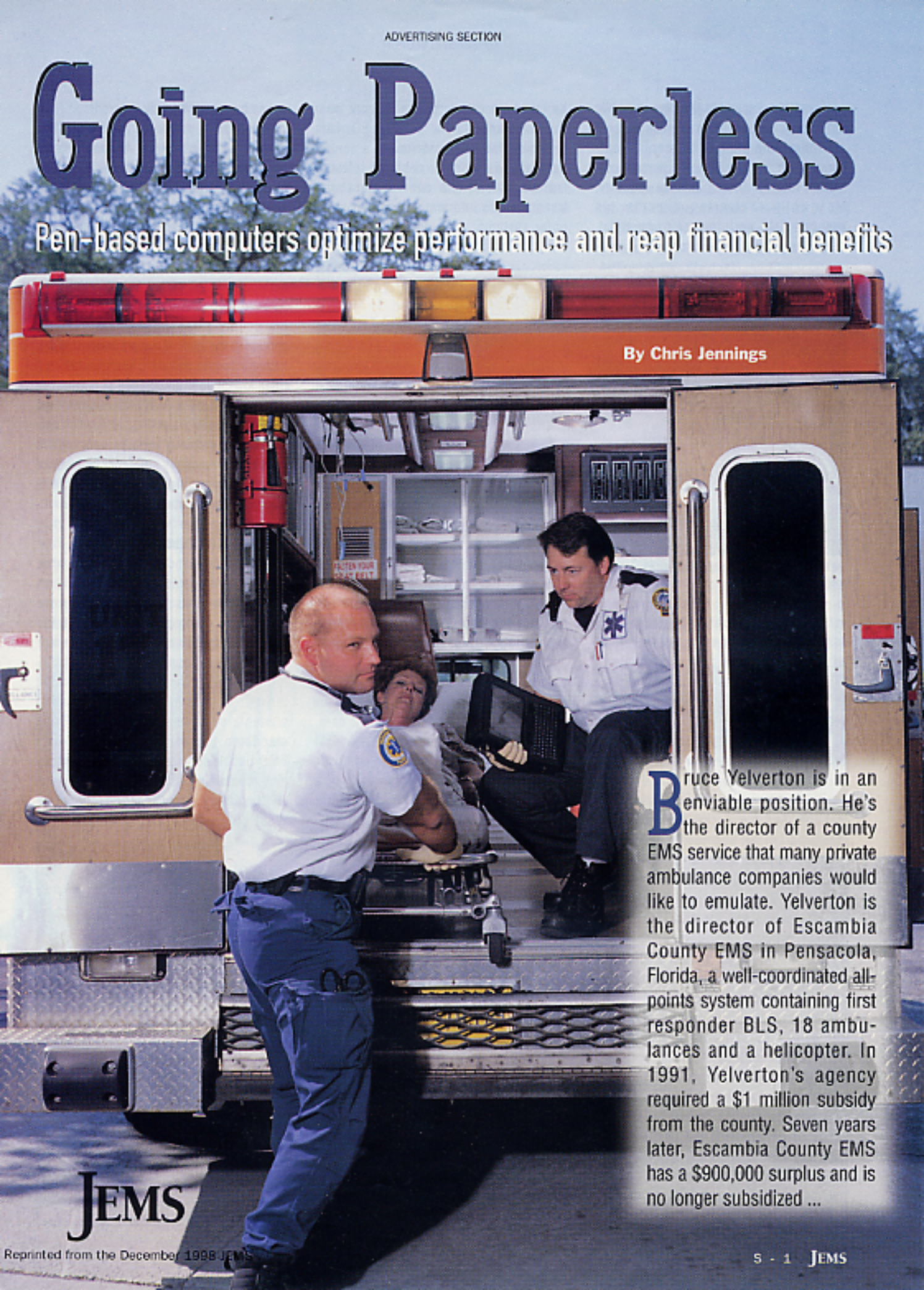


Going Paperless

Pen-based computers optimize performance and reap financial benefits

By Chris Jennings



Bruce Yelverton is in an enviable position. He's the director of a county EMS service that many private ambulance companies would like to emulate. Yelverton is the director of Escambia County EMS in Pensacola, Florida, a well-coordinated all-points system containing first responder BLS, 18 ambulances and a helicopter. In 1991, Yelverton's agency required a \$1 million subsidy from the county. Seven years later, Escambia County EMS has a \$900,000 surplus and is no longer subsidized ...

