That said, the current landscape among potential CVIS customers represents mostly potential—rather than actual—results. Only 25% of the total universe of potential CVIS customers has achieved any significant level of benefit from investment in this area, and fewer than 10% of customers have what could be described as a fully operational and maintained system. Approximately 35% of potential customers report being in a planning stage regarding CVIS implementation. Strikingly, at least 40% of potential customers have not yet achieved a consensus on the need for such a system. Figure 4 on the following page provides a more detailed analysis of the current limitations of most programs and the transformation needed to realize the benefits of CVIS.

Figure 4 – Upgrading Cardiovascular Information Management Abilities



CVIS Vendors—Market Segmentation

While still largely fragmented and immature, the CVIS (non-PACS) market is already worth approximately \$100 million per year and is projected to grow considerably as a variety of State, Federal, and private initiatives contemplate mandatory participation requirements in data aggregation, benchmarking, and pay-for-performance initiatives—processes which by their very nature will require the capabilities provided by CVIS applications. However, not all CVIS service

providers are the same; in fact there is dramatic variation in the scope and depth of products offered by vendors. Some focus on software sales only, others seek to add value through developing benchmarking registries and selling other business management consulting services. At this point, there is no clear picture on who will emerge as the dominant market leader in each category.

Market Movers

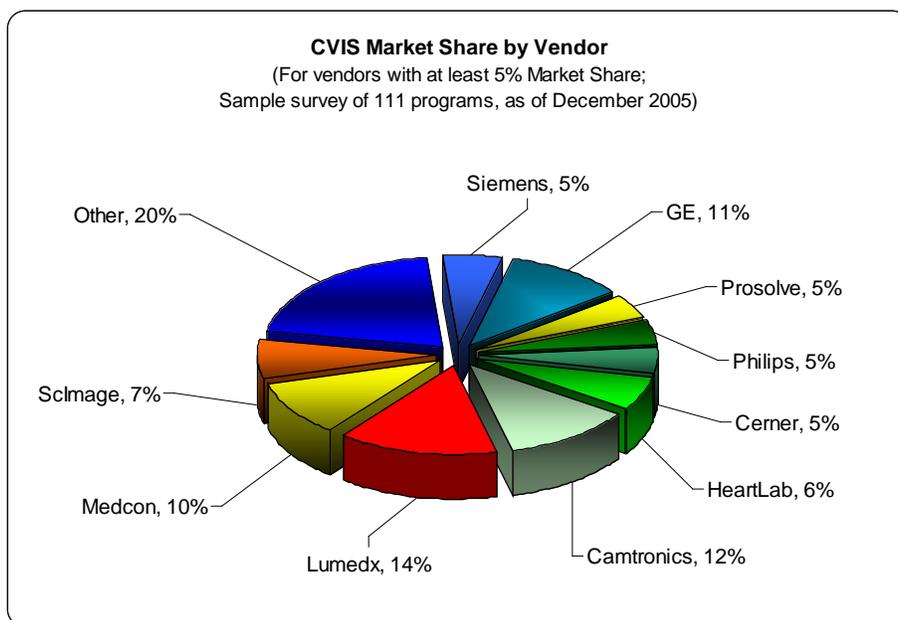
Most of the major cardiology equipment vendors have recognized the strategic value of expanding into CVIS territory. This is not so much because it is a large market in itself but rather because it is strategically important in getting hospitals to lock themselves into a full continuum of hardware, software, and services offered by a single vendor. Medical equipment manufacturers are learning that not having a viable CVIS product could be a deciding factor in which vendor a hospital chooses to go with for its next series of capital equipment purchases—which often total many millions of dollars. As a practical matter, pharmaceutical companies and cardiovascular device manufacturers are more likely to be consumers of CVIS data than developers of the software themselves.

utilization, and there are many types of organizations that could benefit from these valuable data. Some CVIS companies sell or license use of their databases for these purposes, but this is not yet widespread. Group purchasing organizations (GPOs) could undoubtedly benefit from insights gleaned from benchmarking registries (especially on the utilization and pricing side of the equation). In that sense we expect to see more collaborative relationships developed for this purpose in the future. This also extends to insurance companies, who also have a strong interest in cost containment and can leverage the value of the information for their own purposes. We expect that there will likely be a significant first-mover advantage to be enjoyed by those who strike the right relationships first, but that the advantage will dissipate over time as markets adjust to the decisions made on the basis of this information.

