

Contents of V8N1



Electronic Health Records & Online Security: An Overlooked (HIPAA) Medical Necessity

Feature Articles



Thoughts from the Publisher *by Arthur Gasch* [03]

Electronic Health Records Security: An Overlooked Medical (HIPAA) Necessity [05]

2006 HIMSS Healthcare I.T. Conference News [10]

AACN Preview [18]



Defibrillator Leader Focuses Attention On Quality CPR; Supports 2005 AHA Guidelines [19]

Developing Q-CPR™ for the HeartStart MRx [21]

Philips HeartStart FR2+ Incorporates SMART CPR Technology [23]



Philips Patient Monitoring Leverages Strengths in Monitoring, Measurement, and Information Management for Visionary Clinical Decision Support Strategy [25]

Careful Surveillance Required Following Sharp Rise in ICD Malfunctions *by Lawrence J. Gessman, M.D.* [27]

Advanced Monitoring Strategies for the Ambulatory Patient [30]



The Future – An Integrated, Wired & Wi-Fi Wireless, Industry Standards Based, Shared Network [34]

Spacelabs ICS Improves Decision Support at East Texas Medical Center Athens [38]

Technology Highlights



Medical Short Takes [42]

Stem cell sources [42]

Gene linked to effectiveness of anti depressant therapy [43]

Potassium-sparing diuretics reduce risk of Alzheimer's [44]

Folic acid enriched grains help reduce strokes [44]



Vendor Short Takes [45]

Low voltage caution issued for Contak Renewal implantable defibrillators [45]

Philips announces it will acquire Witt Biomedical Corporation [46]

Draeger Medical added a knowledge based weaning system to their EvitaXL [46]

Thoughts from the Publisher

Patient Monitoring Update & AACN Preview in this Issue This issue addresses two important market segments. One is the U.S. hospital patient monitoring market. In this issue we have included 8 articles covering products from 4 major U.S. vendors and a special editorial by Dr. Lawrence J. Gessman, M.D., from the UMDMJ and Robert Wood Johnson Hospital on routine, remote testing of ICDs. Vendors discussed in-depth include: Philips, Nihon Kohden, Draeger Medical and Spacelabs – all of whom are introducing interesting new products. Our hospital readers will want to go over each of these articles carefully. Many of the products discussed in these articles will be displayed for the first time at the May AACN NTI conference in Anaheim. Immediately following this editorial, we have run a short preview of the upcoming AACN meeting that will start on May 23rd.

The other major market covered is the rapidly emerging physician office EHR market. For our growing number of physician office EHR readers we have published the news from the 2006 HIMSS conference held this year in San Diego, CA.

2006 HIMSS: Full of Surprises and Important Announcements Regarding EHR Conversion This content is a must read for all physicians in private practice who have not yet implemented EHR systems, as Dr. David Brailer, a keynote speaker at HIMSS, made it pretty clear that if physician groups don't adopt EHRs voluntarily, there could be a government mandate to do so. Brailer's innuendos sent shock waves through marketing executives of many of the larger EHR and RHIO companies and should also be of grave concern to physicians, as a government mandated solution would offer far less choice than the 100+ viable commercial alternatives currently available.

TEPR Conference is Next EHR Tire-kicking Opportunity Be sure to read the HIMSS review in this issue. It also

contains a wealth of information on various EHR vendors of all sizes and what they were showing at HIMSS. Physicians interested in EHR tire kicking, should plan to attend the TEPR meeting also scheduled for May or MGMA, AAFP or other specialty medical conference of their choice scheduled for later in the year.

While at HIMSS, we interviewed about 40 of the 800 vendors exhibiting and have provided brief abstracts on some of the more interesting ones in this issue. Follow up coverage will be in the next issue with additional vendors we visit at the upcoming TEPR (Towards an Electronic Medical Record) conference.

12th Annual Andrew & Associate EHR Vendor Survey Announced If you can't attend one of these conferences but would like some vendor-neutral, truly independent information on EHR system features, subscribe to our newsletter and catch the 2006 Andrew & Associates 12th Annual EHR survey of over 100 EHR vendor's systems that will be the feature of our next issue. This is by far the largest and most respected EHR survey available, because it is based on the IOM and subsequent standards, has been run consecutively for the last 11 years and contains more EHR vendors than any other in-depth survey. The 2006 survey will contain data on 100 (and counting) EHR vendors.

MSP Reality EHR Navigator™ Announced Data from the current Andrew & Associates survey can be obtained, starting May 1, on CD – allowing practices to browse EHR vendor features. Orders for the MSP Reality EHR Navigator™ CD will be accepted starting May 1, and the CD will ship in May. State DOQ-IT managers, take note – this is the EHR data you have been asking for.

Is Your Practice Ready For EHR? Is your practice ready to implement an EHR? Do you have a current summary

of your workflow for each type of patient you see in your practice? What is your budget for EHR? Is it realistic? What are the advantages of a phased versus an all-at-once implementation strategy? How can you find impartial (and verifiable) data on over 100 EHR vendor systems. Who offers such data that does not have a financial relationship with the EHR vendors? To answer these (and other) important questions, visit the EHR section of our web site (www.medsp.com).

Reality EHR Selector On Track For Summer 2006 Introduction Later this summer, MSP will be introducing the first comprehensive EHR selection tool, the Reality EHR Selector™. This remarkable new tool is the only one based on the 2006 version of the Andrew & Associates 12th Annual EHR and Workflow Management Survey, will provide a Wizard-driven, intuitive approach to automating your practice charting and implementing an EHR, whether you prefer a document scanning or dictation and transcription or structured data entry approach to EHRs.

The Reality EHR Selector™ offers information on 2-1/2 times as many EHR vendors as the HIMSS selection tool, supports ALL popular approaches to EHR implementation, helps document your practice's workflow and is a truly independent and impartial selector tool because MSP has no hidden financial strings to any EHR vendor, nor does it receive the majority of its annual revenues from EHR vendors (like HIMSS and other associations do). Watch for details on this innovative new product in our next issue. Not yet a subscriber? Well, what are you waiting for?

Senate Hears GPO Abuses, Then Refusing to Provide Meaningful Reform Once again the Senate, after hearing the abuses of GPOs, fails to adopt any meaningful reform. The political contributions by GPOs are apparently just too attractive to turn

away, particularly in an election year. After three years and thousands of pages substantiating GPO abuse, Senator Mike DeWine and Herb Kohl can't get their colleagues, many of whom are GPO pact fund recipients, to support any meaningful reforms. Congress again puts the special interests ahead of the interests of average American voters who are struggling for the 5th consecutive year with double-digit increases in their health insurance premium costs.

It is now abundantly clear that Congress can't afford to adopt any meaningful GPO reform. So while Dr. Brailer is talking about EHR adoption at doctor's expense and how it would save 7% from the national healthcare budget and reduce fraud, the good Senators on the Senate Judiciary's Subcommittee on Competition Policy and Consumer Rights can't get congress to provide meaningful GPO oversight of exorbitant contract bribes, known as "user fees".

Hopefully, these elected officials will find voters across the country are fed up with such pandering to special interests and will vote many of the

rascals in Congress out of office in the next round of national elections. It time to sweep Washington clean of officials who are bribed by special interest healthcare lobbyists, and elect officials who will actually take care of important national priorities like reforming the current healthcare system.

If voters remain complacent about such issues, it simply signals Washington legislators that continued bribes will be tolerated by voters and nothing meaningful needs to be done. Certainly there are many problems besides GPO abuse in the current healthcare system but if our elected officials are not willing to address the simple and well-documented problems, what hope is there that they can fix the more difficult ones.

It is abundantly clear that the current trends in healthcare costs are not sustainable and that the U.S. Healthcare systems, as a free and independent system with patient choice, is on the verge of collapse. Without significant and far reaching reform, the entire U.S. healthcare system will undergo major government restructuring

within the next 6 years, and a free healthcare system that this country has had, will be replaced by an inferior, government run and mandated single payer system that operates with the same quality and efficiency as the current VA hospital system.

Americans need to be more assertive about the failure to reform GPO purchasing abuses. GPOs, lawyers and pharmaceutical companies are profiting under the current dysfunctional system, while CMS blatantly continues under-reimbursement for services provided to its members, shifting the losses directly onto the backs of working Americans via inflated premiums for their private healthcare coverage. This is the real reason that there are 46 millions Americans who cannot afford healthcare coverage. Will 280 million insured under a single-payer CMS under-reimbursement scheme improve healthcare services for those currently insured? Change is definitely on the healthcare horizon, the question is not if it will happen, but rather what will a new system look like?

Arthur Gasch,
Publisher

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Electronic Health Records Security: An Overlooked Medical (HIPAA) Necessity

Written by Arthur Gasch, Medical Strategic Planning with technical assistance from Tracy McAllister, ParetoLogic Inc.

With widespread political support and pressure from the Centers for Medicare & Medicaid Services (CMS), health professionals are slowly moving towards Electronic Health Records (EHR). The American Academy of Family Practice has asserted that the effective use of information technology (IT) is essential for the provision of high-quality care in the increasingly complex health care field. Purchasers of care, including some large employers and the Centers for Medicare & Medicaid Services (CMS), are promoting EHR adoption.¹

Although only 11.5% of physicians in the United States have a fully implemented EHR system as of February 2005, more than 45% have begun implementation or will within the next 2 years.² That being said, in July 2004 the Department of Health and Human Services (HHS) unveiled a 10-year plan to create a new national health information infrastructure, including an EHR for every personal health record and a new network to link health records nationwide, and appointed Dr. David Brailer as national healthcare Czar to make it happen.

In 2004 at the HHS Summit on Health Information Technology in Washington, HHS Secretary Tommy Thompson stated that *"electronic health information will provide a quantum leap in patient power, doctor power and effective health care. We can't wait any longer."* He estimated that adoption of EHR systems nationally could save 10% of the nation's current annual \$1.7 trillion health care bill. He also said that *"EHR's would improve privacy, better protect medical records and decrease medical errors while reducing administrative costs. Patients would own and control access to their own medical records"*.³

It is evident that the benefits of EHRs, such as improved access to medical information, improved workflow and patient communication, as well as a decrease in expenses, outweigh the cost of implementation but there

are many security risks involved in moving towards a fully electronic health records system. The Centers for Medicare & Medicaid (CMS) states *"as CMS is a trusted custodian of individual health care data, we must protect its most valuable assets, its information and its information systems. At CMS, we believe that putting the government's credibility at risk is not acceptable."*⁴

What Security Threats Does EHR Impose? As health care providers are bound by strict security laws, regulations, policies, procedures, standards and guidelines around client confidentiality, a big concern when switching to EHRs is the risk involved in patient security. In today's world, anti-virus software alone does not protect Internet users from spyware, identity theft or other electronic threats.

Spyware has quickly evolved from an online nuisance to one of the most dire threats facing the Internet... many find themselves trapped in a cyclical battle against programs that install themselves without warning, open dangerous security holes and reinstall themselves after they've been deleted. The worst of these programs allow online criminals to hijack users' sensitive personal information at will...

According to the Anti-spyware Coalition, "spyware has quickly evolved from an online nuisance to one of the most dire threats facing the Internet. As users struggle to maintain control over their computers, many find themselves trapped in a cyclical battle against programs that install themselves without warning, open dangerous security holes and reinstall themselves after they've been

deleted. The worst of these programs allow online criminals to hijack users' sensitive personal information at will. As the threat has grown, so has the need to mount a coordinated defense against these unwanted programs and their adverse effects."⁵

This is not just a problem for healthcare; in the financial industry tax fraud is at its highest since the advent of electronic filing. The problem has become so widespread in the United States that the Federal Bureau of Investigation (FBI) has created a web site for reporting identity theft. In 1995, the biggest story regarding electronic tax fraud in the United States involved the conviction of 3 people in Houston for filing 800 falsified returns using stolen identities. By 2003, one in every 933 returns filed in the U.S. was fraudulent.⁶

While many health care professionals have some familiarity with the Internet and its inherent risks and may be using some sort of anti-virus software, far fewer are familiar with the importance of anti-spyware applications. Spyware is now widely recognized as a bigger threat than computer viruses, even by leading computer virus makers such as Symantec. According to the Computer Security Institute (CSI) and the FBI's Computer Crime and Security Survey, 99% of companies use anti-virus software, but 82% of them were still hit by viruses and worms.⁷ A recent study by Forrester Research, an independent research firm, states that *"a clear majority of North American computer users (60%) fail to scan for spyware at least once a month. Furthermore, 45% of users don't even know what spyware is, much less how to protect against it."*

According to a report by the Radicati Group, the anti-spyware industry is projected to reach 1.2 billion in revenue by 2010. Because of the concentration of data on millions of people in relatively few places, the potential for thieves to steal hundreds

of thousands of records at once is now possible, as thefts reported by credit bureaus and other corporate entities in 2005 alone documented. There is very little liability so far to companies that do not adequately protect this information, nor means of redress for the victims of such crimes, a fact that Congress has been very slow and loathe to address. Outright theft however is not the only problem, spyware can also cripple productivity.

Health service facilities lose revenue due to lost claims and computer system errors and crashes. Spyware is one of the leading causes of computer system failure and according to a June 2005 study by the Radicati Group, the cost to deal with a spyware infected computer is roughly \$265.00 per user for each time that a spyware infection is identified.⁸

In a spyware article in the Magazine for Senior Financial Executives, an IT support staff member at Miami Children's Hospital stated she noticed something just wasn't right with the desktop machines used by the hospital's 650 physicians and 2,400 employees. "We had machines that experienced freak reactions" says Alex Naveira, the hospital's information security officer. "They were running too slow or they reacted oddly to Websites and pop-ups. After a battery of tests, the diagnosis was clear: an acute case of spyware."⁹

In medical applications, a big concern is the ability for spyware to infiltrate a computer system and monitor the user's actions through keystroke loggers or screen captures, placing confidential patient information and identity at high risk. Spyware system monitors vary in their sophistication and capabilities to record some or all of the following: keystrokes, screen captures, emails, chat room conversations, instant messages, Web sites visited, programs run, time spent on Web sites or using programs, or usernames, passwords or other types of data in transit. This sensitive, medical and personal information is typically either stored for later remote retrieval

or transmitted to the remote process or person employing the monitor.¹⁰

Unfortunately, spyware is usually installed surreptitiously, without the user's knowledge, capturing keystrokes, personal information, and marketing data and then sending that information to a third party. Spyware is therefore far more likely than a computer virus to intercept information that could steal personal identity. While viruses and other malware caught by anti-virus software are usually intended to replicate and take over computers for use by the virus writer, spyware and keystroke loggers (typically called keyloggers) operate silently in the background, reporting the information to a third party. If they go undetected by a doctor or medical center (that is known to have access to patient records) and that information is lost, the liability under HIPAA will rest on the providers, since the third party who used their computers to steal the information is long gone or not easily traced. The key is prevention, not finger pointing after the horse is already out of the barn.

Medical Providers Need More than Anti-virus Protection Anti-virus software alone (such as programs available from well-known anti-virus suppliers) does not adequately safeguard against spyware or help make computer systems HIPAA-compliant. In order to ensure that patient information and identity is not jeopardized, an anti-spyware program that will help eliminate security threats is critical and should be implemented prior to the implementation of EHRs (and computer practice management systems as well). This is why MSP is including information, as well as a free Spyware Awareness Tool (SWAT) of an excellent, anti-spyware program on its forthcoming Reality EHR Navigator™ and Reality EHR Selector™ programs. This is one of several software utilities that MSP has arranged to be included in its software.

The Threat of Keyloggers Keyloggers have existed in some form for many

years. The growth of spyware in this decade has resulted in a mass propagation of the technology. In an article on the spread of spyware infections via the Internet, the respected Internet research firm, Gartner Group reported, "At mid-2004, Gartner's customers are seeing a surge in manifestations of 'spyware,' invasive methods to steal user privacy that disrupt users and their workstations at home and at work. Customers report that the cleanup effort may take a few hours, but that in no time at all, the same systems are infected again."¹¹

Keyloggers present one of the major risks when using computer practice management (CPM) or electronic health record (EHR) software or interacting with Internet sites. Keyloggers are applications that monitor a user's keystrokes and then send the information via the Internet to a malicious 3rd party (the source of the spyware). They will typically generate a log file or even screen shots of what is on the user's desktop, and email or download this information to a server somewhere else on the Internet. These user logs or screen shots can then be used to harvest personal information including details of patient claims or medical records from the unsuspecting user causing violations of HIPAA laws and putting practices at risk.

Variations of Keyloggers Keyloggers found on the Internet are created in one of two forms. The developer may create malware by exploiting a 'hooking' mechanism involving the Microsoft Windows operating system. This type of logging is accomplished by using the Windows function SetWindowsHookEx() that monitors all keystrokes. The spyware will be delivered in the form of an executable file that calls the hook function, plus a DLL file to handle the logging functions. An application that calls SetWindowsHookEx() is also capable of capturing 'auto-complete' passwords provided as a service to Windows users. Kernel based keyloggers operate at the kernel level, inside the heart of the operating system and receive data directly from an input device, which

is typically the keyboard. This form of keylogger can be almost undetectable because it launches when the user's computer boots into the operating system before any security applications or other programs are loaded and active.

EHR software and medical electronic filings are prime targets for spyware and keylogger developers. The personal information entered into EHR or practice management computer software is exactly the type of information that identity thieves seek. Healthcare professionals who submit patient claims electronically, without anti-spyware installed on their computers, are exposing confidential patient information such as: name, address, birth date, social security number and/or medical number to identity theft. Even computer practice management systems connected to the Internet may be open to a screen scraper taking a screen shot of the patient's information and passing it on to someone else who will use the information for personal gain or could go as far as stealing their identity. Adding an EHR simply expands the scope of patient information that will be exposed and increases potential practice liability.

The financial implications of having a security breach explain why the Radicati Group reports that the number of anti-spyware programs installed on business computer systems will increase from 16 million in 2005 to 540 million in 2009. Realizing that highly confidential information, including banking and patient information, is at risk, the IT and office managers of leading health facilities are increasingly employing anti-spyware tools.¹³ Medical Strategic Planning, Inc. (MSP) has found that some tools are far more effective (and less disruptive to office workflow) than others.

There are many anti-spyware programs available for download and trial on the Internet, however MSP has found that not all programs are the same in terms of scan speed or the number of

security threats detected and removed. Ideally, an anti-spyware detector should not drag down machine performance, should run quickly and still catch all of the risks. That is the ideal combination. But it doesn't matter how fast a spyware detector runs if its false-negative performance misses actual spyware programs installed on your system.

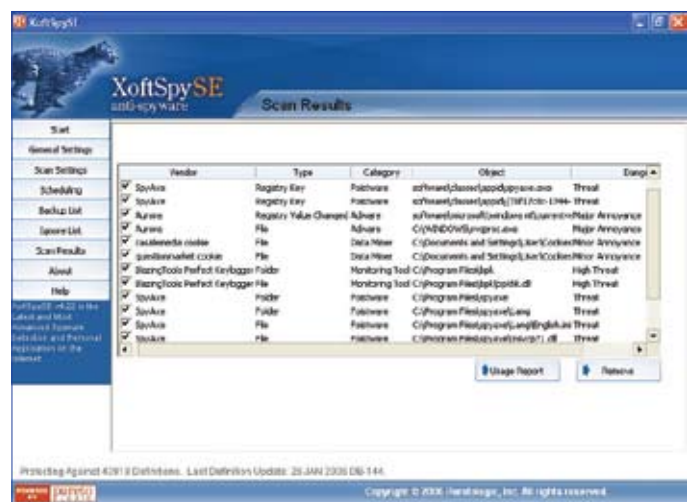
At MSP, we use computers running various versions of Microsoft Windows (including 2000 Professional, XP Multimedia and Professional, 2003 Server Small Business Edition and others). As a first line of defense, we installed the Microsoft Beta 1 version of anti-spyware on all of these systems. Microsoft's anti-spyware program is being integrated into the next version of Windows (Vista), which we are also beta testing. In spite of having this real-time anti-spyware software installed, spyware programs still penetrate our systems. This was also true of Computer Associates' Pest Patrol, real-time anti-spyware programs – they let spyware programs penetrate them. Of the two, Microsoft anti-spyware was the more effective, but still let threats through. We know this because we have downloaded and installed a variety of on-demand anti-spyware scanners on our computers and find spyware in spite of the supposedly, real-time protection offered by Pest Patrol, Microsoft Anti-Spyware and Sunbelt's Counterspy. We have tried on-demand scanners including ParetoLogic's XofterpySE and Spybot Search and Destroy and others, running them at the same time on the same computer, to see what "threats" they detect and how long it takes them to scan the 318,000+ files on our testbed computer. Of all of these products, the best we have found is ParetoLogic's XofterpySE. We now use that in combination with Microsoft's real-time Anti-Spyware detector, to clean up what Microsoft misses and lets through.

The Best Protection for Computers Running Microsoft Operating Systems If your computers use a



Microsoft Windows operating system, ParetoLogic Inc. offers the best leading-edge anti-spyware solution, we have found. XofterpySE, a state-of-the-art program that detects and removes known keyloggers and spyware intended for identity theft, was the fastest of the programs we tested that didn't miss spyware threats and did not drag down computer performance to a crawl while it was scanning (unlike Sunbelt's Counterspy and others). Perhaps it is so effective because ParetoLogic already has compiled one of the largest detection and removal databases in the industry. To make that database even more comprehensive, the company is introducing its new (and patented) Zheng technology, which will substantially expand its spyware database in the future, making its detectors even more effective.

Zheng Technology to the Rescue Zheng technology is an online research system (employing a webcrawler) that identifies information within a network, detects and logs attributes of interest on the identified information, categorizes and generates reports based on the purpose of the research project, this includes researching online threats. Think of the Internet as a single book of browsable information that is so impossibly large that the idea of reading it all is an absurdity. For every 10 pages you read, 10,000 new pages are added. You'll never make it to the end – indeed, you never read it in sequence either. You are just as



Above photos show the process of XoftSpySE as it scans for spyware and viruses. L to R.
<http://www.paretologic.com/industry/health.aspx>

likely to browse one of the “newer” pages as one of the “older” ones. Although you can’t read the whole book, Zheng technology uses search engine (webcrawlers) to electronically scan millions of Web pages for any conceivable topic, so it’s easy to find the right chapters and quickly identify online threats. This results in the ParetoLogic “threat database” being increased and makes XoftspySE (when Zheng technology is integrated later this year) more effective at detecting threats. It may multiply the ParetoLogic threat database that already contains over 43,000+ threats by a factor of 2 or 3.

Run On-Demand Scanner After Each Internet Session Regular use of XoftSpySE will provide ongoing protection against spyware, keyloggers

and other forms of malware. XoftSpySE is designed to scan the user’s complete computer system to detect spyware parasites and quarantine the infected files for immediate protection. The scanner should be installed and run on every network server and workstation. In addition to scheduling XoftSpySE to automatically run once in the morning and later in the day, we recommend that you run it manually after every Internet browsing excursion. Unlike competitive products we tried, it will run in the background and not drag down the performance of other applications that are also active.

For those workstations or servers that are directly connected to the Internet, a scan should be scheduled at least 3 times a day. Use of XoftSpySE will help meet health professionals’ need

for high-performance, comprehensive, scalable, and customizable tools that detect online threats faster and more completely than other anti-spyware companies. Use it in combination with your favorite real-time anti-spyware program. Here’s what XoftspySE will do for you.

