Health Record Banking Alliance White Paper

Health Record Banking:
A Foundation for Myriad Health Information Sharing Business Models

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Executive Summary

The Office of the National Coordinator and the Bipartisan Policy Center both recently expressed support of Consumer-mediated Exchange of health information.[1,2] With the sustainability of Health Information Exchanges (HIEs) in question nationwide, the Health Record Banking Alliance (HRBA) is distributing this white paper to demonstrate how Health Record Banks (HRBs), as a form of consumer-mediated exchange, facilitate a variety of feasible business models for consideration by government, the health industry, and consumers.

Business models comprise two basic elements – what the business does, and how it makes money.[3] The primary driver of value for HRBs is that each consumer's health information is compiled and available in one location, facilitating automated population (filling in) of the record, simpler human and machine access to and use of the record, and creation of consumer-controlled, search-based value.

What is a Health Record Bank? A health record bank (HRB) or trust is an independent organization that provides a secure electronic repository for storing and maintaining an individual's lifetime health and medical records, obtained from multiple sources, and assuring that the individual controls who accesses the information.

How do Health Record Banks make money? Due to the low cost of creating and sustaining HRBs compared to other Health Information Exchange (HIE) systems and contrasted with the high value HRBs create, opportunities abound for a variety of stakeholders to serve as HRB owners or customers, and participate in a variety of feasible business models.

The costs of HRBs are estimated at $8 per person per year, while the value they create is two-fold: 1) an estimated $87 in healthcare cost savings per person per year;[4] and 2) new value produced by applications and services that have access to platform-based HRBs, such as health alerts, health and wellness applications, and data mining.

National Infrastructure Cost Comparison	Query-based Health Information Exchange (HIE)[5]	Interoperable PHR[4] Capable of Consumer-Mediated HIE (HRB)
One-time Acquisition Costs	$129 Billion	$3.7 Billion
Annual Costs	$9.54 Billion	$1.9 Billion

The following chart illustrates that various entities can benefit in more than one way from HIE business models that are based on an HRB infrastructure. For example, since HRBs lower

healthcare costs, insurers/payers may wish to pay for HRB accounts for all beneficiaries in order to capture these savings, but may also see the opportunity to build an HRB as an investment and future business. Similar savings and opportunities are available to other entities, also. The chart suggests potential roles of various entities relative to HRBs:

Entity	Own/Create/Sponsor	Paying Customer
Insurers/Payers*	X	X
Employers*	X	X
Government*	X	X
Providers	X	X
Consumers*		X
Advertisers		X
Researchers		X
Investors/Entrepreneurs	X	
Financial Banks	X	
Community-based Non-Profits (e.g., Health Information Organization)	X	
Others	X	

*These entities could also accrue the estimated $87 per member per year in healthcare cost savings

Pricing/revenue models could include any of the following (paid for by potential customers listed above):

- Free basic accounts
- Subscription fees for accounts
- Charging a percentage of app purchase price for any third-party apps purchased
- Charging for advertising or the elimination of advertising
- Charging for access to data for research purposes
- Charging for additional related services, such as Direct secure messaging for providers and/or consumers

Health Record Banks offer tremendous opportunities to establish a variety of sustainable business models. Due to relatively low startup and operational costs, HRBs produce healthcare cost savings and create new value for a variety of stakeholders. HRBs are not merely sustainable, but potentially highly valuable, profitable businesses that positively impact their stakeholders, the nation's and world's health, and the economy.

I. Introduction

As the nation aggressively explores requirements and systems for successfully sharing and exchanging health information, multiple interrelated elements need to be understood before stakeholders can make informed decisions with the best chances for success. One of the most critical elements underpinning success or failure is the choice of business model. The Health Record Banking Alliance (HRBA) authored this white paper to facilitate the further consideration and expansion of consumer-mediated exchange of health information. We show that estimated value and costs, combined with architecture and consumer access factors, suggest a variety of feasible health record banking business models for consideration.

What is Consumer-mediated Exchange?