Adding Value to Data

Some CVIS vendors make use of their registries and databases to glean insights into product pricing and

Figure 5 - CVIS Market Share by Vendor



Mergers & Acquisitions

To position themselves in this field many equipment vendors have acquired small information technology companies. However, we have observed that in a number of instances the products that result are heavily promoted, but rushed to market and don't perform as advertised. Despite these shortcomings the medical equipment vendors have been successful (temporarily) at gaining market share because they can afford to essentially give their CVIS product away (especially in combination with a major hardware

purchase). But when the product underperforms, some hospitals choose to return to their prior small company vendors and reinstall the old system. This will change over time as the big equipment vendors improve their products or acquire mature technology through acquisition or licensing. As this happens the small niche players in the CVIS field will be faced with serious decisions. Ultimately, we expect to see significant consolidation over the next 3 to 5 years. The figure below illustrates the different business models employed in the CVIS arena and the benefits that they offer clients.

Figure 6 - Major Categories of CVIS Solution Providers

	CVIS Core System Vendors	CVIS Data Integrators	CVIS Consulting
Primary Function	Develop software To standardize data collection and generate reports	Add value to data in core systems (e.g., external benchmarking registries)	CVIS planning and consulting services (no proprietary software)
Key Determinants of Success	Size of installed base; industry reputation; new products; breadth of products; superior support & service	Size of database(s) And data collection methodologies; proprietary data	Industry reputation; vendor neutrality; value-added management consulting services
Primary Revenue Model	Software sales; installation services; ongoing service contracts	Software sales; Subscription plans; consulting; licensing fees	Flat fee or hourly rates; Some risk sharing
Industry Examples	LUMEDX; Camtronics	Goodroe Healthcare Solutions; ACC-NCDR® Registries	HealthGroup West; ADVANCE Healthcare Consulting

Note: many CVIS solutions providers provide (or plan to provide) overlapping services across these categories, including those noted here.

Strategic Management Uses of CVIS

Currently the healthcare industry is focused on developing pay-for-performance and gainsharing programs tied to cardiovascular services. Leaders of cardiovascular programs are spearheading many of these efforts through many different hospital and physician partnerships ranging from “under arrangement” cath lab management structures to outpatient cath lab joint ventures and cath lab leasing models. In all of these scenarios cardiovascular information systems play a highly important role of collecting, analyzing, and reporting cath lab and other cardiovascular-related department statistics that will be compared to the stated quality and performance benchmarks. We expect that as pay-for-performance and gainsharing programs continue to expand and be accepted, the healthcare industry will continue to witness a significant increase in hospital and physician cath lab and cardiovascular program ventures. Cardiovascular information systems will be important to the success in the application of these initiatives in several of the following key management and operational areas:

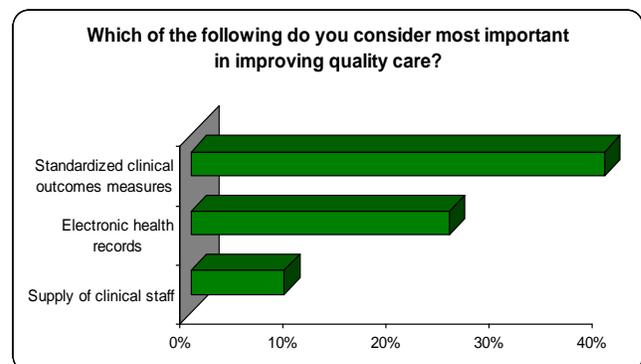
- 1) Defining and monitoring the metrics to be used
- 2) Outlining the size of the incentive
- 3) Tracking and reconciling payment distributions
- 4) Reporting the quality, cost, and productivity outcomes
- 5) Ensuring statutory and regulatory compliance

