Request For Proposal from Health Care Incorporated for a Scale-Able Physician Data Entry Electronic Medical Record Enterprise Wide System

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The Masters’ RFP
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Built with a team including:
Physicians, Computer Systems Analysts, Laboratory Science Specialists,
Process Flow Management Team, Quality Initiative Team.
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Offer and Acceptance

Having read the RFP document

________________________________________
Name of Company Accepting

understands the project and will accept the job if selected.

Attached is a copy of our intent and what we can offer to assist HCI in accomplishing their goal.

________________________________________
President / Project Director
Request For Proposal:

INTRODUCTION

Overview of INDUSTRY DEVELOPMENTS Within E.M.R.
Physician Data Entry Electronic Medical Records

INTRODUCTION

Since the 1960’s, throughout the world, efforts to introduce Physician Data Entry Electronic Medical Records (PDE-EMR) has been attempted with little success. PDE-EMR is not just EMR (Electronic Medical Records), specifically it is a situation in which the physician themselves actually interacts with the computer and personally builds a patient record. Though it has been said as of 2004 that around 13% of the physicians in the US are using EMR, the implementations are not PDE-EMR. Additionally, the EMR implementation have not increased the physician efficiency, cut physician-patient encounter time, nor allowed for continuity with medical information. A major impediment within computerization of health care has been the non-standard information formats creating incompatible computer systems. In other words, this necessitates health care computer users to enter the same information in many different places over and over again, with resultant and imbedded “work arounds,” inefficiencies, time wasters and continuous costly interactions.

To date, health care computerization has been focused on medical billing and immediate needs of hospital administration. Unfortunately, the front line patient care professionals and support staff have ended up paying for it with increased paper work and other duties that have taken them away from their real job of patient care. Over all, the costs of health care have increased, the physicians are seeing less patients per hour yet spending less time with their patients, and getting less patient satisfaction. While health care administration and medical billing is getting computerization for their needs, the needs of the patient and the front line care givers suffers.

In systems analysts' terminology, these efforts are considered failures. Yet, these health care groups are claiming great success. Less time with the patient, less patients per hour, more work for the front line staff, more actual dollar costs, and they say this is a success? When studying computer system implementation one will read about the many failures through time, and how the project leaders were fired when the failed project became apparent. Today, the day of self orientation, people have learned to take failures and turn them into successes, by ignoring the main efforts and focusing on the side effort, the reports that the administrator gets, the billing forms, and many other things that really do nothing to advance the actual job of patient care. With so many administrators out of touch with their staff, as long as they get their report or paper work and it is less work for them, then they can see how the project is a success. It is disgraceful that the health care industry has fallen into this pit of costly, ineffective and inefficient computerization, for the patient is the one that is suffering while a few people are taking their wheel barrows of cash back to their bank. We are not interested in comforting our egos with lies and deceit, we are looking for functional results at the point of care. That is the bottom line.

This project is seeking positive results. We will not be able to define everything we need because we are not sure of what we need. We cannot request a set of specification sheets for engineers to code the software for a completed product, because we know that we will be changing our minds as our users begin to fully understand the technology and how they will be
using it. As we start to understand the computer tools that we need there is no doubt that our needs will become clearer and clearer with time. We will most likely scrap some of the previous work, but there will be no loss, as it will take these failures to get to the success. Big health information systems companies making millions per year in pushing their hospital financial systems, with their order entry systems and the continued add ons that just up the cost and result in more work by the front line team is unacceptable. We have seen the “big boys” tell us on how we need to follow the pyramid plan, with financial software at the bottom, then order entry software, then patient education handouts, then prescription software and then at the very top we can go ahead and plan on getting the physician data entry electronic medical record. This is just plain self oriented and self serving one’s agenda for making more and more money at the expense of patient morbidity and mortality. This misinformation that the health care community has accepted is due to the basic lack of education and knowledge within systems analysis and data base management within the health care community. As a result, the actual cost of computer systems is in a fog. We ask the big hospitals to tell us, how much they spent on their computer system and how much did they save on doing the job. No one wants to talk about how their physicians used to see 6 patients per hour with high patient satisfaction and now if their physicians can see 3 patients per hour. Unfortunately the patient satisfaction is down and an honest appraisal points directly to the computer system as slow down.

We did our own research and found a story that has never been told. We had listened to the big HIS companies for years, and it turns out that their goal is to sell their product, it is not to develop a product for better patient care. In our research we studied other industries that have computerized successfully with tremendous cost cuts, with incredible increases in efficiency, quality and effectiveness. The health care industry has been snookered, and because of our lack of education within the computer field, we fell for it hook, line and sinker. It is time that we health care givers take the reins and solve the problem, for with the billions of dollars invested into the computer systems developed by the big HIS companies, there is no way that they could afford to change paths. They have shown their cards, their path is not the way of quality patient care, patient efficiency, cost savings and best practices. Our path is, and that is the direction in which we will be going.

One thing we learned from looking at the successful computerization of other industries was their effort to computerize the existing system. Find the common denominator, and that’s the system. As a system, health care revolves around the physician-patient encounter. As the hub of health care system wheel, the physician patient encounter is the common denominator. The big HIS systems focused on money and the needs of hospital administration. As a result, huge complicated computer systems were built that are foreign to the actual health care system of patient care and patient well-ness. In their efforts to push this foreign and costly model upon health care, coding systems were developed to “make things easier.” But it didn’t, the efforts have just continued to pile on costly layer after costly layer after costly layer, ending up with more and more work for the front line patient care staff.

The health care system revolves around the physician-patient encounter, it is as simple as that. With this approach of computerizing the physician patient encounter, all actions, all costs, all
supplies, all medicines, all procedures, etc., is captured. That is the health care system and that is what needs to be computerized, and it needed to be computerized first!

The success criteria for this project will be in terms of function. Monthly meetings will review previous goals and results. Payment will be stable and monthly. Milestones at first may not be met with timeliness, however, with time we hope that project goals can be determined and meet.

**OUR SUCCESS CRITERIA**

a. Decrease support staff per physician,
b. Decrease the physician-patient encounter time,
c. Increase the number of patients seen per hour,
d. Improve the quality of medical care,
e. Allow for a method of measuring quality of medical care,
f. Allow for medical note data to interface with order entry, billing, consultation, comprehensive ancillary services forms processing and supply management,
g. Introduce foresighted data collection pathways and guidelines which will result standardization within the process and in turn unique and customized care for each individual patient.
h. The medical note engine must be a create a note style, which will utilize the foresighted process flow guideline data selection from a set of medical data dictionaries that will be used for building quick and readable medical notes, that read like a story.
i. The medical note engine must enable a physician to create unique medical notes at approximately 30-60 seconds per page, no matter what the scenario.
j. The information within the data dictionaries that will be selected by the physician at the point of care must be pre-validated and linked to all forms processing, for support personnel activities even down to housekeeping and maintenance, and for all accounting and cost collection actions.
l. Allow for the patient medical record data base to have a meta layer, so that ad hoc changes can be implemented as needed with minimal effort.
m. The patient medical record needs to have structure, which will include the 12 categories that we have identified and described in the Data section, for prospective and retrospective complete medical record analysis is
n. Develop other support programs for scheduling, staff work, maintenance, and other support tasks that will be identified during this project.

**DISCUSSION**

Though it would be great to be able to describe what we want in detail, it is very difficult because this is pioneering technology. The previous efforts by the big HIS companies have muddied the waters and put us in a rut toward failure. What we can do, we will. However to better illustrate our position we will discuss a number of the failures that have previously occurred so that the team will avoid these paths.
One famous failure involved FHP, a staff model HMO out of California. The effort was to purchase EPIC, a PDE-EMR in development. The Epic sales team pitched a winning story and FHP came up with the necessary millions of dollars to get the project started. FHP’s project leader and champion was a dentist who really liked computers. He had spent his weekends interacting with them and in the eyes of FHP, he was their expert. With weekend computer interaction of his own design, the dentist felt qualified, he knew more about computers than anyone in FHP. FHP had no computer engineers on staff, no electrical engineers on staff and no systems analyst on staff. When there is no competition, any knowledge is better than none. While the project milestones were not being met, excuses were made and as is common for people that have no formal training in systems analysis. There were no PERT charts, no checks and balances, and it always seems like success is just around the corner. With mental commitment and visions of grandeur, the project leader made more and more funding requests. Success was just one more funding request away. It wasn’t long there after that FHP went under. This left tens of thousands of patients abandoned.

We are not interested in instant experts. We expect our consultants to be well educated on the technology. If our staff has an interest in computers, they will be allowed to “tag along,” but we want to make sure that our hired consultants identify inappropriate behavior and inexperience, which can result in costly mistakes.

In the 1980s, HCFA (Health Care Financing Administration) introduced the HCFA 1500 continuous computer printer form. The HCFA Computer Committee included another example of a group of physicians and health care staff that "liked computers," and "wanted to learn more about them." This HCFA form was discussed, designed, and agreed upon, by a committee of instant experts with a resultant HCFA 1500 form designed at 7.2 lines per inch. Common and contemporary computer printers printed at either 6 lines per inch or 8 lines per inch. At that time there was no printer that printed at 7.2 lines per inch. Now, what does one do with form designed for 7.2 line per inch when the available hardware prints at 6 lines per inch or 8 lines per inch? That is a good question. Numerous computer programmers worked on the same problem across the country in an effort to get those letters to type on the lines of that form and all to no avail. It cost the industry tens of millions in efforts to try to get a computer program to put the printed words on the form correctly, yet it could never be done. An example of designing a square peg for a round hole. When the committee was asked about this blunder, the answer was “Oh, I didn’t know.”

We are not interested in instant experts designing anything that can have any potential cost repercussions. Designs made by instant experts need to be verified by real experts.

Oceania was a consulting group out of California created to help a large staff model HMO to build and implement a PDE-EMR. Two serious errors occurred in their product development, first was choosing the Next computer hardware platform, because the hardware failed in acceptance within the industry and secondly, the HMO supplied physicians for ideas on software development were physicians with no training in systems analysis nor computer programming. The consultants did not develop any training courses for the physicians that had been selected
and thus, it was more or less an amateur computer users club, as in the FHP situation. Instead of looking at the goal of quality patient care and speed of data entry, they focused on minute details and peripheral tangents. Though a data dictionary was brought up by the engineering consultants as a solution, the physicians insisted upon SNO-MED as the dictionary to use. SNO-MED was originally developed as a data base for pathology and histology uses within health care. Then, it was decided to make some patches to take if from a data base on autopsies and tissue specimen to a computer medical dictionary. The old adage of “never patch bad code, rewrite,” apparently had not been considered. To date, SNO-MED has been used in a number of attempts at PDE-EMR, all of which had failed. The output of SNO-MED dictionary data did not read like an interesting story, but instead reads very cryptic and more oriented for autopsy and tissue specimen microscopy reports. The origins of SNO-MED are from a pathology association which can be deduced from the dictionary elements.

On the east coast, the National Library of Medicine developed the UMLS (Unified Medical Language Set), a data dictionary with the similar problems of SNO-MED with the cryptic output and the inability to make it read like a story and to bring out the human aspect of medicine which is essential in delivering excellence within health care. Yet some of the features of structured data and pre-validated records were excellent innovations. However, with unreadable reports with software requirements resulting in difficult and bulky interactions these data dictionaries will never allow for in a vigorous and robust front line patient care environment.

The lesson here is that we do want a dictionary but we need a dictionary that allows for colorful descriptive physician - patient interactions, that read well and with interest.

Products that use templates designs predisposes each and every patient to have the same medical note. The information is useless in the research arena, because every note reads the same. An example would be a situation where on the screen the user selects “Normal Nose exam,” and into the medical note goes “The nose has patent nares, no sign of polyps, no epistaxis, no boggyness to the turbinates, no noted lesions, and it is patent for airflow.” Then when a physician later looks at numerous patients, each and every patient has the same sentence under the nose subcategory. Patients are not all the same, this type of situation where the user can select normal and then a whole sentence pops into the medical note, sets up a legal malpractice and fraud situation. If a quality assurance committee or a legal malpractice attorney starts reading multiple medical notes from a single physician and every medical note reads the same with the exact same words and sentences, yet the notes are from different patients, it will cross their mind that possibly the physician did not look at the patient. There are similarities among people, but there are also many differences. Software products that allow for physicians to select one button to get a complete section filled out or a complete page filled out, sets up an easy situation where the physician could be putting information into the note that was not collected and/or false. These are called the “fraudulent normals.” Any PDE-EMR product that uses this model of a single click or action and a complete note is done is predisposing one for fraud and potential malpractice. If the malpractice attorneys get smart, they will start requesting medical notes of multiple patients from the same physician and when they start seeing the exact same sentences for each patient, it won’t take long before they find a lie.
Templates would be better called “Fraud-plates.” We are not interested in fraud or saying the same thing on every patient. Now, we have no aversion to allowing the physician to build their notes quickly, but we have no interest in creating medical notes with lies just because it is quick.

The voice to text products had a few proponents and many viewed this idea with promise. The problem with voice to text has been speed, and we believe that with time, this speed problem will be overcome. However, the problem that we see with voice to text is the same problem we see with dictation, and that is the disjointed rambling on. Dictated notes are not structured, they are end documents to be printed and forgotten. Our goal is to have structured data that is pre-validated and pre-linked to all communications, accounting and forms processing. Dictation is merely a stepping stone, he helps in someways, but the cost of staff and managing are high. With voice to text, some of the transcription team can be eliminated, yet still it is just a stepping stone and does not solve the problem of structured data nor process linked data. Using voice to text in a command since makes sense, but hand-eye coordination and data entry methods have been proven to be up to ten times the speed of voice to text, and when selecting from a dictionary, the information can be validated and linked which is essential to our model.

Being able to use the physician-patient encounter information for all of the tasks around the health care environment is the big picture. There is no aversion of voice to text or voice commands, but if it slows the process down, what is the value?

Liking computers is great but it is no substitute for formal training in computer programming or systems analysis. For the most part, college trained computer engineers with bachelor degrees have not been needed within the health care industry. There just isn’t enough work for them to justify the $80,000.00 or more annual salary. Thus, technicians with on the job training or two year associate degrees have been the main stay of computer staff within the health care industry. With no real well trained systems analysts or computer engineers on staff, the door has been open when computer projects open up within health care establishment. With a hospital committee assigned to a project, a person with a mere interest may be selected to be a major player since they are the most knowledgeable within the group. Even though they may be a rank amateur, when discussing the subject with others that know nothing, this amateur may appear to be an expert. Liking computers is great, however it does not make one a systems analyst nor a computer engineer. A physician that learns how to program computers on their own has as much value as a computer engineer that learns to be a doctor during their spare time. Computer engineering and systems analysis are very complicated subjects and spending weekends writing basic programs, using word processors, using a spread sheet and/or making web pages can give one some very impressive results to the individual, but by no means is this equivalent to being a systems analyst. If a computer engineer was out camping and one of the group fell and broke their forearm, the engineer then took an ace wrap and some strong sticks and splinted the fracture, would this make that engineer a physician? Hardly.

We have no plans on taking a radiologist that entertains themself on the weekend with computers and putting them into a major design role or project chairman role for our primary care clinics. This would be foolish, and we know it. The consulting firm will need to find some of our front
line physicians and train them in understanding some of the computer programming ideas and some of the systems analysis ideas so that the team can extract the real needs of the physician - patient front line environment and in turn focus on our goals of building a tool for physicians that helps the physician to work toward excellence along with cutting costs and increasing efficiency.

We have seen health care computer system firms patronize physicians from the mother company in an effort “to get the money.” We do not want this type of arrangement.

We have visited HMOs that have told us that their “EMR” is a success, yet when we go there, no one is using it. When we go there, the physicians are seeing less patients than they did before. When we go there the physicians are spending more time on the computer than seeing the patient. This is not a success, this is a failure. Looking at these health care companies and seeing these installations of failures and having them calling it a success is a big lie, and we do not want to fall into this emotional commitment where we have to lie to ourselves and call a failure a success. Successful computer systems increase production, they are time savers, they allow one to determine costs per action, they cut costs, they will allow us to give better medical service faster and more efficient and they will allow us to observe our actions and use it to determine best care and best therapy options through time.

When a computer system is installed into a health care company with the result being an increase in costs, an increase in staff, a decrease in efficiency, and a slowing of the point of care process, this by definition is a failure. For this reason, our goals of success are going to be in terms of function.

At this time within the USA, there is a very popular computer system that is a complete failure in the walk in medical services environment and that is the Cardinal Health Pixis system. It is called successful by many yet in reality, it is a serious life threatening failure. Most health care administrators do not even know that it exists, because it is a front line patient care problem and today, health care administrators have little interest in the actual front line job of patient care. In walk in medical care clinics such as urgent cares, emergency departments and the like pixis machines hooked to the computer system for medicine keeping track of. The pixis machine is a computerized lock drawer cabinet. A nurse or physician signs on to the pixis for every encounter and then finds the patient on the system through a complicated screen design, and then the user selects the medicines by organization of the programmer and not by the user or physicians, with another complicated and unnatural screen interaction. The GUI design and the software flow create a lengthy interaction, not uncommon to have to spend even up to 15 minutes, in order to get the medicine needed for the patient. In talking with the company they claim that the user can interact with the machine in seconds. The pharmacy at the hospitals say that the user interact with the pixis and get the medicines out in less than a minute. The users say that it typically takes them around 3-6 minutes per interaction and when the finger print identifier gets bad it typically takes around 15 minutes to get a medicine. Here is another case where the company lies and the pharmacy staff who stock and maintain the machine believe the company lies. Yet the users, the people that actually have to use the machine have a completely different story, a story of difficult use and lengthy interactions. Why does the pharmacy department not know the
truth? Numerous patients have suffered due to the pixis machines bad design in process flow and graphic user interface. The pixis machine user most likely has so much invested in the pixis machine that he cannot assess the product factually and in reality. There has been many whom have said that patients have died due to the inability of the staff to get the medicine out of the pixis machine on time. This is a death that could easily have been prevented, because the company lied about its true functionality, the purchaser pharmacy department lied about the true functionality. Finally, the front line users, those that actually use the product have learned that if they tell the truth they end up losing their job.

In terms of excellence within patient care the pixis machine is a complete failure. Though a different design and different user interface and process may allow this machine to be a success, it is not a success now. We do not want our patients to suffer or to die because of big company lies and the lies of administrators that never use the product. We want to know the facts from the users and we want the consulting team to discover methods and models that will allow the administration to know the real facts of front line patient care. Our bottom line is excellence with patient care.

The following are two examples of how the health care company felt the need to have the project clearly defined in specification sheets. We have read many examples of how the product built meets the specifications to a “T,” but it doesn’t work. Function is everything, it has to do the job. We may end up having to build and rebuild, but we realize that and will take that in to consideration.

On July 3, 2003, the Detroit Free Press wrote a long article on how the Detroit Medical Center contracted Caretech Solutions, Inc and Compuware, Corp to build a PDE-EMR. So, DMC along with CSI and CC built a specifications document so that their project would be well defined and DMC would be a success in the PDE-EMR effort that has never been solved. However, the specification document was built for tried and true technology, again, the people involved with project management were self proclaimed experts, physicians that "liked computers," administrators that "thought they could be doctors," and engineers that "followed the specifications to a 'T'." This project is untried, this project is new and experimental technology. We know what we want, we just do not know how to explain it. We cannot put it down in specifications, and we need an engineering group that knows this and knows that we are looking to succeed and that the specifications that we have today, will most likely change until the function is correct. The function is what is important, not the specification sheet.

Though not talked about now, in the late 1980's and early 1990's Harvard health care systems was going the be the winner and the solution with PDE-EMR. Interpractice Systems was hired for millions of dollars. Needless to say, not only was it a flop, but many people lost their jobs and their reputations due to believing that they understood the problem and the solution but they did not and in a big way.

The blind leading the blind scenario has been played out many times, yet it continues to be a problem within health care again and again. We will not set up our consulting firm with an
In the late 1990's, Presbyterian Health Care Systems out of Albuquerque, New Mexico hired a Pediatrician to be their new Physician Information Systems Medical Director. This Pediatrician was retiring, he had served Presbyterian well over his 30 plus years. Since he was well known within the Hospital Board of Directors, he let it be known that he was looking to get this Physician Information Systems Medical Director position. Though he never had used a computer, he thought that this would be a good opportunity to learn about computers. Once hired, it became very clear that he was in way over his head. The information systems staff, remember most hospital information systems staff members are not college educated computer engineers, at best one or two of them may have a two year degree in computer technician work while the department head may have a degree in business. The rumors about the incompetency of this new physician director spread overnight, though common knowledge throughout the community, the Presbyterian administration never heard a word. Unfortunately, his ego would not permit him to back down, so he got the board to agree to hire a consultant for $2500 per day for 30 days. At the end of 30 work days and $75,000.00 plus expenses later. Dr Stanne (not real name) accepted that there was no real product available for PDE-EMR, but the consultant out of Utah told him that they could obtain the IHS (Indian Health Service) computer system for free, as it was a government system and it was public domain. This sounded great. So, Dr Stanne arranged to get this free system. They first of all needed to get a DEC VAX, because they didn't have one. Plus work stations, and paper and more and more and more. This free system that ended up printing out a single sheet with the patient temperature, blood pressure, pulse rate, and weight ended up costing around $35,000.00 per month. The project was a complete failure. As time went on, the $2500.00 per day consultant was a physician whom had worked for IHS for many years. After retiring, he was hired by a medical computer consulting firm to try to get jobs within IHS. This consultant and Dr Stanne had a lot in common, neither of them knew anything about computers prior to entering their present job. In this case, both people, the pediatrician and the health care computer consultant were put into jobs that were beyond their skill level. Though the staff around them ridiculed them behind their backs, the administration on both sides were giving their “old trusted friends” professional favors which resulted in some heavy costs and poor reputation.

With long discussions of our initial research and systems analysis of our health care system, we found that successful computerization of any company will revolve around the industry system. The health care industry revolves around the physician - patient encounter. All actions, costs, forms, billings, accounting, and everything revolves around the physician - patient encounter. The big health care information companies set up computer financial systems that worked in a different system, in a different model and these ideas were pushed upon the health care industry and accepted because the health care industry had no knowledge of computer systems and how to apply them to their work. Once established with billions of dollars in annual profits, these large and power HIS computer companies have too much at stake to let the truth be known. While many industries have used computers to improve efficiency, cut costs, cut staff and to make products of excellence, health care has been deceived into paying large amounts of money for computer systems that increase costs, that increase staff, that decrease patient satisfaction and
over all push the health care industry into a system of mediocrity.

One of the famous lies that is finally being surfaced is the HIS (Health Information System) Pyramid of computer development. What is amazing is how many people believe it. The pyramid of health care computing has been pushed by the big health care computing firms in an effort to keep the money flowing, to push their products and to keep health care mediocre indefinitely. For when a real systems analyst evaluates health care, the big HIS firms will be out. Their first lie or should we say statement is “Start with a financial system, then an order entry system and then at the top, that small area left, that is the EMR.”

When we initially hired a top systems analyst to go over our health care system we were presented with a model in which everything revolves around the physician-patient encounter. How can this be we asked, that is not at all what the big HIS vendors have been telling us, in fact they have been telling us the opposite. We didn’t believe it so we hired another systems analyst of even higher caliber and lo and behold they told us the same thing which is to design your computer system around the existing system, around the common denominator. Within our system, the common denominator is the physician-patient encounter. When confronting these systems analysts of the “pyramid of health care computer development,” the same answer was repeated, what would you do if you had millions or even billions of dollars tied up into a company that approached the problem incorrectly? What would you do if you owned a large kerosene lamp company and someone invented the electric light bulb? It’s obvious, just keep pushing the myth in order to keep your business afloat. The “Pyramid of Health Care Technology” statement comes from the HIS system manufacturers and has been presented at conferences in hopes of keeping their “kerosene lamp” businesses afloat. The health care industry has spent trillions of dollars on computer systems since the 1970s, and still nothing works. To this day there is no formula to determine the value of computers within the health care system. The approach has failed and we for one are tired of paying more and more money for less and less function and the solution is never solved. There is no doubt the common denominator is the physician-patient encounter, and that needs to be programmed first for that will be where the solution come from.