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Incredibly, Escambia County—a public EMS service—boasts an 80-plus percent collection rate after adjustments, compared to an average 60 to 70 percent collection rate for the ambulance industry. Meanwhile, Yelverton expects his agency's EMS performance to be equal, if not superior, to the benchmarks cur-

be faxed via mobile phone directly from the ambulance to the hospital ED. This data can also be transferred to a central database via modem, cable or infrared transmission. The central database transmits this information to other computer systems, such as the billing system, the quality assurance department or state and federal reporting agencies, as required.

"We heard all the naysayers, but we've always been aggressive looking at technological benefits," Yelverton explains, "from both medical and managerial viewpoints. Although the decision to go paperless was a medical decision based on the need to improve the legibility, quality and detail of our documentation, we now plan to

reinvest the cost-savings that the pen-technology gives us in our medics and employees."

According to Yelverton and his management team, this automated call reporting system expedites patient care, improves cash flow and provides a legal shield by providing unprecedented documentation access and accuracy. As a result of going paperless, Escambia County EMS increased its annual rev-

enues by approximately 6 percent.

The System promotes the competitive standing of the agency. Although members of the private sector may think that municipal and county agencies dwell somewhere above the realm of competition, these public agencies, like everyone else, are compelled to cut costs and increase revenues. "However, the level of service is key," states Don Hackett, the Finance Management Analyst for Escambia County EMS. Hackett's 25 years of service in the U. S. Navy are evident in his intense focus: "Private companies can offer low-budget ambulance services, but they can't offer the level of service that we provide. People are willing to pay for better service, and with these pen-computers we can substantially validate the level of service we provide with authoritative state-mandated data."

Push to go paperless

"Medical compliance with the state, after the state mandated use of its five-part bubble-form, was the initial reason we considered going paperless," explained Bob West, quality assurance coordinator for Escambia County EMS. The bubble-form embodies the fill-in-the-dot format familiar to paramedics and test-taking students everywhere. In 1993, Florida mandated use of a standard five-part EMS bubble-form document, two pages long, containing 138 data fields.

"Legibility was the No. 1 concern," West continues. "You were writing a



The innovative pen-based computer system allows paramedics to easily enter the entire range of patient data.

rently being evaluated by state EMS associations. And he shares the credit with an innovative computer system, WESTECH EMS System, developed by WESTECH Mobile Solutions in Vancouver, B.C.

"I have always felt we could do what a private company does," Yelverton says. "Financially, we support ourselves off user-fees. We aggressively pursue collections. And our decision to go paperless is part of our success."

By going paperless, Yelverton means that instead of clipboards, Escambia County EMS personnel use hand-held, pen-computers and the WESTECH EMS System software. The computers have an attached pen (or stylus) that activates commands when it touches the screen. The pen, a point-and-click device, essentially replaces a mouse. The paramedic navigates through electronic documents by selecting options from easy to follow, drop-down menus.

Using this point-and-click technology, the paramedics record the entire range of patient and call scene data. Data can also be entered by typing or by handwriting directly on the hand-held computer screen with the stylus.

Once in the computer, the data can



A team approach and buy-in from all participants made the switch to computer data collection a winning strategy.



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—Bruce Yelverton, Director

legal document, and you needed a chisel to write through five pages. The fourth or fifth copy was never legible; even the medical director's copy was legible only 50 percent of the time, never mind the problems interpreting poor handwriting." These legibility problems were compounded, of course, whenever the documents were photocopied or faxed to other locations.

Meanwhile, Florida was trying to develop a statewide electronic trauma database. Its initial approach was to scan the mandated bubble-form documents into the database, which required EMS agencies to physically collect the bubble forms, box them up and ship them to the state's database center. When scanning proved impractical, the state eventually offered grant money to promote the adoption of automated documentation by EMS agencies. Escambia County EMS jumped at the chance.

