THE HOSPITAL AS A LIVE ENTERPRISE

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Though life expectancy is longer, many are battling health challenges that are putting a strain on the healthcare and insurance industries. Drug prices are rising to touch tens of thousands of dollars, draining patients. Add to this the rise in surgical interventions taking place – about 40% more than what it was 10 years ago[1] – and you have a healthcare system under pressure that continues to mount.

To not just survive, but thrive, hospitals must upgrade their approach to healthcare delivery by utilizing the available data and technology, to a more intuitive one. This means hospitals must think and behave like an organism that's alive and positioned to evolve. Hospitals must become a live enterprise that can integrate themselves intuitively into each patient's journey. This is crucial for businesses looking to adapt while turning challenges into opportunities.

6 Characteristics of a hospital capable of functioning as a live enterprise

- Connected
- Observable
- Sentient
- Alive
- Agile
- Innovative

To understand these characteristics of a live enterprise and how they make a hospital alive and capable of managing patient needs seamlessly, let's take a look at the case of Phillip Carrey. Phillip is a 65-year-old suffering from Alzheimer's Disease for over 10 years. As a widower, Phillip is currently living in an assisted care facility.

Recently, Phillip had a fainting episode and was going in and out of consciousness. So, his nurse, called for an ambulance while she monitored his vitals. Although he was not a diabetic, his blood sugar was very high. The nurse suspected it was Diabetic Keto Acidosis (DKA), a complication of diabetes (even undiagnosed) that can be life threatening. Once the ambulance arrived, Phillip was taken to St. Martha's Hospital and evaluated and stabilized. Alongside, his daughter Sally was informed about his condition. All of this was possible because the entire ecosystem that Phillip was a part of, was connected, observable, sentient, alive, agile, and innovative. Let's walk through Phillip's journey through a Live Hospital in detail.

Connected

A hospital must be connected with other primary, secondary and tertiary care centers. In Phillip's case, the primary care provider (the nurse) could access the EMT and connect with his daughter Sally. The EMT apprised the hospital about Phillip's needs, because of which they could run the right tests and provide the right care without delay.

Once Phillip's immediate medical needs had been met, the hospital then relayed pertinent information about his future care requirements to the assisted care center where he would return to once discharged. Similarly, to ensure patient needs are adequately met, every individual and department in the healthcare ecosystem should be connected to facilitate seamless transfer of critical patient information.

A few key connections that make a hospital a live enterprise
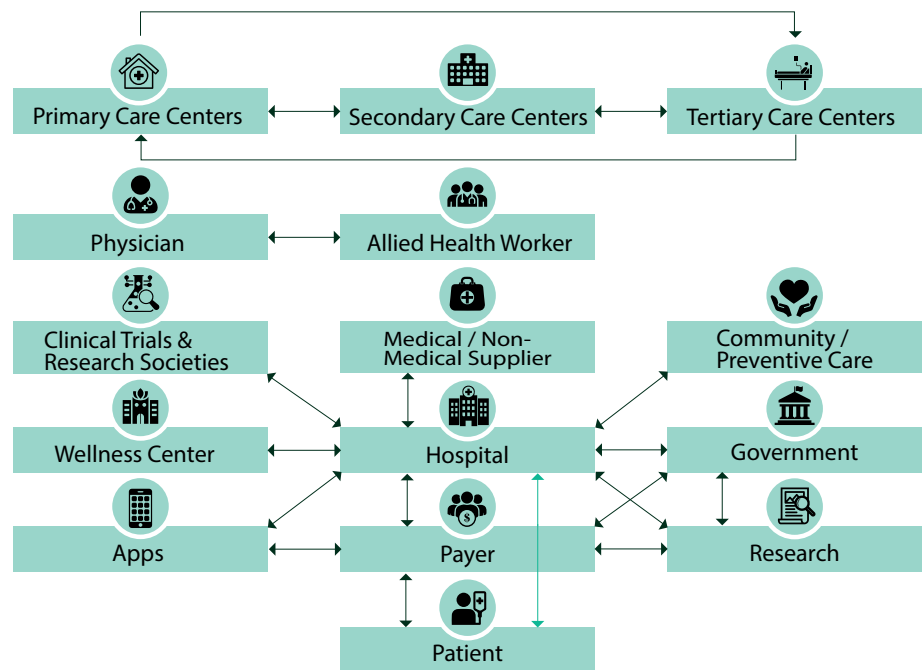
Observable

Observability comes into play when data for decision-making is visible. This is crucial for all the healthcare personnel and departments to function in synchronicity with each other. Data visibility should be provided both within and outside the hospital – to all those in the clinical and non-clinical networks to ensure the seamless delivery of care taking into consideration all the necessary factors for right decision-making.