Another failure which continues to crop up is from light weight programmers. Programmers that are not well trained yet, because the administration does not know what defines a good programmer they are unable to differentiate them at job offering. A typical example is have a Graphics User Interface design with both keyboard and mouse interaction. A well seasoned programmer knows that the environment needs to be a mouse/pen interaction or a keyboard interaction, not both, for it just slows the user down too much. This problem has been presented so often that it is being used in GUI design texts, mouse or keyboard not both. A prime example can be seen on the internet when filling out a form. The programmer designed the form so that the user types in everything until they come to where they put in their State. At this point the programmer has a list of States. The user is supposed to get off the keyboard, find the mouse, move the mouse over to scroll, and click to scroll. Then when they come to their State, they click on it, go over to the next box, click for position, and return to typing. This was a waste time. A poor design due to inadequate training. Another common and frustrating example from internet
forms is forcing the user to use the “TAB” key as a Carriage Return key. It is just as easy to use a “Carriage Return” key to go to the next box as it is the “TAB.” MicroSoft started the “TAB” key to do the function of a Carriage Return key, but without good reason. It makes no sense. People across the world continue to press the Carriage Return key and then the internet program gets lost in a tangent instead of just going to the next line. For 40 years the carriage return key has been important in ending a sentence or a data field. This is so simple and so easy for even the most basic of programmers to implement. For someone to not consider this clearly puts them into the “light weight programmer” class. These examples demonstrate inconsistency of thought and lack of concern for the user. Light weight programmers fail to understand that the user is the one that has importance not themselves.

THINGS WE ARE LOOKING FOR IN SUCCESS

We are not interested in feeling good about making poor decisions or in covering up failure with pretty wrapping paper so that our egos will not get hurt. We are interested in success by demonstration functional efficiency, cost cutting and improvement of quality of our health care service. We realize that the specifications sheet may be redrawn numerous times, but as long as the milestones are being met, then the consultants are doing their job even if changes and added costs occur. We do not want to lie to ourselves, nor do we want consults that are focused on meeting specification sheets, just to end up with another EMR that meets all of the specifications but fails to do the job. As the vast majority of EMRs at this time fall into that category, we want to start from scratch. The money and effort that we have already spent on our existing Information System has not been a solution. The other big time HIS vendors are just pushing the same model, and to date, this model will break us financially if we continue down that path. The HIS are failures, but with so much money invested, it is to difficult for health care companies to change, to get out, to make the break, to openly say, “this was the wrong path and we need to go a different way.”

Our goals will be in functionality, not a specification sheet. This is pioneering technology, we know what we want in a functional sense but in a technological specification sense, we do not know what we want.

Our milestones will be upon the progress within point of care functionality, and as long as progress is occurring, then we will continue to keep the project going. The present manila folder chart holds paper from many different areas. The manila chart is disorganized by its very nature. In order to review one patient encounter, it is not uncommon for a reviewer to take 10 minutes and still not really understand what went on. Medical charts need to read like stories. Being a professional document, having industry terminology is expected, however, any educated person should be able to go through a patient visit and have a general idea of what the problem was and how the encounter occurred. At this time, this can rarely be done. We definitely want a solution for the manila folder chart. We want it changed into a digital chart.

We would like to end up with digital data (though there may be some image data). We need data that can be searched, sorted and analyzed. We want information that we can use and can be
searched and sorted by computer. Scanning in documents may save space, but it sure does not save time nor money. Plus it does not solve the problem of computer recognition of essential and life threatening information. We need our information to be digital.

Not everyone has failed in this effort and our own in-house systems analysis has found one very promising concept. Though the company and its effort has been abandoned, the idea is sound. Also, a small company, (Armus Corp) has taken on this model and has developed a non-working prototype.

It is undeniably clear that the data dictionary model is the solution. Additionally, the starting points or entry points need to be top down or foresighted protocols or guidelines that take the health care professional through a well defined process. W.E.Deming identified process flow management as a solution tool for the manufacturing industry, and our own team has come to believe that this top down process flow management within the service oriented industry is the solution for best health care practices and health care of excellence. We know that the large HIS firms will deny this and bitterly oppose it, and their reasons are clear, it will eliminate them from the industry. The large HIS companies are the problem. It is because of them that the cost of health care is rising, the efficiency within health care is decreasing and the industry of health care has serious and pathological management problems.

A very interesting article in Health Management Technology in May of 1999, gave a very interesting scenario. Mr Dale Symes was the administrator of a 20 physician orthopaedic group out of New Mexico. Though it took over a year of effort, Mr Symes implemented a PDE-EMR from a small company that pushed foresighted process flow management along with data dictionary technology. The implementation appears to be the most innovative and modern approach to the PDE-EMR problem. In limited discussions, the idea was a true computer implementation idea instead of a paper system that was then transferred to a computer. Implementation documented a physician support staff decrease from 3 to 1 or 2. Physicians were increasing their patient volumes per day from 2 to 8 patients. The use of the data dictionary allowed for a defined standard of care that could be measured. With the data dictionary information already pre-validated it could be put right into the medical bill. Each and every form that was needed for every situation was generated from the physicians's effort such as work excuse form, hospital order sheets, physical therapy request forms, prescriptions, consultations, faxing, Work comp forms, revisit forms and many more. The physicians were creating their medical notes that were very readable and unique for each patient at the rate of 30-60 seconds per page, with the other forms being produced with no additional time. Mr Symes, the administrator was also doing research analysis with true medical note data, and it ended up making some excellent economic decisions to the benefit of the medical group, directly from their own medical note information.

At this time the company that created this PDE-EMR abandoned its efforts due lack of financial resources for continued development and maintenance. Though the company is not around, they did publish a number of papers about their model and they gave their model a name, the Foresighted Practice Guideline Model. This idea has merit and we would like to pursue efforts
in this top down foresighted concept that models Deming’s process flow model. Armus Corporation has developed a prototype but at this time cannot commit to a complete enterprise wide system, but are willing to put forth their development.

CONCLUSION

We cannot stress enough, that this is not a standard RFP for tried and true technology. We at HCI are looking for new and pioneering technology that has yet to be developed. We need a dynamic team that already has the technical expertise and is willing to discover new ideas and to put them into functional software for health care.

We need engineers that will not always be working from a specification sheet, but from the front lines of the physician-patient encounter. Our specifications will be oriented around functionality, not around specifics in terms of hardware or software. We realize that this is not the standard approach used within development, however, we are not looking for tried and true methods, we are looking for pioneering concepts that will most likely create a paradigm shift within the health care computer systems and when done, the present big time players may not even be at the table. Armus Corporation out of Burlingame, California has been working on the process flow engine as a part time project with no funding. We would like the consulting team to look at their alpha product to see the present state of events. Below is a paper from the Armus Corporation discussing the Foresighted Practice Guideline Model which has caught our interest.
The Clinical Foresighted Practice Guideline Model.
Armus Corporation, April 2001 (Printed by permission).

INTRODUCTION
The Clinical Foresighted Practice Guideline Model (FPG) is a process flow and activity based costing model. We will call the Clinical Foresighted Practice Guideline Model FPG for short. The FPGs is based upon the concepts and structures of W.E.Deming, a well known quality expert. The FPG model has the potential to do for medicine what Deming’s model did for the manufacturing industry. The FPG model allows medicine to be defined as a process along with allowing for all activities to be linked to all costs and actions. Though this is not a new idea, it is a new idea for medicine. The concept is a real computer model, and not a paper model running on a computer. The FPG concept is similar in concept to Fourier’s mathematical concepts that resulted in the ability to take data points and analyze them through Fourier transform to make images. Though Fourier discovered the concept in the 1800's it wasn’t until the advent of high speed computing power that allowed for demonstration of the idea in practical application with CT Scanners and MRI Scanners. Like the Fourier model, the FPG model needs a computer for the idea to be functional and practical.

The quality and value of medicine and medical care has been developed through the years more by the third party payers than by the health care professionals. As a result, the ideas at the value of medical care and the understanding of the processes of medical care have been from trying to understand the billing process instead of trying to understand the patient care process.

Physicians and nurses have always put patient care above all else. Unfortunately, that attitude has left the health care professionals in a place where their reimbursement is decreasing. Additionally, the major liability on health care revolves “Failure to Diagnose,” yet, after reading this paper it will become very clear that even under the best of conditions, the actual diagnosis of a patient at any one point in time can only be a probability. So, how has the legal community set up a situation in which the physician will fail nearly all of the time, and how has the physician allowed this trap and fallacy to continue on within our society and still not do anything about it.

How could they let this happen to them?

THE PROGRESSION OF HEALTHCARE.
Lets look at the progression of medicine in terms of definition, quality and value in order to understand just how it did happen.

For most of time, people have accepted physicians and their work without question. With the advent of third party payers, the third party payers felt the need for better definition of what the physicians did so that the payments or the value could be established. As the third party payers took in dollars to act as payment administrators to physicians, initially there was no challenge at all. What ever the physician charged the third party paid without question. Through time, data was collected on physician and hospital billing. The results being that the third party payers impressed the requirement for diagnoses codes and procedure codes to be available with every
bill. This then set up the value to associated with the codes for diagnoses, procedures, supplies and room usage. With more time, the requirement to match the procedures, supplies, and room usage with one or more diagnoses became required.

The industry developed the “Super Bill.” The “Super Bill” is a piece of paper with the diagnoses, the procedures, the supplies, and the room usage with their corresponding code numbers. For many years, the “Super Bill” was used alone and sent in to the third party payers as the bill. To this day, the “Super Bill” is still used as an intermediate form. WHY? Because it works.

HCFA (Health Care Financing Administration) changed or better put, added more steps to the process by introducing their own rules and their own forms. HCFA built their own forms for the industry and through time, they forced the medical industry to comply to their forms or face a stiff fine. The main forms are the HCFA 1500 form for physician billing and the UB82 form for health care facility billing.

The initial HCFA 1500 form was a preprinted form requiring handwritten input. However, some did type on the lines. As computers became popular for printing out the super bill, HCFA had their first attempt at a preprinted continuous feed HCFA 1500 form. This form happened to be designed as a 7.2 lines per inch form. Though the only computer printers that were available at the time printed 6 or 8 lines per inch, in the author’s discussion with the committee that created the HCFA 1500 form, one physician committee member replied with the clear and understandable reason for this blunder, ‘I didn’t know anything about computers and I thought being on this HCFA committee would help me to understand computers much better.”

With continued blunders by the controlling forces, physicians have been to busy trying to keep their businesses running at incredible extra expense for these continued extra steps and processes that keep getting added on in terms of forms, paperwork and regulations besides the effort to give excellent quality medical care and to keep up with all of the new medical advances.

WHAT EXACTLY IS THE PROBLEM?
The problem is a process problem. This concept has been discussed and dealt with within the manufacturing industry worldwide. Deming and many other quality experts have discussed this problem and have worked out solutions within the manufacturing industry. The health care industry knows that they need to bring the solution into the point of care, the problem has been how to do it. The answer is the Clinical Foresighted Practice Guideline Model (FPG). This is what the FPG model does, it allows for solutions to be brought into the point of care, with little to no change within the health care professional - patient encounter process.

With the continued advent of extra forms, processes and work being placed upon the health care professionals, the FPG model allows for these extra things to be placed upon the work load as links to existing data. When one actually takes a look at the health care process at the point of care, they soon realize that the health care professionals are doing everything they can to do give excellent quality medical care to the patients in individualized and conscientious medical care.
The FPG model allows for these additional forms and necessary proof to be printed out for the world to see with no extra work by the health care professional or the administrative staff. It allows the physicians to practice medicine, nurses to practice nursing and paramedics to be excellent first responders without having to worry about what forms need to be produced this week.

**HOW DOES THIS PROBLEM KEEP COMING UP.**

The problem is that medicine has been defined by the third party payers, the patients, the government, and the paper documents, all in a hind sighted manner. Yet medicine is practiced by physicians in a foresighted manner. This is how the term the Clinical Foresighted Practice Guideline Model came to be. Medicine needs to be defined as a process. This will allow for the best outcomes to occur for all.

Experts within the government agencies, medicine, the medical insurance agency all look at medicine hind sightedly. For example, there is this overwhelming belief that a physician can see a patient and come to the diagnosis instantly and then know the therapy instantly. If the physician does not have the ability to do this, then the physician is incompetent. The belief that one can define medicine by the concept of “this is the diagnosis and this is the therapy” is overwhelmingly popular, yet very, very far from reality. Physicians practice medicine foresightedly and this is where the confusion lies. In this simple systems analysis model of a foresighted process versus a hind sighted analysis.

With the initial paper on Clinical Practice Guidelines that came out of the Institute of Medicine, there was no mention of this basic concept of foresighted process versus hind sighted analysis. Why? Good question, and we are all waiting for a good answer. Not mentioning this very simple system analysis concept reveals a serious blunder within the core text of the IOM Clinical Practice Guideline Paper has cost the industry billions of dollars in wasted efforts. This blunder illustrates the importance of having people involved with initial papers involving systems analysis to be well versed in the necessary concepts and the concept applications within real life practices. With a system analysis view of the recent paper by the IOM on medical errors, more blunders are exposed by the authors of the IOM paper than by the system they are talking about. This too is a process problem which can be solved very easily by implementation of the FPG model on a larger scale.

**MEDICINE AS A PROCESS**

Medicine is a process. A physician sees a patient, interviews the patient and quickly puts that patient into a category, a ball park, a playing field. This ball park can be labeled as the symptoms that the patient has or as a medical system or as a medical exam. For example, if a patient complains of “Chest pain,” the physician puts them into a ball park called “Chest Pain.” The “Chest Pain” ball park typically takes the physician down a path that is within the physician’s mind. The FPG model allows this ball park and path to be written down, explained and audited not only in process but also in terms of activity based costing. The path is designed for work efficiency and quality of care. The path is typically static yet voluminous (Version 3 of the FPG model allows for dynamic paths). The path is a list of sub themes in a specific order...
that fall under “Chest Pain” that allow for complete descriptions of all of the situations of which the patient could get a “Chest Pain” problem. In the Emergency Medicine FPG called Chest Pain, there is 82 sub themes. These sub themes are placed in the actual order of they process flow on how physicians within the Emergency Room setting collect patient health care information, order ancillary services, request therapies, do clinical decision making, determine a diagnosis or diagnoses, and select a patient disposition. Each of these sub themes may have from 50 to 1000 different options (such as words, phrases, orders, supplies, diagnoses, procedures, links, forms, costs, etc) that will describe the individual patient in attendance. You see, though each patient is unique, the task of the physician is to describe the patient condition into a pattern. For, if the physician can describe the patient condition into a pattern, hopefully this can lead to a diagnosis and to a possible cure or symptomatic relief. Unique information has no value in treating the patient. Though unique information may be colorful and interesting, it is the information that makes the medical pathological patterns that are used within clinical decision making.

Medical information used to describe patients’ conditions is voluminous, however, it is not infinite. The author has found that he needs around 17,000 pieces of information per patient exam, and around 80 different exams to do his entire job as a physician. Though there is overlap within this information, each physician typically needs to know how to use around 1 million pieces of information in today’s medical environment. The FPG allows a method for organizing this information into workable packets that can be organized within exams, sub categories, and process paths which allow the data to be structured for computer use for forms processing, billing, accounting, links and communications.

SUMMARY
The Clinical Foresighted Practice Guideline Model is a process flow model that really works. Now with around 50 users of the model during the last 10 years and close to 1 million created medical notes, the concept has proven some incredible and revealing statistics. When viewing medicine as a process, the quality of medicine can be improved by 300% or more with implementation, the costs of medicine can be viewed and understood in terms of activity so that inefficient practices can be recognized quickly. The linking of tasks via computers from the created medical note can be directed to all forms, processes and costs, and medicine can be defined in terms of process allowing for the Deming quality models to be implemented at the point of care easily and effortlessly.

Additionally, the continued extra processes being added on to medicine by the governing agencies can be easily linked to the computer version of the FPG model with little change on the health care professional.

With added evaluation, it becomes apparent that the addition of these extra processes and forms by the deemed agencies loose their importance, as the goal and understanding that the extra work one is trying to achieve is already available within the reports of the FPG model itself.
EXECUTIVE SUMMARY
OF THE
PDE-EMR PROJECT
AT
HCI.
INTRODUCTION

Health Care Incorporated (HCI) is a large health care company that serves a large city and its surrounding area. It is a staff model HMO, with all of the physicians, nurses, paramedics, technicians, maintenance and administration staff all under one roof. The goal of HCI is to give the best quality medical care possible, eventually with different price options and service options so that patients and their families have choice for what best suits their life style and their financial capabilities.

In order to fully implement this idea, our systems analysis team has determined that we at HCI will need to define health care in terms of a data dictionary. And thus, the options for each patient will be incorporated into the physician-patient encounter process and the available options for each patient will be available to the physician at the time of patient need.

HCI needs a computer tool which ties together the entire HCI system. A computer information system that focuses on the patient and one that works like the real health care system. Presently, health care in general has two separate systems, the patient care system and the financial system. The computer systems within healthcare have revolved around the financial system, and the results have been costly in terms of information management and finances. Still, these information systems have done little to increase the quality of health care within our patient population.

HCI needs a computer tool in which the physician can use at the point of care. A tool which will allow a physician to create a unique medical note at the rate of around 30 to 60 seconds per page. A tool that uses a data dictionary so that we at HCI can offer different packages within health care for different financial arrangements. A tool that allows physicians to practice medicine within a standard of care, yet still allows for each physician to use their own ideas and their own methodologies for individual and quality customized healthcare for the individual. We need a tool that will allow our physicians to do research analysis on each and every patient encounter so that we can learn by our failures and our successes, so that we can learn by ourselves and our colleagues and so that we can learn also by our patients and their families.

We do not want a computer tool that views the medical record as a required evil, and allows for users to build quick computer notes that read the same for each and every patient. We do not want a tool that allows our physicians to ramble on, as dictation has done for the last 50 years. We do not want a tool that ends up with cryptic notes that are unreadable. We do not want a tool that puts paragraphs of information in describing things that we did not even do.

Our physicians want a computer tool that will help them practice excellence within medicine. A tool that will allow each physician to stay up to date on the newest evidence based therapies while they are at work and seeing patients that need this information. A tool that will allow for individual professional and scientific methodologies that our physicians have discovered with their own experience from their original medical education, post graduate training and through
their years of patient care.

Our physicians need a computer tool that will allow them to create a unique medical note that reads like a story, yet is still structured and prevalidated for communications and inevitable processes. Our physicians need a tool that describes each patient as a person, and explains to all of our health care professionals throughout our system about the patients' life style alterations and well being that their health problems have caused.

With the massive amount of information coming forward these days, we need a tool that will allow us to stay up to date with the latest medical care available, yet still allow our patients to understand their financial burden and what will best meet their needs through time.

At HCI, our administration and sales team wants to make sure that when individuals or groups purchase our service, that they will have choices. Choices that will allow for more affordable health care along with wider options and individual care. Choices that can be understood and demonstrated to our patients completely and thoroughly. While professional athletes may select for top of the line joint injury service and products, middle aged people may feel that an ace wrap for a sprained ankle is just fine and see no reason to spend high dollars on a health care package for this higher priced service which they most likely will never use or need. At HCI, we have many patients with different health care wants and needs and we need a way that will allow us to define health care in terms of patient interview, patient exam, diagnoses and available services and therapies. Having to purchase health care to pay for the other person is unfair and it is just not right. Many companies want to be able to get their employees and their families certain levels of health care. Those individuals that want special services or have special needs can purchase an extended package. With the cost of health care getting out of control, it is just not right that people have to pay high costs for services and products which they will most likely never need or receive.

Our researchers at HCI want real physician-patient information, that allows for thorough and complete understanding of the physician patient care process along with the patient healing and therapy process. Only in this manner, with this information, can we move excellence into health care at its highest reaches.

* * * * * * * *

THE PROJECT
HCI is seeking a software company that can help us build a computer tool for our health care professionals. A tool that will run the entire health care system, from the point of the patient, where the heart of the health care system really is.

This is new and untried technology, thus an RFP designed for tried and true technology does not apply. This will be a partnership in experimentation and development. When developing new technology, many of the specifications and project definitions will occur through time. Definitions that we have today, may change tomorrow. We are in need of a solution. We are
not seeking a specific product, we are seeking a solution. A software tool that will actually work for the physician and for the patient.

A team of top engineers that are familiar with computer networks, wireless networks, hand held computers, PDA's, code development, production GUIs, data base development, data base meta layers, user training, systems administration training, training programs, security methods, data dictionaries, and research analysis are needed.

THE END CRITERIA AND OUR SUCCESS CRITERIA

1. Physicians to create medical notes at the rate of 30-60 seconds per page on average.

2. Other patient care support staff, such as nurses, paramedics and ancillary service staff, to have the ability to create their notes at the rate of 30-60 seconds per page on average.

3. User training for all programs at around 2 hours. (Around 20 patient notes to be up to speed.

4. Data Dictionary with pre-validated data for all communications and all processes.

5. Meta Layer for data base, so that the data base entities and its attributes can be modified through time to fit the needs as they are discovered.

6. To decrease support staff per physician.

7. To decrease the physician-patient encounter time.

8. To increase the number of patients per hour.

9. To increase the quality of medical care.


11. To allow for medical note data to interface with order entry, billing, consultation and any and all ancillary services and any and all forms processing.

12. To introduce some sort of standardization which will also allow for unique and customized care for each individual patient.

13. Additionally, the medical note engine must be a create a note style, which will utilize a medical data dictionary. No template product is wanted. Each note must be able to read like a story, we have no interest in cryptic templates, in which every medical note looks and reads the same.

14. Allow for protocols or guidelines that mimic the foresighted process of the health care
professionals.

15. Allow for the physician-patient encounter process to collect information that can be used directly for all forms processing, for support personnel activities even down to housekeeping and maintenance and for all accounting and cost collection actions.

16. Allow for the patient medical record database to have a meta layer so that change can occur because we do not know which way we should go and we do not want a locked in database format.

17. The patient medical record database will need to be structured for complete patient medical record database analysis.

18. To also develop other support programs for scheduling patients, staff work, maintenance, along with other support tasks that will come up during this project.

19. Bills can be generated from a medical note electronically, thus eliminating billing errors and reducing the need for FTE's.

20. Electronic medical records that serve as the starting point of information flow will make a truly integrated information system possible. True cost data will be available and true process data will be available.

21. Physician-entered data will make "real time" process studies possible. Outcome studies can be done on community-based patients.

22. We want to be able to truly cost profile physicians, because there are so many variables, depending upon which patients they take care of, which procedures they do and things along this line.

23. We want to be able to demonstrate patient care methods and results to our individual patients, companies and any other group that needs to see our excellence within healthcare.

24. We want to be able to defend our medical staff within medical liability in terms of the foresighted guidelines and processes. That is, what the physician could do for best possible care of excellence, the physician did do, and we want the methods to prove this.

25. To discover a temporary solution for ancillary service reports and reports from other places to be implemented into the system. We want digital information, image information can be looked at but it cannot be searched or sorted or read by a computer. So, until others across the nation decide upon an error that is usable by all, we will need a temporary solution.
DEVELOPMENT STRATEGY

This will be a phased development strategy. Aiming toward useable products that can be modularly added on to each other. The first few months will be a committee process to get to know each other and to get a working relationship going, for this will be a project that will take many years.

Training and support may eventually be done in house, but time will tell. We may want to own this product, we may not want to own this product. At present, we want a professionally developed completely modern health information system that revolves around the physician-patient encounter as a real time process, and billing, accounting and financial management as a batch oriented process.

We want a system that will decrease our need for staff under the present health care processes, however, this product may bring about additional projects and sources of revenue in which we would like to move our staff that is not needed in one area to the newly created areas.

We cannot emphasize enough, we have recognized that the big companies such as HBO, Allegra, SMS, Cerner and as many more as you can name are not solutions, they are the problem. They have created monstrosities that are costing the health care industry way too much and we want to put a stop to it, at least in our situation as soon as possible. From our own systems analysis, the physician-patient encounter is the hub of the entire medical system and that is what needs to be computerized. Once this is done, the rest of the forms processing, communications, billing and any other processes can become batch processes done without human interaction. There will be built in checks and balances, to assure that the patient is being cared for in a timely manner. There will be a change management program to evaluate where our staff will not be needed and when new options and jobs occur, methods to move the staff to these new positions.

