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[The Data Model That Nearly Killed Me](#)

Tuesday, March 17th, 2009 | Joe Bugajski

On February 17, 2009, President Barack Obama signed into law the economic stimulus package that appropriated about \$20 billion for health information technology (“[Technology Gets a Piece of Stimulus](#)“, New York Times, January 25, 2009. [The American Recovery and Reinvestment Act of 2009](#), Subtitle A—Promotion of Health Information Technology, details the epically massive government program to digitize and network health information.) The law makes a job for yet another bureaucrat to oversee the vast program – is this change we can believe in? It defines rules for health information standards by designating a new standards board – everyone desires more data standards and standards groups. The law also explains how to test systems built with federal money but it does not explain how to measure semantic validity of information – garbage in garbage out! Good luck with all of that Mr. President.

During the last week of January 2009 a faulty electronic, networked, health information data model nearly killed me despite its vaunted status as a component of two state-of-the-art, health information systems at two of the world’s most advanced medical facilities. This will come as no surprise to healthcare IT experts because health information is inherently complex, medical science develops extraordinarily rapidly, patient interactions are intensely personal, and the number of data types and sheer volumes of healthcare data explode prodigiously with new tests, instruments, and treatments. (Prof. Anne Armstrong-Coben, M.D., entitled, “[The Computer Will See You Now](#)“, New York Times, March 5, 2009 describes one physician’s concerns about computerized medicine.)

While President Obama’s vision of a national health information network appeals to many politicians and pundits, that vision may prove more fantastic than practical given the complexities involved in designing, developing, implementing, and maintaining such a complicated network, together with new inventions required for data models and software architecture. (The National Institutes of Health [NIH] investigated the issues surrounding a National Health Information Network [NHIN]. See the NIH report, “[Summary of Nationwide Health Information Network \[HNIN\] Request for Information Responses](#)“, June 2005.) My near-death experience at one of the best tertiary medical centers in the world, with modern electronic health information systems, illuminates the chasm between the President’s NHIN vision and its reality.

Treatment Saga

My ordeal began on Sunday January 25, 2009. I returned from church, ate breakfast, and sat in my favorite chair to read the paper. Within an hour, my lungs were causing so much pain that I had to lie down. Two hours – a 104 degree fever, a not-working-so-well emergency asthma treatment regimen, and a tortured conversation with my then very concerned allergist – later, and I was on my way to urgent care. My wife reluctantly agreed to drive me to the clinic attached to my allergist’s office rather than a closer-by clinic, because, I entreated, the farther-away, attached clinic would enter the attending doctor’s report and any test results into my electronic health record for my allergist to review on Monday morning. (OK – low blood oxygen was messing with my brain but it seemed a good idea.) Thus, day one of a near death experience began.

Urgent Care

The nurse who escorts me into urgent care asks me for my doctor's name. I tell her my allergist's name. The nurse argues that she wants to know the name of my primary care physician. Of course, that information is in my electronic medical record that she can readily access. The nurse next requests me to relate my medical history – which information is available in the electronic record. Next, an attending physician asks for my doctor's name, no, not my allergist, my internist, and please relate my medical history. Never mind that (a) I provided this information to the nurse only moments ago, (b) I can barely breath, (c) I have horrible pain in my lungs, (d) I have a high fever, and (e) the requested data already is in my electronic health record. Perhaps, I think, these professionals must verify my data – regardless of whether or not my brain wants more oxygen. I explain to the nurse and doctor that my allergist (who is a specialist in allergy and immunology, and who also has a Ph.D. in pulmonary medicine) wanted me to receive certain treatments. The attending physician at urgent care says that I may have pneumonia. I say that I also have severe asthma. She smiles politely and walks away.

By-and-by the attending physician requests an X-ray and blood test. I ask for pain relief medication (the correct prescription is in my electronic health record). The doctor prescribes two Tylenol tablets that did nothing for the pain. Hours go by. The X-ray shows no pneumonia, says a radiologist. The attending doctor orders an intravenous antibiotic to help me deal with the infection, and asks if I feel better. I say, no, not really. Do I want a breathing treatment? Yes, that would be good. I am sent home.

During my visit to urgent care, starting about 1pm and continuing until 7pm, my respiration rate was double to triple its normal rate. My lungs are bags of pain that trap CO₂. I have a high fever. I want to die. Despite the existence of a well maintained, electronic health information network, I am not treated for asthma aggravated by a lung infection as my medical history clearly and unambiguously indicates I should have been.

Doctor's Office

I cannot sleep during the night following the visit to urgent care. I am unable to breathe without intense pain. My respiration rate remains much higher than normal. But, my fever broke. First thing in the morning, I call my allergist's office. My allergist's nurse returns my call around 2pm. She says the doctor wants to see me at 4:30pm. He believes that I am still in serious trouble. My wife collects my medications (bless her, because these would keep me alive later) and drives me to my doctor's office.

My allergist and his nurse do not take my medical history. I lie on a gurney in an examination room where I am hooked to monitors and given supplemental oxygen. My doctor listens to my lungs as I labor and cough my way through a few breaths. He observes my respiration rate. He waits awhile. He repeats these observations thrice. Around 5:30pm, my allergist says that I am too sick and must be admitted to hospital for continuous observation. I object. He replies that I may die if I go home. His nurse calls for an ambulance (no, my wife cannot drive me 1.5 miles to the hospital – the doctor said this would be too dangerous).

90 minutes pass before the ambulance arrives. My allergist spends the intervening time preparing a four page memorandum giving my medical history, my current condition, and a treatment plan. He also telephones the admitting physician at the emergency room (ER) where I am to be taken to discuss the medical issues. My allergist then entrusts this information to the ambulance attendant.

ER and ICU

Once in the ambulance, the attendant asks me to give medical history, allergies, and medications. This information he enters into a multipart form. When we arrive in ER at the medical center affiliated with a world renowned university, I am called "asthma" by someone behind a desk who tells the ambulance attendant to park me in a hallway. The attendant delivers his report, oral, and written, to the triage nurse who by then is examining me. The attendant tells the triage nurse that he brought a written report from my physician for the admitting doctor to read. The nurse instructs the attendant to deliver his reports to a person behind a nearby desk. She said it will be put into my chart.

I was in ER for 20 hours before being admitted to the intensive care unit (ICU) where I spent another 28 hours. Throughout my stay, I was hooked to network attached monitors that incessantly sounded alarms to which no one

responded. I was asked 11 times to repeat my medical history, medication, and allergies to as many different medical professionals. I was seen by seven doctors each of whom asked me similar questions. Five doctors were never to be seen again. All doctors mumbled something about putting their findings into the hospital's electronic records system – most did not according to ICU nurses. No one read my allergist's detailed report about my condition and health history.

As I moved from ER, to an ER holding room for admitted patients, back to ER, and to and fro other departments for tests, and finally to ICU, I was visited by nurses and technicians who pushed laptops mounted on wheeled sticks. They checked my vitals; asked me questions about my history, medications, and allergies; and entered findings into the hospital's electronic medical record using the laptops mounted on wheeled sticks.

I asked every nurse and doctor who met me, and I was told that I would receive medication to relieve the intense pain from my lungs. Each claimed they would note this in my electronic medical record. No one did until about 14 hours later, during the middle of the night, when one thoughtful ER nurse finally found a doctor to authorize giving me the oft approved but never delivered pain relief medication.

No one in ER or ICU knew, nor could they find, my allergist's memorandum describing my medical history, current medications, and treatment plan. My wife eventually called the allergist's to obtain a fax copy for ICU. No one ever mentioned reading the fax copy although an ICU nurse confirmed its receipt. The list of persons who denied knowledge of the memorandum included the on-site doctor who represented the same clinic as my allergist. That person could view my electronic health records on-line from the hospital but she ignored this rich source of vital information about my condition preferring instead to come to (an unbiased?) conclusion.

One heroic medical professional, the first nurse I met in ICU, worked to create a consistent record of my condition, allergies, and medications in the hospital's electronic health information system. She spent over one hour searching for previously entered data, correcting errors, and moving or reentering data. She argued with one doctor whose concurrent access to the hospital's system blocked my nurse's access to my information. She called the hospital's pharmacy repeatedly to get my medications delivered. She met and called doctors several times. She even convinced one doctor and a pharmacist to come to my room to resolve data errors in person. Despite these heroic efforts, I never received correct medications during my stay. Indeed, my wife snuck one of my inhalers into my room. After I used it, I finally began to recover.

At one point during my battle with illness and electronic healthcare data, the only asthma medication that had kept me alive began to wear-off. I knew that if I did not receive the right dose within an hour or so, my condition would deteriorate rapidly and I would die. This critical information I had repeated 9 times to doctors and nurses who recorded it in my electronic health record. They promised that I would receive the medicine when it was time. That time came and went. My lungs began to scream with pain. My respiration rate accelerated. My breathing became more labored. I was crashing. I begged the doctor who next stopped to check my condition for her help. She said she would authorize the prescription. The heroic ICU nurse stopped by my room, checked my electronic records, but she could not find the prescription. She then ran to find a doctor to authorize my medicine. She succeeded. I received the medicine. I lived.

