

Mercy Hospital of Pittsburgh
Department of Emergency Medicine
Electronic Medical Record and
Tracking System Specifications

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Introduction

The Department of Emergency Medicine is committed to supporting Mercy Hospital of Pittsburgh's move to an all-electronic medical record. To this end, Department of Emergency Medicine staff have carefully reviewed the current medical record process in the Emergency Department, and special requirements that will apply to the implementation of an electronic Emergency Department record.

This document provides both general and moderately specific specifications for the Department of Emergency Medicine electronic medical record. This version concentrates on the tracking portion of this electronic medical record system and integration with existing electronic applications: Logicare Checkout Level I discharge instructions and Kurzweil VoiceEM voice dictation physician charting.

Interface design for the charting and tracking systems must be a dynamic process with feedback at all stages.

The first phase shall be a system for tracking patients by name, location, diagnosis, and a few important times. Later phases shall implement additional functions.

General Principles

Regardless of how the system is implemented, it **must** meet the following general requirements:

Efficiency

Whatever system we set up **must not take more time than what we do now**, unless there is a great benefit from it. Any

decrease in the efficiency of the Emergency Department will require either (1) additional staff, or (2) a decrease in the quality of care offered by the Emergency Department. Times for data entry shall be similar or better to that offered by existing similar systems, and similar to existing times, to be acceptable.

There shall be **no duplication of any data entry**; nothing shall be entered twice. All computer systems shall connect together. An example applicable to our present system is that we shall not have to enter the name into the Logicare Checkout system when generating discharge instruction. We shall be able to just use the cursor or a mouse or a finger to pick the right patient from those currently registered in the department.

People doing data entry should have benefit from it, so they have a good reason to do it and to do it well. An example is of a PIA (Emergency Department clinical secretary) entering the time of admission and where to. PIAs often must answer calls about patients who have been admitted, and thus they have an investment in having up-to-date information in the computer.

Real Time Information

- ◆ Emergency medicine is **emergency** medicine. Emergency means it needs to be done **now**. We must have instant access to **critical** data, such as patient location, lab results, and clinical data from previous Emergency Department visits or inpatient stays. Delays, even in the setting of system failure, are unacceptable. At best, they are a major disruption to patient flow, at worst, patients may die.

- ◆ Our system must have a **quick response**: people shall never have to wait for the computer to process a request. A second waiting for the computer to process a request is a second lost from emergency patient care. While some of this is related to hardware speed, software design is equally important. Bloated code slows down a system worse than a slow CPU.
- ◆ Administrative activities need real-time information, though time is not as essential as with clinical information. We need to review **clinical** records to determine how our patient load is changing so we can plan for appropriate staffing. We need to identify patients with specific diagnoses, and patients seen by particular attending or resident physicians, for mandated quality improvement activities. For example, we need to identify all patients who returned within seven days of a Department of Emergency Medicine visit and were admitted to the hospital.
- ◆ quickly change interface and data elements without untoward side effects. The system must be in a nonproprietary development language that is widely used (e.g., C++, Smalltalk, or Delphi).
- ◆ Administrative procedures must also permit a rapid response to end-user requests for modification. All such end-user requests from Department of Emergency Medicine staff will be routed through a single person in the Department of Emergency Medicine: the Information Systems Coordinator or designate. From the time of end-user request by the Information Systems Coordinator or designate, through recoding of application elements, to installation of the upgraded modules, shall be no more than an agreed-upon time.
- ◆ All users shall be able to log suggested corrections to data tables whenever they notice a problem. (Examples include inaccuracy in a doctor's address or phone, misspelling of a nurse's name, lack of a new doctor's name and address, need for a new discharge instruction.) "Whenever they notice a problem" means that users can enter such a suggestion no matter where they "are" in the menu/dialogue box system of the program, by bringing up a new window. This will include mouse-based cut and paste features. Suggested corrections will be available for later validation by the Information Systems Coordinator or designate prior to entry into the table, and entry of suggested corrections will trigger an email message to the designated person.