Each and every department needs to be part of this development project for it to be a winning solution. Staff will be selected for team participation, and as many of the people as possible within each department will need to have some sort of team interaction for project development and implementation.
Concise Overview of Why These Changes Must Occur
Concise Overview of Why These Changes Must Occur

The change must occur because the cost per benefit of the health care computer systems is spiraling out of control with no end in sight.

There is no clear cut cost per benefit with any of the present products nor with their path in which they are heading. The concepts are driving the cost of health care out of proportion to even the potential benefit.

Why is it that grocery stores purchase computer systems and their costs of operation go down?

Why is it that computerization of manufacturing plants cut costs and improve efficiency?

We can go on and on with examples, but the point is obvious. The computerization of health care has been a failure. And a big time failure at that. No one can even tell you at any health care information system department what the cost-benefit ratio of computerization is. The administration tells us health care they need to computerize, the computer firms tell us we need to computerize, and then the health care companies do computerize and the result is lots of money spent but very little in return. In fact, while successful computerizations do occur, the results of successful computerization of the information systems is always a cost cutter and an efficiency tool. Here in health care, our business is information, yet wherever you go, the cost of computerization increases the costs and decreases our efficiency.

Don’t tell us that this is just how computerization of health care is done, because it is just makes you look foolish. How can computerization of industry after industry produce cost cuts and system efficiencies on every successful implementation. While within health care, the costs are overwhelming. More staff is required, taking up more space. The operational system gets more and more confusing.

The problem has been approached incorrectly. Instead of us waiting for multi-million dollar companies to see the error of their ways and come up with a solution that will improve the efficiency of our health care system and cut our overall costs, we are going to do it ourselves.

When a health care computer system requires so many “work arounds,” that people who do the job of ancillary service ordering and cannot find what they want to order because the “programmer,” decided to use their own term instead of the terms that have been used for decades, something is wrong.

When a computer controls a set of drawers (pixis machine) in which emergency medicines need to be obtained and as the patient is suffering and in a state of dire straits while the staff wrestles with the computer to get the emergency medicine for up to 15 minutes, something is wrong.

While the administration gets a nice report every day printed to perfection, the front line care
givers have nearly 5-15 minutes of “work arounds” for nearly every patient in order to do their front line job that used to take seconds to minutes, something is wrong.
CURRENT

COMPUTER

ENVIRONMENT

AT HCI
The current environment includes:

**Hardware:**
AS 400 cluster of 4 machines.

PC workstations 400, with a Novell Network.

T-1 Lines for each main building.

Network hubs for each building.

**Software:**

AS 400 OS

MicroSoft Windows.

Novell Network.

Patient Education Handout software, stand alone’s, used but not very good, as it is out of the workflow and the program (Epic) is poorly designed, uses both mouse and keyboard, thus the user has to go back and forth making for a very cumbersome interaction.

Some Type in Physician Data Entry Electronic Medical Records
(None have structured data, none have pre-validated linking communications)

Dictation System, with transcription staff using Word Processors for medical notes.

Prescription writing software, (rarely used, as it is just more work and out of the work flow).

Spreadsheet programs for financing.

Proprietary legacy system for order entry, lab, radiology, etc. Runs on the AS 400, and is accessed via a telnet interface. (Though required, it is rarely used to its full capacity, because the design is slow, it is a “pull” type system, where the user has to pull or request the information). (As a note, we would like to get a “push” type system, so the user will get most of the information they need “pushed” in front of them.)
HCI’s Present Computer Systems
Section 5: Current Computer Environment

4 Vax Mainframes

Server with PCs
The Interview Process
The Interview Process.

The Physicians:
The biggest hurdle is data entry. That process must be streamlined as much as possible. However, there can be no shortcuts. There can be no fraudulent templates or any of the other schemes that put physicians into situations of fraud or untruths. Speed is fine, but lying is not.

Since the physicians will be the prominent data entry people, their process must be fully understood in terms of data entry. At this time, it is our belief from our existing research that a data dictionary is the solution. If there is any uncertainty about this concept, it must be addressed immediately and in all aspects and within the first rounds of interviews and system development.

The physicians will be the main drivers of this system. The system needs to be a push oriented system, not a pull oriented system. When things need to be done, the physician users need to be pushed to do it. However, there must always be an override so the physician can go around it at any given time, except at “patient done.” When the patient is done, then all of the questions must be answered, the software needs to go over the medical note for complete verification at this time, and make sure that all necessary information is completed at this time, this cannot be overridden. Plus, the matching must be done at this time. Matching is a concept in which the physician will match all of the diagnoses with each of the supplies and procedures that were done.

The Nursing staff
The nursing staff will need to build their own data dictionary, in which all of the DRG and APC information will be incorporated.

The Paramedic staff
The paramedic staff will also need to build their own dictionary. Again, as with all of the staff, all of the billing information will need to be linked within the data dictionary.

The Social Services Staff
The social service staff has their own forms and their own data dictionary.

The Cardio-Pulmonary staff
The cardio-pulmonary staff has some reports as in breathing treatments and ventilatory equipment, but much of their actions will be in acknowledging that they received an order and are on their way to do it.

The Imaging staff
The Imaging and Radiology staff will be mainly accepting orders, acknowledging them and letting the ordering physicians know that it is done. There will be a read by a Radiologist which also needs to go on the Que. When the films are read, the report can go back to the patient’s chart and be read by the physician seeing the patient.
The Clerical
The Clerical staff will be getting the patient’s name, address and all demographic information, along with correcting any errors.

The Administration
The administration will mostly be receiving reports and designing reports from the patient data that is accumulating.

The Billing and Accounting Staff
The billing and accounting staff will be making sure that the processes are correct for the billing to occur automatically and for the supply inventory management features to be linked and installed.

CHANGE MANAGEMENT INTERVIEWING

Medical Records
Through time, the Medical Records department will become smaller and smaller, maybe disappearing all together. However, a research department will be forming, and if possible, the attrition and the move into the research department will allow for opportunities for these people.

Transcription
The transcription department will eventually be gone. Though some of the staff may still chose to dictate, this will be able to be done with voice to text software. It is possible that some of the transcriptionists will be able to be utilized for data editing and updating of the data dictionaries.

Clerical staff
It is unclear as to the clerical staff, as we will need to have staff to input the patient demographics and to check and correct this as an ongoing basis. But with the nursing work of taking physician orders and putting them into an order entry system gone, this job will free up the nursing staff for patient intake.

The Billing and Accounting Staff
This department will be greatly cut, for the computer will be doing this work. Like transcription and medical records, the billing and accounting staff have been added on and increased throughout the years due to the addition of forms requirements by the third party payers. With computerization in the proper system and method, much of this staff will again not be needed as in years ago, as it is a stepping stone industry.
THE

STAKEHOLDERS

AND THE

CHAMPIONS
The Stakeholders.

The stakeholders for this project are really the patients, however, they will not know it or fully appreciate it until years after full implementation.

At present, the board of Directors has decided that this move is necessary in order to keep the costs of health care controlled, defined and in perspective.

The Champions.

The champions will be individuals from each department, as yet to fully be identified.
Use Cases along with Narrative Process Flow Descriptions of the Activities of the Health Care Environment
I. USE CASES.

This section will go over use case scenarios and a detailed narrative summary of the present health care processes. The use cases will be brief so as to fit on single pages, and to be quick reminders for the development team.

The lengthy and detailed narrative descriptions will be used for understanding the present process and how to re-engineer it to a real computer process, instead of a paper process that gets put into a computer program.
<table>
<thead>
<tr>
<th><strong>Use Case Name:</strong></th>
<th><strong>Physician / Health Care Professional</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actor:</strong></td>
<td><strong>Physician</strong></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Determines patient problem through interview, exam, clinical decision making, support services requesting, therapy and disposition. Select Guideline for best practice. When done, finish up forms processing.</td>
</tr>
</tbody>
</table>
| **Normal Course:**| 1. Patient Interview.  
2. Patient Exam.  
3. Clinical Decision Making on determination of appropriate services, therapies, interactions and/or consultation.  
4. Revaluation once therapeutic measures have been done.  
5. Disposition, admission or discharge.  
6. Use computer tool by selecting guideline, following best practices, communicate needs, therapies, and disposition. |
| **Precondition:** | Patient has a health care problem and reports to the health care facility. Could be Office, Urgent Care, Emergency Department, Work Comp clinic, and from there hospitalization can occur. |
| **Post Condition:**| 1. Problem controlled and stabilized.  
2. If intervention is needed, then admission is done.  
2. If outpatient ok, then discharged home with appropriate therapies and follow up. |
<p>| <strong>Assumptions:</strong> | Patient is given education about their health care problem. If going home, then what to watch for if return is needed, if admitted, what problems to contact the staff on. |</p>
<table>
<thead>
<tr>
<th>Use Case Name:</th>
<th>Nursing.</th>
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</thead>
<tbody>
<tr>
<td>Actor:</td>
<td>Nurse/Paramedic</td>
</tr>
<tr>
<td>Description:</td>
<td>Initial Triage for patient vitals and assessment. Using system to determine patient priority if need be. Then will receive the physician orders for medicine administration and other therapies and discharge.</td>
</tr>
</tbody>
</table>
| Normal Course:| 1. Patient Vitals  
2. Patient Problem.  
4. Protocol Therapies  
5. Receive Physician Orders to carry out, then recognition of completion.  
| Precondition: | Patient has a health care problem and reports to the health care facility. Could be Office, Urgent Care, Emergency Department, Work Comp clinic, and from there hospitalization can occur. |
| Post Condition:| 1. Problem controlled and stabilized.  
2. If intervention is needed, then admission is done.  
2. If outpatient ok, then discharged home with appropriate therapies and follow up. |
| Assumptions: | Patient is given education about their health care problem. If going home, then what to watch for if return is needed, if admitted, what problems to contact the staff on. |
## Use Case Name:
**Laboratory.**

**Actor:** Medical Technologists.

**Description:**
Receive orders for Laboratory services, via stat orders or appointment. Carry out the service, get the results to the ordering physician or to the pathologists if interpretation is needed. If panic values are discovered, make sure patient knows and ordering physician knows by required communication.

**Normal Course:**
1. Order comes in or Patient on Schedule.
2. Testing or therapy set up, blood studies, UA, Chemistries, Hematology, cultures, Blood Bank, etc.
3. On completion of specimen, patient reevaluation.
4. Make sure that all the specimen are complete for the tests.
5. If additional tests are needed, allow for the Med Tech to order them.
6. When reports are done, make sure that they get back to the ordering physician.
7. If pathologist interpretation is needed, then make sure that pathologist gets the specimen. Make sure that Ordering physician gets the report.
8. Discharge patient or return patient from where picked up, or go and get the specimen from the patient.

**Precondition:**
Patient has a health care problem and reports to the health care facility. Could be Office, Urgent Care, Emergency Department, Work Comp clinic, and from there hospitalization can occur.

**Post Condition:**
1. If health care problem needs Laboratory services, then it is ordered by the physician and carried out by the Medical technician.

**Assumptions:**
Patient is given education about their laboratory service and how they need to see their physician for best interpretation. If a serious problem is found on the testing, then the patient needs to be informed, their physician needs to be informed and service options made available to the patient.
**Use Case Name:** CardioPulmonary.  
**Actor:** CardioPulmonary Technitions  
**Description:** Receive orders for CardioPulmonary services, via stat orders or appointment. Carry out the service, get the results to the physician that ordered the test/therapy.

**Normal Course:**
1. Order comes in or Patient on Schedule.
2. Testing or therapy set up, EKG, Treadmill, Echo, PFTs, Nebulizer, etc.
3. On completion, patient reevaluation.
4. Make sure report is completed.
5. If Report needs physician interpretation, then get to the Physician specialist.
7. Use guideline for best practices.

**Precondition:**
Patient has a health care problem and reports to the health care facility. Could be Office, Urgent Care, Emergency Department, Work Comp clinic, and from there hospitalization can occur.

**Post Condition:**
1. If health care problem needs CardioPulmonary services, then it is ordered by the physician and carried out by the CardioPulmonary technition.

**Assumptions:**
Patient is given education about their cardiopulmonary service and how they need to see their physician for best interpretation.
**Use Case Name:** Radiology/Imaging

**Actor:** Radiological Technician

**Description:** Receive orders for Radiological services, via stat orders or appointment. Carry out the service, get the results to the Radiologist for film interpretation and then get the Radiologists interpretation to the physician that ordered the test/therapy.

<table>
<thead>
<tr>
<th>Normal Course:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Order comes in or Patient on Schedule.</td>
</tr>
<tr>
<td>2. Testing or therapy set up, Xray, CT, MRI, Fluroscopy, US, barium studies, etc</td>
</tr>
<tr>
<td>3. On completion, patient reevaluation.</td>
</tr>
<tr>
<td>4. Make sure Radiologist gets image.</td>
</tr>
<tr>
<td>5. Make sure that no morbidity or mortality issue is in the report. Make sure that Ordering physician gets the report.</td>
</tr>
<tr>
<td>6. Discharge patient or return patient from where picked up.</td>
</tr>
<tr>
<td>7. Use guideline for best practices.</td>
</tr>
</tbody>
</table>

**Precondition:** Patient has a health care problem and reports to the health care facility. Could be Office, Urgent Care, Emergency Department, Work Comp clinic, and from there hospitalization can occur.

**Post Condition:** 1. If health care problem needs Radiology services, then it is ordered by the physician and carried out by the Radiological technician.

**Assumptions:** Patient is given education about their Radiological service and how they need to see their physician for best interpretation. If a serious problem is found on the testing, then the patient needs to be informed and service options made available to them.
Author: Scheduling Team

<table>
<thead>
<tr>
<th>Use Case Name:</th>
<th>Scheduling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor:</td>
<td>Schedulers.</td>
</tr>
<tr>
<td>Description:</td>
<td>There are many scheduling tasks to be done with the health care arena. Surgery suite scheduling, office scheduling, physician scheduling, nursing scheduling, paramedic scheduling, technician scheduling, meeting scheduling, and etc.</td>
</tr>
</tbody>
</table>
| Normal Course:| 1. Presently, many departments have their own scheduling personnel. It is commonly done on the computer, but it is typically a paper based system that is typed into a computer.  
2. The scheduling systems need to keep track of different things. For surgery, when a surgery is scheduled, the scheduler needs to keep track of the length of time that the surgery will take, the surgeon and the surgeon’s history of how long it takes for that specific surgeon to do the scheduled procedure, the necessary tools, the necessary support staff, etc. For patient scheduling one needs to know the basic health care problem and if it can fit in one or two slots, etc. For staff work schedules one needs to work in the staff needs and to share the unpopular days and times.  
3. Schedules need to be posted in a timely fashion.  
4. Alternatives need to be available.  
5. If a patient calls for a change, it is best if the scheduler can drag and drop the patient to the new slot. |
2. Scheduling for procedures.  
3. Scheduling for office appointments.  
4. Scheduling for staff.  
5. Scheduling for meetings.  
| Post Condition:| 1. Schedules need to be posted.  
2. For the walk in patient care facilities, the schedule needs to be posted into the log book after the fact.  
3. Need the schedules for statistical analysis. |
| Assumptions:  | Schedulers need to be keeping the schedules up to date and available. |
### Use Case Name:
Patient

### Actor:
Patient.

### Description:
Patient has a health care problem and associated anxieties. Options are defined for the patient to view via the web, phone, appointment, and/or walk in.

### Normal Course:
1. Patient has a problem and needs a consultation.
2. Depending upon the loss of functionality, patient can come to the emergency department, urgent care or make an appointment.
3. The patient can also use the web to help them to better understand their problem, via the patient module.
4. Patient makes contact with a physician and a therapy plan is determined.
5. The patient follows the therapy plan, if problems options are made known to the patient.

### Precondition:
Patient has a health care problem and reports to the health care facility or looks on the web program for better understanding. The patient gets to a physician and gets started on the therapy process.

### Post Condition:
1. If the therapy is going ok, then discharge can be done, if not on going therapy until the condition is cured. If the condition is chronic, then on going stabilization therapy will be needed.

### Assumptions:
Patient needs to be part of their therapy. It is important to include the patient in as much therapy decision making as possible. This is best for the patient and their outcome.
Author: House Keeping Team

<table>
<thead>
<tr>
<th>Use Case Name:</th>
<th>House Keeping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor:</td>
<td>House Keeping.</td>
</tr>
<tr>
<td>Description:</td>
<td>House Keeping has standard cleaning schedules along with stat cleaning schedules for rooms with patient care problems and/or physician-patient procedures that need cleaning up.</td>
</tr>
</tbody>
</table>
| Normal Course:| 1. House Keeping has their standard cleaning schedule.  
2. Daily surgeries and procedures need cleaning up and the room sanitized.  
3. When the patient procedures are done, House Keeping needs to be notified, as these rooms are needed for the next patient and need to be cleaned immediately.  
4. Once House Keeping is notified, they will solve the problem and then sign off on the task. |
| Precondition: | There are standard cleaning schedules for the offices, clinics, walk in, and hospital departments. Additionally, the surgery suites, the procedure rooms, the clinic rooms and hospital rooms will have patient procedures done, and due to the bio-hazardous fluids, these rooms need cleaning immediately. |
| Post Condition: | Once the room is cleaned, then it is signed off and the staff is notified so that the room can be used again by another patient. |
| Assumptions:  | House Keeping is part of the team and integral with the whole therapy process. Using a PDA, the housekeeping staff can following their standard assignments along with being notified of a stat cleaning jobs. |
## Use Case Name: Administration

**Actor:** Administrators / Managers.

**Description:**
The administration and the department managers, manage the facilities. They take care of staffing, supplies, etc. They make sure that the facility keeps running.

**Normal Course:**
1. The administration needs to keep track of the staff and the interactions. Needing to understand the staffing needs, the supply needs for the patients and all of the aspects of running the facility.
2. Each of the department managers have similar needs in keeping track of their staff, department, supplies and usage.

**Precondition:**
1. There will be some business process re-engineering as we would like this to be coordinated over the computer. Now, much of the process is done by paper processes.

**Post Condition:**
1. With the activity turning into a real computer application, instead of a paper application on a computer, we should be able to use modern management ideas and methodologies for best practices and management.

**Assumptions:**
Managers are crucial in developing this part of the product.
Author: Medical Records / ResearchTeam

<table>
<thead>
<tr>
<th>Use Case Name:</th>
<th>Medical Records / Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor:</td>
<td>Medical Records.</td>
</tr>
<tr>
<td>Description:</td>
<td>The medical records department, which now employs around 50 people, may become a thing of the past. As the new design will allow for the patient records and information to be retrieved by the physicians themselves. However, as there will be much use for research, we would like to keep our medical records staff and train them into doing research studies with the patient data.</td>
</tr>
</tbody>
</table>
| Normal Course:| 1. Presently, the medical records department stores, manages, retrieves, and checks the medical records for legal requirements. With the computer, and a real computer system, the computer can do it all.  
2. The transcriptionists are also in the medical records department, and they too will be gone with complete implementation. .  
3. We have wanted to do research in the past, but with the medical records staff spending all of their time just taking care of business, there has been little to no time for research.  
4. With the computer system up and running, all the medical records tasks will be done by the computer.  
5. This will free up the medical records staff to now do full time research duties, which will give us our best options for patient therapy. |
| Precondition: | 1. Manage Medical Records.  
2. Keep Medical Records Legal.  
3. Prepare Medical Records for Billing.  
4. Prepare Medical Records for audits.  
5. Get medical records to physicians. |
| Post Condition:| 1. Manage research studies.  
2. Do prospective research studies.  
3. Do retrospective research studies. |
| Assumptions:  | Unclear, as this is a new direction. |
Author: Central Supply Team

<table>
<thead>
<tr>
<th>Use Case Name:</th>
<th>Central Supply.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor:</td>
<td>Central Supply Staff.</td>
</tr>
<tr>
<td>Description:</td>
<td>Central Supply keeps track of all the inventory that comes into the health care facilities. They keep track of what each department, office, and patients are using in terms of goods. They try to maintain a steady stream of supplies to the departments, as they are needed.</td>
</tr>
</tbody>
</table>
| Normal Course:        | 1. Keep track of all the supplies from each department.  
                         2. Keep track of the supply flow for each department.  
                         3. Keep track of every surgery, procedure and all supplies used in each and for each surgeon involved.  
                         4. Keep supplies at a minimum within the facilities, but always have them available when needed. |
| Precondition:         | 1. Supplies need to be coming in on a regular basis.  
                         2. Management and keeping track of supplies is a full time job. |
| Post Condition:       | 1. The computer system should be able to learn from doing.  
                         2. As the supplies are being used, and for each department, the computer system needed to start figuring out what is being used, when, by home, and come up with a restocking model that will keep learning as times change and the physicians change, along with other staff. |
| Assumptions:          | This is new territory, so it is hard to figure out. |
Author: Billing Team

<table>
<thead>
<tr>
<th>Use Case Name:</th>
<th>Billing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor:</td>
<td>Billers.</td>
</tr>
<tr>
<td>Description:</td>
<td>Much of our billing and accounting is for a standard staff model HMO, but due to the present system within the USA, we also do standard patient billing.</td>
</tr>
</tbody>
</table>
| Normal Course: | 1. For most patients, we only accept co-pays, as we are a staff model HMO.  
2. For the patients that are not within our system, we do standard billing methodologies.  
3. We have been trying to go through the patient, as we do not want to take care of patients that are out of our system, but do to the present situations, anybody can enter through the emergency department. |
| Precondition: | 1. Standard co-pay for our standard patients. |
| Post Condition: | 1. We will continue with our present model, but also we will want to produce bills that are well organized and properly explained. |
| Assumptions:  | New. |
II. Word Diagram of the Emergency Department Process Flow

1. The Patient Enters the Emergency Room
The patient can enter the emergency room in the following manner
a. By an ambulance
b. By walking in the ER door
c. By being wheel chaired in the ER door.
d. By helicopter or plane
e. By a car coming to the front or the ambulance entrance
f. A hospital employee
   This breaks down to three entrances,
   1) Triage-Registration entrance,
   2) Ambulance entrance,
   3) A hospital back door entrance.

2. The first step is to get the patient’s name into the system. This is done in the following manner:
a. Asking the patient
b. Asking a family member or friend
c. Looking at the patient’s identification
d. If the patient’s name is not available due to an inability to communicate, then the patient is given an Alias name
e. this is done by the physician, the nurse, the tech, the EMTs, the receptionist and or the volunteers.

3. The necessary Name information
a. The last name
b. the first name
c. the birth date
d. the gender
e. If one can get the middle name this is great. In some cultures people have many names within their name. So, it is appropriate to have room for the first name, 5 middle names and the family name (Last name). Some cultures do not have last names but in the US, this is required.
f. for an alias, there should be a stack of alias’s for department use, I would say 10. Then when the patient’s name is finally discovered, there must be a way to move the information from the alias that has been selected to the patient’s real name.

4. At this point, whether there is a real name or an alias name, the system must be ready to accept all actions. As the patient may be very sick or very traumatized and there is no time to get more information.

5. Triage
a. Triage is a concept developed by the Military, to look at all of the traumatized patients and to do a walk by scan and to put people into levels of care. In the USA, there have been some law suits because patients were in the waiting room and died. So, it has become established that the nurses or ER Techs (usually paramedics or EMTs) see the patient as soon as possible in an area in the Emergency Department that has been called Triage. This is not triage in the true sense of the word, this is Triage in the USA Hospital sense of the word. The new Hospital ER triage is that when patients come to the ER, they stand in line, first come first serve, and the staff takes their vitals and does a short history. Sometimes the staff will follow a set of protocols and get testing going right from USA Triage. Additionally, since the military use paramedics for nursing, and those with nursing college degrees are used as managers, it has been found
that because paramedics are cheaper than nurses, some hospitals, especially those around military bases are using paramedics throughout the hospital in place of nurses and in all analysis, they are equivalent. The problem has been politics and the nurses have felt that these paramedics are taking their jobs and thus, there has been political undermining, even to the point that patient safety has become an issue. As a general rule, the paramedics are excellent at triage and much better than nurses due to their formal training.

b. So the vitals and a short history are done by the nurses, paramedic and/or technicians
c. test orders may be done by predetermined protocols.
d. the patient is put into categories, level 1, 2, or 3.
e. The level 1 patients go directly back into the ED. If there is no bed, then there are some hallway gurneys that the patients are put on until a bed is available. Medical care is started immediately
f. If the patient is a level 2 or 3, then they go out to the waiting room.