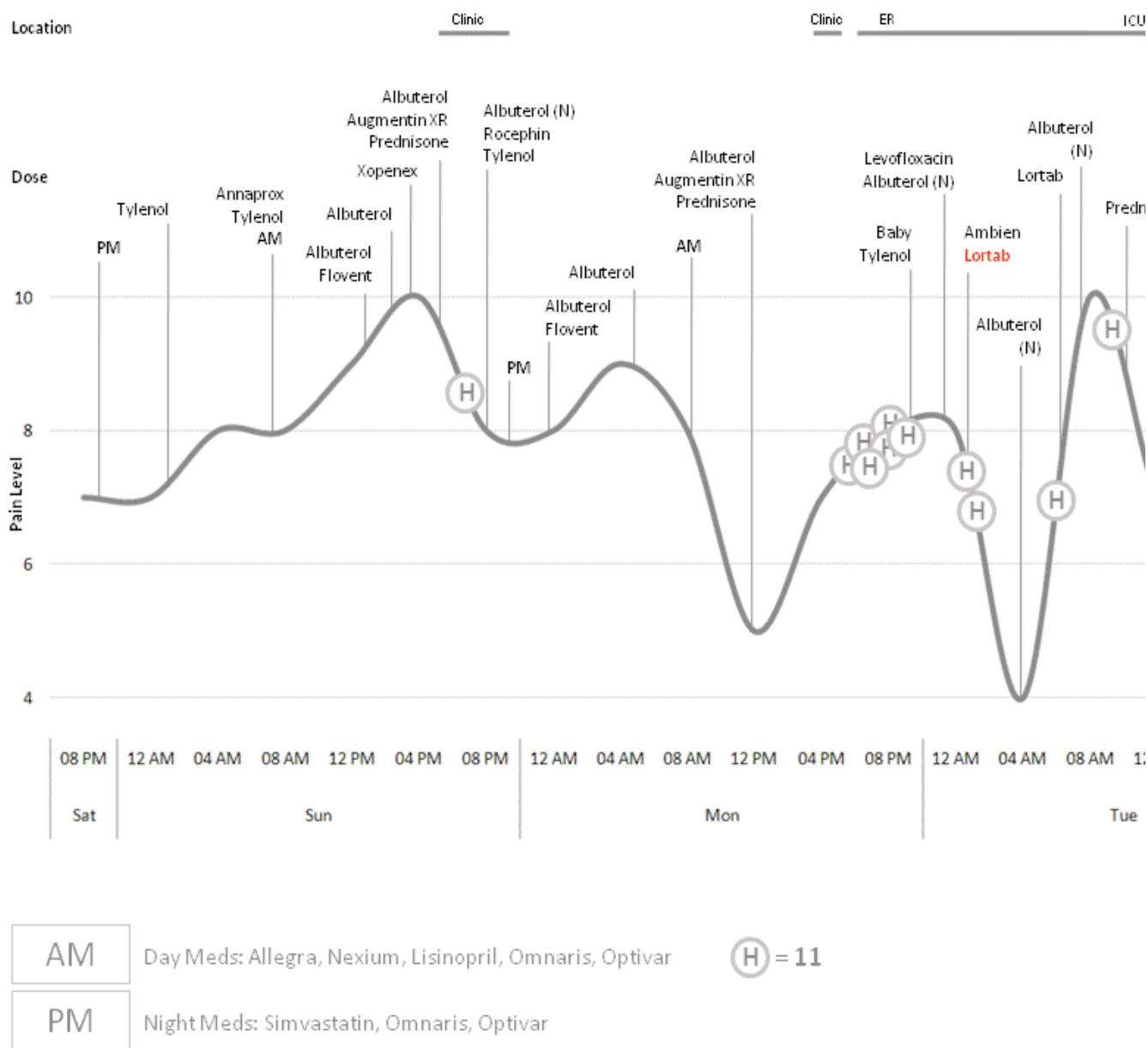


Figure 1: Asthma-Pneumonia Episode Chronology

During the time I was hospitalized, I forced myself to remain coherent so that I could correct errors whenever medical professionals provided “prescribed medications” or they came to run tests (Figure 1 illustrates my experience). I twice received food to which I was allergic, both times after a doctor “recorded” a list of my food allergies.

Needless to say, I was exhausted from labored breathing, a lung infection, pain, tests, effort expended to correct data model errors, energy wasted giving my medical history, and lack of sleep. Several times I stopped fighting. I relaxed. I was able thereby to slow respiration to my normal rate. This made my blood O2 saturation rate drop precipitously which in turn triggered monitor alarms – to which no one responded. (I learned later from a nurse’s assistant, that alarms always sounded in ER and ICU so no one paid attention to them.)

I finally understood the problem everyone was having when the heroic ICU nurse explained what she was doing while working with the hospital’s electronic health records system. It explained why so many caring, competent, knowledgeable, and talented medical professionals behaved so strangely when interacting with patients. It was because

they were fighting a horrible data model. It was that data model that nearly killed me.

Electronic Health Information Systems

Medical personnel at urgent care and the hospital who interacted with me all used a version of the same electronic health information system (the “system”). It became clear that everyone was fighting that system. Indeed, they wasted between 40% and 60% of their time making the system do something useful for them. The system kept everyone from fulfilling their duties – the health information system did not help medical professionals perform their duties.

Since my hospital stay, I confirmed that electronic health information systems are mostly broken. I interviewed medical professionals, healthcare IT experts, and my allergist. They confirmed my sickbed analysis. Indeed, several experts said that they longed for handwritten charts once more hanging from the foot of every patient’s bed. (Again, please read Prof. Dr. Armstrong-Coben’s [Op-Ed article](#).) My analysis argues for careful analysis of strengths, weaknesses, opportunities, and threats (SWOT) associated with building a national health information network. If the nation simply accepts the President’s vision while healthcare IT vendors collect some of the \$20 billion stimulus bounty, individuals and businesses will pay higher medical costs, patients will receive inferior care, and medical professionals will lose precious time fighting IT systems instead of delivering better care.

Killer Data Model

Poor data model design deters medical professionals from delivering quality care. Conceptual data models capture information requirements from medical practitioners’ perspectives but IT professionals only vaguely understand medicine (see, Scot M. Silverstein, M.D., “[Essential Value of Medical Informatics Expertise in High-Risk Areas: an Invasive Cardiology Example](#)“, Drexel University, 2007). Logical data models express information requirements from a technical design perspective (e.g., schema for relational database management system [RDBMS], schema for extensible mark-up language [XML] documents, or formats for health insurance claims [a message model]). Logical data models fail if conceptual models are wrong, if errors occur in transformation of the conceptual model into the logical model (forward engineering), or if logical design is faulty (see Shahid N. Shah’s post, “[Repeat after me: healthcare data models matter](#)“. (For more information about data models and data modeling, see Joe Maguire’s paper, Burton Group, Data Management Strategies, “[Mind Your Business: Serving Business with Data Models that Focus Exclusively on Data](#)“.)

The root of the problem I experienced with health information systems is a very bad data model. Evidence supporting my claim includes these observations:

- Incoherent database design isolates patient information from one department to the next and from one organization to the next. This wastes time and increases errors because medical personnel must enter patient information into a unique view of the system that corresponded to user identity and department – this prevents one medical professional from seeing patient information input by another medical professional.
- Patient information is easily lost inside the electronic records system
- Hard copy patient information becomes dissociated with the electronic record
- A healthcare professional’s work pattern is not reflected in either the system design or data model – people spent considerable time searching and data reentry
- No master data management (MDM) in evidence – Production of a consistent record of me as a patient required the ICU nurse to copy data from multiple database views into the in-patient record
- Admitted in-patient records are treated differently by the system than out-patient or ER record only patients – no information about my medical history gathered during a prior visit to ER was available to my doctors or nurses.
- Nurses and doctors do not have ready access to listings of pharmaceuticals which wasted much time while they searched for information about my daily medications – lists of medications in the system are limited to those at the hospital pharmacy.
- No support existed for recording allergies differently than to ambient source and foods – Lists of allergies were not in drop down menus although these are well known by allergists and drug companies.

The root cause of these problems is the failure by information technology (IT) system architects to correctly capture

business requirements. There also is evidence that no one ever produced a reliable conceptual data model. The problem commonly occurs. Too often, system architects simply gather lists of requirements then they ask their favorite vendors to quote a product. This is non-architecture and system non-design. Rarely do architects request information architecture.

Fault also rests with independent software vendors (ISVs) whose products fail to support end- user requirements – real doctors, nurses, technicians, and pharmacists. Rather they build products to a marketer's or a developer's best guess about end-users' requirements. It is easier to rush a product to market that "looks good" to IT people but horrifies end-users. This seems to have been the case with the electronic health information system used by the clinic and hospital that treated me.

Another common problem is that useful conceptual data modeling tools do not exist. This broad challenge to the industry makes the best data modeler's task more difficult as they work to create conceptual models then validate those models with end-users. Without good tools, information architects and data modelers often use technical elements to represent business concepts. This leads to problems with forward engineering because healthcare (business) concepts are mixed with data design technology artifacts. (See the article by T. J. Eggebraaten, et al, "[A health-care data model based on the HL7 Reference Information Model](#)"; IBM Systems Journal, Vol-46, No.1 2007.)

IT information security professionals in the medical industry appear to be reluctant to deploy document authentication and encryption for users. Many commercial health information systems can produce Adobe Acrobat versions of doctor's reports. These reports could be authenticated using Adobe technology and transmitted to another physician using email encryption programs. The patient might even certify such transmission of their information using electronic systems. This simple practice might have enabled admitting doctors to see my allergist's memorandum in their in-box instead of requiring paper copies to pass from one person to the next.

Clearly, the most important problem is the lack of a consistent data model across departments and providers. This wastes time and increases error rates.

Unreliable Information

Poorly articulated data models engender disbelief in system data among end-users who see data inconsistencies in competing entries about a person, their symptoms, their illnesses, and data entered by different physicians and nurses who cared for the patient. This problem was amply evidenced by 11 full histories taken by every medical professional who checked my condition.

If externally generated information history is difficult to integrate, particularly if that information is not in the form used most frequently by medical professionals in the receiving organization then there is a propensity to misplace that information. Witness the lost memorandum from my allergist. That document was misplaced shortly after its confirmed delivery to ER. Its loss dramatically reduced the quality and effectiveness of my care.

Other problems arise when doctors can arbitrarily block nurses or other doctors from completing data entry tasks. Such issues delayed provision of medications appropriate to treating my ailment (e.g., pain relief medication). Because information was not shared between departments or between the hospital and the clinic, each doctor felt obliged to build a diagnosis and each nurse had to gather my data anew.

Bad Systems

Clearly, the networked monitors with alarms sounding so frequently no one believed they meant anything is a serious design problem. Operating inconsistencies among systems and apparatus that increases the rate of false positive alarms leads to errors in patient care management, some of which are possibly fatal.

Clearly there was no attempt by IT to provide a proper event driven messaging technology to deliver data and manage workflow for doctors and nurses who need to review this information. Too much time was lost in tracing test results and gathering information about medications that used as much as 50% of staffs' available time and dramatically increased error rates that lower patient care quality.

Recommendations

A national health information network, while a laudable vision, will require massive data integration engineering at a scale never before undertaken by the IT industry. (For challenges surrounding data integration, see the Burton Group, Data Management Strategies overview, written by me entitled, "[Data Integration: Fantasies and Facts](#)".)

The only way to achieve the President's vision reliably will require narrowing the scope of work to a demonstrable and doable task that executes in finite time. Mr. President, don't be fooled by IT vendors telling (false) tales of munificent and magnificent skills with their health information system development. Rather, ask them to depart immediately. Instead call upon our nation's best system and data architects to report for duty. Send these people to meet with doctors, nurses, test technicians, pharmacists, hospital, and clinic administrators. Have them learn what practicing medicine really means. Tell them to do these things:

- Build a business (medical information system) requirements model.
- Create conceptual data model and information architecture.
- Validate these models in a public forum like those used by open standards organizations (e.g., OASIS, OMG, W3C, and others).
- After the models are validated, the architects can create formal requests for information (RFIs) for vendors.
- Health information technology vendors can respond to the RFI to see whose system matches those requirements.
- Seek hospital and clinic volunteers to trial the new systems.
- Find the best matches to requirements and submit to the winning vendors a request for proposal (RFP) to build and install the first systems at the volunteer's facilities.
- Narrow down the list of vendors and send them a request for quote (RFP) to decide who will win the initial integration trial between two medical institutions and between two departments in each of those institutions.
- Establish success criteria and measure vendors' achievements relative to that target not one of their making.
- Be sure the vendors work for the volunteers and not for the government. We need a health information system that meets their unique needs.
- Integrate the systems. Pay the winning vendors a bonus for early completion.