- Provide complete PC scanning, checking processes currently running, registry entries, files and folders.
- Detect and remove: adware, spyware, pop-up generators, keyloggers, trojans, hijackers, and malware from your system.
- Protect against more spyware threats using one of the largest spyware definition databases in the industry.

- Automatically keeps its code and threat database current, transparently to the user, so you always have the most up-to-date protection (during each 1-year license period).
- Operate quickly on your computer, not dragging down the performance of other programs that are concurrently executing.
- Help assure the privacy of your patients' confidential information, to help keep your electronic medical office HIPAA-compliant.
- Provide you with no-charge customer technical support (should that ever be needed).

In our own offices, we have found that regularly using XoftSpySE increases our productivity by preventing possible network intrusions and crashes, and the time to repair damage from these. It also provides the extra protection that Microsoft Anti-Spyware doesn't adequately provide. This is important to us because we have research contact names and client email addresses we do not share with anyone. While information and a free Spyware Awareness Tool (SWAT) of ParetoLogic's XoftspySE will be available on both our Reality EHR Navigator™ and our Reality EHR Selector™ later in 2006, you don't have to wait to avail yourself of this important anti-spyware protection. Download it directly from <http://www.paretologic.com/industry/health.aspx>, the ParetoLogic web site. You may be surprised to find there is already spyware installed on the computer you download this software with. We encourage you to give your computer, just like your patients, a physical check up to determine the presence of spyware. Download and use their free Spyware Awareness Tool (SWAT) to ensure the security of your personal and business computers. An annual license for the fully functional program including removal tools and customer support may be purchased for the program to remove any identified threats. The individual and volume license fees for ParetoLogic are

less expensive than most competitive products, so providing this protection will not be expensive, particularly compared to the cost of not doing so. Visit their web site at <http://www.ParetoLogic.com/industry/health.aspx> for the free Spyware Awareness Tool (SWAT) to discover if your computer is infected; license the product to remove any identified threats and also receive a 60-day money back satisfaction guarantee and unlimited free customer support. Watch our next issue for in-depth articles on other utility programs that will be included on the Reality EHR Navigator™ and our Reality EHR Selector™ software products.

About XoftSpySE XoftSpySE is an industry leader in advanced spyware detection and removal. XoftSpySE features a leading-edge anti-spyware solution that includes state-of-the-art detection and removal of known keyloggers and spyware aimed at identity theft. XoftSpySE is fast and has one of the largest detection and removal databases in the industry, providing powerful protection to secure your privacy and your PC.

About ParetoLogic Inc. ParetoLogic is an international software development company headquartered in Victoria, British Columbia, Canada. A member of the Software Industry and Information Association (SIIA), they specialize in providing advanced security applications for enterprise, business and personal computer users. These include custom software solutions for business and government. Δ

¹ Medical Groups' Adoption of Electronic Health Records And Information Systems, David Gans, John Kralewski, Terry Hammons and Bryan Dowd Health Affairs, Vol 24, Issue 5, 1323-1333

² Medical Group Management Association (MGMA) Center for Research, University of Minnesota School of Public Health, Assessing Adoption of Health Information Technology, funded by the Agency for Healthcare Research and Quality (AHRQ)

³ HHS pushes electronic health records, News Store by Bob Brewin, www.computerworld.com

⁴ "Holding Ourselves to a Higher Standard", Centers for Medicare and Medicaid Services, www.cms.hhs.gov/InformationSecurity

⁵ Anti-Spyware Coalition Definitions and Supporting Documents, www.antispywarecoalition.org/documents/definitions.htm

⁶ The Office of Refund Crimes of the Internal Revenue Service

⁷ Computer Security Institute & Federal Bureau of Investigation. (2003). Computer crime and security survey.

⁸ Radicati Group Report. Corporate Anti-Spyware Market, 2005-2009

⁹ "Somebody's watching you: spyware has come in from the cold to become corporate America's top security threat", CFO: Magazine for Senior Financial Executives, Summer, 2005 by John McPartlin

¹⁰ Anti-Spyware Coalition Definitions and Supporting Documents, www.antispywarecoalition.org/documents/definitions.htm

¹¹ Gartner, "A Field Guide to Spyware Variations," John Girard, July 2004

¹² Radicati Group Report. Corporate Anti-Spyware Market, 2005-2009

2006 HIMSS Healthcare I.T. Conference News

More so than in years past, this year's HIMSS, held Feb. 12th through 16th, was a nexus of convergence for hardware and software vendors, end-user and middleware vendors, national and regional special interest groups, civilian and military groups and various other providers and vendors. The conference had almost 800 vendors, making it financially successful for HIMSS even if the attendance was down from last year due to the freak storm that dumped 27" of snow across the Northeast, closing airports from Boston to Baltimore a couple of days before HIMSS, affecting vendor personnel attending as well as those registered. Still, 24,500 were in attendance for one or more of the five days this conference was open.

As with other healthcare conferences, Dr. David Brailer, spokesperson for the Bush Administration's efforts to convince the nation's physicians to convert to electronic patient records, was a keynote speaker. He pointed to the \$0.30 of every dollar he claims is wasted by the current healthcare systems as potential return-on-investment (ROI) if the system were electronic.

Dr. Brailer is increasingly chiding physicians to embrace the conversion to electronic healthcare voluntarily and under a free market approach, but increasingly insinuating that if they remain reluctant to do so, the federal government is willing to make such changes mandatory. While this may be a hollow threat under the current administration, it will certainly play into the Presidential politics of the next national election, now only a couple of years away.

Single-Payor, Government-Run, National Healthcare Plan Being Prepared? The appeal will not be to electronic records directly, but to the 46 million Americans who are uninsured – many of whom work, but whose employers don't currently provide healthcare coverage because it is too

expensive. The solution likely to be offered will be one national healthcare system (under government direction). Under such a system the government would dictate what information is required for reimbursement and how it must be transferred. Some believe that the government would push the open-Vista EHR, a clumsy, archaic EHR product used in the nation's VA hospitals currently by providers who have no choice but to comply.

Under national healthcare, CMS would become the not-so-silent partner of every U.S. hospital and group practice, and its mandates would have to be implemented, regardless of what they mean to hospital efficiency. Thus, the progress in EHR adoption is a harbinger of what is to come in U.S. healthcare overall. The worse case scenario is OpenVista, which would make all of the nation's physicians as productive as the doctors who work in the VA hospitals are now – a truly scary thought!

The Big Losers Under National Healthcare would be larger EHR companies like McKesson, Cerner, Epic, GE Healthcare, Meditech, and Allscripts because the market for their more expensive EHR solutions under a new, U.S. single-payer government system could dramatically shrink overnight. So these are the very companies who are supporting HIMSS' EHR Vendor Consortium and Brailer's rhetoric to get physicians to adopt EHR under a still voluntary system.

National EHR Goals Reiterated The latest goals articulated by Dr. David Brailer at HIMSS included:

- Empowering healthcare consumers to have access to their own records;
- Enhancing EHR Administration and reducing Administrative expenses;
- Improving clinical care by preventing drug and other errors and exposing & tracking deviation from "best practices" approaches; and...

- Enhancing the ability of the federal government to quickly detect and track chemical, biological and other national epidemics that require a coordinated, federal response; something that isn't specific to Republicans and will be a priority to the next administration who will have to continue the "War on Terror" and prepare this country for future biological and chemical attacks.

Government Fails at All Levels, Bureaucrats Blame Each Other If the failures of government at all levels during the Katrina storm has highlighted anything, it is simply how ill prepared the government (at local, state and national levels) is to face a real emergency. Three years after 9/11 they are not even able to communicate with each other and have no pre-coordinated chain of command to use. This appalling lack of coordination should be grounds for impeachment of a President who has created a new government agency to plan for and coordinate responses – one that absolutely failed to solve the most fundamental problems during Katrina, even with days of notice of the event. It should also be grounds to replace incumbent members of the House and Senate. Currently, 1.5 million Americans displaced from the Gulf States are still living elsewhere, after having lost everything they have, with any real resolution still years, if not decades away.

Vista, the Free and Obsolete EHR The "Vista" EHR (not to be confused with the next version of Microsoft Windows) was put into the public domain, not so much because it is a good or cheap or state-of-the-art solution, but because the government has already made it work in hospitals that it currently controls and know how to use it.

Doctors who think they can simply put their heads in the sand for much longer and ignore this situation had better get ready to retire because the EHR issue is the tip of a smoldering

healthcare iceberg of problems that will explode during the next 5 years. This is the very time frame that Brailer continually articulates as the adoption period for EHR conversion in the nations' physician group practices. Doctors who plan to continue their careers in medicine had better start paying attention to what's happening.

Conversion to EHR By Early Adopters Costs \$33K Per Physician according to research published in the September/October (2005) issues of Health Affairs. That price makes EHR unaffordable for the smaller practice if they choose the same large vendors that have supplied the larger physician groups. The good news is that there are over 100 major EHR suppliers, many of which offer systems for much less per physician than what has currently been spent. The high cost has been a result of the fact that larger EHR suppliers have installed these systems, and their solutions are very expensive. Much more cost-effective solutions exist in the market among the 200 or so EHR suppliers vying for physician business, but most are unknown to the nation's doctors. Industry Alert™ is highlighting some of these lesser known EHR vendors, those which offer quality and affordable solutions.

Watch for 12th Annual Andrew & Associates Results In Next Issue We will also highlight in the next issue, summaries of the 12th Annual Andrew & Associates EHR survey, participated in by over 100 EHR vendors. This annual survey will also be the subject of articles in summer issues of MGMA's Connexion magazine, Advance for Healthcare Executives and Healthcare Informatics editorials, but it will be most fully reported here, as MSP is an Andrew & Associate alliance partner and co-collaborator in designing the actual survey. Physicians looking for impartial information from a source that is independent of EHR Vendor financial entanglements, should subscribe to Industry Alert™ today, so they won't miss this next issue.

Reality EHR Navigator Available in May 2006 MSP will also be publishing EHR data on a new CD tool, called the Reality EHR Navigator. It will allow a practice to cross-tabulate various EHR Vendor features among the 76 vendors whose 2005 EHR system data is already collected. The cost of that tool will be \$49, a bargain for any practice desiring to become aware of what EHR features are available today. The tool will run on Microsoft Windows 2000 or XP systems that have a version of Microsoft Office that contains its Access database. MSP will begin accepting credit card orders for the EHR Reality Navigator on May 1, and actually invoice credit cards later in the month when the product ships.

Brailer Touts Increased Budget for EHR At HIMSS, Dr. Brailer offered to continue to "lead the way", as the lead goose in a flock of geese flying along the national IT information infrastructure, noting that the Bush administration has increased the National Healthcare Coordinator's budget for 2006 by \$55M to \$116M, almost doubling it.

Yet Brailer's budget, inflated as it has been, is but a drop in the bucket of what is needed, given the costs cited in the Health Affairs research. Brailer also made it clear that there would be little reimbursement for practices switching to EHRs, although there may be ongoing incremental reimbursement for a small percentage that can use their new system to show they are providing higher quality care, under various aspects of the 33 pay for performance measures being promoted by the government and a variety of other third parties. The goal of EHR automation is to save the U.S. healthcare system \$140 billion a year (or about 7% of total healthcare expenditures).

Brailer Clarifies RHIO Plan Dr. Brailer's other emphasis was on the emergence of Regional Health Information Organizations (RHIOs) around the country. RHIOs are the anticipated points of connection and statewide consolidation for physician group practices sending data from the

new electronic practice management and medical records systems into a national healthcare network that includes CMS, public health and third party payers (the largest of which would be CMS under the coming national healthcare system of the future).

Currently, less than 14% of hospitals participate in RHIOs, and over 75% have done no planning to join RHIOs, so this is an uphill battle for Brailer. A new study of existing RHIOs intended to find out what makes current RHIOs successful was announced by Brailer. Then came the bad news to the big healthcare I.T. suppliers. Brailer indicated that CMS is ultimately looking for only one RHIO per state, which may be great for smaller states like Alaska but not too workable in larger states like California. Even in larger states Brailer anticipates no more than 2-3 RHIOs connected to one, statewide master RHIO that would consolidate for the master national RHIO. "One RHIO to rule them all, one RHIO to find them, one RHIO to bring them all and in the darkness bind them", a bit (healthcare) Czaronistic for some privacy and anti-Big Brother advocates.

If Dr. Brailer's vision of RHIOs is right, the RHIO market will be much smaller than currently anticipated by many big I.T. players, perhaps even a winner-takes-all scenario or at best, one shared by very few of the larger suppliers; making it not unlike the UK's national healthcare infrastructure that is being currently built, mostly by U.S. healthcare I.T. players. So if you want to see what's ahead in America, watch the U.K.

There clearly won't be enough "meat" to feed all of the current, large healthcare I.T. providers, and some will actually merge or leave the market. Indeed, it's already happening. Their customers could be in for a shock. Yet, with big companies comes big infrastructure and support costs – after all, someone has to pay for those \$250,000 HIMSS booth exhibitor fees!

HIMSS Promotes Itself As Healthcare IT Broker HIMSS continues to publicize and promote itself as the natural “broker” on all healthcare I.T. issues, as Steve Lieber and Dr. Mark Levitt announced that HIMSS was participating with the AIMS Foundation in the Katrina Phoenix Project and that HIMSS would establish several new conferences in 2006, including the World of Healthcare I.T. in Geneva, the HIMSS Asia-Pacific Conference (2007) in Singapore and the new June 7-8, 2006 HIMSS “Achieving National Healthcare Transformation” Conference in Washington, DC.

HIMSS is gaining recognition as other healthcare IT organizations and groups use HIMSS as either a venue for their own smaller meetings or to advertise their separate meetings. AMIA (American Medical Informatics Association), AHIMA (American Health Information Management Association), the Medical Records Institute (TEPR conference). Yet HIMSS caters to larger EHR suppliers, leaving the smaller EHR vendors that offer the more cost-effective solutions hosted on more modern platforms unrepresented. This raises concerns about how unbiased HIMSS can be as an honest broker of the interests of all EHR vendors in the market.

17th Annual Leadership Survey Raises Concerns About Margin of Error
The big news at HIMSS each year is

their annual Leadership Survey, now in its 17th year. What is noticeable about the survey is that its margin of error is alarmingly larger each year, e.g. the number of respondents each year is getting smaller, but the overall number of CIOs (the primary completers of the survey), is staying the same size or getting bigger. Total “n” for the 2006 survey was only 205 respondents, of which about 185 were CIOs. In the past the HIMSS Leadership surveys had 2 to 3 times as many respondents. With 4,827 CIOs in hospitals alone, not to mention large IDNs, the level of participation (<3.8%) is small and conclusions drawn would have a +/-7% (14%) margin of error from the small sample size alone. The margin of error is much higher for group practices, only a tiny fraction of which participate in the HIMSS survey. So doctors need to be cautious about running their practices based on HIMSS’ Leadership survey data.

Based upon the revenues reported by survey respondents (see table below), the largest percentage (28%) had revenues in the \$51 to \$200M range, typical of fairly small hospitals. Another 17% had revenues of \$201M to \$350M.

Leadership Survey Conclusions
Conclusions that did emerge from the 2006 survey showed that internal security breaches were the primary security concern of CIOs. Yet 78 percent

planned to implement single sign-on approaches during the next 24 months. Single sign-on certainly makes it easier for one provider to access all medical information but without adequate security safeguards, including vigilant anti-spyware measures, single sign-on makes it very easy for unauthorized personnel to access, change or steal all patient information as well. Currently, only 20% of those CIOs surveyed have implemented single point sign-on.

Security Vulnerability of Single Point Sign-On Single sign-on is a spoofer-takes-all enabler. This makes the use of effective anti-spyware programs mandatory in healthcare; without real-time spyware detection, it’s just too easy for hackers to create unseen back doors into confidential healthcare patient data, creating real HIPAA problems for organizations.

Lest healthcare vendors simply dismiss spyware as not that big a deal, they might take note of the experience of the IRS, since the advent of electronic filing of income tax returns. Tax fraud is at its highest since the advent of electronic filing. The problem has become so widespread in the United States that the Federal Bureau of Investigation (FBI) has created a web site for reporting identity theft.

“In 1995, the biggest story regarding electronic tax fraud in the United States involved the conviction of 3 people in Houston for filing 800 falsified returns using stolen identities. By 2003, one in every 933 returns filed in the U.S. was fraudulent”¹

HIMSS had remarkably little presence of anti-spyware vendors, at least the ones with the most effective products. Microsoft is providing a free anti-spyware program that providers can download and install. They will be integrating it into the next version of Windows (Vista) slated for release in 2006. While this program is superior to Computer Associates’ Pest Patrol in providing real-time, anti-spyware protection, both programs still let too many spyware cookies and programs through. What is needed is a second

Organizational Revenues Per Year	Percentage of Survey Respondents	Cumulative Percentage of Survey Respondents
<\$50M	13%	13%
\$51M to \$200M	18%	31%
\$201M to \$350M	17%	48%
\$351M to \$500M	11%	59%
\$501M to \$1 billion	14%	73%
>\$1 billion	10%	83%
Unknown	7%	90%
Didn't answer	10%	100%

Source: HIMSS 2005 Leadership Survey Release

layer of defense which can be invoked periodically (we recommend 3 times a day) and manually after any episode of browsing on the Internet.

There are various run-on-demand anti-spyware programs also available. Some include: **Paretologic's** (*Victoria, BC Canada*) XoftSpySE, Spybot's Search and Destroy and Sunbelt Software's Counterspy programs. In testing conducted by **Medical Strategic Planning** (*Lincroft, NJ*), the most effective of these was Paretologic's XoftspySE, due to its speed of scanning, lack of drain on CPU resources and comprehensive database of spyware programs. Paretologic's product already has a database of over 34,600 spyware programs, and their novel (and patented) Xheng webcrawler technology will double or triple that number, making it by far the most sensitive spyware detector program MSP has tested. See our article on Paretologic in this issue.

This patient information vulnerability is one of the key drivers that is causing the market for medical anti-spyware software to grow into a \$1.2 billion dollar market by 2010 according to a report by **Radicati Group** (*Palo Alto, CA*) on the anti-spyware industry. Not surprisingly, the other hot technology that CIOs plan to implement is "identity management" technology.

One company whose technology could be at the heart of secure, single sign-on is **Ping Identity** (*Denver, CO*), which is a communication infrastructure company that offers single sign on technology based on web services architecture, using SOAP standard messaging over the web. Ping Identity offers solutions support SAML, x.509, Kerberos and other encryption schemes in both Java-based and .net (Microsoft) platforms.

Other Leadership Survey Conclusions

About 14% of respondents indicated that patients could schedule appointments on their organization's web site, although this was also a capability that 73% were planning to implement over the next couple of years.

Three quarters of those surveyed felt that I.T. budgets would increase in 2006 and 2007, and were planning to add I.T. personnel to their organizations. The survey indicated that I.T. made up only about 2.5% of their organization's total budgets, which is about half of what I.T. budgets in non-healthcare organizations are in the U.S. Again, the survey is very reflective of the hospital I.T. market, rather than the physician EHR market.

Apparently, larger budgets will also be used to finance I.T. outsourcing, as three quarters of those surveyed indicated they currently use outsourcing and plan to expand that. They will also fund reduction of medical errors, indicated by half of survey respondents as a priority for I.T.

Dr. Brailer's message is apparently getting across to those surveyed, as the number indicating that implementing EHRs jumped on the 2006 survey to 45%, up from the 29% that indicated this was a priority in last year's survey.

Other top priorities were providing remote access to data, enhancing workflow process and implementing wireless connectivity. Items that were NOT hot priorities included implementing HIPAA.

Details On Specific HIMSS Exhibitors

Our three reporters interviewed about 40 of the 800 vendors exhibiting at HIMSS. One of these was **Draeger Medical** (*Telford, PA*) and EHR partner Siemens Medical Systems (formerly Shared Medical Systems – *Malvern, PA*). While Siemens is a major EHR player for RHIOs and larger physician group practices, Draeger Medical (owned partially by Siemens) is their sister company for EHR solutions at the point of care in hospitals, with their innovative "OneNet" network solution. (Draeger article on pg. 21).

Meanwhile, Draeger's sister-company **Siemens** (*Malvern, PA*), offered one of the few EHR products (Soarian) that is actually based on an embedded workflow management engine, albeit one that is too expensive for small and

mid-sized provider market. That gap is filled by **JMJ Technologies** (*Atlanta, GA*), a company that offers an EHR also based on an embedded workflow management engine, but priced to be more affordable for smaller group practices.

Cherry Shows Biometric-Enhanced

Keyboards On the medical hardware front, there was the new PC keyboards from Cherry, which were being shown by one of their distributors. It included a fingerprint scanner and mag stripe reader integrated right into the keyboard. This is very convenient for positive ID and single point sign-on or virtual private network (VPN) sign-on functionality required by many medical applications to maintain HIPAA privacy and security for "over-the-Internet" accessible applications.

Hospitals are becoming more cautious at credentialing and doing background checks on employees. Several companies are helping to expedite the background checks. **Xythos Software** (*San Francisco, CA*) offers systems that allow hospitals to take fingerprints from prospective employees and submit them directly to the FBI for review. This solution was recently adopted by the Health and Hospital Services (HHS) agency of NY, which manages hiring for the cities many hospitals. Prior to implementing the Xythos solution, the turnaround time and employee check-up could take up to 10 weeks. After it was installed, that dropped to a week or less, and in some cases as little as 2-3 days. The implementation of the Xythos solution has made the HHS hospitals much more successful in hiring qualified employees.

Scanning & Voice/Transcription

Vendor News In the group of document management vendors, both those with document management and indexing approaches to EHRs and those that offered scanning approaches to conversion of existing paper records into some computer-displayable format for organizations implementing EHRs. The conversion of existing records to a machine-readable format is the

unspoken challenge of EHR adoption and scanning is one of the more effective approaches to it. Companies that were much attuned to the trends included Lanier, Nuance (which just acquired Dictaphone), MRView, and others.

Conversion of existing paper records MRView (Schaumburg, IL) sends in document scanning personnel and convert existing paper charts right at the medical practice or hospital. Scanned records can be moved to microfilm or stored in other, readily displayable electronic formats and indexed down to the individual page of the chart.

Lanier (*Atlanta, GA*) provides an integrated hardware scanning and document archive software solution for dealing not only with older paper records, but with the ongoing paper results that may come in from specialists (who haven't yet embraced the CCR), from labs, from ECG or other tests and all need to be integrated into a document management archive. Lanier offers both outsourced and on-site document capture services and systems in a turn-key system. The system uses bar code labels attached to pages of the paper record to index a patient chart into major sections that then enhance retrieval.

Both Lanier and MRView provide an essential service for hospitals and group practices that have not yet gone electronic and have volumes of existing paper records to somehow integrate into an electronic format when they actually do convert to an electronic approach.

MediNotes (*West Des Moines, IA*), just announced a workflow management update to their system. It is expected to be embraced by a large percentage of the 3,500+ group practices that use their solution now, as these users update their systems. The new release implements the notion of a "practice view" of workflow (tasks that have to be done and people responsible for them) and allows the user to view tasks related to their "role" in the organization, with one set for physicians, another for nurses, etc. The new version also highlights health maintenance items (in red) to remind providers of

tasks which will emphasize maintaining wellness. The MediNotes EHR allows for several care templates to be concurrently open, supporting documentation for patients with multiple co-morbidities or conditions such as cardiac and diabetic related conditions.

e-MDs (*Cedar Park, TX*) showed a "nested templates" and had integrated a provider "dashboard" into their EHR to optimize easy navigation and access to all EHR tasks. This EHR also demonstrated "role" and "task" segmentation to implement workflow. On the business side, the system provided data for adjusted risk capitation and offered interesting emergency department features, features that many other EHRs lack. The entire solution that included EHR and some practice management components (billing, scheduling, scanning and document management) was based on a single code set and database.