6. Registration
a. Registration is usually done by the receptionist
b. In registration a complete set of patient demographics is collected. Typically patients have cards which they pull out and give to the receptionist, not always.
c. The receptionist gets the full patient name, address, insurance information and lots more, up to 100 data items.

7. Bedside Registration
a. Some facilities do what is called bedside registration. Bedside registration is when the patient goes back to the emergency room exam room and the receptionist comes into the exam room with a clipboard, rare handheld computers, and they collect the information while the patient is in the room
b. In some facilities this is done on all patients
c. In some facilities this is done only for the Level 1 patients or the Ambulance patients.

8. Ambulance Patients
a. as a general rule, all ambulance patients are taken from the ambulance into an ER exam room. Exceptions include regular patients that have learned to call the ambulance for convenience, many of these patients are on the welfare system, and do not have to pay for poor decision making, and thus they have found that if they call the ambulance, they do not have to wait for hours to see a physician. However, since this trick is being used more often, the emergency departments have found that in order to discourage this behavior, the patient is triaged and sent to the waiting room, to wait, just as if they walked in.
b. there will be a discussion on the ambulance process

9. Ancillary Service Testing
a. the ancillary services are laboratory, xray, cardiopulmonary, and sometimes others

10. Ancillary service requests from TRIAGE
a. within triage, the nurses/techs can follow protocols that have been prepared by the medical director of the ER or the ER committee
b. The Triage staff will be using the HCP program
c. There will be a protocol list within their data dictionary
d. In the triage situation, the triage staff should be able to create a complete triage note with orders along with symptomatic diagnoses, such as arm pain, leg pain, ankle pain, and then select xrays. In turn, the ancillary service request does need to have the diagnosis/diagnoses on the ancillary service request form
due to the present state and requirements of forms processing. Thus, HCP will need to list the problems or diagnoses so that the HCP user can select one or more that will then be put on to the ancillary service request.

e. At this point, a triage note should print out. This way the ER physician will have a triage note to read. If the patient is listed as a level 3, the ER doc can read the note and reassess the situation. For example, a patient comes in to Triage. Their vitals are stable except they have a rapid respiratory rate of 30. The patient has a history of diabetes. They complain of dizziness and vertigo. The Triage staff believes that the patient is just anxious and that the patient is just hyperventilating. So the triage staff tells the patient to breath into a paper bag (to increase the CO2 content to slow down breathing) a common therapy for hyperventilation due to anxiety, and to wait in the waiting room. The ER physician gets the triage note and focuses in on a patient with diabetes is hyperventilating. Diabetes with hyperventilation can be diabetic ketoacidosis which is a life threatening situation, though the patient can look good and have stable vitals otherwise, this situation can escalate into death within a few hours. For this reason, having the triage notes available for the physician to quickly scan, will greatly assist in best care practices.

f. Could these triage notes be on the computer and in a place where the physician can just scan them through their computer? Yes, that would be a great option. However, some people like paper to read so both options need to be available.

g. In some cases, there are requirements for data gathering in the triage area. HCP will need to have a data type that will require the staff to fill in the data, for example, requirements may be for temperature, pulse rate, respiratory rate, blood pressure, oxygen saturation, height and weight. In some cases, the staff may not do these, yet the physicians want this done on all patients, thus HCP will need to force the situation, and it needs to be done with a data type that is allowed within the data dictionary.

11. The Patient is taken back into a room by a nurse/paramedic/tech
a. The patients vitals may be retaken and entered into the medical note. A history is taken, a review of health care problems and surgeries and allergies is taken and entered into the medical note. Again, some emergency departments have protocols which the nurse/techs follow. They may start IVs, give meds (such as paracetamol or ibuprofen for fever), order tests, etc. This helps to give the patient the best care quickly. Due to the present state of forms processing and medical billing, all ancillary services ordered must be matched with diagnoses which may be a problem later on.

12. The Physician Exam
a. The physician looks at the triage note, the nurses/paramedic note, and every time (if available) the previous charts. Ideally, having a list of visits with diagnoses and dates is very helpful in understanding the patient and their healthcare problems. The physician enters the room and verifies the patient name and usually gets the names or relationships of the other individuals that may be with the patient. Thus, the physician may enter into the note:

   a. This 12 y/o male came to the ED with their mother, father and siblings.
   b. The physician interviews the patient and the others in the room about the problem. In some cases the physician may request that the others leave, as the physician is concerned that some of the information may be private to the patient and the patient is not willing to reveal the information even in front of the people that are with them. The physician will select this information from the data dictionaries to build sentences and paragraphs which will go into the medical note
   b. The physician then examines the patient. In the case that the patient is not in the correct attire, the physician may enter an order for the nurse to return and help the patient into the correct attire. (Order: Please put patient into an exam gown.)
   c. After the interview and exam, the physician then may know the problem and prepare a disposition or
more likely, the physician orders some ancillary services that are available in the facility right now.
d. The physician usually looks at the possible ancillary services that are available and starts to select the
ones that they deem appropriate. After making a number of selections, the physician usually reviews the
orders. The physician may then delete some or add some. When everything looks good, the physician will
select the ORDER button and the orders will be ordered stat, if they are tagged as stat orders. These orders
need to go directly to the testing department, and they need to be acknowledged. An acknowledgement
return should be printed in the STATUS window on the requesting physicians computer and also to the
department where the patient is located. Additionally, an FPG name should be sent with the test request,
and then it should be sent back on return with the result. Then when the physician returns to the patient,
the test results should be displayed and then HCP should go into the FPG name that was returned with the
test result. For example, a liver panel was ordered with the FPG name LiverTests, and on return, the HCP
should go into the LiverTest FPG and go through the data dictionaries reminding the physician of what to
do with the liver test results.
e. The physician may order stat therapy. IV therapy, IV medicines, Pain medicines, etcetera. The
physician may order them and the physician may also give verbal orders. These orders needs to be sent to
the nurse/paramedic/tech that will do the job.

SIDE BAR ON NURSING/TECH
There are three styles of nursing in emergency departments 1) One on One, 2) Sequence and 3) Zone. One
on one is when one nurse/paramedic/tech is assigned to specific rooms or patients and they stay with them
from start to finish. The sequence is that a nurse/tech just gets the next order and carries it out. Zone
nursing is when the nurse handles a group of rooms. It has been proven time and time again that One on
One has less errors, however, Sequence style can be quicker. Zone nursing is a hybrid idea.

Right now, the order is written on a paper chart. When the staff gets to it they see the order and carry it
out.

In this situation, the order could be put on the PATIENT WORKSHEET. The Tracker program can have a
timer in it, and the tracker will tell the nurse or department every 15 minutes or whatever that the patient
needs to be rechecked. Or that orders are ready.

f. In the case that the patient has a dislocation, the physician may just reduce the dislocation immediately.
g. After the physician sees a patient and orders tests or therapy, the physician will suspend this patient and
move on to another. So, a particular patient will be pushed to the side, while the physician starts working
with another patient. Within many medical environment situations, the physician will be going back and
forth from patient to patient. Each physician has different abilities to mentally keep track of a specific
number of patients. It may be anywhere from 4 patients to 15 patients at any given time. Thus, as part of
the tracking scenario and data analysis, it will be important to see how many patients a physician can see at
any given time along with the physicians productivity. There is a point for each person that there is just
too much going on at one time for them to be efficient. Therefore, the idea will be to determine the number
of patients which the physician can see at one time and be the most effective.

a. Typically, a physician will round in the ED and see the patient again and again to see their progress.
This may only last seconds or a minute or two. The physician usually does not enter a note on this, but
they should.
b. The physician may order more tests or more therapy during these rechecks.
c. So a quick resume to the patient, a quick note and a quick therapy or ancillary service order until the
   a. Home, hotel, trailer, vehicle.
      If the patient is doing well, they will be discharged home. The physician will finish up the medical note. The physician may decide to give some medicines right before they leave, or they may give the patient a pre-pack medicine, some prescriptions, a work excuse slip, a discharge sheet, a physical therapy form, a redo lab tomorrow form (up to 35 different forms). The forms will be printed out for the patient immediately. Additionally, some of this communication may go to a pharmacy or another facility by another form of communication if available besides a paper form. The physician will select all of the things from the dictionary that are needed, and then communicate that the physician is done seeing the patient. See matching below.
   b. Admit to the hospital
      If the patient is sick or traumatized in a major way they will be admitted to this hospital. In this case, the physician may admit the patient themselves (not common anymore, but it used to be) the ER physicians can put the patient in for 23 hour observation, that is in the hospital but not really assigned to a physician. Or an observation admission to one of the staff physicians. It is presently common for the ER physicians to look on a call list or to contact the attending physician or the physician on call for that patient’s attending physician. It would be ideal to just email the patient’s physician. Then the computer program would figure out who gets the stat messages, and then that physician would return the email or call back on the phone.
      Anyway, contact is made with the physician that will be responsible for the patient. I will have a complete discussion on this, as this is an ongoing problem.
      The physician accepts the patient for admission. The nursing supervisor is contacted and a bed is found. If there is no bed, then the patient will need to be put in an observation bed or transferred to another hospital. In some cases, the patient may end up staying in the emergency department for hours prior to finding a hospital bed.
   c. Transferred to Jail
      This is the same as an out patient discharge, however, it is important to have a Jail Release Form.
   d. Transferred to a nursing home
      This is similar to an out patient discharge however, one needs to write orders for the ambulance crew and also for the nursing home and contact the nursing home physician. When using an ambulance to transfer a patient from the emergency department to a nursing home, there is a special form (unique to each State or county) that is required. This explains why the patient needs an ambulance to return to the nursing home instead of a private vehicle.
   e. Transferred to a different hospital
      This is difficult. One has to first contact the hospital, find the physician that is on call and communicate directly with them. The transfer has to meet the COBRA rules, so that it is not a dump. In other words, you have to prove that you do not have beds or you do not have the equipment or the resources to take care of this patient’s health problem. You need to fill out transfer forms, COBRA forms, and create an order sheet for the transfer.
   f. Transfer to another facility for a test.
      In some cases, you may transfer a patient via ambulance to another hospital to get a special test. When the test is done the patient will return. You will need to make the contact and arrangements, then write the orders and a test request form.

15. Writing Orders for the Patient that is admitted.
Once the patient is admitted. Orders need to be written. These orders will include the diagnoses, the condition (serious, critical), the ambulation orders (the patient is restricted to their room, they can only go to the bathroom, etc), how often the vitals need to be taken, the IVs, the medicines, the daily medicines, the one time dose medicines, the when ever needed medicines, etc. All of these orders will be in the data decision table dictionaries.

The orders will be printed out on a sheet of paper or on a computer paper, and on the PATIENT WORKSHEET. Plus, the orders will be parsed to the different departments that will be doing the work.

16. End. The physician is done. The physician will communicate to HCP that they are done with the patient. At this point, the physician needs to do matching. Due to the present state of medical billing and forms processing, the bill must contain information matching each procedure and supply with at least one or more diagnosis/diagnoses.

For the physician, this is an easy process, for the nurse, paramedic, the tech, or the billing staff, this is an insurmountable task. For best matching and for best reimbursement the physician needs to be the one to do the matching of the procedures and supplies with the diagnoses. This is where the physician will match the diagnoses with the medicines, the procedures, and the supplies. The Matching needs to be dynamic, as this may be changed though time (as it already has been changed). Within the data dictionary, this information will be identified as either diagnoses information versus procedures or supply information.

17. Nursing Disposition.

The nurse or tech will get the physicians paper work from the printer, sort it out, make sure it is all signed, and then go over the forms and patient education and prescriptions with the patient and family. The Nurse will also make sure that the bandages, slings, crutches, etc are there for the patient, and then put the patient into a wheel chair for discharge.

18. The Nurse is Done

The Nurse/Paramedic/Tech finishes their note after the patient has left. The nurse has to make sure that all of the information for the DRG or the APC is in the note. Also, there must be enough information to satisfy the UB-82 billing form. So the nurse needs to make sure that all of the supplies are tagged on to the patient note. For the UB-82 billing form to get the most dollar, the supplies have to be matched with the physicians diagnoses. However, since the procedure has been matched with the diagnoses by the physician, the nurse will only need to make sure that the supplies are matched with the procedures should this occur after the patient has left. Yet, with a procedure each supply item can be pre-validated and tagged to the procedure possibly making this a non-issue.

19. The SUPER BILL

The super bill is a term for a piece of paper with the diagnoses, the procedures, the supplies and the room usage and all matched together. HCFA (Health Care Financing Administration) has outlawed these super bills for their use, and they will penalize the facility that mails them in stapled to their HCFA forms. Yet, the Super Bill still runs the industry. With the physician matching the diagnoses with the procedures and supplies, a super bill could be printed with this information on it, as a stepping stone to a billing interface. Yet with a good billing interface, this would probably not be needed.

20. The HCFA 1500 Form

This is the physician billing form. It contains the patient’s demographic information, the diagnoses (only 4), the procedures, the supplies in some cases. The physician’s demographic information.

21. The UB-82 Form
This is the hospital billing form. This contains the patient’s demographic information, the procedures, the diagnoses, the supplies and the room usages. Along with the physicians that were involved.

22. The QA / Audit
The deemed organizations (JCAHO and AOA) require health care facilities to perform quality initiatives if these organizations want to participate.

23. The Supply List
At the end of every shift, a supply list of all of the supplies that were used is made up and then given to central supply for restocking.

24. The ER LOG
All departments keep patient logs. The ER log is a record of the patient, the doctor, the nurses, the diagnoses the tests, the therapies, the attending physician, the dispositions of the patients, along with time of entry, time seen, and time left.
III. The Nursing Home

1. Admission
The patient gets admitted through the contacting of the admissions coordinator. This occurs usually over the phone.
A. From a hospital.
B. From another nursing home.
C. From a family home.
D. From a rehabilitation hospital.

The admissions coordinator collects all of the information about the patient demographics during the phone call or with an in person interview. As sometimes the family goes in and talks to the admissions coordinator in person prior to admission, the family members may bring in all of the demographic information and it is then put into the computer right then. Sometimes the admissions coordinator will call up the Hospital, if it is a hospital transfer and get the information from the hospital face sheet.

So, in the nursing home situation, the admission coordinator will collect all of the patient demographics. Additionally, the admissions coordinator has to assign a physician to the patient. And once admission has occurred, the physician is notified and has to come in to see the patient, do an admission History and Physical, and write admission orders that day. In some cases, the physician may call in some initial orders for diet and some medicines, but by law, the physician needs to come in to the facility on the day of admission.

The admissions coordinator will need to see a list of physicians that are on staff with their phone numbers. It would be great to also be able to print out an information sheet on each physician so that the patients can select from the options. In some cases, the nursing homes tell the patients that they have to make the arrangements for their physician. In this case, a list of the physicians is needed so that the patient can call and make a contact.

2. Next the patient is assigned a room. Though this is not coordinated by the admissions coordinator, the information is given to them and they give the patient a room during the admission process.

The nurse supervisor takes care of room assignments. This would occur with the Facility observation. Some of these patients stay in these rooms for years. This would be similar to the nursing supervisor that takes care of room assignments in the hospital. The difference is that these room assignments typically last much longer.

In many cases, the physician calls in a set of orders. And in most cases, the physician requests that the nurse take the orders that were from the hospital for the medicines and to write them down in the new orders. It is common for the physicians to phone in the orders. This would be better sent in by email, because errors on the orders are very, very common. This is for the initial set of orders, as the patients commonly come from hospitals, the physicians typically request the nursing home staff to use the orders that were on the hospital orders for all of the medicines and diet. Then the physician comes in within 24 hours, sees the patient and does long term orders. There is a requirement that the physician must see the patient at least once per month. The physician has orders for all ancillary services when needed (though they are not needed daily like in a hospital), for diet, for leaving the facility for family or friend functions,
for activities, for special needs, for supplies, for PT, and also to close the room for privacy.

4. The physician comes in.
A. An H&P is done, the medical records that are available are reviewed and evaluated. An order sheet is made, physical therapy is requested as PT is available at most nursing homes. The order sheet contains many things for activities and life. Diet, ambulation, activities and lots more. This first note needs to be very comprehensive as the necessity of need form is made from this and the notes. There is an MDS form from which stands for minimum data set. This has to be filled out every month. The RUG scores are like DRGs. These are the billing categories for the Nursing home. The physician bills for diagnoses and procedures. Again, this is for Medicare patients. Cash patients are not influenced by any of these rules and regulations.

B. The physician is required to come in to see the patient in the nursing home once per month. However, if the patient is sick, the physician may come in more often.

C. It will be important to track when the last physician visit was, so that the physician can be reminded to come in to see their patients. This could be done via email.

D. It would be good to be able to send information via email on a nursing home patient.

5. The Nurse
A. The nurse goes through the order sheet and sets up med sheets, day sheets, activity sheets and others for the patient. These sheets are kept in notebook charts. The notebook charts are separated in categories that are convenient for creating the notes and forms. Though, there has been discussion on making the notebook charts that are convenient for the care of the patient, this is difficult to do because of the logistics of doing the work.

B. The nurse has an input sheet, and does a very similar job to the physician history and physical, with more emphasis on nursing and less on health. This is usually a 4 to 10 page sheet.

C. Vitals are not done every day, as they are in the hospital. The physician can order vitals done more often, but they are usually done once per week or every three days.

6. Briggs is a forms company and many nursing homes purchase their forms and MDS sheets from Briggs.

7. There is an MDS (Minimal Data Set) coordinator. This is usually a nurse. This nurse checks the forms for MDS data and takes it from the other forms and puts it on the MDS form. The nurse also has conferences with other staff to collect data for the MDS form. These MDS forms are filled out monthly.

8. Housekeeping usually cleans each room every day.

9. Dietary makes meals for each patient three times per day plus snacks throughout the day.

10. Activity Director. There is an activity director that plans for activities for the patients everyday of the week. So an activity calendar is needed.

11. Once per month, the staff as an integrated meeting about each patient and what direction they need to take for the care of the patient. The nurse, the supervisor, the therapists, and others meet in the
conference room and they take the past medical notes and forms and draw conclusions on care for the patient. The family and the patient is allowed to attend in most cases for input and direction. They then build a form of which they will try to implement during the next month.

12. Social Services
A. Social services help the patients with getting into the government and church programs to help out with their particular situation. The social services people build notes of which the HCP can be used.

13. Physical / Occupational Therapy
It is common for nursing homes to have physical therapy and occupational therapy. The nursing homes get extra fees for this and thus want every patient on PT or OT. However, there are lots of rules to get PT or OT, thus the patients need to meet these criteria.

14. Patient Discharge from the Nursing Home.
Patients are discharged because of the following reasons:
a. Death
b. They were using the facility to recover from an illness or trauma and they are healed and ready to return home
c. Transfer to another nursing home. Some people or families have problems with the nursing home and request to leave
d. Transfer to a hospital. As many of these patients have some major health care issues, the get sick or they fall and then they need to go to the hospital for more intensive medical care or surgery or a procedure of some sort
e. They get kicked out. Some patients are very difficult to work with, as a result they are warned and warned again and again, and then there comes a point where the facility can legally request that they leave.

15. Billing for the nursing home.
A. Cash
B. Third party payer
C. Medicare.
D. Medicaid.
E. Combination

The physicians bill the patient using the HCFA billing form (1500). And the standard CPT codes, ICD 9 codes and the HCPCS codes when applicable. The HCFA form has only 4 spots for diagnoses. People have used two forms when there is more than 4 diagnoses. If sending in the bill electronically, there is no option to send in more than one form. Apparently it just never occurred to them.

The Nursing home facility bills using the UB-82 form. They use the ICD 9 codes from the physicians forms, and they use mostly the HCPCS codes for room usage, supplies, and etc..

Nursing homes are highly regulated. The reason is that it is a highly emotional issue. The patients are people’s mothers and fathers. The people expect a lot and also expect to pay very little. Due to this emotional situation, the people have complained to the governments which have but unbearable regulations on these institutions. Thus, the nursing homes can really benefit from an excellent computer system. It is difficult for people to understand that the payments go for three meals per day, one room cleaning per day, 3 nurse visits per day, supplies, and activities. Many people are expecting hospital care, which is close to $1500.00 per day. That is a nurse checking in on their loved one every hour,
housekeeping whenever it needs it, and lots more. The nursing home typically costs around $100-$300 per day. As one can see, this is a lot different than $1500.00 per day. But the education and marketing has not fully made this point clear.
IV. Admission to a Hospital

1. Admission to a hospital comes in the following ways:
   A. Through the emergency room.
   B. Through the physicians office.
   C. For Surgery or procedures.
   D. Through a transfer from a nursing home.
   E. Through a transfer from another hospital.

2. Collecting the Patient Demographic information.
   A. When entering through the emergency room, the registration clerk should have collected the patient demographics and the patient should be in the system. In the case that the patient is incommunicado and the name is not known of the patient, an alias will be assigned. This alias will be used until the real name is identified. A patient with as a little as Last name, First name, birth date and gender should be enough to get a patient registered within the system.

   B. There are registration clerks with whom the patient interviews prior to admission for elective situations, surgeries, and procedures. The registration clerks enter the patient’s demographics at their registration desk.

   C. When a patient is sick or seriously traumatized for which they need admission, the basic information is obtained over the telephone. Name, birth date and gender, and occasionally SS#. Then the patient is assigned a bed. When the patient arrives, the patient is taken directly to their bed. Then the registration clerk goes to the patient’s bedside and collects the patient demographics.

   D. For transfers, it would be great to be able to put this data on a diskette or to send it via email to the receiving facility.

3. Admission orders. In a hospital, admission orders must be available by the attending physician immediately. However, this is sometimes not the case. Occasionally, patients come to the hospital and get admitted without admission orders. If so, the nurses then call up the attending physicians and get these orders over the phone.

   A. Ideally, the admission orders would be there with the patient when the patient gets registered.

   B. Also, it would be good to be able to email the physician who could then send a recent H&P of the patient and a set of orders.

   C. When the nurse calls for orders. The nurse writes orders on the order sheet and enters them into the computer. This is not an efficient method, but it is commonly practiced. A FPG could be made for the nurse, which would be help the nurse put in the physicians orders directly into the computer, via a dictionary.

4. Nursing Notes
   A. When a patient gets up to the hospital room, the nurse is required to orient the patient, get the patient into the proper hospital clothing, get a new hospital patient packet, and to fill out the nursing admission form. This form goes through all of the things that are needed for excellent nursing. This form is typically 4-8 pages and it contains information on the medical history, the ambulation ability, the diet, the
grooming ability, continence, and life information.

This information is used as a baseline during the patient’s stay.

B. The nurses do a nursing note on each patient every shift. In the intensive care units, the nurses do notes more often.

C. There is also a med sheet, on which the nurses track when they gave patients medicine, noting the date and time.

D. There is an Input and Output sheet for some patients, for the nurses to check how much fluid and food is going into the patient and how much fluid, feces and vomitus is coming out of the patient.

E. There is a vitals sheet which the nurses record the vitals on. It is a graph that they fill in the sheet with numbers or dots in relationship to time. The FPG data type of Time Flow notes will be the solution for this.

5. Ancillary Services
Ancillary services is defined as Laboratory, Xray, CardioPulmonary, Electroneurological services, physical therapy, occupational therapy, dietary, pharmacy, housekeeping, maintenance and some others. Each service has a department. Each department makes their own schedule for their staff, and has task definitions. Each department works very similar, though each has some unique situations and forms. Each of the services has their own code, most of the codes are within the HCPCS manual for the USA, different for other countries. These services are usually charged on a UB-82 form, except for the PT and OT which use the HCFA 1500. In an office situation, if these ancillary services are part of the office, then they are billed on a HCFA 1500 form.

6. Physicians
The physician is required to see the patient every day, at least once. For ICU patients some facilities require the physician to see the patient more. But, most physicians that take care of ICU patients, are responsible enough to do the job necessary. All orders and notes must be signed by the physician. As some of these orders are phone orders, they typically do not get signed until the Medical Records finds them and tells the physician. Electronic signatures would be very helpful for this. The physician is required to have an admission history and physical, a daily note, and a discharge summary.