Conclusion

The national health information network envisioned by President Barak Obama is a pipedream. That is, unless and until information technology (IT) professionals learn how to build systems and data models that meet end-user requirements (read, useful to medical professionals). My recent experience with an urgent care clinic and a major tertiary care hospital convinced me that the United States will require a long time before there is a consistent data model capable of recording a patient's health information, let alone a data model capable of accurately and reliably transmitting that information from one healthcare institution to another. Much of the groundwork required to achieve the vision needs to be done. The \$20 billion allocated by the American Recovery and Reinvestment Act for a health information network will be squandered by IT vendors and hospital administrators long before the nation has a viable network unless and until the administration acts rationally to establish a program of development that is free of vendor and administrative greed. Take it from a guy who recently found breathing very difficult, do not hold your breath waiting for a national health information network to appear.

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1. Conceptual data models would describe the information that an ICU nurse requires to fulfill his responsibilities, or that an ER attending physician must have and must obtain to treat her patients. The same is similarly true for radiology, cardiology, oncology, psychiatry, admissions, billing, pharmacy, and many others.
 2. [Health Level 7 \(HL7\)](#) is an open standards group chartered by the American National Standards Institute (ANSI) to develop health information standards. One such standard is the HL7 [Reference Information Model \(RIM\)](#), a conceptual data model for health care data.

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77 Comments to *The Data Model That Nearly Killed Me*



Asthmatic IT guy

April 17, 2009

As an IT professional and someone who has received a few breathing treatments in ER's, I want to thank you for taking the time to document your experiences and go beyond the suffering to solid recommendations. The only thing I would suggest is to identify a sympathetic expert who can distill the details to a relatively simple storyboard. I know a fair amount about the issues you've raised because I've been in healthcare IT for 20 years and an asthmatic for 50. But this story and its recommendations will come across to many more people if you can tell it with a Powerpoint that makes the issues simpler.



[Karen Lopez](#)

April 17, 2009

I'm wondering if there was a great conceptual and or logical data model that was not implemented at the physical layer.

Given the advent of rushed/Agile/Just get er done approaches to systems development, I'm betting there are many killer databases out there that were originally designed to be less lethal at the logical level.



[Joy de la Ren](#)

April 18, 2009

TY for documenting & posting this. In addition, there is considerable time necessary for dr's to transcribe data rather than scribble it into health report while w/ patient. Additionally, the Computer industry changes so fast, that I'm having trouble accessing my writings from 3 years ago. Programs have been upgraded etc. Health records will be even more inaccessible. I'm liking my 3 ring binder with dividers more & more. I'm really glad you survived the sick healthcare system.



eSkepticalEngr

April 18, 2009

Sorry, IT folks, but this engineer with over three decades of experience in hospitals has had it with IT storyboards, Powerpoints, and methodologies. The problem is your culture, not to mention your arrogance. That goes for the author, too. Immediately after decrying the tragedy of errors that befell him, he immediately jumps to a solution by prescribing a variation on methods that are already failing.

Rearranging the deckchairs on the healthcare Titanic is not going to work.

Get up and get out to the point of care. Having been there and knowing the technology and its limitation, I know why the monitors alarm as they do. I could explain it to you, but I think it's time you experienced it for yourself. Do you honestly believe we don't know about the problems you cite? Maybe you can accomplish what R&D engineers have not for decades. Seriously. But you'll never stand a chance from the comfort of your cubicle and in the company of those who share your perspective.

Go to the bedside and stay there long enough to forget that you work for IT and start to feel like you're part of the team at their bedside. Do something IT simply has not yet been willing to do: Understand the problem by living it. Stop trying to hammer the business business model square peg into the healthcare business model round hole. You've screwed things up enough. Please stop and start over.

**Alexander Scarlet MD**

April 18, 2009

“Data modeling is not optional” (Data Modeling Essentials by Simsion & Witt)

Great article and a correct diagnosis of one of the main problems of the Healthcare Informatics industry. I am a physician with a degree in computer sciences currently employed as Chief Medical Informatics Officer with a medium sized hospital in the USA. We are now in the process of setting up a clinical data repository to store and present the users with laboratory results, imaging links and pharmacy orders on top of the diagnosis and procedures. I found out repeatedly that vendors are not willing to share the database schema of their products with the excuse it is a proprietary document. Unfortunately, many times this is just an excuse for a complete lack of such a schema. Even worse -the conceptual diagram, logical and physical data model is either non existent, poorly defined or kept in someone’s vault. The analogy that comes to mind is trying to build a house without a blueprint or with one that is kept in the builder’s vault.

I strongly recommend anyone in the HIT industry to read the book I have quoted above. I have no doubt it will save millions of \$, mountains of users ‘ frustrations and most probably a couple of lives.

**S Silverstein MD**

April 18, 2009

eSkepticalEngr wrote:

“Do you honestly believe we don’t know about the problems you cite?”

Well, yes, I do honestly believe through empirical observation that most in hospital IT (largely MIS personnel whose experience involves installing shrinkwrapped software packages) have no clue about the problems cited.

See my site at <http://www.ischool.drexel.edu/faculty/ssilverstein/medinfo.htm>

What is precisely needed in healthcare IT is leadership by people with a critical data, software and user experience-engineering mindset such as Mr. Bugajski’s.

**Tim Cook**

April 18, 2009

Instead of “data model” think “information model”. This link is a good place to start: http://www.openehr.org/shared-resources/getting_started/getting_started.html

Then read the primer. The solution exists today but too often my fellow Americans want to keep re-inventing the wheel.

As Albert Einstein said; “Insanity: Doing the same thing over and over again and expecting a different result.

Cheers,

Tim

**ian**

April 19, 2009

Fantastic read, and all too believable given my experiences as a physician. I think, though, that you missed one enormously important factor which is invisible to patients.

A fundamental problem with medical information is the signal:noise ratio. This is due in part to technology (because it is trivial to copy and past vast sections of a note), but also regulatory. In the name of lowering costs of care, physicians

must document huge amounts of information about the patient that are “pertinent negatives”. The poster child of this problem is the Review of Systems. No doctor cares about these elements, but there they are in the record, because the insurance company will not pay the doctor unless they are written down.

The result is a low signal:noise ratio in the chart, which is why none of your doctors looked at the other 10 histories that were taken: they are so gummed up with junk that it’s faster to simply ask you.

These same reasons are why that chart “at the foot of the bed” was so useful: it included only what the doctors felt was directly important to patient care.

Sad truth: doctors are not paid for treating your pain: they are paid for documenting its location, duration, frequency, timing, quality, modifying factors, and associated symptoms.



Alexander Caldwell M.D.

April 20, 2009

As a physician, I think there was a more fundamental problem with your care that touches on changes that have occurred in the practice of medicine that have nothing to do with IT. Your care was extremely fragmented. The allergist, assuming he is a graduate of an approved program, and board certified or eligible, was the most qualified person to manage your care. Why were you directed to an urgent care center to be seen by somebody with much less training with only a handwritten note and the hope that somehow you would get into the healthcare system and things would turn out alright? In my view, the allergist should have hospital privileges. He/she would have just called admitting, gotten you a bed, written orders for your care and then managed it on a continuing basis. You would have bypassed the urgent care, ER and all the other layers you went through. If the allergist felt he needed further help such as from pulmonary medicine, if you had pneumonia, or further diagnostic help, he would have just called the appropriate physician consultant on the phone and presented your case personally and asked for the appropriate consult, physician, to physician, by personal verbal communication. All the IT stuff is just a bunch of chaff that the consultant has to wade through to get to what is really wrong with you, which he could have gotten in a 2 or 3 minute phone call from your allergist. You may ask why this situation has developed in medicine. From my experience, your allergist, as much as he/she may care about you, does not want to have hospital privileges so he/she can “have a life” and therefore, while the handwritten note was, in your mind commendable, it was inadequate and the allergist probably knows that, but does not want to manage hospitalized patients.



Joe Bugajski

April 20, 2009

[reply to eSkepticalEng] You should read (at least) the last paragraph of my post “Unfortunate Issues for a National Health IT Network”: http://dmsblog.burtongroup.com/data_management_strategie/2009/04/unfortunate-issues-for-a-national-health-it-network.html. You do not know me. I was living the problem. If you did know me, you would understand that I teach engineers, and I practice, the art of engineering design that you espouse. Clearly you have knowledge and experience. Please share these.



Joe Bugajski

April 20, 2009

[reply to Dr. Caldwell] The first person with whom I discussed the issues was my (board certified) allergist and immunologist. He agreed with your assessment and remedy (i.e., hospital privileges). He typed a four page memorandum to the admitting ER physician. He spoke with the admitting ER physician before he sent me to hospital. He also noted that certain clinical organizations now employ doctors bearing the title, “hospitalist”. I question the wisdom of having a third-party doctor take responsibility for the care that used to be managed by one’s physician. Is this a trend in the medical profession?

**Proper Perspective Needed . . .**

April 20, 2009

While what happened was quite deplorable, I'm afraid the author of this article has incorrectly assigned the blame for these problems.

The issues noted are occurring at an alarmingly high rate and have been for a very, very long time. These types of things have been happening since paper charts were the only option for documentation and reference of clinical information.

Knowledgeable members of the health care community are well aware that the problems referenced by the article's author are due to substandard organizational medical care processes. Health IT is only a tool (one of many available to clinicians) and even the most robust Health IT systems are only as useful and effective as health care practitioners make them.

It seems the authors obvious disdain for the President colored his analysis and assessment as to the root cause of the errors experienced, seeking only to discredit a worthwhile initiative proposed by the President and supported by the health care industry.

Knowingly or not, the author has highlighted an important point: widespread implementation of EMR technology is only the first step. The next, and most important, step is to optimize and leverage effective use of EMR technology to improve quality outcomes.

**JPEDMD**

April 20, 2009

Speaking as a residency trained Emergency physician for many years (completed residency in 1982), and as architect and maintainer of a functional EMR now in use in an academic urban ED and urgent care center for over 12 years, your experience is a useful one in demonstrating the complex, nonlinear system delivery of acute health care in the US. Several of the commentators above also have some valuable insights into the ancestry of some of the illogical practices patients are faced with:

- 1) A history and exam are done multiple times for many reasons, among them the fact that some people doing them get facts wrong or miss things that a better/more experienced practitioner might not, that a teaching hospital's mission includes providing opportunities for trainees – AND that the attending physician will not be paid – in fact, in MEDICARE cases could be convicted of fraud – if you were billed for services where the attending did not duplicate the history and exam, etc.
- 2) You lingered in a chaotic ED environment for a very long time, likely because market forces and incentives have decreased the number of inpatient beds and an urgency on the part of hospital administration to speed ED throughput at the expense of more profitable cost centers, despite a steady increase in the number of annual national ED visits.
- 3) One of the reasons that people long for the clipboard is that it too less time – partly because you could document less and still get paid – but not any more. documentation standards for reimbursement have increased greatly over my career as a physician, and, well, it takes more time to document more (alas, Ian's comments above have more than a grain of truth to them). We also supply much more extensive patient care instructions for discharged patients – that also takes more time. Still, now I can read all the notes, I don't have to wait an hour to get the record of the patient who returns sicker after being seen an discharged yesterday, inpatient doctors can see my notes in the hospital's main IS system, I can easily review patterns of previous patient visits, etc.
- 4) Clinical decision support tools that are of value can help, but in the ED – with it's incredibly varied patient population – are a harder thing to implement
- 5) Legacy EMRs were often created without any, or with very little, major input from practicing clinicians and therefore

with no knowledge of the workflow process in the ED; and as noted above (Dr Scarlet), having been developed in an environment with no mandated interoperability standards, many don't talk to one another well. And there is the added incentive for them of charging \$\$ for every added interface.