Once an organization selects a vendor and a package of services there is often a variable application of the information provided by the CVIS at different levels in the organization. Figure 8 outlines a multi-tiered approach to employing the CVIS and illustrates the far-

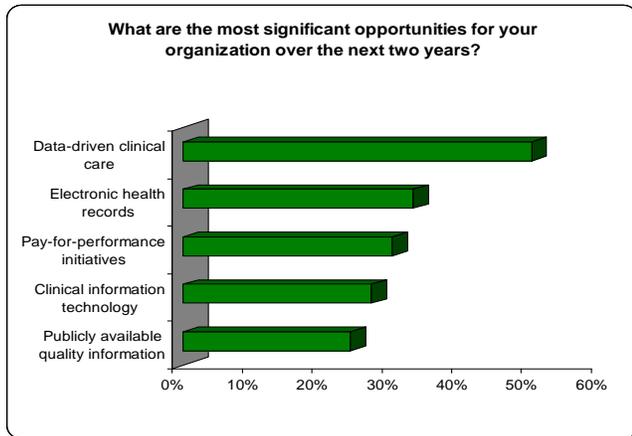
reaching impact that a good CVIS system can have. While primarily a clinical data system, current generation CVIS by some vendors are so good with financial data that they are uploaded by hospital finance departments as the source of their financial planning—departing from the imprecise practice of applying cost-to-charge ratios that has characterized hospital cost accounting in the past.

Quality Management

There is a growing consensus among federal and state governments, private employers, and consumers regarding the importance of public reporting of healthcare quality measures, including hospital and physician provider clinical outcomes, patient satisfaction, and physician malpractice and complaint registries. Many of these state governments and some key federal agencies and employers have already implemented reporting registries, such as CMS, Leapfrog, and HealthGrades.com. The theory behind these efforts is that increased public reporting will provide consumers with the information necessary to make educated and well informed healthcare



Source: Accenture Health pulse survey of over 400 attendees at the World Health Care Congress, January 2005



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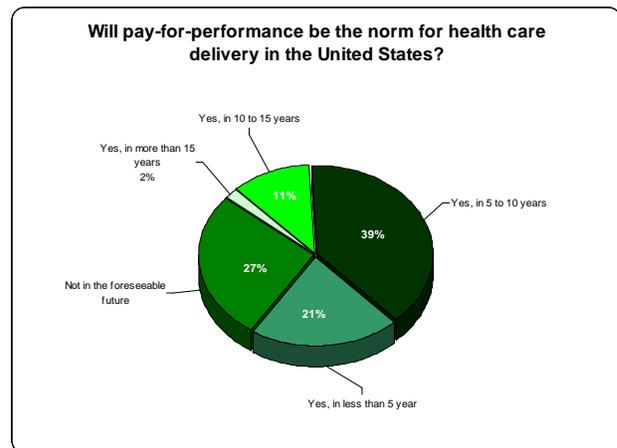
decisions, while influencing hospital and physician quality and accountability. In a 2005 Accenture Health & Life Sciences survey, when respondents were asked “Which of the following do you consider most important in improving quality care?” over 40% responded standardized clinical outcomes measures. In the same survey, respondents were asked “Which of the following do you consider most important in improving accountability in health care?” the majority chose publicly available provider quality data, followed by consumer-directed health care.

Bonus Compensation

In virtually all other industries in the United States, employees are rewarded financially for their quality, cost-savings, and productivity. Compensation increases, bonuses, and stock incentive plans are common financial instruments that are used to compensate both blue and white collar workers. In our current health care industry this is simply not the case—instead compensation is typically dependent on the volume of patients and complexity of procedure performed, irrespective of the outcome. The recent promotion of pay-for-performance and gainsharing strategies has been driven based on recent industry

