



COMMENTARY

Health Information Exchange and Interoperability Supporting Population Health Management: Implications for Health System Decision-Making and Practice

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Abstract

The exchange of health data is of continued importance in the global response to the COVID-19 pandemic. This fact reminds us of the essential roles that data and technology play in our lives. Health information exchange and interoperability are integral components of healthcare systems around the world. In this commentary, the concepts of health information exchange and interoperability are discussed, and two examples are briefly described. We present issues for health system decision-makers to consider as they move toward adopting health information exchanges and interoperability with a health system to support population health management.

Keywords: Health Information Exchange; Interoperability; Types of Health Information Exchange; Population Health Management

Introduction

As shown in the WHO COVID-19 Situation Reports (available online), the exchange of health data is of continued importance in the global response to the COVID-19 pandemic. This fact reminds us of the essential roles that data and technology play in our lives. Health information exchange and interoperability within a healthcare system have identified both successes and challenges. For example, retail pharmacy data for Veterans receiving immunization outside of the Veterans Health Administration (VHA) has been linked to the data of Veterans using the VHA system and the data incorporated directly into an electronic health record to “trigger” clinical decision support, such as flu shot reminders [1]. Similar efforts are underway in countries outside of the United States, with national platforms being implemented to share patient-level, post-discharge stroke health data and information between different health information systems within said country [2].

The increasing use of remote work has given people more options for where they can live. As a result, the movement of people (along with their medical care and medical records) within a healthcare system, either domestically or internationally, presents opportunities for all healthcare systems in our increasingly globalized world. From this perspective, the consideration of the electronic exchange of health information to support population health management in any healthcare system would appear to be a worthwhile

enterprise. We briefly discuss concepts here and offer possible implications for international health system decision-making and practices.

Overview: Health Information Exchange

Population health informatics include discussions of the concepts of interoperability and electronic health information exchange. [3,4] In many parts of the world, including the United States, individuals may seek medical and healthcare services in a variety of settings. Hospitals, primary care and mental health clinics, dental offices, optometry offices, and audiology offices are just a few examples of settings where individuals can receive such services. The ability to share and analyze these data from the various settings where health services are provided and recorded contributes to the process of identifying, monitoring and improving the health of a population [3].

Often, these data are in different formats depending on the health information system used to record the clinical and administrative health data. Interoperability is a key capability in these situations [3]. The term has come to mean the ability

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of two information systems to exchange data within an agreed-upon framework, and, also, where the receiving system can use data in a meaningful way. The electronic transfer or sharing of clinical and/or administrative health information across diverse and sometimes competing healthcare settings is known as a Health Information Exchange (HIE). There are three, broad types of HIE (Table 1).

Overview: Population Health Management

Healthcare systems are increasingly looking at the promise of population health management (PHM). The concept is defined as a model of health care that addresses the health needs of a group of individuals at all points along the continuum of care, including in the community setting, through participation, engagement and targeted interventions for a defined population; the goal of PHM is to take care of or improve the physical and psychosocial well-being of individuals and address health disparities through cost-effective and tailored health solutions [5].

Operationally, population health management in a health care system is accomplished using six steps [3]: Define Population; Identify Medical Care Gaps; Stratify Risks; Engage Patients; Manage Care; and Measure Outcomes. The population health management approach is intended to encourage a more patient-centered or citizen-centered approach to the delivery of health care by moving toward the achievement of specific health care-related metrics and outcomes for a defined population [5]. The collection and analysis of health data is essential for population health management activities and the electronic health record (EHR) is increasingly seen as an important source of data [6].

Healthcare system leaders, recognizing the need for health information systems to support population health management,

have attempted to think strategically about health information systems and population health management strategies [7,8]:

At Centro Hospitalar Universitario do Porto (CHUP), in Porto, Portugal, clinical and health systems leaders recognized the health information problem within the current health system: There were several health information systems within CHUP producing data in different formats and different data structures. Clinical quality and safety decisions for individual patients and patient cohorts could be addressed using a common Electronic Health Record (EHR). Open EHR had technical capabilities that aligned with the protocols established by the Portugal National Health System. The deployment and full implementation of the new Open EHR in CHUP permitted the various clinics in the healthcare facility to electronically exchange health information, be interoperable, and allow the health professionals to communicate health information and plan for patient-level and cohort-level interventions.

At Aria Health, based in Philadelphia, hospital leaders empowered a physician to lead population health efforts designed to close the gap in care for high-risk patients. The hospital implemented preventative screening guidelines for chronic disease management to track patients and make sure they are meeting specific screening recommendations. The hospital used software developed to identify patients with specific test needs and alerted them when to undergo the tests. The office staff and case management team contacted patients to assist them in making appointments for lab tests or necessary procedures. The program was effective in reducing hospital readmissions.

