Trends-in-Medicine

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by Lynne Peterson

SUMMARY

CPOE purchase and/or installation is a major focus for most CIOs. ♦ CIOs expect pay-for-performance to be a positive for IT departments. ♦ RHIOs are proliferating, but there are concerns about public governance and their connectivity to each other. ♦ Vendors continue to cooperate on interoperability standards to let their products work together. ♦ Consolidation is expected to continue in the industry, with three or four large players likely to dominate the market in the future. ♦ Most of the HCIT vendors were described as aggressive in pricing, but there is no price war. ♦ Cerner introduced its own medication cabinets. ♦ Eclipsys is going after Meditech customers with an overlay upgrade product. ♦ Epic is viewed as the Cadillac of HCIT but expensive. ♦ GE and IDX may be a powerful combination, but the proof will be in the integration. ♦ McKesson continues to be on most CIO short-lists. ♦ Siemens will have a great product in Sorian, but it probably won't be ready for prime time until early next year.

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Healthcare Information and Management Systems Society (HIMSS)

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Nearly 25,000 people attended this year's HIMSS meeting, the premier healthcare information technology (HCIT) meeting in the U.S. The number of exhibitors jumped 22% compared to 2005 to a total of 840, with 275 of these at the meeting for the first time. In addition to discussion with officials of various vendors, 24 Chief Information Officers (CIOs) from hospitals of every size, from 60-bed facilities to multi-hospital health systems with a 1,000 beds, were interviewed, and among these were users of every major vendor.

With the exception of two hospitals that are making huge new investments this year, CIOs estimated their budgets are up an average of 3% over last year. Yet, few were shopping at this year's show. An Ohio CIO said, "The show this year is more focused on education than being product-driven." Another Midwest CIO said, "HIMSS is more an opportunity for my staff to have a break."

The key IT item on the mind of most CIOs is purchase and/or installation of computerized physician order entry (CPOE). Only two sources already have CPOE installed and working, and all but one of the others have it on their agenda. Other than that, CIOs were doing little shopping this year, and those who were generally were looking at:

- Single-sign on, with Sentillion mentioned several times. A New England CIO said, "We use fingerprints for remote access, but you get misreads with that, and Asians have poorer fingerprint reads. Retinal scans are better, and face prints have a lot of promise. I want to get away from passwords."
- Single-alert systems.
- Systems to access different imaging modalities, with Emageon getting a look. An Emageon official described his product as a "superPACS" that uses a medical image archive to connect images from various hospitals and various sources within a hospital – DICOM, PACS, echocardiography, etc. Right now, Emageon has radiology, orthopedics, neurology, and cardiology archiving, and it plans to add pathology and ophthalmology.
- Communication with physician offices, with Quovadx and iPeople cited.
- Wireless voice communications.

However, electronic health records (EHRs) do not appear to be on the minds of consumers. A recent survey of 1,095 consumers by IDC's Health Industry Insights found that 70% of consumers are unaware of the federal effort to make EHRs

available to Americans by 2014. Furthermore, only 45% thought the government could meet that timetable, and only 33% believe EHRs would materially reduce the cost of healthcare.

Even with more money in the marketplace, the sales cycle may be lengthening for some vendors. More than half the CIOs said it is taking longer for hospitals to approve large capital expenditures, given their current financial environment. A Midwest CIO said, "It takes a little longer because finances are tight. We are taking a harder look and a longer look." Another Missouri CIO said, "We struggle with only so much capital for many things." A New Jersey CIO said, "It is more of an issue with revenue cycle and financial management products than with clinical products." A New Mexico CIO said, "People are doing wiser planning." A New York CIO said, "We have to show justifications for ROI (return on investment), workflow, and process improvement. Our spending is still up, but the decision cycle might take longer." Another CIO added, "We are increasing the cycle time because we are requiring a proper business analysis."

The big (federal) picture

Regional Healthcare Information Organizations (RHIOs) are springing up around the country, and the federal government isn't discouraging this, but it wants to ensure that the networks can connect to each other. Dr. David Brailer, National Health Information Technology Coordinator at the U.S. Department of Health and Human Services, said the government wants to be sure "RHIO best practices" are developed and a model RHIO concept is developed. Dr. Brailer said, "We won't regulate RHIOs, but…we want to add more formality to them…My views on RHIOs have evolved…I didn't start out believing the national solution is a network of regional networks…It is an absolute must-have that RHIOs have a public governance process. What creates the real legitimacy of RHIOs is the public governance process, and we want to be sure we support that…I have been very encouraged by the level of enthusiasm RHIOs have and in going off and solving our problems, but having 100-200 RHIOs building their own architecture is not the solution. They all have to be tied together."

There are no new significant federal HCIT spending areas on the near horizon. Dr. Brailer said, "The President asked for $116 million for 2007, and, largely speaking, that funding continues all the things not on the table. It supports ongoing work in privacy, architecture, certification and standards, and adoption analysis. Those alone tie up 60%-65% of the budget. Then, there is money for supporting breakthrough initiatives – not to buy our way through them but to help prime the pump or pave the pathway. There is nothing new programmatically in that $116 million that we don't have largely underway right now except the RHIO piece, and we would want to see more funding for support of RHIOs…The issue may not be how much we spend but what we spend it on."

Dr. Brailer believes that both a true national network and a loose set of regional alliances are impractical. He said, "We don't want an imposed network or this loose set of networks…so we are trying to walk down the middle…I hope companies like those who bid on the National Health Information Network (NHIN) will offer competitive operations like Verizon and T-Mobile offer for nationwide cellular connectivity…I envision EHRs and connectivity packaged together…It could be EHR vendors package themselves with a network behind the scenes…If we have RHIOs governing locally, there has to be something tying that together nationally…We made no presumption of the form of delivery of nationwide health delivery services or the form to be governed…but we know there has to be a form of delivery – some person, group, or entity whose job/purpose is to ensure real connectivity rather than the point-to-point basis where we are today…It could be that there is a government role overseeing the Information Highway network…There could be a role for a public sector collaboration."

Will health data some day be Googled? Dr. Brailer said, "The entire debate over the capacity to interoperate has to do with the degree of centralization. I believe there are cost-effective ways to deploy a brokerless health information network. That means everyone has the data, all published on the web and secure, where an authorized person can get it, and where you can Google it, with no index and no record locator, simply a complete peer-to-peer network. That turns out to be pretty challenging, not because of the technical capability of finding data but of protecting it…So, we found a lightly brokered network, where the location for *this* person is at *this* network, and for any person, you can find where the data are. That matrix is an incredibly robust tool for finding where the data are, using some unique identifier and some URL…But if we have no existing trust relationships, how do I know if I should trust you getting the data…I don't like centralized structures, but I can't conclude that a broker-free solution is viable… There are a lot of portal efforts underway and search engine strategies that are trying to find a way to bypass all the barriers…but I have not seen the epiphany…I don't think it is a technical barrier, more a question of the policies we have in place that make it a barrier."

Asked what happens if the government doesn't get traction with its national information highway network idea, Dr. Brailer said, "I have no doubt that there is a whole group of people who, if we fail to do this, will want to bring mandates forward and I would presume they will do it because there would be little credibility left for market-based solutions. The clock is ticking, and we want to be sure it gets done the right way…At this point there is no discussion of mandates of conditions of participation, but there is broad recognition that that is the alternative to what we are doing. We are trying to outrun that alternative, and we have had good progress, so that seems off in the distance, but if we don't deliver the goals on adoption, that will happen."

PAY-FOR-PERFORMANCE (P4P)

Most CIOs predicted that P4P will be a positive for their hospitals and IT departments, though some predicted it will take some time before they feel the effects. Among their comments were:

- "It will be a positive effect, but not for a few years. In the short-term, there won't be an effect."
- "P4P will help our budget and reward our staff for the many hours they work."
- "We expect to make a killing on that."
- "It may provide doctors with greater motivation to computerize."
- "P4P will help EMR use."
- "There will be a trough, and then P4P will be a positive."
- "P4P requires a demonstration of performance, which means data and new reports from me."

However, P4P was not part of the Penn State Hershey Medical Center's reason for going all-electronic. CIO Tom Abendroth explained, "When it (P4P) becomes more real, we will put more emphasis on it. Right now, we are driven by quality, safety, and systems. P4P is an external force and not an (IT) driver." COO David Hefner added, "P4P is misguided. We are all going to have to deal with it. The way it will be implemented is counter-productive to the industry. It will pit people against each other. The data will be weak, and yet we will have to react to it. It forces us into arenas that are big time sinks…We are designing our own performance metrics, and with certain payors we are submitting what you could call P4P, where we are willing to put some reimbursement at risk, and asking payors to put themselves at risk for higher payments and managing cash flow. So, we are trying to apply P4P in both directions."