7. Consulting Physicians
Consulting physicians are typical within hospitals. Specialists and sub-specialists are consulted by the attending physician. Sometimes the consults are just to see the patient once and to try to define the problem and to give a therapy plan. However many times, consults are “Consult and Participate” which means that the consulting physician sees the patient, as does the attending physician, and both physicians then see the patient and both physicians write orders on the patient for testing and therapy. Typically, the consulting physician takes care of some parts of the therapy while the attending takes care of the general care of the patient. A better example would be if a patient was in a motor vehicle accident, and the patient had a broken lower leg along with multiple contusions, the attending would consult with an orthopaedic surgeon for the leg fracture and then the attending would take care of the general care of the patient and the orthopaedic surgeon would just take care of the leg fracture. Legally, either physician could write any orders and do what they so desire, however there is a unwritten law among physicians and each physician knows their part from their training and rarely do they ever cross the line. The consulting physician will
take a “Face Sheet” from the chart, which may be hard to do with an EMR. The face sheet is the patient demographic information used for billing. This face sheet is taken by the consulting physician and typically they will write the diagnoses by hand on this sheet along with a consult value and turn it into their billing staff for billing at a later time.

8. Social Services.
Social services is an important part of US hospitals as there are so much money from so many different sources. The goal of Social Services is to find government and private sources for funding the hospital visit and for paying for the patient in their needs while in the hospital and also on discharge. Also, there are many social programs that patients can benefit from, it is the Social Services Departments job to keep track of all of these services and to get patients enrolled in them.

9. Discharge From the Hospital.
A. Discharge Home.
B. Discharge to a rehabilitation hospital.
C. Discharge to another hospital.
D. Discharge to a Nursing Home.

When the patient is discharged home, a nursing discharge sheet is filled out, a physician discharge summary is dictated, and prescriptions and instructions are given to the patient. Plus, the supplies that the patient bought from their hospital stay.

A. Discharge Home.
After the forms are ready, the patient is typically wheel chaired to the front door or another door, and the family drive up their vehicle and the patient moves from the wheel chair to the vehicle.

B. Discharge to a rehabilitation hospital.
When the forms are ready, typically an ambulance comes to the hospital. The ambulance crew comes into the hospital, goes to the patient’s room, puts the patient into the gurney, takes the patient back to the ambulance and drives the patient to the new facility. This can also occur by a private vehicle. In other countries, public transportation can come into play. A complete copy of the hospital chart for this visit is typical.

C. Discharge to another hospital.
This can occur by an ambulance, a private vehicle, by a helicopter or by a ambulance to a fixed wing airplane. There is a standard set of forms that are needed, discharge forms, transfer forms, and COBRA forms, and the crew can take the patient to the next facility. A complete copy of the hospital chart for this visit is typical.

D. Discharge to a Nursing Home.
Typically a discharge to a nursing home is done by an ambulance, though it can be done by a private vehicle. The forms need to get done, plus a complete copy of the hospital chart (for every visit to the hospital) is typical to take to the nursing home.

10. Things to Remember
Typically, each floor in the hospital has a “BOARD”. A Patient Board. On this board is the name of the patient, the attending and consulting physicians, the room number, things to do today, the nurse on this shift assigned to the patient, and etc. Though all facilities do not have a board, all could use a board.
Some do this on paper. However, the tracker program would be an excellent solution for every floor.
V. Going to a Medical Office or Clinic

1. Getting An Appointment
Offices are set up in a few different scenarios. Some offices are walk in, some allow for some walk in, some have appointments only. Most physicians are typically off schedule. This is a very frustrating situation, as patients typically have to wait and their time is valuable too.
Patients get appointments by calling the office. To my knowledge, no physicians use the WWW to make appointments, however this is a good idea. Reappointments are also common. Where the patients return for reevaluation of their your health care situation. This then is done face to face with or without the physician, but the office staff makes the arrangement with the patient for the scheduled appointment time.

2. Getting Registered.
Registration to get the patient’s demographic information is always a difficult process. Due to the billing process, patient demographics is needed for all billing interactions. This information changes sometimes but not often. Usually, the patient demographics with the insurance information will be good for 5 or more years.

3. Coming to the clinic or office.
In some clinics there is a parking problem. Some have parking validation, thus this information must be available for the patient. The computer could print out a parking validation paper with the visit automatically for this situation. The patient comes to the clinic signs in. This could be done with a computer, even a select concept, as the patient is on the appointment schedule. It would have to be different for walk ins. Typically the patient then just sits there until called by the staff. Once called by the staff, there may be some forms to be filled out for patient demographics. At this time, a computer could be used for the patient to fill out patient demographics and even the patient’s health care concern.

4. The Nurse Patient Encounter in the clinic.
The nurse takes the patient back to a nursing station where the vitals are taken. That is the pulse rate, the respiratory rate, the temperature, the blood pressure and the oxygen saturation. The nurse then enters this information on the encounter form and then the nurse may also ask about the health care problem and also enters this information. The nurse may do all this in an exam room or first at a station and then take the patient to an exam room. For predetermined procedures, the nurse may get the patient in an appropriate gown and get the patient prepared for the procedure.

5. The Physician Patient Encounter.
Once the patient is in the exam room, this situation is identified. There are markers or some sort of communication system for the staff to know. There may be plastic flags of different colors, markers, etc. The idea being to communicate the needs of the clinic. The typical communications are Patient in room ready to see the physician, patient needs a lab test, patient needs an x-ray, patient needs a cardiopulmonary service, patient ready for discharge, patient needs a special gown for the procedure and others. The physician typically sees the patient at least twice during an office visit, not always but typically. The physician walks in the exam room to get a dialogue going as to what the patient’s problem is. The physician does an exam. Then the physician may need to get some ancillary services, either in the office or out, and then the physician leaves to get everything arranged. The staff may then come in to draw blood or do some arrangements. Then when the tests are done or the arrangements are made, the physician returns to go over possible diagnoses, therapy, things that the patient needs to do and then gives the patient their forms such as prescriptions, patient education, ancillary service request forms, and etc. The physician in the standard office is going to see this patient for years. If the physician is a specialist then they will see
the patient over many times for this problem. The FP physician sees the patient for their whole life, thus the chart needs to be organized to constantly review what has been going on over the last year. And to plan for future care.

6. Ancillary Services in the Clinic.
Some clinics have ancillary services in the clinic, such as lab, xray, ekg, etc. In these cases, the tests can be done at the right at the clinic and the physician and patient can get the results right away. These are then billed on the HCFA 1500 form. Billing for tests has been difficult for this situation as the new rules in the USA want a diagnosis and code for each test. This makes it difficult for the physician as the reason tests are done are to confirm or to figure out a diagnosis. As a result, many physician have found a number of symptomatic diagnoses that will meet the needs of the government agencies and third party payers.

7. Ancillary Services out of the clinic.
Ancillary services out of the clinic require a form. Sometimes the office staff needs to phone call or send a communication to the ancillary service to make an appointment. Sometimes just a form is needed to be filled out and the patient can then just walk in to the ancillary service facility. For laboratory testing, it is common for the clinic to draw the blood, fill out the forms and then deliver it to the laboratory as a service. Then the lab sends the results back to the clinic.

8. Patient Forms.
In many cases patients have their own forms. A school athletic physical exam form, a work history and exam form, a department of transportation history and physical exam form and many more. The patient typically bring these in themselves and hand them over to the physician or staff.

The patient discharge results with the physician or nurse giving the patient the prescriptions, the patient education forms, the instructions, and more. Next the patient may go back to the front office to discuss the billing and payment situation.

In the office, there is a mix of billing situations. Cash payments, Co pay, Insurance pay, Supplement pay and company pay. There are many different types of insurances within the USA, well over 100. And for company needs, the companies typically pay with a check. For patients that do not have insurance, many offices allow for payments over time. For insurance and supplements, forms need to be filled out and either mailed in or sent in electronically. Once the payments are made, the office staff then post the payments against the actual bill.
VI. Going to an URGENT Care

1. Entering the facility, as it is walk in care.
Urgent cares are run very similar to emergency rooms. Even with some appointments. Some patients have appointments for IV medical therapy, for medical procedures and other situations. However, most patients just walk into the Urgent Care center. They typically park nearby and walk into the facility. Some Urgent Care’s accept ambulances.

2. Patient registration.
If the patient is not in dire straits, then the office staff types in the patient demographics or writes it down on their forms. If the patient is very sick or has had some serious trauma, the patient is taken back right away for patient care and registration is delayed.

The nurse typically sees the patient first. The nurse can see them in an exam room or to a nursing station and then to an exam room. The nurse gets the patient vitals (pulse rate, respiratory rate,

The Urgent Care physician typically has the mental concept of seeing a patient once. However there are always regular patients that return on a regular basis. So, the UC physician gets a reputation with some patients and they come back to see the specific physician. However, as far as a system, one can look at the UC physician as a physician that sees a patient once with possibly one follow up. So, the chart needs to be designed for a single visit, but also, if one has the information, it would be great to be able to see the chronic disease, the past surgeries, the allergies and the medicines that they take daily for best clinical decision making.

5. Ancillary Services in the Clinic.
The Urgent Care usually has basic laboratory, xray, and cardiopulmonary. One has to make sure that the correct symptomatic diagnoses are available and put on the request sheets for the ancillary services, because the new laws and regulations require that the a diagnosis accompany each ancillary service request.

6. Ancillary Services out of the clinic.
Ancillary Services out of the UC is uncommon. Though it can occur, the practice is just not set up that way. There will be some circumstances in which this can occur, but not daily.

7. Patient Forms.
Patient will need forms for physicals for school, for work, for camp, etc. This is a common situation. So, one will need to be able to produce these. Also prescriptions, work excuse slips, patient education sheets, and others.

8. Patient Discharge.
The nurse usually discharges the patient, as in the ED, and then the patient typically checks back with the billing people on billing matters.

The billing is similar to office billing.
VII Getting Surgery

1. Emergency versus Elective Surgery
   Emergency Surgery is usually for life threatening situations. Trauma is one example. It can also be a chronic disease with an acute situation, such as a gastric ulcer that has perforated, atherosclerotic heart disease that has obliterated a vessel requiring emergency cardiac bypass surgery, etc.
   In many cases these emergency surgeries will force an elective surgery to be delayed, as the emergency can become a higher priority. The system for determining the priority is unique to each facility and it is usually determined by the surgeons and the anesthesiologists. This is a source of continued friction.

   Elective surgery is for problems that have a wide time range. Though some of these problems need to be solved, there is a wider window by days or weeks. Unlike Emergency Surgery which is supposed to have a window for survival of a few hours or less. Elective surgeries can be the same as emergent. ENT surgery is typically elective. Eye surgery is typically elective.
   Knee and shoulder surgery is typically elective. Elective surgery is a more controlled situation.
   It is not a life threatening situation, though the anesthesia or the surgery can make it one, it is usually safe.

2. Getting Registered for Surgery
   In emergency situations, the patient is typically brought into the surgery suite after the emergency department, and thus the patient registration is usually already done and in the hospital computer system.
   For Elective surgery, there are many different situations depending upon each facility.
   Typically, in the elective situations, the patients come in 1-2 hours before the surgery, and there is a staff member to take the patient demographics and type them into the computer right before the surgery. Some facilities use the same staff as the admissions staff and the patient goes to the admissions department for sign in first.

3. The patient getting prepared.
   The patient is typically given an instruction sheet at the surgeon’s office on how to get ready, what to eat or not eat, when to stop taking things by mouth, about smoking or drinking, and what to wear for the surgery. Also on what to expect in times.

   All surgical facilities request that each surgical patient be brought by someone else and to be picked up by someone. They do not want the patient to drive there or to drive home.

5. The Pre Op Nursing.
   In the pre op session, the pre op nurses check all of the paper work and laboratory to make sure that everything is in its proper place. The Anesthesiologists write pre op orders along with the surgeons which the pre op nurses perform, such as starting an IV, giving antibiotics, giving medicines, and getting the patients in the proper clothing.

6. The Anesthesiologist Patient Encounter
   During the pre op session in the pre op area, the anesthesiologist sees the patient and does their own history and physical and determines airway problems and anesthesia medicine interactions that may occur. If there is any problem at this point, the anesthesiologist will stop the surgery.

   Typically, the surgeon has seen the patient in the office. However, every facility I have been in, WILL
8. Moving the patient to the Induction area.
In some facilities, more typical in the British colonies, the patient is taken from pre op to the induction area. In the induction area, the patient is set up with monitors, given the induction agents and neuromuscular blockade agents and put under. Then the patient is transferred to the surgical suite, moved off of the gurney, onto the surgical table, set up with the monitors and then positioned on the surgical table.

In the US, the patient is brought to the surgery suite, put on the table, set up with the monitors and then given the induction agents. After the patient is unconscious, the patient is positioned on the table.

Next all sites continue on with anesthesia medicines.

9. Moving the patient to the Surgical Suite
As explained earlier, in the US, the patient is taken directly to the surgical suite. Once the patient has been connected the monitors and is given anesthesia, the surgery can start. The time the patient enters the surgical suite is recorded. The time in which the surgeon makes the first cut, is the start of surgery.

10. The Nurse Circulator
The nurse circulator is the nurse that is in the surgical suite and takes the notes, gathers the supplies, the tools, and anything else that is needed. The circulator keeps track of all of the times, the tool sets used, the supplies used, the people in the room, and the logging information. Also, the circulator keeps track of any tourniquet times. Heart pump times. Heart block, etc.

11. The Anesthesiologist in Surgery
The Anesthesiologist is considered the patient’s advocate. The Anesthesiologist keeps track of the patient to make sure that the patient is pain free and that the patient’s vital signs are all within range. Should something appear amiss, the anesthesiologist lets the surgeon know.

12. The Surgeon and the Patient
The surgeon and team focus on doing the surgery as quickly and effectively as possible. The surgeon has a plan on how they will approach the health care problem and how they will activate the surgical plan and accomplish it. Should there be a problem the surgeon has a back up plan. Should some supplies not be available, the surgeon has a back up supply plan.

The surgery is considered done, when the skin is closed. However, this is some modification to this. In some surgeries it is after the dressing is put on. In orthopaedic surgery, it is after the cast is put on.

When the surgery is done, the patient is brought out of anesthesia. The goal in the US is to get the patient awake while they are still in the surgery suite and to have the patient then move themselves back onto the gurney. In other countries, the patient is kept asleep and taken back to the induction room for wake up.

Once the patient is ready, the patient is taken to Post op. In post op, the patient is allowed to relax and to wake up fully. After being under anesthesia, the patient is groggy for some time. Also, the patient can wake up in severe pain, which is not good. So, the patient is observed and given narcotics to prevent pain.
or to stop pain. When the patient is fully awake and their pain is under control, the patient can be discharged.

Airway problems occur in post op. Also, if a neuromuscular blocking agent is used and then a reversing agent is used on top of that, the reversing agents are not always as long lasting as the blocking agents. Then patients may stop breathing because the neuromuscular blockage starts in again so the muscle to breathing cannot work. So, the patient needs to stay in the post op area until the neuromuscular blocking agents are worn off completely by a clock not just by electrical muscle testing.

14. The Post Op Nursing
The post op nursing is to watch the airway and to give the patient pain medicines to get pain control. To observe the patient wake up fully. Should there be any problems, the anesthesiologists are called in. In many cases, the post op nurses have experience and become familiar with the medicines and procedures. However, no action can occur unless a physician makes the order. With this in mind, a phone call to the anesthesiologist can sometimes give the necessary order to get a solution to the problem. If there is any serious problem, then the physicians know to come to the post op area.

15. The Discharge
The patient can be discharged home or to the hospital. Outpatient surgeries are becoming very popular especially with the new endoscopic techniques which have very little pain and discomfort associated with them. Once the patient is awake and under pain control, the patient is sent home with a family member or friend. Typically, the nurse gives the patient prescriptions, patient education instructions and a reappointment slip when to see the surgeon in the office.

Billing is complicated for surgery. The surgeon bills on the HCFA 1500 form for the surgery and nowadays the surgery fee is bundled. Bundled means that the surgery and all of the care associated with this surgery is one fee. The anesthesiologist bills on the HCFA 1500, and also has a basic fee for each surgery, plus an add on time fee, should it take extra time. The hospital bills on a UB-82 form and charges for the surgery suite room usage by time, the medicines, and the supplies. I am not sure how the perfusionist bills. I am not sure how the laser equipment people bill, along with the other equipment companies that rent out equipment for surgeries.
VIII. Getting into a Rehabilitation Hospital

1. The Registration of the patient
   Most of these patients come from hospitals or nursing homes. So, the admissions coordinator gets all of the patient demographics for admission. The patient demographics is very important for billing and getting paid. Some of these patients are unconscious, but most are not and they are cooperative. Many of the patients in the rehab hospitals are depressed because they will have a permanent life change.

2. The Nurse Patient Encounter.
   The nurse is integral in the rehabilitation hospital, as with all hospitals. However the rehab hospitals have some very sick people, and they are going to be very sick for a very long. These patients without modern medicine would not survive. Some of the patients that would have died weeks earlier without modern medicine. Some of these patients do remarkably well, such as the burn patients, the patients with necrotizing fasciitis, etc. Some of the cerebral vascular accident (CVA also known as Strokes) patients end up walking out in great shape, which is a real miracle. Patients with spinal cord injuries do fairly well, but the depression is difficult to deal with. Here the patient is, alive, but they cannot move anything. They are stuck in a wheel chair. They clearly cannot do what they did before and their life is guaranteed to be different. So, the nurses are their friends. The nurses see them everyday and the patients get to know the nurses and the nurses get to know the patients.

3. The Physician Patient Encounter.
   The physician is required to come in to see the patient every day and to write a note on the patient’s progress. The progress is typically in weeks, not days, however this is the rule, to have the physician visit daily. The physician typically determines a plan and then executes the plan and observes the outcome over weeks.

   Typically, the rehab hospital has cardiopulmonary, physical therapy and occupational therapy in house. The lab and xray are done from outside sources that actually come to visit the facility. The physicians order the ancillary services just as they would in a hospital, by writing it on the order sheet. Then the clerical staff transfers the information to the necessary forms.

5. The Physical Therapy.
   This is the main stay of the rehab hospital. The PT department is very busy here. This is the PT/OT professional heaven. As every patient needs PT and daily.

6. Consult Teams.
   In most rehab hospitals there is only a handful of full time physicians. These physicians do the daily rounding and daily care. Then there are some consult physicians and consult special nursing teams for wound care and picc line placement. The consult physicians typically come in once or a few times for each consult and do a full work up for their speciality and then write down a therapy plan that the full time physician should follow. The attending physician then reads the consult therapy plan and follows the plan as recommended by the specialist. The specialist then checks back to see how things are going.

7. Discharge.
   For discharge, it is usually a big deal. For here is a patient that has been with the staff for months, and everyone gets to know everyone. So, the patient if they can walk and take care of themselves, get prescriptions, patient education, follow up appointment slip and then boxes of their stuff that has
accumulated over the months.

If the patient is discharged to a nursing home, then it is more typical of moving from one hospital to another.

The rehab hospital does billing daily on each patient, using the UB-82 form. The Physical Therapy can use the HCFA1500 form on a daily basis. The physicians use the HCFA1500 and bill for daily care. To my knowledge rehab is not bundled. The reason is that rehab medicine is difficult to put into a pattern.
IX. Getting Home Health Care

1. Getting a home health care visit
A physician must order a home health care visit by nurses. There is strict criteria. If a physician uses home health care, they soon learn that the home health care does most of its orders by telephone order. Then after they get the telephone order, they mail the order to the physician, whom in turn must sign the order and then mail it back to the home health care agency. It would be great for electronic signatures and for doing this via email.

The agencies know the rules well and give the physicians pointers so that the physician can too stay within the boundaries of the rules.

2. Getting the patient registered.
The patient is registered in two ways, one by telephone, two by the nurse visit. During the visit, the nurse gets all of the necessary information and writes it on to pre printed forms for patient demographics.

3. The Nurse Patient Encounter
Typically, one nurse takes care of one patient. This is because the nurse rarely needs to come every day. In the case that the nurse needs to come everyday, then there is two or more nurses. The nurse and patient get to know each other, and this is part of the therapy. The nurse works with the patient for the desired nursing and health care therapy. It can sometimes be some forms of physical therapy also. The nurse then creates a document to tell of the patient’s progress and the goals of the therapies.

4. Communication with the physician.
The nurse writes up a document, once a week to discuss the patient and the progress. They then mail this document to the physician. In turn, the physician will communicate back with the nurse to discuss therapy options and goals that the team should be heading toward.

5. Discharge
When the patient meets the goals, then the home nursing care is terminated. This is typically done over time, and the visits are decreased over time. The termination is planned so that everyone, especially the patient, knows when the end time is.

I am not sure how this is billed.
X. Getting an XRAY

1. Getting an Xray Request
An xray request in the USA needs to be requested by a physician. This is not the case in other countries. In some places, if you have the cash you can get any xray you want. However, in the USA, one needs a physician request.

2. Getting an appointment.
For most xrays, one can just walk in to an xray department with the xray request form, and they will get the patient in quickly to get their xray done. It rarely takes very long.

However, for special xrays, such as barium enema xrays, barium swallows, IVPs, MRIs, Cts and PET scans these all need to be set up on an appointment, because these take time and special skills. In emergency cases, the physician can call the staff and get one done on an emergent basis, at least this is true for an IVP, a CT and an MRI.

3. Getting Registered.
If a patient is already registered in the hospital, then registration is done, as in the USA, nearly all of the radiology facilities are associated with a hospital. If the patient is not registered and the patient is a walk in from an office, then the clerk at the xray place enters the patient demographics on to a preprinted form or into a computer. In many hospitals, the standard method for any ancillary service is to have the hospital admission staff key punch the patient demographics into a computer. And then this will serve as registration for any test or admission.

4. Getting the Xray.
Once registered and the xray tech has the xray order from the physician, the xray tech calls the patients typically in chronological order. The patient is taken into the xray room and the xray films are taken. Typically, the xray tech talks with the patient to get a simple understanding of their health care problem and to make sure that the correct xray studies are ordered. If the xray studies do not correlate with the patient history, the xray tech will sometimes call the physician to get a better understanding and to discuss the xray options for clinical decision making discovery. If there was a misunderstanding, then the xray tech will change the order to the more appropriate study.

Once the films are done. The films can be given to the patient to take back to their doctor. The films can be given to the radiologist. The films can be put into a stack for the radiologist. The films can be scanned and sent to a radiologist.

5. Getting the report to the physician
If the patient brings the films back to the physician, then the physician reads the films and then makes a decision about the patient. The films are then sent back to a radiologist to be reread and a report to be sent back to the attending physician. If the radiologist reads the films right away, then it is not uncommon for the radiologist to call the doc to give them the results.

If the films are put into a stack, then when the radiologist gets around to it, they read the films dictate a report and the dictated report gets to the attending physician usually around 1-2 weeks later.

6. Discharge
The patient is discharged from the xray department with very little instructions or education. The patient
does not go back to the billing department, as the bill is typically sent to the patient.

Billing for xrays is for the taking of the xray by the hospital or xray facility and then another bill for reading the xray by the radiologist. The radiologist uses the HCFA 1500 form, the hospital uses the UB-82 form.
XI. Getting a Lab Test

1. Getting a Lab request.
In the USA, in order to get a lab test, one needs a physician signature. They are starting to get more lax on this ruling and some labs do offer over the counter lab testing, but not the full range. The lab has to get the patient demographics, which is usually done by the clerical staff or in a hospital lab, the admission clerks. So, for most requests, the physician needs to give a request by a piece of paper or by calling on the phone.

2. Getting an appointment.
Most labs get a specimen and that is it. There is rarely a long line or a wait. So, appointments are not needed.

3. Getting Registered.
Registration for patient demographics takes place by the clerks.

4. Getting the lab test.
Next the lab techs get the specimen, which could be blood, urine, swaps of wounds, any bodily fluid, and surgical specimens. The test is then done on the specimen and the results are typically printed on a computer. For pathology reports, they are typically dictated by the pathologists and then printed on a computer. Then these reports are sent to the physician that ordered them.

5. Getting the result back to the physician.
Typically, the report is on paper and delivered to the physician. Some large companies leave printers at doctors offices and they just print of the reports via a phone connection.

