

**Health Information Technology Policy Committee
Meaningful Use (MU) Workgroup
Population Health Session
Panel 3: Potential areas for HIT Policy Committee consideration
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Written comments by Gib Parrish, Peacham, Vermont, and Dan Friedman, Brookline, Massachusetts

Conceptualizing a U.S. Population Health Record

Overview

The U.S. lacks a comprehensive and coordinated system for providing population health information to its citizens. Building on previous brief descriptions by AMIA, NCVHS, and ISO, and based upon our article in the July 2010 issue of the Journal of the American Informatics Association, Dan Friedman and I provide a conceptual description of a *population health record* (PopHR) to address this lack (Friedman & Parrish, 2010). We suggest content, sources of content, functionalities, business objectives, and information and system architectures for a PopHR. Finally, we address barriers to implementing a PopHR, as well as factors that could enable its implementation.

Need for a US PopHR

U.S. population health data are scattered widely at various agencies and Web sites, in various forms, at various geographical levels, with various statistical and reporting conventions, and require various levels of user statistical and computing expertise. For example, the U.S. DHHS currently makes available at least two dozen publicly accessible Web-based data query systems (WDQS), providing overlapping access to various population health data sets; CDC alone currently maintains about a dozen such systems. There is no single, easily accessible source that provides comprehensive information on population health across regions, states, metropolitan areas, and counties, much less cities, towns, and neighborhoods. As a result, U.S. federal, state, and local government agencies lack a single common and easily accessible source for basic population health data, as do legislators, community-based organizations, the media, and the public.

Definitions

We use a definition of *population health* that generally agrees with the definition provided in the conceptual comments that were sent to panelists for this meeting.¹ We, too, stress the importance of aggregate measures of health and well-being that address a broad range of health determinants and can be used to identify health inequities among population groups, with the goal of improving public health practice and, ultimately, population health.

¹ The definition of *population health* provided in the third paragraph of “Conceptual Comments as Background” is “a conceptual approach to measure the aggregate health of a community or jurisdictional region with a collective goal of improving those measurements and reducing health inequities among population groups. Stepping beyond the individual-level focus of mainstream medicine, population health acknowledges and addresses a broad range of social determinant factors that impact population health. Emphasizing environment, social structure, and resource distribution, population health is less focused on the relatively minor impact that medicine and healthcare have on improving health overall.”

We define the *PopHR* as a repository of statistics, measures, and indicators regarding the state of and influences on the health of a defined population, in computer processable form, stored and transmitted securely, and accessible by multiple authorized users. The PopHR has a standardized and agreed upon logical information model, which is independent of PopHR systems. The primary purpose of the PopHR is the support of continuing, efficient, and effective public health practice; it contains information that is retrospective (historical), current, and prospective (predictive of future trends). To achieve this purpose, the PopHR should be based upon an explicit population health framework and include a schematic representation of all factors that potentially influence the health of a population, as well as those measures that define population health (see Figure 1).

Information Content

A PopHR would contain information about the health and determinants of health of a single population, such as the population within the geographic bounds served by a state or local health department. It would provide only aggregated data, such as statistics, measures, and indicators, and would not contain information on identifiable individuals. PopHR content should ultimately derive from a wide range of information sources on population health and factors influencing it, such as ongoing population surveys, vital registration, public health surveillance, environmental sampling, Medicare and other payer claims, population censuses, and public health practice-related programs. Health care records, including the EHR, could serve as a source of data for the PopHR, but because the scope of health care records is generally limited to patient care and the scope of population health and its determinants extends far beyond patient care, the contribution that these records could make to PopHR content is limited. In the US, not all people are patients, and not all people will have EHRs. The sum of patients does not equal the population, the sum of the content from patient care records will not yield a full portrait of population health and its determinants, and the sum of EHRs will not equal population-based data on healthcare or on population health.