We'll skip all the stuff about why health care is so much more expensive here than in other countries (one way costs might go down is if patients and the MDs writing orders for their care could be kept abreast of a simple running tally of charges for the visit – now wildly divergent from real costs, btw – but alas, the billing system can't manage it and the charges for the exact same care vary greatly based on the applicable insurance, which may not be known at the time of service, etc. etc.).

All that being said, I would say that there were a number of occasions of less than optimal delivery of good old fashioned medical care totally exclusive to the use of technology in your case (such as a delay to delivery of analgesia – or at least an explanation of why it may have been withheld).

As for your last question, yes, hospitalists are definitely a trend in vogue, and most data suggests that their use on average improves the delivery of care – though clearly also introducing communications issues. No new doc outside a concierge practice can – or should – be available 24x7 to orchestrate inpatient care. If you crump at 2 AM, likely better to have the hospitalist who started at midnight and is there in house care for you than wait for your doc to arrive from home already exhausted after 12 hours in the office the preceding day.

Glad you got better!

There are a lot of people trying to improve healthcare IT – but it's an incredibly difficult task:

National eHealth Collaborative:

<http://www.nationalehealth.org/>

Emergency Informatics Association:

<http://emergencyinformatics.org/index.php>

A Shared Roadmap and Vision for Health Care IT:

<http://www.nationalehealth.org/uploadedFiles/Home/News/A%20Shared%20Roadmap%20and%20Vision%20for%20Health%20IT%20-%20Feb%2010%202009%20FINAL3.pdf>

OASIS:

<http://www.oasis-open.org/home/index.php>

Healthcare Information Technology Standards Panel (HITSP):

http://www.hitsp.org/about_hitsp.aspx

Certification Commission for Healthcare Information Technology (CCHIT):

<http://www.cchit.org/>

John Halamka's "Life as a Healthcare CIO" blog:

<http://geekdoctor.blogspot.com/>



Joe Bugajski

April 21, 2009

[Reply to "Proper Perspective Needed..."] I admire, voted for, and strongly support President Obama. I support his vision of a National Health Network (NHN). I strongly disagree with his administration's \$20 billion conclusion that technology and technologists stand ready to build the NHN today. While I know little about practicing medicine, I am an authority (30 experience and many publications) in data interoperability and system integration. Hence, I cannot comment about treatment effectiveness – you and others generously provided these insights. I can write about data in the context of a system design.

The crux of the data model issue is this. If data cannot be made reliably available across silos in a single EHR, then this data cannot be made reliably available to a huge, heterogeneous collection of networked systems. Furthermore, poor quality data models and low quality user interface design convolve into serious data access and use problems for practitioners and their patients. Data models are my immediate concern relative to the NHN, but interface design also needs attention (also a fit subject for study in the NHN context). Further to data models, integration of information across an exceedingly complex, networked, data storage and retrieval topology remains an area of active research. (Indeed, my clients in every industry worldwide struggle with the issues daily – just for in-house systems.) Contrast data integration for NHN with the technology and expertise used to build the interstate highway system – 30 years of networked data knowledge versus 3000 years of road building knowledge. Consider too that technologically advanced, caring, and world-class medical institutions own and operate the troubled systems in question. These experts have immediate access to the best minds in computer, data, and network technologies. If they cannot reliably move data from one department to another, or across the street to from one to the other, how then do the rest of us cope?

**Brian**

April 22, 2009

As an IT person in the healthcare field, I'm not altogether thrilled with how we're portrayed here. I admit it; this article puts us on the defensive.

This patient care episode certainly sounds appalling. That's my first reaction. My second reaction is, did you notice how little problem ownership and patient advocacy was happening? Where were the people following through? Only the heroic ICU nurse seemed to own the patient care issues.

Now I step back. I've been working a long time now and I have to say that the gloomy tone of this article is overdone. I simply cannot count the number of times that effective systems redesign (of which IT is only one part) has corrected situations, departments and organizations that were bad and getting worse. I speak from experience.

If you have buy-in, good people, and adequate resources, great things are possible.

The warnings against vendor happy-talk are dead on the mark. The reference to independent standards and industry best practices are excellent. Application architecture is a pre-requisite, no doubt about it.

However what enables you to make the leap from your experience, to saying that "The national health information network ... is a pipedream..."? This is simply overreaching. This is a common human failing. You've taken your experience, valid as that is, and applied to to the entire nation.

Don't you think that correction of situations like this has to start somewhere? Isn't it worth trying something that hasn't been tried before? To me, you are giving up the fight before it has even begun.

**Keith Thompson MD**

April 24, 2009

As a physician who has experience in developing and deploying a digital information system for our own practice, I agree with Alexander Caldwell M.D.'s assessment: the socio-economic changes in medicine that have occurred during the last qtr. century have resulted in a culture in which no one "owns" the patient or has total accountability for the patient's outcome.

Rather, the patient's "problem" is diffused across multiple interdisciplinary "specialists" without anyone seeing the "big picture" and acting aggressively as an advocate for the patient. IT is but a peripheral issue.

Digital health care information advances and standards are a good thing and they will (marginally) improve care, but **SOMEONE MUST OWN THE PATIENT.**

Until the health care system rectifies this fundamental problem, the "holy grail" of IT cannot not deliver improvements

in quality or cost.



Kirby Nielsen

April 26, 2009

Mr. Tim Cook (above) has provided what I believe is the most reasonable model for consideration. That is an open source patient centric model of medical information storage and retrieval. As a consumer of health care, an amateur observer of HIT, and an advocate of Consumer Driven Health Care I am convinced that no other model of EMR is feasible over the long term and across health care provider barriers.

Start at birth and build an EMR system for life. Access this personal data base with permission of the patient consumer and move the encrypted data to the hospital ER, MD office, or clinic. Open source software means that once the data standards (I guess what you would call the code or program language) are established any certified program will be able to read and use the data.

In this manner the data stays in one place as the patient moves in and out of different health delivery systems. From your story, it is not hard to imagine the various systemic problems you faced will be nearly impossible to ever solve.

Additionally, as an outsider, it is interesting to see how quickly the provider community jumped to problems with the government or insurance companies and how quickly IT people jumped into technical jargon. Most missed the painfulness of your experience and the fact it nearly killed you.

Finally, my wife had a very similar experience with a suspected stroke and actually (I am not making this up) spent the night in a storage closet that housed orthopedic supplies.



Jackson

April 28, 2009

Nice report. Where did you find the time to note down every twist and turn during this episode while you were suffering in pain ?? I would have blanked out.



Tim McNamara

April 28, 2009

There are several layers of problems in this report and the author mistakenly lays most of them at the door of electronic medical records. The first and foremost problem was a systemic one that has taken over the "medical model" of care in too many places: no one person is in charge of and accountable for the patient's care.

In the simplest terms, the patient should have been sent directly to the ER and not to urgent care since he was in a life-threatening medical emergency. This would have saved a lot of time to begin with.

At the ER, he should have been assigned to one attending physician accountable for coordinating the patient's care and to act as the patient's advocate. A pulmonologist should have been consulted, proper care should have been started and the patient would have gotten better in 20 minutes.

This was not a problem with an EMR, this was a problem with the hospital's structural model of care. The EMR may have helped or exacerbated this fundamental problem, but it was not the source of the problem.

In terms of EMRs, we now have two antithetical requirements. First, absolute protection of patient data is required by law (HIPPA). Second, complete access to the information is necessary for providers to do their jobs. These two needs are in opposition to each other and must be resolved on a policy level, not by computer programmers.

As a health care provider working in multiple health care systems, I deal with at least six different EMR systems. None of them are satisfactory and most of them appear to be designed by computer professionals who have some vague idea

of how a medical record should operate, but are not clinicians themselves and do not understand the mental workflow used by clinicians. Interfaces are uniformly atrocious, information is uniformly cumbersome to find, errors are almost impossible to correct, and obvious strengths provided by data processing are not leveraged (e.g., automatically flagging out-of-range lab values for immediate attention, especially critical lab values; flagging potentially adverse medication interactions; flagging medications on the Beers list for geriatric patients; etc.). Medical informatics has a long way to go and needs an Apple-like focus on simplicity and usability, rather than the Windows- and Linux-like kitchen sink approach.

And, Joe, glad you got better!



Dru

April 28, 2009

While you are correct in most of your analysis. I want to provide another glimpse.

For about 3 years I worked for a Clinical Medical Records developer. I am a software developer. You state that IT professionals barely understand the medical profession.

I disagree.

There are no two professions more analogous. The issue is that the people that are driving the EMR push fail to understand both professions. I watched, and participated in, the fights that led to the abortions that are the available products. The development side of the shop knows EXACTLY what the the Medical side of the shop wants. The problem is, that is doesn't sell.

Give the Doctors and nurses a Tablet format PC with a visual representation of a paper chart. Let them transcribe their notes in handwriting. Use the same grid setup they've used on paper for 30 years, and hang that Tablet on the end of the bed (with a charger in the foot of the bed, so that the tablets are always on and ready). Ideally, all of the monitoring equipment would be logging to that tablet, but that's a pipe dream at this point.

But here is the issue.

It won't sell. It isn't all pretty colors and graphs. You can't mine handwriting effectively, and it doesn't solve the problems that EMR is supposed to solve. All it does is move the old paper to an electronic format that is easier to store.

IT knows the medical profession well. In many ways we are in the same business, we spend our lives diagnosing sick an neglected patients, usually with poor ability to communicate with us about what hurts. Like the average doctor, we aren't perfect, but we keep "practicing".

You want to point fingers, point them at the real handicap in the middle. People that aren't worried about solving problems, but are worried about what sells.

The hidden truth in all of this is that EMR is a project that should NOT be a commercial product. It should be a collaborative project, guided by standards and built to solve problems. It should not be built to be pretty or sexy to sell product.

There are few projects that scream more urgently for a comprehensive open source and open standards project than Medical Records, and even fewer that have more commercial vendors lining up every day for a piece of the pie. EMR is big money, and so long as it is big money, the Open Standards needed will not be able to emerge as strong candidates.

So while I personally detest the Obama Spend Our Way Out of a Depression plan, I do think that a plan that forces Open Standards in EMR would have a positive impact, and could *finally* help solve some of the core issues in play.



Paul Sheer

April 28, 2009

I had the identical problem at a large Telecom company that had implemented a system to manage software change requests (CR). If each CR was a patient, the exact analogue of what you speak was happening to us; so obtuse was the management software. We spent as much time entering data about each CR as we did doing the actual work. It was insane.

