The Israeli Virtual National Health Record: A Robust National Health Information Infrastructure Based on a Firm Foundation of Trust

Esther Saig

Israeli Ministry of Health, Tel Aviv Sourasky Medical Center, Israel

Abstract

In many developed countries, a coordinated effort is underway to build national and regional Health Information Infrastructures (HII) for the linking of disparate sites of care, so that an access to a comprehensive Health Record will be feasible when critical medical decisions are made [1]. However, widespread adoption of such national projects is hindered by a series of barriers—regulatory, technical, financial and cultural. Above all, a robust national HII requires a firm foundation of trust: patients must be assured that their confidential health information will not be misused and that there are adequate legal remedies in the event of inappropriate behavior on the part of either authorized or unauthorized parties[2].

The Israeli evolving National HII is an innovative state of the art implementation of a wide-range clinical inter-organizational data exchange, based on a unique concept of virtually temporary sharing of information. A logically connection of multiple caregivers and medical organizations creates a patient-centric virtual repository, without centralization. All information remains in its original format, location, system and ownership. On demand, relevant information is instantly integrated and delivered to the point of care. This system, successfully covering more than half of Israel's population, is currently evolving from a voluntary private-public partnership (dBMOTION and CLALIT HMO) to a formal national reality. The governmental leadership, now taking over the process, is essential to achieve a full potential of the health information technology. All partners of the Israeli health system are coordinated in concert with each other, driven with a shared vision – realizing that a secured, private, confidential health information exchange is assured.

Keywords:
Health Information Infrastructure; National Health Record; Data confidentiality; Electronic Medical Record

1. Introduction

Nation-wide implementation of health information technology is the only demonstrated method of controlling costs in the long run without decreasing the quality of health care delivered [2][3]. The provision of necessary patient information and medical knowledge in the hands of decision makers at the point of clinical decision making greatly benefits the health care system by significantly reducing errors, avoiding dangerous mistakes, reducing duplicate services and unnecessary hospitalizations and improving clinical decisions.
In Israel, advanced communications and computational infrastructure have made wide adoption of health information feasible. In the ambulatory setting, more than 95% of caregivers document medical data almost exclusively into an Electronic Medical Record (EMR), while their colleagues in hospitals use it mainly for clinical admission and discharge. Until recently, the communication between various health care facilities in Israel was often paper-based, rendering the patient to serve as the messenger for data delivery and exchange. During the last 3 years, an outstanding HII project, led by Israel's largest HMO (Clalit Health Services) is gradually attracting multiple health care organizations, linking their various information systems through innovative powerful integration engines (the dbMOTION solution).

For 3.5 million citizens, medical encounters are now supported by and based on a comprehensive clinical database, virtually instantly created at the time and place of care and dissipated immediately at the end of the transaction. Transforming this initiative to a national operation involves multiple dilemmas- legal, technical, ethical, financial and practical. One of the leading questions would be, weather to expand the current technology to a nation-wide implementation or to replace it with an alternative solution, one of several available at the moment.

2. Background

A nationalized health system in Israel provides entitlement of every citizen to one of 4 HMO's. Health services are available to all, based on a payment (Health Insurance Tax). However, service provision is not conditioned by payment. The Israeli health system comprises of 4 sectors: the Ministry of Health, 4 HMO's, the private sector (including hospitals, labs etc.) and several Non Profit Organizations. Out of 50 general hospitals, 8 belong to the largest HMO (Clalit Health Services), 11 are in governmental ownership, the rest are public or private.

Several times a year may the citizen change his affiliation to a certain HMO. Sick patients may be referred to a secondary care hospital consultant. Generally, healthcare is very collaborative in its nature in Israel, making it easier to understand how such a fascinating extraordinary process, of Information Technology Infrastructure, can take place independently, long before governmental involvements take over.

