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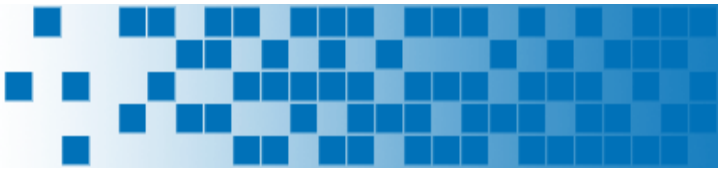

Current State of Emergency Department Information Systems

May 2007

INTRODUCTION

Healthcare Information Systems (HIS) are crucial in providing Emergency Departments (ED) and overall hospital facilities with streamlined and efficient workflow capabilities. The benefits of an Emergency Department Information System (EDIS) are valuable and essential in the optimization of ED resources and patient care. This paper seeks to describe the different components of EDIS, introduce the latest developments in EDIS technology, and describe the accrued benefits of EDIS through two different case studies.

EMERGENCY DEPARTMENT INFORMATION SYSTEMS

Benefits

Emergency departments are one of the most difficult areas to manage within a hospital facility and EDIS provides a means of eliminating supply chain lags and expediting patient turnover with high quality and efficiency. Systems that are able to automate workflow processes have these benefits:

- **Reducing Errors**: One of the most common causes of medical errors is illegible writing and phone calls made between nurses and physicians to communicate orders and conditions of the patient. By automating this process and having information communicated digitally, errors that arise from illegible writing are significantly reduced.

- **Continuity of Care**: EDIS allow ED personnel to immediately access critical patient data. Medical records can be transmitted between various healthcare providers and ensure the instant transfer of medical records of a patient to its necessary destination.

- **Streamlining Workflow**: EDIS systems allow administrators to gain a macro-perspective of how their departmental operations are functioning in both unit-specific and enterprise-wide aspects. Automated systems allow administrators to easily track and identify areas where bottlenecks are prevalent and hinder patient care. Furthermore, by having patient data accessible from an electronic database, also known as electronic medical records (EMR), ED staff can easily pull up patient data without going to a file cabinet and manually extracting critical information.

Components of EDIS

Reductions of errors, continuity of care, streamlined workflow are valuable benefits that are assumed from the following components of EDIS:

- **Charting**
- **Patient Tracking**
- **Registration**
- **Disposition/Discharge**
- **Charge Capture/Bills Processing**

Charting

A charting system and module should support multiple views, address the requirements of external agencies, include a standard set of fields and templates applicable to the end-user, be flexible enough to accommodate a variety of input modalities, and be customizable with limited interaction with the vendor. Therefore, the following components ought to characterize successful charting capabilities:

- **Customized Views**: The three charting views commonly provided in an EDIS are: triage, nursing, and physicians views. There is overlap between the three fields; however, each field is accommodating to the unique needs of staff members and allow for a semi-permeable filter of data input depending on who should enter data (physician, nurse, or physicians assistant) and to what capacity.

- **External Agencies**: Information that ought to be captured in a charting system consist of the following: Assessment, admission notes, allergies, and discharge disposition. Therefore, a good charting system ought to address these aspects:

    - Fields should have a pick-list (e.g. discharge/disposition)
    - Access to patient history, care history, and specific information relating to special care.
    - Semi-restrictive to allow for clinicians and physicians to access necessary data, but comply with HIPAA regulations and ensure confidentiality of selected information.

- **Input Modalities**: This system includes voice recognition and point-of-care solutions, such as PDA's, notebook computers, and remote systems access.

- **Customizable**: The system should be customizable without vendor intervention. Pick lists and customized templates should be driven or modifiable in a way that an end-user is able to make changes or additions as he/she feels.

Patient Tracking

The EDIS patient tracking system is also known as the "Electronic Whiteboard." This applicable patient tracking system is able to supply real-time information concerning the condition of patients, number of patients, and patients' length of stay, but also replaces the use of ED whiteboards. A key feature of patient tracking is that it captures the most up-to-date condition and location of patients without nurses and physicians having to journey throughout the ED. Furthermore, the automation of patient status allows for HIPAA compliance because of the elimination of whiteboards, which often do not ensure the confidentiality of patient information.

Locating a patient is facilitated via Infrared/RFID devices, which allow for locating a patient's whereabouts quickly. While many or all of these components are captured in EDIS, one of the most significant aspects of EDIS is with charting a patient's symptoms and progress. Communicating accurate and precise data of patients' real-time status has proved to be daunting when charts are manually transferred back and forth between departments and amongst staff members. Therefore, an electronic system of charting is invaluable in providing the means of accurate and timely transfer of patient data for the fast pace of any ED.

- **Locating a patient:** There are two general categories of patient tracking systems: passive and active systems.

    - A passive tracking system is one that involves no human intervention or interaction. The tracking of patient is facilitated via a marker, which is endowed with infrared sensors and radio frequencies.

    - An active tracking system requires actual input of patient data by a staff member. Therefore, it involves active intervention by the staff members.

- **Alerts:** The ability to generate alerts is directly tied to tracking physician-patient encounter times. Capturing time information is not only important for retroactive analysis, but can and should alert caregivers when wait times exceed the user-defined values for phases of care.

- **White board:** Specialized views for physicians, nurses, and ED administration are imperative due to

differing needs. Views may include the number of patients waiting for lab tests, x-rays, bed requests, as well as the number of patients in assorted locations.

