Cosalient® EHR – The Digital Divide and Anesthesia Care

Part I: The Problem

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The operating room differs dramatically from other medical practice environments. Exacting precision and nearly instantaneous decision/action times are continually required. Events occur in a time frame perhaps a hundred-fold faster than on a ward or in a physician's office. Force fitting a slow workflow EHR system into the fast paced OR creates usage difficulty, distracts the anesthesia provider, and interferes with care. EHR problems are greatly heightened in the operative environment, and many of these issues generalize to other areas of medical care.

Why is My EHR so Clumsy?

I was appalled by how little EHR user interfaces have improved in the last 15 years. While applications in other fields have adopted more natural interfaces, EHR's largely continue to be based upon last century, fill-in-the-fields, dialog box user interfaces. Contrast the clumsy input screens of a "database constrained" EHR against a modern application on an Apple iPad®. The modern device promotes rapid data access and entry. Meanwhile, the "database constrained" EHR forces you through a maze of dialog boxes and obscures the information being entered. One environment is enticing and pleasant to use. The other is painful, limiting, and often infuriating.

Despite this clear contrast, nearly every major EHR system falls into the same user interface trap. Why? The database structure of a typical EHR system was allowed to determine user interface design. The database "bleeds through" to the user interface.

Recall that most major EHR systems have derived from the billing service world. Databases for billing store a restricted set of possibilities in a limited number of data fields. A non-clinician, program designer added fields for clinical data to expand their system to become an EHR. It might seem perfectly reasonable to simply add screens for users to fill in to create a "clinical" record. Most of the industry is built around this model. It is the easy, least design intensive way to build an EHR. Unfortunately, database centric designs become clinically onerous.

Yes, database centric systems are easy to create, but their underlying database structure is often barely veiled by their user interface. Screens of database elements and dialog boxes to force "valid" entries are a natural result of building an EHR from a database design outward. System after system is built along this database, entry screen, dialog box paradigm.

An EHR can even force every field to be sequentially filled with only one of a limited number of choices. This is simple for programmers to implement, and easy for IT administrators to grasp. In the database, information processing domain, this type of design makes a great deal of sense. Programmers and database managers view limiting choices in this way as "gathering discrete data" and improving consistency. Unfortunately, healthcare providers work in a completely different realm. We practitioners find this leads to a game of choosing the least wrong of several not quite right possibilities within which to pigeon hole our patients.

Patients do not neatly fit into little boxes. Events do not happen in the sequence that the dialog boxes are presented. A database centric design soon saddles clinicians and becomes a database *constraining* system. Nowhere is this mismatch more acute than in anesthesia care. For in the

operating suite, an EHR must meet the needs of an extremely high acuity practice and surpass the effectiveness of a concise, hand written anesthetic record.

Paper Tried and True

The hand written anesthetic record has undergone decades of refinement. It has acted as documentation, an adjunct to intraoperative monitoring, a vigilance tool, and a postoperative communiqué to future providers. In its most advanced embodiment, a paper, handwritten anesthetic record conveys the entire relevant patient history, preoperative evaluation, patient consent, anesthetic plan, anesthetic conduct, and conveyance to PACU all on a *single* page. This highly focused document is instantly interpretable by all anesthesia providers. Its positive attributes are the de facto standard against which electronic records must compete. Handwritten records are, however, deeply flawed in legibility, transcriptional accuracy, and usefulness for data analysis retrieval.

Database constrained user interfaces have not been able to deliver the speed, focus, flexibility, ease of use, and all-at-once visibility of a paper record. Paper records possess familiarity, conciseness, and ease of use but fail to provide

An advanced anesthetic record includes details of the entire perioperative care episode in a visually attractive format. Cosalient® EHR allows electronic usage of such advanced format documents.

the advantages of data analysis, retrieval, and inter-facility data transfer in an increasingly electronic world. Electronic records *are* the future, but the government mandate to rush implementation threatens clinicians with forcible installation of poorly anesthesia optimized, database constrained products.

We looked at this situation and saw a grim future filled with clinically inept anesthesia EHR modules embedded within one-size-misfits-all systems. We anesthesia care providers are a minority and all too often concede our patient care advocacy role to become inert pawns, powerless to affect our choice of clinical tool. Worse yet, there really was nothing that fulfilled our desired goals of usability, clarity, salience, and patient care support. *Cosalient EHR* was created to provide a choice that exceeds the capabilities of both handwritten and database constrained electronic records.