Israel's current Trans-Institutional -Cooperation

The dbMOTION solution is currently applied for more than half of Israel's population (3.5 million members of the Clalit HMO). All 8 general hospitals, hundreds of primary care clinics, labs and institutes of Clalit Health Services are interconnected through this platform throughout the country. In addition, two largest governmental hospitals, as well as one public hospital, have successfully joined the process, actually serving as a pilot for a possible future expansion of this information-net.

At the point and time of care, be it at the primary care clinic, in one of the above ERs or at the hospital ward, upon demand, relevant information is instantly integrated and delivered, enabling clear decisions. Metadata and maintained indexes assure fast retrieval of data (8 seconds on the average).
3. Methods

As described, step by step, following the Clalit initiative, a growing number of medical organizations in Israel have joined the process voluntarily and with no ministerial drive or support. This partnership speeded the adoption of health information technology and has largely promoted the establishment of the Israeli National Health Record. However, a governmental leadership was essential to achieve formal agreement and full cooperation of all partners of Israel's health system. The goal was to build a national, consistent and comprehensive health care network, for a secure data sharing and exchange. Therefore, a strategy of several steering committees has been worked out.

A Superior Steering Committee

Leaders of all sectors of Israel's health system gathered for the establishment of a conceptual framework for the National Health Record: an integration of medical data from all various origins, and its presentation upon request at all points of care, with no data repository or centralization and with absolute dissipation of the generated data once the current medical encounter is through. This unique, innovative approach for the implementation of a national health data communication is by no means the most convincing parameter driving all partners towards the process.

A Technological Committee

The dbMOTION solution, already widely operating, fully addresses the strict demands agreed upon by the superior steering committee, namely the virtual temporary creation of data, followed by its disappearance. Yet, the governmental initiative must involve an impartial analysis of multiple technological solutions, ending up with the most appropriate one for a nation-wide implementation. A Request For Information is been conducted by the committee, asking for proposals for the fulfillment of the agreed strategy.

A 3 layer architecture has been worked out – a basic connectivity Layer, to which pre-organized data, originating from multiple local databases, will be imported; An intermediate Intelligent Layer to dill with data normalization, conversion and synchronization, data security and authorization, clinical algorithms, alarms and alerts and others; A third Viewer layer. Sharing of information is asked to take place between different parties, regardless of the information technology employed by each member. Seeking to address a unified platform for the study and comparison of various technological solutions, a "Testing Lab" is been operated, with the connection of several test-databases installed in a set of servers.

An Advisory Committee for Terminology and Coding

Similarly to other aspects of the national process, moving from an independent initiative to a governmental strategy dictates the need for synchronized and standardized modes of cooperation. Although part of the work is already well underway, this committee will take the appropriate steps for the completion and adoption of standards that will allow medical information sharing electronically.

Originally, the idea of data sharing and exchange relied on the early foundation of a structured minimal set of clinical "items" (Minimal Data Set) – several critical diagnoses, allergies, current medications - upon which an agreement would be achieved, regarding the content, format and nomenclature. However, evolving technological solutions, as well as the ambition to link as many (unrelated) members as early as possible, have strongly
moved us towards the immediate linkage of different databases, long before the completion of a standardized language. Still, exploitation of inter-institutional cooperation will only be fully met by the completion and adoption of a comprehensive medical vocabulary and of health information standards.

**A committee for Ethics and Legislation**

The Israeli law, through The Patient Rights Act and The People Health Act, permits medical data exchange for the purpose of healthcare provision, regardless of the patient's agreement. The establishment of the nation-wide health information sharing requires strong new legislation activities, carried out through this advisory committee.

The committee will convene task forces to determine ethical and legal means for secure and trusted linking of data, while protecting patient privacy.

The current HII operated by the Clalit, already implements robust standards for authentication and authorization. The system routinely and securely records access to data and is capable of tracking activities in a database. The role of this committee is to determine, on a national level, who will be authorized to what piece of information and how will the patient have control over his clinical data.

**4. Discussion**

Health Information exchange and interoperability have become an ongoing challenge for the international healthcare community. Examples include "Health Information Infrastructure" in the USA [4], "Healthconnect" in Australia[5], the Canadian "Infoway"[6], The "National Program for IT" in the United Kingdom[7] and others.

