DIGITAL TRANSFORMATION IN HEALTHCARE: IMAGINED INNOVATIONS BECOMING REALITY
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Introduction

The futuristic healthcare technology in the Star Trek movies and television series was fascinating for its time: tricorders, biobeds, and virtual physicians to name a few. All of which were tied together by the patient’s medical record, which was self-containing and electronically accessible.

A number of the technologies that seemed so fantastic and out-of-reach when first imagined in Star Trek are in use today in various forms. For example, wearable monitors, telehealth physician services, and electronic health records (EHRs) all exist in today’s healthcare landscape.

The data is there, too. Whether it is in a longitudinal health record that captures a patient’s medical history across different sites of care, a registry of patients with specific conditions, or data pulled from social media sources, healthcare organizations are collecting vast amounts of information.

As a result, a number of technological innovations are gaining traction and will continue to digitally transform healthcare—moving the industry ever closer to the futuristic medical care that was once considered mere science fiction. In this eGuide, we’ll take a closer look at the incredible advances, made possible by data and technology, that are now at our doorsteps.
ARTIFICIAL INTELLIGENCE & PATIENT CARE ENHANCEMENT

The volume of data acquired by healthcare organizations is growing exponentially. Big data—the term used to describe this massive collection of information—offers unprecedented opportunities for insight, but also unprecedented challenges as its sheer volume, variety, and velocity make it difficult to manage and analyze.

Defined as an area of computer science that emphasizes the creation of intelligent machines that work and react like humans, artificial intelligence (AI) may be the answer to some of healthcare’s big data challenges. Initial uses of AI in healthcare have focused on individual diseases or small subsets of patient populations, but its future applications are huge as the industry increasingly relies on it to parse data coming from large patient populations. For example, more recent advances in AI build predictive models and make real-time inferences from large patient populations for purposes that include sounding alerts, identifying high risk situations, and predicting lengths of stay.

The combination of big data, natural language processing, algorithms that do not rely on predefined assumptions, and AI offer unlimited opportunities to accurately diagnose and treat patients, and to improve care practices.

1 Techopedia, Definition – What does Artificial Intelligence (AI) mean?
2 Daniel B. Neill, IEEE Intelligent Systems, Using Artificial Intelligence to Improve Hospital Inpatient Care, April 2013
Predictive analytics is not a new concept; it has been used across many industries for a variety of interesting purposes such as determining loan eligibility, forecasting potential sales, or projecting life expectancy for insurance customers.

Until recently, predictive analytics had limited effectiveness in the healthcare industry due to limited access to patient data. However, the widespread adoption of electronic health records (EHRs), coupled with vigorous efforts to connect disparate sources of information, has now opened new opportunities for the use of predictive analytics in healthcare.

Predictive models that take into account a patient's entire healthcare history in order to evaluate potential diagnoses and outcomes can dramatically streamline physicians' decision-making. Focus is on patient-specific diagnoses rather than applying the same risk factors to all patients, which helps to ensure that high-cost therapies are targeted to high-risk individuals.

For example, Kaiser Permanente of Northern California used predictive analytics to reduce overuse of antibiotics in newborns, 11 percent of which were receiving antibiotics, although less than 0.05 percent were ultimately confirmed to have infections.¹ Similarly, Orlando Health used predictive analytics for early identification and intervention of 70 percent of all sepsis occurrences resulting from hospitalization, dramatically reducing its readmission rates.²

¹Kaiser Permanente, PEDIATRICS Volume 133, Number 1, January 2014
²Brian Zimmerman, Becker's Hospital Review, How Orlando Health deploys predictive analytics to fight sepsis, February 2017
INTERNET OF THINGS & PATIENT ENGAGEMENT

Just as technology is allowing hospitals and physicians to collect more medical data on patients, consumers too are taking advantage of new technologies such as the cloud and the Internet of Things (IoT) to engage with their health. Tracking apps and wearables, for example, allow consumers to easily collect information about their lifestyle behaviors, weight, diet, blood pressure, heart rate, and exercise patterns.

When patients share this data with their healthcare providers through cloud portals that connect to their own digital health records, clinicians have a more holistic view of patient health, leading to more productive conversations, improved adherence to care plans, and increased patient involvement.

The future looks exceedingly bright in this area of patient engagement. Studies show that there are more than 165,000 mobile health apps available in the marketplace\(^5\) and that more than 50 percent of smart phone users will have downloaded these types of apps by 2017\(^6\).

SOCIAL MEDIA & HEALTHCARE MARKETING

Consumers are connected by technology to a wide array of online information about providers, services, health advice, and costs of care. In fact, one survey estimates that 40 percent of consumers browse the web and 23 percent use social media to share and gather health information\(^7\).

Data mined from social media sites can help healthcare providers identify areas of dissatisfaction with products or services, opportunities for new programs to address community needs, and inform development of marketing strategies.

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\(^5\)IMS Institute for Healthcare Informatics, Patient Adoption of mHealth, September 2015
\(^6\)GreatCall, Is Mobile Healthcare the Future?, August 2013
\(^7\)Deloitte, Health care consumer engagement: No “one-size-fits-all” approach, February 2015
Although the possibilities are limitless as artificial intelligence, predictive analytics, mobile health, and wearable technology become more sophisticated, the healthcare industry faces some unique interoperability challenges.

Healthcare technology has trickled in over several decades, with each hospital, practice, and often even individual departments introducing systems that have no awareness of other data collection and management operations—and no interoperability between them. Similarly, acquisitions and mergers throughout the healthcare ecosystem have led to mixtures of systems that cannot share data.

Healthcare organizations that would like to make the most of the wealth of new data sources and technologies available to them will need to significantly boost their integration and data management operations to ensure that quality, timely, and consolidated data is the foundation of their digital transformation efforts.

It’s impossible to predict the next technological advancements shaping healthcare’s digital transformation. However, organizations can take steps now to build an infrastructure capable of supporting interoperability among existing and new technologies, and to ensure continued access to actionable insights that improve outcomes, lower costs, and inform strategic decisions.
About Liaison Technologies

As a leader in cloud-based integration and data management solutions, Liaison helps businesses overcome today’s toughest data challenges while building a robust foundation from which to tackle tomorrow’s. From complex integration to data management to big data, our secure ALLOY™ Platform for Healthcare breaks down data silos, reduces inefficiencies, and uncovers actionable insights. Founded in 2000, Liaison serves more than 7,000 customers in 46 countries with offices in the United States, Finland, the Netherlands, Singapore, Sweden and the United Kingdom.