Dr. Brailer gave doctors and CIOs his perspective on what he sees happening with P4P. He said, "Pay-for-performance is a step in the right direction, but it is only a step." He emphasized:

- **P4P is an incentive only.** In the absence of other mainstream policy financial incentives, HCIT needs P4P to take its rightful place. He called it a "small incentive" to doctors to spend money on EHRs but a psychological edge to get people moving in the right direction, "Even if it is not a direct bottom-line incentive, it is beginning to get things moving in the right direction…We are not going to change every practice in a couple of years. But we have a willing group of 10%-15% of doctors who are willing to step up to the plate, and behind that is another group. In the end, the market is a more powerful driver than a government policy program."
- **P4P will spur measurement metrics.** There is a need for quality measurements, and the healthcare community has not done that on its own. He said, "There is no consensus on what we are measuring and how to go about measuring it, and we won't get robustness (in HCIT) until that occurs."
- **P4P needs HCIT.** Practices with HCIT in place perform better on measured metrics than those that do not, though this could be an association and not a cause-and-effect relationship. He added, "Over time the metrics we need to do better on are the ones where IT holds the promise of delivering…In the short term, P4P probably doesn't need HCIT" but longer term HCIT will be critical.
- **P4P will bring HCIT to more people.** Currently, HCIT and P4P both favor large practices. He said, "We see a huge gap in implementation between large and small practices. If you don't have the people to manage the process of care – if you don't have the process of care – it is hard to improve."
- **We have to be sure we don't set up tomorrow's problems.** He said, "P4P leaders need to help us get accountability and financial alignment without creating a me-only attitude in the bottom line."
- **The devil is in the details.** He said, "I'm also worried that…in healthcare we get consensus and then fail to implement it…My job is not to make hospitals and doctors use IT. I think that is inevitable."
- **P4P may be a more suburban or ex-urban model,** with Stark rule relaxation benefiting more urban hospitals and providers. He added, "P4P is interplay between payors and doctors, and Stark is more between hospitals and doctors."

Doctors battered him with questions about the high cost of their individual investment in HCIT and when and how they would see a return on their investment, but he sidestepped all of these. Rather, he suggested that there are three levels of physicians:

1. **Heat-seekers** – those already doing EHRs. He said, "You don't need to incentivize them. The main issue is helping them succeed. They are out there; 15% of doctors claim to have done something in IT."
2. **Those who won't do P4P** – who choose to go to retirement not participating in the information revolution.
3. **Middle** – the group P4P is intended to spur to action.

To reach President Bush's goals, Dr. Brailer estimated that the HCIT adoption rate needs to be 4.5 times the rate it is today – and he added, "If we delay another year, the rate goes up to 5.2 times…That is a sizeable change in industry that has incremented along over time. In the end, I think the question becomes, do we have the capacity to do this?...The investment should be $200 billion over 10 years, and we are spending $15-$20 billion a year. The issue is not whether we spend enough, it is whether we spend it correctly…I'm actually surprised doctors and hospitals spend what they do on IT given the incentives in the current payment systems…There is

no reason to invest anything in quality on those…It says something about the professionals in healthcare that they are spending so much in the absence of modern payment systems. So I'm encouraged that we will see a huge jump in the rate of adoption."

Dr. Brailer continued, "To say I've put money in, and I don't see it come out, that is a stringent standard for something that in many fields is a cost of doing business…I'm not saying doctors need to finance that (HCIT)…(But) if you look at most movers, they were driven by strategic thinking, something they think is right, something to help them recruit doctors, pressure from patients, etc. I don't know that we can support large scale adoption based on spreadsheets. Hopefully, we will be in a world soon where payors will be more supportive of that investment…How do we make sure those not able to do it can come along? We are hoping leaders will drive business – specialists, hospitals, and others in their supply chain – to become as automated as they are. We are trying to elevate and support the leaders so they will bring others along behind them."

INTEROPERABILITY

Once again, HIMSS featured an Interoperability Showcase area. Last year, McKesson and Meditech did not participate, but they were active participants this year. Showcase included 60 participates, 48 vendor companies, and 12 organizations all collaborating to provide an interactive demonstration of practical interoperability and standards-based connectivity, including radiology images, laboratory results, and cardiology reports. A speaker said, "Some (vendors) come just to test their products."

For the first time, the Showcase was structured as a RHIO. Different stations within the Showcase represented different treatment locales, and experts demonstrated how different systems from different vendors could all work together to allow physicians and hospitals to access patient information real-time.

Three weeks before HIMSS, the Connectathon was held to test the interoperability of all these vendors. An official said, "Everything didn't work properly. Different things didn't work. But this is more about process than the technology. Problems included end-to-end connectivity, security, duplicity (redundant records), and optionality (one vendor required something another vendor couldn't collect), and interpretation of the profiles. But by the time of HIMSS, everything was working very smoothly."

Discharge follow-up. In one scenario, a patient who has just been involved in an auto accident is admitted and discharged after an observation. Again, an incidental lung lesion is seen on chest x-ray. The doctor looks up the RHIO patient (using Epic Systems EpiCare and IBM Patient Demographics Server) and dictates a discharge summary, suggesting follow-up. The discharge summary is saved in a repository (HXTI iHistory) and registered in a central registry (IBM). The patient can view these documents and submit an updated version of the personal health record (with CapMed/IBM). A month later the patient visits the primary care doctor and a CT is ordered. The doctor can compare the discharge summary with the CT report (on NextGen EMR). The doctor maps patient IDs (using IBM Patient Identity Cross Reference). All transactions are logged in an audit log (HIPAAT).

- **Without interoperability,** there might not have been a point of reference, and the plan might have been to wait and watch the patient.
- **With interoperability,** the primary care doctor could see the information needed to make treatment decisions, potentially saving a three-month waiting period.

Radiology. In another scenario, the physician orders a chest x-ray for a hospitalized patient with chest pain (using CPSI). The order is transmitted to the order filler system (Cerner RIS). The work list and associated demographic and order information are sent to the DR modality (Kodak Direct View DR), which notifies the RIS and the PACS when the acquisition has been completed. Upon completion of the study, the DR modality forwards the study and all associated information to the GE Healthcare Centricity PACS. The Image Manager confirms storage commitment and notifies the DR modality to delete the images from local storage and notifies the RIS and the Reporting System that the images are available for review and any post-processing requested. The image are post process (Infinitt PACS). The Centricity PACS creates a manifest of images and records them (in IBM Document Repository). IBM then registers these documents (with HXTI iHistory registry). GE maps (using Initiate Identity Hub) its local patient identifier to the RHIO. Later, the patient is seen in another hospital, where the radiologist (using Centricity RIS) retrieves the images from the RHIO.

- **Without interoperability,** critical information regarding images and conditions is missing. Additional images, delay, or errors in interpretation could occur.
- **With interoperability,** previous images are readily available to new caregivers for review or comparison with new studies to improve diagnostic accuracy and reduce delays and costs.

Cardiology. In a third scenario, the physician orders an echocardiograph for a patient (using Cerner RIS). The order is transmitted to the older filler system (Infinitt RIS), which schedules the acquisition steps and creates work lists, including all demographic data as well as required order and clinical details. The work list and associated demographic and order information are sent to the DR modality (Philips IE33), which notifies the RIS and the PACS when the acquisition has been stated and completed. Upon completion of the study, the DR modality forwards the study and all associated information to the ScImage Picom. The Image Manager confirms storage commitment and notifies the Philips IE33 to delete the images from local storage and notifies the RIS and the Reporting

System that the images are available for review and any post-processing requested. The physician (using Witt Biomedical Calysto Display) retrieves the images from the Image Manager and presents them for the physician.

- **Without interoperability,** critical information regarding images and conditions is missing. Additional images, delay, or errors in interpretation could occur.
- **With interoperability,** images are readily available to caregivers for review or comparison with new studies to improve diagnostic accuracy and reduce delays and costs.

COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE)

CIOs are all committed to CPOE, but they are in various stages of adoption and implementation. However, CIOs generally agreed that a CPOE can't be imposed on the hospital staff by the IT department. Rather, it has to be a collaborative effort. A Connecticut CIO said, "CPOE requires: (1) strong leadership support from the CEO, chief medical officer, and chief of nursing, and (2) user ownership and physician involvement. You can't just walk up to physicians and impose it. The chief medical officer has to become involved. We have standing committees of community doctors that is mostly educational, and we found the key leaders and are getting them in the tent...It is not technology at all that is needed to move CPOE forward; it is ownership and involvement."