PopHR functionalities

Core functionalities of PopHR systems include analyzing, visualizing, and reporting information; querying information; generating alerts; generating reports on specific diseases or factors influencing health; identifying disease outbreaks and geographic clusters of disease or influencing factors; displaying temporal trends of diseases; and benchmarking. PopHR content could be indexed and presented for users in multiple ways, with a particular user's view based upon user preference, role, or the particular population health issue of interest.

Business Objectives and Architecture of a PopHR

The business objectives for a PopHR are similar to those specified for an EHR in ISO/DIS 18308.2, although a PopHR would principally support public health practice and improving population health, rather than clinical care. Some of the information architecture requirements for a PopHR could be adapted from EHR requirements in ISO/DIS 18308.2, especially those concerning kinds of health record entries, representation of data values within health record entries, data retrieval and views, and communication and interoperability.

The specific purpose and intended uses of a PopHR will determine its overall system architecture. Several models for a PopHR system architecture can be conceptualized (see Table 1; see Figures 2 and 3). Because much of the content of a PopHR would be derived from other population-based data sets, a PopHR system would not typically engage in primary data collection, but rather in the analysis of primary data sets, followed by the compilation and processing of the results of these analyses to create the information content of a PopHR.

Barriers to Implementing a US PopHR

Barriers in the U.S. to the PopHR include data, financing, and policy and politics. The extent to which these barriers actually impede the PopHR will depend upon the specific information and system architectures for a particular PopHR, its enabling policies, its institutional support, and its strategies for phased development and implementation.

Factors to Enable a US PopHR

At least three factors could facilitate and enable implementation of a U.S. PopHR. The first factor would be a concerted and coordinated effort to portray to key stakeholders the PopHR as a public good that would enable monitoring, comparing, and evaluating national, state, and local health interventions and policies. The second factor would be establishing clear and transparent governance structures for a PopHR. The ONC could be a powerful force in facilitating the development of a governance structure. The third factor would be providing incentives for the development, implementation, and maintenance of a PopHR.

Phased development and implementation

To minimize barriers to a US PopHR, we recommend a phased approach to development and implementation. Initial work should focus on the development of a PopHR population health framework and logical information model, and the development and implementation of PopHR systems with centralized information storage, information processing, and system functions. In the longer term, a PopHR could employ distributed information storage and either centralized or distributed information processing and systems functions to provide greater flexibility in information storage and retrieval for PopHRs.

ONC specifically, and DHHS more generally, could serve as leaders and as examples in establishing a PopHR. Initial steps might include: (1) inventorying current DHHS publicly accessible population health Web-based data query systems, including their data sets and their levels of geographic granularity; (2) developing a logical information model and a metadata directory that would apply to data currently included in those WDQS; (3) adopting an explicit population health framework to be used in analyzing gaps in data currently included in those WDQS; and (4) initiating a DHHS-wide effort to build a single PopHR and eliminating the current multiple overlapping WDQS.

Table and figures

Table 1. Models for Population Health Record (PopHR) system architecture

Model	Information storage	Information retrieval
1	Centralized	Centralized
2	Distributed	Centralized
3	Centralized	Distributed
4	Distributed	Distributed

Figure 1. Influences on population health

(See accompanying file: Friedman-Parrish_PopHR_figure-1_2010.pdf; Figure 1 is also available from: <http://jamia.bmj.com/content/17/4/359/suppl/DC1>)

Figure 2. PopHR and PopHR system showing collection, processing, and retrieval of information content from a PopHR

(See accompanying file: Friedman-Parrish_PopHR_figure-2_2010.pdf; Figure 2 is also available from: <http://jamia.bmj.com/content/17/4/359/suppl/DC1>)

Figure 3. Three models for a PopHR system architecture

(See accompanying file: Friedman-Parrish_PopHR_figure-3_2010.pdf; Figure 2 is also available from: <http://jamia.bmj.com/content/17/4/359/suppl/DC1>)

References

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