On the clinical side:

In Phillip's case, the nurse and hospital had easy authorized access to his medical history. Additionally, the EMT had all the pertinent information on hand, even real-time data on vitals, which allowed the professional to provide effective treatment. Similarly, Phillip's endocrinologist, Dr. Arthur Curry, was able to confirm the diagnosis of DKA (despite gaps in Phillip's memory about his medical history) as he had access to his medical history and current admission events.

On the non-clinical side:

Phillip's transfer from emergency care to the ward went seamlessly because there was a constant stream of information being shared about inpatient metrics like bed utilization and availability, outpatient metrics like waiting times, and footfalls and lab order status.

All the data that gets collected from various stakeholders and departments – like TAT for radiology, pharmacy inventory status and equipment performance - that are connected, form a data lake containing observable and actionable information. Such a data lake can enhance and catalyze research by providing patient information without compromising on patient confidentiality and safety.

Sentient

At this stage, the hospital starts behaving more like a living organism. This is where the data captured by various connected elements in the enterprise gets interpreted meaningfully to predict the future and prepare for it. What makes this possible? Artificial intelligence (AI) models and algorithms, both on the clinical and non-clinical front. So, what does it mean when a hospital is sentient?

Continuing with the example of Phillip, we see that he received timely care from the paramedic and at the hospital. This was possible because St. Martha's Hospital used AI models and algorithms that helped perform event analysis with a reduced TAT. Alongside, these were used to perform risk assessments and offer possible diagnosis and clinical decision support to Phillip's care team at the hospital. When a hospital achieves sentience through technology, its readmission rates are lower and clinical outcomes are better.

On the clinical side:

Technology will play a crucial role in helping perform 'what-if' analysis to reveal the possible healthcare scenarios that a patient is going through. This can be a game-changer especially in scenarios where hospitals are unable to immediately connect a patient with a specialist and urgent treatment decisions are to be made. It can also predict disease progression, perform retrospective analysis of a case, predict possible patient response to a treatment plan before finalizing it, and predict emergent complications for chronic conditions. Additionally, it can analyze a patient's genome and indicate, based on comorbidities, whether a particular drug class will be effective.

On the non-clinical side:

It's extremely vital for hospital staff to be aware of non-clinical metrics like bed utilization and staff capacity per shift. It can help plan for contingencies like a large influx of patients. Knowledge about the performance of medical equipment and diagnostic packages for billing are also crucial. Social media analytics can help the enterprise stay in-the-know about conversations taking place about them on social platforms and tackle issues with the potential to escalate. Sentiment analysis goes a step further and analyses whether conversations have positive, negative or neutral undertones, through natural language processing and helps understand customer needs.

This way, with technology, a Live hospital connects stakeholders and provides observable data that will then offer relevant insights to make it sentient.

Alive

Next, a hospital becomes alive when it meaningfully utilizes the information and insights derived during the sentient stage. This characteristic of being alive applies primarily to all the clinical functions that take place within and without the hospital.

When Phillip's nurse called for an ambulance, the nearest one was assigned based on ambulance response time. The data being shared on the network that the assisted care facility and St. Martha's Hospital were connected to, was utilized to send the nearest ambulance. The emergency care room and lab too could transfer information seamlessly, which allowed providers to offer timely attention to Phillip. The treatment protocols and care plan were also a result of the hospital and its care team harnessing information and insights derived from the previous stages to offer a relevant solution.