I think the US needs to start SMALL with ONE piece of computer automation that works across all hospitals. Just one. And it should be the sharing of some information most useful to doctors, as requested by doctors to be shared.

I.T. always attacks the problem from the wrong angle: they try to implement all conceivable functionality for one hospital instead of one single piece of functionality for all hospitals.

Think small. Think useful.

[Twitted by zelibrarian](#)

April 28, 2009

[...] This post was Twitted by zelibrarian [...]



Todd

April 28, 2009

When I read your story, I see that the biggest problem is the human element. Perhaps you just live near a crappy hospital?

I'm not disagreeing that electronic medical records systems are busted, but I don't really see that your problems were caused by it.

In any event, I'm sorry that this happened to you.

I'm not in medicine, but my wife is a Doctor, and I've heard many stories about how various hospital departments have trouble working together. Plus there are what I might term "class rivalries" between nurses and Doctors.

The profession of "hospitalist" isn't that new, at least in major academic medical systems. We've had them in Boston for years. It makes a lot of sense. Many private practice Doctors don't want to take on the added work load of closely following someone who's admitted to the hospital. Plus, medical science and technology advancements usually happen first in hospitals, and it's not likely that a private practice physician will have as much experience with that as a hospitalist.

Todd



Sean Hopkins

April 28, 2009

As a pharmacist (and admitted technology geek) that works at an academic, tertiary care hospital working on developing a clinical data store of breast cancer patient information, I am very well suited to see where healthcare IT people do not see the problem. I have fought for 18 months with our IS/IT people because IS/IT guards access to electronic information in the name of "privacy" when they already provide access to that same information through clinical applications. But other than territorial fighting, what IS/IT people do not understand about healthcare and technology needs is the following:

Healthcare is driven by documents that are free-flowing, thought driven, and contain rich amounts of information that does not fit into what IS/IT wants to pigeon hole it into – a DATABASE. A database is a rectangle of information – rows and columns linked to other rows and columns. But healthcare information is not easily pounded into that

rectangle format.

Yes, rectangles are easy for IS/IT people to handle. You can put it in a database that can be backed up, stored, queried and linked. But the “data” comes from a document that housed much more information than you have in a database. As an example a pathology report for a patient that has undergone definitive breast cancer surgery is typically 4-6 pages long yet the “discrete” information that people want to look for may at most be 20-30 words in that entire document. All of the richness of that document is lost when you try to satisfy what IS/IT needs – something that can be pounded into a database that can then be used in another way. You can store the report in electronic format but unless you are processing the information and knowledge in the document it is for the most part useless.

And that leads to the failings of the Electronic Health Record model – it is all about databases. But you need to get access to the information about a patient, not just the patient data. What you need to look for is a way to access the knowledge about the patient that is found in the documentation. Yes there will be discrete information in health care – lab tests & medication orders are classic examples – but the rest of the information and knowledge is contained in the documents. You need to look at other paradigms like natural language processing ([Medical Language Processor](#)) or knowledge automation (I would provide a link but I do not want to shill for the proprietary technology that we are investigating and implementing). Only then can you leverage the experts (doctors, pharmacists, nurses, technologists) to get the right information and knowledge about individual patients (and groups of patients) to enhance the overall healthcare environment.

I feel bad ranting a bit because at our hospital we have a corporate EHR and a cancer EHR that contains almost all information that is needed yet there is still tremendous room for improvement.

[PicoBusiness » The computer is your friend. Trust the computer!](#)

April 28, 2009

[...] Egads. [...]



Ruth Cook

April 28, 2009

I'm a software engineer but merely a consumer of health care in the UK, which is suffering similar issues with health IT systems.

IMO part of the problem is that the system procurement method is wrong; people want to make an all-singing all-dancing system before they're really sure what tune and dance they want. Baby steps first...

I'm sure also that some systems really do work well, for the users that use them, but that maybe those same systems transplanted elsewhere would not work (as well/at all) because the people in that environment don't work in the same ways as in the first.

In some ways, it's like the UK railways in the 1830s – before people could usefully use the trains, they had to understand the timetable, but there was no commonly agreed time of day. In those days it was uncommon to have a watch or clock, and if you did it was probably only accurate to an hour or so. So before the trains could run nationally, they had to get everyone to use the same time of day. Similarly, in health we need to understand the data model well enough that it can cope with many differing needs, and it seems to me that this isn't done.

In closing, my recipe would involve

- a serious evaluation of all the current systems *by the staff using them*;
- an analysis of the results of the above by IT personnel who have at least 5 years experience in the environments concerned with a view to incorporating the experiences of the staff;
- staged trials (ideally in mock-up hospitals) of the better systems and how they behave in a wide variety of situations;

I would hope that this would provide some obvious avenues towards improvement.

Ruth



Greg Peres

April 28, 2009

Check out what Canada Health Infoway is doing:

<http://www.infoway-inforoute.ca/lang-en/>

Don't reinvent the wheel. 😊

Cheers,

Greg

[Quasar - Todo Informática » Blog Archive » Estados Unidos sufre la carrera por los expedientes digitales](#)

April 28, 2009

[...] un caso crítico en donde una persona describió con detalle una experiencia de salud “de terror” bajo este sistema y otros casos podemos sacar varias conclusiones. Esta es mi opinión personal al [...]



Bryan

April 28, 2009

While being highly educated in applied physics, I have had some experience with mission-critical apps developed for technical engineers (although massive computer experience was not a given). I think that a number of posts ignore the basic concept behind the author's solution: test out the system before deploying it nationally. Certainly, I would have been hung out to dry if I tried to simply push unproven software to some of my engineers. Since humanity has created rigorous logic machines onto which we may push our instructions (which are not necessarily rigorous or logical), it is indeed not unlike developing a machine to manipulate physical laws (engineering).

If I was to engineer a vehicle, the best way to go to prison would be to not test the vehicle as rigorously as possible, since it's basic purpose is to preserve the lives of its passengers while going from A to B. The testing process is supposed to replicate, while minimizing actual risk to human beings, difficult and stressful situations, as well as normal driving conditions. For a mission-critical system like an electronic health records system, you have to test your machine to see how well it obeys all the constraints and conditions of its environment (the hospital) before deploying it further.

While some may point out that logical induction is faulty, the author's experience points out a MASSIVE failure in a presumably modern healthcare IT system, as well as a MASSIVE failure in the healthcare system in general. Whatever the solution, the author correctly points out that it must be rigorously tested as if people's lives depended on it. Whether the solution is open-source or not, it has to work. This is not necessarily a matter of “user education”: the software MUST make sense for each user. Whether that means individually customized interfaces with fast user switching or something else, it means that no more time should be wasted on health IT systems which *can* allow such a massive failure as documented by the author.

We have to move beyond computers as our new fancy 3-ring binders and get back to the problem at hand: fixing our health care system (of which payment is only a part of the problem).



Mitchell R.

April 28, 2009

I worked for a clinic for a while helping to design and maintain the EMR system. It was a summer job between semesters, and I was taking computer science and pre-med classes. Our systems engineers wouldn't generally listen to

the doctors on what they needed and what systems made sense in their workflows, while the physicians wouldn't listen to the systems engineers on what could improve efficiency. We only had one or two people who understood enough of both sides to help patch together a functional system.

Now, a few years later, the same clinic is functioning much better now. The way doctors work has changed to be more efficient and safer, and they use the EMR instead of fighting it. According to my former co-workers it is still a struggle. I believe EMR can improve the efficiency and safety of healthcare, but it requires the physicians and nurses to change the way they work. If they don't it is expensive and dangerous to patients. Unfortunately, you experienced all the worst in EMR. I think it's past time we switched to EMR, but the change has to happen in the minds of physicians first, not last, if we are to avoid a lot of this sort of thing.

**Stan Jones**

April 28, 2009

The data snafu is one thing, but I recognize well the phenomenon of doctors and nurses paying absolutely no attention to the patient (or a family spokesman) in regard to history, previous treatment, specialist's recommendations, prescriptions, allergies, etc. Many are the times I have accompanied my frail, elderly mother on doctor and hospital visits, and had my explanations and information routinely ignored or pooh-poohed. They are the professionals, you see, and they have a condescending attitude towards "laypeople," even when those people, because of their previous experiences with whatever is ailing them or their loved one, know far more about what the problem is and how to treat it at that moment than do the doctors who don't know you from Adam or Eve. Generally, they screw around on several false leads and red herrings, and eventually wind up doing exactly what you suggested to them in the first place hours or days ago. In the interim, lots of needless treatment and tests contribute to the skyrocketing cost of medical care in the U.S. (and your bill), and, in extreme cases such as the article's author's, may even pit you in mortal danger because the people to whom you are entrusting your life **WON'T LISTEN TO YOU**.

Yes, the problem with handling of medical data needs to be addressed and fixed. But that is just **ONE** aspect of how the whole medical system and culture in this country is broken.

**Charlie**

April 28, 2009

I work for a large consortium of hospitals and health care systems doing systems integration. I'm frequently tasked with making data portable across widely dissimilar systems, primarily for billing purposes. Prior to this job, I have worked in process automation, aerospace, defense, natural science, and software development.

I see a great many things in this article and comments that ring true. However, I believe the medical professionals who have commented here are correct that the strongest factor is the culture of American physicians.

The title "doctor" is a courtesy, given in medieval times to recognize that physicians who minister to the body serve society as do the ministers of the soul. The original "doctors" were doctors of philosophy, and physicians are called doctors for the same reason that some armies address female sergeants as "sir" rather than "m'am". In such armies male titles are considered superior, and in the dark ages priests and religious philosophers were considered superior to commoners.

Today, the culture of American medical professionals seems to be unfortunately similar to that of medieval priests – doctors are trained (through fairly brutal treatment involving sleep deprivation and rigorous indoctrination) to have a certain "hero" mindset and to disregard and distrust outside views that conflict with hierarchically dispensed dogmas.

Real-life example: a systems vendor builds a belt-mounted fetal heartbeat monitoring system and shops it to hospitals. This system alarms whenever the fetal heartbeat stops, causing nurses and doctors to rush to the bedside ready for immediate surgical intervention. Once this is implemented in the real world, the number of caesarian sections skyrockets, and this is directly numerically traceable to the implementation of these systems, since they were not simultaneously installed everywhere. The number of successful births, however, does not increase, because these

surgeries were unnecessary. You see, it turns out that it is normal for fetal heartbeats to occasionally stop (particularly when the mother is commanded to assume an uncomfortable position for the purposes of medical professionals) but without constant monitoring no-one had discovered this.

In the world of industry and engineering, one would hope that this problem would become apparent and be corrected during beta testing. If not, it would certainly be corrected by operators and technicians working together in the field. In the medical world, however, the design and operation of the machine was based on accepted beliefs within the medical profession. Therefore it cannot be modified by technicians in the field, and of course doctors will not admit there is a problem until the accepted beliefs change – 500,000 unneeded caesarians later! So, what happens in the real world? Simple, nurses start ignoring the alarms, and telling the expectant mothers to lean back and relax instead of sitting rigidly at attention whilst awaiting examination or treatment. OK, now there's no need to admit to the existence of a problem, so the alarms ring and the staff learns that alarms aren't really important.