At the other end of the healthcare I.T. spectrum were companies like Siemens, GE Healthcare, Cerner and Misys. This was the first major I.T. show since **GE Healthcare** (*Milwaukee, WI*) had acquired **IDX**, which spawned the acquisition of A4 Health Systems by Allscripts, the acquisition of Dictaphone by Nuance and will spawn addition acquisitions in 2006.

The GE Healthcare group is now a \$1.9 billion dollar entity (mostly by acquisition of companies like Millbrook and others). It is drawing the attention of big healthcare groups, announcing a new I.T. deal with Intermountain Healthcare (and Latter Day Saints Hospital in Salt Lake City, UT). The notion they articulate is "boundary-less care" across all provider settings and all care modalities, with "Centricity" being the unifying concept.

Nonetheless, since building the product portfolio was done mostly by acquisition of existing competitors (such as: Logician, Millbrook and others), their solution to date at least lacks the common user interfaces, code and database sets that would make it easy to support and expand going forward. GE acknowledged progress on moving

all systems from Oracle and diverse platforms onto a Microsoft hosted, SQL-server database platform.

Misys is one of older EHR vendors (founded in 1979). Misys is now one of the five biggest companies, with systems serving over 18,000 physician locations (and they claim 92,000 physicians), as well as 1,250 hospitals and 600 nursing homes. They were exhibiting their Connect 1.0, and talking about Misys Connect 2.0, due to be released later in 2006 that will use cross-enterprise document sharing standards to exchange information with other Misys systems installed.

Smaller competitors, like **AssistMed** (*Los Angeles, CA*) are touting RHIOs, but pitching the idea that they can also provide EHR services, avoiding the need to add to legacy systems. Their Enterprise Solution, an open communications platform, can be used by many physicians and other providers to create a centrally-accessible, complete electronic medical record for patients. The offer MedPost, an intelligent interface engine to integrate legacy systems into this new, RHIO-based EHR approach which supports hospitals, clinics and physician offices, labs and payers. The EHR is Snomed CT concept enabled so that sanitized information can be explored by drug companies, government and other researchers.

iMedica (*Mountain View, CA*), like e-MDs and others, introduced (11/05) a new, integrated electronic health record and practice management system built totally new on a Windows platform and single database. This is clearly the direction that progressive EHR vendors are taking; starting over and building an integrated EHR/PMS instead of simply interfacing with other vendors' systems. However, if a physician group already has a PMR, iMedica also integrates with 30 different PMS systems. iMedica is one of a growing number of companies that is offering a single, integrated product deliverable today that is based on Microsoft and SQL server, making it one of the first deliverable integrated solutions based on an all Microsoft platform. iMedica's has been a consistent winning of the TEPR documentation

challenge (now 4 years running). iMedica was able to document the scenario in only 5 minutes, earning it a first place ranking.

MicroFour (*Amarillo, TX*) demonstrated its PracticeStudio EHR and practice management solution. The electronic health record portion of this product has one of the nicest graphic user interfaces we have seen. It has large, well spaced buttons with intuitive pictures for users to navigate as well as quality graphics that enable point and click charting. The symbol legend is included as part of the image that will be stored in the patient chart. All of the buttons that can be touched on the computer screen are large and color coded so that the user is able to touch once and know that they chose correctly. The graphics also enable more efficient workflow as there is a graphic of the physician office and a patient "icon" that moves from the office waiting room to the exam room to check out. Because the system allows multiple user access, anyone on staff can see where the patient is simply by looking at the Patient Walk-Through screen.

Microfour's EHR offers a cost-effective but power solution for smaller practices and has an installed base of over 2,700 clinics, mostly smaller ones, and is one of those EHR vendors that offers good value to smaller practices, particularly those in dermatology, pulmonary, cardiology and chiropractic specialties. Their solution was originally based on FoxPro, but has been migrated to SQL server. The company has taken a template-based, structured approach to EHR and charting with their ChartPower is quick and flexible, as well as one of the few EHRs we have seen that offers well integrated graphics for charting.

PatientKeeper (*Newton, MA*) announced at HIMSS that its PatientKeeper Charge Capture won the MS-HUG award in the category of Administrative/Financial Systems. Their mission as a company is to provide a tool that can support a physician all day long, in whatever provider context where (s)he may be working, including their home, office, hospital, nursing home

or traveling in-between. Their suite of applications includes a task manager, an order entry and clinical surveillance and charge capture.

JMJ Technologies (*Atlanta, GA*), another quality EHR vendor built from the ground up to enhance practice workflow and provide user-level workflow management (without vendor assistance or programming). It announced its connectivity to SureScripts' (*Alexandria, VA*) e-prescribing and formularies display. SureScripts is the largest network provider of electronic prescribing services, connecting physicians with pharmacies. JMJ also will be using First Databank (*San Bruno, CA*) for its drug interactions database. First DataBank provides comprehensive drug information to healthcare professionals at the point of care. Currently, JMJ has integrated the Barton-Schmidt telephone/nurse triage protocol system into their system, giving structure to clinician-parent interactions.

Mercure Electronic Health Records (*Gate City, VA*), an EHR offered by Lakes Health Systems, was a first time attendee at HIMSS. This EHR is intended for physician practices of 1-9 doctors and was programmed by a physician-user. Although this was a fairly basic EHR, the major advantage to users is the low pricing structure. The total cost for a one-time purchase was \$2,500 per doctor, which included all updates and technical support for one year; after a year, the cost was \$500 per doctor per year. If a practice wanted to opt for an annual payment plan, the cost was \$1,200 per doctor per year.

Philips' (*Vienna, Austria*) Speech Recognition product, SpeechMagic 6.1 talked about its upcoming version of SpeechMagic, indicating that it will contain unique features which optimize the accuracy, security and administration of medical document creation. SpeechMagic 6.1 boosts speech recognition accuracy and scalability and the software architecture allows for centralized administration and management, facilitating integration with medical IT systems such as Electronic Health Records (EHR) systems.

Philips' Advanced Resolution Channel, which will also be introduced with the next-generation speech recognizer, will reduce the error rate by 30%. Speaker Detection, a feature that protects individual speakers' settings, means that when several physicians share a workstation, one may accidentally dictate using another person's voice profile. SpeechMagic 6.1 detects whether or not the speaker and voice profile correspond - leaving the active profile intact and protecting individual dictation characteristics.

In addition, sophisticated learning algorithms enable SpeechMagic to automatically and immediately adapt to the dictation style and pronunciation of each user. Additional technology highlights include: automatic detection of whether a new user is male or female and selection of the corresponding profile for optimal recognition accuracy; support of multi-processor machines allowing hospitals to save hardware costs by using multiple instances of backend speech recognition on one machine; and full backward compatibility which allows for an upgrade from SpeechMagic 5.1; all user adaptations will be transferred to the new version. It seems clear that Philips is ready to take on all challengers. Indeed, from what we saw actually demonstrated at HIMSS, Philips has embedded what appears to be an advanced natural language processing infrastructure provided to it by partner Language and Computing (*Reston, VA*).

MaxMD (*Jersey City, NJ*) announced their .md domain that launched last December, 2005. .md is the only Internet domain dedicated to the needs of the medical community; including physicians, hospitals, nurses and others in the medical area. The basic .md registration includes the registration of a .md domain name, a WebCard and provider listing in the .md domain and one standard email account for the cost of \$150 per year. MaxMD also offers email solutions with integrated security features that assist physicians to address issues such as HIPAA compliance. There are cost savings if a medical clinician purchases more than one year's service. Physician, medical centers and even medical technology vendors may

find that having their company name.md can draw attention and differentiate them from general websites that use .com or .net or .org extensions.

Medsphere (*Aliso Viejo, CA*) showed the public-domain OpenVista EHR technology that it represents as a single solution for use across acute, ambulatory, and long-term care environments as well as in multi-facility, multi-specialty healthcare organizations. This is the EHR used throughout the VA System, now available to everyone.

The difficulty has been that there have been so few adopters of the software – Medsphere was touting Midland Hospital (*Midland, TX*) as implementing the Medsphere OpenVista solution across three hospital campuses and two outpatient facilities. And they cited 6 other long term care facilities as using OpenVista but that isn't a lot of users in the ready-to-grow EHR market. There is still a cloud of doubt concerning Vista's viability, real costs and competitiveness to other systems that seem far more optimized and less disruptive to group practice workflow. We think that Medsphere is going to have an uphill battle to convince the market that the archaic Vista technology makes sense in today's marketplace.

Many document management companies are planning to participate in the **12th Annual Andrew & Associates** (*Winter Haven, FL*) EHR survey, a joint project with **Medical Strategic Planning, Inc.** (*Lincroft, NJ*) a market information company. The survey results this year will be available in July 2006, and will be published in various articles that will appear in MGMA's Connexion magazine, Healthcare Informatics, Advance for Healthcare Information Executives and MSP's Industry Alert newsletter. Selected survey results will also be available on the MSP web site. Data from this survey will be of interest to EHR consultants, DOQ-IT managers and individual group practices, as it is the most comprehensive, authoritative and practical information available about over 92 EHR vendor's products.

On the medical biometric ID and identity hardware front, there were lots of new keyboards and other biometric devices at HIMSS. One important one was the new G83-6744 and G83-14x01 series PC keyboards from Cherry (Pleasant Prairie, WI), which were being shown by one of their distributors. These included either or both an integrated fingerprint scanner and mag stripe reader, integrated right into the keyboard. This is very convenient location for biometric ID needed to secure single point sign-on or virtual private network (VPN) sign-on functionality required by many medical applications to maintain HIPAA privacy and security for "over-the-Internet" accessible applications. It also makes for efficient smart card login for VPN private key infrastructure (PKI) access to patient data in medical systems.

Another approach to biometric ID was being shown by Ultra-Scan (*Amberst, NY*), which demonstrated their biometric ID using ultrasound technology. Ultra-Scan technology utilizes high frequency sound waves to capture high quality fingerprint images; the company says that they can scan even dirty or oil smudged fingerprints without problem – or when the scanning device is dirty or smudged. Ultra-Scan has ruggedized polyurethane surfaces that the company claims do not need to be even routinely cleaned. The technology comes in a desktop fingerprint reader, as part of a desktop enrollment station, as a sign-on application, as a link to electronic health record data and as a turnkey script authorization solution.

Siemens was showing one of the few EHR products that is actually based on an embedded workflow management engine, albeit one that may be a bit expensive for small and midsized physician group practices. That gap is filled by **JMJ Technologies** (*Atlanta, GA*), a company that offers their EncounterPro EHR, built from the ground up on an embedded workflow management engine, but priced to be more affordable for smaller group practices.

Lest the patient get lost amid all this HIMSS technology, there was **GetWell Network** (*Bethesda, MD*). GetWell is a patient empowerment company, aimed at helping the patient being cared for in the acute care, hospital setting. The idea is to transform this environment into one that the patient has some control over, by providing educational and other relevant content to the patient via their televisions. GetWell is an outgrowth of the ICU experience of its founder, Michael O'Neil, who was himself a patient in a hospital with a serious condition, and realized that lack of empowerment and information that ICU patients have in the current U.S. healthcare system. O'Neil's idea is to put the patient back at the "center" of their healthcare experience, by enhancing communications of critical information to them at all stages of their treatment and recovery.

Vocera (*Cupertino, CA*) showed a new application suite that enables staff to be tracked based on their proximity to the nearest 802.11B access point. This is only adequate for the most gross tracking and certainly not adequate for finding or tracking patients, nor for allowing staff members to use proximity to gain access to medication/narcotics rooms for example. For those situations where more precise patient location is required, readers will want to look at **Radiance** (*Lawrence, MA*), that uses a combination of RF and IR technology to isolate a patient into a specific room. Radiance, like Vocera is also an Emergin partner, as was **Pango Technology** (*Framingham, MA*), who showing an ISM-band, 802.11 Wi-Fi piggy-back approach to device location.

Vocera also showed that the display of the back of their badge could now receive a page message. They were also showing connectivity enhancements that allow other vendors to trigger Vocera communicators. While Vocera is an Emergin partner (to facilitate voice alarm integration from monitors, nurse call systems and other devices), it is clearly working to encourage some of these companies to develop direct, point-

to-point interfaces as well. Whether this is to supplement installations at sites that do not have **Emergin** (*Boca Raton, FL*) installed, or to compete head on with Emergin, either way it's a bad solution – as it encourages more point-to-point, proprietary, fragmented approaches to communications integration. Emergin while not directly exhibiting at HIMSS, had their systems in about 10 of their major partners' booths.

One company that offered interesting network security tools, which we saw at HIMSS was **Newberry Networks** (*Boston, MA*). Newberry Networks was interesting to us because it integrated so much functionality into wireless networks. One of their products is their Wi-Fi Watchdog™ that detects, monitors and secures 802.11-based wireless networks (WLANs). Wi-Fi Watchdog is a server-based software system that can be used “stand-alone” to enforce “No Wi-Fi” policies as well as integrate with any existing Wi-Fi equipment to stop the increasing number of security threats not addressed by authentication, encryption or VPNs.

Newberry also integrates network security with patented 802.11 device tracking capabilities, Wi-Fi Watchdog precisely locates every Wi-Fi device (within 3-5 meters) – in real-time, 24x7 – to enforce the Perimeter Security at healthcare facilities and actively prevents neighboring users (or skilled hackers) from gaining unauthorized access to these facilities 802.11 WLAN resources. Newberry also prevents authorized wireless healthcare users from inadvertently associating an inside network with any access point (AP) radio one operating outside of the hospital. Wi-Fi Watchdog distinguishes legitimate clients from rogue access points, accurately characterizing weaknesses in wireless healthcare network, identifying and resolving security holes created by internal users or visitors, and alerts IT/security personnel with the precise physical location of vulnerabilities and attacks as soon as they appear on the network. Newberry just announced the addition

of centralized Asset Tracking to their system.

PMSI (*Seattle, WA*) appeared at this year's HIMSS under its new name, Practice Partner (Seattle, WA), which has taken the name of its EHR/CPM system, jettisoning the older PMSI (Physician Microsystems, Inc.) name. Note that their corporate offices in Seattle have also moved, so look them up on web before contacting them. Δ

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- 2 “Somebody's watching you: spyware has come in from the cold to become corporate America's top security threat”, CFO: Magazine for Senior Financial Executives, Summer, 2005 by John McPartin.



Staying Up-To-Date: Patient Monitoring & Other Technologies

We cover announcements of new monitors made by all the major patient monitoring companies in this newsletter.

In the last 4 issues we have provided in-depth coverage of new products announced by Philips, Datascope, Nihon Kohden, Welch Allyn, Masimo, Radianse, Emergin, as well as announcements of new products by other companies.

These issues have covered conventional monitors, wireless networking, biphasic defibrillation, impedance cardiography and other technologies. Information in our newsletter can be particularly helpful to hospitals that are in the market for new monitors and want a broad overview of what's available in the market and what's been announced and shown at major trade shows.

In many cases our coverage of these products is the first in-depth coverage featured in the U.S. trade press. To stay informed, consider a subscription to the newsletter – either the print or the electronic edition. To catch up, consider the **Patient Monitoring Technology Advisory** series, available on our web site. Visit the web also for the new and updated, 2006 Vendor Service Quality Report, just released and available at www.medsp.com Δ

AACN Preview

The American Association of Critical-Care Nurses (AACN) is the world's largest educational conference and exposition focused on acute and critical care nurses. NTI is appropriate for bedside nurses, nurse educators, nurse managers, clinical nurse specialists and nurse practitioners who care for patients who are acutely or critically ill. NTI provides comprehensive, all-encompassing resources to maximize your contribution to caring and improving the healthcare of these patients and their families. Network with peers while earning CE credits for attending educational presentations. Review courses and specialty focused exams (CCNS, CCRN, PCCN) or subspecialty (CMC, CSC) certifications are also offered.

Last of the Spring Conferences The AACN's NTI is the last of the 2006 Spring conferences and an excellent opportunity to see some interesting new technologies being introduced by Philips, Draeger Medical, Nihon-Kohden, Spacelabs, GE Healthcare and others. Hospitals considering the replacement of existing monitoring systems would be wise to send members of the equipment selection committees to this conference. There are real and significant differences in the direction that monitoring vendors are taking with regard to telemetry and monitoring networking. This is one place where you can explore all of those differences at once.

Which Approach Does MSP Support? Many of these vendors have taken divergent approaches and MSP has written several of them up in this issue. It is not our intent to promote any particular vendor, whether covered in this issue or not. Rather, it is our intent to keep readers informed of the new technologies and directions announced by all of the major vendors, so that our readers can become more informed consumers. When we have opinions about specific approaches, we will express them in editorial columns.

We hope our readers appreciate the diversity of vendors and vendor approaches presented and count on them to process the information and draw their own conclusions.

The 2006 NTI will be at the Anaheim Convention Center in Anaheim, CA May 23-25. By exhibiting, sales and marketing teams can meet AACN's audience of more than 6,000 nurses if they register while space is available. Some conference highlights include:

- Catching the Wave: Advanced Hemodynamic Waveform Analysis
- CCRN Review Course Parts I & II
- Complications of CareIllness: Polyneuropathy & Myopathy
- Dealing with Drips: Making it Simple
- DO₂/VO₂ Relationships: is Cardiac Output Enough?
- Heart Sounds: Adult Basic to Advanced
- Managing the Critically Ill Obstetric Patient
- Mastering Sepsis: Identification and Treatments Advanced in 2006
- Paws for a New Kind of Therapy: AAT Exhibit are open Tuesday - Thursday, offering a total of 12 hours of exhibit time over three days, with more than 5.0 hours of dedicated (unopposed) exhibit time. Vendors exhibiting at the conference experience good booth traffic. The attendance trend is upward, with 6,500 nurse participants at the 2003 NTI, 6,800 nurse participants at the 2004 conference and over 7,900 nurse participants at last year's conference in New Orleans. It is the last of the major spring shows and several vendors will be introducing new products at this year's conference so its a good place to see the latest technology offered by the 400 companies who have already

signed up to exhibit. Healthcare professionals who visit the show can earn up to six (6) contact hours of CE credit through the popular Exhibit CE Program (0.5 contact hours per session), offered in exhibit displays on the show floor.

Advanced Practice Institute Conference Within a Conference The Advanced Practice Institute™ (API) is fully integrated within the National Teaching Institute and offers preconferences, clinical sessions, leadership/role development, pharmacology and mastery sessions specifically targeted to meet the needs of the advanced practice nurse.

Pharmacology Content Credit The API in Anaheim presents educational sessions with content that meets pharmacology requirements. Participants attending these sessions will be awarded pharmacology continuing education for advanced practice nurse who requires this category of credit for licensure and/or recertification. More than 6.0 CE hours of pharmacology content are available during the Advanced Practice Institute in 2006. For more information or to register, contact:

Anaheim Convention Center
800 West Katella Avenue
Anaheim, California 92802
714/765-8950
www.anaheimconventioncenter.com
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Defibrillator Leader Focuses Attention On Quality CPR; Supports 2005 AHA Guidelines

Early defibrillation has been the primary focus of defibrillator companies for the past 10 years, bringing forth such advances as newer, lighter defibrillators with biphasic waveforms from resuscitation market leaders like Philips. Recently, the focus has shifted to other aspects of CPR that contribute to improving patient outcomes.

Philips has charted the course for treating sudden cardiac arrest, in and out of the hospital. Recent studies have shed new light on the physiology of sudden cardiac arrest and the role of CPR.* What has emerged is a new emphasis on achieving continuous perfusion and a deeper appreciation for the harm caused by hyperventilation. If the patient has been down for >5 minutes, they can benefit from 1 to 2 minutes of quality CPR prior shock delivery.^{1,2}

Other studies have demonstrated that caregivers, on the whole, in and out of the hospital, are not performing quality compressions and/or ventilations meeting present AHA and ERC guidelines during CPR. The quality of CPR varies due to the caregiver's training, experience and physical strength. Caregivers have difficulty accurately gauging their own performance (e.g., determining the rate and depth of compressions, the volume of ventilations, and the duration of interruptions, aka hands-off-time), and fatigue causes CPR quality to suffer as resuscitation times increase.

Current research reveals that the quality of CPR and early defibrillation are inextricably linked for successful resuscitations. A good combination is essential to increase the survival rate of sudden cardiac arrest victims.

Recently, the AHA published their 2005 Guidelines for Cardiopulmonary Resuscitation (CPR) and Emergency Cardiac Care (ECC). These new Guidelines include major changes for all classes of rescuers including lay, basic life support (BLS) and advanced life support (ALS). What is common to all three is a new emphasis on



Philips HeartStart Defibrillators: MRx, FR2+, FRx and OnSite

the quality of CPR, its link to early defibrillation, and the combined impact of both on maximizing continuous perfusion of the heart, brain and other vital organs. A substantial body of new scientific research supports new CPR requirements expressed in the 2005 AHA Guidelines.

Philips was first to publicly announce that all their devices are either configurable today or, where updates are necessary, will be configurable shortly. Philips anticipated the nature of the Guidelines changes, namely the importance of high quality CPR in conjunction with early defibrillation, and made product enhancements before the new standard was announced. Healthcare organizations looking to make CPR protocol changes to comply with the new Guidelines can do so easily if they have Philips resuscitation products.

While several companies are also moving to address this issue, Philips has already introduced a wide range of resuscitation technology solutions that ensure that both quality CPR and early defibrillation can be delivered quickly, effectively and in proper sequence by caregivers at any skill level. Some of these solutions include:

- **Q-CPR™ is a first-of-its-kind innovation developed by Philips and Laerdal,**

now available as an option integrated with the HeartStart MRx monitor/defibrillator. Q-CPR supports quality CPR in real-time as delivered by the professional rescuer, and also supports retrospective CPR data analysis for purposes of continuous quality improvement (CQI). Before Q-CPR, there was no way to objectively measure the quality of CPR across healthcare organizations. The 2005 Guidelines state — “*Methods should be developed to improve the quality of CPR delivered at the scene of cardiac arrest by healthcare providers and lay rescuers. (Class IIa). Components of CPR known to affect hemodynamics include ventilation rate and duration, compression depth, compression rate and number, complete chest recoil, and hands-off time.*” (Circulation, 2005:112:IV-29). Q-CPR is the only device that measures and provides feedback on all six of these CPR components — and more.

The Guidelines also state “*Systems that deliver professional CPR should implement processes of continuous quality improvement that include monitoring the quality of CPR delivered at the scene of cardiac arrest, other process-of-care measures (e.g. initial rhythm, bystander CPR, and response intervals), and patient outcome up to hospital discharge. This evidence should be used to maximize the quality of CPR delivered.*” (Circulation, 2005:112:IV-29) Q-CPR is the

only device that comprehensively monitors both compressions and ventilations, and the Q-CPR Review software application provides for retrospective review and analysis for continuous quality improvement. Because Q-CPR is bundled with a data management application (Q-CPR Review), it supports system-wide QA/QI and continuous CPR training, empowering new possibilities for resuscitation research.

- **Philips introduces SMART CPR** SMART CPR for professional and designated first responders is available on the Philips HeartStart FR2+ Automated External Defibrillator (AED). SMART CPR is the industry's first "treatment path" analysis tool, analyzing the patient's heart rhythm and determining whether to provide an immediate defibrillation shock, or CPR first followed by a shock. This helps first responders provide care in the correct sequence, even if they have no medical training.