Cosalient EHR combines faster than paper ease, user driven flexibility, better than handwritten legibility, with the data gathering and automated assistance capabilities of electronic records. Simply meeting "meaningful use" is not enough. Most of the meaningful use criteria were conceived for the primary care and ward environments and apply poorly to anesthesia care. Anesthesia care providers deserve a tailored solution that exceeds the ease of use of a paper record and delivers the promised benefits of electronic data gathering.

Design for Clinical Usability

Our approach to designing *Cosalient EHR* began with the concept that beautiful graphic design makes information more intelligible. Add fluid, user interaction. Help the clinician create concise, human friendly documents. Finally, bridge the entries into the database realm without letting the database intrude into the user experience. It was much more difficult to create a human user centric solution, but ultimately worth our effort. *Cosalient EHR* is far easier for our users. How easy? Fifteen minutes training and most users can readily perform cases using *Cosalient EHR*. Best of both worlds? *Cosalient EHR* delivers *better* than both worlds.

Not all Data is Information

A database constrained system forces users to enter only the predefined comments that are already in the system. Often, IT professionals state as mantra that free text is no data. In a room filled with computer professionals this is accepted without dissent. After all, their databases are more difficult to populate from free text. Meanwhile, the clinicians in the room are aghast at what is an unbelievably wrong assertion. From a clinician's viewpoint, free text often conveys much more useful information than scores of data derived through selections among the constrained options allowed by entry screens.

Compare…

> *John Smith an 87 year old male fell at home after shoveling snow. He complained of shortness of breath and back pain when EMT's arrived. Pulses in his legs were non-palpable.*

Against…

The free text conveyed much more *useful* clinical information, yet would not be acknowledged by

IT professionals as data. The database constrained screen captures "data" for the database, but misses clinically important items because they are not among the available choices. Irrelevant items overwhelm the display and the presentation is difficult for human clinicians to digest. Every clinician who works with conventional, database constrained EHR's knows the frustration of low relevance "data" hiding important information. Salience is lost.

"I only look at the free text," stated an OB as we discussed the above example.

"That is exactly the problem we get with (product name deleted)," as she pointed at the database display example.

This disconnect between what clinicians want and what computer scientists believe is important extends beyond the anesthesia realm. Seemingly smart choices for the computer scientist not only frustrate practitioners but also threaten patient care. "Data" is gathered under the guise of improving patient care through the promise of analysis, but the resultant record becomes clinically less salient and uncommunicative. Programmers and business managers look at their treasure trove of analyzable "data" and proclaim a job well done. Worse yet, EHR system clumsiness means more work is loaded upon the front line clinician.

Time spent struggling with an EHR is time taken away from patient care and safety.

Whose problem is this? Information Technology directors select systems that meet their needs and are purported amongst *their* peers to be superior tools. They feel they are doing their due diligence. "The nurses and physicians don't understand information systems and will need to adapt to the new system." Meanwhile, clinicians find themselves carrying out critical patient care, but supplied with EHR tools ill suited to their work. This does not have to come to pass. If you are already in this situation, lobby for change. Nobody else will make the effort on you and your patients' behalf. *Cosalient EHR* is the clinically adept tool worth pursuing for your patient care.

Graphic Design Matters

A well conceived graphical design conveys information clearly and quickly. An EHR should facilitate concise, easily understood communication with other providers. The above chart is a beautiful example of good graphic design conveying a complex story. Charles Minard, in 1869, illustrated Napoleon's army advance and retreat from Russia. His graphic powerfully and quickly conveys the position, time, and diminution of Napoleon's army. In a glance, you see and understand the destruction of his forces.
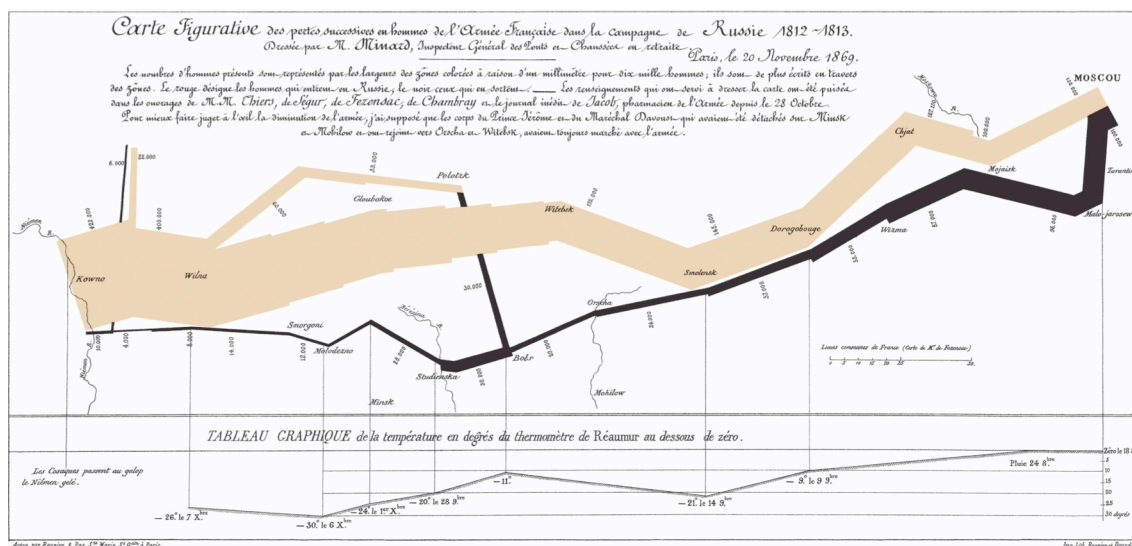
Imagine how a database centric documentation system would have presented this as a table of dates, locations and manpower. Yes, the data would be there, but human intelligibility would be a meager fraction of the powerful message contained in Minard's graphic. This is not a lesson that everything should be in a graph. The lesson is that good graphic design is important in conveying information, particularly when humans are the actual users of the information.