These examples include some likely characteristics. The value of health data to monitor health outcomes in patients receiving care within the healthcare system was identified and

Table1: Type, Description and Use of Health Information Exchanges

Type	Description	Example of use
Direct Health Information Exchange	Directed exchange gives health care providers the ability to electronically send and receive secure information – such as laboratory orders and results, patient referrals, or discharge summaries – to other health care providers involved in a patient’s care over the Internet via encrypted, secure, and reliable messaging.	A primary care provider can directly send electronic care summaries that include medications, problems, and lab results to a specialist when referring their patients. This information helps to inform the visit and prevents the duplication of tests, redundant collection of information from the patient, wasted visits, and medication errors.
Query-based Health Information Exchange	Query-based exchange gives health care providers the ability to find and/or request information on a patient from other providers and is often used for unplanned/ emergency care.	Emergency room physicians can utilize query-based exchange to access patient information—such as medications, recent radiology images, and problem lists—might adjust treatment plans to avoid adverse medication reactions or duplicative testing.
Consumer Mediated Health Information Exchange.	Consumer Mediated Exchange gives patients the ability to aggregate and manage their health information on the Internet. When in control of their own health information, patients can help transfer information between providers, correct inaccurate demographic, medical, or billing information, and track and monitor their own health.	Patients can actively participate in their care coordination by: <ul style="list-style-type: none"> • Providing other providers with their health information • Identifying and correcting wrong or missing health information • Identifying and correcting incorrect billing information • Tracking and monitoring their own health

Adapted from: “What is Health Information Exchange?” URL: <https://www.healthit.gov/topic/health-it-and-health-information-exchange-basics/what-hie>

led to strategies for a group of patients anywhere in the system. Technology and technology protocols permitted clinicians and other health professionals to use health data to guide the development and deployment of interventions that would be appropriate for a specific cohort of patients. The interventions were delivered to specific patients that were part of the initial patient cohort.

Going Forward

The application of the electronic exchange of health information and interoperability has the potential to improve the health status of a population. To take advantage of this potential, health system leaders may consider and discuss the following in the pursuit of efforts to advance population health management within a healthcare system [9-12]:

Health Policy

While there has been government policy implemented to increase the use of electronic health records and exchange data, there is a need for additional policy and guidance to establish easier connectivity. One of the most significant legal barriers to HIE progress seems to be the varying patient consent requirements. These requirements can lead to extensive delays in agencies' efforts to exchange data. Another policy implication of health information exchange is health equity. A recommendation to advance health equity suggests developing health policies that mandate standardized collection of social determinants of health in clinical and person-centered settings, using reliable and valid tools. Moreover, to address equity issues, the stratification of data is essential to aid in decision making for health planning purposes.

Interagency Collaboration

As HIE evolves, data sharing across the boundaries of often competing institutions is vital. Such sharing of data has been challenging because of a lack of trust among competing institutions. As such, it is vital for interagency collaboration as organizations begin to share sensitive information for specific purposes across political, geographical, and institutional boundaries. Focusing on the common good and incentivizing agencies could lead to effective strategies for entering into interagency data exchange agreements. Consideration must be given when developing policies and procedures for safeguarding the transmission and use of health information.

Population Health Management Planning

If a health system plans to pursue population health management activities, it would be useful to take a deliberate look at the near- and long-term health burdens of the target population and consider the general types of population health management activities that would be useful to address. This examination could lead to a better view of the resources—both material and human—that would be needed, and plans can be developed and implemented to acquire these resources, including technological resources.

Health Information Technology

The selection of technology should support population health management actions. For health information exchange and interoperability to aid in population health management, it seems essential to consider and document the types of population health management actions that may be planned for a specific, patient population and, then, leverage the health information exchange technology and interoperability requirements to support the types of anticipated population health management actions.

Workforce Issues

While the medical care and treatment of individuals will necessitate appropriately trained medical care professionals, other professionals with a different, non-clinical, skill-set will be needed to leverage technology and working relationships (consider the example of the eHealthExchange.org) to support population health at a national and international level as well as population health management activities within a healthcare system at a local level.

Conclusion

The exchange of health information derived from individuals using the services of a healthcare system and the recording, storage, and analysis of that data are necessary to monitor population health status and to deploy appropriate population health management activities within a country, across international borders or within a healthcare system. The examples shown here remind us of just a couple of important opportunities. We believe that the application of electronic health information exchange and consideration of issues of interoperability for population health status monitoring and population health management should take into account issues of operational health policy, interagency collaboration, population health management planning, technology issues, and workforce concerns.

Disclaimer

The views expressed are those of the authors and do not represent any official position of the US Government.

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