- **Philips now provides Quick Shock capability for all HeartStart devices and users.** Quick Shock is a unique feature, only available on Philips HeartStart automated external defibrillators (AEDs) and the HeartStart MRx monitor/defibrillators. These devices can deliver a shock in less than 10 seconds after the end of a CPR pause. (Other devices are not able to do this as quickly, according to Philips). This is important because the beneficial effect of CPR disappears

very rapidly once CPR is stopped, so time to shock after CPR pause is very important.^{3,4} Quick Shock helps by minimizing the time CPR chest compressions must be interrupted, thereby increasing the chance that a shock will result in a successful return to spontaneous circulation.

Peer-Reviewed Research Supports Fast Shock Two articles published in *Circulation* support the design intent of Quick Shock. In one article, Dr. Yu (et al.) concluded, "Interruptions of precordial compression for rhythm analysis that exceed 15 seconds before each shock compromise the outcome of CPR and increase the severity of post-resuscitation myocardial dysfunction."³ A second study by Dr. Eftestol (et al.) similarly concluded, "The interval between discontinuation of chest compressions and delivery of a shock should be kept as short as possible."⁴ Shocking the heart as soon as possible after CPR ceases aids in the return of spontaneous circulation, potentially saving more lives.

How do HeartStart Defibrillators (with Quick Shock) Compare to Other Devices? The Quick Shock feature (less than 10 seconds to deliver a shock following a CPR pause) makes HeartStart the fastest with respect to this critical measure, as shown in the graphs below.⁵

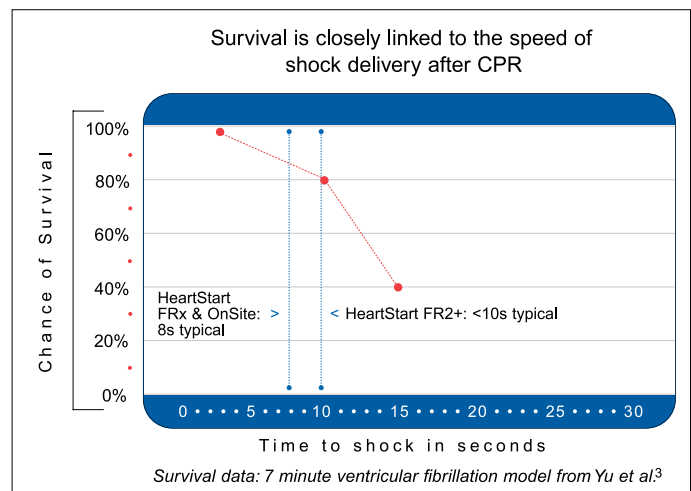
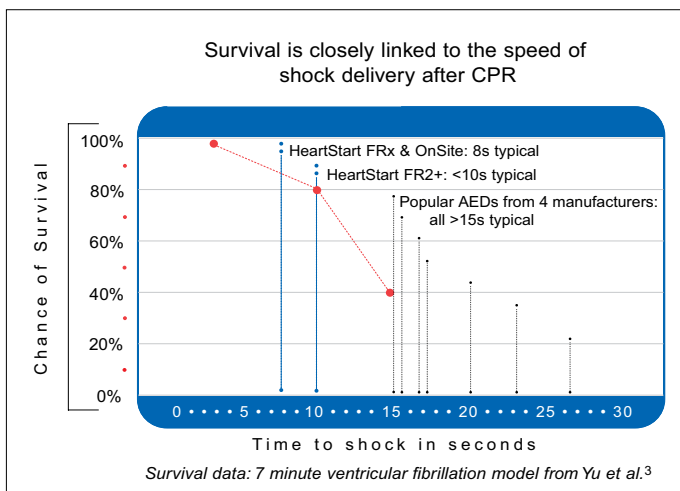
The HeartStart FRx and OnSite are able to deliver a shock in 8 seconds (typical); the FR2+ in 10 seconds (typical). Other technologies fall

farther out on this curve. According to Philips, no other manufacturer's device comes close to the HeartStart FRx, HeartStart MRx, OnSite or FR2+ defibrillators regarding shock time and are up to 60% faster than most other solutions on the market.

Such rapid delivery of therapy assures that the benefits of CPR are not entirely lost as a result of stopping compressions and ventilations while the defibrillator analyzes the patient's heart rhythm and charges up.

- Philips also provides CPR Coaching for bystander-initiated CPR and minimally-trained rescuers, which is available on the HeartStart FRx, OnSite, and Home Defibrillators. This is the only coaching for adult and infant/child CPR we have seen so far, providing audio cues for breaths, as well as the appropriate number and rate of chest compressions.

Each of these Philips innovations are designed to make the outcome of resuscitation more successful, and virtually all Philips defibrillators currently available – HeartStart Home, OnSite, FRx, FR2+ and MRx – can be reconfigured to comply with the new one-shock defibrillation protocol recommended in the recent AHA 2005 CPR and ECG Guidelines. For devices with CPR coaching and feedback capabilities, a software update will soon be available to address the Guidelines' new CPR protocols. The European Resuscitation Council (ERC)



has also released its Guidelines for Resuscitation 2005, which Philips' defibrillators can also be configured to meet. For more information about these products, visit www.philips.com/heartstart.

For more information about the AHA's 2005 Guidelines, visit the AHA web site at <http://www.americanheart.org>. Δ

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Developing Q-CPR™ for the HeartStart MRx

Performing quality CPR in the treatment of cardiac arrest can improve a patient's chance of survival. Recent science has shed new light on the importance of continuous chest compressions and optimal ventilations for victims of cardiac arrest.^{1,2} Research shows not only the quality of compressions and ventilations to often be suboptimal during CPR, but also that compressions are interrupted too frequently, and too much time passes while no compression activity takes place before shock. Several studies have addressed the problems caused by inadequate perfusion and highlight the need to reduce hands-off time during resuscitation.^{3,4}

To assist care providers in performing quality CPR, Philips has added CPR measurement and feedback to their HeartStart MRx monitor/defibrillator. This one-of-a-kind tool, powered by Laerdal's Q-CPR™ technology, offers objective, real-time measurement and corrective feedback on compression depth and rate, as well as ventilation volume and rate. Additionally, it helps reinforce CPR training with each and every use, which is important since numerous studies suggest that CPR skill retention typically begins to deteriorate soon after training.^{5,6}

Developing Q-CPR This new technology, Q-CPR™ Measurement and Feedback, was jointly developed by Laerdal Medical Corporation and Philips. Laerdal and Philips researchers, with years of experience in AEDs and interactive skills-training technologies, already knew the powerful effect of voice prompts on caregivers. With voice prompts, minimally trained and even untrained rescuers can effectively use an AED. So it seemed plausible that voice prompts could also help rescuers deliver better CPR. Together the two companies developed a series of research tools to investigate the effect of CPR verbal feedback and developed algorithms that worked with lay people as well as with trained healthcare professionals. This technology, called VAM (voice activated manikin), improved CPR when used as a feedback system and proved feasible as a training instrument.

The First Prototype Next, Laerdal and Philips developed a prototype device to deliver both visual and verbal feedback, using a modified Philips HeartStart defibrillator, which was then used by EMS systems in Stockholm, London and Akershus (Oslo), and in hospitals in Vienna and in Chicago for use in two studies. The device (with feedback deactivated) enabled researchers to record the current state of CPR quality and establish a baseline for CPR performance during actual in-hospital and out-of-hospital instances of cardiac arrest. The results, which showed that the quality of CPR delivered both in and out of the hospital was consistently suboptimal relative to AHA guidelines, were published in the January 2005 issue of *JAMA*.^{7,8}

In the second stage of the research, verbal feedback was activated in the prototype device and introduced to users as part of their annual retraining. The results of these studies, presented at the AHA's Scientific Sessions 2005, showed improved CPR performance for CPR measurement and feedback users, in and out of the hospital. Dr. Jo Kramer-Johansen, from Oslo, reported on cardiac arrests in three ambulance services in Europe, where the automatic verbal and visual feedback features of Q-CPR™ improved the quality of CPR delivered by the paramedics and EMTs, doubling the percentage of compressions within guidelines and increasing the mean depth of compressions. There was a trend toward increased survival with regards to both the percentage of patients admitted to



HeartStart MRx with defibrillation pads and Q-CPR compression sensor.

hospital and those discharged alive with good neurological status.

Dr. Ben Abella, from Chicago, announced that real-time CPR monitoring and feedback also improved multiple parameters of CPR quality for cardiac arrest patients treated in hospital. And his colleague, Dr. Dana Edelson, received the ReSS Young Investigator of the Year award for a study on cardiac arrest patients showing that the quality of CPR affects the success rate of defibrillation, which is also associated with more patients leaving hospitals alive. In particular, she reported that a modest increase in the depth of chest compressions could double the chance of defibrillation success.

How Q-CPR Works Q-CPR is easy to set up and to use. There is virtually no added time or weight: just a Compression Sensor weighing only 8 ounces. The sensor is applied over the patient's sternum in the normal CPR hand position. And the defibrillation pads, as they typically would be, are applied to the patient in the anterior/anterior positions. Once the user connects the sensor and pads to the HeartStart MRx and selects the therapy mode, either manual or automated defibrillation, CPR measurement and feedback begins.



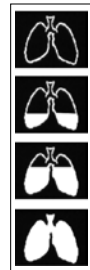
Q-CPR Screen Manual Mode

Measuring Compressions The Q-CPR Compression Sensor on the patient's chest gathers data and transmits it to

HeartStart MRx where it is interpreted and displayed. Compression rate and depth are presented as a waveform: wave height depicts compression depth, while the interval between waves indicates rate. A calculated compressions-per-minute (cpm) value is shown as a numeric above the wave.

Compressions are also analyzed in real-time, contrasting actual performance with established American Heart Association (AHA) and European Resuscitation Council (ERC) guidelines. If either depth or rate drifts outside its target range, MRx displays on-screen signals and provides audible feedback.

Measuring Ventilations Ventilation data is collected with the same pads used for defibrillation. Attached to the patient's chest, the pads detect changes in chest impedance which are interpreted by MRx then displayed as lung volume and ventilation rate on-screen. Just above the compression wave, the ventilation indicator shows a representation of lung volume. The calculated ventilations-per-minute (vpm) value appears next to the lungs indicator. Ventilations too, are analyzed and compared with established AHA and ERC guidelines. If either measurement, volume or rate, falls outside its target range, MRx provides on-screen signals and audible feedback.



Corrective Feedback On-screen visual prompts and audible voice prompts alert the caregiver to needed adjustments in CPR performance. Unlike CPR coaching, these comments are corrective and highlight a needed change in order to meet AHA/ERC Guidelines. They are prioritized and delivered in the order of their clinical significance. In addition to compression depth, rate and ventilation volume and frequency, MRx with Q-CPR monitors lapses in compression and ventilation activity. For example, after a 15-second pause in compressions, voice and text prompts say, "15 seconds without compressions." Once a correction is made, the related prompts cease. The volume of the voice prompts can be adjusted up or down and even muted

by the clinician. Waveform and visual prompts remain active regardless of the audio's on/off state.

Data Reporting CPR measurements can be recorded using the strip chart printer on HeartStart MRx. Printing all active monitoring parameters in real-time, or with a 10-second delay, MRx documents ventilation rate, compression rate, and "no-CPR" time every 25 seconds. Laerdal and Philips are jointly expanding the data collection and management capability of Q-CPR. They will soon release Q-CPR Review, a data management application for case review, performance analysis, storage and reporting. Aggregate data can help track system performance and improvements, reveal patterns and support resuscitation research.

For More Information Readers interested in more information about these advanced features should contact Philips at their web site www.philips.com/heartstart. Δ

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Philips HeartStart FR2+ Incorporates SMART CPR Technology

When the response time is greater than 5 minutes after sudden cardiac arrest, studies bear out the benefit of providing 1-2 minutes of CPR prior to a defibrillation shock.^{1,2} However, it is often not possible for a responder to determine on arrival if an individual patient would benefit more from an immediate shock or an initial interval of CPR prior to a shock. In response to this dilemma, Philips has introduced a new capability called SMART CPR in its HeartStart FR2+ automated external defibrillator (AED).

When SMART CPR is enabled, the HeartStart FR2+ evaluates key attributes of the patient’s presenting heart rhythm and advises whether to initially treat shockable ventricular fibrillation (VF), the most common form of sudden cardiac arrest (SCA), with a shock or with CPR immediately followed by a shock. If a patient in VF is likely to experience a return of circulation with a shock (as is typical of short-duration VF), the FR2+ advises an immediate shock. If the VF rhythm is indicative of a patient unlikely to return to circulation with initial defibrillation, the FR2+ advises an initial interval of CPR prior to a shock.

SMART CPR is designed to help responders make better-informed, more refined treatment decisions. It supports an emerging response protocol that current scientific literature suggests may improve survival for more patients.

CPR Reconsidered The conventional wisdom has been that the best treatment for VF is immediate defibrillation. If a responder had an AED readily available, defibrillation was to take priority over CPR. CPR was considered best administered after a series of shocks. So defibrillator manufacturers initially designed their defibrillators accordingly, and traditional AEDs generally treat all VF by advising a series of shocks followed by an interval of CPR.

However, recent studies have revealed that under certain circumstances, CPR should take precedence over immediate defibrillation.^{1,2} CPR not only oxygenates

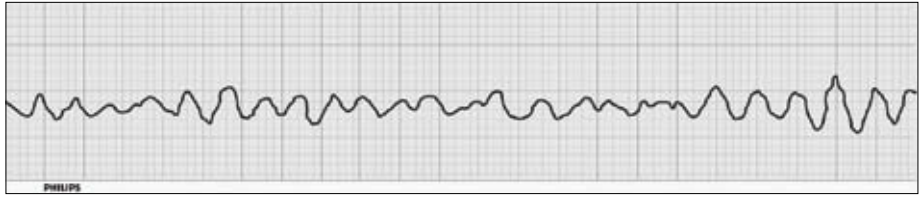


Figure 1a - VF rhythm with high frequency and amplitude, characteristic of a heart receptive to a defibrillation shock.

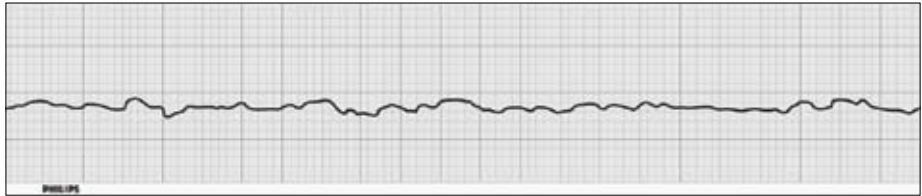


Figure 1b - VF rhythm with low frequency and amplitude, characteristic of a heart that is unlikely to return to circulation with a shock. CPR prior to a shock may improve outcome.

the blood and moves it throughout the brain, organs, and coronary arteries, it also redistributes blood within the heart chambers for more optimal pumping. And it sets off biochemical reactions that generate new fuel desperately needed by a heart in the chaos of VF. As a result, CPR re-energizes the heart and can render it more receptive to a defibrillation shock. These benefits are fleeting, however, and dissipate quickly once CPR is stopped.^{3,4}

Not All VF is the Same Patients with some VF rhythms respond well to a shock by achieving a return of circulation. If the VF rhythm is of high frequency and amplitude – in other words, if the rhythm is coarse, spiky, and energetic, typical of short-duration VF – the heart is likely to return to circulation with an immediate shock (Figure 1a). For these rhythms, an immediate shock is beneficial.

Other VF rhythms are indicative of a heart that is not receptive to a shock. If the frequency and amplitude of the VF rhythm is low – if the rhythm is weak,

and rather flat – the heart’s energy is depleted and a return to circulation is unlikely (Figure 1b). For these rhythms, an initial interval of CPR prior to a shock may be beneficial. CPR can improve the condition of the heart, making it more receptive to a shock.

Progression of VF Over Time At the onset of cardiac arrest, VF typically starts out quite coarse and energetic. As minutes pass without treatment, however, the heart depletes its fuel reserves, and the VF rhythm progressively weakens, getting flatter and finer. Figure 2 is a graphical representation of this progression. (Note that time is not the only contributor to a weak VF. Other factors include the degree of underlying heart disease and the cause of the arrest.)

It is not surprising, therefore, that recent studies are showing that patients with rhythms typical of short-duration VF respond better when they receive an initial treatment of defibrillation shocks, while survival is higher for

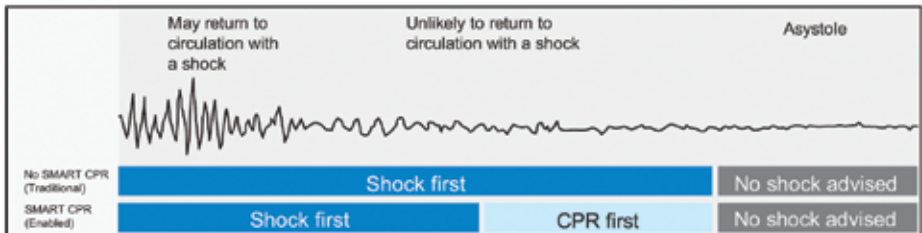


Figure 2 - The Progression of VF Over Time.

patients with rhythms typical of long-duration VF (>5 minutes) when they receive an initial interval of CPR prior to defibrillation shocks.^{1,2} Defibrillation success decreases with time due to continued cellular deterioration, an increasing imbalance of oxygen supply and demand and the continued depletion of fuel the heart muscle desperately needs. CPR can temporarily improve the condition of the heart and “coarsen” VF, making it more receptive to a shock.

To illustrate, a study by Wik et al. looked at cardiac arrest patients in an EMS system.² Patients were divided into two groups. One group received shocks as the initial treatment. The other group received an interval of CPR followed by shocks. The short-duration VF patients who received immediate shocks had higher observed survival than those who received CPR first. This is consistent with other studies that have demonstrated remarkably good survival in patients with consistently short duration VF.^{5,6} However, survival rates with an immediate shock protocol dropped precipitously the longer the patients were in VF. Figure 3 shows the survival curve over time for that group of patients. Of particular interest is that among patients with longer-duration VF, those in the group receiving an interval of CPR prior to a shock had significantly better survival.

However those with long-duration VF had higher survival rates when receiving CPR prior to a shock.

The Opportunity to Improve Survival This data suggests an opportunity to improve survival of cardiac arrest with a change in response protocol: provide immediate shocks to patients in short-duration VF, but provide initial CPR prior to shocks to patients in long-duration VF (Figure 4). Indeed, the current literature proposes such a protocol, and AEDs that support it, as a way to improve survival.⁷

With this opportunity in mind, Philips has augmented the HeartStart FR2+’s well-proven patient analysis logic with a separate, more refined treatment algorithm called SMART CPR. The FR2+ assesses the initial heart rhythm to determine if it is shockable. If it is, SMART CPR determines if the rhythm is typical of a heart in short-duration VF and the patient is thus likely to benefit from an initial defibrillation shock. If this is the case, the FR2+ will advise a shock. Otherwise, it will advise a period of CPR first, followed quickly by a shock, anticipating that CPR may render the heart more receptive to a shock. Either way, the FR2+ adjusts its voice instructions accordingly.

Conclusion SMART CPR takes automated patient analysis and treatment advice to a new level of refinement. It helps responders make better-informed treatment decisions. SMART CPR supports an emerging response protocol the scientific literature suggests may improve survival. This represents an important step in applying the results of recent research to help more patients. Δ

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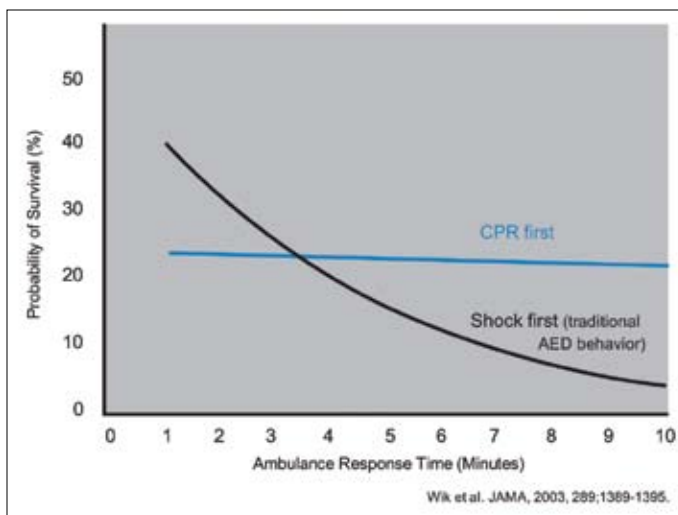


Figure 3 - Results of study by Wik et al. Patients with short-duration VF had good survival rates when they received immediate shocks.

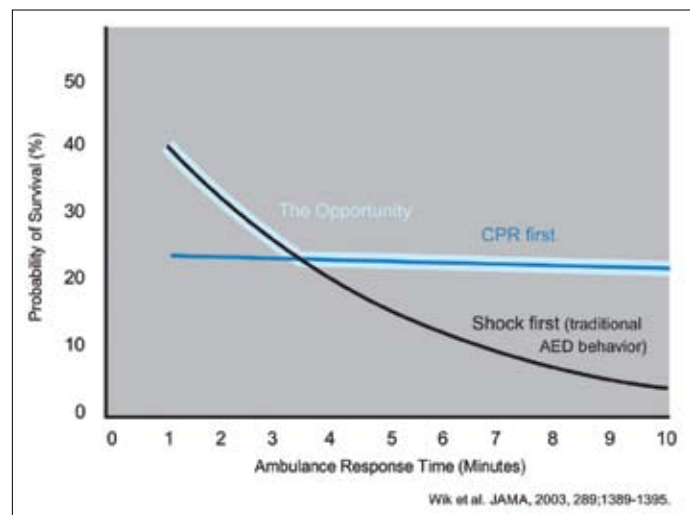


Figure 4 - An Opportunity to Improve Survival with a Change in Response Protocol.

Philips Patient Monitoring Leverages Strengths in Monitoring, Measurement, and Information Management for Visionary Clinical Decision Support Strategy

Philips Patient Monitoring is pursuing a strategy to develop the industry's most compelling clinical decision support solutions. The goal is to integrate key clinical workspaces, such as the ICU, OR, and NICU, and to harness the power of physiologic data, accumulated experience, and evidence-based care standards for better, faster diagnosis, monitoring and therapy. Early proof points have been part of the Philips patient monitoring portfolio for decades already and certainly have helped Philips to gain its commanding share of the U.S. patient monitoring market.

Over the past two years, Philips Patient Monitoring group has released new clinical decision support applications that can synthesize multiple data sources and present them in clinically relevant ways to help care teams make well-informed treatment choices at the point of care. On Philips' newest IntelliVue monitors alone, users can take advantage of multi-parameter alarming and unique, patented displays such as **ST-Map** and **Horizon Trends**.

The new release of the CareVue Chart clinical information system actively safeguards patients with clinical advisories. Its reporting capabilities are also indispensable to hospitals in this new era of pay for performance, not to mention unannounced full site inspections from JCAHO.

Advanced Patient Monitoring Reflects Clinical Thought Processes The very successful IntelliVue patient monitors have built-in clinical decision support tools that reflect clinical thought processes and make the most of IntelliVue's powerful algorithms and highly flexible display capabilities.

