Case 2

Baby Monitor

It's 9:00PM on Friday, October 31st 2025. Dr Richard Sanchez, an attending emergency response (ER) physician has just clocked out of his 14 hour shift from St. James Hospital. It's Halloween, and it gets really crazy. Most cases are alcohol related, with some having sustained wounds from bar fights. It's also common to see gunshot wound cases during this night. Nothing too crazy for another Halloween night. As he clocked out for the night, he felt all of it. The exhaustion. The walking. The talking. The listening. The suffering. All of it. "At some point, you just get kind of used to it I guess" he said to one of his residents.

On the drive home, Richard kept thinking of a better way to do this. A lot that goes on in an ER is having to constantly shift focus. There's always a fire to put out it seems. He just kept thinking why their hospital, though has seen its fair share of innovations, still feels like it's not doing anything intelligently. Efficiently. "With the rise of AI" he thought "hospitals could benefit from a little thinking machine."

The advocate

Dr Richard Sanchez is a brilliant and ambitious doctor. He took up his residency at St. James Hospital under the tutelage of Dr. Anthony "Tony" Jones. Dr. Tony was smart, efficient, but he's by the book. He won't do anything significant if it's not within protocols, and he expects the same thing from his residents. This is where Richard and Tony always wrestled. From Richard's perspective, it is important to follow protocols but he questioned that sometimes they can be outdated or non-sensical. After all, protocols must change at some point.

"But not anytime soon and not while I'm breathing" said Tony.

"Keep that up, and sooner or later you'll realize how far behind you are." responded Richard intensely.

Years later, Dr. Tony retired and now Dr. Richard climbed up the ladder to be the attending doctor of St. James Hospital's emergency ward. He has had his fair share of cases. Some mundane. Others gory and vexing. But all the while he barely had the time to think about revamping the emergency ward. Nor does he have the energy to wrangle all of the bureaucratic and political issues to get new systems going.

"If there's one thing to understand about Tony, it's that he's the embodiment of St. James' philosophy" said Richard to one of his friends Dr Emira Tan. This came about from a discussion they had over lunch while reminiscing their old residency days. They wondered how, by the law, hospitals need to keep detailed logs of all cases, census, and other metrics every day. How the data they collect are anonymized and published to the public as an effort for transparency. Yet, they barely use it.

"You know, Richard we've had huge budget cuts recently" Emira said.

"I'm sorry to hear that" responded Richard.

"Yeah, and because of this the OB-GYN ward is spread so thin already. Nurses scrambling from room to room. Doctors and residents overwhelmed with all the emergency cases. We can't even find the time to go to the bathroom when we need to" Emira continued. "Of all the things going wrong, we still have to take the time to monitor the newborns. Sure, it's not as stressful as the other tasks we have to do but it's supposed to be time we could have used to do more things that mattered. I wish there was a way for us to do something more proactive, you know?"

As Emira said these words, an idea was born in Richard's head.

Ward Intelligence

Joel Alberto is a senior developer working on a new high stakes project. He has a reputation of doing things fast and accurately. This project isn't something he hasn't heard of. It was actually a pretty common use case for him. The project was about creating an application to build proactive intelligence for the OB-GYN ward of St. James Hospital.

One of the reasons why this project came about is to help doctors and, primarily, nurses be more focused on their efforts in their patient care and, hopefully, treat more patients efficiently to free up more rooms for new ones.

Healthcare intelligence systems is the expertise of Joel and of his employer, Data Monitors. This is a walk-in-the-park for Joel. Sure, it takes a lot of effort. Since this is more aligned to a typical sprint-based project, Joel was able to meet his client's expectations well.

The intelligence tool consisted of a dedicated web application with the backend currently hosted on the cloud. The web app shows a map view of the ward to help nurses identify free

rooms and patient recovery times simultaneously and easily. Moreover, the app provides metrics on doctors, nurses, supplies, and it can even schedule operating room bookings for doctors – all in one application.

