Unleashing Innovation
Tapping into the full potential of Information-driven Healthcare
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For more than a decade now, the global healthcare community has been engaged in sweeping transformation. Driven by necessity and enabled by technology, the promise of this transformation includes everything from revolutionary new systems of payment and care delivery like accountable care organizations to the potential of patient engagement through mobile devices and social media. And these optimistic outlooks have given healthcare professionals reason to believe that a new era of care is dawning; that the future of healthcare is within reach.

But on the ground, the process of actually achieving this future is hard work. Hospitals and care providers must first engage in thoughtful and careful planning around foundational technologies, the building blocks of healthcare IT, such as electronic health records and image-archiving systems. They need an intimate understanding of federal, state, and local healthcare regulations and policy. And they need sustained investment, ongoing maintenance, and the management of culture change throughout their organizations.

When mired in the world of basic healthcare IT blocking and tackling, it’s hard to feel like you’re making progress towards curing cancer. But the truth is, with every electronic health record we get one step closer to that future scenario. And when done right, this foundation of digitized, distributed medical information supports the entire healthcare ecosystem in exploring what is possible -- from exchanging and analyzing medical data for the development of new treatments to practicing truly preventive medicine by predicting and preempting disease.

“This is a dynamic time in the industry, and technology is opening the floodgates to a tidal wave of change,” says Dr. Andrew Litt, Chief Medical Officer at Dell. “Hospitals have more valuable data at their disposal than at any time in history, enabling them to understand their administrative and clinical operations like never before. By using this new insight, they can deliver better care at lower costs, which is really what we all want from our healthcare system.”
At Dell, we call this Information-driven Healthcare, an approach that leverages technology to inform and empower the institutions and individuals that provide care. We define Information-driven Healthcare by using this four-step framework:

### Build a future-ready infrastructure
IT systems should be capable of adapting to change, scaling, and achieving maximum efficiency.

### Unlock Information
Data must be free from the shackles of paper and from digital silos, with secure access when and where it is needed.

### Empower Caregivers
Caregivers need technology and process, including real-time clinical decision support and operational insight.

### Unleash Innovation
Strengthen cash flow, drive organizational improvement, and reallocate resources to improve patient care.

In this whitepaper, we will explore different aspects of **Unleashing Innovation**, a critical stage of the Information-driven Healthcare journey in which investments in technology and process yield significant returns in the form of efficiency and quality of care. These innovations can happen at the individual physician or hospital level, across an integrated healthcare delivery network, or even nationally or globally. They can focus on operational efficiency, clinical process improvement, or the discovery of new treatments for specific diseases like cancer or diabetes. And they can help transform the entire healthcare industry, by identifying effective treatments, and allowing providers, payers, and patients to collaborate in new ways. When built upon solid foundations of technology, process and people, the possibilities of the Unleashing Innovation stage are limited only by the imagination of the institutions pursuing it.
Unleashing Innovation

Unleashing innovation, broadly defined, is anything a hospital can do that falls outside the basics of healthcare IT. In our whitepapers on Unlocking Information and Empowering Caregivers, we explored some of those basics, learning how hospitals are seeing major cost and care benefits from digitizing information, and redesigning the culture, processes and workflows around delivering care.

These are critical first steps in supporting healthcare innovation for three reasons: 1.) they create the digital infrastructure necessary to combine, analyze, and extract insight from the trove of medical data being produced around the world; 2.) they serve that information up to caregivers at the point of care, and 3.) they free up resources – IT and otherwise – so that hospitals can focus their efforts on more strategic goals.

There are dozens of technologies that lay this groundwork, and hospitals across the globe are employing them in various ways. For example, the adoption of electronic health records is soaring, enabling the sharing of information within and between hospitals and physician offices. The virtualization of healthcare IT infrastructure and use of the cloud is greatly simplifying the management of technology in large and small hospital settings, and allowing clinical data to be truly mobile, available to physicians and patients wherever they need it. And advances in patient data security, telehealth, and the use of social media are all contributing to safer, more efficient, and more effective practices in the continuum of care.

With technology enablement like this, it’s easy to see how hospitals can turn their attention to higher aims, analyzing the efficiency of their own operations, or collaborating with other care providers to effect change throughout the industry. It is at this stage that the visions of personalized medicine, preventive care, and collaborative research become realities.

“Our job is to make technology work for our patients and our caregivers,” says Jeff Pelot, Chief Information Officer at Denver Health, an integrated health system that provides care to one third of the population of Denver, Colorado. “We want it to work in the background, always available to them, so that we can deliver more efficient and effective care. Once we have that in place, we start pushing the boundaries on what is possible.”
At Denver Health, “working in the background” is a system of more than 3 million comprehensive electronic health records, available to caregivers throughout the network, ensuring proper care and the elimination of duplicate tests. And “pushing the boundaries” means committing to a culture of public health and prevention. Denver Health is a “safety net” hospital, providing level one care to 150,000 patients, regardless of their ability to pay. Many of those patients are uninsured, so reducing readmissions and preventing acute care are high priorities for this provider.

“The idea is to keep them out of the hospital,” says Pelot. “This is real preventative care. It’s better for our patients’ health, and it’s helping us to keep our costs down.”

Denver Health uses information technology to do this in a number of ways. For example, the hospital created a vaccination tracking system called VaxTrax, which uses EHRs to keep tabs on vaccination schedules for every patient in the system, reminding patients and providers when it’s time for a vaccination, and improving Denver area vaccination rates from 60 percent to 90 percent. Better vaccination rates means fewer emergency illnesses, improved public health and reduced costs at Denver Health.

