Lessons Learned from the Cerner EHRM Project: October 2021

Summary Statement:

* The specifications for an electronic health care record (EHR) are extremely important. You get what is written down in the specifications; If it isn’t in the specifications, you likely won’t get it.
* The contract for the electronic health care record is extremely important.
* Software reflects the purpose and goals of the designer and software engineers.
* Most electronic health care records are accounting systems, written by software engineers, with a text editor tacked on.
* VISTA/CPRS is an electronic health care record, written by clinicians, optimized to provide the best care possible, with some accounting tacked on.
* The Cerner electronic health care record is an accounting system with a text editor added on.
* In anesthesia, record keeping is real time, the user interface matters. If usability is poor, there can be loss of situational awareness and serious risk to patients.
* Loss of situational awareness from computer problems is dangerous in anesthesia.
* Testing is essential. Untested clinical software is dangerous for clinical use.

Background:

I have worked on the Cerner EHRM project since 2017. I was part of the original team and the problems with the Cerner EHRM project started at the beginning. Our first task was to write specifications for the EHRM project. The EMRM project was organized by councils based on the DOD model. Anesthesia was placed under the surgical council. The problem with this organizational structure is that the IT (Information Technology) needs of anesthesia are fundamentally different from the IT needs of surgeons. Surgeons examine patients, write notes, write orders, admit patients, discharge patients, but they do not write notes while they are doing surgery. Surgical IT needs are similar to those of internal medicine physicians and they are fundamentally different from those of anesthesiologists. Anesthesiologists write notes, write orders, discharge patients but we also document care in real time as we give medications, start infusions, perform procedures. Anesthesia IT needs include those of all other physicians, but they also include real time data collection and documentation. Putting anesthesia under surgery ignored the fundamental differences between surgical and anesthesia EHR needs. I pointed out this problem to Dr John Sum-Ping. He elevated the problem, and the decision was made to follow the DOD structure but simply change the name of the surgical council to the perioperative council. This decision made it so that anesthesia IT needs were not addressed by the EHRM project.

The next problem was specifications. The national anesthesia service spent multiple years writing specifications for the CIS/ARK (Computerized Information Systems) used in the ICU and (Anesthesia Record Keeping Systems) used in the operating room (OR). These specifications are 150 pages long and specify data acquisition rates, storage, analytics, and usability. They have been used for multiple decades successfully. I submitted these specifications to the Perioperative Council and the decision was made by EHRM leadership to have “less specific specifications” that said things like “able to store information.” The problem with “less specific specifications” is the vendor, Cerner only has to provide what is in the specifications. If there are no usability standards or analytic standards, then the vendor can simply provide their product as is with no input from the user. Cerner is fulfilling the specifications they are not trying to provide a product that is useful, high quality, safe, or usable. More than 50% of all IT projects fail with complete loss of the investment. The most common reason for failure is the specifications. We obtained the specifications that the DOD used for the anesthesia part of the Cerner EHRM project and it was two words (“includes Anesthesia”). These specifications are not sufficient to detail the IT needs for the anesthesia components of an electronic health record. Cerner had no reason to improve or fix or provide what the VA anesthesia services needed because the specifications did not delineate what was required. This two-word specifications (“includes Anesthesia”) should be compared to the 150-page detailed CIS/ARK specifications that the VA had utilized for more than a decade.

The next fundamental problem is the concept of the EHRM project. The fundamental goal of EHRM was to allow data exchange between DOD and VA. The problem with this concept is it is fundamentally flawed. The DOD does not want information on active-duty personnel to be freely exchanged. They view this information as part of operational readiness, and they don’t want it to be examined by the VA. The vast majority of personnel only move from DOD to VA once at the end of military service, there are very few facilities where patients traverse back and forth between DOD and VA. Many patients enter the VA system decades after their DOD service making any medical records from DOD obsolete. VA patients average 68 years of age and have ten medical problems. They could not pass a DOD physical; they are not going back to the DOD. Moreover, there is already an IT product, JLV, that allows viewing of DOD and VA records. The entire concept of making the DOD and VA systems identical, so the data can be exchanged, is non-sensical. The other problem with linking the two systems is it allowed Cerner to not make any changes to the VA system. Cerner said over and over and over again. The DOD already decided so you can’t change anything. Insisting that the DOD and VA systems be exactly identical allows Cerner to use this excuse to not make any configuration changes. The DOD did not assign anyone to the surgical council prior to go live. Cerner provided generic Inter Mountain Health build of their product. When there were problems with the DOD go live, DOD assigned one anesthesiologist to fix the problems but he had limited time secondary to clinical duties. When the VA project began Cerner said, “The DOD has decided so you can’t change anything.” This approach allowed Cerner to not configure their system for the DOD and then not configure it for VA basing it on the concept that the DOD not doing the work of configuring the system was a decision to not configure the system. Cerner saved the expense of configuring the DOD and VA systems and both institutions were left with a sub-optimal, poorly configured, system.

