



# Improving Healthcare in Three Dimensions

Health and Life Sciences

The delivery of healthcare has dramatically changed in the last decade. Through a combination of legislation, technology and reimbursement changes, the entire healthcare system has had to make fundamental shifts. These shifts can be seen in the way care is managed, delivered and, ultimately, the patient experience. However, there are immediate ways that providers can make concrete strides to improve patient engagement and outcomes, patient and asset management within facilities and IT system reliability.



Historically, one of the biggest challenges to treatment is providing the physician with a complete health picture. Physicians were forced to make treatment decisions with limited or partial data, largely based on self-reported symptoms or partial clinical records. To a large extent, that situation began to change with the mandate to implement an electronic medical records (EMR) solution. The solutions created additional burdens, to be sure, but they also created, for the first time, an ability to collect and maintain a complete patient record across providers.

EMR solutions from firms like Cerner, EPIC and others allow a disciplined, orderly, and potentially integrated, view of patient treatment. At the same time, consumer wearable devices have created unprecedented visibility into real-time patient behaviors. These devices, from companies like Microsoft, Fitbit, Jabra, Apple and Nike have capitalized on advances in miniaturized sensors to capture a variety of health indicators. Consumers and physicians can collect and aggregate basic activity levels, heart rate, skin temperature, external UV radiation and location using GPS technology. In addition, advances in diagnostic techniques allow smart phone users to capitalize on the high resolution cameras in these phones to, provide a low-cost way to bring retinal (or fundus) photography to more patients. Diseases like retinoblastoma can be directly detected using this method.

All combined, healthcare providers can, in a very real way, create better composite views of a patient health, track progress, and more accurately adjust treatment to improve health outcomes.

Another critical dimension of today's healthcare environment is better asset and patient tracking. Certainly in the context of skilled nursing and assisted living facilities, it's not practical or possible to have sufficient staff available to monitor all residents. Uniquely, these residents are also not often equipped to self-monitor and self-regulate their conditions or behaviors. Similar situations, for differing reasons, can be found in emergency rooms and more traditional hospital care settings. Simultaneously, current funding levels require effective and efficient distribution and management of "mobile" diagnostic and treatment assets, from the simple blood pressure cuffs to more expensive crash carts.

As a result, facilities need to rely on technology to supplement monitoring and management efforts. Pervasive technologies like passive RFID bracelets and low-energy Bluetooth "beacons" can provide effective and, in many cases, low cost mechanisms to better track asset and resident location, typical movement patterns and the ability, using movement pattern data, to predict capital investment needs and/or simply find a "lost" asset, avoiding potential duplicative investment in new equipment.

Finally, none of what has been highlighted can exist without the extensive use of technology. The pervasive and necessary integration of new technologies is a requirement, more today than any time in our history. Technology, as illustrated previously, allows more for cost effective diagnostics, supplements human staff and makes it possible to deliver clinical services in the context of today's regulatory, payment and skills context.

To that end, providers need a fool-proof mechanism to ensure the software and hardware that powers all of these advances remains operational and available. While virtually all providers have well documented disaster and business continuity plans, just as many have limited experience testing whether the plan is practical or meets service level goals. Moreover, most plans make a set of potentially flawed assumptions about available staff, fitness of alternative equipment or the state of the facilities to house recovery systems. For example, in a catastrophic situation, will the employees necessary to carry out critical recovery tasks be available to execute them? Is the alternate hardware configured properly to support your production environment? Is there enough capacity to run all systems should more than one system fail simultaneously? The answer, in many cases, is "unknown."

Meanwhile, advances in system management automation and cloud architectures can significantly reduce or eliminate many of these risks, while also providing a backup for your backup. This could include dynamic provisioning of a like-kind production environment to test, completely automate system workload movement to alternate data centers or replicating the production environment, temporarily, into a public/private cloud environment. All of this can be done, largely, without human intervention. Moreover, when using cloud architectures – public or private – capacity concerns should be completely mitigated.



In the end, while there are plenty of challenges that providers must overcome, there are also many, very real opportunities. This means providers should seek ways to combine both clinical and consumer-source health data to provide a better composite view of patient health. These tools and technologies are available today. Patient tracking can dramatically improve bed utilization in hospitals and resident tracking can vastly improve resident safety. Providers who implement effective asset tracking, using technologies like RFID or low-energy Bluetooth, will be better able to responsibly apply capital dollars against needed equipment acquisitions and better predict usage over time.

Finally, providers who take advantage of mature technology management and automation tools, can safely use newer cloud architectures and cloud service providers to ensure the technology necessary to provide care is available when needed, even if technology staff is unavailable during an interruption. The question now becomes, how to make this happen for your organization?

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