Database programmers seldom are good graphic designers. This is painfully obvious in many systems. Busy screen layouts, entry forms visually overwhelming data, lists of notes all at the same type size, layers of hidden information, and crudely rendered graphs are the norm. An EHR optimized to gather discrete data points might work well for report generation, billing, research, coding, and administrative monitoring, but fails miserably at producing clinically friendly documents. As a practitioner, I found this situation intolerable. So, the *Cosalient EHR* mission was begun.

We free you to create graphically pleasing documentation without being a programmer. Let good graphic design determine the front end. Let users fluidly add input the way they want it to look. Have the system reduce labor by assisting the user with repetitive tasks. Finally, make the program responsible for transparently adapting the human friendly documentation to data analysis. This is the *Cosalient EHR* approach to clinically driven documentation. The practitioner guides the experience instead of a database directing your actions.

In the next installment, I will describe how *Cosalient EHR* is a radical departure from database constrained EHR design.

Location	Size
Kowne	422000
Wilna	400000
Wilbsk	175000
Smolensk	145000
Chjat	11700
Mojaisk	100000
Moscot	100000
Malojara	36000
Wirma	87000
Orscha	24000
Botr	20000
Studienska	50000
Smorgoni	12000
Vienna	10000

The data may be present in a table, but the power of the message is lost. It is even difficult to detect an error in the table.

Cosalient® EHR – The Digital Divide and Anesthesia Care

Part II: Beautiful Documents, Ease of Use

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In the previous section, we saw how allowing a database to determine EHR interface design can hinder clinical data gathering and patient care. We also explored the desirability of good graphic design in presenting information. *Cosalient™ EHR* was specifically tailored to leverage your existing document designs. We allow the graphically inclined to add sophisticated document features *without* need for a programmer. In other words, your documentation can look the way you want and then be intelligently completed with *Cosalient EHR*. The system flexibly adapts to a large range of forms. It can electronically implement your currently familiar forms with minimal workflow disruption and then support painless migration to more advanced documentation.

Most EHR systems ignore the lessons learned over the last several years of web page design. In the early days of the web, page layouts were crude. This was caused by an emphasis on deploying the underlying page data free of commands that directly determined the actual appearance of web pages.

Today's, much more visually friendly web pages are possible because a graphical appearance system was finally implemented that allows web page designers to specify how a page appears. We will not delve into the details of how this happened, but simply understand that today's web grew beyond an originally data centric design to one that includes features to make things look nicer and easier to use. Remember what we learned about data centric EHR's bleeding their database roots into the user interface? *Cosalient EHR* makes the generational leap and allows you to build documents that feature user-friendly design.

Using *Cosalient EHR* feels completely different from using other EHR's because it places emphasis on creating expressive documentation. *Cosalient EHR* provides the tools for you to efficiently craft your document so it clearly conveys your clinical story. Your anesthetic record once more becomes *your* document, complete with the details arranged the way you want them – beautifully, because it matters.

Legibility

Legibility in medicolegal documentation has been largely synonymous with how recognizable handwritten letters appear. Try reading the scrawl on a handwritten anesthetic record and you will soon agree that the well formed typefaces of electronic text are a dramatic legibility improvement over handwritten entries. The "chicken scratch" that many of us

Legibility is not only greatly improved with Cosalient® EHR (right), but text entry speed is faster than typing or hand writing due to Cosalient EHR's text entry assistance tools.

produce on handwritten records defies reliable human reading let alone machine translation into searchable text.