"Given the state's EMS grant program for field testing, we explored quite a bit and evaluated a number of products," explains Yelverton. "We selected the Westech system." WESTECH Mobile Solutions provides software to the EMS industry. It was an original innovator of EMS software and is the industry leader.

The system is unique in that it was cre-



"We can customize WESTECH to suit ourselves. If we want to change the tables, data fields, terminology, crews, etc., we can alter the software ourselves; we

don't have to go to programmers to do it."

—Buddy Garrett, IS Coordinator

ated by the EMS professionals who use it. During early stages of design and development, Westech set up user groups that helped redefine and redesign the product through several layers of development, and continues to do so. Even ZOLL Vice President Ward Hamilton, is a former paramedic with seven years experience in the field.

Escambia County EMS was involved in this development, too. "We adopted the Westech system in its infancy, in its beta form," explains Buddy Garrett, information systems coordinator for Escambia County EMS. The bearded Garrett is Escambia's techie. "With the 75/25 percent grant from the state," he continues, "we were not able to jump straight into the technology, but started with six computers for our 18 vehicles, and added a few at a time."

For hardware, Garrett explains, they experimented with a number of laptops, which couldn't handle the heavy wear, before selecting a new line of rugged handheld computers, designed for use by front line emergency service personnel, such as paramedics, firefighters and police officers. Garrett, with the consensus of his colleagues, selected the pen-computer Husky FC486 (from WPI Husky Computers Limited, Clearwater, Fla.). Garrett likes to recount how he demonstrated the sturdiness of a brand new Husky 486 to a new shift supervisor. "I took it out of the box," he says, "tossed in on the floor and jumped up and down on it. You should have seen his jaw drop."

The newer model pen-computers, such as the Husky PX5 and Fujitsu's Stylistic 1200 (Fujitsu Personal Systems, Inc., Santa Clara, Calif.), also accept 12-lead EKG input. Using ZOLL's System-12TM ECG software package, these pen-computers allow monitoring and recording of EKG data.

A medical decision that reaps revenues

"In 1991, we required a \$1 million subsidy from the county, and we now have a cash reserve of \$900,000," says Director Yelverton with great satisfaction. "We started with the pen-technology because of document legibility and medical compliance, but the Westech system has definitely contributed to our financial suc-

cess. The system reduces employee overhead, prevents the loss of substantial revenue from missed charges and improves cash flow. I expect to gain an additional 2 or 3 percent in my collection rate (thereby increasing collections to 82 or 83 percent)."

With the WESTECH EMS System in place, Yelverton says, "we are sure of coding insurance properly. Before we had the system, it required two full-time medical record technicians to code bills properly. Now, with the pen-technology, EMS assessments are mapped down to the ICD-9 code. Having Westech in place saves me at least half of a full-time medical record technician's time in the area of coding."

These chores are a thing of the past because, in the field, the computer leads the paramedic through a menu of options



"With these pen-computers we can substantially validate the level of service we provide with authoritative state-mandated data."

—Don Backert, Finance

that the paramedic selects with a touch of the pen. These selections automatically enter the EMS procedures and appropriate charges for services and materials. For example, the recording of an IV emplacement automatically registers charges for the service and the IV supplies, too.

Yelverton continues to recount the problematic days of paper forms. First, approximately 15 percent of call sheets were bounced back to the paramedics by the billing department via the shift supervisor. Often it was simply because of a missing signature; on the state bubble-form, the paramedic had to sign twice, both the top copy and one of the carbon copies—an easily forgotten nuisance. Sometimes the written narrative was illegible. Supervisors frequently had to hound paramedics to complete forms. Yelverton recalls that "there were a lot of bad feelings," and says, "the pen-technology has been a blessing for everybody."

The WESTECH EMS System virtually eliminates bounce-backs due to missing data. The medic cannot "close the call" unless all mandatory fields are completed. Signatures are accepted by writing directly on the screen. By allowing the paramedic to select options from drop-down menus, the computer eliminates errors and repetitive work by "remembering" state ID numbers (numbers that identify individual hospitals, nursing homes and other providers) and other routine information.