The Office of the National Coordinator (ONC), and the Bipartisan Policy Center both recently expressed a stated direction and interest in furthering the consideration and expansion of Consumer-mediated Exchange. [2,6,7,8] In the past year, ONC included Consumer-mediated Exchange among the three types of exchange it will support – the other two being Directed Exchange and Query-based Exchange.[2]

> Consumer-mediated Exchange: Consumers with access to and control over their own health information can share information with providers, and other parties.[2]
>
> Directed Exchange: Parties known to each other send and receive a patient's health information via secure messaging protocols.[2] Directed Exchange is also being promoted for secure messaging between providers and consumers (and consumers' PHRs).[9]
>
> Query-based Exchange: Providers are able to query a system to retrieve a patient's health information when delivering unplanned care.[2]

Directed Exchange (formerly known as "the Direct Project"), a new federal effort called "Automate Blue Button Initiative" (ABBI), and the new Meaningful Use Stage 2 Core Requirements to facilitate patients' ability to "View, Download, and Transmit" (VDT) their health information are working together to further consumer-mediated exchange, and in the process lower the costs of health record bank implementation and operations.

Directed Exchange uses Direct secure messaging standards, essentially a secure email. As described in "the Direct Project Overview," Direct "specifies a simple, secure, scalable, standards-based way for participants to send authenticated, encrypted health information directly to known, trusted recipients over the Internet."[10] Direct can be used for communications between healthcare providers, between providers and patients/consumers, and ultimately between any

two known persons or entities (e.g., family members). Consumers can have a Direct address associated with their Personal Health Record (PHR) or health record bank (HRB) accounts, and ask providers, payors, and other holders of their health information to send that information to their account via their Direct address.

> *For example, Microsoft already provides those with HealthVault accounts with Direct addresses that look like the following: jane.doe@direct.healthvault.com*

The Automate Blue Button Initiative (ABBI), led by ONC, is an expansion of the earlier Blue Button project run by the Veterans Administration (VA). The original Blue Button program facilitated veterans' clicking on the Blue Button graphic within the VA's MyHealtheVet patient portal, and downloading to their computer or an external device their health information in an ASCII text format, for subsequent review or sharing.[11] Blue Button was then quickly expanded by the Centers for Medicare and Medicaid Services (CMS) to allow Medicare beneficiaries to download their claims data.[12] As of August 2012, the VA reported that one million veterans had registered to use the Blue Button.[13]

Expanding Blue Button through the Automate Blue Button Initiative is intended to broaden the number of organizations that make data available to consumers via the Blue Button. It also provides the ability for the information to be viewed and downloaded in both human and machine readable format, and transmitted to a location of the consumer's choosing. As stated in the new Automate Blue Button Project Charter, the initial two goals are:

> **PUSH:** Automating the private and secure transmission of personal health data to a specific location of the consumer's choosing.
>
> **PULL:** Allowing a third party application of the consumer's choosing to privately and securely access personal health data on demand.[14]

Finally, Stage 2 Meaningful Use (providing incentives to hospitals and physicians that "meaningfully use" an Electronic Health Record) includes the following two Core Requirements:

> **ELIGIBLE PROFESSIONALS (EP):** Provide patients the ability to view online, download and transmit their health information within four business days of the information being available to the EP (>50% provided timely access; >5% view, download, and transmit)
>
> **ELIGIBLE HOSPITALS (EH):** Provide patients the ability to view online, download and transmit their health information within 36 hours after discharge from the hospital (more than 50% within 36 hours have access; more than 5% view, download or transmit to a third party)

Eligible Professionals are also required to use secure messaging to communicate health information to their patients as a Core Requirement of Stage 2.[15]

It is expected that the transfer of health information by the patient in the Blue Button and Meaningful Use scenarios will very likely be done using Direct (e.g., sending via a Direct address to a PHR or HRB account). As one of the perceived weaknesses of PHRs in the past was their reliance on patient-entered data, the three programs above, on their own and combined, will enable consumers, providers, payors and others to transmit data to and from a PHR or HRB in an automated way. This not only facilitates data acquisition, but reduces the need for costly interfaces between PHRs/HRBs and organizations holding or needing to view consumers' data. It also solves a problem of interstate, and potentially international, Health Information Exchange. When consumers move their own data, there is no need for data sharing agreements between health care facilities or governments.

What is a Health Record Bank?