Improving legibility is a must for any EHR, but a key difference between systems is how efficiently and reliably the system achieves legibility. *Cosalient EHR's* advanced text entry assistance features let you enter text comments directly, *faster* than you can type, and far faster than you can write by hand. Moreover, what you write is reliably placed into your record. There is no risk of the record not matching what you wrote due to intermediate conversion errors. Your billing office and everyone else who needs to read your records will enjoy much improved legibility in your EHR. *Cosalient EHR* creates a more legible record with *less* work and *greater* speed.

Legibility alone is not enough to convey information to other people. The aspects of readability and salience must also be maximized in your documents.

Readability

Readability is the measure of how easy it is to view, absorb, and comprehend your writing. This is largely determined by your writing style and skill, but in the busy operating room environment, you often lack the time to document as extensively as you wish. Even so, sometimes you create pieces of text that would be useful if the same situation recurred. If you could recall those phrases, you could use them to achieve better readability even when time is limited.

Cosalient EHR improves document readability by allowing you to reuse previously written phrases. We call these recallable elements "Marking Sets" in *Cosalient EHR*. As you build your personal library of recallable markings, your workload steadily decreases, but your documentation improves in quality and completeness. Your marking sets automatically travel with you when you log into a *Cosalient EHR* workstation. No super user assistance or special skills are required to create your *Marking Sets*. You simply select the elements you wish and save them. Later you recall your markings in an instant.

The blue background, yellow boxes, and labels are far more visible than the actual clinical information in this EHR display screen that has poor salience.

Salience

Salience – the ability of important items to stand out from their surroundings is typically lost in conventional EHR's. When you look at a medical record, clinical content should be the most prominent information in the EHR, but most other systems visually hide clinical content. They sabotage the salience of your clinical messages.

Cosalient EHR promotes salience by letting the most important parts of the medical record stand out. You can even add extra emphasis with graphics, photos, and text size changes.

Let us examine some poor form designs so you understand what I mean by salience.
The above EHR display screen has a "form" that is much more prominent than its clinical content. On the following page, another EHR screen contains colorful, high contrast design elements. Those are the underlying form areas and program controls instead of the clinical

information. Category labels and text boxes prominently stand out, but actual clinical information is visually subservient. These are pretty, but one could easily miss the life threatening clinical information hidden within each example.

Did you notice them immediately?

Probably not.
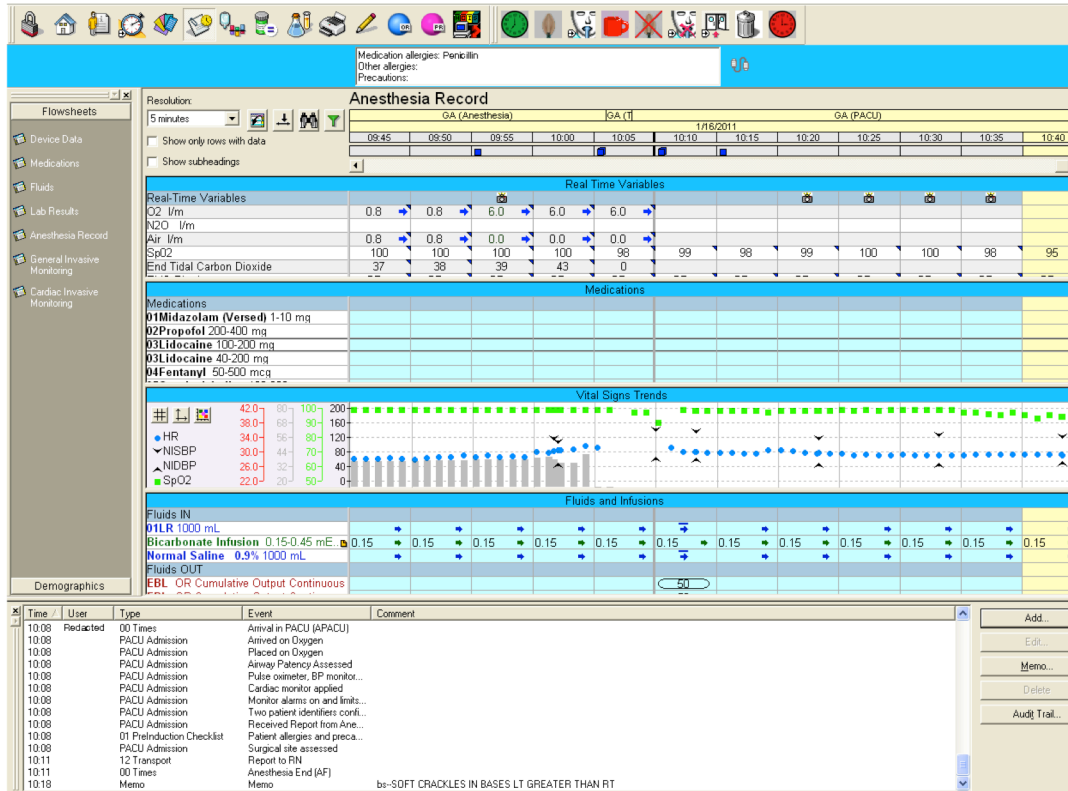
This typical anesthesia EHR screen prominently features its screen regions and program controls instead of highlighting the clinical information.