Armed with insights, hospitals can update their SOPs, plan for the future based on medical trends, and establish protocols for disaster management. It also creates crucial connects between departments like surgical and histopathology. Consider this: a surgeon excises a patient's tumor and sends the sample to identify the presence or absence of markers to decide the best course of action on the table. The histopathology department must report back quickly. The surgeon can get the report in time only if the connect between the OT and the histopathology department is real-time and seamless. Such connections are critical even between OP/IP/ER and the laboratory and radiology departments.

Data made available as public health data can empower the system to prepare and plan for epidemics and pandemics effectively. Clinical decision support is also enabled through protocols for treatments, infection control and antibiotic prescription.

Agile

An agile hospital can easily adapt and stay flexible. Agility should be the hallmark of all non-clinical functions within and without a hospital that's a Live enterprise. To understand this better, let's revisit Phillip's example. While technology helped connect the ambulance, hospital, and care providers to ensure Phillip received the best care possible, agile AI proposes multiple options the players can handle the situation differently.

With agility comes the ability to offer patients personalized educational material based on their specific comorbidities etc. It also helps with roster management assigning staff skilled in dealing with Phillip's conditions to his healthcare team, to keep tabs on whether Philip, who suffers from memory loss, is following and maintaining his exercise regimen.

Agility allows hospitals to adapt to updated regulatory and clinical protocols, perform inventory management efficiently, trace hospital equipment by tagging with RFID, carry out roster and equipment servicing management, and ensure ADT management. Agility allows providers to offer fact-based patient decision support based on AI recommendations.

Hospitals can also use it to ensure real-time patient flow optimization, review non-clinical sentient data analysis and assess services and experiences offered by the competition. This will allow them to know what their patients are likely to look for (in a facility) or need (from equipment or technology).

Innovative

In a hospital setting, innovations are evaluated based on usefulness. And the recent years have brought a number of such innovations to the table in healthcare. Below are a few instances of valuable advances brought on by the intersection of healthcare and technology:

AI in Medicine:

- AI for clinical decision support
- AI for patient support
- AI for recommendations
- Updating protocols
- Robotic process automation (RPA)

Genomics and AI: In genome sequencing, ML helps calculate probabilities (i.e. the likelihood of a person getting a disease), while in DTC genomics, it gives practical information on aspects like the impact of a person's genes on weight gain.

Virtual Reality (VR) for Surgeries: VR is being used across several institutes to create life-like 3D models of patient organs and systems that surgeons and trainees can use to prepare for surgeries.

Remote Patient Monitoring (RPM) Devices: RPM tools enable care providers to monitor patient data even when they are outside the typical healthcare settings.

AI-Enabled Stethoscopes: They run on algorithms that can train systems to identify acoustic signatures that may be missed by the human ear.

3D Printing of Tissues/Grafts/Stents: 3D printing allows for the creation of exact replicas of patients' organs that can help surgeons plan a surgery or even develop prosthetics.

As for Phillip - who had the opportunity to be treated within an ecosystem that was a live enterprise - his care during his stay at the hospital and care plan for after he was discharged, took into consideration his specific needs. The ER doctors, the referred Endocrinologist along with the physiotherapist, the dietitian and the behavioral therapist assigned to his case as part of a holistic approach – all of them had access to pertinent information about Phillip and his medical conditions. It allowed them to customize his care plan. The connected and observable system that allowed for seamless information sharing among care team to create Phillip's personalized regimen was a result of a system that is sentient and alive.

Once he was back at his care center, Phillip's exercise regimen was monitored by a physiotherapist who has experience working with patients who have Alzheimer's syndrome. His behavioral therapist went on to use innovative visual stimuli-based technique leveraging AR and VR to help trigger and maintain his memory, while also enabling him to manage his condition effectively. Agility in the ecosystem allowed Sally, his daughter, to get all the relevant information on her father's condition, based on which she took the decision to move closer to Phillip's care center.

Together, all these factors have helped Phillip stay consistent with his medication, improve his memory, and feel healthier while also staying more connected with his daughter. As much as this is a win for Phillip, it is a significant victory for a healthcare ecosystem that is alive and sentient enough to meet the healthcare needs of its patient as wholly and completely as is possible.

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