Interoperability Challenges in the Health Management of Patients with Implantable Defibrillators

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An increasing number of patients make the choice to accept an Implantable Cardioverter-Defibrillator (ICD) to alleviate the risk of life-threatening conditions such as dangerous arrhythmias, sudden death, heart failure, etc. Technology empowered patients and their families access online educational resources, maintain Personal Health Records (PHRs), engage in social networking relating to their condition, use wireless activity and lifestyle monitoring devices. Electronic Health Records (EHRs) and decision support tools assist cardiologists in follow-up of ICD patients typically 3 times per year based on current clinical guidelines. Recent CIED models support remote monitoring and clinical trials show reduction of in-office visits and improved quality of care. The CIED device transfers data on the health status of the device and the patient to proprietary vendor databases. The attending cardiologist may receive alerts and remotely access the vendors database to review the patients and devices health status. In this paper we report on current status of relevant interoperability initiatives. IHE is working on the (Implantable Device Cardiac Observation) IDCO profile, using HL7 and ISO/IEEE11073 standards including the Rosetta Terminology mapping to facilitate interoperability at the device level. Other IHE profiles address EHRs to leverage provider data (e.g. diagnostic examinations, lab results, progress reports) and PHRs to capture activity and lifestyle data. Continua Health Alliance works on interoperability guidelines for personal health devices. However, a widely acceptable solution for ECG interoperability is still not available despite the efforts of the OpenECG network. The iCARDEA (An Intelligent Platform for Personalized Remote Monitoring of the Cardiac Patients with Electronic Implant Devices) project has engaged a multidisciplinary group in addressing this challenge offering automated computer interpretable personalized guidelines based on PHR, EHR, and ICD data as a Decision Support tool for cardiologists hoping to improve quality of life of ICD patients in a secure, unobtrusive and transparent way.