Eventually, the thing that drives a change is when a medical professional makes his/her career by heroically proving in an accepted peer-reviewed journal what everyone already knows but won't admit.

Ask your pediatrician why he didn't tell you to put 2 drops of vinegar in your infant's ears after every bath. It's the broken culture of American medicine, where surgical implantation of tubes is preferable to preventive care. Until that culture is fixed, no data model will serve.



Daniel Savard

April 28, 2009

From Alexander Scarlat MD diagnostic, open sourcing the whole system with paid developers, architects, etc would surely ensure nobody will longer consider this design its own. After all, this system will be paid by taxpayers with their taxes and as such should be owned by taxpayers. Healthcare is not a business like anyone else.



John

April 28, 2009

I'm just a lowly software developer, but given the little I do know about medial records, it boggles the mind that someone would try to fit that information into a well structured database. It is not well structured data.

With my experience outside of the medical field, I think it is safe to say that the requirements outlined by government and health care professionals are to blame. As Sean Hopkins mentioned, the notion of allowing fine grained access is what forces the data into ridiculous models.

Just because the computer can do it, doesn't mean that it is a good idea. Relax the requirements and software engineers can build the right system using the right tools.



Mitch Berg

April 28, 2009

I'm a Human Experience Designer; I have designed user interfaces for Healthcare, although I am not in that industry at the moment.

In my experience, Mr. Bugajski's comments about system design being subordinated to marketing and executive whim to be all too accurate.

I see stories – both Mr. Bugajski's, and the behind-the-scenes story of the EMR behind it all – and see a system that was most likely:

* Designed at a series of JAD sessions in which

“requirements” were captured in text – i.e. very abstractly

* Hurried into design, with no time budgeted or taken to validate the design with real-world users (disclosure: that’s what I do for a living); I’ll bet times to dollars the conceptual model was never “stress-tested” in a situation that approximated the real world.

* Signed off by an executive (or ten) who really, really believed that all the requirements were met. And he was right – on paper.

All of the objections are likely true – IT is sold short (I’m sure the coding is just fine), doctors and nurses ARE harried and overworked, yadda yadda – and none of it undercuts my point; usability isn’t just a pretty, intuitive GUI. It’s reflected at the conceptual model level – and you can not make that work without doing the homework; user research, usability validation, and all of the un-pretty, un-glamorous work that *precedes* writing good code.

[Some interesting stories from the US about electronic healthcare records « A Web That Works](#)

April 28, 2009

[...] <http://www.syleum.com/2009/03/17/healthcare-data-model/> [...]



Dava Bergeron

April 28, 2009

What would be great is something like (not exactly like) facebook.. you have a basic page for each patients that is accessible to everyone involved in the healthcare treatment, that would list current medications, allergies and illnesses with some diagnostic information. then some illnesses would have modules (like the facebook apps) that could be created by more specialised entities (module for diabetes, hemodialysis, some sort of cancer, ER, whoever needs one) but the important thing is that no data should be reproduced in different departments/hospital/pharmacy.

As a dialysis patient I am very much worried when I go far away that if something happens and I end up in an hospital unconscious they won’t know what to do with me and in 2008 there should be no reason for me to be worried about this... The doctor should not be impressed when I show her graphs with a history of my weight and blood test results ... they should be able to generate that on demand any day.



Laurence Clark

April 28, 2009

A COMMENT ON YOUR PAIN RELIEF

You needed to say the magic words, “my pain level is eight.” It is standard these days that pain-level is taken with other vital signs. Before going to the ER take a maximum dose of Tylenol or Motrin, usually four tablets (2 grams total). Now when you show up at the ER you can say “I have taken two grams of Tylenol and my pain level is eight.” This should get you a narcotic. Hospitals are very concerned about litigation due to lack of pain relief. Patients generally have “standing orders” for pain relief meds. This means a form (paper or electronic) where the clinician checks off meds from a list starting with Tylenol and progressing to IV morphine. With a maximum dose of Tylenol in your system you are already eligible for the third or so item on the list. If you don’t get pain relief you can and should litigate.

[Liberty or Bust | rights | liberty | privacy | politics | technology | economics | limited government](#)

April 28, 2009

[...] <http://www.syleum.com/2009/03/17/healthcare-data-model> Posted in government, health care | [...]



B. Smart

April 28, 2009

Great, well written article. Sadly, a very typical experience. Two important facts not covered: Imagine the potential for security breaches in a system so complex. If we can't even keep money information safe, what chance will we have to keep our medical details away from prying eyes. Sorry, HEPA rules don't help, they just make life more difficult. Next, imagine the potential for horrible abuse by insurance companies and employers. You can bet it won't be long before a check of you health records will be done before an insurance policy granted or a job is offered. Obama and the government is saying, "Trust Us". Good luck with that.



EMT Man

April 28, 2009

It has often been said that any advocate for computerized medical records understand neither computers nor medicine. Hi. I'm EMT Man. I actually know both. I'm an EMT, and I'm a geek. Your experience is not unusual. There is absolutely no substitute for an active sense of scepticism and a very irritated advocate in any healthcare setting. None. Unfortunately, your wife was unable to get your "asthma doctor" to visit you in the hospital and intervene on your behalf. I nearly lost one of my kids to a similar kind of situation, involving severe anaphylaxis. To compound EVERYTHING ELSE that went wrong, ten seconds with google would have brought the Attending in the ER up to speed. Unfortunately, the crisis in healthcare, which has numerous causes, has ultimately three effects, all of which I have seen first-hand: 1) Cost goes up. 2) Delay goes up. 3) Quality goes down.



[Stephan Wehner](#)

April 28, 2009

What was the total on your medical bill ?

Stephan



EMT Man

April 28, 2009

EMT Man again. I forgot to mention another thought that is related. In firefighting, we have what are called PASS alarms on our SCBA's. The PASS is a motion-sensing switch with a timer. If the switch does not trip every 30 seconds or so, indicating that the wearer of the device is moving, the PASS trips. For the first few seconds it is a low-medium level sound (the exact sound varies from manufacturer to manufacturer). If after 3-5 seconds of that noise the alarm isn't silenced (either through motion or via a cutoff button), the alarm goes hog-wild, because the assumption is that the firefighter is down and in big trouble, whether trapped, or unconscious, or whatever.

It used to be common to hear PASS devices wailing at fire scenes. Sometimes folks took their SCBA's off and set them down when they were outside the structure. Sometimes, because of the ambient noise, a firefighter wouldn't know that his alarm was starting up until it went nuclear. So folks ignored them.

Then, a couple of years ago, something amazing happened. We decided, as a group, that PASS alarms are actually important, and will be treated as such. Now, everyone on the fire grounds is sure to make sure that their alarm is secured when it is not necessary for it to be active. The reasoning is that our Chiefs have decided that in any case where a PASS alarm goes to Hells Bells, the firefighter attached to that device will be brought to the ground. His/her PASS will be secured, and the now-patient will be stripped to the skin. A full trauma assessment will be administered, and the patient will be secured, removed to an ambulance, and treated for their maladies. Everybody bought in, and now, a few years and only two embarrassed firefighters later, PASS alarms mean something again.

**Ray Hudson**

April 28, 2009

The processes and engineering analysis tools used to develop and certify aircraft automatic landing systems are a perfect model for what is needed here. Go look at a design standard known as DO-178B that governs ALL flight-critical software development. People may say I am crazy, but I have several friends who worked with me in commercial aircraft flight controls that were actively courted and hired by medical device companies. Yes, it starts with good Systems Engineering. But it is not like it has not been done, in spades, already.

**Nick F**

April 28, 2009

I really enjoyed your article and I have skimmed through some of the responses. I have the unique experience to have worked on both sides of the coin. I worked in clinics, a hospital and now I am on the I.T. side of the coin.

What I have noticed and what is constantly missed and continues to be missed is simply training. Training for employees is a huge cost requirement, not only do you have to pay for the trainer you have to pay for the time off the employees could be making money. So the answer to this is to do some type of 30 minute web based video that provides a good overview. No physician wants to do this, any many nurses do not want to either. So now there can be a wonderful system in place that nobody uses.

To me this is what seems most likely in your case and this is my reasoning. You were continually asked the same questions, in a paper world this wouldn't happen, and it should not happen in an electronic EMR world either. I have seen this too many times before. A physician doesn't know how to quickly access patient data so they simply ask the same questions over and over. From this point they don't really know how to access historic data so they treat based on what they hear. Now instead of enabling the distribution of data the system has done exactly the opposite. Many physicians feel pressured to never ask questions as a sign of intellectual integrity. This creates a very dangerous situation for far too many patients.

In no place is the inability to interact between I.T. and Healthcare more apparent than in the lack of training that is typically shown. Now matter how well a system is designed, if it is not used correctly then the risk is much greater then simply maintaining using a paper record.

**RVD**

April 28, 2009

This article describes the real problem, but author makes wrong conclusion. As many other mentioned already, it is fragmented patient care. No one cares, basically, as no one is solely responsible for the possible outcome.

11 doctors asking the same questions again and again, half of them never to see if patient is still alive. Hoards of nurses, etc. Everyone just wanted to do his minimum and pushed the patient further the money making conveyor aka Health Care.

What does it have to do with IT and data model? The system could be broken, but why does it matter if nobody is using it anyways? How such system could even be improved if it sees no real usage?

**jeff deifik**

April 28, 2009

This is a horrific tale, and I am not qualified to comment on most of it. However, I am qualified to comment on the constant alarm problem.

I used to work at a company that makes pulse oximeters. When I worked there, the standard oximeter would often produce false alarms. Nurses learned to ignore these false alarms. Our oximeter was much superior, and generated roughly 100 times less false alarms. If it went off, it was a real issue that needed to be dealt with.

I can't speak for other types of medical electronics false alarm rates, but at least for pulse oximeters, there is a good solution that is on the market that virtually eliminates false alarms. Anyone familiar with oximeters, knows about the studies of false alarms, and which company has very few.

I went to a pulmonary doctor's office recently, and saw a different brand oximeter, and mentioned that their brand was crap. Of course, under ideal conditions, with healthy people, they all work well enough. The good ones aren't more expensive than the crappy ones. You can buy the good ones everywhere in the world. I often saw them in the background on the tv show ER.

I would guess the hospital you went to didn't care about alarms, which to me, means they don't care much about patient safety and health.



[Antony](#)

April 28, 2009

Thanks for sharing your experience. A relevant article was published last year about the ongoing transformation of health records as a cognitive artifact into a billing artifact. Anything entered into electronic health records becomes evidence for insurance companies and lawyers, so there's nowhere to jot notes, thoughts, informal warnings, or the other rich data that a commenter above described. See my link above and good luck.



David L

April 28, 2009

You mention the cause is "the failure by information technology (IT) system architects to correctly capture business requirements." I disagree. I can relate with a similar experience with anaphylactic shock. My wife is a surgical intern, so I have some perspective you don't.

That nurse of yours was fantastic, I would first like to say. There are not enough of her.