A health record bank (HRB) or trust is an independent organization that provides a secure electronic repository for storing and maintaining an individual's lifetime health and medical records from multiple sources, while assuring that the individual always has control over who accesses the information (to the maximum extent allowed by law).[18]

An infrastructure comprised of health record banks meets the key requirements of providing comprehensive electronic patient information when and where needed, protecting privacy with dynamic patient access control, and enabling financial sustainability. Generic HRB architecture is important to the business model, as it is a lower-cost infrastructure, facilitates more value creation, and ultimately enables consideration of a wide variety of potential business models. A separate HRBA white paper addresses generic HRB architecture, including how a national (and internationally scalable) system of HRBs could interoperate.[16] Such a network of HRBs could be the foundation for both a feasible and sustainable nationwide health information infrastructure and for an international health information infrastructure (in the same way consumers control the movement of their financial information internationally).[17] HRBA's website features two videos that provide an overview of a HRB and a comparison of HRB to traditional, Query-based HIEs.[18]

Why do Health Record Banks Facilitate Feasible Business Models?

Since HRBs compile health information for a consumer in one place, human and machine access to and further population of the record is greatly simplified, and the creation of consumer-controlled search-based value is facilitated.[17] This remainder of this paper offers a more detailed description of HRB value creation.

Business Model versus Sustainability Model?

The term "sustainability" is frequently used when referring to business models for Health Information Exchange. There are many reasons for use of this term. The two most compelling are

the desire by the healthcare stakeholders for the ongoing process of sharing information between providers (primarily Query-based Exchange) to be "sustained" financially due to consumer and provider acceptance; and the large number of organizations performing or hoping to perform such HIE that have shut down due to a lack of sufficient revenue to sustain operations.

In this paper, the focus is on use of the term "business model." We believe that the architecture and consumer control of health record bank accounts actually facilitate platforms for both a limited set of necessary health information sharing functions and for ongoing creation of new functions and value via "substitutable applications" (apps). These apps will allow health record banks to thrive as businesses (regardless of whether they are for-profit or not-for-profit), and be much more than merely "sustainable."

What is a Business Model?

Business models are defined in many ways, some more complex than others. In this paper, we use the following definition:

A business model consists of two elements:

1) What the business does
2) How the business makes money doing these things[3] (which also implies knowing who the customers are, and how they will produce revenue for the business)[19]

A specific health record bank, then, would choose a business *model*, and then produce its own unique business *plan* built on this model. The business plan (often considered a detailed "pitch") will often include the problem, solution, business model, marketing and sales plans, competitive analysis, management team bios and accomplishments, financial projections and key metrics, the current status of the business, and the planned use of the funds sought and generated.[19]

II. The Elements of Health Record Banking Business Models

What the Business Does

Though the basic definition of a health record bank set out above often is understood in terms of a version of a Personal Health Record (PHR; a single application backed by a database), the advent of health record banks using Personal Health Platforms (from a technical and business point of view) greatly expands the potential value, attractiveness, utility, and revenue opportunities of HRB business models. Using the terms of the MIT Sloan working paper on business models, this allows for potential expansion of HRBs from purely the "landlord" model of "leasing" an asset (e.g., online PHR accounts) to one of also serving as a "broker" or marketplace connecting consumers with additional purveyors of products and services.[3]

Personal Health Platform (PHP) is a term coined by Chilmark Research, which proposes the following definition:

> *A Personal Health Platform (PHP) is an Internet-based platform that securely stores and manages a citizen's personal health data, data that may be derived from multiple sources including among others clinical systems, payer systems, self-entered data, and biometrics. The PHP also provides the framework and capabilities to support applications, services and/or tools that a citizen may invoke to leverage their personal health data enabling the citizen to make better, more well-informed decisions regarding their health or the health of a loved one.*[20]

Thus, if an HRB uses a platform-based approach (i.e., PHP), and not just a single application (i.e., PHR) approach, the functionality becomes limited only to the creativity of the marketplace to build and offer value-added applications, services and tools to meet the needs of anyone wanting, subject to consumer control (active or passive), to populate or access the personal health data. Many PHR applications (as opposed to platforms), however, also continue to expand their native functionality, often incorporating functions such as secure messaging and health alerts that might otherwise be provided by a third-party application (app).

Health information sharing via one or more platforms (whether consumer controlled, or other), featuring substitutable applications, was enthusiastically discussed by private sector, academic and government health IT leaders at "The Meeting at Harvard on a Health Information Technology Platform" in 2009.[21] Directly applicable to the development of health record banks, the SMART project (Substitutable Medical Apps, Reusable Technologies) at Boston Children's Hospital is one example of the continuation of industry, academia and government interest in this platform, which is funded through an ONC SHARP grant.[22]

PHR and HRB – What's the Difference? As the core functionality of an HRB is to store a consumer's longitudinal health record, HRBs are often intended to be a PHP or PHR implemented on a (geographic) community or regional basis, with interfaces to multiple, unaffiliated providers – much in the same way as an HIE – in order to import the majority of health information on a single consumer. Exceptions will include employer-sponsored models, where the deployment is across multiple communities or regions where the company has employees.