Flexible and Upgradable

- ◆ Our system shall modularly **flexible and upgradable**. In the initial phases of implementation, we may wish to make changes. Practice patterns, regulatory requirements, or new medical knowledge may require modification of the system on an occasional but continuing basis. Data elements (e.g., doctor and nurse lists) must be editable with no special computer skills.
- ◆ The system software must be well-enough commented and modular enough that programmers, even those who didn't do the initial coding, can

Eliminate Geography

We shall be able to get needed information wherever we are: Emergency Department, office, Emergency Medicine Association of Pittsburgh office down the street (our emergency physician group), or at home. This is primarily for quality management and other administrative information, but occasionally a patient calls with a problem and we need clinical information from these other locations. This includes modem access (which is already available through the hospital's network server modem pool).

"Information at Our Fingertips": Interface Issues

To use a phrase from Bill Gates of Microsoft, we need "**information at our fingertips**" for research and follow-up. It shall take **little effort and little training and little** time to find the information right when we need it. Many of our staff rotate in the Emergency **Department** from other facilities, and sometimes from other countries.

- ◆ Interfaces must be user-friendly, and must work without any unnecessary repetition of data request entry. Systems must include context-sensitive help. During alpha and beta testing, interfaces must be tested with inexperienced users performing a suite of data access tasks prior to implementation. Systems shall not emerge from beta testing until untrained users can reliably use the interface with no prompting other than the interface and context-sensitive help. Manuals and training shall be superfluous for users

who are already familiar with a mouse and the Windows or Windows 95 graphical user interface.

General interface design requirements:

- ◆ Context-sensitive cursor types (e.g., different cursors for applying nurse or doctor to a patient)
- ◆ *Quick* lookup for patients in Emergency Department or who have been in the ED recently
- ◆ For table lookups, users must be able to find entries by simply typing a few letters of the name or item.
- ◆ For order entry of labs and x-rays: standardized "panels" easily entered with a single action by a nurse or clinical secretary (e.g., cardiac arrest, CCU labs/X-ray). Panels easily changed by the ED Information Systems Coordinator or designate. Interface to Action 2000 lab ordering system to eliminate duplicate order entry.
- ◆ Easy anonymous log-on for selected actions by non-ED staff (e.g., escort, ultrasound technicians returning patients to the ED).
- ◆ Easy electronic signature for nurses to validate time-stamped entries, with easy printout of such validated entries. (To include in printed charts until an all-electronic chart is implemented.)

Color and Icons

- ◆ Gestalt: a single view of a tracking system monitor shall provide a gestalt of the department's status. Specifically, the

view shall show an overall pattern of colors and icons that tell whether there are lots of patients: waiting to be registered, waiting to come to rooms, waiting to be seen by physician.

- ◆ For color-blind personnel, the icons for each status must not only have different colors, but different shapes that are distinguishable from a distance.

Help system requirements:

- ◆ hypertext links
- ◆ search capability
- ◆ an index
- ◆ "stay on top" options for selected help windows
- ◆ an online tutorial (multimedia optional)
- ◆ popup or balloon help if a cursor is held over an icon or button for a second or so

Triage Data Needs

- ◆ We need to replace our existing triage log with a computerized triage log, as suggested by JCAHSO on accreditation surveys for the past several years. At present, some required data elements are not entered in timely fashion, and are difficult to get out.
- ◆ For triage (which, by COBRA regulations, must occur **prior** to registration), the triage nurse must chart certain data elements. Charting must be done in real-time at the point of care, in a chaotic, hectic, and stressful environment. We need automated entry of vital signs directly from our automatic instruments (automated BP

cuff, digital thermometer) with optional manual entry if needed.