CIOs commenting about timetables said:

Installed. 2 CIOs already have CPOE systems – one large hospital that chose GE Centricity, and a small one that chose Meditech. The Meditech user said, "We didn't see it as an IT project but a nursing project with IT support. It is more a buy-in issue than a technical issue. Our sister hospital is having a problem because they have no buy-in."

Installing. 5 CIOs are in the process of installing CPOEs this year.

- 3 large hospitals with Cerner. One CIO explained, "We liked Cerner's integrated one-stop database, their product maturity, and their vision. We thought they could be a partner with us."
- 1 large hospital with Eclipsys. The CIO said, "We are a first-time Eclipsys customer because we thought the work-flow component was more appropriate for our environment."
- 1 large hospital with Meditech.

Planned installations.

- 2 medium-sized hospitals plan to start installations in about one year, and both of these chose Cerner. One CIO said, "CPOE isn't something you buy. It means putting in the systems you need and then going to electronic order entry. We bought a health information system that includes order entry and clinical documentation. CPOE is a point you arrive at. We chose Cerner because they are aligned best with our strategic view and are fully integrated." The other CIO said, "We have Cerner in pharmacy, and we'll stay with Cerner."
- 1 large hospital expects to bring an IDX system on line over the next two years. The CIO said, "We have it installed, but it isn't operable yet."

Shopping. 4 CIOs are still shopping for a system. Their short-lists are:

- *Medium hospital* – Cerner, Eclipsys, and McKesson. The CIO said, "Price is not the issue as much as the implementation strategy and relationships. We have McKesson now, and we have a bias to them in our choice, but we are trying to come out of a best-of-breed shop and become more integrated."
- *Small hospital #1* – McKesson and Keane. The CIO said, "We have other systems with these, McKesson for drug dispensing and Keane for pharmacy."
- *Small hospital #2* – Cerner, Eclipsys, and Meditech. The CIO said, "New doctors out of school are asking for CPOE, and we want an integrated system. Meditech is a long shot. We like the bells and whistles and functionality of Cerner, but it is a beast to put in and expensive."
- *Small hospital #3* – a higher end system. The CIO said, "We are looking at the higher end for ease of use and quality. We are not looking that much at price. I like best of breed, but it is slower to implement. We currently have a single source vendor."

HIMSS LEADERSHIP SURVEY

The 17th annual HIMSS Leadership Survey of 205 CIOs and other senior IT officials from 473 different hospitals, sponsored by ACS Healthcare Solutions, was released at HIMSS. The key findings were:

- Patient satisfaction is a top industry driver.
- Financial support continues to be a barrier to implementation.
- Patient safety, EMRs, and connecting IT at hospitals and remote locations are top industry priorities.
- EMRs, bar-coding, and CPOE will be top future technologies.
- An internal breach of security is a top concern with response to electronic medical information.

Current priorities. The key priorities in 2006 are medical error reduction and implementation of an EMR. In fact, compared to last year, EMR implementation is a significantly more important priority, while replacing/upgrading inpatient clinical systems is a much less of a priority.

Future priorities. Over the next two years, the top IT priority will be implementing an EMR. No areas are expected to get much more priority in the next two years than they do today, and several areas expected to become less of a priority, including implementation of wireless systems, designing/ implementing a strategic IT plan, reducing medical errors, process/workflow redesign, and upgrading network infrastructure. Thus, a source suggested it appears the facilities who are interested in wireless are doing it today, and there isn't a second wave or adoptees in the wings, at least for the next 2 years.

Top business issues. For the next two years, the key business issues will be reducing medical errors, patient satisfaction, and Medicare cutbacks. Improving operational efficiency has become a less important issue.

Barriers to IT implementation. A key change from last year is that vendors are perceived as better able to effectively deliver products.

Most important IT applications. With the exception of a drop in importance of PACS, the key applications remain relatively unchanged from last year: EMRs, bar-coded medication management, and CPOE.

EMRs. 24% of respondents have a fully operational EMR today, and the number of CIOs with no plans yet for an EMR has dropped to 12%.

IT budgets and staffing. 72% of CIOs said their budget is up from 2005, and staffing also is up very slightly from last year. The greatest staffing need over the next two years is for programmers, with a drop in the need for network support, clinical informaticists, and clinical champions.

Data security. This is less a priority than last year, with 98% of sources reporting they have firewalls and 88% having user access controls. However, internal security remains the biggest security concern.

Websites. The key uses for websites remain marketing and promotion, employee recruitments, and an online provider directory. Three areas getting attention for this year that were not mentioned last year are remote employee access, physician portal link, and business-to-business transactions.

IT outsourcing. Website outsourcing has decreased slightly from last year, but outsourcing of dictation and transcription and telecommunications were mentioned for the first time this year. Over the next two years, outsourcing is expected to decrease slightly in all other categories except help desk, which is likely to be flat.

IT Priorities

Issue	IT priorities for 2005	IT priorities for 2006	Projected IT priorities in 2 years
Reduce medical errors	53%	60%	35%
Implement EMR	29%	45%	46%
Connect IT at hospital and remote locations	32%	36%	31%
Process/workflow redesign	32%	35%	20%
Implement wireless system	35%	32%	12%
Replace/upgrade inpatient clinical systems	38%	29%	23%

*Source: 17th annual HIMSS Leadership Survey

Barriers to IT Implementation

Issue	Respondents
Lack of financial support	18%
Lack of staffing resources	17%
Vendor inability to effectively deliver product	12%
Proving ROI	11%
Difficulty achieving end-user acceptance	11%
Lack of clinical leadership	8%
Lack of top management support	7%
Lack of strategic IT plan	4%
Laws prohibiting technology sharing	4%

*Source: 17th annual HIMSS Leadership Survey

Top Business Issues in 2006

Issue	Respondents
Patient satisfaction	51%
Medicare cutbacks	50%
Reducing medical errors	44%
Cost pressures	42%
Clinical transformation	38%
Integration and interoperability	37%
Improving quality of care	36%
Adoption of new technology	29%
Improving operational efficiency	25%

*Source: 17th annual HIMSS Leadership Survey

Applications for Next 2 Years

Issue	Respondents
EMR	61%
Barcode medication management	58%
CPOE	52%
Enterprise-wide clinical information sharing	49%
Clinical data repository	45%
Point-of-care decision support	41%
PACS	26%
Ambulatory systems	22%

*Source: 17th annual HIMSS Leadership Survey

THE VENDORS

CIOs predicted that consolidation will continue in the industry, and they expect only three or four large players to dominate the market in the future. An industry official commented, "Consolidation will continue. It will be a few big players." Another industry official said, "I think it will be a complex environment. We think hospitals will move more and more to single vendors." A CIO said, "What Wal-Mart did to Mom & Pop stores we'll see happen in healthcare."

GE and Siemens are definitely expected to be among the "big guys," and sources expect Eclipsys to be bought, perhaps by Philips. Philips currently has a collaboration with Epic, but CIOs do not believe Philips can buy Epic. Many sources believe Philips will need to make an acquisition to be a major player in the field, and Eclipsys is the company they think is most likely to be targeted, though a few suggested Philips might even go after Cerner. An industry source said, "I think Eclipsys will stay independent if Philips doesn't buy it." Some sources also speculated that a non-healthcare company might buy Eclipsys to get into the HCIT space. Can Cerner and Epic remain stand-alone companies? Perhaps, sources said, though one CIO even suggested Eclipsys might go after Cerner.

One of the key debates going on right now is whether the EHR move should start in the ambulatory arena and move in to the hospital or whether it should start in the hospital and move out to the ambulatory market. A CIO said, "How we decided to deploy was starting inpatient and working our way out…The pressing issue which we couldn't have foreseen three years ago (when we started electronic implementation) but is now important is transparency, the outside regulations. It is 1,000-fold more risky on the in-patient side than on the outpatient side." An Eclipsys user took the opposite approach, "We started with Eclipsys in the ambulatory setting, and now we are doing the hospital, and if we had the choice again, we would still do it the same way – outside first and then inside. We were ready on the ambulatory side first, and we learned a lot from that."