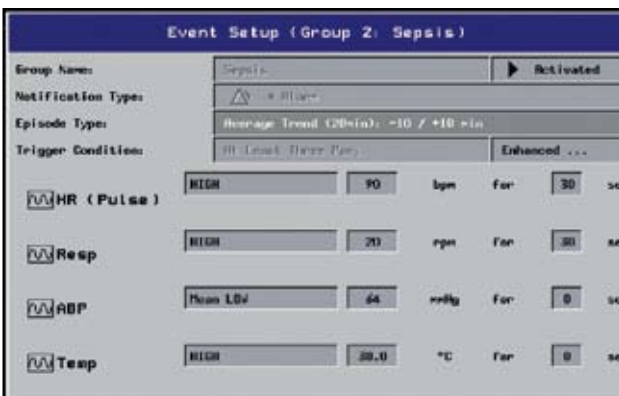
Advanced Event Surveillance The latest version of Advanced Event Surveillance gives clinicians great control over the criteria that constitute an event by allowing them to set relative or hard limits, duration settings, and up to four parameters per event group. The ability to tie standard *, **, and *** alarms to events is an important step toward achieving meaningful smart alarms.

Horizon Trends Horizon trends plot trends from a baseline so that deviations are put into sharp focus. The clinician chooses the baseline value, which could be a target for therapy, for example. The unique horizon bar displays the current value in relation to the baseline, and the arrow indicates the trend over the last ten minutes.

Neonatal Event Review Neonatal Event Review, when introduced in the early 1980s, was a pioneering innovation for the NICU. It correlated apnea, bradycardia, and drops in oxygenation and then documented the number, severity and distribution of these events to inform treatment decisions.

Today, ST-Map collects ST values and trends derived from the vertical (limb leads) and horizontal (chest leads) planes into an integrated, immediately comprehensible display. The maps are multi-axis portraits of the patient's ST segments as measured with the ST/AR algorithm.

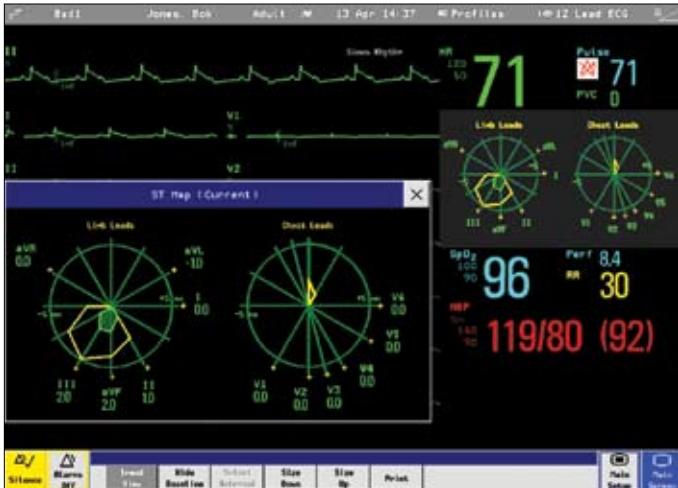
Clinical Information Systems Extend Decision Support Out To The Enterprise CareVue Chart synthesizes virtually every element of the patient's accumulated clinical data – vital signs, medications, demographics, lab results, calculations, orders, and more – into actionable information for clinical decision making. For today's extended care teams, that coherent, centralized picture of patients' current statuses and how they got there can help ensure more consistent care and speed intervention when a problem begins to manifest.



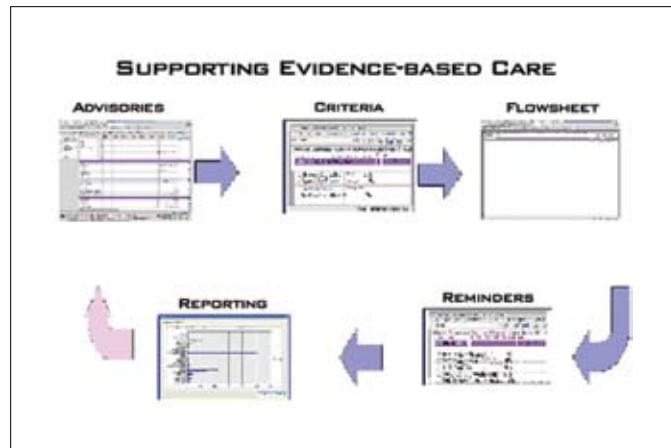
This screen shows how a clinician could set up Advanced Event Surveillance according to a sepsis guideline.



Horizon trends are the distinctive shaded trends running along the bottom of the screen. Note how the colors are keyed to the live waveforms.



The ST Map displays an overview of the patient's ST status at a glance.



CareVue Chart provides an array of tools to support evidence-based care.

CareVue Chart constantly evaluates incoming patient data and issues clinical advisories, which can be sent out to pagers, when constellations of events warrant attention. Consider, for example, a patient on a ventilator whose O₂ saturation levels have decreased. Is this something to worry about? CareVue Chart can calculate immediately that the patient's Oxygenation Index has increased, based on the combination of blood gas measurements and ventilator settings and issue a clinical advisory, which makes it very clear to the clinician that the patient needs help.

CareVue Chart delivers a well-organized, coherent picture of each patient's care and current status wherever a provider needs it – at a networked office PC, on a wireless tablet during rounds, on an IntelliVue patient monitor at the bedside or from home over the Internet. A standard Windows user interface makes it easy to access information through flexible flowsheets, forms, and reports.

CareVue Chart supports a hospital's care guidelines from end to end. Advisories provide early indications of significant changes in patient condition – from warning signs of sepsis to drug-drug interactions. Advisories enforce a workflow since they must be acknowledged, and steps taken are documented. CareVue Chart handles any orders that result from

an advisory and issues reminders for overdue interventions. The CareVue Chart database can also be tapped for retrospective reporting on outcomes and compliance to care guidelines.

Other Inpatient EHRs for Other Care Sites Philips offers a similar product for obstetrical care, called OB TraceVue. It is designed for complete obstetrical documentation, data storage and surveillance from conception through delivery (including well baby charting) and across pregnancies. It features advanced alerting with trace pattern recognition.

CompuRecord, a Solution for Perioperative Care CompuRecord is a complete anesthesia documentation system, spanning preoperative, intraoperative, and post-operative care, providing automated professional and medication cost capture.

Comprehensive Surveillance and Clinical Analysis with the IntelliVue Information Center The IntelliVue Information Center, the heart of the IntelliVue Clinical Network, combines real-time monitoring surveillance of a central station with six Clinical Review Applications to provide a coherent environment for analyzing patients' complete monitoring records from the past 96 hours. A range of carefully chosen, consistently applied display techniques make it easier to discern

physiologic patterns and correlate different parameters.

Philips' Patient Monitoring Group is demonstrating its continued commitment to clinical decision support with the powerful new CareVue Chart release and the steadily growing array of tools for IntelliVue monitors. With the ultimate goal of improving patient care and safety in sight, the road ahead is full of opportunities.

Collectively, Philips offers a suite of clinical information systems, a cut above the point-of-care modules that large HIS vendors have recently begun promoting. Hospitals pursuing a "best-of-breed" approach to building clinical IT infrastructure will want to take a hard look at Philips. Even hospitals with a whole-house HIS installation will want to take a look at CareVue Chart, which provides one solution that can satisfy the most demanding clinical users and then interface smoothly back into the HIS enterprise-wide central clinical data repositories. Δ

Careful Surveillance Required Following Sharp Rise in ICD Malfunctions

by Lawrence J. Gessman, M.D.

When the Heart Rhythm Society and the Food and Drug Administration convened a policy conference this past September 2005 on pacemaker and ICD (implantable cardioverter-defibrillator) performance, a disturbing yet not surprising report was presented showing a sharp rise of more than 50% in ICD malfunctions during the last three years of the study conducted from 1990 to 2002. Hardware problems, battery/capacitor abnormalities and electrical issues accounted for a significant amount of the total device failures according to the report. However, the vast majority of these failures did not lead to death or serious injury and they were detected in time to ensure that patients received therapy when needed.

The conference was called following unsettling news last summer for thousands of people with ICDs who learned there were critical flaws in certain models manufactured by a major cardiac device company, which physicians who had implanted them had been unaware of. In some instances, these models short-circuited instead of delivering a life-saving electrical shock to return an erratically beating heart back to a normal rhythm. The result was several patient deaths associated with short circuits and subsequent recalls and alerts issued by the FDA.

The policy conference could not cite any specific reason why the rate of ICD malfunction replacements has risen in a relatively short period of time. Over the past 10 years, ICDs have become much smaller, yet they've maintained their high-energy output and memory capacity, and they provide more therapeutic features, such as the addition of dual chamber pacing. The decrease in size along with modifications to the battery, capacitor and circuitry (the addition of more leads) may have accounted for some of the observed malfunctions, the report surmised.



Patient with St. Jude Medical Housecall Plus Transmitter.

ICDs Present Increased Patient Risk During Surgery Added to the sharp rise in reported ICD malfunctions is a growing concern for ICD patients who must undergo surgery. An increasing number of anesthesiologists are reportedly finding that many patients with ICDs have units that are not functioning properly during their pre-surgical evaluation. Management of an ICD for surgery must be discussed in advance with the patient's electrophysiologist and/or cardiologist. If a magnet is placed over the ICD and taped in place during surgery, it will suspend detection without interrupting backup bradycardia pacing. Should VT/VF arrhythmias occur during the operation, removal of the magnet will cause the ICD to resume detection and delivery therapy in about 10 seconds, provided the device is not programmed to permanently deactivate when a magnet is placed over it.

Using a magnet also avoids delays in reactivation of the ICD after surgery by a skilled programmer. Whether a magnet is used or the ICD is permanently deactivated before surgery, external defibrillator pads should be in place in the OR and attached to an external defibrillator throughout the entire surgical procedure. Once surgery is completed, in post-op, the ICD should be checked to make sure it's programmed correctly and properly functioning.

ICD Implants Rapidly Increasing Another consideration is the surge of ICD implants anticipated in the next several years in the United States. More than 120,000 ICDs were implanted in the U.S. in 2004, and this number is projected to double within three years, according to the Center for Medicare and Medicaid Services (CMS) that has recommended expanding the scope of ICD coverage to include more at-risk cardiac patients.

Shortage of Electrophysiologists Compounds Problem With so many ICD implants expected in the next few years, careful monitoring after implantation is a necessity, however reliable these devices are. Since electrophysiologists like myself who implant ICDs are a small but specialized group of cardiologists, the challenge will be how to manage this growing patient population.

Implanted cardiac devices, be they ICDs or pacemakers, require regular monitoring to make sure they are functioning properly and working at optimum performance. In most cases, cardiologists require that their patients visit the office every three to four months to have their ICDs checked. Routine office visits should be coupled with remote monitoring, a safe and more efficient way to check an ICD.

Remote ICD Monitoring Improves Convenience and Compliance A physician must prescribe the service and frequency of testing for each patient. Remote ICD monitoring provides physicians with immediate access to "real-time" information – everything a doctor can check during a routine office visit. The only difference is remote monitoring is more convenient for the patient and more efficient for the physician.

Remote ICD monitoring can determine the following:

- Battery problems, such as battery weakness and deterioration

- Issues with the device's lead which is extremely critical since many ICDs have more than one lead
- Device malfunctions, such as misinterpretation of heart rhythms
- Programming information to determine if the device is programmed and set correctly for the individual patient's condition
- "Real-time" and stored electrograms
- Surface ECGs
- Arrhythmia histograms
- A record of delivered therapies, the amount of voltage used to shock the heart back to a normal rhythm during an episode

Retrospective Shock Analysis What makes the service even more valuable is after an episode, remote monitoring can help identify the cause of a shock. The patient's physician can immediately decide whether the patient needs to go to the emergency room. If so, information about the shock episode is forwarded to the hospital prior to the patient's arrival. This can be done anywhere in the country at any hour of the day.

Equipment Required Remote transmission of the ICD data takes only about 10 minutes time and can be done with a telephone using a transmitter with two wristband ECG electrodes and a small wand which the patient holds over his or her chest where the ICD is located. The telephone transmission sends the "real-time" information to a monitoring center where skilled technicians work around-the-clock, seven-days-a-week to assess the information from the device. Once the assessment is complete, the monitoring center sends the information to the patient's physician either by fax, Internet or the mail, if the results are normal.

I prescribe remote monitoring for my patients every three months and additional monitoring should they experience palpitations or shocks. If an event occurs or remote monitoring detects serious abnormalities or

arrhythmias, the monitoring center alerts me immediately so I can give the patient my full attention.

The Case for Routine Remote Monitoring A case in point that demonstrates the effectiveness of ICD remote monitoring, particularly if the patient is away from home, involved one of my ICD patients who spends three months during the winter in Florida. One day, he had what appeared to be a grand mal seizure and then fainted. His family took him to the local hospital emergency room and physicians there proceeded to do a neurological work-up. His family then called me and I arranged for his ICD to be remotely monitored while he was in the ER. The test results immediately revealed that he suffered from an episode of ventricular fibrillation (VF) that was successfully treated by the second high-energy shock he received from his ICD. As a result of remote monitoring, I was able to cancel the neurological work-up and I advised my patient to see a local electrophysiologist who programmed a higher energy first shock should he have another VF episode. Not only was the patient able to leave the hospital without having to be admitted for further testing, he didn't have to endure the physical and psychological stress of hospitalization, and a costly medical hospital stay was averted.

Published studies such as a major one conducted by The Cleveland Clinic Foundation prove that outsourcing remote ICD monitoring is as safe, reliable and effective for heart patients as routine follow-up at the doctor's office, a lab or a clinic. The study included 124 patients who remotely monitored their ICDs for a period of six months. Each ICD patient was provided with a transmitter that delivered "real-time" information about their device to a trained technician at a remote monitoring center operated by Raytel Cardiac Services, a leading provider of remote pacemaker monitoring and cardiac diagnostic testing in the United States. Remote interrogation proved highly effective as the study found it to have as

much diagnostic value as in-clinic monitoring, offering more intensive but less invasive surveillance. Remote monitoring was also more likely to detect any ICD malfunctions earlier, was more convenient than traveling to the doctor's office and allowed "real-time" data to be sent immediately to an emergency room, often before the patient arrived, if there was a shock event.

What has added to the importance of remote ICD monitoring are the findings reported in the 2005 "Sudden Cardiac Death in Heart Failure Trial," more commonly referred to as the SCD-HeFT study, which demonstrated that ICDs save hundreds of thousands of lives among people at risk for sudden cardiac death. As a result, more people who may be at risk can receive an ICD as part of a new standard of care approved by Medicare. With such a dramatic increase expected in ICD implantation, remote monitoring is likely the only way that doctors can safely monitor and manage routine follow-up of all these new patients in a timely and comprehensive manner, and maintain a high level of immediate emergency follow-up that doesn't put the patient at risk.

For the physician and other healthcare professionals, remote monitoring provides a needed solution to reliably test ICD patients more cost-effectively, freeing the physician's office of the burden of routine monitoring. Office staff that normally handles these required follow-up procedures can be more productively engaged in seeing more acute patients and addressing their medical needs as well as new patients. Physicians have the assurance that any abnormal function will always be called to their attention quickly, and any routine or post-shock episode can be remotely monitored faster with no loss of accuracy.

Patients who live in rural areas or travel far away from their cardiologist/electrophysiologist or who spend several months a year away from home are most likely to benefit by

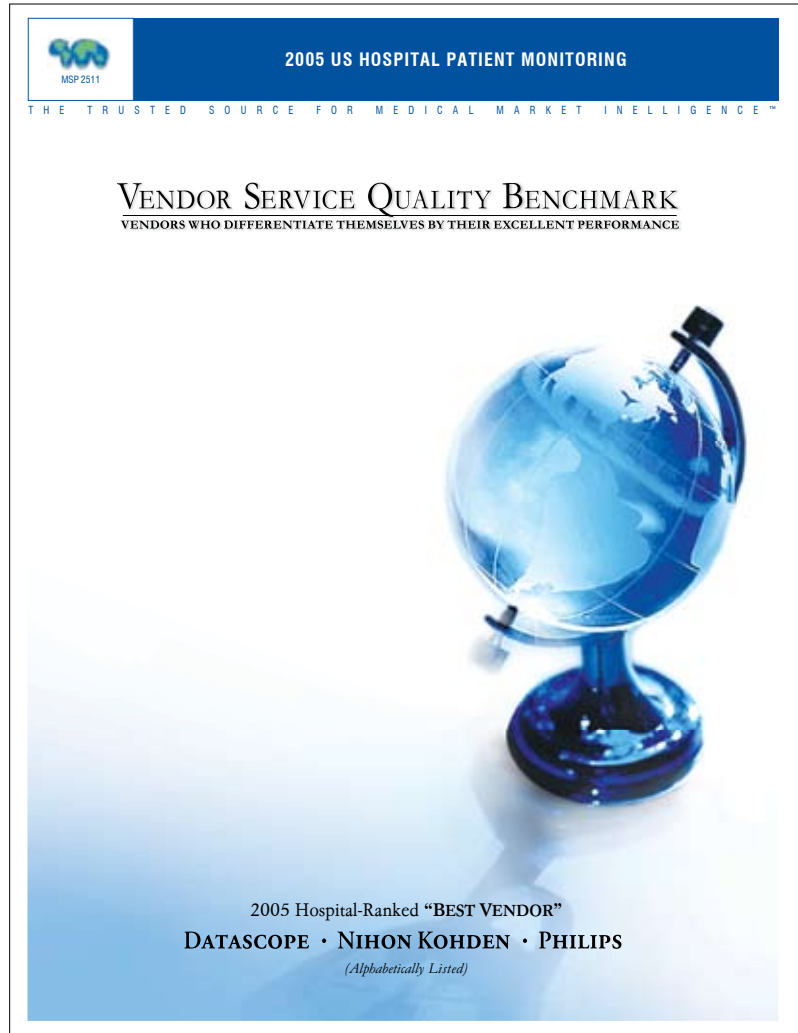
remote ICD monitoring. Patients are given the transmitter and trained by the monitoring company, and they don't have to deal with billing issues since the company works directly with Medicare, insurance companies and HMOs. Knowing that a monitoring center is always available anytime of day or evening should they receive a shock is not only an emotional relief, it is a major enhancement to their quality of life.

Background

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Dr. Gessman is also an Associate Professor of Medicine at the University of Medicine and Dentistry-Robert Wood Johnson Medical School in Camden. He serves as a medical consultant for Raytel Cardiac Services (www.raytel.com), a 30-year leader in remote cardiac device monitoring.

Raytel Cardiac Services (www.raytel.com) is a division of Raytel Medical Corporation, a wholly owned subsidiary of SHL-Telemedicine Ltd. (www.SHL-Telemedicine.com), world leader in developing and marketing advanced telemedicine systems, and the provider of call center services to subscribers. Δ



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Advanced Monitoring Strategies for the Ambulatory Patient

New, Scalable Solutions Needed to Handle Higher-Acuity Patients in SDUs and on General Wards March 4, 1998, the following caption appeared on the front page of the Wall Street Journal: For Texas Station, HDTV Means Hospital-Disturbing Television.

Here's why the story made headlines in the mainstream media; it made the nation aware of potential interference issues for medical telemetry systems. In June 2000, the FCC ushered in the era of Wireless Medical Telemetry Service (WMTS). The FCC initially gave hospitals three years to migrate to the new frequencies allocated exclusively for WMTS. In September 2003, the American Hospital Association (AHA) reported that, based on its informal polling of hospitals, there had been virtually no migration of medical telemetry systems to the new WMTS frequencies. Our Reality Survey of over 3,000 U.S. hospitals shows that most hospitals have now changed into the new WMTS band. The early migration was out of the lower part (450-460 MHz.) of the UHF band. In the last 2 years, additional migration has been out of the upper part (460-470 MHz.) of the UHF band.

On October 15, 2003, the FCC extended the freeze for an additional 180 days and then once more through December 31, 2005. While many hospitals have migrated, a few are still in the process. Today, only about 10% of hospitals remain in the UHF band, at considerable risk to themselves and their patients. For many, the issue is one of risk management – staying with current systems to avoid the financial impact of migration while hoping new sources of interference do not impact their operations – which borders on “magic thinking”.

As a result of the extensive migration from older UHF bands into the new WMTS, there will be slow growth for traditional U.S. hospital ambulatory step-down telemetry units over the next few years; however, there is a new

market that is expanding – monitoring patients in hospital general wards (many of which are increasingly being equipped with bedside monitors).

Monitoring Beyond Traditional Telemetry Boundaries As U.S. hospitals ramp up to accommodate the healthcare needs of the rapidly aging Baby-Boomer generation, telemetry monitoring will be increasingly called upon to monitor these higher-acuity patients. Today, most hospital monitoring is located in traditional ICUs or telemetry step-down units that are already filled to capacity with critically ill patients. As a result, patients are increasingly being admitted to the general medical/surgical floors when they require monitoring.

Preparing to care for aging Baby-Boomers and 46 million currently uninsured patients who will at some point come under a national healthcare program, will require hospitals to re-think the design of their facilities, particularly their “general wards”. Many believe that as more acute and aging patients require precautionary or continuous monitoring, there will be monitoring on all general medical-surgical units. In the future, ICUs and traditional telemetry step-down units will still be needed to monitor higher acuity patients that require more nursing care and a higher nurse-to-patient ratio. General care areas will become tomorrow's new progressive care units.

Centralized Monitoring - Hospital Wide Some trend-setting hospitals have already implemented a wireless infrastructure to provide for centralized monitoring of patients in many nursing care units. Some of these facilities have designed central surveillance units to monitor large numbers of patients from one location, citing both improved quality of patient care and patient flow efficiencies. This allows a patient to be admitted to any nursing care unit, but still be monitored for cardiac, respiratory or other problems. It is useful

when a patient presents with more than one problem, such as a patient who has a diabetic or cardiac co-morbidity. With telemetry, any bed can become a monitored bed, making it easier to admit patients to any (appropriate) available bed. This strategy provides for the best nursing care for the primary diagnosis but with supplemental surveillance of continuous monitoring.

An approach like this can help a hospital that has a crowded emergency operation improve patient admissions. When monitored beds exist in multiple care areas, the numbers of patients that are held in the ED are minimized. We previously documented this scenario at Holy Name Hospital in Teaneck, New Jersey (see Holy Name Hospital Renovates Incorporating Nihon Kohden & Other Advanced Technologies, Industry Alert Vol. 6 No. 4).

What Parameters to Monitor? Many patients today present with respiratory or other conditions for which NiBP and SpO₂ are more sensitive parameters to monitor than just ECG (which may show changes too late to be useful). Post-surgical patients are a good example, as a possible complication can be pulmonary embolism. Currently most of these patients are not monitored post-operatively and have written orders for vital-sign assessments every four hours.

An early sign of pulmonary embolism is a subtle decrease in the pulse oximetry value – but if it is not monitored, it may be 4 hours before it is detected by manual spot check vital signs monitoring. Spot checks of this parameter are a risky approach to early detection of this important complication, whereas continuous surveillance of respiration rate, SpO₂, NiBP and ECG together would detect it almost immediately. The problem is, most conventional, patient-worn telemetry systems do not offer respiratory rate, SpO₂ and NiBP. There are many other scenarios where continuous monitoring of patients outside of the traditional monitoring

environment is beneficial, but often the decision to monitor patients in these settings is offset by technology limitations or staffing requirements.

On many general medical surgical units there are elderly patients whose clinical conditions require them to ambulate during their hospitalization. As a method of assessing their tolerance of this activity, the nursing staff can conduct basic, non-invasive monitoring of ECG, NiBP, SpO2 and respiration. This assures that they have the cardiac and respiratory reserves required for such ambulation. The respiratory monitoring is particularly important for patients who have been smokers, have asthma, emphysema or COPD conditions.