The cause is beyond the scope of IT. Hospitals *as an organization* don't seem to give a d*** about their patients. The function like giant machines seeking the mash, pulp, and process anything that goes through them, but as you said, without care to the end result. That is the real problem. There are some excellent people working in them who become massively overworked. I can cite some causes of this, but I don't pretend to know them all:

1. Hospitals are practically unable to fire unproductive or counterproductive people. This creates a culture encouraging this behavior that becomes self-perpetuating, resulting in contractual limitations that reinforce the problem.
2. Good people become overwhelmed, because of #1. I know many.
3. Finances make healthcare hard. Health insurance companies refuse to pay for vital preventive care but will pay for much more expensive acute care.
4. Laws make healthcare hard. Hospitals have to serve anyone who walks into an ER, and many do for non-vital care because they have no healthcare. ERs burn a *ton* of money because of this.

My opinions are my own, not those of my employer.



Dr Nick Bell MB ChB MRCP(UK)

April 28, 2009

Interesting for me as a UK respiratory physician too.

1. Alarms ignored

The easy one – electronic alarms are certainly distressing patients, whilst it is obvious to nurses and doctors that the alarms are merely artefactual or indicative of a trend which clinicians are already aware of. The challenge is to limit patients' exposure to alarms whilst keeping clinicians informed of what is frequently old news.

2. Ownership

The UK system is arguably more primitive and feudal. The patient's out-of-hospital care is 'owned' by a specialist who is almost invariably known to the hospital in which the patient is admitted. That specialist is therefore immediately available to the hospital switchboard. The ER doctors/nurses should (in my opinion) have noticed prima facie evidence of respiratory distress. The immediate treatments for this should follow irrespective of where the patient came from or who their 'specialist' was. If I, as the receiving doctor, at whatever level, was informed that a specialist had extensive knowledge of the patient, and the patient was critically ill, I would immediately attempt to contact the specialist via switchboard. If such contact were not possible overnight (very rare – I have called innumerable specialists overnight even outside of their normal 'on-call' hours and never received a negative reception) I would contact the specialist in the morning; the irregardless of this contact standard, evidenced-based care should continue in any event. You don't need records to make 99% of the correct immediate treatment decisions.

3. IT

Clearly there are multiple IT systems interacting in this case. In the UK we have a referring letter, the presenting clinical condition and (more often than not) IT giving information about recent out-patient and in-patient encounters and outcomes. It is very rare that this information alters the immediate care however. The next morning specialists can be contacted.

At least in the dozen or so hospitals in the UK in which I have worked, all immediate care records are entered on paper records. There is more paper recording than I think necessary (each element often following from a specific incident deemed not to be adequately handled by the existign record system) but no current requirement for completion of arbitrary schemas. If I as the clinical feel that there is an urgent problem X based on Y I do not have to document Z, A and B to maintain current UK standards for record keeping unless I feel it pertinent to the case. The summaries of admission and outpatient encounters are entered on IT systems within a short time after completion and are useful, but as I said rarely change immediate management.

My take-home messages for this: think about patient responses when designing alarm systems; make sure all referring specialists are immediately available to all receiving hospitals; and make sure doctors are involved properly in IT systems.

Apologies if this is too long-winded or if I appear pompous or as if this is an attack on a very differently-structured healthcare system. I'm just trying to rationalise a well-presented patient episode.



[Spencer Hamons](#)

April 28, 2009

Thank you for taking the time to put together a very well thought out analysis.

Having been a flight medic, paramedic, working in the ED, cardiac care unit, the ICU, and the cath lab before moving into the healthcare technology arena, I think you hit some very good points that others that have been in healthcare for years can't verbalize.

There are huge differences in the way that the providers and the technology work (or don't work) together. The problem is that neither side of the equation wants to give in. Most of the providers I have met, and this includes physicians, mid-levels and nurses, do not want to change the way that they practice medicine. Likewise, technology staff and vendors do not have the knowledge of the medical processes, nor do we really have the right information at the right time in the right way to facilitate the practice of medicine in the way that it has been done for so many years.

My point here is that when it comes to the development of the next generation of healthcare information systems, it is all a huge crap sandwich and we are all have to take a bite. The biggest basis of the problem is the culture. Technology

wants to develop systems that fit within a finite scope, but the “practice” of medicine is not finite. Physician’s do not want to be turned into data entry clerks, but current technology does not allow for indexable data elements that can be brought into a system through brain waves or conversational text. As much as we as a society want to think that our technological capabilities are out of this world, reality is that we are still constrained. What we have been doing for years is taking technologies and trying to make them fit into a 50 year old system of medicine. What we need to do is have forward thinking providers, technologists, and some of the most talented technology developers sit down and design a system without the limitations of what we are constrained with today. Once we know what we want the end result to be, let’s build it. I think we would be much better served by \$3 billion being spent this way, than \$20 billion being spent to implement systems that do not effectively meet a need that none of us have even agreed to the definition of.



Mindy Gallagher

April 28, 2009

There have been a lot of interesting points raised here, but as a pediatric hospitalist myself I would like to address that issue. One of the main responsibilities of the hospitalist is to keep in contact with a patient’s primary care physician not only to provide a progress report, but also to ensure follow up once the patient is released from the hospital. Though we represent another link in the chain of communication we can be an important one. If there is a sudden deterioration in a patient’s condition we can let his or her primary know and implement a treatment plan immediately.

The way things are in medicine these days many primaries have to see >40 patients per day in order to keep themselves afloat. This hectic schedule makes it difficult for many of these physicians to get to the hospital. When they are able to come in they have just enough time to talk with the family, see how the patient is doing at that moment and scribble a note in the chart. It is the hospitalist’s job to monitor the progress of that patient for the rest of the day and assure them they are receiving ongoing care.

Finally, there are significant differences between inpatient and outpatient medicine and different types of expertise required for both. Having experts in both areas only serves to benefit the patient, and as Joe has pointed out that is ultimately the most important thing.



unacceptable

April 28, 2009

lets all be honest. The hospital decision makers, politicians. software vendors all cheat the system. Please don’t bother saying otherwise. This man almost died and others have. As a patient you run the gauntlet of evil in trying to find some good that will help you. All the people that are involved financially in your care are all there via dishonest standards while continuously promoting dishonest standards. Lets face it, it’s like that in every industry. It starts with a college degree that convinces the decision makers that they are competent enough to choose a “system”. It ends up with you dying or almost dead. When the decision makers don’t go through a pilot program to test their choices in the field, thats when things break down. And none of them test their choices. They just choose what looks good. Mankind has a LONG way to go. And it’s like that in every industry. Thats the sad part. The horrible part is how close you came to death by human incompetence. You should sue the hospital, and not let them settle unless as part of the settlement they must pay multiple software vendors for multiple systems until one of them meets YOUR approval. It’s the only way to force them to be competent. After all, its YOUR life that matters, not their words or opinions. I’m so glad you made it.



EIPolloLoco

April 28, 2009

#28 “This article describes the real problem, but author makes wrong conclusion. As many other mentioned already, it is fragmented patient care.”

Exactly. Blaming IT is not the least bit appropriate here. These people, with the only exception being the ER nurse Joe mentioned, forgot the #1 job of the pilot: _fly the plane._

If this is typical of hospital care in your area, Joe, you need to move. You got caught up in a perfect storm of incompetence. Rest assured, if it hadn't been for the broken data-management system, these people would have found something else to blame.



Jane

April 28, 2009

I'm a physician in a teaching hospital. Two things: I'm afraid that patients, once they understand that the government will have access to their medical records, will leave crucial things out of their histories, more than they do now. Also, I was recently told by an IT developer that the input of doctors didn't matter, that doctors of the future, brought up with the Electronic Medical Record, won't know any better and will be happy with it. Perhaps the IT developer will teach them how to look after a sick guy with asthma. Perhaps in your hospital that has already happened.



db

April 28, 2009

As a former ICU and ER nurse and current healthcare IT consultant (backend systems) I don't find this too surprising, but, the same issues occurred 20 years ago when all (most) systems were paper only. Many of the problems experienced were the result of the way many healthcare professionals think and work – 'you're the patient, I'm the expert'. Paper records are frequently not available, incomplete, not updated in a timely manner etc.

Healthcare IT has a long way to go to get an EHR working well, but many of the issues highlighted won't be solved by even a perfectly designed and implemented system.

[The Healthcare Data Model < randomize](#)

April 28, 2009

[...] <http://www.syleum.com/2009/03/17/healthcare-data-model/> [...]

[Videolapalooza and More! Out of My Mind 29 April 2009 < Out Of My Mind](#)

April 29, 2009

[...] Another health threat: Crappy electronic medical records systems. [...]

[The Greenroom » Forum Archive » Electronic medical records will not cure what ails you](#)

April 29, 2009

[...] The Data Model That Nearly Killed Me The law [the stimulus bill] also explains how to test systems built with federal money but it does not explain how to measure semantic validity of information – garbage in garbage out! Good luck with all of that Mr. President. [...]



gzuckier

April 29, 2009

yeah, your information is spread out across numerous departments of each of every hospital you've ever visited, every insurance company you've ever had, every doctor you've ever visited, etc.

key fields undoubtedly include your name, very likely spelled wrong in several places, your social security number, very likely typoed in a few places, your insurance number (different for every insurer, also prone to typos) and patient IDs for hospital and doctor.

i've actually worked on pulling just hospital records together for a coherent patient record, and it's a bitch. even just within a single hospital, some hospitals will rapidly recycle patient IDs so that several people have the same ID; others will have separate IDs for the same patient in different departments, the residue of long-ago turf wars between the

emergency room and admitting, for instance.

and of course, as mentioned, this is a problem for paper charts too, obviously; the advent of electronic records just makes it frustrating, in that one can see the goal of a coherent record if we could get over this stuff. whereas with paper charts, i've had more than one copy of my history just vanish, probably filed away under the wrong initial letter.

fun fact: if you've been employed by a couple of large companies, even if you've had the same medical insurer for both, there's a good chance your "insurer" is really just administering the claims, and the big companies were your actual insurers, i.e. supplying the finances to cover your claims, what they refer to as "self-insured"; the reason being that real insurers charge an overhead to carry the risk, or indemnity; and a large company has a large enough workforce that their annual claims will be predictable and a large enough cash reserve to cover any random overages, so can save quite a bit of money by "self-insuring". you never know the difference, you continue to get your mail from "insurance R us, inc." in either case. But.... according to law, your data is the property of your insurer; which means that if you worked for Big Motors inc and had a heart attack then moved over to National Crap Inc., and both were self-insuring, even though you're getting your bills and payments from Insurance R Us in both cases, as far as they are allowed to know now that you're not working for Big Motors any more, you never had a heart attack before. That's Big Motors' private data. Isn't that cute?



Reed Gelzer

April 29, 2009

Dear Mr. Bugajski,

In case you're still reading these comments, first I add my thanks. Second, did you ever find out why nobody bothered to read the notes from your allergist? Third, is the hospital taking any action to analyze why your course of care was so dangerous and nearly fatal?

