Challenges encountered in the development process of the International Standard Accident Number (ISAN)

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ABSTRACT

In accident and emergency care, the provision of information on the emergency situation and the first medical treatment is essential to ensure efficient rescue operations. Despite the ongoing digitalisation of health care, not all potentially available sources of information are used. With the constantly increasing integration of IoT* technology into people's everyday lives (e.g. smart wearables, cars, homes) the amount of useful data for the rescue operation performed by the emergency medical services will increase further.

Unfortunately, this data is not integrated into emergency care. The rescue team as well as the medical service in the hospital have to rely solely on the information provided by the patient or the emergency caller. In addition, the parties involved in the rescue operation, such as the rescue service, the emergency departments like hospitals use their own IT systems and data silos, which are not technically interconnected. Information on the course of the accident and the patient's state of health is passed on from one element of the rescue chain to the next by manually completed protocols. During this process there is always the risk that important information are lost and cannot be retrieved afterwards.

In order to overcome the lack of data exchange between the isolated data silos and to integrate further data sources, we initiated the ISAN project to propose an emergency system architecture that uses an International Standard Accident Number (ISAN) – an unique identifier for accidents, emergencies and other medical events – to link the various IT systems and data silos in accident and emergency care. The proposed system architecture will transform the limited information flow (from one member of the rescue operation to another) into a fully interconnected data exchange system that enables secure bi-directional communication between the various IT systems involved in the emergency operation.

We believe that in the near future smart devices and environments, such as smart homes, will have the capabilities for triggering an alarm automatically when an adverse event is detected (similar to the In-vehicle eCall system in Europe). By using the proposed ISAN the data being exchanged safely and securely between between various IT systems and provide valuable information for the rescue operation. The Public Service Answering Point (PSAP) as well as the Emergency Medical Services (EMS) and other emergency units can interact with the alerting system and request real-time and stored data.

Within the project, the specification of the ISAN and the corresponding software for data exchange will be developed and evaluated in a pilot phase in an ambulance service and a hospital in Braunschweig. In order to realize the postulated aims of the ISAN, appropriate interfaces between the heterogeneous IT systems in emergency care must be established. It must be taken into account that the individual parties are connected to the Internet in completely different ways or possibly are not yet connected to the Internet at all (e.g. the ambulance cars). The provision of new interfaces to the emergency care also entails the risk of new attacks (e.g. man-in-the-middle attacks). Therefore the highest safety requirements must be met. It is also necessary to define how data is exchanged between the systems. Although there are already many different formats for the exchange of IoT, medical and other data, they are all domain-specific. Currently, there is no internationally standardized general-purpose format for exchanging data from different domains. This raises the question of whether a general format should be standardized for all emerging data or whether several standards should be supported for the individual types of data. These and other challenges will be addressed within the ISAN project.

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*Internet of Things