Selecting the Right Device for the Patient's Monitoring Needs To accomplish this type of monitoring, a monitoring manufacturer needs to provide patient-worn devices employing a wireless infrastructure that transmits the patient's signal to a central surveillance site or traditional central station.

An obvious disadvantage of some systems is that some key parameters are not incorporated into the patient-worn device, but rather are incorporated into a separate patient monitor that is mounted on a roll around stand that the patient becomes tethered to and must push (or carry in their hand) as they ambulate. Even if the monitor is light weight, it still consumes one of the patient's hands, which for elderly patients who have balance problems, may limit their ability to get in and out of wheelchairs or to steady themselves when they are losing their balance. Indeed, even a monitor as light as 2 pounds can become a burden to a 90 pound, elderly female with advanced COPD. When the parameters needed are in a separate device on a roll around stand, ambulation may require nursing assistance. In this era when hospitals are faced with a growing nursing shortage, such an approach is an inefficient use of a very limited resource – nursing staff.

Battery Life Considerations Battery life of ambulatory telemetry is always a consideration. Many of the older generation telemetry systems had very limited battery life, in some cases less than two days. Battery life of portable monitors were even more limited, often ranging from only 2 to 6 hours.

Preparing to care for aging Baby-Boomers and 46 million currently uninsured patients who will at some point come under a national healthcare program, will require hospitals to re-think the design of their facilities, particularly their general wards.

This presents a problem when a patient is sent off a nursing unit for a test that may take more than 2 hours, particularly if a record of the patient's vital signs is required during this stressful situation. Approaches that use monitors on IV poles need to be plugged in to recharge as soon as the patient returns to the room, or if the battery runs low during the test, will require the patient to be seated near an electrical outlet, which is not always conveniently available in many existing hospital diagnostic areas. Such limitations affect the patient's ability to toilet themselves and may contribute to the impression of poor care by the patient. Fortunately, some monitoring companies are finding ways to offer next-generation, patient-worn telemetry systems that allow ambulation and provide adequate battery life to overcome these problems. Below we have listed some of the characteristics of systems that enable telemetry surveillance of patients located in any ambulatory environment.

1. Patient-worn devices should be very lightweight and truly portable – the patient should be provided with total freedom of ambulation, the monitor should be battery-operated and patient-wearable.

2. Energy efficient – The monitor should operate on battery power for at least 24 hours for all parameters and longer when NiBP is not monitored.
3. The patient-worn unit should be flexible enough to monitor any combination of multi-vector ECG, NiBP, SpO2 and respiration.
4. The telemetry system should minimize nursing interventions or equipment care; nurses on general wards have many patients to care for.
5. The telemetry system should monitor and transmit all alarms – including arrhythmia notification – to a central station (or remote surveillance site).
6. The monitor should be capable of transparent and automatic transfer of all collected patient vital signs data to other clinical areas or the hospital's information system repository.



Nihon Kohden Emerges by Introducing Technologically-Innovative Solutions Over the last several years, MSP has watched as Nihon Kohden has become one of the fastest-growing monitoring companies in the U.S. marketplace. Year upon year Nihon Kohden's unit sales and market share have grown very significantly, a pattern we expect to see continue into 2006. NK has done this by displacing both smaller



specialty monitoring companies and larger, facility-wide suppliers – a rather remarkable feat for an emerging monitoring company. Why have they been so successful?

Nihon Kohden's ability to offer an array of innovative monitoring products useful across a variety of departments – both wired and wireless – and their ability to connect information on a highly robust network has contributed to their success. The remarkable value of their systems (which are typically 20-30% less than larger competitors) and their 5-year warranty have become a compelling combination to many hospitals seeking value but unwilling to compromise state-of-the-art design. Service quality has also made a significant contribution to their success.

MSP Identifies NK for Outstanding Service in 2004 and 2005 Each year MSP conducts an annual survey of all U.S. hospitals, of which about 65-70% respond. This survey measures a variety of parameters related to the quality of vendor service – such things as: the knowledge of the vendor's service desk personal, the time to arrive on site, the ability to fix a problem on the first visit, the cost of the service, the reliability of the equipment and others. This data is measured from the input of over 2,700

U.S. hospitals, making the results far more accurate than any other survey. In both our 2004 and 2005 Vendor Service Quality Reports (available at www.medsp.com), Nihon Kohden was noted both years, along with Philips, as the two best monitoring companies for overall service quality. Nihon Kohden also was tops in service value as their unprecedented five-year parts and labor warranty for all bedside monitors, transmitters, receivers and anesthetic agent analyzers makes after sale support virtually free.

The value of Nihon-Kohden products has been enhanced again by the introduction of the first transmitter designed to monitor ECG, NiBP, SpO2 and respiration in the WMTS band – the new NTX, patient-worn transmitter (shown above). This new transmitter allows Nihon Kohden to continue to expand its role as an enterprise-wide monitoring supplier by offering a product for surveillance in both traditional telemetry step-down units, but also for the emerging general ward telemetry surveillance market – the only component of the telemetry market that is poised for rapid growth over the next 4 years.

The NTX enables hospital staff to monitor higher acuity patients admitted

to lower cost clinical settings. The NTX is unique among other transmitters not only in the number of parameters, but in its design. The NTX allows patients to ambulate with a single ergonomically designed, patient-wearable, wireless monitor without the restrictions found in traditional telemetry or bedside monitors. The design of the NTX allows it to be worn either in the cuff or around the waist, similar to a Holter-style recorder.

Extremely comfortable to wear in either location, the NTX is lightweight and can operate for a minimum of 24 hours on three AA batteries while processing up to eight vectors of ECG, respiration, continuous SpO2 and NIBP with automatic inflations set at one-hour intervals. This frees the patient to ambulate without dragging along an IV roller pole and monitor and contributes to a better (and safer) in-hospital patient experience.

The NTX utilizes Nihon Kohden's unique miniaturization technology that provides more telemetry capabilities and value. One of Nihon Kohden's first technological advances was their unique "Smart Modular Cables", achieved by miniaturizing the circuitry found in traditional bedside modules and embedding it directly into the patient cables. The result was a truly functional, modular bedside monitor offering



a full spectrum of parameters and arrhythmia monitoring priced almost 20-30% lower than traditional modular monitors, a value that has been noticed by a growing number of hospitals. The same miniaturization technology was applied to capONE mainstream CO₂ technology specifically designed for non-intubated patients. Now that technological prowess is again manifested in the NTX, a breakthrough in multi-parameter, patient-worn ambulatory monitoring.

One strength of the NTX is that it connects to the Nihon Kohden monitoring network – making it ideal for “mission control” type, central surveillance configurations (where trained monitoring technicians can oversee the activities of many patients and report back to the caregivers any adverse changes or negative trends occurring with patients’ vital signs or ECG rhythms).

In anticipation of the NTX product release, Nihon Kohden made two significant changes to their central station software to further enhance the clinical utilization of the NTX. The first

change is that the user can turn ECG monitoring on and off from the central station, so the NTX can be converted instantaneously from a simple vital signs monitor (NiBP, SpO₂ and pulse rate) to a telemetry transmitter that can support a high variance in patient acuity.

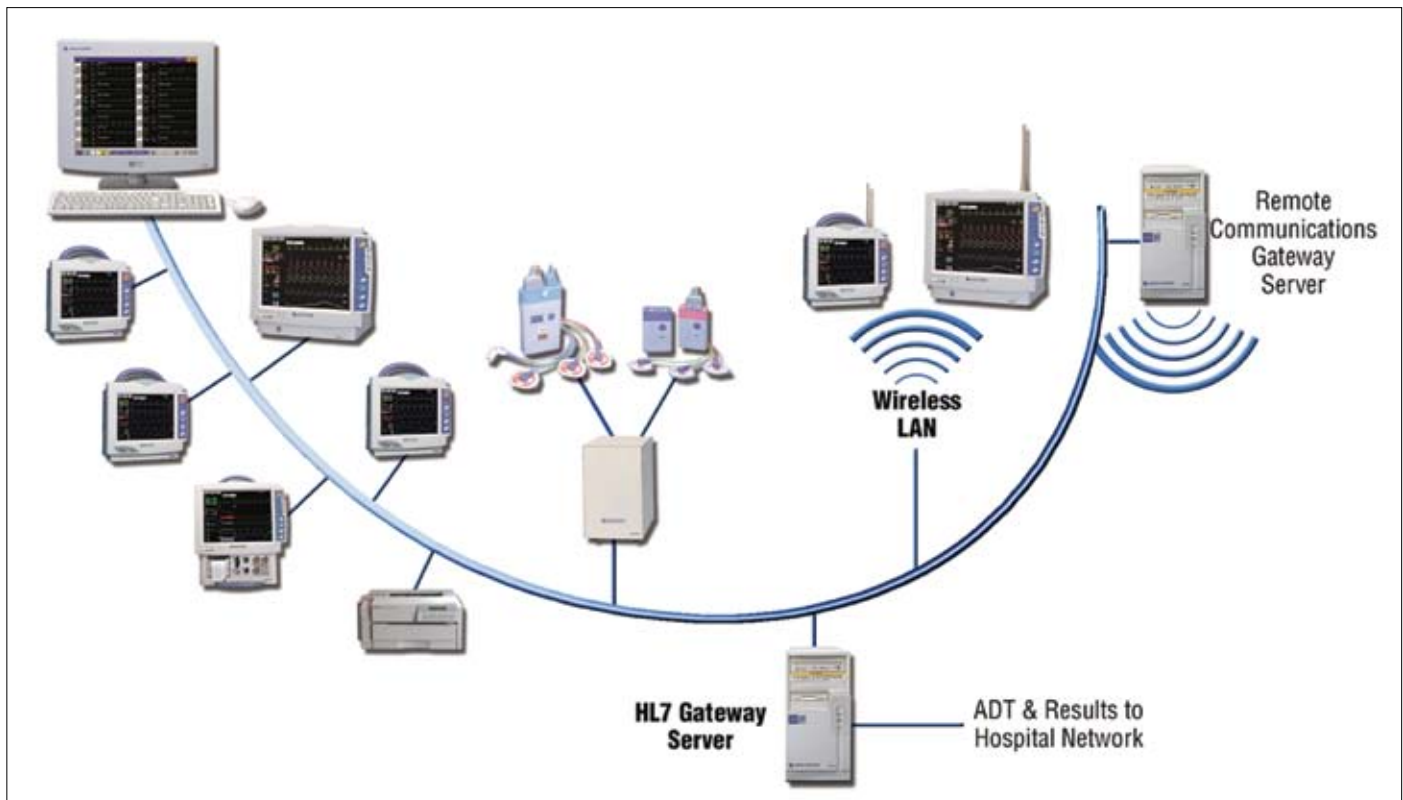
NK has succeeded by displacing both smaller specialty suppliers, and larger, facility-wide suppliers – a rather remarkable feat for an emerging monitoring company.

Second, a new feature called Device Transfer was added, which makes Nihon Kohden’s central networking system one of the few patient-centric systems in the industry. With Device Transfer, all patient information, including waveforms, vital signs and full disclosure data, can be acquired and transferred seamlessly from one clinical unit to another, regardless of the device that is being used to acquire that data. Being patient-centric empowers

hospitals by giving them the ability to maintain a seamless patient record across the patient’s entire admission.

These two features were added to the Nihon Kohden monitoring network that already featured a very robust yet inexpensive HL7 gateway server that allowed industry-standard transmission of all patients’ vital signs data to the hospital’s record-keeping system or other HL7-compliant systems or repositories. That makes Nihon Kohden a good partner for enterprise-wide data integration – an increasingly important issue today.

While many monitoring vendors have products optimized for the traditional, ECG or ECG/SpO₂ telemetry step-down markets (which will have very low volume over the next 4 years), Nihon Kohden has cleverly positioned itself to participate or lead the conversion of the general ward from manual, spot-checked patient surveillance to continuous, networked surveillance using their innovative, patient-worn telemetry systems. Δ



The Future – An Integrated, Wired & Wi-Fi Wireless, Industry Standards Based, Shared Network

When it comes to new technology, healthcare providers should understand and feel confident with the systems to which they entrust their mission-critical applications. This is especially true of the life-critical, patient monitoring technology, for which healthcare providers are seeking an accurate and sustainable solution. In the last 5-8 years, with the growth of mobile network patient devices and EMR applications, real-time networking has become more important in supplying timely patient information to support quality of care and cost efficiencies at the point of care. Combined with the explosion of wireless networks in hospital, a compelling argument can be made for running monitoring together with other healthcare applications on a single network.

Limitations of Multiple Networks

In the past, patient monitor networks have required a completely separate, dedicated and parallel network infrastructure, completely independent of the hospital data networks, in order to guarantee security, quality of service and performance. These monitoring networks have been isolated and proprietary, and integrate well with overall hospital networking strategy. The disadvantages of such an approach include:

- There is no leverage of strategic investments in network infrastructure; the hospital must build, maintain, and pay for service on two completely separate networks.
- With the growing adoption of wireless networking, it is not physically possible to support two 802.11b/g networks (i.e., one for patient monitoring and a second for general hospital data networking).

If there are different networks within a hospital (for monitoring and other functions), the CIO has to support all of them, which may be based on different standards (or no standards



The Pick and Go® system eliminates the need for separate patient monitors and enables patient vital sign data to be continuously tracked throughout procedures, during transport from remote locations, and while being moved throughout a facility.

at all) and which may have different hardware and different skills sets required to support them. The initial capital investment the hospital will have to make for networking will be higher, requiring two or more sets of wiring, switches and controls (the systems may be parallel, but there will still be dual hardware systems in the hospital).

The CIO will also be faced with ongoing, long-term costs of ownership of running/supporting multiple networks. Typically, a system is updated every 3-5 years, but meanwhile, there are ongoing annual costs associated with the hardware and the need to maintain staff skills (i.e., via classroom training and certification exams).

Benefits of a Shared Infrastructure
Therefore, eliminating redundant infrastructure through a shared network has many advantages:

- Cost savings (e.g., lower cost of installation and ownership. Instead of installing two separate wireless networks, the hospital can leverage its existing infrastructure and share the finite bandwidth).

- Better compliance with overall hospital enterprise network strategy.
- Improved reliability (i.e., uptime).
- Unifies network maintenance and administration.
- Ease of data integration (e.g., of location-based services and wireless site survey software, planning documentation and Voice over Internet protocol – VoIP).
- Flexibility (openness of architecture to integrate into what the hospital wants; i.e., what functions or devices they want in their IT system, to build the solution that works best for them).
- Ability to transport information throughout one integrated hospital network.
- Mobility for patients, so they receive the same quality of care while ambulating or moving from unit-to-unit in the hospital. This creates value for patients and caregivers.
- Supports open standards (standards-based technology rather than the limitations of non-standard or proprietary network components).

This is what the average CIO hopes to achieve. In response to this demand, Draeger Medical Inc. is creating a paradigm shift — from looking not only at monitor features, but also at the total IT enterprise. Recognizing that there is more than one way to support monitoring, Draeger Medical is the first company to market with an integrated monitoring and hospital network that can support wired and Wi-Fi wireless, and offers standardization throughout the hospital – without compromising on patient care network reliability.

Standards-based, Innovative Wired/Wireless Technology Draeger Medical's wired/wireless product offering, Infinity® OneNet, is innovative technology. Draeger Medical chose

a Wi-Fi standard already in hospitals to develop a VLAN-based shared infrastructure integrating wired and wireless Wi-Fi patient monitoring, to help maintain continuous access to all patient vital signs while running other applications over the same network.

Draeger Medical Embraces Open Standards Rather than building a proprietary, standalone network for “life critical” patient monitoring data, a hospital can capitalize on the redundancy of its existing network and use preferred network management tools. To solve inherent problems with wireless networks, Draeger Medical has created a special form of Quality of Service; through a mechanism called Wireless Bandwidth Allocation (WBA), monitors will always have dedicated bandwidth in the air, and the hospital can balance competing data demands by prioritizing network data. Draeger Medical lets organizations think differently about their infrastructure, to facilitate continuous improvement in quality of care, workflow and costs. Proprietary technology is not going to be compliant with the overall network strategy; it represents a risk and added cost to hospitals. Because OneNet is an industry-standard, non-proprietary, open-system approach, CIOs don’t have to make exceptions in their plan to assimilate monitoring, which may have previously been viewed as the networking “stepchild” by the CIO.

Data Transport: Infinity OneNet and Pick & Go Many companies are now jumping on the Wi-Fi bandwagon (after initially expressing concerns about its security aspects). But only Draeger Medical has a product line that is specifically set up to safely leverage Wi-Fi technology. While other companies say they can support wireless, Draeger Medical has forged ahead by supporting a single wired and wireless monitor network that works throughout all care areas, allowing the monitor to travel with the patient and be connected transparently to this network as soon as they are attached to any Infinity docking station.

In 2002, Draeger Medical introduced an Infinity patient monitor using Wi-Fi components. It was different from competitive products because of Draeger’s Pick & Go® approach, which optimizes patient care and nursing workflow. The combination of OneNet and Pick & Go is unique to Draeger Medical, and empowers the company’s enterprise monitoring solution.

Pick & Go devices can go from wired to wireless, with monitors designed to travel with the patient. This unique design and network approach allows the same monitor to automatically switch from a bedside monitor to a transport monitor, saving clinicians time and enabling continuity of patient data and 100 percent connectivity at all times. It also saves the cost of having two separate types of monitors – transport monitors and bedside monitors. The clinician can simply pick up the monitor and go to the next destination, without having to search for other equipment or consume limited nursing time by “preparing the patient to be transferred”.

Recognizing that there is more than one way to support monitoring, Draeger Medical is the only company that markets an integrated monitoring and hospital network that can support wired and Wi-Fi wireless, and offers standardization throughout the hospital...

OneNet enhances existing Pick & Go features, so that all patient parameters are sent continuously back to a central station (location). Nurses can see the data there or on monitors at the patient’s bedside, enhancing efficiency and enabling earlier warning of deteriorating patient conditions and faster reactions in an emergency.

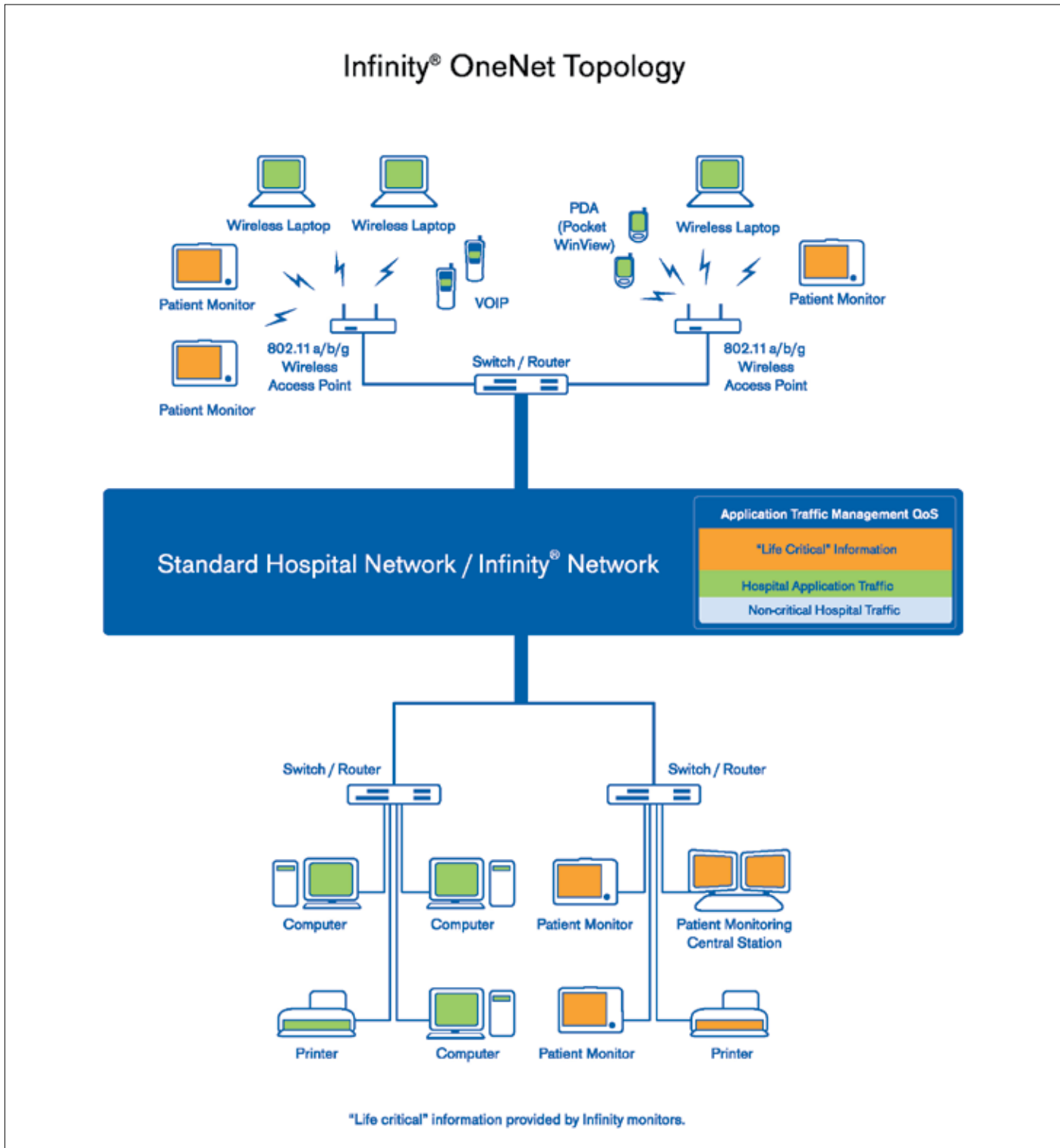
The combination of these two innovative technologies provides enhanced patient comfort and more

flexible bed assignments; e.g., with wireless in ED, a patient can be put into any bed and it becomes a monitored bed, which doesn’t have to be assigned.

Clinical Functionality/Quality of Service The shared Wi-Fi network infrastructure of Infinity OneNet means that any or all areas in the hospital can be enabled for wireless monitors, and can support data and voice over Internet protocol (VoIP). This significantly reduces the total cost of ownership and facilitates easy future network expansion. As the network grows, Infinity OneNet uses custom-designed services and a unique Quality of Service (QoS) design to continue to allocate adequate bandwidth for life-critical patient monitoring devices, so other data does not infringe on the patient monitoring information traffic flow. How they achieve this is interesting.

PacketShaper & Packeteer Perform the Network Bandwidth Allocations Draeger Medical incorporates an Application Traffic Management system to control quality of service (QoS) to the patient monitoring devices, including a PacketShaper® from Packeteer®, to manage the traffic on the OneNet network. The PacketShaper, an intelligent network appliance, reads the priority level of the application involved and controls the section of bandwidth allocated to that priority, much like a traffic cop.

To route the large amounts of critical data (e.g., waveforms) coming in continuously from patient monitors and keep this separate from other applications data on the hospital network, the PacketShaper allows only those packets with a patient monitoring “tag” to go in the larger, high-priority bandwidth. If administrative applications ever reach a point that maxes out their assigned bandwidth (controlled by the PacketShaper), the transfer rate of that data automatically slows down so that patient monitoring data is not impacted.



A VLAN-based shared infrastructure that reduces costs and simplifies network administration.