A lot of the app's features are standard, yet provides invaluable functional analysis for its users. However, there is one component there that contains a machine learning model. Dr. Richard and Dr. Emira, Joel's clients and primary contact, requested to have a predictive model to assess the risks of newborns within their ward.

Dr. Emira stressed that the main pain-point for them is the fact that sometimes they're too slow in providing treatment and it adds some stressful guesswork on their end why the alarms are going off. It would be nice if we could predict if a baby would need more attention and tell us exactly what we need to look at. Because, as useful as current alerts are, they are based on certain rules on metrics. Dr. Emira wants to see if we could develop a model that could provide a more holistic view for these newborns.

When the project was signed off and placed into production, the app alongside the machine learning model was placed into the hospital's system. The app was useful and the model was accurate and useful enough that it increased patient satisfaction by 50%, response times are up by 10%, and mortality rates from doctors are down by an average of 8%.

Overall, the OB-GYN was happy. Because of this, Dr Richard is looking to cascade this to the higher ups and showcase this project to other departments.

St. James Hospital

St. James Hospital was founded on April 15 1985. It's one of the oldest and most preferred hospitals in the city. There were 5 founders of the hospital, 4 of which are doctors and the other one is a business man. The founders pride themselves of their technical excellence, transparency to the public, and compliance to the law. So much so that they made these their three core values for the hospital.

The founders set up a protocol that would ensure that they would deliver the very best patient care and prioritizing trust with the public through transparency and compliance. To some degree, they are like Apple – slow to innovate, but when they do everyone follows.

The years have passed and the current hospital head is now Dr Susan Atkins. She was a revered neurosurgeon before taking up the mantle of CEO. Dr Susan, like the founders, pride herself with the same tenets as of the hospital. In recent years, there has been some push to embody more innovation within the hospital. Although she lauds the effort, she balances it by ensuring compliance is being met. Apart from that, she's juggling the recent budget cuts to the entire healthcare industry in the city imposed by the new president.

With a trimmed down budget, trade wars, inflation, and patient volumes worsen so too is the capacity of St. James. Therefore, Dr. Susan has to be strategic and intentional. She has to prioritize the budget for high impact, compliant, transparent, and, ideally, cheap projects and resources that would maximize the hospitals potential. She already feels bad for cutting down departments, rejecting projects, and reducing staff benefits she can't fail them now or else everything would have been for nothing.

In the past few months, an attending ER doctor by the name of Dr. Richard talked to her about a potential project that would benefit the entire hospital. It was an intelligence platform for the OB-GYN department. Dr. Richard mentioned how this project could be used as a template for other departments should it succeed. After all, hospital departments are siloed and she has been looking for a way to have each department's endorsement for a better data infrastructure.

With the support of the chief of the OB-GYN department, Dr. Emira Tan, the three of them invested in this project. Dr. Susan left Dr. Richard to be in charge of the project's success.

"Should there be any issues with this project, especially with compliance, we'll need to pull the plug on all of this." Susan cautioned to Richard.

"I know. That's why we won't fail." he responded.

Data Monitors

Data Monitors is an internationally recognized and accredited company, specializing in healthcare analytics. It was founded in 2002 during the early stages of the internet.

Charlie Dixon, the founder, was the son of a family medicine doctor. He would often visit the clinic of his father, Dr. Dave Dixon, and noticed that all of the records kept are handwritten. Charlie would notice that his father's secretary would usually take a couple of minutes finding the records of each patient coming in.

"That's a lot of time and effort lost just finding something." Charlie thought.

He took up a degree in computer science during his college years and decided that one of the most untapped industries for digital change is the highly regulated healthcare industry. After years of effort, what started out as a database company soon rose to become so much more.

With an international presence, Data Monitors became an internationally recognized company serving over 200 hospitals and partnering with about 10 data brokers. These data brokers enhance Data Monitors' offerings tenfold as they can provide data in areas that lack it, and provide custom analysis for hospitals. For every hospital that partnered with them, the hospital gained a 3% bump year-on-year in their net income just from building intelligence tools.

