



Smart Healthcare

Extending the Horizon of
Healthcare with Stretchable
Electronics



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“
- healthcare costs down;
- life quality;
- patient's satisfaction; ”



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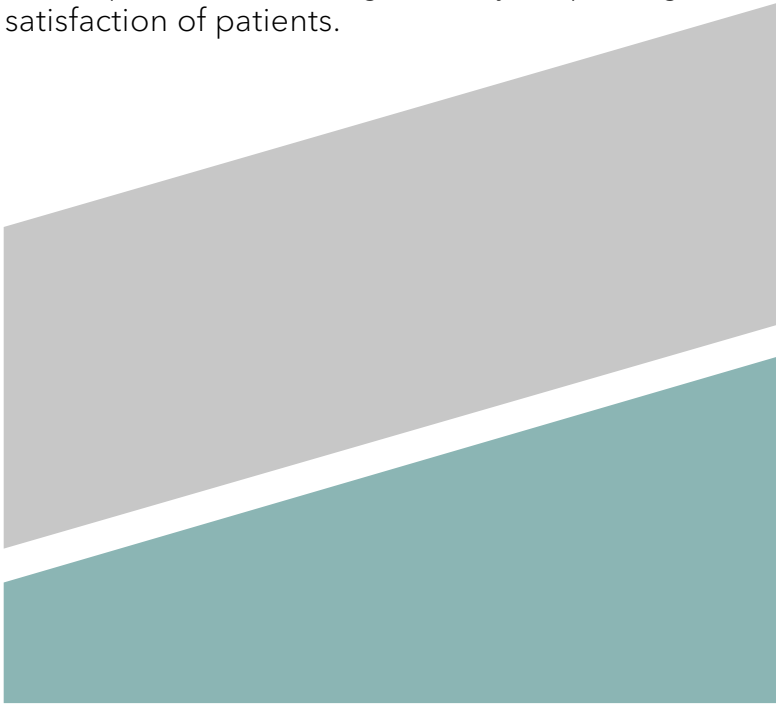


Introduction

Healthcare has undergone significant change since the beginning of the century with the introduction of modern and technologically advanced systems for use in hospital settings aimed at better care and treatment of patients. However, with the increase in healthcare cost and increased awareness of individuals about their own body, government and the public are gradually shifting from curative healthcare to preventive one. Implementation of modern digital technologies combined with conformal devices is envisaged to bring healthcare costs down without compromising on healthcare, and life quality, and satisfaction of patients. [1]

With increase in healthcare coverage, there is rise in the influx of patients to the hospitals. On the other hand, the shift in healthcare to value-based care or accountable care has increased the strain on the hospital and its staff without proportionate increase in revenue.

The growth in the number of patients without any comparable rise in revenue is a major challenge to deal with in the efficient operation of hospitals without significantly impacting satisfaction of patients.



1. Care Innovations. (n.d.). What Are the Benefits of Remote Patient Monitoring (RPM) for Patients?

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These challenges entail the adoption of digitally enabled stretchable electronic devices. These devices offer capabilities that were impossible by conventional medical devices. Some of the advantages include:

- » Satisfaction of patients due to less inconvenience caused by stretchable devices
- » Better quality of diagnostic data due to conformance to body
- » Real time monitoring of patients thanks to their light weight and adherence to patients' body
- » Less patients visit to hospitals freeing up physicians time for attending to serious issues
- » Decreasing the need for hospital resources owing to reduction in patients [2]