Registration

Registration has often been one of the most time consuming processes for both the ED and the patient. An EDIS has registration applications that will drastically reduce time spent on registration. Some examples of these applications include:

- **Pre-registration**: Registration is performed before a patient arrives at the hospital whilst en-route in an ambulance, helicopter, or doctor's office.
- **Point of care registration**: Regardless of patient's location or condition, registration is done effectively to accommodate a patient's status and whereabouts within the ED.

Disposition/Discharge

An EDIS will provide a means to facilitate the transfer of patients to and from different care units and also allow for proper discharge instructions to be communicated to different staff members within and outside of the ED.

- **Prescriptions**: Physicians are able to record and transmit prescriptions orders and eliminate the hassles of handwriting them.
- **Aftercare Instructions**: Instructions, available in multiple languages, are accessible and modifiable to physicians and staff members providing for the finishing care.
- **Work/school notes**: No longer handwritten – they are automated.
- **Discharge/Dispositions**: Encompasses facilitating bed requests, but also transfers intra-department and intra-unit.

Charge Capture/Billing Coordination

High volumes of patients and activity can create an environment where charges can be easily misplaced or lost. An EDIS should provide tools to help capture charges and should address these following specifications:

- **Pick Lists**: This simplest type of charge capture calls for manually entered charges selected from a pick list.
- **Supply Cabinets**: Automated supply cabinets not only provide a means of capturing charges, but also facilitate inventory management. Through barcoding, inventory is easily tracked and managed and shortages are eliminated.
- **Code Generation**: The strongest type of charge capture module, which generates charges as the encounter is documented. Therefore, components of charges are easily assessed and eliminates facilitating back-end dictation, transcription, and coding costs.

Interfaces

EDIS require strong interface capabilities to meet the different needs of care units. An EDIS with proper interface capabilities will emcompass these following criteria:

- **Design:** An interface designed to meet the specific needs of different staff members – administrative staff members, nurses, and physicians.

- **User-Friendly System:** It is important for the interface to be user-friendly and not too technical and difficult to use as to need the constant attention of the vendor.

- **Compatibility with Main HIS:** Flip-flopping around multiple systems within the hospital or between EDIS and other care units can defeat the purpose of an EDIS. Compatibility between EDIS and enterprise-wide HIS will allow for smooth clinical workflow.

Innovations and Newer Technologies

There have been more developments in EDIS that facilitate more efficient and sophisticated ED operational capabilities. Some of them include:

- **Hand-held Computers**: Emergency physicians are able to access and enter information at the patients' bedsides with their wireless internet card installed computers.

- **Telematics**: Is the blend of computers and wireless telecommunication technologies that transmits data over vast networks. It can also include real-time video and data links between emergency departments and ambulances that allow for remote assessment of patient condition, automobile accident notification, and hazardous material alerts to better prepare for immediate attention and treatment.

- **Portable Computers to Register at Bedside**: Allows emergency patients to be taken to their beds immediately and registration clerks register them into the system via a wireless portable computer.

- **Bedside Ultrasound**: Ultrasound exams to address patients' conditions in a highly focused and goal-directed exam with a purpose of answering a select set of questions instantaneously at the patients' bedside..

- **Physiologic Monitoring Stations**: This equipment measures cardiac rhythm, pulse, and blood pressure, as well as the blood oxygen level.

- **Radio Frequency Identification Tags (RFID)**: method of remotely storing and retrieving data using devices called RFID tags/transponders. A RFID tag is a small object, such as an adhesive sticker, that contains antennas to enable them to receive and respond to radio-frequency queries from a RFID transceiver.

- **VoIP:** VoIP provides a two-way messaging interface with HIS and Nurse Call Systems. The portable handset supports prioritized messaging, instant message display, and broadcast messaging to ensure response to urgent situations.

As HIS and EDIS have both matured and grown in popularity over the last several years, these latest advancements are introduced to administrators and end-users to meet specific ED needs even more efficiently and effectively.

VENDORS

Hospitals seeking information system solutions to best meet the everyday needs of the Emergency Departments are often times faced with a barrage of choices and decisions in choosing an EDIS. Opinions regarding the best strategy and system will ultimately depend on the factors that are unique to the ED in question.

In the world of healthcare information systems (HIS), there are two main types of EDIS: niche (best-of-breed, or BoB) and HIS enterprise vendors. There are both advantages and disadvantages to BoB and enterprise products. Enterprise vendors allow for hospital-wide information technology implementation and BoB allow for need-specific implementation. Regardless of the type of solution, these are the three most important criteria to be considered:

- Functionality, workflow, and ease of use that truly meets the needs of the ED staff and end-users
- Implementation horizon of the next few months
- Tangible return on investment (ROI)

Before assuming a cost savings for maintenance and integration with an EDIS solution, look closely not only at the domain of the software and hardware offered by the vendor, but also the system administration requirements that are necessary for good compatibility.

Please see Addendum I for full list of Vendors

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
BoB Vendors									
Allscripts	www.allscripts.com	Healthmatics ED	x	A comprehensive ED system. Released in 2000 by A4 as Healthmatics ED and acquired by Allscripts. This product, as well as the EmStat product, has been integrated from A4 Health Systems upon a recent M&A. Highlighted Feature: Empowerment of the user: Allows easy customization of the system, down to the data, by the user. The system also has strong ad hoc reporting capabilities	x	PASSIVE	x	x	x
Allscripts	www.allscripts.com	EmStat ED	x	A comprehensive ED system, originally released in 1987, acquired through M&A with A4 Health Systems. EmSTAT is an Emergency Department Information System that guides emergency nurses and doctors in entering consistent, complete, and efficient documentation with features such as discharge roadblocks, chart controls, and navigation buttons. Highlighted Feature:The EMSTAT Reimbursement Module captures charges for procedures and HCPCS (HCFA Common Procedure Coding System). EMSTAT has also incorporated a point system of Weighted Values for patient care items that do not have HCPCS codes associated with them.	x	x	x	x	x

Case Studies

Two case studies are included to illustrate the success and the benefits of EDIS in two distinct scenarios. The first case study involves an overview of the process, implementation, and success of an EDIS that involves automation of all the workflow components of EDIS. The second case study introduces the integration of radio frequency identification tags (RFID) with an existing EDIS that was completed to meet the specific needs of an EDIS.