Another salience problem illustrated by the above example is that clinical memos are presented without hint of importance. A critical airway comment would be camouflaged within unimportant chatter. This is particularly problematic because most EHR's never let you see all the clinical comments at once and may automatically insert boilerplate messages that further hide your important clinical notations.

In contrast, *Cosalient EHR* is graphically based. We empower you to make important details visually stand out and be noticed. We will see examples of improved clinical salience later.

Paper Forms May Also Lack Salience

The problem of poor graphic design obscuring clinical data predates electronic records. Paper records, particularly clinical forms created using just a spreadsheet or word processor program, may lack sophisticated design features that make clinical content more prominent. This example paper record was created with a spreadsheet.

Graphic design matters because it dramatically affects your ability to efficiently gather information from a record. The difference between a well-designed screen layout and a poorly designed one could make you miss an important piece of clinical information. Intelligent graphic design also assists your clinical flow by helping you logically progress through documenting your actions.

Supports Sophisticated Graphical Design

Nuanced graphical details like line weight, fully formed graphic elements, and vertically aligned label numbers are difficult to produce in a spreadsheet. A graphic design program allows much finer control of visual design.

Cosalient EHR lets you create forms in your favorite graphics layout program and then use the results electronically. Compare the previous examples with the more sophisticated PACU record design to the right. Clinical entries on this form will be prominent.

Remember. The most important information on your record is *not* the form or display screen. It is what you wrote in the record. This principle is violated again and again by most EHR's.

Cosalient EHR combines advanced form design with on screen features like contrasting color and text size to make your clinical information more prominent.

Heavy cell boundaries and lettering make this form difficult to read because any written content will be lighter than the form.

This form incorporates many graphic design elements to encourage salience. Light rule lines, checkboxes, and chart grid backgrounds allow clinical entries to be visually prominent instead of the underlying form.

⚠️ **Penicillin --> Anaphylaxis**

Page 1 of 1

The form shows an anesthesia record with the following readable entries:

- PLAN: GA, Regional, Local; MAC Requested by Surgeon for…, Medically Complex Patient, Painful Invasive Procedure
- CONSENT: PT ID, Procedure and Site Verified with Patient; Anesthetic Options, Procedures & Risks Explained; Patient, Parent, Guardian Accepts Anesthetic Plan
- Patient agrees to MAC with GA backup after process and risks including pain, awareness, nausea, and more serious disclosed.
- Pre-med
- ASA ☒1 ☐2 ☐3 ☐4 ☐5 ☐E
- GA / AIRWAY: ☒Cannula, Supp. O2 Mask, OA, NA
- REGIONAL
- POSITION: ☒Supine, ARMS ☒<90° Abduct ☒Padded, Tucked
- Condition on Arrival PACU
- PACU initial vitals accepted at transfer of care.

Time columns: 9:00, 10:00, 11:00, 12:00

Fi O2 %	96 98 97 98 98 98 98 98 98 98 98 98
Fi N2O %	0 0 0 0 0 0 0 0 0 0 0 0 0
SEV %	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Lido/Propofol mg	30
Midazolam mg	2
Fentanyl mcg	50 50
Propofol mcg/kg/min	100- 100--- 100--- 100--- 100-
Zofran mg	4
Decadron mg	
Temp	
SpO2%	100 100 100 99 100 100 100 100 100 100 100 100

MON. & AIDS: ☒Equip Check, ☒EKG, ☒NIBP, ☒SpO2, ☒O2 Analyzer, ☒ET CO2, ☒Eyes Taped, Mech Vent, Nerve Stim, Bair Hugger, Temp Esoph, Temp Nasal, Temp Skin, Blood Warmer, Artificial Nose, PC/ES Steth

EVENT
Fluids LR ---------- --------- --------- --------- -600

Redacted
Procedure(s): First metatarsal osteotomy   ASA Code 01480
Diagnosis: Bunion   ICD-9 727.1 / 735.0

Patient has history of difficult intubation in past.