All of the vendors, except perhaps Epic, were described as aggressive in their pricing. Among the comments on pricing were:

- "Eclipsys' pricing was a good deal and a factor in our choice of Eclipsys for CPOE. We looked at function first and then cost, and they were very competitive."
- "Eclipsys is being very aggressive in pricing."
- "Cerner is surprisingly competitive, not bargain basement, but fairly priced, not cheap but fair."
- "Cerner is not the most price aggressive. It's kind of a higher priced brand. In some cases, I would prefer to get Cerner, but I got something else because of the price."
- "Cerner pricing is comparable to the others, but hospitals are not good at negotiating contracts, setting milestones, or structuring payments."

Each of the major vendors – Cerner, Eclipsys, Epic, General Electric, McKesson, and Siemens – has positive and negatives, according to the CIOs. And some of the companies had announcements to make at HIMSS. The ***perceptions*** are that:

- Epic is the Cadillac of the industry but expensive. It was described as trying to move from outpatient to inpatient, which is the opposite of what most sources believe is now the trend. A competitor said, "There is a lot we can learn from Epic. Their implementation model is very good."
- Cerner has an excellent product that is difficult to implement. Cerner also has a new medication cabinet offering.
- Eclipsys claims Sunrise 4.0 and 4.5 are fully integrated systems, but many CIOs do not perceive those as fully integrated. It was described as having a little less emphasis on ambulatory market than its competitors. An Eclipsys official said, "Our entire clinical platform is fully integrated. We have a single platform and a single database. We do interface to 'feeder' systems, like lab, but pharmacy is totally integrated. Objects Plus is an integration capability that is a unique differentiator for us that allows us to integrate stand-alone best-of-breeds rather than just interface them, and Objects Plus is inherent in our platform."
- GE has tremendous potential with the purchase of IDX and a good vision for integration, but the process is expected to be challenging.
- McKesson was "steady on," with little new or unique at HIMSS, but the company continues to be in the running for most CPOE purchases.
- Siemens will have a great product in Sorian, but it probably won't be ready for prime time until early next year.

ALLSCRIPTS

Prior to GE's purchase of IDX, Allscripts had a deal with IDX that allowed it to market its EHR to IDX customers. An Allscripts official said that arrangement was re-negotiated and will continue for the next 18 months, in direct competition with GE, which has always marketed to the IDX customer base. He explained, "Now, we can also sell outside the IDX customer base as well because we recently got a practice management product from A4 Health Systems. I think GE's purchase of IDX will be a positive for us. Our expertise was mid-to-large practices, and we had no product in the smaller practice market. A4 has a significant footprint in that market …One of the things in the re-negotiations was our ability to buy A4, but we won't sell that product to IDX customers for 18 months, just TouchWorks for EHR...Our focus, more than anyone, is the ambulatory market." A GE official offered this take on the Allscripts arrangement. He said, "We already re-did the Allscripts agreement. Centricity will be marketed to independent physicians, and we will not be selling the Allscripts (product). We are phasing out Allscripts. We will

offer it for 18 months ***in addition*** to Centricity but only to existing IDX customers."

CERNER

New product announcement. Cerner fired a salvo at competitors – particularly McKesson, Omnicell, and Cardinal Health – at HIMSS with the introduction of a new hardware product, an automated drug-dispending medication cabinet to run with the Millennium operating system. CareAware RxStation is a closet-sized, 500-pound, robotic drug dispensing cabinet – much like a vending machine – that links to patient medical records. The first RxStation will be installed in a Phoenix hospital this summer.

Cerner CEO Neil Patterson said, "It's a brand new business for us." Paul Gorup, Senior Vice President of Knowledge & Discovery, said RxStation is Cerner's first entry into this marketplace, "We want to go beyond chart capture and inventory and address the needs of the clinician. We want a clinician/patient-focused model…We provide improved control not just at the bedside but all the way to the pharmacy that is well-priced, scalable, and integrated…Efforts by others to reduce errors have been focused on prescribing and administration…What we have done is eliminate duplicate entry or systems."

RxStation uses both barcode and RFID technology to ensure that patients get the correct medication. Using a personal digital assistant (PDA), doctors and nurses can log into the RxStation and enter a patient's ID number. The system's software tells RxStation how much of which drugs to dispense. Then, a puff of air pushes the appropriate medication (and dosage) into a bag labeled for the patient. At the patient's bedside, medications (and the patient's wristband) are both scanned again to ensure there are no medication errors.

Gorup outlined these key design features of RxStation:

- Sealed device design that eliminates selecting the wrong medication, increases control of medication, reduces inventory count backs, and decreases time at the device.
- Use of RFID, a built-in digital image monitor, and a single database which decreases the chance for loading error and improves inventory management and expiration tracking, and enhances diversion auditing.
- Unified workflow which means a single source for order, dispensing, and maintenance of workflow.
- Reduced system cost (~25% less than competitors) which lowers the total cost of ownership.

RxStation is part of an effort to simplify HCIT hardware. Patterson said, "If you go into a hospital, particularly an ICU, you'll see dozens of devices manufactured by different companies, and no standards that regulate how — or even if — they relate to each other." Patterson would like to see healthcare equipment get standardized along the lines of the USB interface and plug-and-play functionality that lets printers, scanners, etc., connect to computers.

Business overview. Patterson noted that the company's scale is "increasingly becoming part of our competitive advantage," adding, there is "an entrepreneurial side" to Cerner. Senior Vice President Mike Valentine said the market remains strong at the macro level, "Overall, the financial condition of hospitals is good, with profit margins at a six-year high of 5.2%."

Cerner officials claimed the company is "the clear CPOE leader," with more live acute care facilities and top ratings by KLAS, a leading healthcare information technology research firm. They said Cerner has 317 clients at 928 facilities, 4,845 live Cerner Millennium Solutions, and a presence in 70% of global clinical IT markets (from Singapore to Saudi Arabia to Europe). In the U.K., Cerner got a small but strategic contract (Choose & Book) from the NHS Connecting for Health program, and it met and beat the milestones for implementation so far. In addition, Cerner replaced another vendor in the South Region and went live less than four months after the contract was signed. Cerner expects to have >10 Trusts live in the next 12 months.

Mike Nill, Vice President of CernerWorks Operations and Millennium Architecture, said more and more large clients (159 to date) are utilizing Cerner's data center because of:

- Increasing ability to deliver in that space.
- Predictable cost to customers.
- Declining cost that makes the service more affordable. With 160 managed service contracts, Cerner says it has the scale today to utilize different technology configurations and different system management techniques that permit the company to drive costs down.

The data center also is synergistic with Cerner's other businesses. Nill explained, "By hosting our own system, I get a very direct connection with clients on the health of our systems, and I can identify where we have challenges or opportunities for improvement…We are learning from operating Millennium for our hosted clients."

Rick Heise, Director of PowerWorks, noted that fewer than 10% of physicians have EMRs today, with penetration lowest in small practices, where the majority of doctors are. The main reason they haven't purchased an EMR system, he said, is cost. With the 2005 acquisition of VitalWorks in 2005 Cerner started offering a low-cost model for these doctors ($595 per month per doctor), did some telemarketing, and got implementation time down from four months to one month. Heise said, "You will see competitors offering lower subscription prices…but that does not include all we include:

- $2,200 setup costs per provider.
- $345 PowerWorks EMR.

- $250 PowerWorks Practice management, including transaction services.
- Connectivity to data center.
- Software licenses and support.
- Implementation and training.

User perspective. Penn State's Abendroth, a Cerner customer, said, "Our goals are similar to other Cerner clients – quality, safety, recruitment, and efficiency. We are making tangible progress in each area. Working with Cerner, we are making a dent in what will be a long journey. We are successful because we are working with a committed business partner, and we recognize upfront that this is a process change, a profound behavioral change. The EMR evolution is really a clinical transformation masquerading as a series of IT projects." Asked if the cost is worth it, COO Hefner added, "The way we estimated this three years ago is that it is a seven year march…Can I give a hard ROI (return on investment)? No. But from a recruiting aspect, we thought it was imperative. And outside transparency is becoming necessary…But in spending $100 million we had to say no to other things."

Hefner said cost was definitely an issue in the original decision to move into an all-electronic world, "It was certainly about cost. When you look at the total cost of ownership, we felt the edge belonged to Cerner. Today, based on what we are seeing if we took another snapshot, it would be even more the competitive cost that would have us choose Cerner." Abendroth said Siemens and Eclipsys had been on the short-list before Cerner was chosen, "Siemens had a great story with the new Sorian, but it turns out it was too far off, and Siemens couldn't predict when it would be ready. In retrospect that was a good decision. Eclipsys at that time did not have a clear enough understanding of an integrated workforce of nurses, physicians, and pharmacists. They had relegated the role of nurses into the background, which is absolutely wrong, and at that time (it's changed now) they did have integration as important."