- ◆ We must have easy entry of subjective information, which is so important for triage assessments. The best way to do this isn't clear to us. A menu/checklist approach will not work because people come to the Emergency Department with so many varied complaints ("glued eye together with superglue"; "lump in throat"; "took medicine from trip Japan that has no English on the label and now may be having a medication reaction.") Only a few nurses can type efficiently, so typing is not an option. Kurzweil voice recognition is being used by all our physicians, but our experience shows that noise can make the Kurzweil system nonfunctional, and the noisy environment of our waiting room, with TVs blaring, patients crying and moaning, and families wailing, is not a good environment for voice dictation. A combination of menu/checklist approach, with mouse or touchscreen, along with handwriting recognition might be the best. There shall be simple checklists for destination (Urgent Care Center, Pediatric Emergency Center, Main Emergency Department) and for standard nursing diagnoses ("alteration in comfort," etc.), but with the flexibility for manual entry of unusual entries. There shall be an option for deferring documentation to other nurses in the Emergency Department, for example for disaster situations.
- ◆ Triage nurses are responsible for ordering certain labs as soon as they evaluate a patient. For example, by protocol, some walk-in patients with

chest pain need an EKG done and shown to an attending physician within ten minutes. For some other conditions, triage nurses order other tests, such as blood tests. Triage nurses shall be able to use the computer documentation system to order these tests. Since the time these tests were ordered, and the particular tests ordered, are important parts of the Emergency Department record, ordering shall be part of the record. Standard algorithms apply to ordering these tests, and they shall be incorporated into the triage module to ensure that nurses can order tests appropriately.

- ◆ The tracking system shall have a rapid-entry (lookup/list) system for entering drug names and dosages in triage or during other nursing assesment.
- ◆ Whatever system we implement must be implemented carefully. At present, most Department of Emergency Medicine nurses see computerized nurses' notes as an impossible task for them. We should use alpha and beta testing with one or two nurses who are not anti-computer, and should not start implementing the system more widely until these nurses can (1) show that the system works as efficiently as the present system, or at least better if not as efficient, and (2) act as proponents for the system with the rest of the nursing staff.
- ◆ The tracking system shall provide an easy way to enter "see and call" or similar messages from admitting staff physicians, and to connect these at the time the patient presents, even if it is a new patient.

Integration Issues

Our tracking system shall be the front end for our ED computer system. It shall tie together our other applications. It must export and import data to other ED applications (Action 2000, Protouch lab reporting system, Logicare Checkout Level I, Kurzweil VoiceEM). Equally important, the tracking system's interface will provide entry to other applications. For instance, selecting a patient from the tracking system, and then picking the "discharge instructions" button shall bring up Logicare Level I with the patient's name and medical record number already entered. When a user exits from generating a discharge instruction from Logicare Level I, the tracking system shall flag that discharge instructions are prepared, as well as sending a copy to the patient's electronic chart.

The Department of Emergency Medicine currently uses two major computer systems in its daily documentation activities, and any tracking system must either (1) interface seamlessly with them, or (2) completely replace them with adequate substitutes.

The first system is Kurzweil Applied Intelligence's *Voice-EM* voice-dictation charting system. This is currently used by attending physicians for charting. To interface properly, the tracking system shall feed Kurzweil basic demographic information (patient name, medical record number, visit account number) and then take back a completed medical record, along with an appropriate electronic signature, and pass it to the hospital's electronic chart. The tracking system shall pass information about labs ordered to Kurzweil, and the physician shall be shown

the labs and prompted by Kurzweil to comment on each lab, as is required.

Voice dictation is not an adequate substitute for the Kurzweil system because (1) it does not prompt the user for pertinent negatives when charting, and (2) the delay in receiving dictated charts is unacceptable for attending notes unless a transcriptionist is sitting in the Emergency Department typing in real time, and we have found such a system prohibitively expensive.

At present, attending physicians in the Pediatric Emergency Center do not use the Kurzweil system. We expect them to start using the system once we obtain funding for a fourth Kurzweil station for the Pediatric Emergency Center, which we have not yet been able to do.