Another example is the chronic disease registry that Denver Health uses to monitor and manage patients with conditions like asthma and diabetes. The registry is designed primarily to engage patients in the management of their own disease, and increase adherence to care guidelines. It does this by using analytics to first identify potential candidates of chronic disease. Once the patients are diagnosed, the system generates and sends personalized report cards the patients’ home every quarter. And between visits, the registry can automatically send texts to encourage patients to tend to their condition and remind them to take their medicine regularly.

Better data, better outcomes

There is a belief throughout the healthcare industry that efficient care is better care, for both the provider and the patient. That has certainly been the case at Intermountain Healthcare, an integrated medical delivery system based in Salt Lake City, Utah, which has unleashed a torrent of analytical data to improve its operations and care delivery.

Intermountain consists of 22 hospitals, 185 physician clinics, and more than 33,000 employees. The organization set out nearly twenty years ago to use data analytics to better understand a wide variety of clinical areas, and manage variation among specific clinical processes. The initiative consisted of four key steps: 1.) identify key care processes to be analyzed; 2.) develop information systems that can manage integrated clinical and financial data; 3.) activate the data to encourage accountability and change; and 4.) align incentives to reduce costs and improve care.
Among the first departments to implement this approach was the maternity department, which delivers more than 30,000 babies a year. By collecting and analyzing electively induced labor data from its EHR system, Intermountain learned that nearly 28 percent of inductions occurred before the baby reached a gestational age of 39 weeks. This would happen for a variety of reasons, but often it was the patient that requested the early induction, for reasons of convenience. In reviewing the data, Intermountain also learned that early inductions were more likely to lead to complications during birth, including cesarean deliveries and admission of the infant to the neonatal intensive care unit.

To address this, Intermountain adapted and enforced an existing protocol that prohibits early induction for pregnancies unless medically necessary. It did this by implementing an electronic alert system that notifies labor and delivery nurses when a patient requests early induction but does not meet the medical requirements. The program has produced dramatic results. Early inductions have dropped from 28 percent to less than 2 percent of all inductions. And the rates of C-sections and newborn complications went down, and Apgar scores went up. It is estimated that this simple change in clinical process is saving millions a year in healthcare costs in Utah.

**Taking aim at pediatric cancer**

As Intermountain demonstrates, the power of aggregating and analyzing data that hospitals already have can yield massive cost savings and better patient outcomes. But that is just one health network working with a limited data set. What would happen if hospitals, researchers, and scientists around the world could combine data, pool computing power, and collaborate to tackle the world’s most complex and deadly diseases?

The short answer is: personalized medicine. In the last ten years, advances in high-performance computing and the adoption of cloud technology have combined to rapidly accelerate the shared analysis of genomic data. And the “big data” that lay behind these solutions are yielding life-saving insights.

The Translational Genomics Research Institute (TGen) is a non-profit, biomedical research institute that is dedicated to applying innovations from the Human Genome Project to the diagnosis and treatment of cancer, neurological disorders, and other complex diseases. In one such effort, TGen is working to improve the treatment of neuroblastoma, a deadly form of pediatric cancer. There has only been one new treatment for pediatric cancer approved by the FDA since the 1980s, compared to 50 new treatments for adults. As a result, pediatric oncologists often prescribe adult treatments for kids, which can have uncertain results and toxic side effects.

To change this, TGen is working to analyze the genetic makeup of the neuroblastoma tumors themselves, identifying their specific vulnerabilities, and tailoring treatments

TGen uses a private cloud-based, high-performance computing solution from Dell that accelerates genetic analysis, and exchanges data with key collaborators. The result is precision medicine, reducing the time between diagnosis and treatment from months to days.
that will attack the tumors, but leave children’s healthy cells untouched. They do this by comparing the genetic makeup of a tumor against a vast database of others from around the world, and identifying specific treatments that are known to be effective against genetically similar tumors. But this process involves the generation and analysis of massive data sets. And all of this information must be shared with dozens of other researchers and clinicians in far-flung locations. So TGen uses a private cloud-based, high-performance computing solution from Dell that accelerates genetic analysis, and exchanges data with key collaborators. The result is precision medicine, reducing the time between diagnosis and treatment from months to days.

“We need to get a meaningful result in a clinically relevant amount of time. So if we can take something that used to take days, and reduce it to hours, that’s literally the difference between life and death.”

— Jason Corneveaux, a bioinformatician in the Neurogenomics Division of TGen

The TGen clinical knowledge network analyzes the genetic makeup of neuroblastoma tumors. It then compares that DNA against a vast database of similar tumors, quickly determining the most effective course of treatment.
Endless innovation

Transforming an industry is not easy, regardless of how urgent the need. The foundational work being done by providers to digitize health records, redesign workflows, and change workplace cultures can be arduous and expensive. But it is beginning to pay off, both individually and in the aggregate.

“We believe healthcare IT is a powerful catalyst in the transformation of this industry,” says Jamie Coffin, Ph.D, vice president and general manager of Dell Healthcare and Life Sciences. “It’s playing more than just a support role, more than just cost savings. It’s opening up entirely new possibilities for the delivery of care.”

As pioneers like Denver Health, Intermountain, and TGen demonstrate, the future of healthcare is beginning to take shape. And it is based on one of the most valuable medical resources in history: data. Whether hospitals choose to analyze their financial operations to find savings, refine clinical processes to improve care, or collaborate with experts from around the world to cure disease, they are using data to improve the healthcare ecosystem, one hospital at a time. And the benefits of these collective actions accrue at the level of all society.

We encourage you to share this whitepaper – and the companion pieces on Unlocking Information and Empowering Caregivers – with others in your field. And share your stories of Information-driven Healthcare with us on Twitter by following and engaging with @DellHealth using the hashtag #DoMoreHIT.

See how Dell’s integrated solutions create Information-driven Healthcare to improve patient care, enhance efficiency and reduce costs at dell.com/discoverhealthcareIT

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