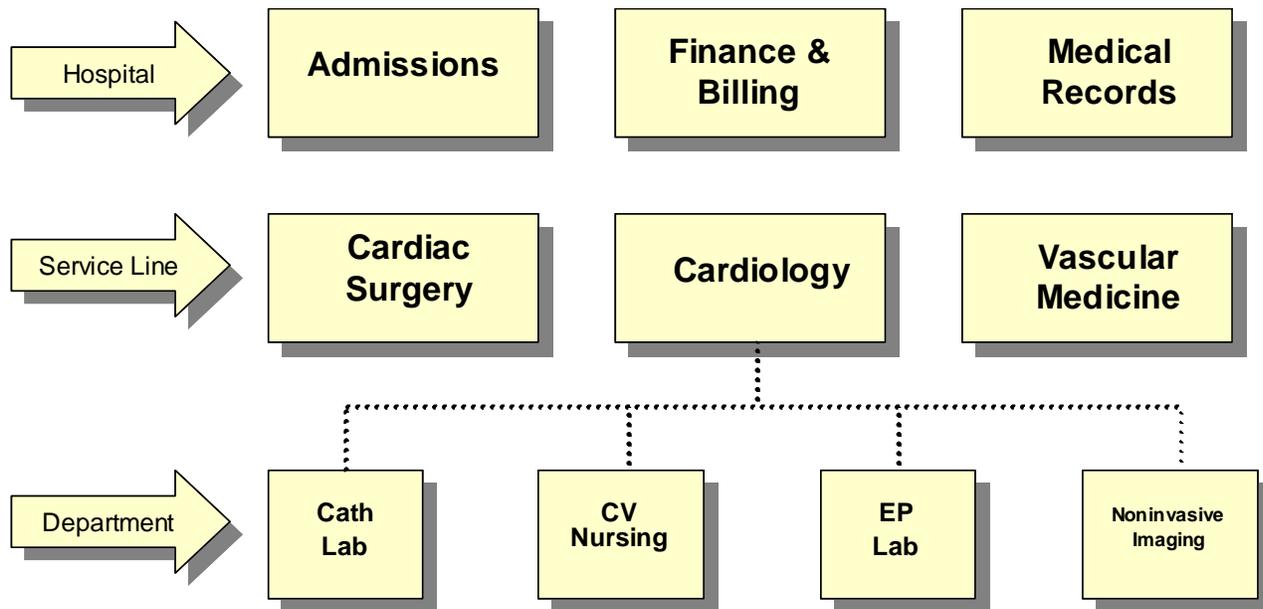
studies focused on medication and patient safety error such as those outlined in the Institute of Medicine report *Crossing the Quality Chasm*. In general it is believed that quality of care is not advancing fast enough and that there exists significant variability in the quality and amount of care being provided.

Clearly, past attempts at improving quality of care delivered and improving patient choice by publicly releasing hospital and physician performance data have had suboptimal effects on these areas. In addition to all of these issues, the current reimbursement system does not provide the best incentive for supporting the expected quality of care efforts. Since January 2005, the Office of the Inspector



Source: HIMSS VantagePoint survey, January 2005

General (OIG) has supported advisory opinions for six cardiovascular gainsharing or “valuesharing” arrangements. Also, the senate committee and key senators evaluating specialty hospitals have publicly supported gainsharing arrangements between hospital and physician providers, as well as, a through review of the Medicare payment system. One commonality of all of these initiatives is the need for extensive (and credible) data to support the successful implementation of these programs.

Figure 8 – Multi-tiered application of CVIS technology in a hospital

CVIS Implementation Costs—Start-up and Recurring

Because of differences in the scope of deployment the start-up costs for implementing a new CVIS can vary by a factor of ten. On the low end, the installation of a cardiac cath lab CVIS module (including software, hardware, and implementation planning) can be accomplished for under \$100,000. More extensive deployments—those that include numerous other data modules and functions—can cost well in excess of \$1,000,000. In fact, in our research we discovered that some of the leading CVIS vendors are currently securing contracts in the \$1.5 million range. In practice, many hospitals choose to begin with a basic package of software and services and grow the system over time as their staff capabilities and budgets allow. In addition, when a hospital system with multiple cardiac programs makes a CVIS vendor selection the implementation plan is usually carried out over the

course of several years—beginning with one hospital and then integrating other system members on a rational timetable. Once installation is complete there are usually sizeable ongoing costs associated with database management. These costs range from approximately \$80,000 a year in limited deployments to well over \$300,000 a year to maintain comprehensive systems. In our research we found that this element (more than any other) had the potential to doom the success of the project in an environment of tight budget constraints—data management personnel are often viewed as more expendable than other types of workers when layoffs are required. With that in mind, we believe that a focus on ongoing costs—not initial costs—should be a primary method of differentiating between CVIS vendors.

