EHRs as a Platform for Innovation

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Abstract— **With electronic health record systems (EHRs) now widely deployed in the US attention has turned to the challenges of interoperability, usability and clinical impact of these systems. Solving the first challenge by creating 'open' interoperability shows great promise of leading to solutions to the other two.**

I. CLINICALLY ADAPTIVE EHRs

The 2009 National Acadmies Press book *Computational Technology for Effective Health Care: Immediate Steps and Strategic Directions* describes a key major limitation of current health IT systems as follows: "The health care IT systems of today tend to squeeze all cognitive support for the clinician through the lens of health care transactions and the related raw data, without an underlying representation of a conceptual model for the patient showing how data fit together and which are important or unimportant. As a result, an understanding of the patient can be lost amidst all the data, all the tests, and all the monitoring equipment." [1]

In fact, "commercial EHRs evolved from practice-management (i.e., billing) systems." [2] As a result they are not 'clinically adaptive' and physicians often complain about a negative impact on workflow, clinical process and efficiency. Rather, according to S Wallace, "EHRs can, and should, provide relevant information when and where clinicians need it, recognizing that care is not a commodity and that different care processes have different information needs." [3]

II. THE POTENTIALLY TRANSFORMATIVE ROLL OF OPEN HEALTHCARE APIS

Application Programming Interfaces (APIs) are essentially the *lingua franca* of modern information systems. They allow independently developed components or modules to function together and provide value that no one of them could alone provide. Perhaps the most widely used and understood example is the smartphone which can host hundreds of independently developed apps to which it provides vital services such as access to time, location, weather and data from sensors that can be transformed into useful parameters such as step counts. Few would argue that this paradigm has been a platform for innovation that has literally transformed the way people live their personal and professional lives.

RS Huckman and M Uppaluru observe that "Leaders of most internet-based businesses have realized the critical importance of using open application programming interfaces (APIs) to expand the reach of their organizations. If the health care industry followed suit, the impact on the quality and cost of care, the patient's experience, and innovation could be enormous." [4]

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III. FAST HEALTHCARE INTEROPERABILITY RESOURCES

Beginning in 2011, Health Level 7 (HL7) the voluntary, global healthcare interoperability standards setting organization, organized a 'fresh look' taskforce to rethink sharing of health data. The group eventually organized their work around the organization of the most commonly used health data into a simplified model instantiated as set of JSON/XML formatted "resources". It also developed a RESTful API to support the Creation, Reading, Updating and Deletion (CRUD) of these resources in whatever systems the underlying data resides. The resulting standard is called Fast Healthcare Interoperability Resources (FHIR). [5]

The Computational Health Informatics Program (CHIP) at Boston Childrens Program had previously developed the SMART Platforms initiative to design the "app store for health". Recognizing the significance of FHIR the CHIP group redeveloped SMART using FHIR as the platform's API and renamed it SMART on FHIR. As a result major EHRs are now being opened up to innovative apps for purposes such as clinical decision support for physicians or the use of health data to help patients better manage disease and disease risks. Public app galleries now showcase many examples of this. [6]

The concept has become sufficiently accepted that "The 21st Century Cures Act requires that certified health IT products have an application programming interface that allows health data to be accessed and exchanged. The provision could shape the way that physicians and patients experience health care for years to come."

REFERENCES

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