The second system in general use is the Logicare Checkout Level I program for generating discharge instructions. We now mandate that every patient discharged from the Emergency Department receive written discharge instructions, and 99% of our discharge instructions are generated by this program. The discharge instructions form part of the medical record, and so the tracking system must absorb these from the Logicare program. The tracking system shall also export demographic information to Logicare so that the generated discharge instructions can be matched up with the appropriate medical record.

Status Board Design Requirements

In some Emergency Departments, a status board can be replaced by a single large display board (e.g., a large LCD display). However, in our department, a single large LCD display would not be visible from many parts of the department.

It also raises questions of patient confidentiality. An attractive alternative has been suggested: have a status board display function as a sort of "screen blanker" for all monitors in the department. If no other application or application module has been used for a few minutes, the status-board-screen-blanker appears. Or, users could switch to it on demand, if they wish.

The status board would serve two main functions. First, it would display information about all patients currently registered in (or recently discharged from) the Department of Emergency Medicine: where they are, what their chief complaint is, what their current status is; with colorful flags for conditions requiring attention.

As with Cybermedix Inc's "Cliniplex" system, specific distinctive graphics icons could represent status: Waiting for nurse, Waiting for doctor, Waiting for lab tests, Waiting for X-rays or in X-ray, Waiting for Consultation, etc.

Our status board interface shall provide the following:

- ◆ "Drag and Drop" for moving patients from room to room, for applying nurses and doctors to a patient, and similar tasks.
- ◆ Geographic representation of patient location on tracking board views (looks like a map of the area).
- ◆ "Screen blanker" function where selected monitors default to a status board view after a specified time.
- ◆ Different default status board for selected monitors in selected areas: views of only that particular area (i.e., main department, UCC, PEC, trauma

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- room) with option for other views, including entire ED.
- ◆ The status display shall show, in easily-grasped form:
 - how many patients are waiting to be seen
 - how many are in a room waiting to be seen by a physician
 - which patients have labs that need to be performed
 - which patients have x-rays that need to be performed
 - which patients have nursing procedures that need to be performed
- ◆ The tracking system shall provide an easy way to "turn over" all of a particular doctor's or nurse's patients to a replacement. If one is only turning over a subset of these patients, there shall be a shortcut to make subsequent transfers easier than the first one (e.g., selecting "same as last doctor" rather than selecting from a list)
- ◆ The tracking system shall provide for more than one patient in a room by providing a series of cascaded windows, nearly superimposed.
- ◆ The tracking system shall provide for a limited number of patients on stretchers in the hall. Such patients' icons shall, on interrogation, easily provide information about the room(s) in which the patient was previously.
- ◆ When a patient is transferred from one area of the ED to another, the system shall offer to change the nurse and doctor to those in the new area.
- ◆ When a doctor or nurse goes off shift, the system shall offer to "block reassign" groups of patients to the new nurse or doctor.
- ◆ The tracking system shall display patients "in X-ray" or "in nuclear medicine" or "in ultrasound" or "in waiting room" in special areas of the status board (perhaps in abbreviated form).
- ◆ If the monitor is showing a view of one sub-area of the Emergency Department, there shall be an colored iconic indicator of the overall status of other parts of the Emergency Department.
- ◆ The tracking system shall display continuously-incremented length of stay for each patient.
- ◆ Our computer system needs to allow the PIA (or anyone who wants to know) to immediately know where all patients are (including discharged or admitted patients) when calls come in, and how long they've been here. This includes "in DEM X-ray" and "at third floor nuclear medicine for lung scan." This would allow those answering the phone to direct call appropriately. Respiratory and escort and consultants should be able to find DEM patients more easily than at present. The "screen blanker status board" would provide this, if there were options to look up recently discharged or admitted patients, and patients in other parts of the Department of Emergency Medicine (for Urgent Care Center, Pediatric Emergency Center, main ED).