Case Study I: Nebraska Medical Center

The Nebraska Medical Center and its partner in academia, the University of Nebraska Medical Center, is the hub of one of only two level 1 trauma centers in Nebraska and western Iowa and treats patients from across the region. The medical center provides integrated medical services and operates 689 licensed beds and 29 operating rooms. In fiscal year 2006, The Nebraska Medical Center experienced more than 56,600 emergency room visits and had more than 428,000 outpatient visits. Its Emergency Room not only provides fully staffed, around-the-clock emergency care, but also has a heliport to provide quick access and care to the critically ill and injured patients.

One of the biggest obstacles to the Medical Center's busy ED was effectively tracking patients in crucial and problematic moments. Most ED's use a single, centrally located dry-erase white board, which is often difficult to see and does not supply the most current information about a patient. The Nebraska Medical Center knew this problem would be magnified in a large ED and a real-time system to track patients was indeed necessary. Second, a pressing concern was the patient charts, which were mostly handwritten. Paper charts are frequently difficult to find, track, and read. The major drawback to this problem was the time-lag in the transfer of information back to primary care providers as well as follow-up physicians. Finally, automation of data collection and reporting was in dire need. Virtually all department statistics were captured by hand, significantly limiting the quantity, quality, and timeliness of data.

Implementation

To address these issues and in preparation of opening a new ED, the Nebraska Medical Center made the decision to purchase an EDIS. To fit the needs of the new and the two existing ED's, the system would have to be designed so that data from the two existing departments could be combined immediately upon the opening of the new department. A further challenge, common to most hospital projects, was minimizing the need for IT resources. Therefore, an EDIS would be interfaced with the existing hospital information system (HIS), the lab information system, and the radiology information system using standard Hl7 interfaces. After a thorough evaluation process, due diligence, a written request for proposal, product demonstrations, technical conferences, and reference checks, Wellsoft Corporation was chosen to take on the challenge. Wellsoft's 18 years of experience in emergency department software and flexible, scalable nature of the product were the key factors in the decision.

Phase I

Phase I included implementing patient and orders tracking, triage documentation, data collection, and reporting discharging instructions and prescriptions, while still occupying the smaller distinct departments. Wellsoft custom-configured the software to meet the varying needs of each department, installed the application, trained the staff, and providing 24-hour go-live coverage in all three ED's.

Approximately one month after the initial go-lives, the two existing departments were combined without closing doors or shortcutting its operations to patients. The move went smoothly and quickly, and with the new EDIS, the staff now had means of communicating with people they could not see in the large 33-department hospital facility. The Phase I go-live was a complete success and the ED staff, many of

whom float department-to-department, found that the old dry-erase boards and verbal communication would no longer work.

Phase II

The core aspect of this phase was to address the needs for providing timely information to primary care providers and follow-up physicians. The EDIS now sends all of the patient's emergency room visit information to the HIS. This information is sent instantaneously after the end of the patient's visit. This allows for quick feedback and proactive identification of bottlenecks. This ease of workflow has allowed the residency program to evaluate and analyze comprehensive data to better address patients' cases.

Benefits

The Nebraska Medical Center now has extensive statistics on the health of the ED, using the reporting features of the EDIS. Productivity can be measured throughout the patient's visit and there is proactive identification of the nature of bottlenecks. The residency program has also greatly benefited from the introduction and integration of EDIS. Resident coordinators now receive information on different cases and case mixes and length of stays, which were not available before in such great detail. In addition, the ED and other departments are able to produce detailed and more accurate reports of specific situations and cases.

In the past, the Nebraska Medical Center boasted their left-without-being-seen (LWBS) record of 2 to 3 percent, which put the Center among the top performers of ED's in the nation. After the implementation of just Phase I, the LWBS rate decreased to 2 percent.

Door-to-door time has also shown an improvement after the EDIS implementation. Since patients expect to see their physicians in a timely manner, the time-to-physician data was necessary but difficult to track because the time a physician entered a patient's room was manually recorded. Using the EDIS provided simplified process, the ED is able to document the time entering the patient's room with more than 80% compliance. Furthermore, since the data is well documented and tracked, giving feedback and identifying bottlenecks in workflow has become a great motivating source for physicians to address these issues. As a result, the time-to-physician has improved 20 percent.

Another area of improvement is increased efficiency in the time spent tracking patient status and the status of orders. Since the EDIS automatically tracks each step of the patient's visit, the time spent tracking patients' progress has dramatically decreased. The current HIS also has prescription writing capabilities, so charge nurses estimate that calls made to check the handwriting on prescriptions has declined by 25 percent. In addition, 100 percent compliance has been achieved by physicians, who take advantage of drug allergy and drug-drug interaction checking tools on every prescription written.