Other Cerner customers agreed they are very happy with the company and its products, but they also complained that implementation can be very challenging – and that this hasn't improved recently. CIO comments from users and non-users included:

- *User #1:* "They've morphed, but they are still difficult. Cerner is struggling with getting top notch talent at its Accelerated Solutions Center (ASC), but they have very good implementations methodology and know where they need to be. They know what they need to do, but they need to be sure they have the research to make it happen."
- *User #2:* "Cerner is still having the same problem today in areas. They've put a lot of resources in making things simpler, but the products are more complicated. They have the most robust and broadest vision, but the most complicated implementation."
- *Non-user:* "Cerner has a decent reputation and a lot of customers, so it has a lot of staying power, but its weaknesses are the same things – bigness and clients. Can they support the business they've already written?"
- *User #3:* "Implementation has improved for us in the last couple of years, but it could be because we are more experienced customers."
- *User #4:* "Millennium is not as functional as Classic, and you can't get from Classic to Millennium. It would have been easier to start from scratch. Classic hospitals are loathe to move to Millennium because it is a pain. Now, Cerner is trying to demonstrate a new direction to enable upgrades from Classic to Millennium. Classic is sucking them dry. If they don't get it done soon, Classic users will get lured to other vendors."
- *User #5:* "Cerner needs to lower the cost of implementation, and code quality has to improve. Overall response time has to continue to improve, too."

Asked about the upgrades from Classic to Millennium, Patterson said, "We are automating that with Bedrock, but clients who want to add functionality at the same time create 'scope creep,' and that makes it harder…Those comments (about upgrade difficulties) do not represent the mainstream."

Asked about the implementation complaints, Cerner officials skirted the issue somewhat. Patterson said, "What people don't get is how deep a process of integration we are doing, and virtually no one else is. There are a lot of comparability issues when people talk about Cerner…Comparability is lacking in this industry…Most competitors used to argue that you didn't need pharmacy, you could interface it, which I said was dangerous and irresponsible. We are kind of past all that; we are where we need to be as an industry…Watch our U.K. performance as we implement a country. If it is really that difficult, you will see us have significant issues there. No company on earth is doing as many implementations as we are today. With the NHS you will have absolute benchmark data. I'm saying the process of getting healthcare to think horizontally vs. in silos is hard." A Cerner customer, at a Cerner event, said, "Clinical implementation isn't about tools; it is about process. We were so successful in the first three days that we put the children's hospital up a week early because implementation was going so well, and then the rest of the house in two weeks…We had a fairly seamless implementation. I think implementation is about the clinical process support and understanding during implementation."

Outsourcing. Cerner is doing more of its testing in India, but this does not concern CIOs. In fact, most consider it a positive, saying it demonstrates an increased commitment to testing, which they applauded. A CIO said, "Outsourcing of testing is not a negative. If they outsourced development, that still would not be an issue. Outsourcing is a political issue, not a technical issue." Another CIO said, "I heard Cerner was outsourcing the testing of code changes and new releases.

That could be good because one issue they had was code quality." A third CIO said, "It is more important that they actually are testing things than who does it."

Patterson said the Cerner workforce in India is increasing in size, "We want a 24-hour cycle. Development is mostly here (in the U.S.), and then we test it at night (in India)…We are moving a lot of testing – of systems and integration mostly – but it is still inside our company, just in India."

ECLIPSYS

Sunrise 4.5 XA has been launched, but many CIOs were not aware that the release is real, though they generally believe it is promising. A CIO said, "With 4.0 you can't install nursing documentation before CPOE; with 4.5 you can, and I hope that works, but I hear that 4.5 pharmacy is not ready." Another CIO said, "Sunrise 4.5 seems to have a lot of promise. The product piques my interest, but I'm concerned with the company, its history, and its management problems." A source who has Eclipsys on his short-list said, "Sunrise 4.5 looks very real. It's ready, and the pharmacy is absolutely great…but we haven't talked to other Eclipsys customers yet, so we are not clear on their support and service."

Eclipsys customers said they are satisfied with the product. A physician whose hospital-owned medical group uses Eclipsys said, "Our hospital is getting Sunrise 4.0, and we will do Sunrise 4.5 as soon as we can…We chose it because of a lot of little things – for example, enhancements in prescription writing and the image scanning capability. We won't use the pharmacy part because we have our own pharmacy system that interfaces with Sunrise." A West Coast Eclipsys user said, "We use a number of Eclipsys products now, and we are upgrading to Sunrise 4.0 first, then 4.5…We considered McKesson but decided to stay with Eclipsys because the Eclipsys integration exceeded McKesson's, and we want to go from a best-of-breed to a more integrated approach."

Whether they were customers of Eclipsys or not, CIOs generally agreed that the management changes at Eclipsys are a positive step. Most believe it is too early to tell if the new people will perform as they hope, but they are optimistic. Sources who have met the new president and CEO, R. Andrew Eckert, were impressed with him. A West Coast CIO said, "If they've really brought in new management and cut the high deadwood and increased support and implementation, then it will be good." A New England CIO said, "It is a positive change, but I don't know if upper management has much impact on reality or just on Wall Street. Eclipsys needs to solve more problems at the lower, technical level – software issues. Other vendors are moving forward, and Eclipsys doesn't have the software." A third CIO said, "It's too early to tell." A California CIO said, "It's too early to tell, but so far the new management is headed in the right direction."

Implementations do not appear to be a particular problem for Eclipsys. Customers all said implementations have gone well – not perfectly, but well. A user said, "Depending on the timelines and the resources, we try to do more than one implementation at once. Eclipsys is willing to work with us on that. Our implementations have gone very well, but we are very focused on testing."

The Eclipsys' ambulatory offering got cautiously optimistic comments. An Eclipsys official said the company is not selling directly to doctors' offices but, instead, is selling through hospitals to doctors. Another Eclipsys official said, "We have an ambulatory offering, but we want to improve it. It is targeted at physicians affiliated with hospitals. Large institutions with affiliated practices are a large part of our customer base…and that (affiliated practices) is where most of the activity is. We can do this through the hospitals." A CIO said, "I'm hearing good things about it." Another CIO said, "We have a provision for it in our contract. We will pilot it and see. Strategically, we prefer something integrated in inpatient and outpatient. The code is new; it is workflow driven and not back-end driven." A third source said, "My first impression is that it looks pretty good, but I didn't see the entire workflow in it yet." Another CIO said, "Ambulatory was rolled out first. We started with a three-doctor practice, then another, and another. It was all about workflow."

Sources were asked what Eclipsys is lacking in product offerings compared to its major competitors (Cerner, Epic, GE, McKesson, and Siemens). One CIO said, "One of the drawbacks (to Sunrise) is registration and billing. Eclipsys has a good middle, but not the front and back ends." Another CIO said, "There is a lack of OR, ED, lab, and radiology packages, so you have to turn to a separate vendor for those. Eclipsys pushes its core product and doesn't have all the peripherals, saying you can interface with better niche applications than they can manage. What happens to us when our board demands interoperability? One would think we might go to best-of-breed…but that isn't the best way to tie disparate hospitals together." A third source said, "Sunrise 4.5 meets virtually all our needs. 5.0 is just more features and fine-tuning."

Eclipsys is believed to be gaining some market share, primarily from GE, but also from Siemens. A CIO said, "Eclipsys has a fragile place in the market. It could get stuff installed and make inroads in existing contracts. If it gets software running, then it will succeed." A Siemens user who is considering Eclipsys for clinical documentation said, "What we want is an integrated system and an application that will carry the full house."

Most CIOs believe that Eclipsys will get bought, that it won't exist as a stand-alone company in five years. The most likely buyer, sources speculated, is Philips. Despite Philips' working relationship with Epic, sources speculated that Philips would have to buy someone to be a top-tier competitor, and they doubted that Philips could or would buy Epic. If Philips isn't the buyer, then sources believe it could be someone outside of healthcare, someone like, perhaps, HP or Toshiba that wants

to become a major player in healthcare. However, an HP official emphatically stated that HP is not headed in that direction, that it wants to remain a partner not a competitor to the other players in healthcare. A Midwest CIO said, "I would have thought Eclipsys would already have been bought. I can't think of any good candidates." A New England CIO said, "I would have thought GE, Oracle, or someone not in healthcare would have bought Eclipsys. Or, Eclipsys could go after Cerner and the Cerner platform." A New York CIO said, "I'll bet it is acquired, but by whom I don't know."