In recent years, Data Monitors has come across the trends in AI, with Charlie seeing its future potential for hospitals.

“This can change everything” he said to Joel Alberto his most senior developer. “I want you to take this St. James Hospital project and pilot a machine learning product for the company.”

“But I don’t know that much about machine learning and AI” Joel responded.

“We have libraries and online resources for that already. We can sponsor all of that for you. Anything you need to get up to speed. I think with your experience, it shouldn’t be too hard.”

“Okay, but I do think it’s a bad idea just leaving me there to develop the model on my own”

“We have Lara, another senior dev with a degree in math. I think you two working together would make the modeling part easy. The priority is to still deliver on the intelligence platform, but add in the ML part to get them excited. We want you to succeed, so you’ll have our support, Joel.”

The tipping point

The intelligence platform that Data Monitors made has been a huge success. Dr. Richard has been able to showcase the project to other departments, and now has the backing of the surgery and pediatrics departments.

Months passed without a hitch, and the entire department has begun trusting the platform more and more. It got to the point where they don’t need to monitor the babies that actively anymore. Then, on the 30th week, a newborn was misclassified by the algorithm and died without anyone noticing. It was sudden. The staff and the entire department was in disarray.

It got so bad that it reached Dr Susan and the legal officer, Alex Newport.

“What happened”? asked Dr. Emira.

“A baby died, because he was misclassified to have normal vitals. So we checked all of the newborns to see if the algorithm got it wrong and found 12 babies misclassified.” a nurse said. It could have gotten worse, and it couldn’t have happened at a better time for Dr. Richard.

A few days passed and the OB-GYN department stopped trusting the baby monitoring algorithm. While the app was still useful, the distrust on the algorithm hit the overall productivity of the staff, with the response times being hit the hardest.

Alex called in a meeting. He met up with Dr. Richard, Dr. Susan, Dr. Emira, Joel and a few members of Data Monitor’s team to clear up the issue. They had a long talk, and at the end of the meeting they all ultimately decided to hire an independent auditor called OWL.

OWL

The **O**rganization for **W**hitebox mode**L**s is a non-profit organization that advocates for the ethical use of machine learning through transparency. The organization was founded in 2012, when the rise of AI technologies was slowly ramping up its momentum. It is an organization that consists of statisticians, quants, data analysts, data scientists, mathematicians, computer scientists, and other careers that are primarily interested in data and AI for social impact.

The organization mostly handles checks and balances for developed models by other organizations. They provide accreditation, such as DAMA-CDMP, IIBA-CBDA, ISO, and GDPR. Companies and other organizations tend to get certifications from OWL because an accreditation from OWL provides social proof of trustworthiness for the organization.

A couple of days ago a peculiar case came to your desk. It was a request to audit a model built for the OB-GYN department of St. James Hospital. You take a look at the files and you have requested for all of the necessary documentation from the third party vendor known as Data Monitors.

You've never heard of Data Monitors before, so you don't have a lot of information going in for this request. You assemble a small team to help you with this case. You are contacted by Alex Newport from St. James and you are tasked to audit and critique the model that Data Monitors made. They also want you to investigate what happened to the 12 misclassified babies and shed light unto how their model predicted them as such. In order to prevent this from happening again, St. James also requested that you develop a methodology and protocol for future ML modeling efforts done for the same case.

With this, Data Monitors have provided you with their documentation and model. While St. James provided you with some historical data on the model's predictions and the misclassified babies' information.

Concluding Rites

With having learned a lot about the case, you now wonder what you should recommend to St. James. Knowing what you know now about all of the parties involved, how should you go about providing your findings to everyone?

You see the importance of the project, so how can you balance all of the factors from each party to provide an objective solution? Should Data Monitors be penalized? Should the project be pulled? What would you suggest to Dr. Susan to improve the hospital's data infrastructure? Is there a strategy where everyone benefits from this?