Electronic documentation has also provided many benefits, such as legible information transmitted to various departments and within the ED. First, nurses no longer have to wait for others to complete their documentation and for these charts to be manually passed to them. Second, charts do not need to be located in folders and file cabinets, but just by a simple few clicks on the mouse. Third, physicians are constantly up-to-date with nurse's notes from any computer in the department. Since all components of patients' care are well-documented, the need for chart audits has become obsolete.

Finally, the EDIS also provides patients with convenience. In the past, patients had to bring poor quality photocopies of their charts, but now physicians are able to instantaneously view patients' charts online through the EDIS intranet.

Case Study II: Christiana Care Health System of Newark, Delaware

Based in Wilmington, DE, Christiana Care Health System is one of the largest health care providers in the mid-Atlantic region, serving all of Delaware and portions of seven counties bordering the state in Pennsylvania, Maryland and New Jersey. The not-for-profit, privately owned Christiana Care family of services includes two hospitals (Christiana Hospital, on a suburban campus south of the City of Wilmington, and Wilmington Hospital, in the downtown business district of Wilmington). The 50,000 square feet Level 1 trauma center operates 76 treatment room ED with seven triage assessment areas. The center has 94,000 visits per year and is staffed with 300 members.

Before the implementation of active radio frequency identification (RFID) technology and infrared locating to automate patient throughput within their Emergency Department, Christiana Hospital had a hard time keeping tack of the 100+ patients in its ED. The hospital used conventional methods of manual data entry and this was creating a serious lag in patient movement. Christiana Hospital solved its patient tracking problem by implementing a passive tracking system using wireless infrared and RFID technology. In the 12-month period after implementation of the technology, the hospital reported a 20 to 45 minute reduction time in length of stay for patients treated and released and about 35 minutes for patients admitted. The Health Data Management System implemented earned Christiana Hospital *Health Data Magazine*'s inaugural Nursing Information Technology Innovation Award.

Vendor Selection

A group of ED leaders was assembled to not only create a roll-out plan for the system makeover, but for the vendor selection process. After presentations and formal due diligence were completed, a project steering committee decided to move ahead with EDTracker software from Versus Technology, which had the potential to meet the unique needs of the ED.

Implementation and Success

Keeping up with patients meant the former tracking system needed a good makeover. Christiana needed a passive tracking solution that did not require staff members to constantly input information into the system and would be acknowledged by all levels of personnel, from the clerks to the physicians. Therefore, the best solution was to incorporate a tracking system that uses infrared/RFID sensors and plastic badges embedded with tracking chips to passively monitor the location of patients and staff in real-time.

When patients arrive at Christiana's emergency department they receive a triangular badge – which measures 2.5 inches by 1 inch – that clips to their clothing. The badge number is then activated in the tracking systems. Whenever patients enter a new care area or move back and forth between care units, the badge sends a signal to the tracking application. Clinicians are then able to call up a self-developed electronic dashboard on a computer that shows the patient's location anywhere at anytime. Nurses, ED clerical staff and radiology technicians also wear badges that identify and record patient interaction and location.

The ED triage process was renovated to expedite care and treatment processes and to take advantage of the electronic tracking system. Upon arrival at the ED, the patient is registered and his/her conditions are assessed. Then, the patient's conditions and a badge are entered into the hospital's admission-discharge-transfer application. Throughout the patient care process, the system works jointly with the EDTracker application and allows for all Lab and radiology test results to flow electronically to the tracking system as well. Therefore, the electronic transfer of this data eliminates unnecessary and redundant labor.

Once patients are brought into the ED for a full assessment, they receive a badge and the triage nurse

decides what action to take. If a patient is to be admitted, a bed management staff is notified electronically to ensure the quickness of care and action. When the bed is assigned its number is displayed on the racking system dashboard, which also can be used by nurses to request patient transport to the inpatient unit. The dashboard also enables hospital administration to remotely view ED demographics, such as the number of patient and those waiting to be admitted, from a PC, PDA, or a cell phone.

Data warehousing has also become a much easier and less time consuming task. The system also supports the hospital's overall operational workflow. The hospital staff is now exporting tracking data to the data repository to analyze components, such as wait times, from an operations management perspective. This phenomenon is another positive result from implementing the passive tracking system. The staff is able to measure specific intervals of care in the emergency department, which they can understand to improve care and efficiency of the overall workflow. Administrators also now have real-time information that they can track the ED status to make effective hospital-wide adjustments and capacity decisions.

Other benefits of the passive tracking include:

- Patient turnaround time decreased by 5% due to an increased volume of 8%
- At one time approximately 5 percent of patients were leaving the ED without treatment. After implementation, this figure has declined to 1 to 2 percent and patients are brought into the treatment rooms almost 40% faster than before
- The number of hours the hospital is on "ambulance divert" has plunged from more than 60 hours per month to 11 hours per month.

Christiana's nursing team can spend more time on patients and attending to their needs instead of following up on orders, transporting charts to update the status of patients, and looking for patients around the ED.

Implementation was a huge success not only due to the nature of the tracking system and all of the benefits it offered, but also because the entire nursing staff embraced the system with such optimism, excitement, and readiness. Getting nurses to change their way of doing things was initially thought to be a steep hill to climb; however, after an internal marketing program and thorough introduction and well-executed training of the nurses, the implementation was a success and proved to be a valuable step in helping the ED run its operations in a more efficient and effective manner.