The next problem is this linking of the systems makes any changes impossible. To change something now, we have to get the entire VA to agree, then get the entire DOD to agree, then get the organization above DOD and VA to agree, and then fund Cerner to change it. Cerner estimates that their component, once VA and DOD agree, will take 18 to 24 months to make a change. Cerner has avoided configuring the system and they have locked the VA and DOD into an impossible to change configuration. The COVID-19 pandemic has shown how disastrous and dangerous this approach is. During the pandemic medical care changed rapidly. We created new order sets, new approaches to testing, adopted new medications. All of this change required changes to CPRS orders on a daily basis as the pandemic evolved. With Cerner none of this change would be possible in under 2-4 years. With CPRS we can customize an order set in under an hour and adopt it to local requirements including the phone number of the person to call for special testing, or instructions on where to go for a test, none of this customizability and rapid response is possible with Cerner. The VA will lose the ability to use the IT system to provide rapid, responsive care or respond to QI events paralyzing the entire VA system.

The next problem is the purpose of an electronic health care record. Software reflects the concept of the designers and programmers. I asked Cerner what the purpose of an electronic health care record is and the answer is uniform from the more than 20 Cerner staff asked: “BILLING”. When I pointed out that the VA wants to use the electronic health care record to exchange information to provide high quality medical care, they retorted “Don’t you want to bill?” Cerner has produced an accounting system to generate a bill. The fundamental purpose of the Cerner EHRM system is billing. Cerner is not interested in exchanging information to provide high quality care. Many times, Cerner staff will say something like “Don’t worry about notes, they are unreadable.” “No one can read these notes they are unreadable”. “We can’t allow the nurses to see the anesthesia record when they are in the PACU.” Cerner is providing an accounting system. The VA is trying to buy an electronic health care record system to provide clinical care. If the two parties have fundamentally different ideas of the purpose of a system, the customer will not get what they want. CPRS/VISTA was written by clinicians to exchange information to provide the highest quality care possible. Cerner was designed by accountants to generate the highest bill possible. To show the difference, the Cerner software used to schedule physicians to see patients is named “Revenue” and provides how much money each visit will bring in. When I asked to change the name of this software to Scheduling, the request was denied. When we asked to hide the income generated from each visit from people, that request was denied. Cerner’s goal is maximizing charges to patients. The VA’s goal is exchanging information to provide high quality care.

Cerner staff did a site visit at our VA. I provided a binder with all our clinical software and analytic tools including: CPRS, VISTA, PICIS, ProtoViewer, and Analytic reports. Cerner staff had no interest in looking at our current system and “lost” the binder. Cerner staff have continuously stated that the VA uses paper records for clinical care. They say things like “It will be great when the VA no longer uses paper clinical records.” I pointed out that we have not used paper records for clinical care at the VA for more than 2 decades. Cerner ignored the current state of VA informatics and continued to push the false narrative that the VA uses paper records for clinical care. This narrative even extended to making posters celebrating the VA shift from paper records with EHRM. When I finally pointed out that the only place we used paper in the VA was in the restroom, they discontinued the false narrative. Cerner has no interest in what the VA needs or currently has, they only tell us about their system with no interest in what our current status is or what we actually need to provide clinical care.