Conversion Costs

In the event a facility chooses to convert their existing system to a new CVIS vendor (referred to colloquially by the winning vendor as ‘upgrading’) some of the necessary infrastructure will already be in place. Much of the hardware and hospital system interface components can likely be retained, and it is likely that the facility will also have in place departmental and IS staff familiar with basic CVIS processes. In addition, as an inducement to switch (and thus move market share from a competitor) many vendors will discount the up-front cost of their products (in fact, sometimes a vendor

will give its software away to gain the client of a competitor). While all of this can produce some savings over the cost of a new install, our analysis is that the cost of converting to a new CVIS system is still usually about 75% of the cost of a fresh install—clearly a strong inducement to retain the status quo. That said, in our interviews with CVIS users we found that most would be willing to consider a change if a positive ROI could reasonably be predicted. Conversion planning also includes a vendor selection process that can be as long and detailed as for a fresh install, plus comparable in-house preparation efforts.

Figure 9 - Top 10 Areas where CVIS can Produce A Positive ROI

Strategic Application	Potential Benefit	Range or Type of Savings
Managed care contracting support	Revenue enhancement through better rates	Up to several percentage points of operating profit
Supply management	Cost-per-case savings	Reports of up to \$1.5M annually
Scheduling efficiencies	Increased throughput and staff productivity	Reduced staff overtime; up to 10% of labor budget
Documentation of outcomes	Quality improvement; public relations	Reduced risk of litigation and associated costs
Improved billing accuracy	Revenue enhancement; reduction in denials	More timely reimbursement; several reports of ‘hundreds of thousands’ saved annually
Charting efficiencies and reduced paperwork	Increased physician productivity; hospital and physician revenue enhancement	Higher output per doctor; every 10% increase = \$250,000 in NPR per FTE MD
Budget preparation	More efficient capital allocation; reduced variances	Can safely reduce number of days cash on hand
Vendor negotiations	Drug and device cost savings	Largest line item in cath labs and CVOR; many reports of ‘tens of thousands’ saved annually
Top-Level decision making	Fully informed decisions; reduces guess work	Outmaneuver competitors
Physician performance tracking	Doctor buy-in and satisfaction; risk reduction	Political capital (priceless)

Table 1 - Typical CVIS Start-Up and Recurring Costs
(Single Hospital Deployment; non-PACS)

	Basic System	Mid-Range System	Complex System
Start Up Costs			
Hardware & Software			
CVIS Application Modules	\$75,000	\$225,000	\$650,000
Hospital System Interfaces	\$0	\$30,000	\$180,000
CVIS Workstations ^a	\$3,000	\$12,000	\$24,000
CVIS Networked Server	<u>\$0</u>	<u>\$3,500</u>	<u>\$7,500</u>
Subtotal	\$78,000	\$270,500	\$861,500
Human Resources			
Feasibility Study (for vendor selection)	\$12,000	\$25,000	\$35,000
Implementation Planning Costs ^b	\$5,625	\$14,625	\$29,250
Pre-Launch Training ^c	<u>\$4,000</u>	<u>\$8,500</u>	<u>\$12,500</u>
Subtotal	\$21,625	\$48,125	\$76,750
Total Start Up Costs	\$99,625	\$318,625	\$938,250
Recurring Annual Costs			
Incremental Staff Needs			
Database Manager ^d	\$40,000	\$80,000	\$90,000
Additional Data Entry ^e	<u>\$21,000</u>	<u>\$42,000</u>	<u>\$63,000</u>
Subtotal	\$61,000	\$122,000	\$153,000
Hardware & Software			
Premium Software Support ^f	\$11,250	\$33,750	\$97,500
CVIS Software Upgrades ^g	<u>\$7,500</u>	<u>\$22,500</u>	<u>\$65,000</u>
Subtotal	\$18,750	\$56,250	\$162,500
Total Recurring Annual Costs	\$79,750	\$178,250	\$315,500

Source: HealthGroup West CVIS vendor and hospital personnel interviews and industry research.