CONCLUSIONS

Emergency Department automation and implementing the right information system to meet crucial needs are challenging, but worth it. Planning for an enhanced and successful ED requires not only the commitment of internal management, but also the joint effort of all members involved: emergency department staff, development team, and EDIS experts. In developing and implementing EDIS, it is a priority to introduce a zero-fault-tolerant system which provides turnkey solutions even at the most hectic and compelling moments. As arduous as it may seem, a successful and well-planned information system can not only provide a positive ROI in a timely payback period, but also result in better patient care, improved staff productivity, and a satisfying work environment.

By making an assessment, creating a strategic plan together with EDIS experts and providing patients with the care they need and deserve, will ultimately increase the ROI that will lead to a successful and non-static Emergency Department that will be at the forefront of emergency medicine.

Addendum I:

Vendor List

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
BoB Vendors									
Allscripts	www.allscripts.com	**Healthmatics ED**	x	A comprehensive ED system. Released in 2000 by A4 as Healthmatics ED and acquired by Allscripts. This product, as well as the EmStat product, has been integrated from A4 Health Systems upon a recent M&A. Highlighted Feature: Empowerment of the user: Allows easy customization of the system, down to the data, by the user. The system also has strong ad hoc reporting capabilities	x	PASSIVE	x	x	x
Allscripts	www.allscripts.com	**EmStat ED**	x	A comprehensive ED system, originally released in 1987, acquired through M&A with A4 Health Systems. EmSTAT is an Emergency Department Information System that guides emergency nurses and doctors in entering consistent, complete, and efficient documentation with features such as discharge roadblocks, chart controls, and navigation buttons. Highlighted Feature:The EMSTAT Reimbursement Module captures charges for procedures and HCPCS (HCFA Common Procedure Coding System). EMSTAT has also incorporated a point system of Weighted Values for patient care items that do not have HCPCS codes associated with them.	x	x	x	x	x

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
CodoniX	www.codonix.com	**Codonix ED** **Codonix Notes**	x	The Company was founded in 1995 and offers extensive ED applications and tools. Codonix ED is a complete software system built to electronically manage your busy Emergency Department. It was designed to increase efficiency while helping clinicians conquer strict guidelines for documentation and regulatory compliance. It utilizes proprietary charting technology to accurately document and capture every procedure in the ED, from Triage to Discharge. Codonix Notes is a web application that provides a JCAHO compliance package, an electronic tracking board, complete nursing documentation including triage, complete physician documentation, electronic prescription writing, and automated discharge instructions. Highlighted Feature: Codonix prides itself on NOT being template-based. It uses object oriented programming to imitate the way a physician practices. Every situation or "medical problem" in the ED is treated as an individual entity with certain inherent properties. Each question answered invokes a series of other, appropriate questions.	x	x	x	x	x

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Emergisoft	www.emergisoft.com	**EmergisoftED**		Founded in 1992, Emergisoft Corporation has focused its clinical point of care development efforts on creating a comprehensive, "full-HIS-interface" system for the Emergency Department. Highlighted Feature: EmergisoftED automates each step of the patient management and patient documentation process including triage, tracking, nursing & physician charting, disposition, charge capture, management reporting and syndromic surveillance. By effectively combining an easy-to-use interface with the most powerful EDIS functionality in the healthcare industry, EmergisoftED provides the critical data hospital clinicians and administrators need to reduce costs, maximize resources, improve patient outcomes and analyze the costs of care delivery.	x	x	x	x	x

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Exit-Writer	www.exitwriter.com	**Exit-Writer**		Exit-Writer was founded in 1984 by David Campell, MD, FACEP, a practicing, board-certified Emergency Medicine Physician. A discharge instruction system developed by a practicing board certified emergency physician. Note: Exit-Writer is incorporated into MedHost's EDMS product.Highlighted Feature: Included are the prescription feature and the "Referral-Fax" features. The prescription writing tool - including Medication Reconciliation - comes standard with all Exit-Writer software purchases. The "Referral-Fax" feature ensures continuity of care by automatically faxing to the referral physician a one-page summary of the information provided to each patient discharged.				x	x

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Patient Care Technology Systems	www.pcts.com	**AmeliorED AmeliorEDTracker AmeliorED Template**		AmeliorED PCTS entered the emergency department information system market in 2001. It was designed by a team of practicing emergency physicians and nurses and includes advanced clinical support intelligence. EDTracker product is the passive patient tracking system. It has been given a facelift with incorporated Infrared/RFID capabilities. EDTemplate consists of 100 complaint or procedure-specific paper templates developed by board-certified ED physicians and experts in billing, coding, and risk management. Double-sided EDTemplate templates are customizable to your particular ED and feature easy-to-use and consistent layout and content. Highlighted Feature:Amelior ED® has a Clinical Intelligence Engine that includes: automated diagnostic reasoning, differential diagnoses and treatment plans; automated medication dosing based on patients' age, weight and diagnosis; drug interaction, allergy and contraindication alerts; point-of-care decision support for rare but life-threatening conditions.	X	PASSIVE	X	X	

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
MedHost, Inc.	www.medhost.com	**EDMS**		EDMS MedHost was established in 1996. Founded by medical professionals and IT experts, the company leveraged expertise in ED management and customer management software to create a patient management software and communications system. Its current functions include tracking, management reporting, prescription writing, nursing documentation, physician documentation, CPOE, comprehensive discharge instructions , and complete charge capture. MedHost also incorporates Exit-Writer into its product. Highlighted Feature:EDMS includes an order entry module that is specifically designed for use by clinicians to write patient orders electronically and reduce medical errors. EDMS Order Entry also supports physician messaging, results management, patient rounding, and easy access to reference tools.	X	X	X	X	X