In 2017 and 2018 Cerner demonstrated their product. In 2018 we started going to Kansas City to the Cerner Experience Center to see their product. Cerner began by telling us what we were getting. When we identified problems, bugs, or requested configuration changes, Cerner staff simply said “No” to all requests. The standard line was The DOD already decided this point. No changes are allowed. The system must be identical to the DOD build. After six months of once a month, weeklong trips to Cerner to hear what we were getting, I asked if we could just save time by Cerner giving us a DVD with the current build and we would be done. Cerner understood the sarcasm and then appeared to listen to what configuration changes we requested. These meetings involved 500 people going to Kansas City for a week. There were meetings, discussions, Booze Allen staff appeared to be taking notes. None of the notes by Cerner staff or Booze Allen seem to have survived. None of the configuration changes agreed on were implemented. None of the work done on these ten, weeklong trips to Kansas City resulted in a single change to the configuration and all the records of the agreed upon configuration choices were lost. We then began having meetings virtually with Cerner staff. None of the agreed upon configuration choices were implemented. We agreed on notes, order sets, and configuration changes to SA Anesthesia. None of this work was implemented by Cerner and none of the decisions were retained by either Cerner or Booze Allen. When we asked to see the current VA build, we were not shown it. Cerner always showed a demo build, or a non-VA build. When we did see what was supposed to be the current build, none of the configuration choices we made were implemented. Moreover, when making these configuration changes, Cerner staff worked with Excel spread sheets to make choices. When we asked to see what the clinician using the Cerner software would see, Cerner was unable to show anything because the Excel spread sheet had to be sent to some other staff to implement and that takes months. We were asked to approve configuration changes based on data fields in an Excel spread sheet and were never shown what it was going to look like to the clinician. None of the choices we made were implemented. Some of these issues involved days of work on hundreds of configuration choices, all of this work was discarded by Cerner. Some decisions were to the level of absurdity. We worked for months on the Ketamine for Depression order set. This order set has one medication on it, ketamine. Cerner in more than a year of work has been unable to produce the Ketamine for depression order set with one medication. When they would show the order set, it didn’t have ketamine on it. Consider this level of problem. This order set has one medication order, ketamine, and Cerner staff were unable to put a single medication on a single order set in more than a year of work. Finally, they stated that they didn’t think their software could deliver a set amount of drug in mg over 40 minutes. None of the Cerner staff we delt with were trained clinicians, none of them had ever ordered a medication or delivered a medication, and none of them were programmers. They had no idea what a clinician needs to be able to do. In October 2021 we are still being shown demos of Cerner software. The Cerner staff assigned to this configuration project are not given permission to open the VA or DOD build. This Cerner staff is still showing us what Cerner can do but can’t show us the DOD or VA build, can’t make any changes, and doesn’t record or implement what we request.

Cerner staff at present admit that the Cerner software SA Anesthesia has many deficiencies and was designed and built in the last century. Cerner staff, admitting these problems have stated that Cerner recognizes the major problems with their product and plans to work on SA Anesthesia after they fix the surgical package, the nursing package, and work will begin in 3-4 years with a time table of a minimum of 5 years until SA Anesthesia is improved. We first identified problems with SA Anesthesia in 2018, so a timeline of possibly fixing the issues in 2026 represents a slow response time.

Cerner staff essentially say “No” to all configuration changes. The reason for “No” has changed somewhat. The first reason was that the DOD had already decided so no configuration changes were allowed because the VA and DOD systems had to be identical. The next reason was that the DOD and VA had to agree to all changes and the DOD representative wasn’t present. We then got the DOD representative for anesthesia to come to the meetings and then the reason was that the DOD representative was not approved to make decisions for the DOD and had to send those requests up the chain of command to get approval. We then made decisions, that were approved by the DOD and VA, and those configuration choices were “lost” by Cerner and Booze Allen. This approach has wasted four years of configuration work from 2018 to 2021. It also represents a major risk to patient safety. In our current VISTA/CPRS system if a safety issue is identified, I email the local CAC (Computer Applications Coordinator) with the requested change to CPRS. The change is implemented in an hour to a day, and we then have the benefit of the improved template, note, order set, or reminder. With Cerner EHRM, to get a change, we have to get the entire VA to agree, then have the DOD agree, then get the organization above DOD and VA to agree, then get funding approved to pay Cerner to make the change, then Cerner takes 18 months to make a change. The Cerner EHRM approach eliminates the ability to use the EHR to improve care or respond to clinical issues using the EHR. No improvements to the EHR can be tested on a local level so there can be no justification for making a change. The VA will essentially eliminate the ability to improve care through the use of IT.

What requests were denied? We found that when a surgical case was being booked the diagnosis was not included. Surgical procedures are in response to a diagnosis and the diagnosis is essential in planning a case. An exploratory laparotomy for cancer is very different from one for trauma or appendicitis or an aneurysm. The diagnosis is essential. Cerner refused to add a field for the diagnosis. Cerner displays the birth weight on all screens. All patients in the VA are veterans, they are not infants, the patient’s birth weight, on average 68 years ago is not meaningful information. We asked to use consistent terms throughout the system. Cerner refused. For example, the clinician will be requested to enter the patient’s weight. On the next screen that value will be called dosing weight. Data entered in a box entitled weight will be stored in a variable with a different name. Those names will change depending on what Cerner package is being accessed. We asked to use consistent variable names. This request was denied. When a surgical case is booked successfully, the indicator turns red. We asked to use GREEN for success and were denied. If the case has invalid information, the choice of anesthesia type turns slightly darker grey and then the case appears to be booked. It isn’t booked; it just goes onto a list of failed bookings with no feedback to the person entering the case that there was a problem. We asked to use RED if there was a problem and GREEN if it worked. This request was denied. We asked to eliminate question from menus; denied. Some menus have many hundreds of questions and staff have less than five minutes to fill out the form, all requests to simplify menus were denied. In Cerner there are some programs where time moves right to left on the screen, we asked to have time move left to right, denied. We asked if fonts could be in a different color from the background color so the text could be read by staff, the request for readability were denied. We requested that PACU nurses be able to see anesthesia records in the Post Anesthesia Recovery Unit so they could provide care, this request was denied. We requested that note titles be based on LOINC standards and not be changeable so analytics would be possible; denied. We requested that the concentration of a drug be correct in SA anesthesia. Cerner was unable to provide this essential information.