Real-Time Flagging of Data Interaction

Sometimes, data elements (described below) combine, in real-time, to indicate an urgent or emergency condition that should be addressed immediately. The tracking system shall, in real-time, alert Department of Emergency Medicine staff to these conditions. The tracking system will let us know when all labs and X-rays are back, and a patient is just waiting for disposition. Dangerous levels on laboratory tests shall immediately show a striking visual indicator on the status board. When labs are overdue, another type of visual display shall notify us so we can check with the lab and see why it is delayed.

For certain data elements, a continuously-updated report is central to efficient Emergency Department function. At present, the location of the paper chart indicates a variety of conditions. The number of charts in the "need a room" box tells us how many patients are in the waiting room waiting to be seen (assuming the triage nurse is keeping up).. The number of charts on the counter shows how many are in a room waiting to be seen by a physician. The number of charts in the "secretary to enter" and "nurse to do" boxes indicate how many patients have labs that need to be entered by the PIA (clinical secretary), and which and how many patients have physician orders the nurse needs to complete. To be equivalent to the present system, the system must permit a single glance from anywhere in the Emergency Department to give this information.

Specific Data Elements

The following data elements must be captured by the system, and become part of the medical record. All are vital parts of the record for both medical and legal reasons. Items with an asterisk* shall be implemented in the initial phase.

- ◆ Time of arrival*
- ◆ Time of registration* (even if patient goes immediately back for emergency treatment and is registered after already in a critical care bed; admissions staff shall be able to register patients using terminal in the critical care areas, or with portable terminals with radio modems)
- ◆ Time placed in room and room number (and time and room number for any changes in room or location, e.g., to X-ray or nuclear medicine for tests)
- ◆ Time of vital signs, and the vital signs themselves; abnormal vital signs, at least on admission, shall be flagged in a visibly distinctive way, e.g., showing up in red on the screen
- ◆ Time seen by physician
- ◆ Time labs, X-rays, EKGs ordered (and that they were ordered)
- ◆ Time labs expected back (standard time frames for these available from Laboratory Medicine)
- ◆ Time labs back, time patient back from X-rays, and time EKG shown to attending emergency physician
- ◆ Time consults ordered
- ◆ Time consultants paged, and time they answered (having the computer system handle the paging would be ideal; one

could just select from a menu of options such as "on-call orthopedic resident", and the computer would show the name of the on-call resident as it pages him or her, as well as stamping the time on the medical record.)

- ◆ Time IVs, drugs, and other treatments administered
- ◆ Time consultants responded (by phone or in person)
- ◆ Time patient disposition decided (discharge, admit, AMA, etc.) and disposition
- ◆ Time patient completes disposition* and condition on disposition
- ◆ Time of consult to Internal Medicine Admitting Resident, and time seen by resident and name. (The medical admitting resident needs his or her own display, showing those patients that need to be seen, and those that have already been seen by the admitting resident but are still in the Emergency Department waiting to go to bed.)
- ◆ Comments field for displaying on main status board views.
- ◆ Work-related injury status, and status regarding specific workers' compensation programs, with information on which Mercy physicians participate.
- ◆ Managed-care program status, with information on which Mercy physicians participate.
- ◆ Ability for online viewing of all Mercy Clinical Pathways and protocols (e.g., ED consensus management guidelines for myocardial infarction). Ability to use

such guidelines to generate appropriate orders (e.g., labs, x-rays, respiratory orders), and reviewing such orders and revising as appropriate.

We need to be able to determine DEM volume on different bases: hourly, by numbers and percentages of admissions to different units, by type of discharge, by acuity, by type of diagnosis. In particular, we must compare our care to practice standards, such as the ACEP clinical policy on chest pain. We need to be able to easily select visits for QA purposes, e.g., "list all patients with chest pain from last month." We must be able to do this with no assistance from MIS, and using untrained personnel.