Drug Wastage: Morphine, Midazolam 0, Fentanyl 0

- 99140 - Emergency
- 64413 - Cervical Plexus Block
- 64415 - Interscalene Block
- 64417 - Axillary Nerve Block
- 64445 - Sciatic Nerve Block
- 64447 - Femoral Nerve Block
- 64450 - Popliteal Nerve Block
- 64450 - Other Periph Nerve Block

Pre-Op antibiotic ordered and…; ☒No Pre-Op antibiotic ordered 4047-8P
☒Case < 60 min 4256F
Active Warming NOT Used Due to…

Name (Last Name, First Name Initial): Redacted, Redacted
ID# 00000 Episode# 1
DOB 1/1/1950 Age 61 ☒Female
11/11/11
Redacted
11/11/11

OSC Room 1
10:06 / 08:40 / 09:01

Overlake Surgery Center **ANESTHESIA RECORD** v2010-02-04 EL

Chart Copy Chart Copy Chart Copy

A Cosalient® EHR anesthetic record displays clinical entries more prominently than the underlying form

Above we see how clarity is promoted by *Cosalient EHR*. Clinical information is prominently presented and distinct from the underlying form. No longer are critical pieces of information buried. Advanced form design, in concert with salience enhancing display make your documentation easier to read and understand. Other care providers immediately see what is important in your records.

⚠ Penicillin --> Anaphylaxis

PLAN
- ☐ GA
- ☐ Regional
- ☐ Local
- ☒ MAC Requested by Surgeon for...
- ☐ Medically Complex Patient
- ☒ Painful Invasive Procedure

CONSENT
- ☒ PT ID
- ☒ Procedure and Site Verified with Patient
- ☒ Anesthetic Options, Procedures & Risks Explained
- ☒ Patient ☐ Parent ☐ Guardian Accepts Anesthetic Plan

Patient agrees to MAC with GA backup after process and risks including pain, awareness, nausea, and more serious disclosed.

Pre-med

ASA ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ E

GA / AIRWAY ☒ Cannula ☐ Supp. O2 Mask ☐ OA ☐ NA
- LMA # ☐ Anes. Mask
- Blade _____ ☐ Cuff ☐ LTA
- Tube _____ ☐ CO2 ☐ Stylet
- Difficulty _____ ☐ BS= ☐ RSI
- ☐ Atraumatic / Teeth Intact

REGIONAL Type _____

	9:00 • ✗ • 10:00
Fi O2 %	96 98 97 98 98 98 98 98 98 98 98 99 98
Fi N2O %	0 0 0 0 0 0 0 0 0 0 0 0 0
SEV %	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Lido/Propofol mg	30
Midazolam mg	2
Fentanyl mcg	50 50
Propofol mcg/kg/min	100- 100--- 100--- 100--- 100
Zofran mg	4
Decadron mg	
Temp	
SpO2%	100 100 100 99 100 100 100 100 100 100 100 100 100
ET CO2	240
EKG	sr sr sr sr sr sr sr sr sr sr sr sr sr
	220

Close up from a Cosalient® EHR anesthetic record. Contrasting colors, text size, and graphics encourage focus on the clinical entries.

You now have an understanding of how advanced graphic design dramatically improves clinical communication and documentation. Flexibility, elegance, communicability are thus maximized. *Cosalient EHR* is an adaptive, document creation system that accepts many types of forms for use electronically. Although it can work with most forms, even ones with relatively poor graphical design, the system works most effectively if the forms are designed with salience and clinical flow in mind.

Adaptability to different forms renders the issue of needing a specific Pre-op or PACU module largely moot. Change the form and you expand *Cosalient EHR's* functionality. Yes, the system provides generalizable power, but we also refined usability for the anesthesia provider.

In the next section, I will explore how *Cosalient EHR* makes creating your EHR documents easier, faster, and more complete. We provide many features to reduce your workload so you can pay more attention to patient care and safety. After all, you want to use *Cosalient EHR* in the intraoperative environment.

Cosalient® EHR – The Digital Divide and Anesthesia Care

Part III: Fitting Your Workflow

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In parts 1 and 2 of this article series, we learned why salience and communicability are important in anesthesia documentation. We also learned the advantage of smart graphic design emphasizing clinical information instead of an arbitrary database structure. In this article, we examine how *Cosalient EHR* fits into your workflow and reduces overall effort through familiarity, ease of use, adaptation, and completeness. Your EHR should assist you with patient care instead of enslaving you to documentation.