When we examined forms and asked Cerner how long they took to fill out, on one form there were thousands of questions and Cerner estimated it would take 90 minutes. We indicated the nurse had under five minutes to examine the patient, educate them, and fill out the form. Cerner indicated we should hire more staff. We were told with the Cerner Go-Live that the inefficiencies of the Cerner system would be severe enough that we should hire 50% additional clinical staff to handle the Cerner software. When we indicated that that was impossible, Cerner said, that’s what is needed. Cerner thought there should be three nurses in each OR, one additional nurse over our current staffing, simply to handle the increased workload of the Cerner software. Rather than make the software compatible with people, Cerner expects the VA to make the people compatible with their software.

EHRM management undermined the ability of the councils to have any configuration changes. EHRM senior management announced that if there was any VA policy, directive, or process that conflicted with Cerner Software, the VA policy would be changed. This decision made it impossible for the councils to say, this software violates VA policy it needs to be changed. EHRM senior management decided to make the VA health care system compatible with Cerner software rather than make the software compatible with VA health care system policies and procedures.

Why is Cerner so resistant to any improvements or configuration changes? The VA provided 500 of the most experience clinical informaticists in the world to work on the EHRM project. For example, I have used electronic health care records for clinical care for more than 40 years. I have designed, developed, and programmed multiple electronic health care records systems and CIS/ARK programs. I have an MD and a PhD in biomedical engineering, am board certified in clinical informatics, and teach the AMIA 10x10 program at the VA. Cerner was completely disinterested in anything we had to say about their product. There is a hospital across the street from Cerner world headquarters that uses EPIC not Cerner. Normally companies would give their system to that hospital and send their engineers across the street each day to observe, optimize, and fix the issues with their software. There are no hospitals in Kansas City that use Cerner and the closest hospital that Cerner has identified as using Cerner is more than 100 miles away. You can’t experience or use the Cerner system at the Cerner Experience Center. The primary reason I could detect for Cerner not caring what customers think or want is change costs money and they don’t have the interest or the funds or ability to make even minor configuration changes. One of the major risks to software development is mission creep, where changing specifications drag out projects. Cerner has solved this problem by not having specifications and not allowing any changes of any type. At present, none of the configuration changes we requested were made and we have been told that funding for configuration changes has run out and Task Order 28 has been cancelled. Cerner is no longer funded to even listen to what we need. None of the order sets, notes, preference, or configuration changes requested by anesthesia were implemented while there was funding for this work and now there is no funding to make the requested changes.

Cerner does not understand usability testing or improvements. Cerner’s basic tenet is that we should train staff to use their system. When we ask how long something takes to fill out, and the time is too long, Cerner recommends hiring more staff. When we recommend simplifying a process to help people do the task correctly, Cerner’s response is simply to train the staff to be compatible with their system. Cerner tried to get the Anesthesia service to use PowerNotes. They then said. “No one likes PowerNotes because they are unreadable.” Why are you recommending something that is unreadable? “Because we are told to.” They also recommended using PowerForm notes, which feed into a database. Cerner then stated they didn’t have time to create PowerForm notes, and they are unreadable. I offered to fix the notes to make them readable. This request was denied. I offered to take the Cerner class to be certified in PowerNotes and PowerForms so that we could make our own notes since Cerner did not have the staff with time to make the notes and this request was denied. Cerner recommends using types of notes PowerNotes and PowerForms that they don’t have time to create, are unreadable, and their staff admit everyone hates. They won’t allow VA staff to either fix the notes to make them readable or take the class to make our own notes.