We need to be able to identify: all Internal Alert patient records; whether the Internal Alert was for a trauma or for something else; whether the Internal Trauma alert turned into a full trauma-team trauma; and any Internal Alert trauma patients readmitted soon after discharge.

Lab and X-ray Data and Interpretation Entry

The Department of Emergency Medicine is doing more and more bedside testing: urinalyses, pregnancy tests and strep tests at present, and more planned for the future. As with the clinical lab, these tests need to be entered into the tracking system and available electronically.

This will allow us to review these tests for quality improvement programs. For instance, we are now sending every fifth urine to the lab to check against our Department of Emergency Medicine urinalysis. The tracking system shall make this easy for us. We will be able to

painlessly identify all urinalyses or other tests done in the Department of Emergency Medicine by day, week, or month.

Department of Emergency Medicine attendings must enter a wet reading of every X-ray. This shall be entered electronically, at the X-ray reading board, with an alternate entry point in the X-ray tech's room for when the X-rays on the board are being read by the radiologist. The radiologist shall be able to immediately review all clinical information for any X-rays, and shall be able to electronically flag X-ray discrepancies for immediate attention by Department of Emergency Medicine staff. Eventually, the DEM attendings' wet reading shall be entered only one time, which attaches to the chart as well as being available to the radiologist. The attending shall be able to review the X-ray readings of resident, intern, and medical student charts, and add an attending note or correction if needed.

The same applies to cardiologists reading Department of Emergency Medicine EKGs. Unlike X-rays, DEM attendings do not enter a separate "wet reading" for an EKG; the EKG reading merely appears on the chart. Cardiologists shall have immediate access to the chart, and shall be able to flag discrepancies.

Capturing Times

Times are vital parts of Department of Emergency Medicine charting. And time is vitally important in the care of patients in the Department of Emergency Medicine. However times are captured, it must not slow down the care of patients. Doctors and nurses shall not have to seek out a fixed

terminal to enter the time of every intervention; yet, they will not be able to "save up" times and enter them later because memory is fallible and the Emergency Department environment chaotic.

Alternatives for such time entry include personal terminals (Personal Digital Assistants or "workslate" computers with radio modems, such as the new Zenith product), enough terminals throughout the Department of Emergency Medicine that access is not a problem, simple dumb pushbutton terminals in rooms and on carts in the hall, bar-code reader systems, and many others. Whatever system is implemented must be tested with good engineering technique, including stress-testing to destruction using a Saturday night with multiple cardiac arrests and drunken trauma patients as stressors.

Prehospital Providers

An important part of the chart is the report turned in by prehospital providers. We must have some way to integrate this into the patient record. Standard trip sheets are used by all ambulance services, and certain demographic information is entered in machine-readable form, but the copies we get are from the back of a multi-part form and may be unreadable by scanners. The city of Pittsburgh is moving to an electronic EMS trip sheet, which should ease this process.

Interconnection with other Healthcare Facilities

We shall be able to E-mail or fax selections or complete ED medical records to another facility. This could be for emergency use by the other facility, or to provide information to private physicians' offices or clinics who will be seeing Emergency Department patients in follow up. Primary physicians shall know, the next morning, that their patients were in the Department of Emergency Medicine, or that their patients were admitted. We don't necessarily call an internist when his or her patient is in the Emergency Department with a wrist fracture, but it's something the physician should know about at some point, especially if the patient is admitted. The tracking system shall automate as much of this as technology permits (including automatic faxing and email)

Likewise, we often get records from other hospitals or doctors' offices by fax (e.g., EKGs), or handed directly to us by office staff. If we are using this information clinically, it shall become part of the medical record, and we shall be able to integrate it into the record. Fax transmissions could go directly into the system, as could e-mail; photocopy records from doctors' offices or other hospitals would have to be scanned into the record.

Disasters

Whatever emergency clinical documentation system we install must have provisions for disasters, including various levels of backup.