PHRs to date are primarily either tethered (a patient portal on a single provider organization's EHR), or untethered/independent – with the latter often being deployed nationally with few provider interfaces established. Those providers that interface with untethered PHRs to date have not been covering the same geographic region, so data from providers in an untethered PHR for a single patient often makes up a smaller amount of the data in a PHR than patient-entered, claims, or device-sourced data in the same PHR. Regional implementations of PHRs as HRBs, *with provider cooperation* (required by law and incented by Meaningful Use requirements), should instead result in the vast majority of the PHR data's being provider-sourced.[23,24,25,26,27,28] Many PHRs today visibly show the source of the data to those viewing a patient record. As some elements of PHR deployment and value are directly applicable to that of HRBs, this paper will

include references to PHRs when it is assumed that the same PHR value or benefit can also be assumed by HRBs.

Due to HRBs' focus on accumulating all of the necessary patient data, most of which typically resides in a given geographic area, they would fall under the classification of what Computer Sciences Corporation (CSC) calls "The *True* Personal Health Record."[29] CSC's Erica Drazen described a "True Personal Health Record" as "comprehensive, interactive, patient-controlled, and secure," and states that "no 'personal health record' on the market today possesses all the characteristics of a true PHR." HRBs seek to fill this gap.

How the Business Makes Money

The common structure for the HRB business model variations is as follows (the order of priority may vary):

I. An entity invests in, establishes, and/or begins to operate an HRB (owners and operators can be separate, also)
II. Interfaces to data holders are established for eventual compilation via auto-population of longitudinal health data for individuals
III. The entity "sells" (or gives away) HRB accounts *for* individuals – paid for by a variety of possible customers: consumers, employers, insurers/payers, government, even established enterprise and community health HIEs wishing to add a patient engagement component
IV. The individuals authorize population of their HRB account via the interfaces and other data retrieval
V. The individuals authorize sharing of their longitudinal data with healthcare providers – the value of healthcare cost savings accumulates
VI. Third party applications, services, devices and organizations are chosen (potentially purchased), and authorized by the HRB member to access their HRB account – additional, new value accrues

A great deal of variety is possible regarding which entities own the HRB; operate the HRB; pay for or cover the cost of basic HRB accounts; and provide applications, services, and devices. One thing is constant: consumers are the account holders, passively or actively controlling population of and access to their health information.

HRB business models have four key elements: 1) Value; 2) Costs; 3) Pricing Models; and 4) Sponsors/Customers.

Value. Two underlying factors facilitate creation of value through HRBs: (1) the information is contained in a centralized repository; and (2) consumers have direct access to and approval of the use of the information.

Centralized repository. Because the information is centralized, it can be easily accessed and analyzed by individual or population. Searching the data is exponentially faster when the data is centralized.[17] Such analysis could include consumer or provider decision support based on an individual's longitudinal medical record, or could be for population health (e.g., epidemiology, employee health) or research purposes. By publishing its application programming interface (API), an HRB's value is no longer limited to the creativity of its own designers, because a marketplace of substitutable applications (apps) can be built to serve those with access to the records (consumers and their designees, such as providers or family members).[30] Such consumer-based health platforms with app marketplaces are already in operation by Dossia and Microsoft HealthVault.[31] Under HRB principles, all uses would be subject to the consumer's active approval or pre-determined choices and consent.

Consumer access/control. By providing consumers with access to the information, a marketplace wherein the value is created is only limited by developers' creativity. If a traditional, Query-based HIE is centralized, it can produce some of this value, though it will be limited to the uses for which it has already disclosed, and to which consumers have agreed, if the HIE is to comply with the Fair Information Practice Principles as directed by the ONC's directive in the spring of 2012 to state HIEs.[32]

The value created by having the information in a central repository with consumer access and control can be divided into two basic categories: 1) Healthcare cost savings; and 2) New value.