Principle questions, by which various national programs might differ from each other, are as follows: Is it going to replace the Medical Record (including intensive data entry), or will it mainly provide a "read only" access to the patients' comprehensive clinical status? Is a Central Database been maintained, populated by aggregative data available at all time (although authorization-dependent), or whether limited relevant data is retrieved upon request, on-line originating from multiple, diverse data repositories? Is it permitted to aggregate identified information or whether statistical unidentifiable data is only available, for the sake of privacy? Is it mandatory to replace all existing information technologies, or whether a powerful integration engine is been used, providing the conservation of current technologies?

The" Centralized Model" is less popular, especially when national involvement is the case, due to privacy violation concern. The "Federation Model", characterized by virtual organization of data "looks and feels" safer, though it doesn't necessarily exclude the existence of stored data- the threat of the "Big Brother".

"The HealthConnect" in Australia is structured for "electronic collection, storage and exchange of consumer health information via a secure network and within strict privacy safeguards" – in Israel we found such declarations insufficient for the achievement of robust consensus and cooperation, as to the willingness of care providers, health organizations and especially the patients to share any piece of data, what so ever. In Israel, therefore, the concept of the National Health Record is pivoted in our real effort to guaranty zero violence of privacy – the virtual clinical data retrieved for temporary use, doe's not exist in its aggregative form in any site in the system. Moreover, there is no way to store the data locally, following its use and before its dissipation.
Standards

Technical and semantic standards are essential for sharing of high quality information across a national health care system. To support better management of shared clinical information, standards are required for privacy and data protection, security and authentication, massaging and communication, data standards and terminology coding and classification systems[8]. Current wide HII in Israel, the dbMOTION-Clalit cooperation, is a self production rather than an open & non proprietary technology.

Transforming from an independent voluntary initiative to a national program, will soon evolve a request for proposals (RFP). Solutions appropriate for our needs should support various formal terminology systems as Snowmed-CT, ICD-9-CM, CPT-4 and others. Massaging services should be based on the HL7 version 3 massaging standard.

Shifting from a voluntary inter-institutional cooperation, wide and successful as one can be, to a National Health Record, is a revolution of health care. Various characteristics of the Israeli health system have made this revolution feasible.

Paucity of insurers

In Israel, each citizen belongs to one of four HMOs, 55% been affiliated to Clalit, 25% belonging to the second large, leaving the rest to two similar smaller HMOs. In addition, most of the general hospitals belong to one of two owners - the government and the largest HMO.

Current strategy of Israel Ministry of Finance, to establish a unified communicational infrastructure, linking various government ministries to each other and with the citizens (E Government), further augments the homogenous infrastructure of Israel's health system.

Master Patient Index

Personal identification (ID) numbers, like we maintain in Israel, are mandatory for data interchange projects. These nationwide identifiers enable the unambiguously identifying of patients and linking their information from multiple sources within and across clinical enterprises.

Wide Acceptance of IT by Providers

Information technology of all kinds is very popular among care providers in Israel. Wide adoption of various EMRs, knowledge management applications, computerized clinical guidelines and algorithms as well as data warehouse systems, all catalyze the implementation of the national process.

Secondary to the above-mentioned strengths of the Israeli health system "profile", the emergence of the National Health Record was trivial. However, the most powerful strength of our current system is the innovative, unique concept of virtual data, which is always there when you need it, secured and updated, and at the same time does not really exist anywhere in its integrative manner. At the current legal atmosphere in Israel, namely the seemingly unlimited permission for medical data exchange among providers, only such robust foundation of trust could make this state of the art cutting edge technology part of our daily reality.

Section 6: Healthcare Networks
5. References


Address for correspondence

Esther Saiag, MD,MSc
Tel Aviv Sourasky Medical Center
6, Weizman St.Tel-Aviv64239, ISRAEL
esthers@tasmc.health.gov.il

Section 6: Healthcare Networks