What is our current workflow?

Does the EHR reduce or increase workload?

Will the EHR detract from vigilance?

Will I confidently know what is in my records?

These are some questions you need to ask when implementing an anesthesia EHR system. They probably apply to other clinical specialties, but in our particular work environment, workflow is critical to safety and speed.

EHR Implementation Anxiety

Adding an EHR system into your work day is a major change. Depending on the EHR system, you may be forced to completely revamp how you perform your cases. All too often, an EHR will demand extra effort and take attention away from your patients. Experiencing those problems drove us to create *Cosalient EHR*.

Delivering anesthetic care is stressful enough without adding more documentation work. Even worse, a clumsy system may mean going through each day not trusting the contents of your records to communicate clinical course and serve in defense of your care.

Your EHR should feel like a faithful companion. If it doesn't, something is wrong.

Workflow Preserved

Cosalient EHR makes your EHR transition simple because we preserve your workflow. Your anesthetic evaluation, plan and patient care are left intact.

You already know how to deliver anesthetics and document your care. Most other EHR's force you to learn an alien system and mold your care around an arbitrary documentation sequence dictated by the EHR. In contrast, *Cosalient EHR* can closely match your existing workflow and reduce workload.

Cosalient EHR lets you work with familiar looking, fully formatted anesthesia records.

You already know what you want to say on your anesthetic records. Your colleagues know how to read them. Other specialties understand the format. The difference after adding *Cosalient EHR* is that your records become more legible, complete, and require *less* effort during cases.

*Autocompletion text system requires few keystrokes to enter words and phrases.
Vocabulary specific to each section of the record speeds data entry.*

By preserving your present workflow and delivering an EHR that typically requires only 15 minutes of instruction before you can carry out cases, we dramatically smooth your EHR implementation.

Advanced User Interface

Cosalient EHR applies user interface principles that enhance intuitive usability. WYSIWIG (What You See is What You Get) live, editable views mean your document appears on screen just the way you expect. You can see the *entire* clinical story in a single view. This makes summarizing your patient care simple and without extra work. You always know what is actually in the record instead of remaining uncertain about what notes are missing or lurking in a closed panel

Modeless clinical notation creation without intervening dialog boxes and data entry screens also means more speed.

Point and type. No need to click exactly on the right spot. Cosalient EHR's ATP (Automatic Text Positioning) system keeps text tidy.

If you can type, and point a mouse, you can use *Cosalient EHR.*

Maintaining Clinical Flow

Anesthesia EHR's are easy to implement poorly, but difficult to implement well. Anesthesia workflow is rapid, intense, unforgiving of error, and needs to appear effortless. The more you work with *Cosalient EHR*, the more you will appreciate the intense effort spent making the user interface as smooth and responsive as possible.

You might think we are overly concerned about speed, but it is for good reason. We believe it vital that an anesthesia EHR minimize interruption of clinical flow. Pulling you "out of flow" disrupts clinical care in a way unique to anesthesia care. Efficiency of an EHR for anesthesia is not just a matter of preserving time for patient care. It is also one of keeping your clinically trained mind free to model your patient.

A good anesthesia provider pays attention to patient, monitors, surrounding situation and responds as needed. A *great* anesthesia provider *anticipates* what is needed next rather than merely responding to situation. Responding means you are behind. If an EHR constantly issues alerts and warnings, demands attention at inopportune times, or makes routine tasks onerous, you quickly find yourself responding to the EHR instead of anticipating your patient's needs.

We made *Cosalient EHR* extremely user efficient so you can stay "in the flow."

Action Cycle

The "normal" cycle of observation, looking up orders or calling a physician, getting drugs from pharmacy, matching drug against the orders and patient, and finally starting delivery is the slow workflow for which many EHR's are designed. It makes sense on the ward to make a user preselect a desired drug, have the system look up all the interactions, document the user dismissing each warning, deliver the drug and then document that the dose was given.

The operating room is not the ward.

The acute response time demands of real life intraoperative care render the "normal" model poorly applicable to our practice. Our required observation, evaluation, ordering, and delivery cycle is extremely short. We see a change on the monitor, evaluate the observation, decide on a drug therapy, and deliver a dose all in under five seconds. Other than in the midst of a code, most other specialties do not work under such a fast paradigm.

Very few EHR designers, medical protocol writers, or programmers understand this critical environment difference. Consequently dose entry systems are rarely implemented in a manner that can keep up with our rapid pace. You often see dose entry screens or dialog boxes with a "Where is Waldo" usage model.