Notes: Basic System assumes cath lab CVIS data module only; Mid-Range System assumes cardiac cath lab (including peripheral vascular and electrophysiology capabilities) and CVOR components; Complex System includes all of the above and the addition of noninvasive imaging (e.g. echo and nuclear), disease management (e.g., CHF and cardiac rehab) and inventory tracking components.

Assumptions:

- Each workstation with operating system software @ \$3,000 each.
- Based on estimated internal staff time devoted to integrating CVIS planning with other hospital systems @ \$45 per hour (wages and benefits).
- Includes staff time and travel costs directly related to CVIS system training.
- Basic System assumes 0.5 FTEs, Mid-Range and Complex Systems assume 1.0 FTE (salary and benefits).
- Based on estimated additional internal staff time devoted CVIS @ \$42 per hour (wages and benefits).
- Based on an average of 15% of start-up software cost.
- Estimated at 10% of initial application purchase price (some vendors include in service agreement.)

Conclusion

Back in 1997, while writing about the belated arrival on the healthcare scene of powerful information technologies, we lamented that “though these [CVIS] technologies offer great potential in the quest to rein in costs while simultaneously improving quality, there is a persistent mystique surrounding information systems that has only served to confuse many whose understanding of information technologies is constrained by limited practical experience.” In the intervening years some progress has been made toward the more general understanding of the potential that CVIS offers; but much remains to be done before the benefits of these systems are more generally realized. As we remarked at the outset, with billions of dollars at stake, any CVIS technology that can aid in improving quality and reducing cost of cardiovascular care stands to make an important contribution to both the health and the economy of the nation. With that in mind, we adapt here a 10-point guide (originally developed by LUMEDX) for helping cardiovascular leaders analyze their needs and begin the process of selecting and implementing an appropriate CVIS for their organization.

Key Questions in the CVIS Evaluation Process

1. **Reliability.** Is the CVIS a reliable system, generating the same results on successive trials?
2. **Value.** Does the CVIS deliver high value—price to utility—and generate a positive return on investment (ROI)?
3. **Speed and Efficiency.** Does the system perform up to requirements? Does it complete requested tasks in a timely manner?
4. **Scalability.** Is the system scalable? Can it interoperate with other vendor's software and handle an increasing workload, growing with your needs over time?
5. **Ease of Use.** Is the database system easy to administer? (i.e., programming flexibility, data analysis, report writing)
6. **Robustness.** Can the database system function as the center of the cardiovascular information network, rather than a simple and limited peripheral program?
7. **Simplification.** Does the CVIS system provide for a single point of data entry for the cardiovascular staff?
8. **Connectivity and Power.** Is the database system a relational database (provides operations to retrieve the data from multiple tables so that the user sees the data in a single table form)?
9. **Up-to-Date.** Does the CVIS provide for real-time data collection, analysis, and reporting?
10. **Certification.** Is the database recognized by the American College of Cardiology and the Society of Thoracic Surgeons as a certified software vendor for data extraction?

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About HealthGroup West

HealthGroup West is expert in the planning and development of cardiac and vascular healthcare services. It is one of the most knowledgeable groups of experts in the country on the development of cardiovascular markets and all types of specialized cardiovascular services and facilities. Collectively, the full-time staff and special advisors of HealthGroup West, LLC represent many years of hands-on experience in the analysis and development of cardiovascular and other specialty medical services. They hold advanced degrees in the fields of Business Administration, Health Policy, Information Science, Clinical Sciences, and others. We welcome your feedback and comments on this report.

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