Healthcare Cost Savings. The Center for Information Technology Leadership (CITL), a research center that was based at Partners HealthCare, performed much of the early analysis of the costs and value of interoperable health information and HIE, which was utilized by the ONC and other entities to showcase the value of HIE.[5] Four years later, CITL did the same analysis for various architectures and deployments of personal health records (PHRs).[4] One of the PHR deployments, with a centralized architecture like HRBs, is referred to as "Interoperable PHRs." They are described as deployed in geographic regions (communities of 10,000 or more) throughout the U.S., and are closely aligned with the HRB community-based model.

The CITL analysis of the value of PHRs was limited to just eight highly recognizable applications that would create healthcare cost savings if effectively utilized:

1. Sharing of Complete Test Results
2. Sharing of Complete Medication Lists
3. Congestive Heart Failure Management
4. Smoking Cessation Management

5. Appointment Scheduling
6. Medication Renewals
7. Pre-Encounter Questionnaires
8. E-Visits[4]

The healthcare cost savings of implementing only these eight applications across 80% of the U.S. population is estimated at $21 billion annually. Dividing this by 240 million people (80% of the 2006 Census estimate) yields an annual value of $87 per person.[33] This value would accrue to any organization or individual responsible for paying or contributing to that person's healthcare costs. The following are breakdowns of contributors (the entities that ultimately fund the payments) and those making actual payments for healthcare costs in the U.S. as of 2009:[34]

Contributors to Spending
Households: 28%
Federal Government: 27%
Private Business: 21%
State and Local Government: 16%
Other Private: 7%

Payment Sources
Private Health Insurance: 32%
Medicare: 20%
Medicaid: 15%
Out-Of-Pocket: 12% (Consumers)
Other Payers: 11%
Investment: 6%
Public Health: 3%

Thus, the value will initially accrue to the payment sources. It then theoretically passes on to those contributing to the payment sources. For example, the value could be passed on to businesses and individuals paying taxes that fund government healthcare payments.

New Value. As the information contained in the HRB is made accessible for new applications, additional value can be produced. The new applications could range from alerts that bring value to those managing the care of account holders, to health and wellness applications that may contribute to the wellness of the individual, to data mining that would contribute value to researchers and those running clinical trials (for which they may be willing to pay the HRB members and/or the HRB). The Rand Corporation, in an analysis sponsored by the Dossia Consortium, identified three categories of functions that a Personal Health Platform (referred to as a Consumer Controlled Personal Health Management System [or HMS] in their analysis), could provide:[35]

- Health Information Management
    - Personal Health Record (PHR)
    - Health Risk Assessment
    - Integration of Monitoring Data
- Promotion of Wellness and Healthy Lifestyles
    - Educational Content
    - Reminder Systems
    - Integration with (employer) incentive systems
    - Social-Networking Tools
- Healthcare Decision Support
    - Data on Price and Value of Providers
    - Telehealth Consultations

Note that some of these functions will contribute to health care cost savings and others may create new value, and were identified also in the context of potential employer sponsorship/benefit.

Those familiar with the Health 2.0 movement will recognize that nationwide implementation of HRBs - populated with provider data and accessible to third party applications - could unleash a flurry of activity, innovation and investment in new technologies and consumer marketing of Health 2.0 applications. These applications would positively impact the health of Americans and, in addition, create information technology-based economic development.[36]

Summary of Value. As the CITL analysis shows, a set of very limited basic functionality interacting with an HRB could produce $87 per year per person (over $7 Per Member Per Month in health insurer terms) worth of value in healthcare cost savings. The savings would accrue to those paying for healthcare. Additional applications can create additional value accruing to the HRB members (individuals/families), to those paying for healthcare costs (if the applications contribute to wellness), and to outside entities wishing to mine the data for research, clinical trials, or public health (and these entities may be willing to pay the HRB members and/or the HRB for this value). Finally, if widespread use of platform-based HRBs incents new third party device and application development, the growth of such companies contributes to economic development, as indicated by the estimated creation of 210,000 app-related jobs by Apple's iOS platform.[37] An estimated 9,000 health apps had been created by September 2011 for the iPhone platform alone, with over 13,000 anticipated by July 2012.[38] Access to longitudinal health information, as contained in HRBs, creates huge additional opportunities for innovation.