Yelverton also remembers when paper forms were consigned "to the deep dark hole of medical records" from whence they might never return, even when required by a subpoena. What Yelverton disliked most about paper was the irretrievable waste of work-hours looking for lost forms and refiling forms once they had been pulled: never mind the forces of nature, like moisture and coffee stains.

Mailing bills—next day service

Health care service providers are keenly aware that collections are a race against the clock—or, perhaps more precisely, against the calendar. Collections from many insurance providers have a time limit. The clock starts running from the time of service, and the service provider has to submit the bill, properly coded, before the window of opportunity has passed.



"The state form provides only 3 skin colors for assessing patient presentation. Our chart contains 7 skin colors. Our physical assessment is more complete, and in court, the more information the better—more information lessens the liability exposure."

—Dianne Sims, Field Training Officer

"After adjustment for Medicare and Medicaid write-offs, our billable current collection rate is 80 percent," reports Don Hackett, Finance Analyst, "our bad debt is about 20 percent, primarily due to private pay uncollectibles." Even with this collection rate, which exceeds the national industry average, Escambia



QA Coordinator Bob West (left) and Richard Slevinski, MD, Medical Director for Escambia County EMS and the state of Florida.

County still loses 2 percent to 3 percent due to late bill submission. "We expect to recover this 2 percent to 3 percent and improve our collection rate to 82 percent or 83 percent," claims Director Bruce Yelverton, "but more importantly, we expect a significant improvement in our cash flow."

Cash flow improvement has been a principal focus of Yelverton. Virtually every ambulance service suffers from a long delay in billing. Before Yelverton's initial efforts, the Escambia County EMS Service occasionally encountered up to a 45-day delay between the time of service and billing. Even before implementing the WESTECH system, with tremendous effort, Yelverton had reduced that delay to 15 days. After the WESTECH EMS System and a billing software package were adopted, the delay in billing dropped to 1 day. "Our maximum backlog on bills is now 3 to 4 days, and that only happens over 3-day weekends," explains Hackett, "during the week, bills go out the day following service. Due to "close call" rules, error reports are flagged daily, so there is no delay in following up on the few incomplete call reports we receive."

Given the lower employee overhead, the increased revenue from missed charges, and several other substantial savings, all tabulated in Table 1, the annual net savings provided by the WESTECH System is an estimated \$250,000. Added to total revenue, this amount translates into a 6 percent increase in net annual income.

QA/QI in the candy store

When QA Coordinator Bob West talks about the WESTECH EMS System, he looks like a kid in a candy store. The data collection and integration capabilities of the system open up a whole realm of possibilities for pin-pointing demographics, accident or injury trends; benchmarking performance; monitoring the efficacy of training and/or new equipment; and even defending the agency's public image by validating its level of service.

"The Westech system enables us to glean data from our records that was not attainable in the past," West states enthusiastically. "For example, the local newspaper was preparing an article on drowning in our community, and we were able to immediately generate the demographics and specifics of each incident." Using the system, West pulled together a report on the agency's response time, scene time, locations, patient ages and transport times for all water related incidents during the prior year. "It took 30 minutes," he said. "Before we had Westech—working with papers, digging into medical records, tabulating the data—the process would have taken 6 months: it never would have happened. Even the state can't believe how good our charts are."

"The WESTECH EMS System provides better quality documentation by improving the volume, accuracy and efficiency of data collection," says Richard Slevinski, MD, Medical Director for Escambia County EMS and EMS Medical Director for the State of Florida. "It is a tool for

sorting the individual behavior of paramedics or evaluating the group behavior of our system." Dr. Slevinski's primary concerns are time issues related to cardiac care outcomes, trauma outcomes and intubation. Dr. Slevinski does not allow any procedure or technology to rest on its laurels; he demands constant improvement. "By allowing us to manage the patient-paramedic encounter more precisely," he adds, "the Westech system helps ensure optimum care."