At HIMSS, Eclipsys:

- Offered Sunrise Clinical Advantage, which can let Meditech customers add more advanced Eclipsys features with an overlay. An official said, "This (the Meditech user base) is a huge, huge market for us. We have a lot of (Meditech) clients in deep discussion over this, and we've had a lot of interest in it at our booth." Asked why Meditech users – especially community-based hospitals – might want to do this, the official said, "Our documentation is more robust, we have imbedded content (knowledge-based charting), and our CPOE is less clunky. And there are significant savings over an entire new system."
- Emphasized how Sunrise 4.5 can ensure smooth "handoffs" and eliminate departmental and facility "islands of care."
- Co-chaired – and actively participated in – the Interoperability Showcase.
- Promoted its new partnership with PanGo Networks, through which Eclipsys will re-sell, deploy, and support PanGo's asset-tracking (RFID) system.
- Highlighted the ">1,500 new features" in Sunrise 4.5 XA, especially: the pharmacy management, workflow, point-of-care bar-coding, enhanced CPOE, ED enhancements, increased content, and integrated clinical and financial solutions.

EPIC

CIOs agreed that Epic has a premier product, but it is expensive. A Midwest CIO said, "Most of my peers love Epic, and I would love it too, but I can't afford it…It all works, it's all linked together, and it's tight. I'm impressed with Epic's strategy, but I didn't choose Epic (for CPOE) because their timing was off. They were not in the in-patient world at the time I made my choice." A New England CIO said, "It is at the high end because it is very expensive, but you get what you pay for. Epic really pays attention to what users need…Watch Epic. It has good leadership and is less market-driven." An Eclipsys customer said, "We chose Eclipsys because Epic was not at the right stage when we were looking. They were strong in outpatient, and we wanted to focus first on inpatient."

GENERAL ELECTRIC (GE)

Vishal Wanchoo, President and CEO of GE Healthcare Integrated IT Solutions, a new GE unit, said HCIT accounts for about 10% of all the ~$17 billion in revenue at GE Healthcare. With the acquisition of Amersham, GE has moved from late disease (symptom-based illness management) to early health (prevention/prediction, detailed patient information, and targeted therapies)." Key focus areas for GE HCIT are neurology (particularly Alzheimer's Disease), breast cancer, cardiology (particularly congestive heart failure management), and home monitoring.

Wanchoo is confident GE Healthcare Integrated IT Solutions can show 15%-16% growth in 2006. He said, "We have independently grown double digits, and with the combination (of GE and IDX), there is a huge opportunity. What makes it tough in an acquisition is when you are sunsetting a lot of products and redirecting efforts. In this combination, the huge benefit in product synergy is tremendous. There is an easy transition."

Sources could not come up with any products they think GE is now lacking and might need to buy. A Midwest CIO said, "Before they do that, they need to fix the current product."

IDX acquisition. GE is poised to become an even bigger force in HCIT. The purchase of IDX "filled in the gaps" in GE's product offerings, but GE is not patching its Centricity line with the IDX products. Instead, GE's plan is to take the key features of the IDX products and integrate them into Centricity, with all IDX products rebranded with the Centricity name. CareCast will become Centricity Enterprise, ImageCast will be Centricity I-RIS (replacing the current C-RIS), and FlowCast will be Centricity Practice Solutions.

The cultural fit appears to be going well between IDX and GE, perhaps because there is "all new GE leadership" at IDX. Wanchoo said, "Integration has been, in the short run, phenomenal."

The question, CIOs said, is how well GE executes on that integration plan. Wanchoo commented, "They (IDX) have streaming technology. It is the best available in the market. We are excited about that technology. IDX has some really good potential applications, and we plan to use that in some things, incorporating it."

GE View of the Synergy Between GE and IDX Products

Location	HCIT overview	Size of Market	GE strengths	IDX strengths
Hospital	Advanced clinical/inpatient EMR	$4.3 billion	---	√
Hospital	Departmental clinicals	$2.8 billion	√√ (radiology)	√√
Hospital	Patient management revenue cycle (registration, billing, scheduling)	$7.3 billion	---	√√
Physician office	Practice management (U.S. only) and EMR	$2.5 million	√	√√

Wanchoo said GE has three strategies for handling the integration of IDX:

1. **Physician practice strategy.** Over the next 6-9 months GE plans to make its EMR function seamlessly with IDX's practice management system.
2. **Imaging (PACS).** Wanchoo said this work started even before the acquisition.
3. **Enterprise system (CareCast).**

On IDX, Wanchoo said, "We have a broader base of customers now to accelerate what we want to do. Physician offices are very under penetrated…GE has a strong presence in radiology, PACS, critical care, and operating rooms where GE was selling devices and connecting them with HCIT systems. What IDX brings is enterprise EMR for the inpatient setting and a very large customer base…IDX provides a platform to accelerate what we were doing in developing advanced EMRs…Centricity was focused at the departmental level. We started working on that at a few institutions to build this functionality. What IDX brought was the ability to accelerate way beyond where we were with Centricity. We were not in hospital information systems, just the clinical side of the business. IDX brought a good portfolio in hospital information systems. We know a long-term, integrated system is an important strategy, so getting that into product portfolio was an important strategy…GE has a strong presence in PACS; IDX has a strong presence in workflow products, especially in radiology, so the combination made a lot of sense …And the advanced clinical systems with IDX's CareCast gave us the acceleration we needed…Where we want to end up…was to provide – from a single physician practice all the way to a complex integrated network – suites of products to improve administrative practice as well as providing advanced clinical functionality across the full gamut of healthcare, with the end goal of digitalizing from a small physician practice into the acute care setting and vice versa."

Brandon Savage, Chief Medical Officer of GE Healthcare IT Solutions said interoperability is the key to GE's strategy with IDX. He said, "It's time for a new paradigm…Interoperability is key…Procedural medicine is a high revenue item in many hospitals (e.g., surgery, interventional cardiology, radiology). They need images combined into workflow. GE's PACS plus GE's EHR combine with radiology and drive the cycle…In the P4P environment, IT links clinical and administrative workflows…It's a holistic approach to quality/productivity improvement and addressed P4P trends.

Intermountain Healthcare in Utah – an IDN with 21 hospitals, 100 clinics, 550 doctors, and 500,000 covered lives – is implementing GE/IDX systems. CIO Marc Probst, said, "It is the passion that drew us to GE…Inclusion of IDX was a surprise to us, and at this point we think it was a good surprise because it helps us get a little quicker to the end we want to be at. Using (IDX's) CareCast will take some of the grunt work away that we would have done if we started from scratch. We will implement CareCast across all of Intermountain. The IDX acquisition has been great because some IDX clients are people we think we can learn from. We (like) the customers that IDX brings to the table."

John Haughom, Senior Vice President of PeaceHealth – which has six hospitals, 340 physicians, regional labs, etc., in Oregon, Washington, and Alaska – was another featured GE customer. He praised GE's acquisition of IDX: "We wanted a community health record, not just an EMR. We are all fully automated and digitized. We use CareCast for inpatient…We are very excited about GE's acquisition of IDX…Personally, I think it was a marriage made in heaven."

There are still some product gaps GE wants to fill, but the "overall broad strategy is fulfilled," Wanchoo said. He indicated two products will be phased out as a result of the IDX acquisition:

- The component of Centricity focused on acute care will be phased out. FlowCast will fold into the GE naming nomenclature – Centricity. About six hospitals have been working with Centricity implementation, and they will get Centricity/FlowCast.
- The Centricity radiology system that was in development will be phased out, and IDX's ImageCast will go forward – because GE decided ImageCast was "better."

Among GE's plans for enhancing CareCast are:

- **Improving functionality.** This was described as a No. 1 priority. A GE official said a lot of customers want to use CareCast in the ambulatory setting to tie physicians to the IDN. Wanchoo said GE will enhance the ambulatory product, with a Centricity beta module expected in 1Q06 and a full-rollout expected in mid-2007.
- **Critical care.** GE plans to add new technology, replacing some of the IDX partnerships and developing new products.
- **Ambulatory setting.** GE plans to bring some of the intellectual property from Centricity to the CareCast ambulatory portfolio, but officials didn't explain specifically what this meant.

U.K. projects. Asked how the U.K. contract is going, Wanchoo said, "GE is involved in the U.K. on imaging with PACS, and IDX is in EMR deployment. In the southern cluster for PACS, we've had tremendous success, so we are way ahead in that implementation timeline. We've expanded outside the southern cluster, and we see additional business beyond the southern cluster. The London cluster with IDX and other EMRs have been significantly challenged on how many deployments would be made. GE is stepping in. We are in discussion with the government in the U.K. on timetables. Initial discussions with the government were very positive. They are very pleased that GE is coming in, given our success in other clusters. We will work through this with them and make progress over the next 30 days on a timeline."