Services/Partners Services are critical for a successful IT implementation. Hospitals are discovering that wireless systems, in particular, require careful planning and design to support the type of applications for which they are being installed. For instance, if a

hospital wants to implement Wi-Fi and use it for VoIP, special consideration will be required.

While several companies have recently released Wi-Fi compatible monitors, Draeger Medical has in

addition developed the comprehensive suite of procedures, processes, and services needed to install Wi-Fi for patient monitoring into a hospital, including validation procedures for network hardware, network architecture and design; professional

design and implementation services; and site surveys using state-of-the-art tools for spectrum analysis and RF planning. With Predictive Modeling tools, Draeger Medical can predict the number and locations of access points even before a building is constructed.

Draeger Medical also leverages its certified network partners to implement wireless patient monitors (e.g., Siemens Communications and Anyware Networks). These companies are wireless specialists – cutting-edge networking professionals specifically trained to integrate Draeger Medical monitoring solutions into hospital networks. Draeger Medical is also a Cisco development partner, keeping Draeger in sync with the latest changing technologies announced by this networking market leader.

Thus, Draeger Medical does not position itself as a networking expert, but rather, as a company that has partnered with other experts to provide integrated solutions. This “third party integrator” concept follows the recent recommendations of the IEC 60601-1 committee and some of the recent discussions involving complex IT solutions within the FDA. At Draeger Medical, the impetus for developing partner relationships with recognized expert networking companies rather than trying to become a leading network company itself, allows Draeger to focus on its core competency, creating medical devices and patient care solutions – expertise that no networking company can provide.

Draeger Medical recognized that its strength did not depend upon “locking” customers into proprietary solutions, but rather by offering outstanding monitoring solutions that could easily integrate with others. This “open systems” approach contrasts with some competitors that require exclusive partnerships that lock the hospital into proprietary and expensive voice, data and telemetry technologies.

Sociotechnological Trends Draeger Medical’s implementation of cutting-edge technology harmonizes and empowers emerging healthcare trends, including:

- Improved patient safety;
- Demand for improvements in process workflow;
- Need for staff retention and recruitment.

Patient Safety Enhancement In recent years, hospitals have committed significant resources towards improving patient safety, utilizing tools and guidelines from agencies such as the Institute for Healthcare Improvement and the Agency for Healthcare Research and Quality. Patient safety can be enhanced by integrated monitoring and IT devices that make patient-centric, mission-critical information available when and where it’s needed.

Demand for Workflow Improvements Using one integrated technology system allows healthcare providers to access patient information quickly and easily from anywhere inside or outside of the hospital and allows patients to be immediately moved to wherever in the hospital the proper level of care can be provided, without any gaps in the patient’s vital signs record.

Need for Staff Retention and Recruitment Computer-savvy new medical and nursing school graduates expect to have modern technology available to them, as it is documented to improve patient care and increase job satisfaction. Healthcare institutions can also use IT as a recruitment tool by demonstrating that it contributes to a better work/life balance.

Emergence of IT Department as a Purchasing Influence In the past, the hospital’s biomedical department has managed the monitoring network; however, the level of sophistication of networking and data transfer is increasingly causing the IT department to pick up this task as part of an enterprise-wide approach to networking. This is likely to increase

in the future unless there is a major change in the way biomedical engineers approach medical networking. The BME’s role in this important activity has eroded as the need to integrate data from monitoring, ventilation, and clinical systems into HIS and clinical repositories has increased.

What’s Ahead? Certainly the trend towards open system solutions will continue to emerge and with it the importance of using industry-standard approaches and leveraging the expertise from outside of the medical community on expert network, security and infrastructure partners. The Draeger Medical Infinity OneNet creates the foundation layer for an enterprise-wide, integrated monitoring network strategy. Draeger Medical responded to customer requests with this innovative solution, which leverages its deep background in the acute point-of-care solutions to help healthcare institutions better and more cost-effectively meet today’s and tomorrow’s patient care needs. Δ

Spacelabs ICS Improves Decision Support at East Texas Medical Center Athens

New Technology Captures All the Tales of the Heart Upon admittance to the ICU of East Texas Medical Center (ETMC Athens) Athens, TX, Jane Doe was diagnosed with respiratory distress. After four days, she presented with a cardiac arrhythmia known as atrial fibrillation and flutter with a heart rate of more than 100 beats per minute. Her blood pressure started decreasing rapidly.

Using Spacelabs' unique Full Disclosure application, which stores and analyzes patient monitoring data for a 72-hour period, cardiologists were able to go back in time and review her history to determine that her underlying rhythm was, in fact, normal. Given that, they decided to shock her heart to normalize the current arrhythmia. Without the availability of full-disclosure data, or had it shown an abnormal underlying rhythm, they would have pursued other interventions.

The immediate shock treatment minimized Jane's risk of dislodging a clot that could result in a stroke or pulmonary embolism. Cardioversion was performed less than 30 minutes from the onset of atypical rhythm, and the patient had an excellent outcome.

Can a software application change a life? Perhaps it did for Jane Doe. It also has significantly altered the day-to-day operations in the ICU and the entire cardiology department at the busy 117-bed ETMC Athens hospital. Intesys Clinical Suite (ICS) has enhanced clinical confidence, increased efficiency and empowered a higher standard of care, all while cutting costs.

ETMC Athens: A State-of-the-Art Hospital A state-of-the-art hospital, ETMC Athens offers uniquely advanced and comprehensive medical care in a small-town environment. It boasts such specialized departments and services as a full-time cardiac catheterization lab, cardiac stress testing and cardiac ultrasound, including echocardiography, with an outpatient



cardiac and pulmonary rehab program. The emergency department has been repeatedly designated as a Level III trauma center with services that include not only ambulances, but also an Air 1 emergency helicopter. It also offers extensive diagnostic and laboratory services, as well as a fully equipped radiology department. With a mirrored-glass exterior, four-acre lake, interior waterfalls and 32-foot atrium, even its setting and architecture stand out.

ETMC Athens is equipped with an 8-bed ICU typically staffed by 4 nurses, supported by a monitor technologist located at a central desk with access to all patient monitoring data. Patients leaving the ICU are often moved to the 12-bed Intermediate Care (Step Down) Unit, staffed by 3 nurses and monitored by one technologist at a central desk.

Capturing Trends in Heart Data As a hospital committed to high-quality cardiac patient care, ETMC Athens believes that high-quality patient monitors are extremely important. One year ago, the hospital was ready to update the technology in the ICU and selected Spacelabs because it had been extremely pleased with their performance in other areas of the hospital as well as at a group of 13 affiliated hospitals where Spacelabs' monitors are also installed.

To keep on the cutting edge of patient care technology, when purchasing the new ICU devices, the hospital equipped both the ICU and the Intermediate Care Unit monitors with Spacelabs' new, state-of-the-art Intesys Clinical Suite (ICS) applications. Full Disclosure is just one of a number of advanced components of Spacelabs' innovative suite of software applications that add important new functionality to Spacelabs' patient monitoring system. Currently, ICS is making a dramatic difference at ETMC Athens's intensive care unit (ICU) and Intermediate Care Unit.

Asif Wahid, MD, ETMC Athens cardiologist explains that when it comes to understanding a patient's full medical status, the heart speaks volumes. *"By capturing a full 72-hour history of a patient's monitoring data with Spacelabs' advanced Full Disclosure feature, I can make better clinical decisions,"* he says. *"Full Disclosure allows me to see trends in patient heart rhythms and other vital signs, which enables adjustment in the patient's plan of care when needed."*

With these advanced applications, ETMC Athens cardiology staff can actually turn back the clock to review previous data and use it to inform medical treatment decisions going forward.



An Advanced Software Suite

Comprising eight advanced software components, ICS analyzes, stores and presents patient monitoring and related waveform data to caregivers located throughout the enterprise and beyond. With advanced network connectivity, ICS makes patient-monitoring information available wherever and whenever a caregiver needs it (inside or outside of the hospital), creating a vital signs surveillance system without walls. It is also capable of automating information flow to a full range of hospital information systems, enhancing speed and accuracy, while minimizing the risk of human error and data loss in copying or transcribing such data.

Other ICS Components Enhance Patient Care - Improve Staff Efficiency

At ETMC Athens, clinicians are already taking advantage of many ICS components with plans to implement the entire suite in the future. In addition to examining patient retrospective data with Full Disclosure, cardiology staff is currently utilizing the Electronic Flowsheet component to automate collection of vital signs, eliminating time-consuming manual transcription. Using the Vital Signs Viewer, clinicians are seeing waveforms in near real-time on Web-enabled PCs throughout the hospital, at home and other locations. Using Print Manager, they are turning Spacelabs patient monitors into network

printer-enabled devices, eliminating the management and cost of thermal strip paper. Together, the components enable caregivers to take full advantage of the large and important volume of data generated by patient monitors throughout the hospital.

ICS stores all patient data from all monitored areas in a centralized database accessible from any location running Vital Signs Viewer. As the hospital implements additional components, its goal is to have in the ICS database a universally accessible history of their patients' data from the time they present until they are removed from patient monitors.

Spacelabs Delivers Immediate Benefits

After installation, doctors, nurses and other clinicians enjoyed immediate benefits from ICS. *"First and foremost, from a clinical standpoint, one of the major positive impacts of the system has been the availability of much more comprehensive patient data to drive the treatment decision-making process,"* said Melissa Lehman, RN, nursing performance improvement coordinator for ETMC Athens. When the ICU relied on standard thermal strips, much of the data simply was not printed out or was lost in a mass of paper.

"Nurses on the unit are busy – they don't have time to go through strips immediately

after printing. Often it may be hours before the nurse can look to see what precipitated a patient event," said Lehman. Now, they simply scroll back in time to examine the surrounding data right on the monitor. Viewing this information, they also can look for trends and watch subtle changes such as ST changes over time, which provides them with a significantly enhanced overall picture of the patient status.

Using an advanced, non-proprietary hardware and software architecture, historical patient information can be sent over the hospital network to other computers for remote viewing, providing benefits even before patients are brought to the ICU. David Williams, RN, director of ICU nursing explains: *"When new patients are being brought into the unit, we can access their historical data remotely before they arrive. As a result, we can be better equipped with the correct equipment, medication and other preparations. This has had a major positive impact."*

The system also facilitates more consultation among the patient care team. If monitor technologists have a question, they can share data with nurses. Nurses also have data at their fingertips to share with cardiologists. According to Williams, doctors are particularly pleased that they can go back in time and view a patient event firsthand.

Enhancing Cardiac Care

Spacelabs' ICS streamlines the entire cardiac care process itself, because prior to making rounds, doctors can look at monitoring data and then plan to see the most critical patients first, followed by patients scheduled for discharge. With more comprehensive data, clinicians also can be sure that patients have been arrhythmia-free for a certain period of time, sometimes leading to earlier discharges and improved hospital cash flow (since DRG reimbursement is fixed).

Automated Patient Charting

Also significantly streamlining workflow at ETMC Athens is the ICS Electronic Flowsheet, which automates most of the time consuming and inexact tasks involved in manual patient charting.

The longitudinal patient flowsheets are viewable in intervals of the user's choice, from one minute to one hour. The application allows complete customization of flowsheets and trend graphs and offers a pre-formatted end-of-shift report.

According to Williams, the shift reports are a major benefit of this component. *"Not only do these convenient and automated reports eliminate the chance of human error, but they also realize significant cost savings because on busy days, nurses typically have to go into overtime to sum up their patient data."* Williams estimates that each nurse saves about 30 minutes per shift that would otherwise be spent on charting. All patient data can be printed out directly from the patient monitors to any printer on the network, eliminating cumbersome thermal paper strips. The hospital staff agrees that the benefits of plain paper printing cannot be overemphasized. In addition to increasing clutter and inconvenience, thermal paper is expensive and time consuming to manage. Williams adds that the time and expense of creating reports with the strips, as well as storing and permanently archiving these reports through scanning or microfiche, also are significant and now have been eliminated by Spacelabs ICS.

Extending the Patient Monitoring System Beyond the Hospital's Walls Enabling near real-time access to waveform data at ETMC Athens, Vital Signs Viewer is expanding communications to create a patient monitoring system without walls. The sophisticated application shares patient information in near real-time over any Web-enabled computer browser, providing access throughout the hospital, to doctors at home and at remote offices and hospitals.

With this enhanced access, physicians can implement more accurate and immediate patient management strategies even if they are not in the ICU. Nurses can monitor patients from any location - the nurse's station, charting station or physicians' offices.

Staff also is pleased that the configurable display enables customization of parameters such as color, speed and size. A convenient pause feature freezes waveforms for study or hardcopy.

From an IT perspective, according to Steve Lowe, ETMC Athens Director of Engineering and Safety, *"the system is elegantly designed and standards based, making implementation relatively straightforward and operation both flexible and reliable"*. Key to this as well as to the ease of information access is the unique centralized database holding all patient monitoring and other waveform data hospital-wide. With this architecture, data can easily follow a patient through the facility. Competing systems typically utilize multiple databases for various locations, compromising speed and simplicity.

Advanced Monitoring Hardware Even without the benefits of the advanced software, clinicians believe the Spacelabs patient monitors offer unique benefits over the competition. Set-up for individual patients is so much easier than with the previous monitors. Busy nursing staff used to be required to spend up to 15 minutes to start up a device, while now this has been reduced to less than five minutes. When nurses are working bedside, they can access monitoring information for any patient in the system on their local monitor.

Moreover, they can rely on the innovative Alarm Watch feature to notify them of a patient emergency at any designated monitor location, enabling ETMC Athens's busy and caring clinicians to be always in touch with every patient. In short, according to Williams, *"The ICU nursing staff just loves the entire system. They feel really good about the enhanced patient care."*

Cardiologists also are very enthusiastic about the system and feel that the more comprehensive information leads to a better standard of care and assists them in decision support.

A State-of-the-Art Vision of Cardiac Care What will the future bring? In keeping with its commitment to remaining in the forefront of technology, the hospital has a vision of patient monitoring data flowing throughout the hospital with secure but ready accessibility to every care provider who needs it. Doctors, wherever located, will be free to check on patients. Cross-enterprise consultations will be routine. When the hospital implements an interface to their ADT system, patient demographics and status information will flow from there to the Spacelabs monitors.

Changing the Paradigm of Care Part of this vision has already been achieved by the Spacelabs technology recently put in place, and sophisticated use of it simply needs to become routine. For example, with the remote access to historical patient data through Full Disclosure and to current patient information through Vital Signs Viewer, doctors are increasingly checking on patients remotely. Even today, if desired, physicians could plan virtual consultations across institutions and implement remote diagnoses for other hospitals without cardiologists on staff.

Currently, telemetry patients are being monitored remotely by a technologist at a central location. Soon the hospital will add Full Disclosure and Vital Signs Viewer to provide more comprehensive information and flexible information access to this department. Also shortly, with the addition of a new technology, the hospital will have the ability to forward patient data and alarms to existing wireless telephones and pagers, further expanding the reach of this vital information.

At ETMC Athens, cutting edge technology is and will remain an important part of its high standard of care and the hospital is confident that its current supplier (Spacelabs), in conjunction with its outstanding staff, will continue to keep ETMC Athens on the cutting edge of medical care. Δ



**Which of the 100 Top EHR Vendors
Best Fits My Practice Needs and Budget?**

**The Reality EHR Selector™
Provides Definitive Direction**

Finding & Following the Right Path for Your Practice

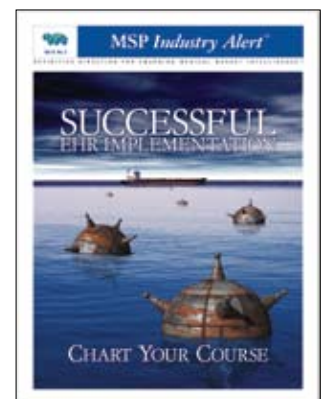
Who among top 100 EHR vendors, can automate my patient charting?

It's not a simple question to answer. Many factors need to be taken into account, including personal preferences of each practice stakeholder. For example, do you prefer a dictation or a scanned document approach? Or, is working from a structured vocabulary with pick lists more comfortable for you? What products are right for your practice specialty? How do you accommodate the needs of all the different EHR stakeholders? Have you documented current workflow for each type of patient encounter? How will the EHR optimize this workflow after it is installed? Do you want an in-office or a web-based 'ASP' EHR solution? Which operating system will be best? How will you manage backup and security of patient records?

Collecting vendor-neutral data, since 1994

If you want to base your EHR implementation plan and allocate your precious resources on vendor-neutral data, consider that Medical Strategic Planning (*Lincroft, NJ*) in conjunction with Andrew & Associates, has been collecting EHR vendor system information since 1994. Since 2003 that has included workflow management information, the cutting edge of EHR product development. Limited data abstracts are available at www.medsp.com. In Spring 2006 MSP will introduce the

Reality EHR Navigator™ tool, allowing group practices to navigate this EHR product labyrinth. MSP can provide the verifiable data to answer key questions, research available EHR alternatives and understand the implications of your practice becoming EHR ready. Stay abreast of EHR and regulatory developments by subscribing to Industry Alert™, our quarterly newsletter. You won't want to miss a single issue.



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Medical Short Takes

INSTITUTE OF MEDICINE

(Washington, D.C.) Blood from umbilical cords – a byproduct of normal childbirth – is a good source of potentially life-saving stem cells, called hematopoietic progenitor cells (HPCs), the type of stem cells also found in bone marrow and mobilized peripheral blood that give rise to various kinds of blood cells. Transplants of these stem cells have saved the lives of roughly 20,000 Americans with leukemia, lymphoma, sickle cell anemia, and several other illnesses in recent years. However, thousands of patients who might benefit from a transplant die every year waiting for a match. Although 22 public banks have been established in the United States to collect, store, and distribute donated cord blood containing these cells, these banks operate without any centralized coordination. Recognizing the need for a national system for the collection, distribution, and use of cord blood, the U.S. Congress asked the Institute of Medicine to review the options for such a system and to make recommendations on the ideal structure of a national program. The committee recommended that the U.S. Department of Health and Human Services should establish a new National Cord Blood Policy Board to set rules for the banking and use of lifesaving stem cells derived from donated umbilical cord blood. The department's Health Resources and Services Administration also should call for proposals to identify an organization that would manage daily operations of cord blood banking and allocation nationwide. For more information, go to <http://www.iom.edu/?id=26386&redirect=0>

THE CENTER FOR STUDYING HEALTH SYSTEM CHANGE

(Washington, D.C.) According to a recent report, having a large or full-service ED is one way to ensure a steady flow of insured inpatients and make a hospital appealing to clinicians and patients. In general, ED expansions appear to be motivated by competition for well-insured patients, particularly in affluent locations, the report says, an occurrence that was particularly notable in Indianapolis, Miami, northern New Jersey, Phoenix, and Seattle. Another development at some hospitals that has improved flow through EDs is the creation of adjacent admissions units, which allow staff to transfer patients from the ED to these units as soon as the decision to admit has been made. Once in the admissions unit, the initial set of clinical orders can be carried out, including lab testing, radiology services, and drug administration, if necessary. For further details, go to <http://www.hschange.com/index.cgi?data=12>

THE RISK MANAGEMENT & PATIENT SAFETY INSTITUTE

(Lansing, MI) Errors occur because of one of three types of behavior, reported Geri Amori, PhD. The first type is human error, in which the employee meant well and did not realize he or she was doing anything wrong. Response to human error could include improvements in processes

and procedures, more training, better design, or changes in the work environment. The second type error includes at-risk behavior; behavior that results from habits developed over time that lead to unintentional risk taking. An example would be a staff member who skips double-checking high-risk medications so often that (s)he doesn't recognize that the safety step is being missed. Not double-checking becomes the routine. The appropriate response to at-risk behavior is to ensure that employees have the proper tools to do their jobs, and to make sure they are not overworked. The third type of error belongs to the reckless behavior category. Reckless behavior occurs when an employee takes intentional risks by overriding safety mechanisms or ignoring standards and is aware that the outcome can be dangerous; the employee consciously knows he or she is taking a risk. This behavior justifies disciplinary behavior under a just culture. In addition to examining factors such as illness or medication use by the employee, it also may be appropriate to consider other factors such as whether the person already received retraining on this issue, lied about the event or tried to cover it up, lacks remorse, or does not appear willing to learn from the error. The employee's previous involvement with errors, or lack thereof, should also be considered. For further information, go to <http://www.rmpsi.com/contact/contact.htm>

CENTERS FOR DISEASE CONTROL

(Atlanta, GA) In many regions of the world, the difference in current cigarette smoking between boys and girls is narrower than expected, according to an article published online Friday, February 17, 2006, by The Lancet. In the Global Youth Tobacco Survey (GYTS), Charles Warren (Centers for Disease Control and Prevention, Atlanta, GA, USA) and colleagues surveyed around 750,000 students aged 13–15 years from 131 countries and the Gaza Strip and West Bank about tobacco use. They found that overall nearly 9% of students were current smokers and 11% currently used tobacco products other than cigarettes. They also found that the difference in current cigarette smoking between boys and girls is smaller than the difference between men and women. Almost 1 of 5 never-smokers reported that they were susceptible to smoking in the next year, more than 4 of 10 students had high exposure to secondhand smoke at home, and 5 of 10 had high exposure in public places. For further information, go to <http://www.cdc.gov/tobacco/lancet.htm>

CENTERS FOR DISEASE CONTROL

(Atlanta, GA) National Ground Water Awareness Week for 2006 was March 12-18, with the primary focus being to emphasize the importance of ground water as a source of clean drinking water—one of the world's most precious resources. Protecting water sources from contamination is a major concern of countries throughout the world. Many

developing countries do not have an adequate clean water supply and cannot assure access to safe drinking water for their populations. As a result, every year, millions of people die and millions more become ill with infections caused by parasites, bacteria, viruses, and exposures to other contaminants in their drinking water. Drinking water supplies in the United States are among the safest in the world. However, even in the U.S., people still get sick from their drinking water. More than 30% of Americans depend on public drinking water systems that use ground water. In 2001 and 2002, 31 disease outbreaks that were linked to drinking water were reported to the Centers for Disease Control and Prevention (CDC). These outbreaks were associated with more than 1000 cases of illness and 7 deaths. Sixteen (52%) of these outbreaks, and two deaths, could be attributed to improperly treated or untreated ground-water that was used for drinking purposes. For more information, go to <http://www.cdc.gov/nceh/ehhe/water/groundwater.htm>

NATIONAL INSTITUTE OF HEALTH

(Washington, D.C.) Whether depressed patients will respond to an antidepressant depends, in part, on which version of a gene they inherit, a study led by scientists at the National Institutes of Health (NIH) has discovered. Having two copies of one version of a gene that codes for a component of the brain's mood-regulating system increased the odds of a favorable response to an antidepressant by up to 18 percent, compared to having two copies of the other, more common version. Since the less common version was over 6 times more prevalent in white than in black patients — and fewer blacks responded — the researchers suggest that the gene may help to explain racial differences in the outcome of antidepressant treatment. The findings also add to evidence that the component, a receptor for the chemical messenger serotonin, plays a pivotal role in the mechanism of antidepressant action. The study, authored by National Institute of Mental Health (NIMH) researchers Francis J. McMahon, M.D., Silvia Buervenich, Ph.D., and Husseini Manji, M.D., along with collaborators at several other institutions, was posted online March 8 and will appear in the May, 2006 American Journal of Human Genetics. For more details, go to <http://www.nih.gov/news/pr/mar2006/nimh-15.htm>