6. Discharge
When the specimen is taken, the patient leaves.

For billing, they need the patient name and demographics, the lab tests and a diagnosis for why the test was requested.
XII. Getting a CardioPulmonary Test

1. Getting a CP Request.
   In the USA, a cardiopulmonary test requires a physician request. The CP requests are: EKG, PFT, Treadmill, Nebulizer therapy, Oxygen therapy, Ventilator management, etc.

2. Getting an appointment.
   As some of these tests take time, they make appointments for outpatients. For ER and inpatients the CP services are done on demand. Presently, the CP clerk keeps an appointment schedule for each of the testing services that they offer. The demand services are kept track of also in their log.

3. Getting registered.
   Again, the patient demographics are needed for billing. The clerks typically take in this information. For hospitals which are commonly the location for CP departments, the admissions people take care of this function.

4. Getting the CP Test.
   The patient is either in the facility or goes to the CP department. The CP test is done at bedside or in the CP department.

5. Getting the results back to the physician.
   Many of the CP tests create a graphic image, such as an EKG, a PFT, a Holter, etc. These need interpretation by a physician. And then a report is dictated and printed with the graphic image. Then sent to the requesting physician. For in house, the graphic image copy is given to the physician immediately and an interpretation is given later.

6. Discharge.
   When the test is done, the patient is discharged with no special situation.

   Billing requires the patient demographics and a diagnosis for each request.
XIII. Getting a copy of your medical records

Historical Medical Records.
1. Contacting the facility with the patient's medical records.
   Typically, the patient will need to go to the facility with their medical records in order to get a copy. This can be done by mail, phone, or fax.

2. Physician office versus individual patient.
   When a physician requests a copy of the patient records, the patient is required to sign a consent form and then the medical records are copied and sent to the requesting physician. They are sometimes faxed. The individual patient typically has to go to the place to get the records.

3. Costs.
   Typically, the physician does not have to pay for patient’s medical records. However, patients do have to pay. Attorneys also have to pay.

The New Idea of Getting Medical Records.

With the new system, we want the physician to be able to pull up all of the patient’s records easily and quickly. Though there may be distributed storage, with all systems running, it should be an easy process, as it occurs often.

With time, we would like the patients to be able to log on via the internet and under secure cover, be able to look at their medical notes and ancillary service reports at any time.
XIV. The Billing Process

1. The physician billing.
Physicians typically bill on the HCFA 1500 form. This form is required for medicare and medicaid. However, other third party payers may require their own forms. In all cases except Medicare and Medicaid, a super bill is ok. A super bill is a piece of paper with the patient’s name, demographics, the diagnoses, the procedures, and the supplies.

2. The hospital billing.
Hospitals typically bill on the UB-92 form and take care of all hospital services including the ancillary service forms.

3. The ancillary service billing.
When just coming in for an ancillary service, the lab uses a UB-92 billing form.

4. The Physical therapy billing.
When just coming in for physical therapy, if a physician is not involved then a UB-82 form is used.

5. The nursing home billing.
The nursing homes use the UB-82 form.

The billing process is become very complicated, however it is just an exercise in shuffling information around on forms. If the information is structured and identified, then a computer can do forms processing very easily. The government agencies are presently very strong in determining the practices that we are required to use. Now, for Medicare and Medicaid, we have to use DRGs and APCs for billing and their special forms.

Once this billing information is linked directly from the physician input data dictionaries, and the software written to take this information and correctly put it into these forms, then more than 90 percent of the staff presently doing this job will not be needed to do this task anymore. This will be quite a relief, because it is really a problem.
XV. The Supplies and Inventories Process.

Supplies to hospitals can be very complex. There is some general hospital suppliers. There is also many specialty suppliers. For example, for cardiovascular surgery, the supplies are very expensive, thus they are ordered and delivered for specific surgeries. As the prices are in the thousands for each supply, the representative typically comes along and delivers the goods to the surgeon in the surgical room. This is also true with many other surgical supplies.

For standard supplies, the central supply department takes care of keeping track of these, inventory and ordering.

Each hospital department is supposed to keep a list of all of their supplies used and then they are restocked weekly. With the supply list being tagged to the data dictionary, a much more accurate account of the data should occur.
XVI. Some of the Known Computer Problems With Medical Computer Systems

1. Unique Identifiers for patients.
In our look at many hospital computer systems, we have found that these systems typically have numerous patient entries for a single person. At one facility, late at night, we were looking at a single patient that we knew was a frequent visitor. We found that that patient had 14 different entries. That is, this one patient, was in the computer 14 times under different names. Though the names were similar, there were misspellings and thus, this one patient had 14 different unique identifiers. As we looked at this problem, the error occurred because the patient name field was a single field, it was not broken up into Last Name, First Name, Middle Name, and as a result, each time the name was misspelled, or a middle initial or a full middle name was put in, the patient was registered as a new patient.

2. In general, the patient is assigned a billing transaction number for each billing situation. Within healthcare, due to the heavy regulation, charges may be bundled, that is more than one visit and interaction may be within one bill. Thus, if a patient came in for a surgery, the charge for this may include multiple visits whether they are used or not. For stitches, a recheck and stitch removal are all included in one charge, thus additional charges cannot be billed. So at this point, it may take a human to check the patient encounters and the billing to see if they are bundled or not. With time, we will find an easy way to identify this situation and it will be included within the data dictionary and thus the computer programs will have data to confirm bundled situations.

3. Pixis machine. Cardinal Health systems has been very successful with their pixis machine. This is a machine that requires the user to sign in each time to get medicines for any given patient. For patients on the medical floor with scheduled medicines, this is a good way to keep track of the medicines, however, it is a slow process. For acute care situations where this is no scheduled medicines, there is an overwhelming morbidity associated with the pixis machine. There is also suspect mortality, however, because the machine forces medicine keeping track of, the serious patient consequences are presently being overlooked and the plaintiff malpractice attorneys have not yet thought of this angle. The idea of having medicines or supplies in locked drawers that are computer controlled is a good idea, the problem is that the software is not designed for the job nor the user. The software, like so many other pieces of software, is designed by a low level programmer. Someone that most likely lacks systems analysis training and thus just did not have enough education nor training to understand the effect that this would have on the industry, with patients suffering in pain and coming close to death and all kinds of patient morbidity, it most likely just never occurred to them, thus there was very little ergonomic consideration in the software design. Though we will most likely be using computer controlled cabinets and drawers, we want to have software that works like our staff does within the environment that they are in. We need to have quick over rides for quick access so that patients will not suffer such as they do with the Cardinal Health Pixis machine.

With the data dictionary, once a medicine is ordered, the information should be able to interface with a computer activated cabinet machine and once the physician orders the medicine, then the machine should print out a message for the staff that will be giving the medicine and in turn, open the file with the medicine so that they can remove it without even asking the machine. For if one of our staff orders it, then it is recorded whom ordered it and using the identity badge a quick movement would be the verification. The devices where the cards just need to be close to the machines seem to work like we envision.
The Re-Engineering of Our Process and System.

What We Envision
Data Flow with the Present System

Physician Patient Encounter

Paper Chart
Sign Off Tasks

Order Entry Staff
Computer Or Paper
Same Process

Partial Patient Education by

Prescriptions Dispositions

Patient Disposition with Ending Patient Education

Administration

Staffing / Policy / Work Flow

Patient Gone / Post Processing

Accounting

Inventory / Supplies

Radiology/Imaging

Cardio/Pulmonary

Laboratory

Nursing/Paramedical Tasks

Pharmacy

Consults

Medical Records

Research
Data Flow with the New System

- Prescriptions
- Medical Records
- Patient Education
- Inventory / Supplies
- Staffing
- Research
- Accounting
- Administration
- Consults
- Radiology/Imaging
- Cardio/Pulmonary
- Laboratory
- Nursing/Paramedic Tasks

Physician Patient Encounter
Health Care Professional.

For our physicians we need a tool with a single screen design. The screen cannot be cluttered, it needs to be easy to navigate through with the design and colors for a professional work environment. (This is not a video game.)

Basic screen design should include:
Guideline data dictionary
Navigation map
Medical Note
Patient Name/Demographics
User Name/Demographics
Action Buttons
Value gauge
Status window

Patient.
The physicians will need to have an option to select the patient that they are going to build their note for. It needs to be select a patient for the scheduled situations, create a patient for the non-scheduled situations, alias patient for the patient which cannot give their complete name, and search for a patient for select. Additionally, our physicians are professionals, they need the ability to edit the patient name and demographics should that be necessary.

Chart Review.
If a patient has been in our system, the physician will need the ability to review the past charts in a number of ways. One method is that particular physician’s standard chart review, so that every time a patient gets selected, the program will display the pre-scripted review that that particular physician would like to see. Some physicians like to see a list of the visits, some a list of the diagnoses, a list of the medicines, and so on. Some will want to see the vitals charted out, tables of some of their information. Additionally, for more detail, allowing for complete review of the past notes in chronological descending order with a select is very important. The physician may only want to review certain sections of the notes also.

Add to note from previous note.
Some physicians like to add things from their previous medical note to the present medical note that they are working on. Even if there was another physician visit in between, it is important to get to this particular physician’s note, and not anothers. The note is divided up into 12 sections, described under the data section. The physician may leave a specific section for this purpose. Then with a script, that section will always be added to the present note, or with a select, a section of the previous note can be added to the present note.

Edit the note that one is building.
The physician may need to modify the data, add data, or change things within the note that is
being built. Since the information within the data dictionary is pre-validated, it will need to secure. However, adding or typing, or dictating in free text is fine and needs to be an option.

Suspend Resume.
Suspend will suspend the existing patient and start with a new screen, and put this patient that was suspended into a suspend que. While resume will give a list of all of the patients that are available for resuming.

USER NAME.
The user name will need to be displayed on the screen, so that one using the product will know that they indeed are signed on. The user can sign off if need be.

GUIDELINE Name window.
The guideline that the physician is using needs to be displayed. Additionally, some sort of gauge or navigation map associated with the guideline so that the physician knows where they are located within their patient care process.

The name of the dictionary table that one is in.
Each individual data dictionary, for a guideline may be composed of tens or hundreds of them, needs to be displayed with the data dictionary information. The user needs to see this.

Navigation map.
As suggested above in the GUIDELINE area, there needs to be a navigation gauge or map so that the user knows where they are in terms of the process.

Value Gauge.
Today, physicians work is valued in terms of procedures associated with billing. So, a methodology with a script for continuous evaluation of the present note that the physician is building is needed along with a gauge or display to let the physician user know where they are at within the value level of the note in terms of levels 1 through 5.

Status Window.
As the processes of the program are going on, a message to the Status window needs to be on going, to let the user know what the program is doing or what the program wants. This is also for email messages, and return lab. Different levels of status messages will determine whether an action is required by the user or not.

Other programs.
A list or a set of icons somewhere or in a pop up window, of the programs that the user is also allowed to use. Not necessary.

System.
Configuration settings for this particular program on this particular machine.
Patient Done.
When the user is done with this patient, there needs to be a PATIENT DONE button or some such idea. At this point the matching of all of the diagnoses with the supplies, procedures, room usage and medicines can be determined with a select and match method.

Maintenance.
Maintenance is a function for established patients. If a patient with heart failure and diabetes comes in for a skin laceration, they may also say “Oh Doc by the way” and request for some refills. Maintenance goes into the Problem Files and gets a list of the meds that the patient is on and gets the names of the dictionaries and puts those dictionary names at the bottom of the present Guideline list, so that the user can also select from these dictionaries to refill the patient’s medicines.

Security.
In the case that the physician or user needs to leave their machine, then they will need to lock out the machine. And also when they return, they will need a combination to get back into the machine. This needs to be a quick process.

Sum.
If there is some SUM data in the dictionaries and the user selects them, then the SUM button needs to be there. The SUM is to sum data items so that the user can see trends and potential problems prior to their being a problem. In looking at this, there is presently a “#” in front of the data that has numbers to be summed. The program just sum up this data, every time one of these “#” data items was selected, instead of hitting the sum button.

Age.
This can be done in a number of ways. Either touch or click on the birth date if available, or have its own button. This will enter into the note. “This 50 y/o male.” also, would be nice to add in RACE. “This 50 y/o Caucasian male....”

TIMESTAMP.
This can be done by just touching or clicking on the clock that is on the screen. Options need to have a with or without the name list.

ORDERS.
Orders can be selected from the dictionaries, however they are not to be processed until the end of the note or if the user selects orders then they are to be processed right then.

ACCEPT ORDERS
Once a lab test is done, or any of the ancillary services are done and the report or image is ready, the physician will need to be notified and verified. Then the physician will need to accept the report / image, and view the report / image. Additionally, at that time the physician may want to act upon that information.
Analysis.
This is for analyzing the data that is in the medical note that one is creating right now. Also helpful would be analysis on the data that is available right now and data that is in the patient’s chart from before. Additionally, ability to analyze data from other patients with the same or similar problems would be useful. There can be some scripts somewhere, in files, in the database, where ever. Then, the options need to be able to put up an analysis button. Then, up pops the analysis options, and the user selects ......

Help for the user.
Help on how to use the program and help to understand medical information, help on looking up disease and therapy information.

Data Input for Medical Note
Dictionary data input.
Type in data.
Voice to text, just like type in.
Image data to put into note.
Drawing, similar to image data, but will need a processor to create the drawing.

SPECIAL EXCEPTIONS
In some cases, dictation is very good because of the situation. In the autopsy, the physician is gloved and a device with a foot pedal is used to dictate the report as the physician works. As with all dictated reports, we have found these to ramble on and each physician rambles on in their own method, and it is the rare case where there is structure. Without structure there can be no research. We want to have research analysis on every patient situation, even the autopsies. This will take some discussion and observation, but we will need to have a situation where the report can still read like a story, and still be structured.
The Ancillary Service Staff.

The ancillary service staff do not have a lot of forms processing to do, thus we would like to see them carry around a wireless PDA. This device will be their communication to the staff that use their services.

For example, for a Imaging technician, they will
A. receive an imaging order with the order information and the name and location of the patient. Should the order be vague, the technician will need to be able to modify or change the order to what was really wanted. It is not unusual for image orders to be changed because of the new computer order entry software does not replicate the job well. Thus, the physician knows what image they want, but the available list of orders are not in the common medical terminology used within the departments, and thus a request is ordered using the wrong term, so the technician deletes the order and puts in the correct one.

B. The technician needs to acknowledge order receipt and indicate their estimated time of arrival, so that the department where the patient is can give the staff time estimates in case other tasks need to be done in the mean time. If the technician cannot find the patient, the technician needs to be able to put in a query to help them find the patient.

C. With the laboratory, it is common practice for the phlebotomists to draw extra tubes of blood, because later on another test is needed, and this saves having to stick the patient with a needle more times than needed. So, if more blood is drawn and put into tubes that are may or may not be used, these tubes still need labels to be kept track of for 24 hours. Some of the blood samples are kept for 1 week and logs are kept for tracking of these blood samples. And in some cases, some blood is frozen and kept for years. This also has logs and needs to be tracked.

D. With the cardiopulmonary department, if an EKG is done, if there is a previous EKG, you can guarantee that the physician will want a copy of that previous EKG printed out for comparison. Additionally a list of the EKGs and their dates is very important. Within pulmonary, a print out of their last pulmonary function test is very important and very useful. Also the number of treatments that the patient has had over the years is very useful.

E. Once the ancillary service is done, the technician needs to be able to let the system know that they have completed the task and that they are ready for another assignment.

F. In the case of some tasks, such as an hour long pulmonary nebulization treatment, the technician will start the treatment and then go on to other tasks. In some cases the technician will come back to see how the treatment went and if another is needed, and in some cases the department staff will do the ending processes.
DEPARTMENT SYSTEMS AND TASKS

There are many departments within a hospital. An office clinic also has departments with usually a front office and a back office. Within a hospital there will be each patient floor such as Surgery, Medicine, Pediatrics, Intensive Care, Emergency Department, Obstetrics, Infectious Care, CardioPulmonary, Imaging/Xray, Laboratory, Surgery, Central Supply, Pharmacy, Maintenance, Housekeeping, Dietary, Administration and sometimes more or less depending upon the situation.

Each department though has similar responsibilities in terms of staff scheduling and staff assignments, break times, lunch times, sign on, sign off, interdepartmental transfers, department logging, patient assignments, patient admissions and discharges, the person in charge or on call and a number of other things that are common to department business and keeping track of.

The department will need a system that will keep track of these tasks and assignments.

Additionally, it would be great to be able to track staff location with a gps like locator on the name badge. This would help in viewing the activities of the staff through time and in determining best practices.

The phone can be an asset and a detriment. In most cases, the staff uses the phone appropriately, however, there is always one staff member that spends an over abundance amount on time on the telephone with friends and family doing non-work activities. It is important to be able to keep track of whom is using the phone, for how long and where the call went. Calling home is ok for checking on the children or if something needs to be taken care of, but for small talk and entertainment, we do want to discourage that.

Some departments have what appear to be unique tasks, but then maybe it is just the information and not the process. For example, a surgery circulator keeps track of the Surgical Board. This board is a tracking board, and tracking boards or similar ideas are used in every department. The job of the surgery circulator is to track the cases that are going on in each surgical suite, where the case is within the process, let the next group that is going to go in what the times and expectations are. They may call the next surgeon and get the next surgical sets ready. If another surgical room finishes up, they may move the next case to another room. It is popular to have a tracking board for this task, though there are computer screens that can do this same idea, and if not, then the program could be built to do this. This department circulator manager concept will need to have a tracking screen that can be described with a script, so that each department can relatively easily build their tracking screen for their needs and to put in their tasks.
SCHEDULING TASKS

There is much scheduling to do and much of it is very similar. We would like to have one scheduling routine that can be used for all of our scheduling activities.

The scheduling activities include:

- Patient scheduling in the individual offices.
- Patient scheduling for surgery.
- Department staff work schedules.
- Physician Call Schedules.
- Department Call schedules.
- Maintenance Schedules
- Housekeeping schedules.
- Department Maintenance Schedules.
- Emergency Equipment schedules.
- Central Supply Schedules.

There is also some ongoing monitoring that will be associated with these schedules. For example, some surgeons schedule a surgical procedure and claim that they can do the task in one hour. With surgical room cleaning and set up, the total time may be 90 minutes. Though in practice, it may turn out that it takes the surgeon 90 minutes to do this surgical procedure, changing a 90 minute room turn around to a 120 minute room turn around causing everyone on the schedule behind this person to wait. The scheduler needs to keep track of the surgeon’s name and the booked time and the actual time, so that at some time in the future, when there is a data base of 20 or more cases by this surgeon, that the scheduler will not allow that physician to claim a 60 minute time slot, due to the past history. In other words, the scheduler will learn the real times that the surgeon takes to do a surgical procedure and when the surgeon requests to get on the surgery schedule, then the real time will be used by the scheduler.

Some staff are always late. We want to record this, for 5 minutes late per day for 1 year is equal to 2.5 shifts, which is a lot. In health care work, most of the staff need to be there, someone cannot leave until someone takes their place, due to the responsibilities of patient care. If a staffer arrives late, that means that another staffer has to extend their shift to accommodate this late person. We want to be able to keep track of staff arrival and departure and reward the staff that goes the extra mile.

Schedules will need options for moving patients and workers from one slot to another because it happens often.
PATIENT REGISTRATION

Patient registration can occur in many places, over the phone, in person, at the bed side, and or in the waiting room. There will be staff assigned to this task, but in some cases the nurses and even the physicians may be registering patients.

With physician patient registration, it is typically a health care emergency and there is little time to get every detail. Thus, there needs to be an option that a patient can be registered with very minimal information and at a later time, a full registration can occur filling in the missing information.

Also, alias names, some patient’s come in and cannot communicate for one reason or another, different language, patient is dumb, patient is in a coma, patient is to young, and etc. In these cases, the staff will need to just select an alias name to use until the real name can be discovered. Once the real name is discovered, the selected alias information, the medical notes, and all will need to be reassigned to the real name.
PATIENT TRACKING

Patient tracking boards are becoming popular. It is a helpful management tool to visualizing where the patients are and in what capacity staffing and management is needed. The higher the patient volumes the more useful this tool is.

Patient tracking needs to be done for the clinics, for each department, for each patient floor, and for all of the out patient and in patient situations. One will need to be able to see all of the patients within a single department on one screen. For extended information situations, one may need to telescope in to an individual patient.

Typically the needed information for each patient is:
Patient Name
Patient location
Patients problem
Patient’s physician
Patient’s care team
Patient’s room assignment
Patient’s acuity

Some departments have what appears to be unique tasks, however it may be just the information and not the process that is unique. For example, a surgery circulator keeps track of the Surgical Board. This board is a tracking board, and tracking boards or similar ideas are used in every department. The job of the surgery circulator is to keep track of the cases that are going on in each surgical suite, keep track of where the case is within the process, and then to let the next group that is going to go in what the times are and expectations. They may call the next surgeon, get the next surgical sets ready, or if another surgical room finishes up, they may move the next case to another room. It is popular to have a tracking board for this task, though there are computer screens that can do this same idea, and if not, then the program could be built to do this. This department circulator manager concept will need to have a tracking screen that can be described with a script, so that each department can relatively easily build their tracking screen for their needs and to put in their tasks.
PATIENT BILLING

As we are a business, we do need to keep track of our billable items and the responsible party. We want the system to be able to get all of the billable items from the medical notes. Each of these items needs to be within the data dictionary and pre-validated so that once it is selected we know that the information will go through the system correctly.

There is a plethora of billing accommodations that need to be addressed as the plan will be to continue to run our existing billing system and then build a new one to replace the existing system, we will spend time on understanding the present process.

A batch oriented system is planned where the information is collected from the medical notes at medical note completion. Then, once or twice a day, the billing information will be processed and sent to the billing parties.

Posting is another process in which checks are sent for multiple patients and situations. A person will have to enter the amount of the check and then assign portions of that check to the individual patients as described on the posting invoice.

There will be reports like the ones we use now, plus we will want options for more as we discover more of what we need and want for best financial decision making.
ADMINISTRATION AND MANAGEMENT

The administration has the job of overseeing all of the other jobs. So, we will need to see information from each of the departments in terms of costs, supply use, patient numbers, patient procedures, staffing, ratios, and things of this nature.

Additionally, we like to be able to bring up a screen from any of the departments or PDAs so that we can observe what the staff is seeing on their computer and what actions they take.

With reports, we will want to be able to design reports from information from each department and to be able to keep these designs if we like them for scheduled reports. We will want to be able to create batch run situations so that at specific times be it daily, weekly, or monthly, these reports will come out without prompting.

Additionally, we will need to do statistical analysis on this data along with data analysis and researching of previous data that has been accumulated through time.

We will come up with some of the existing reports and some of the reports that we would like to see.

Through time, we will get a better idea of what we want and what is available, and we will come up with report ideas that can be built as we progress.
CREDENTIALING OF STAFF

Within the health care arena, the State and Federal regulatory agencies have created a mountain of paperwork that we need to do. For each of the physicians, nurses, paramedics and licensed staff members, we need to keep a record of their up to date licenses.

For this we will need a scheduler to let us know when the staffers last license expires so that we can get the new and up to date one. This also applies with continuing medical education which is required and we in turn must keep track or be liable for this.
PHYSICIAN GUIDELINE BUILDING
PATIENT EDUCATION HANDOUTS
RESEARCH

The physicians will develop a team to build their guidelines. We will need a guideline editor for this purpose. The data dictionary will have all of the options for data types as described in the data section.

Also, patient education handouts will be built. These patient education handouts will have names and within the data dictionary the physician will have an option to select a handout name which in turn will be printed out for the patient with the patient’s name so that it will not get lost.

Each of the physicians will want to do research on their practices and this option will be needed. As it is not done much at this time due to the difficulty and time restraints, with this computer system it will be easy. We will need prospective research where one of our researchers will put in a script of what they are look for, for example:

Seeking a patient that is greater than 50 years of age, is male or female, has a past history of heart disease, and enters with a chief complaint of chest pain.

If there is a match, was an EKG ordered? Were cardiac enzymes ordered? Was the patient admitted.

