# Common Open Telemedicine Hub and Interface Standard Recommendation

**Ábel Garai, István Péntek**

The presented paper demonstrates the gaps of health systems interoperability with solution recommendation. This article shows the conclusions of the research on clinical integration of eHealth smart device technology. The aim is to establish the empirical basis for the general IoT-Clinical Systems interconnection. The emerging sensor-based smart devices collect bulk data. The technical solutions for building a bridge between the classical clinical information systems and the eHealth smart devices is still missing. Sensor-based smart devices collect and transmit continuous data series. Clinical information systems transmit and store static data with reference to patients. The data representation, structure, methodic and rationale is different by the hospital information systems and by the eHealth smart devices. Present IoT trends show that within a decade multi-billion smart devices will be communication continuously multilaterally. The issue of interoperability among clinical systems and eHealth smart device technology is unresolved. There is a need for the flawless technical and methodical interoperability among the classical clinical information systems, the industrial telemedicine instruments and the eHealth smart appliances. For the study a hospital information system installed in sixty hospitals within Europe and serving around forty thousand users was analyzed. Furthermore, a medical spirometer was installed and connected through HL7-based interface to the hospital information system. A heart rate monitor smart device was also procured for the research. There are international standards and recommendations for clinical systems interoperability. However, the integration and unification of these standards and recommendations is an issue to be solved. Furthermore the interconnection of the eHealth smart devices with the classical hospital information system landscape is a significant challenge. As the eHealth smart device users number will reach billions within the near future, the collected healthcare information have remarkable value. Recent big data analytical capacities combined with the incoming volumes of personal health data open new horizons of forecasting both at personal and at community level, including epidemic control. The bandwidth capacity of one GSM network was also analyzed in order to serve as an empirical basis whether the telecommunicational infrastructure is prepared for the challenges posed by the massive data-exchange of the IoT. In this paper the leading international clinical interoperability standards, inter alia Snomed and HL7 are analyzed and demonstrated. The challenges blocking the proliferation of the HL7 v3 standard is also presented within this paper. The research takes place at the Department of Pulmonology of a Pediatric Clinic. A spirometer is connected to the clinical information system during the presented research. The clinical information system is accessed with tablets through local clinical wlan by the medical staff. The research demonstrates, how the mobile spirometer and the also mobile clinical information system GUI works together, enabling further application areas of this system and architectural landscape, like in mobile ambulance or deployment in remote or rural areas. The presented paper demonstrates the different HL7 v2.x and HL7 v3 standards. Notwithstanding that the latest HL7 v3 standard has a wider capacity range, the HL7 v2.x standard is going to dominate the interoperability platforms among the clinical information systems. Beside clinical systems operability, as mentioned earlier, the integration of the eHealth smart device technology within the classical medical system landscape is highly desirable. Therefore the Common Open Telemedicine Interoperability Hub and interface standard recommendation is presented within this paper. The Common Open Telemedicine Interoperability Hub (COTIH) establishes the link for valid information exchange among the classical medical systems, industrial telemedicine instrument, eHealth smart devices and adaptive health-services. The COTIH relies upon the basis of the international HL7 standard, and with thorough extension it provides with interconnection capabilities

reaching the eHealth smart devices. The paper presents the interoperability modalities concretizing the contextual background. The cloud architecture lies underneath the COTIH. The cloud architecture brings significant benefits, however leads to legal obstacles, issues of confidence and of personal perceptions. The article concludes that notwithstanding that the COTIH enables stable semantic interoperability between the classical medical information systems and the eHealth smart device technology, there is further room for improvement regarding process interoperability, which is also necessary for the flawless multilateral communication of health-related systems and appliances.

## Acknowledgements

This work was supported by Attila Adamkó, Department of Information Technology, University of Debrecen.

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