

Emerging technologies in patient monitoring

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Emerging Technologies in Patient Monitoring

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Introduction

The healthcare systems in the developed countries are changing rapidly. This is driven by socio-economic developments related to the aging population, the aggravating healthcare costs and the expected shortage of medical staff. These challenges might be – partially – addressed by more autonomous and intelligent patient monitoring with a trend to extend monitoring to lower acuity settings in hospitals or even at home. Currently technology options become available for patient monitoring and more integrated in our daily-lives, which have been originally developed for the consumer market such as miniaturized cameras, smart phones and tablet PC. This opens a wide range of opportunities for personal care, optimised privacy, comfort and family bonding.

Methods

A comprehensive overview of new and up-coming technologies for patient monitoring will be discussed and example applications introduced. New options include wearable wireless on-body sensors for continuous monitoring e.g. of mobile patients in general ward, sensors for contactless measurements in ICU or at home as well as new user interfaces e.g. via tablet PCs or SmartPhones. Impact on design aspects of a camera-solution for vital-sign monitoring has been analyzed in more detail based on user-confrontation tests conducted in ICU, medium care and general wards.

Results

New sensor technologies initially developed for consumer applications offer attractive opportunities in patient monitoring. Patients could be monitored more continuously to track progress during recovery, detect critical events earlier or enable the documentation of patient care. However, in parallel these technical advancements will have strong impact on established work-flows, alarm generation / alarm management, need for context-sensitive automated data interpretation as well as legal and ethical aspects. A careful and holistic consideration of underlying unmet needs in a specific use-case requires the involvement of all stakeholders from the very beginning.

Conclusion

New monitoring technologies can help towards more efficient and effective monitoring of patients in particular in lower acuity settings. Medical technology innovation is a complex process, in which industry, academia, clinical institutions and regulatory bodies have to act closely together.