QA Coordinator Bob West plans to benchmark performance and relate performance to training endeavors. "I'm a member of the Florida Quality Management Peer Organization," he says, "and we are compiling a database of 85 percent of EMS charts in the state. We are planning to benchmark response time, scene times, cardiac resuscitation and survival rates and skill usage, such as IV and intubation success rates. This is a peer-driven effort." He adds, "We're looking for the best practices, so we can show the legislators and others valid data based on clear research. Once we've proved efficacy and established a base-

line, then we can work on improving performance." West also expects to measure the impact of equipment on performance. "For example," he says, "we'll now notice whether the 1st stick success rate changes following a switch to a new brand of IV equipment."

As a result of going paperless, Escambia County EMS increased its annual revenues by approximately 6 percent.

Training, of course, is a key component of quality improvement. Both Bob West and Dianne Sims, the Field Training Officer at Escambia County EMS, recognize the Westech system as an unprecedented tool for training and quality assurance. Sims is a field professional with 17 years

experience who knows what matters. Sims views the system as a valuable training tool. "Westech definitely improves the quality of care," she states, "because we are able to compare skills, record skill performance—such as IV and intubation success rates—identify deficiencies, and then retrain our personnel." Although Dr. Slevinski was reluctant to discuss specifics, citing his concern over paramedic confidentiality, he states that the system helped improve intubation success rates in some cases from approximately 70 percent to 90 percent. (The computer also encourages proper intubation procedure by requiring the paramedics to record intubation depth; it ensures that they actually check the tube's depth markings following intubation.) "In the past, if there was a deficiency, we didn't know," Sims plans to utilize the system for both training students and documenting their interventions. "This helps us out a lot," she adds. "We're very flat in administration here. Other agencies require more people to accomplish what we do because they are not technologically efficient."

Table 1: Money saved by Escambia County EMS due to WESTECH EMS System

(Based on 21,000 calls per year)¹

WESTECH EMS SYSTEM SAVINGS			
Revenue:	Increased billables - due to technological advances	+	\$138,600
Revenue:	Reduction in billing denial rate due to data errors*	+	\$92,400
Revenue:	Increase billables - no lost call sheets	+	\$ 2,310
Revenue:	Interest on cash earned by improving cash flow	+	\$ 6,000
Labor:	Billing Department - save 2 employees (potentially)	+	\$58,590
Labor:	QA/QI Department - save 1/2 employee	+	\$15,479
Materials:	No need to purchase paper call sheets and billings forms	+	\$ 6,300
TOTAL WESTECH EMS SYSTEM INCOME			\$319,679
WESTECH SYSTEM EXPENSES**			\$69,000
NET ANNUAL INCOME			= \$250,679

*Reduction in denial rate due to miscoding, missed deadlines, missing signature, etc.

**Hardware and software costs (\$60,000 annually over 3 years) plus Service Maintenance Option (\$9,000).

References

1. Calculated estimates assume 1) an average cost of billing labor per ambulance of \$10,500, 2) an estimated billing labor savings of 31%, 3) an average cost of QA/QI labor per ambulance of \$2,263, and 4) an estimated QA/QI labor savings of 38%. These figures are derived from "An Analysis of the U.S. Market for a Pen-Based Computing Product for Patient Care and Billing Documentation of Ambulance Operations," May 18, 1993, pages 23-24. Emergency Care Information Center, Carlsbad, California.

Electronic documentation—the legal shield

Yelverton asserts that the paperless document is simply a better legal document; it records what the paramedic did and why. He says, in essence, that the pen-technology is a safety feature, one that can protect his agency in court, or in the event of a Medicare or Medicaid audit.

"The state EMS form only contains 138 data fields and ours has 175 data fields," says Information Systems Coordinator Buddy Garrett. Dianne Sims jumps in, adding more specifics: "The state form provides only 3 skin colors for assessing patient presentation. Our chart contains 7 skin colors. Our physical assessment is more complete, and in court, the more information the better—more information lessens the liability exposure."

"The document also very clearly documents what the 1st responder has done, what 3rd party agencies have done—who performed which procedures," says Sims.