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
New Wave Software	www.newwavesoft.com	**NWS/EDS NWS/WebED**		Key features of the NWS/EDS system include very friendly user interface, patient location and care status tracking, built-in staff communications and alerts, order entry and result status updates, real-time monitoring of the department statistics, advanced electronic charting capabilities, electronic boards, support of wireless handheld devices, and seamless interfaces to other hospital systems. The NEW/WebED provides automated visit applications, charge generator, discharge forms and instructions (English/Spanish), Rx writer (based on Thomson/Micromedex content), physician templates, nurse templates	x	PASSIVE	x	x	x

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Picis	www.picis.com	**ED PulseCheck**		Picis guarantees success in high-acuity automation. and Picis' systems are installed in more than 1000 medical centers and Integrated Delivery Networks (IDN) worldwide. Highlighted Feature: ED PulseCheck is one of the most comprehensive and well-integrated emergency department information system (EDIS) in the industry. Designed by clinicians for clinicians, this Web browser-based software combines triage, patient tracking, physician and nursing documentation, risk management, charge management, integrated voice recognition, prescription writing and other unique features.	x	PASSIVE	x	x	x

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Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
T-System	www.tsystem.com	**T System EV**		T-System was formed 1996. T SystemEV uniquely combines the most widely used documentation system in the U.S. with advanced technology, allowing for quick and thorough charting. T SystemEV is a comprehensive Emergency Department Information System (EDIS). Its functionality spans the entire ED experience from triage to discharge. The new version provides core clinical data module which amongst its capabilities documents, stores, and retrieves vital signs, allergies, and medications. The new version also has a computerized physicians order entry (CPOE) capability that is highly customizable and displays real time status of orders and automatically displays tracking/status boards. Highlighted Feature: A charting system that electronically replicates the most popular manual form of documentation used in emergency departments.	x	x	x	x	

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Wellsoft Corporation	www.wellsoft.com	**Wellsoft EDIS**		Founded in 1988, Wellsoft is dedicated to emergency department information systems. Highlighted Feature: A user-friendly interface that allows for flexibility in usage of touch screen or a PDA, a plasma screen or a bedside monitor combined with LAN or wireless web systems. It is highly customizable to provide applications the most comprehensive support systems from tracking to discharge and even medication management.	x	x	x	x	x
Tenet		**EDNet**		A comprehensive ED system, originally released in 1986. Sold in three tiers, with the simplest tier basically composed of an aftercare module. Highlighted Feature:The EDNet System has been designed from day one for full support of multi-hospital and large enterprise installations.Notes: The EDNet Emergency Department Information System product line, previously owned by Tenet Information Services Inc., was acquired by MediServe Information Systems Inc. MediServe will offer information systems for emergency departments and urgent care centers of health systems. EDNet was sold off to MediServe Infosystems Inc. and these two companies have formed strategic alliances in the area of project management.	x	x	x	x	x
Enterprise Systems									

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Cerner	www.cerner.com	**FirstNet**	x	Founded on the integration of clinical and financial information throughout the emergency encounter, FirstNet helps you handle the complexities of tracking and managing your patients while running a responsible business and enjoying unparalleled operational, clinical and financial benefits. Highlighted Feature: Highly integrated emergency department solution. This is a high-end product and provides a comprehensive system from registration and tracking applications to resources providing risk management, including alerts and interaction checking.	x	x	x	x	x

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
McKesson	www.mckesson.com	**Horizon Emergency Care**	x	Horizon Emergency Care™ improves emergency department performance by enhancing communication among care team members, optimizing department workflow and ensuring appropriate reimbursement. Horizon Emergency Care features patient tracking, knowledge-driven documentation and coding, electronic order/results communication, discharge information and management reporting. Hightlighted Features:Improves patient management by providing an automated way to admit, track and disposition patients throughout the ED Enhances financial performance through more accurate coding and reduced transcription costs Facilitates rapid adoption by clinicians because its branching logic mirrors their workflow and thought processes	x	x	x	x	x

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Eclipsys	www.eclipsys.com	**Sunrise Emergency Care**		Sunrise Emergency Care ED solution optimizes patient throughput and outcomes in the Emergency Department (ED) by automating registration, triage, patient-tracking, orders/results, documentation, prescription-writing, discharge and more. Highlighted feature: HIPAA-compliant solution integrates the ED with the full healthcare enterprise. Status Board follows patient's location and shows status of available resources and diagnostics. Physicians, nurses and other hospital staff can enter patient information from multiple locations and monitor each patient's progress on the Status Board. E&M Coding ensures that documentation is complete enough to justify billing at a certain level. Other features: Include triage and prescription writing , secure messaging (for tasks including appointment requests, prescription refills, health notices), knowledge-based orders, and structured documentation	x	x	x	x	x

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Meditech	www.meditech.com	**Meditech**		A leading software vendor in the health care informatics industry for 37 years, Meditech provides integrated software solutions that meet the information needs of health care organizations worldwide. Meditech's ED management application assists ED clinicians and staff in the critical task of managing patients quickly and efficiently. Highlights: Integrated desktop and patient tracking system, documentation, reception, discharge management, registration, comprehensive medical record, patient documentation and triage, security, quick order entry, prescriptions, medications, and follow-up/call management	x	x	x	x	x