Many thanks again,

RDGelzer, MD, MPH, CHCC
Advocates for Documentation Integrity and Compliance



Deborah Kohn

April 29, 2009

As many already stated, 1) this article describes an unfortunate problem, but 2) the author makes some wrong conclusions that relate to IT and the existing data model.

For one month I was a victim of a similar, horrific episode of care that involved two community specialists, an Emergency Department of a prestigious teaching hospital, and the hospital's Medical-Surgical unit — only to be readmitted two days post discharge for two more weeks, again through the Emergency Department and into the Medical-Surgical unit.

ALL involved used PAPER medical records.

As a health information management and technology professional for thirty years, I strongly support better designs, better systems, better outcomes. But let's begin with improving / reforming our terribly fragmented health care system.



canonical form

April 29, 2009

I have worked as a health care professional for over 20 years, using computerized patient documentation systems as they were introduced into the hospitals and have used many different models over the years. As the author of the article

suggests, each of these systems met a list of requirements but did not meet the needs of the healthcare profession.

In the hospital where I currently work, a new electronic medical record system is being created that should be portable for every patient that enters our hospital and would enable access for other healthcare professionals from anywhere in the world. The system development schedule included meetings between programmers and health care professionals who would be using the system to discuss interface design. Healthcare workers from across the hospital were chosen to participate in the meetings based on their expertise in actual patient care delivery. I was selected as one of the nurses who would provide feedback and suggestions.

The meetings were initially scheduled to occur monthly over a two year period. The goal was to give the system developers feedback which would allow them to design a user interface to the database that would work effectively in the real world of patient care. The architects and IT professionals showed up with a prototype to demonstrate how the system would behave. Our job was to watch the designers demonstrate the software then provide feedback and suggestions to improve the design. The developers had a month between each meeting to implement changes we presented. In the first three meetings, the healthcare professionals provided dozens of specific and detailed ideas to make the system fit into the hospital's patient care model.

In almost every instance the IT designers responded to the feedback by saying that the proposed change was too difficult or not possible to implement. I believe the developers never attempted to implement the suggestions. The frustration level of the system developers increased with each meeting. I suspect that to implement the ideas presented by the nurses, therapists, doctors, technicians, and other health care professionals would have required a complete system redesign.

So after only three of the scheduled 24 meetings, hospital management informed the healthcare professionals that they no longer needed to attend. To my knowledge, none of the changes recommended by the healthcare professionals at the meetings were ever implemented. I suspect that the hospital had already invested too much money into the project to be willing to pay for a system redesign.



Gerry Creager

April 30, 2009

I found both the original article and subsequent comments fascinating. I'm not a physician, but have extensive clinical experience in field EMS, hospital ED, OR, and ICU settings, as well as on the floor, although most of it is dated by now.

I suspect the largest element of the problem is, as mentioned several times, software developers don't listen to their end-users, and thus miss the basics of how a system like EMR should positively affect patient care.

Also, as mentioned, the medical community is too busy, harried, or tired to attend the webcast that could have helped them.

Another issue, however, to the original story (solely in my opinion) is that the physician of today has scant training looking at the patient, but lots of training at looking for a molecular cause for any illness. Thus, they tend to believe the lab more than they believe the patient. How many of you have never seen a lab error arise in acute patient care, causing you to pursue a course of treatment that had to be reversed later? Imagine, for a moment, the doc who agrees with the first (erroneous) lab result, but has trouble letting go thereof when a correction is posted. Now, imagine a practitioner who never learns about the correction because it's not appropriately flagged in the EMR, and comprehensive re-review of labs hasn't been drummed into you.

A valid point was made early in the comments about everyone getting at least some degree of history from the patient. Medicare and a lot of for-profit insurers won't pay if a history wasn't elicited. Period. However, allowing that history to be entered for you by checklists, while it makes charting uniform, allows errors of omission and commission to creep in. (I long for the 4 years we had one particular internal medicine resident. As an intern, she showed particular skill at performing H&P, but little else. I loved having her on-service since I could trust her H&P, and daily documentation of needed updates thereto, were spot-on. I couldn't trust her to create a valid differential diagnosis or to successfully treat

anything, but H&P was always stellar...)

And, to address alarms: In one setting, I worked with Seimens on a new monitoring system. They were in my lab, weekly, talking to us about how the system worked, and what didn't work. They made tweaks and fixes for over a year before they started a widespread update to all the hospital ICU and IMU monitors. They made a great impact in false alarms, and the ability to silence alarms remotely. In that setting, alarms were not ignored, but they might not get a human into the room, unless the cause of the alarm was not obvious. Today, some of those lessons appear to have been un-learned. My wife, a midwife, tells me that at a large military community hospital, alarms in L&D wait for the overworked L&D nurse assigned to the patient to get in and determine if everything's OK. The docs and midwives no longer watch the monitors in the nurses' station because they can't silence alarms that are trivial. The cacophony has driven them away.

EMR has an excellent history of medical informaticists working with providers to create decent open standards. The implementations I've seen, however, aren't so pretty. Medical records hardly lend themselves to relational databases. There are relational issues, for certain, and things like lab could and should be handled there. However, natural language search offers a lot for locating free text in notes. I'm less than happy with checklists and preformed/structured note addition: Checklists should be used only where there's no potential for ambiguity among providers.

I lived most of my clinical experience with paper records, and have known for near 30 years there had to be a better way. I wish now I'd acted on it 30 years ago, when my coding skills were sorta up to it.

gerry



Karl

April 30, 2009

Well-written, well thought-out analysis. Thank you. As an IT person, I will take your recommendations to heart.



Brian

May 5, 2009

I should add something to my earlier comment.

One thing that stands out in the story is the underlying tension between the clinical practitioners and their Health Information System (HIS). The clinicians kept collecting medical histories, over and over again. Get to the heart of why this is happening and you'll start to gain insight.

Now it may be that the HIS is a problem and actually has interface or even architectural problems, as the author suggests. However there's another plausible reason.

One thing I've noted over the years is that clinicians tend to look to other clinicians for buy-in and leadership. What if this HIS was implemented without sufficient participation by the clinicians? Not only does this help get the system configured and implemented appropriately, but it overcomes the credibility problem with clinicians. The most important thing to get buy-in from a physician, bar none, is to get another respected physician to tell them "this is good. Do it this way for this reason. It helps you, it helps the hospital, and it helps the patient."

There's a weird lack of clinical leadership going on in this story. Otherwise, how do you explain the constant beeping ICU alarms, that no one is attending to? Yeah, I know, the on-site clinicians hear too many of them and figure the false positive rates on the alarms is crazy. Yet that's just a first line reason. What needs to happen is someone to approach this as a problem, worthy of being solved.

Otherwise you risk missing a true positive alarm. And that has drastic patient care implications.

**Doctor D'gain**

May 8, 2009

As a doctor in a large teaching hospital who works in the ER, the ICU, and “on the floors”, I would just like to say two things: 1) The patient is aware of about 20% of all the work that the staff is doing for him or her, making any “my trip to the hospital” report grossly lopsided. 2) There is no magic in a note from an allergist. Allergists are one step above dermatologists – they treat generally healthy, outpatient, ambulatory patients with an itch, a rash, or a sneeze, but never venture into the hospital to actually treat sick patients. Although this man thinks the allergist’s note was a message from Jehovah, it’s not likely that the information in it was that unique or valuable. If it was so critical, why didn’t the allergist help manage the care instead writing a note and saying “good luck”?

[UCL CHIME » Blog Archive » Watching the Americans](#)

May 8, 2009

[...] responses, including warnings on the Op-Ed pages of the New York Times and, most notably, this incredibly striking posting, a unique combination of dramatic personal testimony and informed professional analysis. A number [...]

**Bill**

May 18, 2009

I am 59 years old. When I was 10 I suffered severe abdominal pain at 3:30 am. Our family physician, Dr Rogers drove to our house with his Irish setter. He diagnosed me with acute apendicitis. My parents followed the dr in our car to the hospital. Within 15 minutes after arriving at the hospital at about 5:00 am the dr had secured an operating room and an assistant. I was operated on, spent the rest of the day in recovery, admitted to a hospital room, attended by dr Rogers and discharged three days later. Total bill \$440 paid by cash by my father (according to my father). Dr Rogers diagnosed, administered, performed the surgery, did all follow up, discharge and collected the fees. I to this day recall his kind and measured words of assurance. Worked pretty well. Could work well again.

[Idea #100 for May 29th, 2009: What is EMR or The Heart of the Matter? Part 1 « Fixing Healthcare in 365 Days](#)

May 29, 2009

[...] I think it’s hard to call what they have truly an EMR. This reminds me of the story told in “The Data Model That Almost Killed Me” . Delayed entry in many cases, particularly in a hospital environment with the expectation of a [...]

**Atul Salgaonkar**

May 29, 2009

I agree with many here that the root cause is related to the work-flow controls of a fragmented treatment. The same experience repeats everywhere despite paper records.

It also seems to me that organizations like CCHIT (www.cchit.org) that certify performance of software systems in healthcare can influence some aspects of product performance: for instance, false alarms with oximeters. Perhaps some post-certification monitoring is required?

**MitchellD**

June 5, 2009

While I agree that every system is not perfect, it is still the responsibility of the clinician to rely on their skills to treat patients. People forget – the computer doesn’t treat your patient, you do! The computer system can’t be blamed for all of the different physicians asking the same questions over and over again. They’re being careful. People will always be responsible for what is placed in the computer (for the most part). Nurses, doctors, etc., need to be careful with what is

entered in the system. I think the challenge is learning how to balance patient care (at all levels) with the technology.



A concerned person

July 8, 2009

Thank you very much for the description of your case. I never trusted the healthcare system as is. I had my own bad experiences, but yours make mine look like a mild headache. And also all those doctors that stopped by just to ask questions didn't do a peep but had a nice hour tagged to your bill. As it is today the system stimulates this type of hidden mugging.

[Alexandru Bolboaca-Diaconu \(alexboldy\) 's status on Thursday, 13-Aug-09 07:36:09 UTC - Identi.ca](#)

August 12, 2009

[...] The data model than nearly killed Joe Bugajski <http://www.syleum.com/2009/03/17/healthcare-data-model/> [...]

[Fred Trotter » A geek in the ER](#)

August 14, 2009

[...] Recently someone turned me on to a post by data expert Joe Bugajski entitled the Data Model that Nearly Killed Me. [...]

[Myth 32. Information technology will improve efficiency and safety. « AAPS News of the Day](#)

January 7, 2010

[...] "The national health information network envisioned by President Barack Obama is a pipedream," he writes (Joe Bugajski, "The Data Model That Nearly Killed Me," Syleum.com 3/17/09). [...]



[voicechat](#)

January 31, 2010

Dear Mr. Bugajski,

In case you're still reading these comments, first I add my thanks. Second, did you ever find out why nobody bothered to read the notes from your allergist? Third, is the hospital taking any action to analyze why your course of care was so dangerous and nearly fatal?

Many thanks again,

RDGelzer, MD, MPH, CHCC
Advocates for Documentation Integrity and Compliance

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