Cosalient EHR is direct. You think it. You do it. You write it. The drug name flows direct from you into the record instead of you hunting for it in the system.

Direct entry of dosage on the record intuitively indicates time of dosage. The left edge of the dose indicates the time the dose was delivered.

Anesthesia Documents Retrospectively

We usually perform a series of intense patient care actions in a row and cannot pause to document during those actions. For instance, induction and airway management requires critically timed actions and medications. We take care of our patient and document AFTER the events, not during the events. Otherwise, our patients would be harmed. An anesthesia EHR must allow documentation of actions after the event while readily indicating the time the action occurred. *Cosalient EHR* accomplishes this as naturally as you do with a paper record. A single action records dosage and time. Simply record your dose on the chart at the desired time.

Playing back a marking set for a femoral block placement documents far faster than you can type.

Faster than You Can Type

Every anesthesia EHR system records vitals for you, and therein, may claim work and time saving. However, our real documentation work is in the myriad of events that must be documented to produce a complete, billable, and defendable medico-legal record – not merely a system that records vitals

If you perform anesthetics, you know that often you must write the same or similar phrases. If you do it the same way, you document it the same way. *Cosalient EHR* dramatically reduces the effort of rewriting material by letting you record and play back your own personalized marking sets. I previously mentioned *Marking Sets*. You create them yourself by simply selecting the items you wish to reuse and storing them. No super user or special skills are needed.

Other EHR systems may promise you the possibility of personalized macros, but have so difficult an interface that they recommend waiting six months to gain enough system familiarity. The reality is that you probably never actually build your macros after all that time. *Cosalient EHR* marking sets are easy. You start building your library right away.

Meet Documentation Requirements

Before *Cosalient EHR*, we all occasionally failed to fill out all the necessary checkboxes and remarks to fully complete a record. The effect of missing an element might be inconsequential. On the other hand, you could lose billing for a block because you did not indicate it properly. Worse, SCIP and PQRS reporting items might have been forgotten. During a busy case, it is easy to overlook administrative items, but the cost of missing your facility's SCIP and PQRS reporting thresholds could mean reduced reimbursement or a penalty for your facility. Does your anesthesia department want to be blamed for your facility's PQRS penalty or missed bonus? No!

Now you can painlessly achieve compliance without ineffective letters of warning, disruptive alarms, and dialog boxes.

Cosalient EHR includes an effective, but non-disruptive mechanism for enhancing administrative documentation compliance during every case. We can designate items on the anesthetic record to be required or absolutely required. These items are displayed with a pink or purple tint until you complete them.

All at Once View

A powerful advantage of *Cosalient EHR* is its all at once, unified view of what is in your document. Other systems fragment the clinical story and never quite show you everything at once. You have to reveal hidden panels, scroll separate sections, or go to a separate summary screen. With *Cosalient EHR*, you confidently know your clinical story is presented in its entirety.

Because *Cosalient EHR* lets you view the entire document in one glance, it is easy to know if any required item needs to be completed. If all the tinted regions are gone, the required items have been completed.

See the whole story. Know when everything is complete. Simple. Powerful. Effective.

Tinted regions visually indicate required items need to be completed

Litmus Test

A litmus test of true usability is how well the system works during pediatric mask cases. There you have only one documenting hand and cannot physically let go of the airway. Can you comfortably document the case without feeling rushed? You absolutely can with *Cosalient EHR.*

"Thanks for making a day of pediatric cases less stressful." Murray Urquhart, MD

Cosalient EHR is an excellent fit for intense, rapid turnover, pediatric cases, because its combination of ease of use, personalized marking sets, and automated data capture dramatically reduce documentation effort during mask cases.

You complete your documentation in seconds and are freed to focus solely on the child instead of the paperwork. Your anesthetic record is more complete than you could achieve by hand. Even better, instead of falling behind in your documentation, you are now ahead and can anticipate instead of rushing and reacting.

Less work, less stress, more complete documentation. It *is* possible with a well tailored anesthesia EHR. In the space available, I could only touch upon a small fraction of the work and time saving features in the system, but you should already realize that *Cosalient EHR* uniquely emphasizes the user interface and facilitates clinical flow.

Beautify documents and ease of use are just part of the story. *Cosalient EHR* does much more in the background than you realize. It continually protects your documents against tampering and secures information through advanced encryption. Those beautiful clinical documents are also (gasp!) analyzable data. We work invisibly behind the scenes to preserve your clinical flow while painlessly meeting the database functions desired of an EHR.

We will cover data extraction later, but our next installment continues the implementation story with physical deployment considerations for the operating room.