Chapter 13
Remote Elderly Health Monitoring System Using Cloud–Based WBANs

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ABSTRACT
Monitoring the physical condition of patients is a major errand for specialists. The development of wireless remote elderly patient monitoring system has been intensive in the past. RPM (remote patient monitoring) is reliant on the person’s inspiration to deal with their wellbeing. The flow of patient data requires a group of medicinal services suppliers to deal with the information. RPM sending is reliant on a wireless telecommunication infrastructure, which may not be accessible/practical in provincial territories. Patients’ data are shared as service on cloud in hospitals. Therefore, in the current research, a new approach of cloud-based wireless remote patient monitoring system during emergency is proposed as a model to monitor the critical health data. The vital parameters are measured and transmitted. In this chapter, the authors present an extensive review of the significant technologies associated with wireless patient monitoring using wireless sensor networks and cloud.

INTRODUCTION
Remote and rural areas with significant elderly population have challenges getting appropriate and timely care during emergency and critical care as health services in rural and remote areas are very different from the city. Significant progress has been made in RPM which helps the situation with the required data. However, the main challenge is the access and connectivity to the relevant patient data at the point

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of care in timely manner appropriate to the care parameters. While the patient’s clinical history would be available in a particular location, the point of care would be having data which would be required to be presented for drawing relevant expertise from a different location.

During an emergency care requirement, the patient may not be near a location with appropriate connectivity to facilitate reliable RPM, effectively, denying expert care to the patient. In the event that the emergency physician, utilizing sensible judgment, communicates concern about a patient’s fast approaching risk of harm to him/herself, the patient ought to be taken for appraisal and treatment. Considering necessary paramedical skill available locally, the remote point of care should be capable of initiating vital RPM with limited energy and bandwidth resources to allow for early-on monitoring until the patient is taken to a care point that allows for a more intensive care. The mode of care could be either in-situ or by tele-medicine or by a combination of both.

John Knight & Yamni Nigam, (2008) states that with increasing age, elderly people experience various anatomical and physiological changes. These changes bring many emotional, behavioral and attitudinal changes in them. As a result, they suffer different physiological problems such as loss of strength and resistance, which turn into more perceptive as they grow older. These conditions further complicate the care requirement multiple fold and will require vast knowledge base to be taken into account before administering care.

Various studies are being conducted in the areas of RPM, Wireless Body Area Networks, QoS in WBAN, Care Scenarios in emergency care, Machine to Machine(M2M) and Cloud Computing as an attempt to improve the quality of care in the above situation.

**SCOPE**

While the study involves various aspects of the care scenario, this chapter presents the WBAN options available currently, Cloud Computing platforms that enable M2M interaction and also interaction with different health-care and medical information systems in the health-care ecosystem to enable effective RPM and relevant care delivery and aspects in possible emergency care scenarios that necessitate data availability.

**Cloud Computing for Patient Monitoring**

Cloud computing is characterized as the arrival of computing administrations—servers, stockpiling, databases, organizing, software, examination and the web (“the cloud”). Corporate contributing these computing administrations are called cloud suppliers and normally charge for cloud computing administrations in light of use, like charging for water or power at home.

Cloud Computing provides the following solution choices that can be mashed-up based on relevancy with care scenario that is being addressed. This also empowers the care community to take learned decision relevant to the situation ensuring timely delivery of the care, enabling them in the process to identify and provide quality personalized care. They are monitored via Software-as-a-Service Applications and Platform and Cloud Based M2M and IoT Platform.