NATIONAL INSTITUTE OF HEALTH

(Washington, D.C.) A clinical trial funded by the National Eye Institute (NEI), part of the National Institutes of Health (NIH), has concluded that a single dose of azithromycin taken by mouth after surgery reduces by one-third the recurrence of a vision-threatening eyelid condition called trichiasis. This is in contrast to the usual six-week regimen of tetracycline ointment applied directly to the eye. This study is published in the March 2006 issue of Archives of Ophthalmology. "This study illustrates the importance of NIH clinical trials to find treatments for diseases that affect people throughout the world," said Elias A. Zerhouni, M.D.,

director of the NIH. "When we consider that an estimated 11 million people worldwide develop trichiasis every year, we see the impact that the findings of this study may have in preventing future vision loss." Trichiasis is a condition in which the eyelid turns inward and eyelashes rub against the eye, resulting in corneal scarring and loss of vision. It results from trachoma, an eye infection that is the leading preventable cause of blindness in the world. It is spread through contact with flies and other insects, clothing or household items that harbor the bacterium, or infected people. Trachoma occurs in poor, overcrowded communities that have little access to clean water, waste treatment facilities, or health care. These communities are located mainly in Africa, the Middle East, Asia, Australia and some areas of Latin America. In this study, called Surgery for Trichiasis, Antibiotics to Prevent Recurrence (STAR), eye infection with the bacterium that causes trachoma was present in 19 percent of the adults with trichiasis in Wolayta Zone, Ethiopia, the location of the clinical trial. More than 77 percent of the patients were women, who have four times the rate of trichiasis than men. Women often contract trachoma repeatedly by taking care of infected children. For further details, go to <http://www.nih.gov/news/pr/mar2006/nei-13.htm>

NATIONAL INSTITUTE OF HEALTH

(Washington, D.C.) The face of aging in the United States is changing dramatically and rapidly, according to a new U.S. Census Bureau report, commissioned by the National Institute on Aging (NIA). Today's older Americans are very different from their predecessors, living longer, having lower rates of disability, achieving higher levels of education and less often living in poverty. And the baby boomers, the first of whom celebrated their 60th birthdays in 2006, promise to redefine further what it means to grow older in America. The report, 65+ in the United States: 2005, was prepared for NIA, a component of the National Institutes of Health (NIH) at the U.S. Department of Health and Human Services, to provide a picture of the health and socioeconomic status of the aging population at a critical time in the maturing of the United States. Among the trends: By 2030, almost 1 out of every 5 Americans — some 72 million people — will be 65 years or older. The age group 85 and older is now the fastest growing segment of the U.S. population. The proportion with a disability fell significantly from 26.2 percent in 1982 to 19.7 percent in 1999. The proportion of people aged 65 and older in poverty decreased from 35 percent in 1959 to 10 percent in 2003, mostly attributed to the support of Social Security. In 2003, older Americans were 83 percent non-Hispanic White, 8 percent Black, 6 percent Hispanic and 3 percent Asian. By 2030, an estimated 72 percent of older Americans will be non-Hispanic White, 11 percent Hispanic, 10 percent Black and 5 percent Asian. For more information, go to <http://www.nih.gov/news/pr/mar2006/nia-09.htm>

AMERICAN NURSING ASSOCIATION

(Silver Spring, MD) Responding to President Bush's remarks regarding health care during his recent State of the Union address, ANA President Barbara Blakeney, MS, RN, noted that while the administration should be commended for refocusing on the issue, the president's proposals place too much emphasis on the concerns of employers, small businesses in particular, and not enough on protecting consumers from undue risk and financial burden. "At a time when a record number of Americans lack any kind of health insurance at all, and while plans are underway today in Congress to pass a budget bill that proposes to cut Medicaid by \$22.6 billion over 10 years (with 80 percent of the savings resulting from Medicaid beneficiaries forgoing needed care), President Bush's State of the Union proposals to rein in what he characterizes as the 'rising costs of entitlements' add insult to injury by asking the American people to shoulder even more of the cost and the risk," said Blakeney. "ANA finds the narrow focus of this plan unacceptable and irresponsible." Pointing to President Bush's proposal to offer tax incentives to help small businesses and individuals get the same health care advantages as people working for big business, Blakeney noted several shortfalls, including the omission of the 45 million Americans who are uninsured. For more information, go to <http://www.nursingworld.org/pressrel/2006/pr020106.htm>

ALZHEIMER'S ASSOCIATION

(Chicago, IL) Older adults taking blood pressure medication seem to have a reduced risk of developing Alzheimer's disease, according to a report by Ara S. Khachaturian, Ph.D., and colleagues in the March Archives of Neurology. The study found that one specific type of drug, potassium-sparing diuretics, appeared to have the greatest impact, reducing risk by more than 70%. Potassium-sparing diuretics control blood pressure by removing excess fluid from the body. Unlike other diuretics, they do not tend to wash potassium, an essential mineral, out of the body along with the excess fluid. The benefit from potassium-sparing diuretics did not seem tied to their impact on blood pressure, suggesting they may influence Alzheimer risk through a different mechanism. "There is a growing body of evidence linking high blood pressure to an increased risk of late-life cognitive decline, and a growing awareness that it may be important to control blood pressure to protect the brain as well as the heart," says William H. Thies, Ph.D., Alzheimer's Association vice president, medical and scientific relations. "It isn't yet clear why potassium-sparing diuretics in particular might be linked to a greater reduction in risk of Alzheimer's. There is some evidence that low potassium levels are associated with inflammation, constriction of blood vessels, and other effects that could contribute to Alzheimer's disease. As the authors note, we'll need more studies specifically designed to test the effect of these drugs on Alzheimer's and explain how they work if their impact is due to something other than their effect on blood pressure." For more details, go to <http://www.alz.org/News/06Q1/031406.asp>

AMERICAN DIABETES ASSOCIATION

(Alexandria, VA) Drugs known as fibrates (Tricor, Lopid, Atromid) are currently used to treat individuals with hyperlipidemia, or higher than normal blood levels of fat and cholesterol. Through funding of his American Diabetes Association Research Award, Dr. Ganesaratnam Balendiran of the Beckman Research Institute and City of Hope National Medical Center in Duarte, California, has discovered that fibrates may also be effective in preventing diabetes-related complications such as neuropathy (nerve damage) which can lead to loss of feeling and amputation of the limbs, and retinopathy (eye disease) which can cause blindness. Individuals with diabetes have an excess amount of glucose in their bloodstream. As glucose accumulates, an enzyme known as aldose reductase begins to change glucose into a sugar alcohol called sorbitol. Why is this a bad thing? Because too much sorbitol trapped in eye or nerve cells can cause cell damage leading to neuropathy and retinopathy. Researchers know that drugs that slow or prevent aldose reductase from turning glucose into sorbitol may prevent people with diabetes from developing neuropathy and retinopathy. Results from Dr. Balendiran's study, published in the November 2005 edition of the journal *Biochemical Pharmacology*, have revealed for the first time that several different fibrate molecules are able to prevent aldose reductase from turning glucose into sorbitol. This is important news, especially since fibrates are already being used successfully to treat patients with hyperlipidemia. Dr. Balendiran writes that this new information can be used to design newer fibrate-like drugs to treat a variety of health conditions including diabetes complications and other health problems caused by aldose reductase. For more details, go to <http://www.diabetes.org/diabetes-research/discoveries.jsp>

AMERICAN HEART ASSOCIATION

(Dallas, TX) Folic acid fortification of enriched grain products — a requirement in the United States and Canada to reduce neural tube defects — might also be linked to a significant decrease in stroke deaths, according to a report in *Circulation: Journal of the American Heart Association*. The average blood level of folic acid has nearly doubled in the general population since 1998, when mandatory folic acid fortification of enriched grain products went into effect. The fortification has also resulted in a 20 percent to 25 percent drop in neural tube defects. "There is accumulating, controversial evidence that homocysteine — an amino acid in the blood — is an independent risk factor for stroke and ischemic heart disease," said Quanhe Yang, Ph.D., lead author of the study and an epidemiologist at the National Center on Birth Defects and Developmental Disabilities in the Centers for Disease Control and Prevention in Atlanta, GA. "The increase in folate concentration in the population is inversely associated with homocysteine level, so if you have high folic acid concentration, you have lower homocysteine concentration," he said. Researchers tested the hypothesis that increased folic acid concentration after fortification would improve stroke mortality because of

reduced homocysteine. They studied national death statistics in the United States and Canada from 1990 to 2002 to determine if fortification significantly affected stroke death rates. They then compared the results of their research to two countries that do not have fortification: England and Wales. They found that in the United States, between 1990-97 (before fortification), overall stroke mortality decreased 0.3 percent per year. From 1998-2002, stroke mortality declined 2.9 percent per year. After 1998, the U.S. average annual rate of decline in stroke-related death rates among whites in all age and sex groups was less than 1 percent before fortification and greater than 2.7 percent after fortification. Researchers reported a similar effect among blacks, with the annual decline increasing from 1.4 percent among men and 0.7 percent among women before fortification to 2.9 percent among men and 2.7 percent among women after fortification. The percentages translate to nearly 13,000 fewer stroke deaths a year among people over age 40 in the United States. In Canada, the annual percent decline in stroke-related deaths was 1.2 percent for men and 0.9 percent for women over age 40 before fortification. Reductions increased to 5.6 percent for men and 5.4 percent for women after fortification. That would mean about 2,800 fewer stroke deaths a year in Canada post-fortification. For further information, go to <http://www.americanheart.org/presenter.jhtml?jsessionid=HTYWCTPZ EIRVMCQFCXPSKTQ?identifier=3038285>

WILLIAM BEAUMONT HOSPITAL

(Royal Oak, MI) A study conducted by Gilbert Ralf, MD and a team of researchers evaluated the use of CTA (computerized tomographic angiography) to track the blood flow in the veins and arteries in order to exclude coronary artery disease (CAD). The study randomized 200 patients to receive the standard EKG, serial cardiac enzymes and rest-stress nuclear scanning or the CTA testing. The study found that the standard care quickly and accurately ruled out significant CAD in about 67% of cases while CAD was correctly determined in 91% of the CTA patients. CTA quickly ruled out CAD in the majority of cases and reduced the total time spent in the ED by about 45% or just over 6 hours versus over 14 hours. CTA was also less expensive per patient by around \$300. For further information, go to <http://www.crireistry.com/William.Beaumont.Hospital.htm>

Vendor Short Takes

GUIDANT

(Indianapolis, IN) has issued a statement that it is voluntarily cautioning physicians to check the voltage on certain of its Contak Renewal 3 RF and Contak Renewal 4 RF models of its implantable defibrillators. The FDA may classify their notification as a product recall. The company said that it has received 39 reports from physicians that the devices tested before being implanted had a lower than expected voltage; none of these devices had been implanted into patients. Guidant noted that 4,000 of these devices have already been implanted but that they had not received any reports related to this issue for these devices. This is not good news for a company that has already recalled thousands of pacemakers and defibrillators since last summer and is due to complete the \$27.2 million merger with buyer Boston Scientific (Natick, MA). For further information, go to http://www.guidant.com/news/600/web_release/nr_000624.shtml

ARROW INTERNATIONAL

(Reading, PA) has initiated a web site called, First Do No Harm. This site's purpose is to help physicians and nurses abide by one of the fundamental tenets of medicine: First, do no harm. FirstDoNoHarm.com is designed to help healthcare professionals by providing: A clearinghouse for the latest unbiased, authoritative information on preventing catheter-related bloodstream infection. This includes clinical studies, relevant news stories and Catheter Mythbusters; A future forum for professionals to share insights on infection-prevention techniques, technology and compliance; Quick access to information and updates on Arrow products, infection-prevention innovations and cost-reduction calculators. For further details, go to <http://www.firstdonoharm.com/about/index.asp>

MASIMO

(Irvine, CA) has announced that it has signed a three-year, multisource agreement with Premier Inc., a healthcare alliance entirely owned by more than 200 of the nation's leading hospital and healthcare systems. The agreement covers Masimo SET pulse oximetry and Masimo Rainbow SET Pulse CO-Oximetry, including standalone monitoring devices, handhelds and sensors. Joe E. Kiani, Masimo's Chairman and CEO stated, "We are happy to announce this new agreement with Premier. Since being added to the Premier contract in October 2002, our annualized sales to Premier hospitals have increased by over 7,500%, signifying the demand for our technology. Through this new agreement, Premier hospital members will continue to have access to superior Masimo SET pulse oximetry products as well as Masimo Rainbow SET technology, that will allow earlier detection and treatment of an expanding number of potentially life-threatening conditions." For further details, go to <http://www.masimo.com/news/index.cfm#03092006>

CARDIAC SCIENCE CORPORATION

(*Bothell, WA*) announced recent ground-breaking new research that can be used to help predict a patient's likelihood of dying from cardiovascular causes such as sudden cardiac death, commonly known as a fatal heart attack. The research, conducted in collaboration with Stanford University Medical Center/VA Palo Alto Health Care System, shows that a new dimension of analysis of cardiac stress testing data can be used to determine whether patients are more than 10 times as likely to experience cardiovascular death (CVD). The findings were announced at the American College of Cardiology's 55th Annual Scientific Session in Atlanta, Georgia on March 14, 2006. The method of analyzing cardiac stress testing data shows that patients in the test population with abnormal heart rate variability, when combined with an abnormal Duke Treadmill Score, are more than 10 times as likely to experience CVD. When using the Duke Treadmill Score alone, which is the current "gold standard" for assessing cardiovascular risk, patients in the study were only identified as being three to four times more likely to experience CVD. For more details, go to http://www.cardiacscience.com/news/news_detail.cfm?id=348

PHILIPS MEDICAL

(*Andover, MA*) announced that it will acquire Witt Biomedical Corporation, the largest independent supplier of hemodynamic monitoring and clinical reporting systems used in cardiology catheterization laboratories (cath labs). With the growing digitization of hospitals, cardiologists are increasingly demanding that cath labs be fully integrated into a hospital's IT infrastructure. Witt Biomedical is one of the leading suppliers of hemodynamic monitoring and clinical reporting systems, and its systems hold top rankings from healthcare IT vendor reviewers MD Buyline and KLAS. Through this acquisition, customers will benefit from an integrated suite of best-in-class technologies for the cath lab. Based on company estimates in 2005, Philips held the number one position in cardiovascular x-ray. In hemodynamic monitoring and clinical reporting systems, Witt Biomedical was the largest independent supplier in the United States in 2005, and was the number two supplier in the global market. For further details, go to http://www.medical.philips.com/us/news/content/file_1078.html

PHILIPS MEDICAL

(*Andover, MA*) also announced the new Philips Spirometry Module for continuous respiratory mechanics measurement. Continuous Spirometry has numerous clinical applications both in the operating room and intensive care units; such as its ability to help physicians accurately detect heart disorders, and monitor effects of therapy as well as respiratory status changes. Philips Spirometry provides continuous evaluation of the lung using Philips IntelliVue patient monitor displays and can increase patient safety through improved ventilation management by reducing ventilator-associated complications and reducing patient ventilation dependence. For further

information, go to http://www.medical.philips.com/us/news/content/file_1078.html

DRAEGER MEDICAL

(*Malvern, PA*) added a new degree of intelligence to their EvitaXL. By integrating protocolized care into their state-of-the-art ventilator, the clinician is freed from intensive involvement in the ventilator weaning process. SmartCare/PS, a knowledge based weaning system, the first member of the new option SmartCare, contains automated clinical guidelines based on recognized medical expertise. For more information, go to <http://www.draeger-medical.com/>

WELCH ALLYN

(*Beaverton, OR*) recently announced the availability of Masimo SET pulse oximetry (SpO2) in their Vital Signs Monitor 300 Series automated vital signs monitor. The offering marks the latest collaboration between the two companies in a partnership that applies Masimo pulse oximetry technology across a range of Welch Allyn patient monitoring solutions. The Vital Signs Monitor 300 Series is a fully-featured patient monitor that provides simple, automated vital signs measurement before, during, and after medical procedures. It allows caregivers to either spot-check or continuously monitor patients' blood pressure, temperature, heart rate and pulse oximetry from a single device. For further information, go to <http://www.welchallyn.com/medical/news/press/view.asp?ID=362>

ANALOGIC

(*Peabody, MA*) has announced the launch of the LIFEGARD II family of non-invasive patient monitors. LIFEGARD II with ICG (Impedance CardioGraphy) uses Thoracic Electrical Bioimpedance (TEB) to measure continuous cardiac output, and is the only patient monitor that has ICG totally integrated with all other standard, non-invasive vital signs. Additional models with expanded capabilities which have already received U.S. Food & Drug Administration (FDA) clearance will be made available over the next 12 months. For more information, go to www.analogic.com/lifegard

MEDIVATION

(*San Francisco, CA*) has listed its common stock on the American Stock Exchange under the symbol MDV. Medivation acquires promising medical device and pharmaceutical technologies in late preclinical development and then continues the development in human first proof-of-efficacy studies and then offers them for sale or partners with successful programs with large pharmaceutical companies or biotech and device companies for later stage clinical studies and commercialization. For further information, go to <http://www.medivation.net/>

MASIMO

(Irvine, CA) Masimo announced in March that it had received FDA Clearance of Masimo Rainbow SET Rad-57cm, the world's first non-invasive device capable of measuring Carboxyhemoglobin, Methemoglobin and Oxyhemoglobin saturation levels in the blood. The device is an extension of the company's Rainbow SET Rad-57cm Pulse CO-Oximeter technology. The Masimo Rad-57cm is a handheld, continuous monitor that analyzes data from a sophisticated yet simple-to-apply, 8-wavelength finger sensor to accurately measure arterial oxygen saturation, carbon monoxide, methemoglobin and pulse rate. Building on the success of the Rad-57 launched in 2005, the Rad-57cm adds the ability to measure methemoglobin, another silent killer like carbon monoxide. Authors from The 2004 Johns Hopkins University School of Medicine study entitled "Acquired Methemoglobinemia", concluded "drugs that cause acquired methemoglobinemia are ubiquitous in both the hospital and the outpatient setting." The Johns Hopkins study had several key findings:

- 1) Acquired methemoglobinemia is ubiquitous in hospitals, from OR to the General Ward and is independent of patient's age.
- 2) Over 25 drugs that are used frequently in hospitals cause acquired methemoglobinemia, including 'caine' anesthetics such as Benzocaine and Lidocaine, nitroglycerin which is commonly used on cardiac patients, EMLA cream for infants and neonates, inhaled nitric oxide used on premature infants and sometimes cardiac patients, and Dapsone, a powerful anti-infective which is commonly used on organ transplant, AIDS, and dermatoses patients.
- 3) Methemoglobinemia can cause serious injury and even death, but can be treated if detected. During the study time, there were 3 near deaths and one death.
- 4) 20% of patients tested had elevated methemoglobin levels and 25% of the cases were found accidentally.
- 5) The cost of doing invasive testing of methemoglobin is \$35 each time and during the 28-month study period it would have cost the hospital \$9 Million for testing.
- 6) Based on the results of the study, despite the cost, the authors recommended the measurement of methemoglobin every time blood was drawn for arterial blood gas testing and serial testing during treatment.

In another study by Osaka City University Medical School Researchers entitled "Elevated Methemoglobin in Patients with Sepsis", the authors showed that methemoglobin rises in patients before they go into septic shock. Detecting the onset of septic shock has been one of the most sought after findings in modern medicine. If patients developing sepsis can be diagnosed early enough, they can be treated more effectively, enhancing their chances of surviving this potentially fatal condition.

In the outpatient setting, many common agents can cause methemoglobinemia such as: inhalation of industrial fumes from automobile exhaust or the burning of plastics and

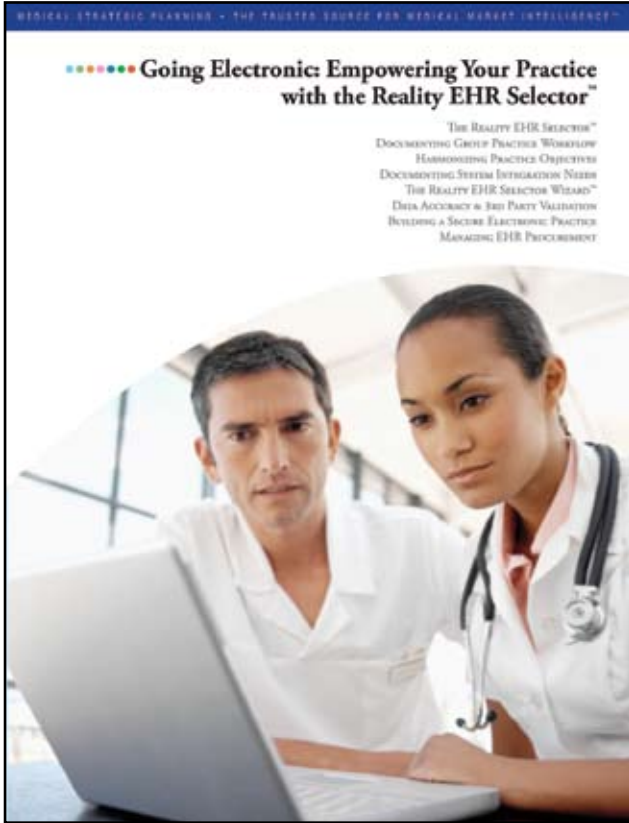
wood; herbicides and pesticides; industrial chemicals such as petrol octane booster; nitrobenzene; nitroethane which is found in nail polish; resins and rubber adhesives; and drugs of abuse. Noninvasive monitoring of methemoglobin is essential to reducing the number of injuries and deaths." "Methemoglobinemia is much more common than the healthcare community realizes" said Maribeth Sayre, MD, Director of Medical Affairs of Masimo. "Historically, methemoglobinemia has often been missed because clinical suspicion was necessary and then a blood test using an expensive laboratory co-oximeter was required for confirmation. Only about 50% of US hospitals have a laboratory co-oximeter, so diagnosing elevated and potentially dangerous levels of methemoglobin has been a practical challenge. We believe that Rad 57cm with Masimo Rainbow SET represents a major advance in patient monitoring."

SPACELABS

(Issaquah, WA) Spacelabs Medical announced the availability of a brand new addition to the UltraviewSL™ line of patient monitors. Spacelabs is introducing the UltraviewSL 2600, a compact monitor with options that support connectivity, including WinDNA®, which brings workstation functionality for charting and other hospital applications to the point of care. The new monitor will be available worldwide.

The UltraviewSL 2600 is well-suited to a broad range of environments, including perioperative, emergency and neonatal care applications. The monitor's compact size and larger display, coupled with advanced monitoring features, provide a flexible solution that enables hospitals to augment their existing installation of Spacelabs monitoring, as the new monitor has full network compatibility with all existing Spacelabs UltraviewSL Ultraview® and PCMSTM centrals and bedside monitors.

Additionally, a wireless networking option supports central surveillance during patient transport, when patients are often under greater stress and risk, enhancing patient safety and improving emergency response time. Together with Spacelabs' new Clinical Event Interface to pagers and other handheld devices, these capabilities serve to accelerate the flow of critical, time-sensitive patient information to caregivers, regardless of patient or caregiver location.



Reality EHR Navigator™

Now group practices can learn about EHR systems, and compare the features of over 75 EHR vendors with the MSP Reality EHR Navigator™. Based on the Andrew & Associates survey of EHR vendors, MSP has developed a simple tool that allows users to cross-tabulate vendor EHR features creating an ad-hoc comparison based on up to 40 key parameters. The cost is only \$49. All major credit cards are accepted, which will be billed in May when the product ships.

For More Information

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