Chapter 16
Technology in Healthcare:
Vision of Smart Hospitals

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ABSTRACT

Healthcare is one of the significant areas of development where the hospitals are turning to innovative models built around advanced medical technologies like electronic health, tele-medicine, and mobile health. Healthcare sector is revolving around big data sets and huge amount of unstructured information produced from these high-tech devices and tools. But the technologies like machine language, big data, and artificial intelligence are turning them to a data-intensive science. The data is used for analysis by medical researchers which in turn is becoming solution for many healthcare challenges like early diagnosis, quality care, portable healthcare, cost- and time-effective treatments, and many more. Therefore, the hospitals are turning to smart hospitals to strengthen their existence in tomorrow's challenging medical service market. This chapter discusses the technology contribution in healthcare, challenges in future, future healthcare and cost model, and challenges for insurance companies.

INTRODUCTION

The Health care is one of the most important development areas in a country which requires efforts and attention in transition to an innovative technological model based on the high-tech medicine methods and advanced digital technologies. Over the past years, hospitals are extending their sizes and services to meet the needs of the rising demands of the community. The change in the patient expectations and advances in the technology has led to a new direction towards the hospital structures. They are on a new road of consumer- oriented healthcare services.

Technology has already pervaded the healthcare with technologies like electronic health records (EHR); Tele medicine; Mobile Health applications (m-health) and 3D printing (Y. Yin et al. 2016). These technologies where on one side provide the services which attract the consumers/patients but on the other side produces a huge amount of complex data sets and unstructured information. Further, it

is adding challenges for the hospitals like development challenges, cost and re-imbursement models, connectivity, scalability and resistance by providers in adopting the new models. These challenges are imposing questions on the best usage of the technology by developing a cost-effective care for everyone. These challenges are not only for providers and consumers but for the hospital designers also. With the rising use of technologies like m- Health, Tele medicine and virtual physicians, is there really a need of physical buildings? Or should the hospitals be virtual hospitals? If there is a capability of remote sensing and presence of medical data in cloud, patients are not required to come to hospitals for monitoring. The consultations will take place over the internet. The diagnosis can be done through virtual doctors. Prescriptions can be done through tele medicine. We will have robot doctors in the hospitals with space age machines where even the surgeries will be carried out at home. This disruptive shift will affect the complete nature and meaning of hospitals. How the care will be delivered to the patient? What will be the look of hospitals in future? The transition to the Smart or Virtual Hospital will be the need of medical services market.

With small and fewer infrastructures of hospitals, the overall cost will be reduced which will affect not only the consumers and doctors but also the insurance companies. There will be a drastic shift in the premiums of insurance and the healthcare companies will be more focused on Care and preventive healthcare services. Like with EHR, prediction of chronic diseases will be much easier and better health plans will be recommended to the members. Need for the preferred provider network and fee-for-service model will be eliminated.

This article discusses about the two sides of the advancing digital tech in the healthcare. It also highlights on the changing requirements, changes in the healthcare cost and insurance models and the various challenges for the healthcare and insurance companies. How the future hospitals will look like and what will be the changes to the providers and members with the new cost and insurance models, will also be discussed in this article.

HEALTH CARE TRANSFORMATION FACTORS: A SURVEY

There are various transformations factors in Health care sector which are changing the shape of the whole industry and re-shaping per the demands and needs of the patients and customers. As per the market trends and Transparent Market Research, the forecast is that telehealth global market will reach US$19.5 billion by 2025 (Market Research 2018). That is an estimated CAGR (compound annual growth rate) of 13% from US$6 billion in 2016 (Market Research 2018).

Among the top priorities of health care systems are reducing the length of stay and re-admission rates. Continuous efforts towards these goals are important with the rise in value- based re-imbursement schemes. Future health care systems will highlight telehealth and outpatient care which would be the key enablers of the systems. A telehealth program launched at Frederick Memorial Hospital in 2016 for patients with high risk chronic conditions, such as chronic heart failure, has already shown encouraging results (Wicklund E. 2019). Emergency room visits have so far been cut by half, hospitalizations have been reduced by almost 90%, and the cost of care for these patients has been cut by more than 50% (Wicklund E. 2019).

Per the study of Definitive Health in 2017, as estimated 70% of patients already use a telemedicine service (Inpatient Telemedicine Study 2017). Now a days, the patients are equipped with modern tools and self-help oriented that they don't find any value in personally visiting the doctor just to share minor

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