Uninsured Rate: 2008 to 2018

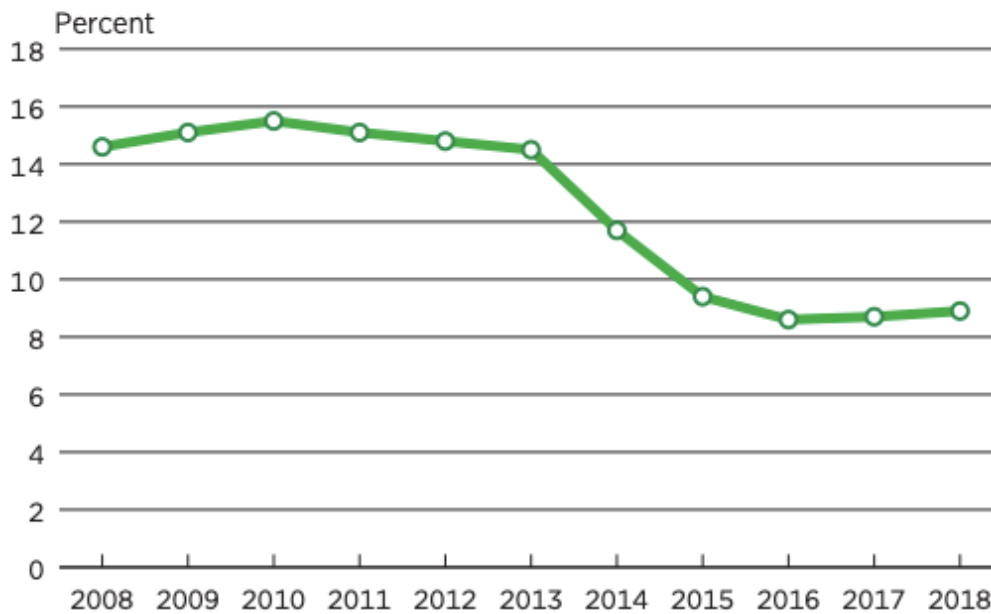


Figure 1 | Proportion of uninsured population in the US. Dylan Scott. (2019). The uninsured rate had been steadily declining for a decade. But now it's rising again. Vox. [3]

In addition, these devices enable proactive identification of health issues and prevent diseases ensuring better health of individual and better patient doctor relationship.

2. Shailendra Sinhasane. (2018). Remote Patient Monitoring: Benefits, Challenges, and Applications. Mobisoft Infotech.

3. Dylan Scott. (2019). The uninsured rate had been steadily declining for a decade. But now it's rising again. Vox

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Top 5 Challenges for Adopting Stretchable Electronics in Healthcare

Healthcare sector face certain challenges in adopting Stretchable Electronics. These include:

1. Cost: Healthcare payment across much of the developed world is dominated by insurance companies and world over, insurance companies are keen on reducing expenses due to the burgeoning healthcare costs. In addition to complying with the requirements of medical device regulatory agencies such as the Food and Drug Administration (USFDA) or the China Food and Drug Administration (CFDA), devices has to get approval of insurance companies to be available for reimbursement. The insurance companies have set very high standards for acceptance of medical device for reimbursement.

Moreover, the introduction of new regulations, such as The Affordable Care Act in the US has transitioned the reimbursement model from volume-based to value-based resulting in the need for medical device manufacturers to provide evidence of positive outcomes and increased real-world value of newer devices over existing devices. This is a significant challenge for the introduction of new and innovative stretchable medical devices at affordable cost.