Sims cited the unpleasant experience of being subpoenaed, standing to testify in court, and trying to read her own handwriting on a carbon copy that had been in storage for 5 years. "There is no comparison between documentation now and then," she says, "it is not humanly possible to remember all the EMS procedures you performed without the visual prompts of the computer. Particularly following a critical call, after you've performed 20 or 30 procedures and have to write the report later. The prompts jog your memory."

She also finds that she rarely needs to write an extensive narrative. "The data fields record all the necessary details," Sims explains, "there is no need to duplicate the report in a narrative. Formerly, we'd check off a list of items on trip sheets that meant nothing, then have to write a novel to describe the call. I can't imagine going back to paper—paper is a nightmare."

"There's nothing as nice as getting a fresh copy, in a standardized format and legible every time, just like the day it was done," says Garrett with evident satisfaction in the system's instantaneous retrieval capabilities.

A particular managerial nightmare that haunts EMS administrators is the fear of a Medicaid or Medicare audit. With the continued focus on health care costs, both federal agencies have persisted in auditing

EMS agencies for coding fraud and error. "The Westech system enables us to meet the test of the times," says Yelverton, "the pen-technology links ICD-9 codes to interventions and these maps have been blessed by numerous certifications, so we have completely validated coding data in the event of an audit." Such information must help him sleep at night.

Appreciation is wonderful

Not everyone who appreciates the WESTECH EMS System works at Escambia County EMS. Danna Barnes, RN, BSN, Trauma Coordinator for the West Florida Regional Medical Center for the past 10 years, is on the receiving end of the electronic documentation and has nothing but positive comments on the quality of Escambia County EMS' documentation.

Historically, Barnes experienced the usual problem: illegibility of run reports. "We get the bottom copy of the state forms," she says, "I used to go to the copy machine hoping that photocopies could bring out more details." Sometimes nothing worked; and she had to contact the ambulance team and receive their report verbally by phone, a time-consuming, inefficient operation.

"Trauma is time," Barnes states insistently, "timeliness is very important. Pre-hospital evaluation and treatment provide vital information for treatment decisions both in the emergency room and critical care: surgeons frequently refer to run reports seeking information to make treatment decisions. The system gives you the level and detail you need every time without delay."

Barnes also explained that the Westech system streamlined the subrogation process, the hospital's passing of the financial claim onto a third party for collection. The swifter the subrogation process, the greater the likelihood of successful collection. This is particularly true in situations such as auto accidents, wherein the rather small personal protection coverage is paid out on a first-come, first-served basis. It is best to get your bill in first.

"We're under revenue pressure right now," Barnes says. "Trauma is usually not profitable partially because of the difficulty of subrogating the patient's claim. All the financial people at my institution know how far behind we are, mainly because I have to

paper chase all day to get the data I need to pass on the claim. Now, I have the time to go about my job treating patients, I don't have to spend all my time pushing papers; it makes my job easier."

Summary

Going paperless solves two major problems of EMS documentation: illegibility and incomplete records. Incredibly, by eliminating these two problems, pen-computers actually reduce personnel overhead by eliminating an enormous backlog of work created by those two afflictions. The pen-technology also significantly increases profits by capturing service and materials charges previously not recorded, and increases revenues further by reducing non-payment due to late bill submission. The WESTECH EMS System increases Escambia's profits by approximately \$250,000 annually.

From the QA and training perspectives, the WESTECH EMS System provides a tool for evaluating individual paramedic skills usage and EMS system efficiency in terms of response time, intervention outcomes, and much more. The system identifies deficiencies that can be corrected with targeted training, thereby improving patient care delivery.

The benefits are passed along to other health care providers in the continuum of care. Legible information on prehospital treatment and events, so necessary for treatment decisions, is immediately available to ED staff, surgeons, or other critical care providers. Finally, the pen-computers create an improved legal document that can be retrieved in a legible, standardized format at will.

Chris Jennings is the executive editor for Health Alert Press in Cambridge, Mass.

Special thanks to West Florida Regional Medical Center for their assistance with the photography for this article.

Created by Health Alert Press, Cambridge, Mass. Photography by Gary Langhammer Studios, Pensacola, Fla.

For More Information

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