For this case, as patients go through our system, each will be checked for the criteria and then if a match occurs, the patient’s name and identification information will be logged. These type of studies will not be unlimited as they can take time and resources. When we determine the amount of time it takes, we will assign a maximum number of prospective studies that can be done at any one time.

Retrospective studies will be done in a similar fashion but they will be done on the patient database and not on incoming information. These will be done one at a time by single researchers. A script language will be designed and then the researcher will be able to enter their research script and the study can commence. Should these studies tie up the system, then a limit will be put upon them and the task may be assigned a priority log and run in batch mode, with results to be picked up when done.
PATIENTS COMING IN VIA THE INTERNET

Patients are getting more and more sophisticated. There will be a time when they will want access to their health care records and it is our philosophy that they should be able to have this information.

With time, there will need to be a web based sign on with security. Then the patient can look at their information. A single screen design that is self explanatory will be very important.

All activities that the patient does with their records, such as print, view, etc, will need to be logged.
SUPPLY INVENTORY MANAGEMENT

RETAIL SALES TO PATIENTS STAFF

Many supplies are coming and going in the health care environment. We want to be able to keep track of this information directly from the medical note. All supplies, soft goods, medicines, and everything we want to eventually be on the guideline data dictionary and when the health care professional selects information to build their medical note, the supplies associated with that action will also go into that note, into accounting and also into our supply management system for supply inventory management.

We have an open policy with our staff and along with selling supplies to patients, these supplies are also sold to our staff on request. Our central supply system has a method where a staff goes to central supply, makes their supply request on paper and then they pick it up after their shift on their way home. The cost of the supply is then taken off of their paycheck with an itemized statement.
QUALITY ASSURANCE, QUALITY CONTROL, AUDITING

In order for us to have quality health care, we at HCI have a quality program following W.E. Deming’s methods on process flow management.

Since our guideline is a foresighted process flow model, we will want this to be modeled for quality evaluation through time. The research modules may do this same function.
TIME CLOCK, STAFF WORK TIMES ETC.

We will need to have our staff clock in and clock out. We would like to do this with the staffer ID badges. We do want to keep track of all of this information and feed it to the payroll department.
REGISTRY PROCESSING AND DATA COLLECTION

Due to health care regulation by the State and Federal agencies, some of the health care procedures are kept track of and need to be turned in to these agencies on a scheduled basis. We want to make sure that the registry information is identified and put into the data dictionaries and if applicable, the user at the time of the procedure will collect the information needed at that time.

Some of the registry processes are very time consuming, requiring the hiring of additional staff. We would like to be able to include the necessary steps within our foresighted processes and then be able to have a scheduled batch routine search for this information and satisfy the needs of the registry data bases.
Security.
The Security of the computer system will need to be scaled. Though most of the ideas will be very similar to computer security ideas that already exist, there will be some new ideas.

We do want any computer that is working with programs that access to patient information to have a quick suspend concept. Something that is very easy for the user to accomplish. Something which will lock out the computer with a single move and then the user can return and with an easy combination get back to where they left off.

There could be a hardware situation, where the hand held computers have a button that is very convenient to press down when one is holding the machine and when one sets the machine down the security can take effect, assuring patient privacy.

This may not be something that is available today, but we do want to keep this in mind, and in time, we will implement it.

The finger print readers end up having lots of problems through time, and as a result it really slows the worker down. We do not want to use any technology that slows the patient care process down in any way. We do like the ID badge with electronic identifiers in them. Ones that can be waved past a device and then security is opened up. If lost ID badges get to be a problem, then we will need to reevaluate this model.
USE CASE for SECURITY:

<table>
<thead>
<tr>
<th>Use Case Name:</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor:</td>
<td>Security and Staff</td>
</tr>
<tr>
<td>Description</td>
<td>The facility needs security. This can be tied into a name badge, which would be idea. We need security on whom is in the facilities, on medicines, supplies, and location. This could be tied in with payroll.</td>
</tr>
<tr>
<td>Normal Course</td>
<td>At this time, we have security personnel, but cannot do a good job due to the present situation.</td>
</tr>
<tr>
<td>Pre-Condition:</td>
<td>At this time we use security personnel, pixis, and individuals that know others to do security.</td>
</tr>
<tr>
<td>Post-Condition:</td>
<td>Would like to have badges that can be tracked by a computer system, thus when someone comes in they can be monitored and their location can be known. When a non-badge carrying person comes in, this can also be identified. For medicine and supplies, a swipe of the badge should do the trick. Getting the patient’s name on who got the medicine can come at a later time.</td>
</tr>
<tr>
<td>Assumption:</td>
<td></td>
</tr>
</tbody>
</table>
Systems Administration
The system administration will be maintaining this new system, thus they will be an integral part of the development. Though one does not have to be a systems analyst nor systems engineer to be on our Systems Administration team, the individuals do have an interest in these concepts and we would like to utilize this development with on the job education for this department.

The systems administration team will maintain the following information

User profiles
Patient demographic corrections
Security assignments
Forms Processing scripting
Local Program configuration
Hardware maintenance
System Integrity Testing
Logical Device administration
Payroll Scripting
Web page building

Additionally, we would like this department to be part of the program user manuals and user training development efforts, for with time, this will be one of their jobs.
The Hardware And the Information.
The Hardware.

As a health care company we view computer hardware acquisitions to have a useable life span of 10 years. Now, we know that the industry views computers as acquisitions with 2-3 year life spans. This needs to be explained and understood by our hired consultants.

We are in the health care business, we are not in the computer systems business. Computers are tools to help us with health care. If we can develop a computer system that will accommodate our needs today, then that system will work for us for many years to come. Our goal is to give health care service to patients. Computers are only tools to accomplish this goal and whether there is a computer there or not, we can still give health care to our patients.

We definitely do not want restrictive hardware such as the Cardinal Health Pixis machine. The pixis machine has a long list of patient morbidity and suspected mortality due to its design. The pixis machine is a computer operated drawer system with which the computer system opens the drawers. A user signs on and then selects a patient and then selects the ordered medications. The software then opens the drawer and the user pulls out the medications giving a count before and a count after, with user input. The system is great for the Pharmacy department and for the accounting department. But for the people doing the work, it is terrible. In increases work time, patients that need a medicine right now have to wait and suffer. In studies and observation it has been proven time and time again that it is not unusual to wait up to 15 minutes, yet the people that manage the machine deny the observed facts and lie to whomever, in support of this machine that makes patients suffer every day it is used. A design could be made to make this a useful machine with quick access, but the company refuses to head in that direction.

We need hardware that will be useful for the users. Hardware that fits within the present system that our staff already uses. We do not need computers to give health care, computers are tools and thus we want our consultants to keep this in mind.

For the physicians and patient support staff, we are thinking along the lines of hand held computers. For the ancillary service staff we are thinking along the lines of hand held PDAs. For the departments, administration, and those that do most of their work at a desk, we are thinking of the standard desk top.

Networking will be essential with the desktops having hard wire links and the PDAs and hand held computers to have wireless links.

Depending upon the amount of traffic through time and through our efforts will determine how the main server works and how much horsepower the server will need. As our goal is patient health care, we like the idea of server clusters and local processing for should there be a server failure, our main job of giving patients health care can still go on in the local environment and once the server is back up and running, the data base can be updated with the new information.

We would like to look into using the identity badges for computer sign on for this would
encourage our staff to have their identity badges with them at all times and a card, if not lost, is an excellent positive identification tool.

For the most part we envision standard computer equipment that is easily available. With identity card security, a special piece of hardware could be attached to the computer allowing for quick access and top security.

As some of the locations within the hospital may use specific chemicals in terms of hardware damage this information needs to be available to those areas and clearly defined. Some of the patients we have will have infectious diseases and any hardware in those areas may need to be cleaned with special disinfectants. Should our cleaning agents be of any problem, we need to identify this as soon as possible.

Presently we have a number of machines such as the IV pumps, the ventilator machine and a few others that are programmable by microwaves. Cell phone use around these machines has re-programmed these machines. In case scenarios, fortunately not at our institution, patients have been killed by these cell phone re-programing. We would like to stay away from machines that are programmed by microwaves because of the bad patient outcomes that have occurred at other locations.
HCI’s Present Computer Systems

DEC Vax System I
DEC Vax System II
DEC Vax System III
DEC Vax System IV

COUPLER

PC Network Server
Network Couplers
ISDN Line T-1
Multiple Dumb Terminal Front End for Vax System
System Wide PCs
ISDN Company
Individual Terminals
The New System
The Information
PRESENT INFORMATION STRUCTURE.

The present information is based around our financial and accounting processes. This has been a poor idea and model since the start. Unfortunately it never occurred to us that this was the case. Like many large health care facilities, we put very little value on our information and in turn, we put very little value into our information system department. We hired light weights like everyone else does. We hired Chief Information Officers that had business backgrounds and as we knew very little about computers, it never even occurred to us that our CIO really didn’t know much either.

After years of listening to our CIO, and after years of purchasing millions of dollars of computer equipment and supporting software, one of our young managers had gone to a seminar on computers in health care and asked us on his return what was our cost per benefit ratio.

With millions of dollars into the computer system, we couldn’t answer this basic question. We started looking into it and found out that our CIO, though professed to be of top caliber by the health care industry, was in reality way out of his league. He lacked a basic understanding of systems analysis, of data structures, of systems engineering, of process engineering, of process management and health care process.

Our present information is patient demographics and billing data. From some of our studies requested by some of the physicians, we realized that our data was useless. We could not go backward, we could not produce a medical chart from our data. Yet, in every medical chart, we could produce a bill. We realized that we had it backward. The health care computer system giants were killing their customers. These giants were setting us up to fail.

And we realized that, if we were to stay afloat, we had to solve the problem ourselves.

<table>
<thead>
<tr>
<th>Billing Number</th>
<th>Patient Identifier</th>
<th>Billing Codes</th>
<th>Matching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Demographics</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The whole system revolves around billing. When we say that no one could make hide nor tail out of the billing data, yet, from the medical record, the physicians could easily tell us what our bill would be, we then knew, the industry had approach the problem incorrectly. Instead of coming clean, they led us on a wild goose chase, just to make money.
THE NEW DATA.

We envision two major databases, with numerous small initialization and program configuration data tables.

The two main databases will be:

1. The Data Dictionaries.

Each of the medical specialties will develop their own data dictionary. Each dictionary will be pre-validated and pre-linked in terms of communications, forms processing and billing, accounting and all forms of record keeping.

There will also be smaller data dictionaries for some of the support staff such as nursing, and ancillary service departments because they also are required to build medical notes on their patient interaction after their patient encounters. These dictionaries will also need to be pre-validated and pre-linked.

2. The Patient Records.

This will be the largest data base within the system. It needs to be a distributed data base because patients will have a primary physician and they will also be involved with consulting physicians and other health care givers with time. As our health care system revolves around the primary care physician, so should the patient record data base.

Yet, there will be needs for other databases, and their structures are as yet undetermined, though their function is defined:

3. Other Data Information.

Each licensed staff member will need to have an entry that will allow for licensing needs update reminders, for example, license update, continuing medical education updates, and things of this nature.

Payroll information processing.

Scheduling information.

4. Medical Markup Language

We will need to have a language that our systems administrators will use to develop printed forms and reports from the patient records. Our suggestion is the creation of MML, a medical markup language.

These databases are dynamic because the problem of PDE-EMR (Physician Data Entry-Electronic Medical Records) is a new idea. This is not tried and true technology, this is new technology that has yet to be proven to be a working and viable tool. For this reason, the data base technology that we will be using will have some unique aspects.
The database will need to have a meta layer. This meta layer will explain the structure of the physical layout of the database in a manner that will allow for meta layer modification and thus database modification without having to remake the database.

The meta layer will have a simple language that will allow for an explanation of the database, and a method in which the meta layer can be modified so that the database itself can be modified, without ever actually changing the physical database, just by changing the meta layer.

Information systems within healthcare are not well defined. The approaches thus far have been toward managing the money instead of the patient. As a result, information systems implementations have been quite costly and their return has been questionable.

Thus, until the actual healthcare system, in terms of computer information systems is well understood, we need to have an information system in which the actual database such as the individual records and their fields, that is the entities and their attributes, can be modified in terms of their labels, their relationships and their internal format.
DATABASE:

1. The Data Dictionaries.

The entry into the data dictionaries will be staff determined. For the physicians, each group or speciality will determine data dictionary entry terminology. For example, in the primary care department, the physicians may want to choose from a list of presenting patient problems or body systems. That is the physician may select “Chest Pain,” and from that point, there will be a predetermined (possibly a modifiable flow using an if then else concept) foresighted flow going through a specific set of data dictionaries. The flow of these data dictionaries will be modifiable and those that use these will form a committee or some sort of methodology in which to accomplish this. There will be a limit of up to 100 entry points, examples include: Chest pain, Dyspnea, URI, Abdominal Pain, Dermatology, Lacerations, Head Injury and things along this nature. The list of entry points or process flow guidelines will be displayed on a single screen and the order will be determined by those that use them. The user will be able to select one or more and then command the process flow guideline engine to start going through the data dictionaries.

Medical notes are divided up into 12 main categories:

<table>
<thead>
<tr>
<th>Medical Notes Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Information</td>
</tr>
<tr>
<td>Front of the Chart</td>
</tr>
<tr>
<td>ROS or Review of Systems Information</td>
</tr>
<tr>
<td>History of Past Medical History of all sorts information</td>
</tr>
<tr>
<td>Symptom or Subjective information</td>
</tr>
<tr>
<td>Objective or Physical Exam information</td>
</tr>
<tr>
<td>Assessment or Diagnoses Information</td>
</tr>
<tr>
<td>Plan or the Plan of Health Care Action information.</td>
</tr>
<tr>
<td>Therapy information</td>
</tr>
<tr>
<td>Index information</td>
</tr>
<tr>
<td>Back of the Chart Information</td>
</tr>
<tr>
<td>Physician or Provider or Care giver Name and Information</td>
</tr>
</tbody>
</table>

A data dictionary will fall within one of the 10 middle entities F, R, H, S, O, A, P, T, I, and B, which will be our abbreviation for the group of entities mentioned above. Within each main entity, there will be sub entities. For example, within the O or Objective entity, there may a sub entity called EAR. Within this sub entity will be the actual records with their attributes. For example under:

Main Category: Objective
Sub Category: Ears

The following information will be available:
Ear exam revealed 2
no abnormalities
bite marks
bleeding
blood
canals angled
canals clear
canal drainage
canal inflammation
canal swollen on L
canal swollen on R
partial cerumen L
partial cerumen R
cannot see TM L
cannot see TM R
cerumen impacted
FB in L canal
FB in R canal
Hearing aid L
Hearing aid R
Hearing aids
pain
pinnae intact
TM bullae L
TM bullae R
TM intact L
TM intact R
TM L fluid line
TM R fluid line
TM L scars
TM R scars
TM L with reddness
TM R with reddness
TM L some reddness
TM R some reddness
etc ...............
Information within each of the subcategories will be consistent and the entire sub category will be able
to be tagged, so that information that is selected from a sub category, that is when a record is selected
from a sub category and that record is tagged, there will be a tag description to indicate what type of
information it is and the number of fields that are needed for a complete records. Additionally, this
information may be destined for a specific form, such as a prescription, or for a faxed report, or for the
accounting department or for any or all of the departments for communications, forms, actions,
requests, and things of the usual duties that this information is presently being used for.

So, tagged sub categories will be identified in a separate configuration area with an identifiable tab, a
word description for users, how many fields are needed for each record, how the fields are separated,
where this information will be linked to, the task that this information is destined to and any hardware
specifications that may be needed associated with this information.

For example if a physician is under a data dictionary with the main category of Plan and the sub
Category of Laboratory, the physician may want to select a lab test called a CBC. The CBC test has a
procedure code of 53421 which is presently required for billing forms, it is a procedure, it’s place of
service could be an office, a hospital, an outpatient department, with the type of service being
diagnostic laboratory, all of this information is needed for billing forms processing. Now the physician
does not need to see all of this information, but this information does need to be within the CBC record
along with the price value and where the information should go, should the physician select it, for
example to the printer to print out a lab request form, or to a fax machine to be faxed to the lab, or
directly to a lab computer.

Data Types
a. Standard
b. *Template
c. & Type in
d. ! Pop up with columns
e. 😳 Grouped Popups with columns
f. !! Time Flow
g. / Comment
h. # Calculation
i. Draw a picture (Not figured out as yet)
j. Timestamp
k. Patient Education Handouts.
l. Matching

  This is a data item.

An example from main category called Symptom
and a sub category called CC-Abdominal Pain

Lower abdominal pain.
b. Linked list data type.
   *User information
   This information goes into the medical note
   more data string until the last line which will be a
   null

An example from a main category called OBJECTIVE
and a sub category called Abdomen.

*Normal Abdomen
Bowel sounds were easily ascultated. The abdomen was soft with no
masses or organomegaly. There was no tenderness.
(null)

c. Solicit data type.
   &Only user see string #chars
   label string:
   label string:
   null

   #chars = a number that represents the maximum number of allowable
   characters that the user will type in.

An example from main category called OBJECTIVE
and a sub category called VITALS.
&Vitals 15
BP:
R:
P:
T:
(null)

d. Pop up data type.
   Basic Structure
   !(start of sentence) #columns(options)
   data string
   data string
   data string
   null

   #columns is a number from 1-4
   Options are
   none
   nc - no commas.
   nf - No First comma
   np - no commas, no periods.
   or - Or instead of and.
so - select one, in this option,
the user selects one option
and the program closes the popup.

An example from a main category called SYMPTOM
and a sub category called CC-Abdominal Pain.

!Location of abdominal pain is 2
upper right
lower right
upper left
lower left
hypogastric
supra pubic
periumbilical
epigastic
flank pain
CV angle
(null)

e. {! Grouped Popups with columns
The grouped popups basically works the same as the popup, with the additional feature that once one popup is done, the program will automatically go to the next popup, until it reaches a "}" character, which will be at the end of the group of popups.

f. !! Time Flow
TimeFlow

TimeFlow is a routine to display a grid on the screen. Labels will be on the left, and the grid will be time. A start time will be at the upper left hand corner of the grid.

The user will have options to have the grid in times of 1, 2.5, 5, 10, 15 minute options.

For dynamic situations, the user will select the labels such as meds or BP or pulse, or Oxygen sat prior to it appearing on the screen.

Data will have two set ups.
First will be all of the options.
Two ways have a double list, this is not good, better to have a single list.

TIMEFLOW

as the first keyword.
The routine will read through the entire file, compile a list of all of the !!! Labels, when the user selects the top square, the labels will list in a figured out column ratio. The user will select the label and then that label will appear in the first column of boxes on the left. The user can select as many as they want, and then if there is more labels then room on the screen, then there will be a scroll up scroll down option.

<table>
<thead>
<tr>
<th>Time</th>
<th>10:43</th>
<th>1045</th>
<th>1055</th>
<th>1105</th>
<th>1115</th>
<th>1125</th>
<th>1135</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sevo In</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sevo Out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O2 %</td>
<td>10 L</td>
<td>10L</td>
<td>3 L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propofol</td>
<td>200 mg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>50 mg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TIMEFLOW=1
for 1 minute

TIMEFLOW=10
for ten minutes

When the user hits the first box upper left, the first option will be the Start time, and the user will select a start time.

The second time the user hits the time start box, upper left hand corner, the list of labels will appear, in fact from that time forward, whenever the user touches that start time box, the list of labels appears.

As the user selects the labels, the labels are placed in the boxes, in the order that the user selects them.

Then when the user touches a box to the right of the label, up will pop the choices, and the user will select once and the choice goes into that box.

On the screen, the data will be displayed in the boxes.
In the file, the data will be displayed:
label:time:data;Time:data;Time:data;

ON the printed output there will be output options, with the graph being a standard option.

g. / Comment
User instruction data type
Basic Structure
/ user instruction or education

An example:

/ Unless the patient has crepitance over a scalp wound, neurological
/ disorders, loss of extraocular eye movement, csf coming from
/ the nose, mouth, ear and/or wound site, a skull xray will have
/ only rare positive results.
/

h. #Calculation
#String: #.
For example:

#GSW:4.
In this manner, the Calculation command, will look for this #tag: data, and all of the strings/tags that are the same, will be added together. This information will be inserted into the medical note. It will need to be protected in some way, as if the user selects calculation again, it may pick up the calculated information and add it to the new calculation.

i. Draw a picture

The idea is to have a text description that can be interpreted into a drawn picture. Within health care, most of the drawings we do are similar, anatomical drawings with pathology and or with repair.

j. Time stamp.
In some cases a note entry may need to be time stamped. For example if a nurse is giving the patient a medicine, the nurse will want to time stamp the entry and then select the medicine that was given. In some cases, the time stamp will be associated with a set of initials. With sequence nursing, multiple nurses may be taking care of one patient, thus when a time stamp is done the nurse will need to select their initials or their initials will need to be entered, and then the medicine. It can be in opposite order.

K. PATIENT EDUCATION HANDOUTS.
We will be developing our own patient education handouts. We want to be able to use an HTML idea so that we can have words and graphics. The handouts will be named and during the physician patient
encounter, while the physician is creating the medical note, one of the data dictionaries will be a list of
the patient handout names, these handouts will be organized according to theme and be named
according to theme.  The actual physical location of the patient handout will be defined in the program
configuration area.

L. MATCHING.
Matching is a concept that has not been described in other system descriptions.  For medical billing, the
diagnoses must be matched with the supplies, the room usage, and the procedures.
This has always been difficult for the billing and coding staff, because it is a very difficult concept.

Once the physician says that they are done with the patient for that encounter, the engine must go and
find each and every diagnoses for this visit, and it must find each and every supply and procedure used
during this visit.  Next, they need to be matched.  The matches can be multiple.

For example if a patient comes in for headache, odynophagia, fever, and rectal bleeding,
the office visit of a level 4 would be associated with all of the diagnoses.  The strep culture would be
associated with odynophagia, the occult blood test would be associated with the rectal bleeding, and the
penicillin shot would be associated with odynophagia and fever.

(Level 4 (headache, odynophagia, fever, rectal bleeding))
(Strep Culture (Odynophagia))
(Occult Blood(rectal bleeding)).
(Penicillin shot(Odynophagia, fever))

Now, if these were not associated correctly, then the third party payer will not pay and there may be
some liability.  For the physician, this is easy.  So, if the software can put up a list of two columns, then
highlight one item at a time from the procedure/supply list, then the physician can easily select which
diagnoses go with that item and also select a done with this item to go to the next one, or just select the
next item.  Quick is important.  Since more bill-able items are lost in this process alone, we want to
make sure that it is not missed.
2. The Patient Records.

Once the medical note is built, it will be stored in a database. This database will need to have a meta layer so that as we become more and more sophisticated, we will be able to modify the database and its structure to the needs that we discover through time.

The commercial databases at present are very structured and not one of them will be of much use to us for any long periods of time. Just managing and rebuilding a database to meet the needs that we discover on an annual basis have the potential to be extremely costly.

So a lot of care will be needed in designing a database which can handle different levels of patients for our different facilities and also to be able to keep the patient records at the individual sites where the patients spend most of their time. The system will need to find the sites and then just maintain them at that site.

With each patient the following information will be needed for quick recall and evaluation:
- Patient Demographics
- Patient’s individual notes/records
- The patient visit log.
- The patient problem lists.

For each patient medical note, there may be up to 12 sections, as described above and again right here:

Patient Information
- Front of the chart information
- ROS or Review of Systems Information
- History of Past Medical History of all sorts information
- Symptom or Subjective information
- Objective or Physical Exam information
- Assessment or Diagnoses Information
- Plan or the Plan of Health Care Action information.
- Therapy information
- Index information
- Back of the Chart Information

Physician or Provider or Care giver Name and Information (may be multiple).

Patients per any given day.

3. OTHER DATA CONSIDERATIONS

Configuration information for each user.
Configuration information for each program.
Schedules for patients and staff and rooms.
Housekeeping scheduled cleaning duties and when a room needs cleaning.

Report Headers
Local addresses for pharmacies, physician offices, soft goods, etc.
Fax numbers for outside affiliates.

Patient Tracking, to know where any patient is that is within the facility at any time.

Staff tracking.