Costs. CITL, in both its PHR and HIE studies, did extensive analyses of costs as well as value. When the CITL total and per-capita cost results of each study are compared, dramatic differences are shown in both initial and ongoing costs. Both the HIE and PHR models take into consideration establishing interfaces to data sources, which would allow accomplishing the basic element of health information sharing (exchange). The HIE costs include installations of more

advanced clinical systems (Electronic Health Records), capable of greater interoperability, but even adjusting for those numbers, the HIE costs are much greater than the HRB costs.

National Infrastructure Costs

	Query-Based Health Information Exchange (HIE) [5]	HIE without clinical systems	Interoperable PHR capable of Consumer-Mediated HIE (HRB)[4]
Initial Costs	$320 Billion	$129 Billion	$3.7 Billion
Annual Costs	$20.2 Billion	$9.54 Billion	$1.9 Billion

Each HRB's centralized technical infrastructure and applications are estimated to be established and operated much more cost-effectively than Query-based Exchange. The estimated technical costs of geographically-based HRBs are only $8/year/account, depending on number of subscribers, or approximately $0.67 per member/per month (PMPM) using insurance-related cost terminology.[4] The $8/year/account is based on estimates for a population of 560,000 members for each interoperable, geographically-based PHR.[4] Given the economies of scale of centralized architecture, the cost per user is expected to decrease as the population served increases. HRBs organized on a state, multi-state, or even national basis would eventually have even lower per-subscriber costs.

The basic costs of an HRB can be broken down into four categories, two of which (infrastructure and applications) were described and estimated by CITL: [4]

I. Infrastructure (technical)
   a. Data Center
   b. User Authentication and Authorization
   c. Internet Connectivity
   d. End-User Interfaces (consumer)
   e. User Support
   f. Record Matching Services
   g. Data Interfaces
   h. Data Storage
   i. Secure Messaging
II. Applications (technical)
III. Marketing/Customer Acquisition
IV. Administration/Governance

User authentication and authorization, though requirements for HRBs, are not addressed in this paper. Because this subject pertains to business models, however, some entities that choose to own, build, sponsor or offer HRB accounts may have a competitive advantage if they already authenticate individuals (e.g,. financial banks, providers, employers, insurance companies), or have other robust infrastructure or offerings that can be leveraged in provision of an HRB, lowering implementation or operational costs, and/or reducing time to market.

The additional costs of marketing/customer acquisition and administration/governance will depend upon the business model and stakeholders involved in rolling out the HRB. For example, if the organization is new and relatively unknown in its geography, marketing the HRB without a strong relationship with providers or employers, and its sole operation is the HRB, then its costs will be significantly higher than if the HRB is operated by an existing, well-known entity that is working hand-in-hand with providers and/or employers - and which may be adding HRB services to others that it already offers to consumers in the same geographic area. Examples of the latter could include a Health Information Organization, health insurance company, financial bank, retailer, institution of higher education, or community-based non-profit.

Because the costs of some technologies continue to become commoditized, with data storage costs per unit decreasing, the pricing of the HRB technology costs may now be even lower than at the time CITL wrote its report on PHR value. Regardless of specific estimates, it is clear that the costs of PHR-based infrastructure utilized for HRBs continue to be much less expensive than those of Query-based HIE.[39]

Pricing Models. A variety of models exist both to establish pricing and receive payment for HRB accounts. These include the following:

1. Free. Using a "freemium" model, operators of an HRB may offer the actual accounts – or basic accounts –free to users, subsidizing the operating costs by:
    - **a.** Optional purchases of premium accounts, and services
    - **b.** Revenue from third-party application presence and/or sales (shopping mall model)
    - **c.** Advertising revenues or payment for turning off ads
    - **d.** Revenue from other non-affiliated products/services already purchased by the consumers (e.g., financial banks)
    - **e.** Internal administrative savings through HRB use for health education, self-care/management, etc. (e.g., insurers/payers)
    - **f.** Healthcare cost savings or incentive payments as part of a Patient Centered Medical Home, Accountable Care Organization, or HITECH Meaningful Use
2. Annual subscription payments for individual accounts paid for by a consumer/patient, payer, provider/provider group, or HIE (as detailed below)
3. Monthly subscription payments for individual accounts paid for by a consumer/patient, payer, provider/provider group, HIE, or other (as detailed below)

4. One-time, lifetime account payment (with a lower, ongoing operational cost per account to keep data feeds active) paid for by a patient, payer, provider/provider group, HIE, or other (as detailed below)

Sponsors/Customers. Due to the value that accrues from HRB use to multiple stakeholders in the healthcare marketplace and the potential for revenue from new value creation, there are a number of entities that may benefit from sponsoring or supporting their ongoing operations, or becoming a paying customer.