In four years of work, we have not been able to see the VA or DOD build. When we meet with Cerner they will show a “commercial” build, or a “demo build”. These builds are not the ones that the VA will use. We asked to test SA Anesthesia prior to go live. Many excuses were given including it’s not ready, we don’t have time, we don’t have funding to allow travel, the DOD will need to approve, etc, etc. I took the DOD security training and despite passing security checks was not allowed to see the DOD build or facility using Cerner. We asked to test the Cerner build in our simulation center and this request was denied as Cerner was incapable of installing it. We asked to test the Cerner build in the VA SimLearn simulation center and this request was denied for similar reasons. I asked to travel to Spokane to test the system and it was denied for lack of funding and lack of time. I offered to go on my vacation and pay for my own travel costs and the request was denied. Finally, I said that it was dangerous to implement an untested system in anesthesia and we were approved for a trip to Spokane for two days. Testing at the Spokane VA identified more than 80 problems that made the system unusable and unsafe for clinical care. Simple problems like 80% of commonly used anesthesia medications were missing. None of the configuration changes we had agreed on were made. The build implemented was not the DOD build and not the build we had agreed. We informed senior EHRM management of the problems. The national anesthesia director, the former national anesthesia director, the deputy national anesthesia director, and the co-chair of the perioperative council all stated that the system was not safe for clinical use. Senior EHRM management decided to ignore this statement and implemented a different, untested build with the goal of staying on schedule. This decision is surprising. When multiple, experienced clinicians tell management that something is unsafe for clinical use the decision to use it anyway is inappropriate.

At the current time, no testing has been done on the SA anesthesia module being used. No changes are approved. Task Order 28 has been cancelled. The Cerner staff assigned to anesthesia state they do not have access to the VA or DOD build and are simply showing us Cerner software unrelated to current VA or DOD builds. The [Safety Assurance Factors for EHR Resilience (SAFER) Guides](http://www.healthit.gov/policy-researchers-implementers/safer) indicate that utilization of untested clinical informatics software does not meet their guidelines. Cerner and EHRM management did not allow testing of the software used for go-live at Spokane violating multiple best practices in clinical informatics.

The staff at Cerner we interacted with were not clinicians. They were not programmers. None of the Cerner staff we interacted with could answer the simple question of what Cerner was written in. Cerner staff made choices on Excel spread sheets and demonstrated the Cerner product. None of the configuration changes we spent four years making were implemented. We were not able to be shown what the final build would look like to the clinician and we were not allowed to test the system.

The cost of the Cerner project is more than $17 billion dollars. At present the costs will include the additional expense of upgrading networking at VA hospitals because the Cerner product is hosted in Kansas City so all computers must connect at high speed to the Cerner Server. The Cerner product is difficult to use without two large computer monitors. Cerner has not done the work to make the product usable on a smaller or a single screen so additional monitors, networking, and the space for dual monitor clinical computers will be needed. Cerner charged the VA $400 million dollars to host the EHRM project prior to go-live. This hosting supported 70 simultaneous users. VISTA/CPRS costs $40 million per year to support 333,000 users. It is important to recognize this difference. Cerner charged the VA $400 million to host 70 users for a year. VISTA CPRS costs $40 million for 330,000 users. VISTA CPRS hosted on AWS (Amazon Web Services) for 330,000 users would cost only $10 million per year and not require any upgrades to VA computers or networking.

Summary:

The Cerner EHRM project is a billing system designed to generate a bill for clinical care. The VA clinicians will be converted into a data entry clerk for billing. None of the configuration changes requested by the anesthesia service were made. None of the safety issues identified with SA Anesthesia were made. Cerner admits that their software has major limitations and they have not made any effort to correct those safety or usability problems. Cerner is not able or willing to allow the VA to test the system. When problems are identified that will engender patients, no changes or improvements are made. Usability is essential in anesthesia software to reduce the risks of loss of situational awareness and patient injury. Cerner software is going to make providing clinical care more difficult. Cerner software will make quality improvements and responses to clinical events using the electronic health care record impossible. Cerner thinks that training VA staff to be compatible with their software is the correct approach. If any VA policy or procedure is incompatible with Cerner software, the VA is supposed to change that policy to be compatible with Cerner software. The VA is to adapt it’s business practices, clinical care, policies, and procedures to be compatible with Cerner software. This approach is absurd, dangerous, and will reduce access, increase wait times, and lead to staff burnout, and decreased and lower quality clinical care. To summarize, the usability expert on the perioperative council summarized the EHRM project. “The EHRM project is going to be an EPIC failure; the VA is committing Cerner-cide.” The other most common comment from VA staff working on EHRM is “I am going to retire before go-live.” The EHRM project is going to devastate the ability of the VA to provide clinical care to veterans.