Introduction

Section 1

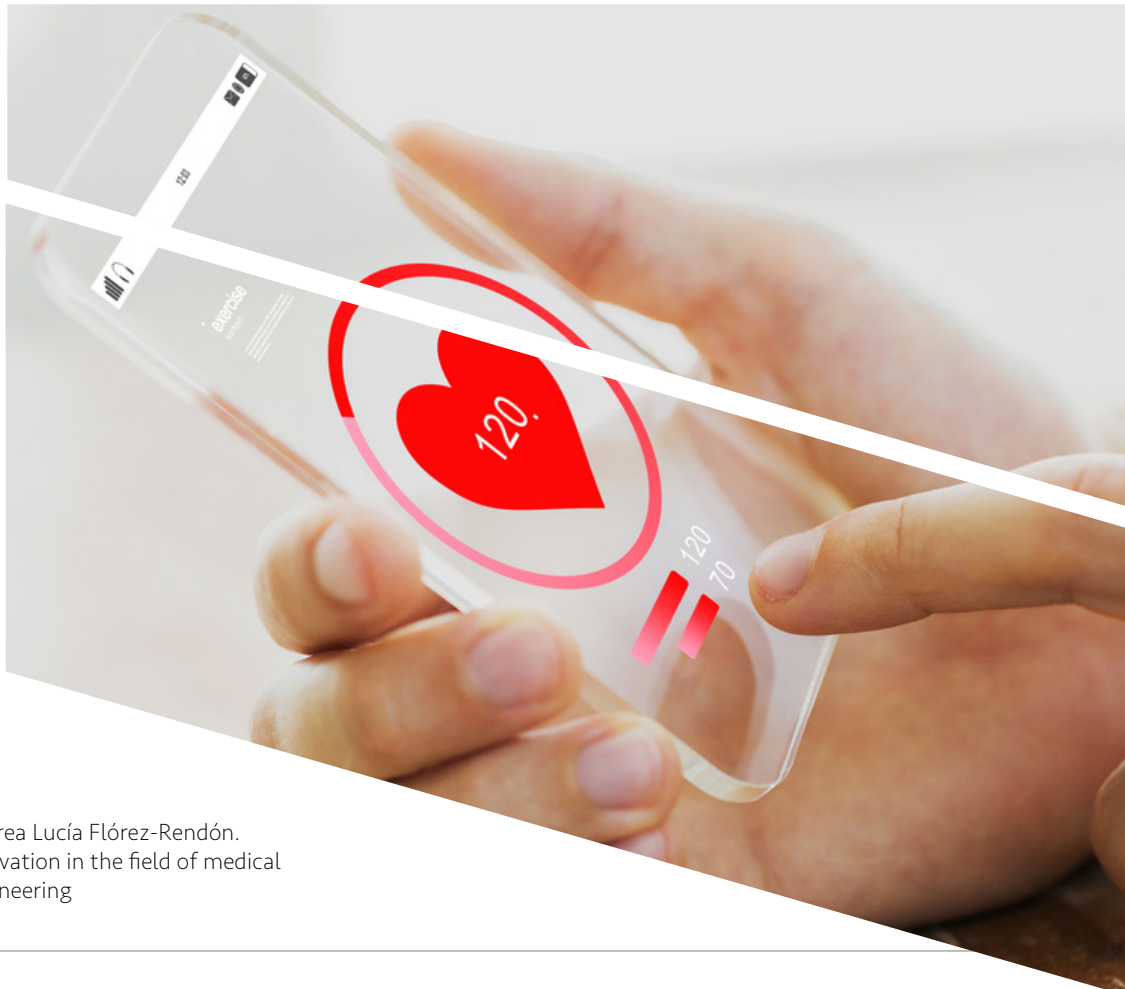
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2. Regulation: The speed of development of Assay Validation Methods for medical devices (Comprehensive experiments that evaluate and document the quantitative performance of an assay, including sensitivity, specificity, accuracy, precision, detection limit, range and limits of quantitation. Full Assay Validation will include inter-assay and inter-laboratory assessment of assay repeatability and robustness.) and the associated regulatory system for innovative medical devices is slower compared to the rapid advancement in academic and industrial research. As more than 98 percent of devices presented for FDA approval are based on incremental changes to the established products, there is very little or slow development in the improvement of regulatory mechanism for new products. Furthermore, the tightening of the regulations related to clinical trials owing to the increase in number of product recalls has pushed the cost of corporate compliance 3-5 times in the past 10 years. [4] [5] [6]



4. Rosa Mayelin Guerra Bretaña, Andrea Lucía Flórez-Rendón. (2018). Impact of regulations on innovation in the field of medical devices. Research on Biomedical Engineering

5. Patricia Kontoudis. (2019). The Impact of U.S. Regulation on Medical Device Innovation. ODT Mag.

6. Robert Mandle . (n.d.). Assay Validation Methods - Definitions and Terms.

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