GE expects to be able to manage the focus in the U.K. without having a negative impact on U.S. customers. Wanchoo said, "It was hospital system functionality for the U.K. – the way they do billing, scheduling, etc., is unique to the U.K. So, the last two years were spent developing customized functionality, and that took a lot of (IDX's) attention away from the U.S. market and CareCast. That development has been completed for the most part. There is a little customized development that needs to be done, mostly they need clinical functionality now, which is what U.S. customers want, too, so the alignment of development effort will be better going forward. And we inject a number of GE resources into the mix here. The partnership with Intermountain, for example, would require a number of resources of GE and Intermountain, and all of those resources are being deployed, with 100% directed to enhancement of CareCast, and that gives the U.S. customer base a much better resource pool to leverage."

Home monitoring. GE has a partnership with Guidant on monitoring pacemaker patients at home, and that project is going forward despite Boston Scientific's purchase of Guidant, Wanchoo said, "There is good synergy between what Guidant is doing and what we are doing in the clinical area. We bring the expertise of EMR and decision in support, whereas Guidant brought expertise in implants (devices). What they (Guidant) didn't have was the capability to know what to do with the information after it was collected."

CIOs are generally excited about GE's purchase of IDX, but they said it is too soon to know how the integration will go.

- "Our relations with GE are very, very good, and we are very excited about the IDX purchase. But we have issues with data transfer from IDX to Centricity."
- "GE is doing what Eclipsys did. The applications clearly don't talk to each other. It will be tough, a challenge, for GE to fix IDX. IDX needs to be built on a more standard base."
- "So far, it is all talk, but I'm cautiously optimistic. GE has some heavy lifting to improve the product. It has to integrate it and do a lot of housekeeping and cleaning up. It is a very difficult position."
- "My big question for GE is: What's the roadmap? GE has the pocketbook. If it sticks to its guns and has a solid roadmap, it will be okay. If GE stabilizes and integrates the product, they can grow the product."
- "IDX is a great product, but it is very heterogeneous, and there are a lot of errors in the product. IDX had some sales, but it wasn't taking care of the product."
- "GE has size, but it doesn't understand healthcare very well."
- "GE has a good process for adding things and bringing them up to their standards, but that takes time."

Enterprise Access. GE also announced a partnership with Mobil Access to bring wireless to healthcare facilities via a "distributed antenna system," Enterprise Access. A GE official said, "Most customers have 10-50 different wireless systems in the hospital – for calls, wi-fi, two-way communications, fire and alarms, pagers, medical telemetry, etc. This is overly complex and lacks integration. With Mobil Access' distributed antenna system, a hospital gets rid of multiple antennas, lowers overall costs, lowers overall maintenance costs, and simplifies security."

A Mobil Access official said Enterprise Access also increases the safety of cell phone use in a hospital, "When you use our system, cell phones are at a lower power than outside the hospitals because our network connection point is closer."

Asked why GE wanted to get into wireless access, the GE official said, "There is a lot of value in partnering with companies on expertise. Our expertise is our knowledge of the clinical use of devices, and we've been installing medical telemetry for 20 years, and we understand it. There are unique RF issues in a hospital…We clearly see a wireless explosion coming."

Mobil Access has more than 1,000 sites outside of healthcare, but so far only a handful in healthcare. Medical telemetry is just being integrated into the Mobil Access system, with a pilot due to start shortly and a release expected in mid-2006. GE will sell and service the system.

HEWLETT-PACKARD (HP)

Healthcare is a top priority, a strategic market, for HP. Chuck Kinzel, HP's Director of Sales, Americas Healthcare, who is responsible for the company's provider/payor market, said, "We provide infrastructure services…Our role is always to go to market with our partners. That means we team with the major companies. Our (HIS) intellectual property is limited to a system in Spain, and we have no plans to move that toward the U.S. We are not interested in that. We won't do that. Our role is not to compete with our partners but to augment their products and services."

IBM is HP's key competitor in this market. Kinzel gave some reasons customers should choose HP over IBM: "Our history, our expertise, and our partnership model – that we won't compete with them. For us, when we talk to customers, we bring one message and that is that we don't bid against our partners, so that leaves us with one customer face. When you look at the HP history in healthcare. We basically made engineering boxes that went in OEM boxes, and we've had a 20-25 year relationship with some partners, so we are experienced in healthcare and healthcare issues, where others are not."

What's new at HP?

➢ **A medical archiving solution** which offers DICOM-based picture archiving. We can take customers' existing PACS, put them on a grid, and offer multiple modalities, depending on how much money they want to spend on archiving a file. With the grid, they have options, like putting (storing) things on lower cost tape. It is a fixed content source. This is a better alternative and not competitive to any PACS; PACS sits on top of this."

The HP Medical Archiving Solution, which stores data on HP ProLiant servers, also received a new certification from PACS provider Siemens. "The HP Medical Archiving Solution is designed to work with a wide range of environments, addressing the needs of healthcare providers from large health systems to small regional hospitals and medical centers," Kinzel said. The system also helps hospitals and other healthcare organizations comply with regulatory requirements guiding the storage, transmission, and protection of patient data.

➢ **A radiology information system (RIS) product** which reduces the hospital's cost of email storage and record-keeping. Kinzel said Siemens and McKesson both use this now.

➢ **St. Olav's Hospital** in Norway, a totally new digital hospital. This is not top priority, but it is representative of the increasing drive for data in a hospital. And the design is different, with patient rooms more individual and closer together, cutting walking time for nurses. The project is a joint effort of HP, Cisco Systems, and CARDIAC. Cisco's Medical Grade Network framework and CARDIAC's Integrated Hospital (middleware), with HP as the integrator through its Digital Hospital Infrastructure (DHI) program. The joint effort will let hospitals share patient information quickly and with a high degree of security, track mobile equipment and assets wirelessly, communicate with patients and colleagues wirelessly and in real-time, and monitor patients remotely, quickly, and accurately.

HP is also interested in working on industry standards. Kinzel said, "One Brailer key initiative is industry standards, and all of our (products) meet those standards…We have people on a lot of the committees working with RHIOs to understand what HP brings to the table. The model is still developing, so I can't say what HP's association with RHIOs and the models will be…It is interesting to see the different models and who is taking the lead. We want to stay on the forefront of the models but to be sure we can play with all of them."

At HIMSS, HP's goal was to demonstrate the breadth of the company's products and services and what they can do to reduce costs and meet a CIO's needs in today's changing environment. Kinzel said, "Sometimes HP gets pigeon-holed, viewed as a printer company or a PC company, and we are so much more than that…We have a larger share of the (healthcare IT) market than anyone. We ship more technology to healthcare than anyone – $1.5 billion. Traditionally, a lot is technology, but our service industry is growing. We are also in a lot of booths with partners. McKesson and Cerner, for example, see the value of the HP brand to their applications, and we have a very loyal customer base."

Over the past year, HP has become more involved in marketing. Kinzel said, "We are more strategic with our partners. We used to provide hardware, and they led marketing, but now we are elevated to where the CIO is responsible for the whole hospital's IT, so it is more underlying architecture questions. If they can bring the HP brand along with them, it adds weight to proposals, so we do joint planning, marketing, sales, customer events, etc. They see HP stepping up to see what more we can do instead of at end of deal just what can we ship."

McKesson

Pam Pure, President of McKesson, offered these performance highlights for McKesson over the past year:

- 2.4 million logins/month with the Horizon Physician portal.
- 800,000/month with Horizon Expert Orders (CPOE).
- 48% growth in Horizon Medical Imaging.
- 20 products in the top 3 in the KLAS year-end report.

She said she was particularly proud of:

➢ **Duke University's** success with Horizon Expert Orders. She said, "They did an extensive RFP for ambulatory and awarded us the expansion of our relationship to include ambulatory. This is very significant. They have 80 health clinics and physician practices with 1,500 physicians. They are really ready to and think this is really the right time to implement this technology.

➢ **Triad Hospitals**, which is doing a $1.3 billion clinical and business transformation project, which includes $120 million in McKesson software and services and $42 million to Perot for central data center operations. Pure said, "The final two (potential suppliers) were McKesson and Cerner, but we were chosen because of the strength of our product, that we can now quickly and cost-effectively deploy the solution. Physicians bought into the portal and CPOE…We work on our relationships every day. If anyone says this is not a relationship and service business, they are wrong."