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
GE Healthcare	www.gehealthcare.com	**Centricity**	x	The Centricity product was acquired by GE Medical in 2000. Centricity does not aim to compete with the four major players but rather aims to support these systems. The focus is on patient care. Before patients have reached the hospital, Centricity can track patient status and needs in the ambulance en route to the medical facility. Centricity functions in all major hospital divisions—emergency, labor and delivery, anesthesia, cardiology, and so forth.Centricity Clinical Information Systems modules produce an integrated longitudinal medical record. Data flows through Centricity via Clinical Data Repository (CDR) that draws data, text, and other information from HIS and ancillary systems. Existing CDR can feed the Centricity Clinical Information System (CIS) modules in areas like the ED, OR, Critical Care and Med/Surg floors to optimize workflow and deliver patient safety, clinical productivity and operational efficiency. Highlighted Feature:PatientNet wireless communication system, designed to the FCC's new WMTS standard, makes text and waveform information instantly accessible to providers at any time and place. Other Featur	x	x	x	x	x

Completed: March 28, 2007 and Updated from: July 19, 2004

Vendor	Website	Product	EMR/EHR Application with CCHIT Certification	Comments	Charting	Patient Tracking	Registration	Discharge	Interfaces
Siemens	www.siemens.com	**Signature - Questionable functionality for the ER**	x	SIGNATURE provides comprehensive HIS support integrating with Siemens hospital and enterprise-based solutions. Other features include immunization tracking, electronic payer communications, automated document manage. Invision offers integrated support to help streamline workflows across clinical, financial and administrative functions. This solution delivers a complete Electronic Health Record (EHR) which authorized users can access anytime from any location. It also stores episodic information, and it supports access to demographic information through integration with Enterprise Access Directory – the enterprise master patient index. Other features: Enterprise payer communication, immunization tracking, automated document management. Siemens also has a strategic alliance with NextGen Healthcare and has added their EMR application to its ED portfolio.	x	x	x		x

Addendum II:

EDIS Vendors and Single Sign On

Outside Single Sign-On Applications

Vendor	Website	Ping Identity	DeVa Systems Group	Imprivata OneSign	Vergence (Sentillion)	IBM	Sun Microsystems	Active Identity	Novell
BoB Vendors									
Allscripts	www.allscripts.com	**X**							
Allscripts	www.allscripts.com	**X**							
CodoniX	www.codonix.com								
Emergisoft	www.emergisoft.com								
Exit-Writer	www.exitwriter.com								
Patient Care Technology Systems	www.pcts.com								
MedHost, Inc.	www.medhost.com								
New Wave Software	www.newwavesoft.com								
Picis	www.picis.com		**X (picis only)**						
T-System, Inc.	www.tsystem.com								
Wellsoft Corporation	www.wellsoft.com				**X**				
Tenet									
Enterprise Vendors									
Cerner	www.cerner.com			**X**	**X**	**X**		**X**	**X**
McKesson	www.mckesson.com			**X**	**X**	**X**			**X**
Eclipsys	www.eclipsys.com			**X**	**X**	**X**			
Meditech	www.meditech.com			**X**	**X**	**X**		**X**	
GE Healthcare/IDX	www.gehealthcare.com			**IDX only**	**IDX only**	**X**	**X**		**GE only**
Siemens	www.siemens.com			**X**	**X**	**X**			**X**

Addendum III:

EDIS Vendors with Clinical Decision Support and Evidence Based Medicine

Completed as of May 17, 2007

Vendor	Website	Product Name	Brief Description	Clinical-Decision Support	Evidence-Based Medicine (included)	Seperate Product (Possible Interfaces)
BoB Vendors						
Allscripts	www.allscripts.com	Allscripts TouchWorks	Allscripts TouchWorks solutions are the trusted choice for clinical and financial management in thousands of leading medical groups nationwide. Developed by physicians for physicians, TouchWorks' integrated Electronic Health Record and Practice Management System combine world-class clinical tools with sophisticated scheduling and financial management to deliver higher quality care more efficiently and at lower cost.	**X**	**X**	**Y**
CodoniX	www.codonix.com	N/A	N/A	**N/A**	**N/A**	**N/A**
Emergisoft	www.emergisoft.com	N/A[1]	N/A1	**N/A**	**N/A**	**N/A**
Exit-Writer	www.exitwriter.com	N/A	N/A	**N/A**	**N/A**	**N/A**
Patient Care Technology Systems	www.pcts.com	AmeliorED[2]	Amelior *ED* is a comprehensive EDIS that manages patient information from triage to disposition. Designed by emergency clinicians, it incorporates category leading automatic tracking, computerized provider order entry simplicity, and *context-sensitive clinical decision support* . It is the first EDIS to embed automatic tracking within the system to provide the power of real-time patient and asset location and tracking information while caregivers chart.	**X**	**N/A**	**N**
MedHost, Inc.	www.medhost.com	EDMS[3]	MedHost's EDIS product will integrate clinical-decision support application into its system.	**X**	**N/A**	**n**
New Wave Software	www.newwavesoft.com	N/A	N/A	**N/A**	**N/A**	**N/A**
Picis	www.picis.com	N/A[4]	N/A	**??**	**N/A**	**??**