Policing / Criminal activity alerts.
4. The Medical Mark Up Language

Like HTML, the medical industry needs a mark up language for its forms processing. With the information that is being used to build the medical notes coming from a pre-validated and structured data dictionary, the information within the medical notes will be useable. Unlike now where most computer electronic patient records have information that is non-structured and basically of little to no value beyond the medical note, the process that we are supporting will allow for options beyond our belief.

With time, we would like to see a medical mark up language, MML. With MML, people would be able to write out scripts, as in HTML, and then the MML processors would be able to get the patient’s medical records and in turn parse the information within the medical record and use that information to make forms of any and all types. Forms such as prescriptions, test requests, patient education handouts, work excuse slips, go back to school slips, revisit slips, consultation requests, billing forms and on and on and on.

The medical notes will still need to be printed out on occasion and there are formats that need to be available.

The following information within each medical note will need to be identified for forms processing:

Diagnoses[#]
Procedure[#]
Health Care Professional such as the physician [Label]
Patient Name[Label]
Facility Name[Label]
SERVICE [field#]
HEADER[May need a script for all the items to be in a header]
FOOTER[May need a script for all the items to be in the header]
SUM[Variables to sum]

Medical notes in general are divided into 12 sections, these sections include:
1) Patient 9) Therapy
2) Front 10) Plan
3) Symptom 11) Back
4) History 12) Physician Name
5) ROS
6) Objective
7) Assessment
8) Index

The sections are not always printed out in the above order. They can be printed out in many different orders. It is common to have the patient name information at the beginning and the physician name at the end, but with procedure and surgical reports, the physician name is near the top and there is multiple physician names.
The styles in which the printed medical note report appear have never been named. So we took the liberty to name them here. Each of the 12 different sections may have a different style, so an option to define the section, the order in which the section will be printed (or it may be left out) and the style with which to print that section out will be needed.

1) Standard
A style of standard titles with each sub category heading, no line between each sub category section.

2) Formal
Titles with each sub category heading, a line between each sub category.

3) Standard with Space

4) Compressed
All of the information for the entire section is compressed, or appended together.

5) Narrative
No sub category titles, just narrative style text. It is assumed that it is designed to read like a story from each sub category section.

6) List
Used with diagnoses, just prints each record out in a list.

7) Table
A table for information within the medical note such as specific testing and it fits into a table. No sub category title is used, they are discarded for the output. For the entire section one table is created.

8) Table and Title
Same as table, but the sub category title is used before each sub section and a table is made for each of the data dictionaries. Each of the sub categories makes one table.

9) Column
Outputs the section in a column.
The System Change and User Education
Discussion on Changes that will occur.

Many years ago, prior to the modern political regulations that have been put upon the health care industry in terms of forms processing, legal malpractice and billing, the health care industry was mostly physicians, nurses and patients. Administration and the support staff typically fit within one or two offices. Through time, positions have been added on to support the newly required forms, the legal problems, and the billing requirements that were never really a part of the health care industry at all, that is until the political regulations forced it upon the industry. It has been said that around 1/3 of the costs of health care go to supporting the forms processing and billing requirements of this industry. With a good computer system, no, not a paper system that runs on a computer, but a real computer system that uses the power of the computer to maximum efficiency, these newly created positions will prove themselves to be stepping stone position. The computer will be able to do their job, since their job is really just forms processing and advanced keeping track of, which the computer does extremely well.

During this project and with success, we plan on making some serious changes to HCI and possibly the entire health care industry, nationwide. As this system will take years to develop, our plan is not to fire people, but to use people in different positions as our needs change. As the changes occur and our patient population increases, we will utilize the employees we have. Thus, we probably will not be hiring many more people until we become steady state and determine what our new job positions will be and the staff population we need to maintain that. We do expect changes and a cut in total staff over time per patient population and we will describe our expectations at this time so that we can become prepared for our best staff options.

Decrease in physician support staff.
In the office setting and in outpatient care setting, the need for nurses will decrease, because the physician will be able to do many of the tasks that the nurses are presently doing, such as order entry, medicine orders, charging, all forms processing, all billing. So, the present shortage of nurses will quickly become an over abundance of nurses.

Mid-level Providers such as nurse practitioners and physician assistants.
Physicians typically have 11 years of education beyond highschool. Mid-levels have from 3 to 5 years of education beyond highschool, the mid-level programs are not standardized. There is much discussion on quality of care between physicians and mid-levels yet the studies have not been good nor well quantified. With patient oriented guideline data dictionary medical computer systems, studying the quality and abilities will be very easy and open for everyone to see through time.

Ability for hospital nurses/paramedics to more effective in their present hospital roles.
Though nurses do have a lot of political power with their State and National societies, the paramedics have demonstrated time and time again, that they are very effective at the patient
bedside and are equivalent in every way to a nurse. The problem is in the politics and the job securing activities that the nurses have been doing in efforts to make the paramedics look poorly, even though the studies indicate otherwise. The new patient centered computer systems will demonstrate this and show the facts and the real truth in whether the nurses or paramedics are better or worse or the same in patient care. With the fear tactics and "nurse requirement political regulation," there is great concern that maybe the paramedics really are better at patient care than nurses are. Again, true data analysis will bring this to light.

**Decrease in medical billing staff.**
With a good data dictionary system, once the physician is done, so will be the medical billing. Posting will stay the same, but with time, this too will be able to be reevaluated. At present, there is so much duplication of work, it will be difficult to fully understand it all until some of the massive amount of staff gets culled out, and things get back to how they were many years ago, prior to the forced upon us billing and forms processing nightmare. There will be no need for medical coders, because coding is simply a stepping stone industry, not really needed at all. Regulations forced it upon the industry, and computerization will remove the need for orders, because the data dictionary will already have all of the diagnoses and all of the pre-validated codes so that any of this information will be correct when it gets to the bill.

**Decrease in medical records people.**
With this model, all notes will be typed up and done immediately. There will be no need to check the notes for signing, because this can all be done immediately and electronically. Since the system can keep all of the medical records, the physician will be able to retrieve their own, and there will be no need to have a full time team searching for medical records 24/7.

**Decrease in Administration.**
Much of the administrative work is going through and checking the paper work. With it all being in the computer, it can be done by the computer, and problems can be flagged and a systems administrator will bring it to the attention of the physician.

**Existing Software vendors Stakeholder**
This will present the biggest obstacle. We suspect that our present hospital information system and our present order entry system will do everything they can do to prevent this product from coming to life. The reason is that once this concept comes to life, these multi-million dollar health information systems will become obsolete and overnight they will disappear.

The existing multimillion dollar hospital information systems are not a solution. In fact, they are the problem. It is due to them, that we healthcare providers are stuck with 1960s technology, with no where to go and no way to get out. These products with Cerner, HBO, SMS, Allegra, and the many more are anchors that have set us in mud that is very difficult change. These
systems are "cripple ware," once one gets into these products, they are stuck for years to come, due to the cost, the expense, the time, and inability to change to new ideas and new systems.

We want to rid ourselves of these monstrosities. That is our goal.

Hopefully, HCI will not end up like Brazil, when Brazil started using ethanol to power their vehicles, with the brute force of the oil companies making the companies of Brazil have to pay for their decision. But, Brazil made it out and they are the better for it. We at HCI, know that development of a patient oriented computer system will remove the need for the existing multi-million dollar health care computer systems industry that is presently controlling the industry. The system that we are looking for and have described in our RFP when made, will put the industry back into the hands of the front line health care providers, realizing reduced costs across the board and allowing for information to be analyzed and reported in true fashion to demonstrate real patient care practices that work.

**MEDICAL SUPPLY COMPANIES**

With this product that we propose, real information on real patients for real research will be available and quickly to determine evidence based outcomes. Not just studies that we plan ahead to make certain products look good or bad. Not just studies that we can design to give our sought after outcomes, but real information with real patients that can really tell us from once this product is built to for ever with continuing evidence based information procuring the real outcomes through time.

**DATA MINING SALES**

Within a year we will have over a million patient records, all structured, all accessible by research queries. Additionally, we will be able to put in prospective studies and get information as it occurs. Some of our existing staff will be moved over to this new department with time and we hope to have sales of this information along with marketing of the prospective queries for different researchers around the world.
The User Education Process.

For our users, we plan on having in house training session, manuals and one page quick sheets.

TRAINING COURSES
The in house training sessions will be planned by the staff, and the consulting firm and the staff will each take tums in training others so that the program can become streamlined and time efficient. Once the program looks good, we want to record the training program so that new staff can learn at any time.

MANUALS
The original manuals will be developed by our staff development team and the staff users with help from the consulting firm. Then once developed, the systems administration department will maintain them through time.

ONE PAGE QUICKSHEETS
Also, one page quick sheets will be developed by the staff users and modified throughout time on a monthly basis through committee for the first year or two.
Project Payment
and
Costs
Project Payment

At present we want to arrange for a monthly fee, with defined milestones of development. There will be a meeting at the beginning of each month to determine the milestones and the successful accomplishment of those tasks.

As there may be problems, this is ok, we just need to understand the problems and why the milestones are not being met.

Our projected monthly costs will be discussed in our first meeting, in terms of what everyone thinks the costs will be.

When costs are put into RFPs, it always seems that whatever the value is, that is what the consultant comes up with.

The costs are not determined. With the consulting team, we will determine a monthly cost and will try to keep that monthly fee stable for the duration of the project. At this time, we estimate the project to be a 5 year project.

We do not want to put in fees, because as with all RFPs, whatever fee we put in will be the resultant fee.

We would like to look at it in terms of consultant staff days per month, basically hours and materials.

INITIAL PAYMENT:
We would like to pay $200,000.00 up front for development of a proto-type product that will allow for a physician to build a medical note at the rate of one page in 2 minutes or less. Once this is done, the next steps will come in to place, for this is the major bottle neck.

See section 15, the PERT CHARTS for projected projects and times. Cost will be determined on a man hours and materials model. We know this is a big project and that it will take at least two years if not 3 or 4 for completion.
The Milestones.

PERT CHARTS
PERT CHART DEVELOPMENT.

Part of the project will be for the consultants to select a team and develop PERT Charts for the whole project. We want our physicians, nurses, paramedics, and all of our staff to be part of this process re-engineering, for this is how it will be a success and be a solution for us all.

PART Zero

<table>
<thead>
<tr>
<th>Selection of Team Members</th>
<th>30 days.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic PERT CHART Training and Development</td>
<td>30 days.</td>
</tr>
<tr>
<td>PERT CHART Layouts below.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
### PERT CHART Development

**PART ONE**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussions with team for laying out direction and milestones.</td>
<td>30 Days</td>
</tr>
<tr>
<td>Discussions on hardware needed for each module development.</td>
<td>30 Days</td>
</tr>
<tr>
<td>Development and decision on Data Base and Meta Layer structures.</td>
<td>60 Days</td>
</tr>
<tr>
<td>Development of Meta Layer or Middleware scripts and definitions.</td>
<td>60 Days</td>
</tr>
<tr>
<td>Development of Guideline data dictionary, for each specialty and support.</td>
<td>2 Years</td>
</tr>
<tr>
<td>Development of a Medical Markup Language for a Forms Processor</td>
<td>60 Days</td>
</tr>
</tbody>
</table>
PERT Chart Development

PART TWO

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Guideline Engine.</td>
<td>12 months.</td>
</tr>
<tr>
<td>Development of Forms Processor.</td>
<td>12 months.</td>
</tr>
<tr>
<td>Beta Testing of Guideline Engine and Forms Processor, together and make</td>
<td>60 days.</td>
</tr>
<tr>
<td>corrections throughout the process.</td>
<td></td>
</tr>
<tr>
<td>Implementation of Guideline Engine and Forms Processor for Paper System.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
Section 15: Milestones (PERT CHARTS AND TIME TABLES).  Page 5 of 12

PERT CHART Development

PART THREE

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of a Patient Data Base, with meta layer, and requests packages.</td>
<td>12 months.</td>
</tr>
<tr>
<td>Development of Communication Structures and Modules.</td>
<td>12 months.</td>
</tr>
<tr>
<td>Development of PDA Guideline Engine.</td>
<td>12 months.</td>
</tr>
<tr>
<td>Beta Testing of the PDA Guideline Engine.</td>
<td>6 months.</td>
</tr>
<tr>
<td>Implementation of the Patient Data Base, Communications, and PDA Guideline Engine.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
### PERT CHART Development

#### Part Four

<table>
<thead>
<tr>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of the Billing Module, mainly a batch module, a behind the scenes module that just prints out the bill when needed.</td>
<td>6 months.</td>
</tr>
<tr>
<td>Development of the Scheduling Module.</td>
<td>6 months.</td>
</tr>
<tr>
<td>Beta Testing of Billing and Scheduling.</td>
<td>60 days.</td>
</tr>
<tr>
<td>Implementation of Billing and Scheduling.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
PERT CHART DEVELOPMENT

Part Five

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of the Research Query Module.</td>
<td>24 months.</td>
</tr>
<tr>
<td>Development of Outcomes Registry Module</td>
<td>24 months.</td>
</tr>
<tr>
<td>Beta Testing of Research and Outcomes Modules.</td>
<td>6 months.</td>
</tr>
<tr>
<td>Implementation of Research and Outcomes Modules.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
### PERT CHART DEVELOPMENT

**Part Six**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of the Supply Management Module, make sure it is tied to the data dictionaries, and the patient notes.</td>
<td>12 months.</td>
</tr>
<tr>
<td>Beta Testing of the Supply Management Module.</td>
<td>60 days.</td>
</tr>
<tr>
<td>Implementation of the Supply Management Module.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
### PERT CHART Development

**Part Seven**

<table>
<thead>
<tr>
<th>Development of the Housekeeping / Maintenance Module. Will be very similar to the PDA Guideline engine.</th>
<th>6 months.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta Testing of the Housekeeping / Maintenance Module.</td>
<td>60 days.</td>
</tr>
<tr>
<td>Implementation of the Housekeeping / Maintenance Module.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
**PERT CHART Development.**

**Part Eight**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of the Credentialing Module.</td>
<td>6 months.</td>
</tr>
<tr>
<td>Beta Testing of Credentialing Module.</td>
<td>60 days.</td>
</tr>
<tr>
<td>Implementation of Credentialing Module.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
**PERT CHART Development**

**Part Nine.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Manuals, Quick Sheets, Training Courses.</td>
<td>6 months.</td>
</tr>
<tr>
<td>Beta testing of Manuals, Quick Sheets and Training programs.</td>
<td>60 days.</td>
</tr>
<tr>
<td>Implementation of the training programs.</td>
<td>30 days.</td>
</tr>
</tbody>
</table>
### PERT CHART DEVELOPMENT

**Part Ten**

<table>
<thead>
<tr>
<th>Description</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Maintenance Program</td>
<td>30 Days.</td>
</tr>
<tr>
<td>Implementation of Maintenance Program.</td>
<td>On Going.</td>
</tr>
</tbody>
</table>
OVERVIEW

- 228 PHYSICIANS
- 20 SPECIALTIES AND SUBSPECIALTIES
- 1362 SUPPORT STAFF (~6/PHYSICIAN)
- 2 HOSPITALS
- 11 SATELITE CLINICS
- 250,000 PATIENTS
- OPERATING BUDGET $18 MILLION/MONTH
CURRENT SYSTEM DESCRIPTION

Vax Cluster 4
Multiple Terminals
T-1 from ISDN
PC Network

Order Entry/
HIS/Accounting
Pharmacy Med Dispenser
Transcription System
Epic Handouts
Medicaid Verifier
Kurzweil Voice Notes
Problems

• Process disorganization
• Computer Systems have been designed for financial needs, not for the actual job, PATIENT CARE.
• Fixes have been patch after patch after patch
PROBLEMS

• FORMS PROCESSING
• COMMUNICATION
• EVER CHANGING FORMS AND REGS
• INCREASING COSTS AND STAFF REQUIREMENTS
• COMPUTERIZED PAPER SYSTEM
• PATIENTS SUFFER WHILE CAREGIVERS SPEND VALUABLE TIME FILLING OUT FORMS THAT COULD OTHERWISE BE AUTOMATED
PROBLEMS (continued)

• TOO MANY PEOPLE REQUIRED IN THE PROCESS
• PATIENTS SUFFER WHILE TRYING TO GET MEDICATIONS OUT OF THE CARDINAL HEALTH PIXIS MACHINE.
• PATIENT EDUCATION SHEETS SPEND TOO MUCH TIME TRYING TO NOT GET IN LEGAL PROBLEMS INSTEAD OF EDUCATING THE PATIENT.
• THERAPY IS GETTING TO BE AIMED AT KEEPING OUT OF LEGAL TROUBLE INSTEAD OF PATIENT WELL BEING.
ORIGINS OF CURRENT SITUATION

- Government Regulation
- Third Party Payers
- Malpractice Climate and Greed orientation
- Unrelenting Forms Processing tasks
- Management with lack of understanding of the actual job of patient care in terms of process flow.
- Patient Care professionals lack of understanding of process flow management.

- Our Stakeholders which are our staff and our patients cannot go on in this manner, a change is needed, and if we do not do it, who will?
SOLUTION

• Comprehensive Native Computer Application for a complete health care system.
• Not a Paper model reengineered for use on a computer, but a real computer system designed around the real health care system, the physician-patient
• Champions are our Physicians, with discussions through time, the management and the physicians have become dedicated to this new and pioneering project.
• We cannot keep following the existing vendors because they are taking down a path of failure.
• Old ideas of HL-7, the Pyramid structure have failed, it is time to move on to what will really work. With a PDE-EMR, HL-7 is not even needed. XML is already replacing it.
What Vendors Want You To Believe

- The Vendors Goal is to make Money
- This model is very costly and will never allow for a cost effective solution
Physician Patient Encounter

Hub of the health care system

- From the Physician – Patient Encounter, All activities occur.
- This is the solution
- Intended Computer Hardware and Software System Architecture will revolve around a Hand Held Wireless Notebooks for Physicians, PDA’s for Nurses, Paramedics, support staff.
- Distributed Filing Systems with patient records in the physical location at their main physician’s office.
- High speed line connects
- Web Enabled
## Success Criteria

<table>
<thead>
<tr>
<th>Success Criteria</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease support staff per physician</td>
<td>Meta Layer in Patient Record data base for easy modification through time</td>
</tr>
<tr>
<td>Increase the number of patients seen per hour</td>
<td>Structured Patient Records</td>
</tr>
<tr>
<td>Improve the quality of patient care, allow for a method of measuring quality.</td>
<td>Research Modules, Auditing,</td>
</tr>
<tr>
<td>The Existing Computer System may or may not be useful. New design, using existing hardware/software may cost more.</td>
<td>Scheduling for patients, staff, room usage, surgery, procedures</td>
</tr>
<tr>
<td>Allow for medical note information to be interfaced throughout the system</td>
<td>Patient Boards for seeing the whole department at a glance.</td>
</tr>
<tr>
<td>Introduce formal foresighted data collection methodologies</td>
<td>Security revolving around ID cards.</td>
</tr>
<tr>
<td>Create a note style, NO TEMPLATES, NO CANNED NOTES WITH ONE CLICK</td>
<td>MEDICATION MACHINES THAT WORK, NOT PIXIS STYLE! With morbidity.</td>
</tr>
<tr>
<td>Create a page in under 2 minutes</td>
<td>Supply management from Medical Note</td>
</tr>
<tr>
<td>Data Dictionary with pre-validated, pre-linked data</td>
<td>Hand Helds for front line care givers, Notebooks, PDAs.</td>
</tr>
<tr>
<td><strong>USE CASE</strong></td>
<td><strong>PHYSICIAN</strong></td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Actor</strong></td>
<td>Physician</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Discovers Patients’ problems, determines ancillary services, diagnoses, therapy and needed health care.</td>
</tr>
<tr>
<td><strong>Normal Course</strong></td>
<td>Interview, Exam, CDM for services, therapies, re-evaluation through time, disposition.</td>
</tr>
<tr>
<td><strong>With New Tool</strong></td>
<td>Use of foresighted guideline for data collection during interview, exam, test requests, test answers, diagnoses, therapies, disposition, communications forms processing.</td>
</tr>
</tbody>
</table>
## USE CASE

<table>
<thead>
<tr>
<th>USE CASE</th>
<th>Nurse/Paramedic.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor</td>
<td>Nurse/Paramedic.</td>
</tr>
<tr>
<td>Description</td>
<td>Initial Triage, Vitals, Evaluation, determining patient stability. Carries out some of the physician orders or assists in getting the other services during patient testing and care.</td>
</tr>
<tr>
<td>Normal Course</td>
<td>Triage Intake, Vitals, Chief Complaint, initial protocol testing, initial protocol medical medical therapies.</td>
</tr>
<tr>
<td>With New Tool</td>
<td>Use of foresighted guideline for data collection during triage interview, vitals, data collections, with initial protocols in front of them and available for quick starts and best patient care.</td>
</tr>
<tr>
<td>Use Case</td>
<td>Ancillary Services: Xray, Laboratory, CardioPulmonary, Physical Therapy, Social Services</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Actor</td>
<td>Department Technicians.</td>
</tr>
<tr>
<td>Description</td>
<td>Services ordered by Physician, order recognized, Tech locates patient, carries out service, gets service/report to patient.</td>
</tr>
<tr>
<td>Present Course</td>
<td>Physician writes order, order entered (computer/paper form), staff calls ancillary service dept. as computer order entry system is not reliable, tech comes down or arrangements made to take patient to dept, test done, film or report returned for physician evaluation.</td>
</tr>
<tr>
<td>Course with New Tool</td>
<td>Physician in exam room with patient, ancillary service options in the guideline is available for this health care problem, physician selects it, order goes through the computer to ancillary services techs, who get the order on their PDA, and acknowledge it. Arrangements made for testing, physician is notified on the computer of the results which can be viewed when ready. If panic values, physician acknowledgement required.</td>
</tr>
</tbody>
</table>
Other Use Cases

- Surgery Staff
- Each Department
- Each Clinic
- Maintenance
- Housekeeping
- Security
- Administration
**INPUT IS THE BOTTLENECK**

- Dictionary Model
- Single Screen Design
- Pen/Mouse or Keyboard, NOT BOTH
- 15 functions per screen, max.
- Minor Windows: Patient, Physician, Status, Actions
OUTPUTS ARE EASY

• BATCH Vs DEMAND (Batch for anything that can be (A Push Model, Not a Pull Model which is common))
• Medical Markup Language (New Idea)
• Medical Notes: H&Ps, Surgery Notes, Daily Notes, Procedure Notes, Consults, etc.
• Prescriptions, Consult requests, work slips, PT Requests, CP Requests, XRay requests, Lab Requests, etc.
• Patient Education sheets
• Billing sheets
• More than 35 different forms per physician per their practice for communications to others within the health care of any given patient.
• Initial $200,000.00, which for a 60 day project to discuss our RFP and to build a non-functional proto-type to prove that our model can work.

• Once functionality is established, this project will most likely go on for 5 years.

• We are looking to keep the cost at less than $40,000 per month.

• In researching the literature, and comparing our success criteria with the existing implementations, there have been no successes, so we are working with new and pioneering technology which is undiscovered and unproven. The costs cannot be correctly determined or applied due to the pioneering nature of the project.

• Milestones will be determined and met, plus when to abandon.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine Feasibility</td>
<td>60 Days, Initial $200,000.00</td>
</tr>
<tr>
<td>Determine the Milestones and the Successful arrival at these Milestones.</td>
<td>4 months, $40,000 per month. At this time, there will be agreement on all sides.</td>
</tr>
<tr>
<td>Build Teams from existing staff for project development. Determine order of development based on patient care functionality. Make first functional product the Physician Data Entry Electronic Medical Record Engine</td>
<td>1 month, $40,000.00</td>
</tr>
<tr>
<td></td>
<td>6 months, $40,000 per month.</td>
</tr>
</tbody>
</table>
CHANGE MANAGEMENT

- IS Department. Will need a Manager with a computer/electrical engineering background. Will need to change old ideas of thinking (HL-7, Pyramid, etc).
- Medical Records, will most likely be cut by 90% or more.
- Physicians will be expected to do more with less.
- Less FTA’s per physician.
- Billing department will decrease.
- Central Supply should be getting exact counts.
- Decrease in Administration.
Change Management

• New research capabilities as never seen before.
• Prospective and Retrospective.
• Data Mining, with data mining sales.
• Pharmaceutical Companies will be wanting to use our research tool.
• All of the above will take additional staff.