➢ **Europe.** Pure said, "We have had a strong business in France for a long time, and we have 39 Trusts live on ESR (electronic staff records/payroll systems), paying 108,000 people in the U.K. We had bumps in the road in the U.K. project, but it is back on track and going well."

➢ **Cutting the time** from service to value product nearly in half.

"The industry is not making the progress it expected to make with EMRs and regional efforts," Pure said, adding, "We can't blame the technology any more. We feel strongly the opportunity to accelerate that the change will require strong leadership. The booth theme at HIMSS is: Giving our customers the power to lead…And by accelerating implementations, we are getting more satisfied customers."

Pure cited several steps that McKesson needs to accomplish:

1. **Physician portal access.** Only 25% of hospitals provide portal access to physicians outside the hospital. She called that "an embarrassment."
2. **Image-enabled care.** Pure said, "You can't be a leader without the power. I think we will uniquely stand out as a company giving customer access to images."
3. **Eliminate medical errors.** McKesson also has a new medication cabinet product. Pure said, "We are looking from bedside back on how to manage medications. We are trying to re-invent the nurse station, make the entire nurse station portable, and have it go with the nurse. CarePoint-RN is a new project that reinvents the cabinet space…It decreases the time to gather medications and supplies at pilot sites by 83%, shortening documentation time by 30%. We'll never get ahead without reducing the cabinets…We need to drive treatment to the patient's room. We have the only (pharmacy) robot. ***We took the brain of the robot software all the way to the cart.*** Our goal is to keep people out of pharmacy, to have meds delivered directly to the cart. No one else can match this strategy. Three customers have this technology so far, and they've seen a 9% increase in nursing time spent on units and a 12% time retrieving meds cut down to 4%."
4. **Drive evidence-based care.** McKesson wants to automate and connect physician offices, including getting to individual community doctors ***through health systems,*** and they have projects underway in Kansas City and at Duke.
5. **Deliver care in the home.** McKesson is trying to help customers manage chronic disease. Pure said, "You'll see 20 companies (on the HIMSS exhibit floor) with a kiosk or a portal. What we've tried to do is look at users and support the process. We have a kiosk for patients, a Patient Vision product, for patients to use in the hospital to keep up with care. For homes, we have encounter management, etc."

Asked what McKesson has that is unique, another McKesson official said, "We added a carotid module to our PACS system, an endoscopy module, which is really getting into the ability to do optical images."

In the ambulatory market, an official said, "We have our own systems that we install that provide EHR and also e-prescribing. We are marketing to large practices and also through acute care to physicians. The thought is that when Stark is realized a little, then the hospitals can do more for the independent physicians, and that is our strategy…The only way to have EHRs move from doctors to hospitals is to make sure they are using the same database."

Pure said McKesson is targeting three distinct ambulatory markets:

1. Hospitals and IDNs. "These are people who already did inpatient and now are doing ambulatory."
2. Large, stand-alone physician practices (≥75 doctors), which she estimated is only penetrated 25%-30% by all vendors.
3. Others, including smaller, stand-alone physicians. McKesson plans to reach doctors affiliated with hospitals and health systems through partnerships with those facilities.

Pure described McKesson's ambulatory market strategy this way: "We will hit each segment with a tailored offering. We aim to get a significant presence in each in two years. We expect to be very successful going after the (hospital and IDN) group, that is the most likely place to increase penetration… We'd like to double penetration from 15% to 30% in a couple of years, and the hospitals and IDN group will drive it. In the large, stand-alone physicians, growth will not be as fast because of (their lack of) access to capital."

Asked about Cerner's decision to sell its own medication cabinets, a McKesson official said, "They are trying to get in the closed loop patient safety area where McKesson already is. Cerner has to fill a few missing links, and cabinets is one. It is a threat obviously because we have a number of clients who don't have our HIS who use our cabinets, but I think it is a bigger threat to Cardinal with Pyxis."

Among customer comments were:

- "McKesson is not a big diagnostic company. It's a drug provider. What McKesson has that GE and Siemens don't have is medication cabinets, pharmacy robots, and a pharmacy purchasing program. McKesson has a continuum from ordering and distribution to the bedside."
- *On the ambulatory market:* "It seems like they are trying to invest more into a more integrated approach. Traditionally, McKesson has been known as fragmented, but its reputation is improving on integration, making them able to be considered."

SIEMENS

Siemens was showcasing Sorian, with its portfolio of workflow-driven HCIT solutions. Tom Miller, president of Siemens Healthcare IT Division, said, "Patient care is no longer about one doctor's office or one hospital bed. It's about care delivery occurring across multiple settings and among interdisciplinary care teams, each with a network of collaborative support systems that must act in a coordinated and timely manner. Siemens is transforming the way care is

delivered by breaking down the traditional boundaries that exist in today's care settings: too few resources, unavailable information, and broken processes."

CIOs were generally enthusiastic about Sorian, but most shoppers were not including it on their short-list because, they said, it is not yet ready for prime time. A CIO said, "Siemens scares the daylights out of me. It's like AT&T before the breakup. It is very, very big, trying to be everything to everyone. It is so big that it worries me…There has been a lot of hype about Sorian customers, but I don't see people saying they have it and like it, and I heard Siemens officials in Germany are unhappy, that they are dissatisfied with sales and that segment of the company. I wouldn't be surprised if Siemens jettisoned the division, but they probably can't get rid of it because GE bought IDX." A Siemens user said, "We are looking for a clinical documentation system now, but Siemens is not on our short-list – which is Eclipsys, Epic, and Cerner – because Siemens is not ready when we need it."

Siemens claims to have more than 100 Sorian customers live on the system, including 57 in the U.S. but those are sites in various stages and are using various Sorian modules, not CPOE, and it is CPOE capability that CIOs said they are waiting to see.

Siemens officials claim Sorian's CPOE will be ready for prime time later this year, but another knowledgeable source predicted that it won't happen until late 2006 or, more probably, early 2007. He said, "Feature functionality in a non-beta environment won't be ready until then. To get to the Cerner and Eclipsys level, it will take until mid-2007, but it will be worth the wait." A Siemens official said, CPOE is ready and could be deployed at smaller sites. We will work on making it more robust. We have the breadth but we need the depth."

On the HIMSS exhibit floor, Siemens was demonstrating how Sorian's:

- **Pneumonia Workflow** can identify patients with community-acquired pneumonia and initiate orders automatically, accelerating completion of the diagnostic phase. The system assists doctors in completing tests and triggers an intravenous (IV) antibiotic protocol within four hours after admission, reducing manual paperwork and phone calls.
- **IV Restart Workflow** tracks and initiates IV site care protocols to prevent infection and maintain IV access.
- **NPO Workflow** can eliminate rescheduling of tests and subsequent delays in treatment, optimizing radiology throughput and workflow and maximizing resource utilization.

A Siemens official offered several broad reasons CIOs should choose Siemens:

- Ease of use of the system.
- HTML, so no special browsers are required.
- Company size and commitment to healthcare.

Chester County Hospital, a 238-bed hospital in Pennsylvania, has been one of the beta sites for Sorian. Ray Hess, Chester's vice president of information management, said they chose Siemens in part because it was close and in part because of the opportunities that came with being a beta site, "We bought Siemens' vision." He said everyone at his hospital is happy with the decision, "From the board chairman on down, everyone would do it again. There were issues, challenges, and frustrations, but the excitement has continued."

Hess cited several reasons they bought Siemens:

1. **Vision.** "Siemens has a 'medicine meets IT' approach. They had all the pieces, and we had a lot of their technology…We are not an all-Siemens shop, even now, but we are moving more to a 'best of show' vs. a best-of-breed approach, with a suite of Siemens products…There are some good systems, but Siemens spent more on Sorian than some of the other companies are worth."
2. **Workflow engine.** "Siemens has a unique concept, and I've still not seen anything to match it."
3. **Longevity.** "We wanted a system that will be around a while (10-15 years)."

At HIMSS Siemens also announced a partnership with Vocera Communications, a developer of wireless voice communication systems. Siemens will integrate Vocera into Sorian, though the combined product is not yet commercially available. The Vocera Communications System is comprised of the Vocera System Software and the Vocera Communications Badge. The badge – a wearable device that weighs less than two ounces and can be clipped to a shirt pocket or worn on a lanyard – enables instant two-way conversation using natural spoken commands. When live conversation is not necessary, text messages and alerts can be sent to the LCD screen on the back of the badge. The system can also connect to a hospital's PBX to place and receive public telephone calls. ♦