Vendor	Website	Product Name	Brief Description	Clinical-Decision Support	Evidence-Based Medicine (included)	Seperate Product (Possible Interfaces)
T-System, Inc.	www.tsystem.com	T-System EV[5]	Document, store and retrieve vital signs, allergies and medications; auto pre-population of patient history data from prior visits; drug/drug and drug/allergy conflict checking; vital sign trending and graphs; alerts and prompts for required documentation elements; *Medi-Span* formulary for decision support *integrated* into EDIS	**X**	**X - ??**	**N**
T-System, Inc.	www.tsystem.com	T-System Nexus ????????????????	The T System Nexus is a suite of technology-enabled solutions designed for use in the emergency department (ED) environment in conjunction with the T System for physicians and/or nurses documentation solutions. Nexus helps EDs improve clinical and administrative information management and workflow while further leveraging the many benefits of T-System's proven paper-based charting templates. The ED Nexus suite can be implemented in its entirety or as discrete components.	**X**	**X**	**???**
Wellsoft Corporation	www.wellsoft.com	N/A	N/A	**N/A**	**N/A**	
Tenet	N/A	N/A				

Vendor	Website	Product Name	Brief Description	Clinical-Decision Support	Evidence-Based Medicine (included)	Seperate Product (Possible Interfaces)
Enterprise Vendors						
Cerner	www.cerner.com	Executable Knowledge (EK) ???????? - List Millennium which has modules like EK that provide CDS and EBM	Places evidence-based, patient-specific information at the clinician's fingertips, enabling them to drive measurable improvements in health outcomes	**X**	**X**	**Y**
Cerner	www.cerner.com	PowerInsight - ????????? See comment above	PowerInsight solution suite provides healthcare leaders with a direct path from data collection to decision-making. Unlike traditional decision-support systems that support only specific business requirements;PowerInsight harnesses the power of clinical;management and financial data through a leading-edge data-warehouse infrastructure and business-intelligence applications.	**X - ??**	**X - ??**	**Y**
McKesson	www.mckesson.com	InterQual - This is a whole separate line of products - Horizon Emergency Care has CDS - Tie to Horizon Expert Orders	InterQual solutions are clinical decision support tools that enable you to apply the medical evidence for individual patients effectively and efficiently. InterQual tools deliver evidence that works in managed care organizations, hospitals and outpatient settings — evidence that works within any clinical management workflow and for everyone on your care management team. With InterQual, you can drive quality of care with consistency and confidence.	**X**	**X**	**Y**
Eclipsys	www.eclipsys.com	Sunrise Clinical Manager - I believe this is needed for the ED solution Knowledge-Based Charting has EBM	Sunrise Clinical Manager™ solutions provide clinicians the tools they need to provide high-quality, efficient care in the most demanding environments.	**X**	**X**	**Y**

Vendor	Website	Product Name	Brief Description	Clinical-Decision Support	Evidence-Based Medicine (included)	Seperate Product (Possible Interfaces)
Meditech	www.meditech.com	Data Repository (DR) & Medisolv Rapid - I did not see EBM as being part of these solutions although Meditech does have it built into other modules utilizing Zynx. - CDR is utilized through other products like CPOE.	RAPID is an Intranet application that converts hospital "transactional" data into high value information by embedding proprietary knowledge and making it available to end users for interactive analysis on a near real time basis. Health system data is usually fragmented and often requires manual processes to convert into meaningful information. Most data used in RAPID reports is automatically accessed from existing Data Warehouses such as the MEDITECH Data Repository. Additional data from other sources, e.g. a stand-alone physician credentialing systems, may be added through RAPID's data import features.	**X**	**X - ??**	**Y**
GE Healthcare/IDX - I really did not see that GE provides an ED product but their Centricity product can be utilized by ED but does not have all the ED funcationality	www.gehealthcare.com	iConsult (Elsevier Product)[7] - The GE Centricity product line for PM and EMR include EBM and CDS cababilities.	By delivering instant access to current evidence-based information order sets from Elsevier provide the resources clinicians need to employ effective disease-management practices - and more. Elsevier order sets promote correctness and consistency, while allowing you to order faster and more efficiently. Furthermore, computerized order sets ensure that your entire organization is using the most current version of any protocol.	**X**	**X**	**Y**

Vendor	Website	Product Name	Brief Description	Clinical-Decision Support	Evidence-Based Medicine (included)	Seperate Product (Possible Interfaces)
Siemens	www.siemens.com	Decision Support Solutions (DSS) - Siemens also partners with Zynx to provide EBM within their Invision and Soarian products -	Siemens Decision Support Solutions (DSS) Clinical Performance Management Solution is a fully functional clinical performance analysis tool that can help you understand what level of care you can efficiently and effectively provide. With Clinical Performance Management, you can automatically gather and store the following information to make the right decision for your patients.	**X**	**X**	**Y**

Footnotes:

[1.] *The design of the EmergisoftED application supports the real time integration of evidence-based decision-making rules in the practice of emergency medicine. Any process can include evidence-based rule of question string input with variable logic directives returned by the application. JCAHO is strongly in favor of the future integration of evidence-based medical decision-making in the medicine and EmergisoftED supports those efforts today.*

[2.] *AmeliorED has an integrated clinical decision support application within the EDIS.*

[3.] *MedHost will integrate a clinical decision support software into its EDIS.*

[4.] *Picis' decision support system is a Business Intelligence Application for HIS.*

[5.] *T-System EV has an application integrated into the EDIS and is not separate.*

[6] *Decision support systems is for Business Intelligence purpose.*

[7.] *Elsevier, a world-leading medical publisher, has integrated its iCONSULT clinical decision support service with GE Healthcare's electronic medical record (EMR) software. The strategic partnership will focus on delivering Elsevier's iCONSULT service directly to the hospital and group medical practice community through GE Healthcare's Centricity Physician Office electronic medical record (EMR). iCONSULT delivers real-time clinical decision support by putting evidence-based, point-of-care clinical reference content directly into the electronic workflow of health practitioners.*