Data Interoperability to Enable a Learning Health System

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Abstract

The concept of a learning health system was first put forth by the US Institute of Medicine (now The National Academy of Medicine) in 2007. Learning health systems are self-aware systems in which knowledge generation processes and analytics are embedded in care delivery to produce continual improvement in care. At the highest level it is an infinitely interconnected system of systems, from the level of organ systems of individuals to the level of populations that extend beyond the borders of nations. Health outcomes are continuously improving based on data from care and clinical and translational research that is taking place daily.

During the relatively short time since that concept was first expressed, the amount of electronic data that exists has increased several folds and continues to double every 2 years. Most of that electronic data is in healthcare. There is also an increasing portion of the electronic data essential to understanding and improving the health of individuals and populations which exists outside Electronic Health Records. That growing and increasingly diverse expanse of data exists in other healthcare databases, in patient care devices, in mobile devices and wearables, in imaging centers, in social and governmental systems, in genomic sequencing databases, and from many other sources.

This presentation will describe the role of informatics in the creation and implementation of healthcare data standards needed to create interoperability between disparate data sources across a system whether it is at a facility, regional or national level to access and exchange the data. Medical devices, whether therapeutic or diagnostic, whether mechanical, electrical, or software based, are part of the overall system. Data produced by devices and patient data that is influenced by therapeutic devices is part of the data that describes the system and can be used to measure the status of individuals and populations of individuals. Improving health of individuals and improving the system is dependent on capturing and understanding that data.

The presentation will also explain how data standards make possible information models to represent that data semantically, and to represent the knowledge derived from the data that completes the loop enabling continuous process improvement in health and care.

Bio Sketch

Russell Leftwich, MD is Senior Clinical Advisor for Interoperability, InterSystems Corporation, Adjunct Assistant Professor of Biomedical Informatics, Vanderbilt University, and adjunct faculty Biomedical Informatics, Arizona State University. He is active in leadership of Health Level Seven International (HL7) the healthcare data standards organization and the American Medical Informatics Association. He is founder and Co-chair of the HL7 Learning Health Systems Workgroup and a Co-chair of the HL7 Clinical Interoperability Council. He is recognized as an international leader in the development of HL7 Fast Healthcare Interoperability Resources (FHIR), which has been described as the Worldwide Web for healthcare. He is a frequent presenter at national and international conferences on healthcare data interoperability and on the HL7 FHIR standard. He served as a director and treasurer of the HL7 board of directors from 2016-2019 and is currently a director of the HL7 FHIR Foundation. Prior to his current position he served as CMIO for the state of Tennessee Office of eHealth. His background also includes two decades in internal medicine practice as Clinical Assistant Professor at Vanderbilt University. He is board certified in Internal Medicine, Allergy/Immunology, and Clinical Informatics. He is a fellow of the American Medical Informatics Association, the American Academy of Allergy, Asthma, and Immunology, and the American College of Chest Physicians.