The most obvious disaster is when (not if) the computer system goes down. Despite

RAID disks, fault-tolerant networks, and UPSes, systems go down. When lives depend on documentation, an alternative **must** be available.

What if, as happened during last winter's ice storm, we get a hundred patients in an hour or two? Our clinical documentation system must have a way to deal with the load, especially if the computer system goes down. A paper backup system is essential.

As with when the system goes down, we perhaps can switch back to paper charts and scribbled notes. We could then have transcriptionists later review all these charts and try to transcribe them, keeping scanned originals on file for reference. Or, perhaps some other system would suffice.

Regardless, the system must provide explicit procedures for such disasters, and these must be developed in concert with any tracking system vendor.

Intern/Resident/Medical Student Documentation

(N.B.: the following is not part of the tracking system we expect from a vendor, but a separate charting system to be developed by Mercy Hospital. Nonetheless is is described for completeness.)

Third year residents from the University of Pittsburgh Affiliated Residency in Emergency Medicine provide a significant portion of the staffing for the Emergency Department. These residents are eager to begin using the Kurzweil system. The Department of Emergency Medicine is committed to letting these residents using Kurzweil. This will not only help meet the hospital's commitment to an all-electronic medical record, but it will improve medical documentation

completeness and legibility, and will serve important educational needs for the residents.

Attending physicians and third-year emergency medicine residents will have enough training and experience to use the Kurzweil system. By adding a sixth station and providing training to residents we could include second-year emergency medicine residents in the Kurzweil system. However, we have many first-year residents (interns) and medical and Physician Assistant students rotating in the Department of Emergency Medicine.

Interns and medical students are responsible for documentation on all patients that they see. Charts must have an attending note added.

We cannot change the system to make an attending responsible for charting for patients seen by interns and medical student. Doing so would require a large increase in attending staff coverage, and would cost roughly one or two million dollars a year.

Unlike emergency medicine residents who spend considerable time in the Mercy Emergency Department, most interns and students rotate in the Department of Emergency Medicine for only four weeks. This is not enough time to allow them to learn how to use the Kurzweil system and begin to use it effectively.

An alternative is to use rapid-turnaround voice dictation with transcriptionists typing the dictations and returning them electronically to the Emergency Department. However, unlike on the floor, the current system is that an attending physician reviews the intern or medical student chart for accuracy and completeness prior to the patient's discharge. This allows the attending physician to review the workup for

*completeness. The attending can then direct the intern or medical student to perform studies or physical exam items to complete the workup. **This must occur prior to the patient's discharge.** You can't go back and do another physical exam item on someone who isn't there any more. Therefore, any such transcription system must have a short turnaround time.*

Time from arrival to patient discharge is one of the most critical measures for how many patients the Emergency Department can see. Delaying patient discharge to wait for a transcriptionist to complete a chart will slow down the number of patients the Department of Emergency Medicine can see in a given time. An average delay of even a half an hour for intern/medical student charts would probably require an expansion of the Department of Emergency Medicine physical facility, at a large cost.

Having enough transcriptionists to assure rapid turnaround of Department of Emergency Medicine charts will also be expensive. However, if such a transcription system is already in use in for progress notes on the floor, a large part of the cost is already accounted for, and the incremental cost for extra staffing to cover peak hours in the Department of Emergency Medicine will be less. One option that might be explored is the idea of home distributed processing for peak-hour transcription. Transcriptionists could have a PC at home, and be on call for emergency transcription needs. When the on-call transcriptionist gets an emergency call, he or she could download the voice dictation via a high-speed modem, type the report, and upload it via modem.

Even if we were to accept a certain delay in the transcription of Emergency Department charts, and expand the

*Emergency Department to account for the delay in moving patients, a quality assurance issue will arise. Time to discharge of Emergency Department patients is one of the most critical factors for patient satisfaction. (If you go to the Emergency Department for a badly sprained ankle, and you're all ready to go home at 1· AM, do **you** want to wait until 2· AM for the chart to be typed?)*