Insurers/Payers. Due to the healthcare cost savings that result from HRB use, as detailed above, insurers who are paying the majority of the healthcare expenses may be interested in exploring a return on investment from their members' or employees' (in the case of self-insured employers) participation in HRBs. This follows much of the same logic applied to health insurance companies' support of HIE operations in many states and regions.

Existing examples of HRB-like business model support by insurers/payers (including self-insured employers):

1. Dossia.org (self-insured employers)[40]
2. CarePass.com (supported by Aetna)[41]
3. SimplyWell (self-insured employers)[42] [43]

Employers. Self-insured employers will achieve the same benefits listed above under ***Insurers/Payers.*** Employers that are not self-insured may wish to support HRB use to achieve better health/wellness and productivity of their workforce, to offer HRBs as an attractive employee benefit, and to increase the likelihood that their employees receive good healthcare. According to the National Business Group on Health, in 2009, 39% of large employers offered a PHR (similar to HRB), and 7% offered employees a financial incentive to use one.[44]

Additional examples of HRB-like business models supported by employers:

1. Carlson Companies support/use of myHealthFolio[45]
2. Starbucks support/use of WebMD[46]

Government. Governments fall into several categories, including those of insurer/payers (e.g., Medicare, Medicaid, self-insured employers) and employers (non-self-insured), but many also have varying degrees of responsibility and interest in disease control and prevention and other public health functions. In cases where the government has taken on a role of insuring the majority of the citizenry, such as the UK and Canada, governments are attempting to implement HIE and HRB-like functionality.

Existing examples of HRB-like business model support by governments:

1. Province of Alberta, Canada's use of Microsoft HealthVault[47]

2. Australia's launch of the Personally Controlled Electronic Health Record (PCEHR)[48]
3. Funding to expand use of the MyOSCAR PHR by the Federal Economic Development Agency for Southern Ontario[49]

Providers. Providers may already be offering a tethered-PHR, otherwise known as a patient portal. Even in cases where providers are part of an HMO or Integrated Delivery Network, they recognize that many patients still receive care from other providers. In cases where the providers are incented or otherwise interested in increasing the likelihood that the patient receives high quality care, regardless of the use of their own facilities (e.g., PCMH, ACO), there may be the same interest in supporting an HRB as there is in supporting a multi-(non-affiliated) provider HIE. The HRB can also serve as a platform for patient engagement and provision of information to the patient, as required to qualify for EHR Meaningful Use incentives.

Existing examples of HRB-like business models supported by providers:

1. NoMoreClipboard's work with Meridian Health (4 hospitals), Bon Secours Health System, and other providers.[50]
2. RelayHealth and Hill Physicians[51]
3. RelayHealth and Jersey Health Connect[52]

Advertisers. In *Personal Health Records: The Essential Missing Element in 21st Century Healthcare*, published by HIMSS, the chapter on "PHR Business Sustainability Models" describes advertising as follows:

> "In the context of ePHRs, it is possible for advertising to be customized based on the information in the consumer's ePHR. For example, a consumer who has diabetes could be shown ads for glucose meters. Such "targeted" advertising usually produces a higher response rate and is therefore more valuable to sponsors. The usual and legal incentive is to obtain consumer authorization for such advertising."[53]

Researchers. Due to the large existing market for secondary use of health information by pharmaceutical firms, researchers, and insurers, there is a potential market for secondary use of HRB data.[53] Use of this data would be only with the patient's consent.

Investors/Entrepreneurs/Existing (non healthcare) Businesses. Whether existing companies seek to add additional service lines (e.g., financial banks, retailers, software or IT firms), entrepreneurs seek to launch new businesses, or institutional or private investors seek a good business opportunity, participating as an owner of an HRB and benefiting from the potential return on investment (ROI) may incent investment from a number of parties. These are companies that may have limited participation in the healthcare marketplace beyond paying for employee health insurance (and this product line).

Existing examples of HRB-like implementations by existing businesses or entrepreneurs:

1. Microsoft HealthVault[54]
2. Cognovant's PocketHealth[55]
3. Patient Command[56]
4. MotherKnows[57]

. . . and many more

Financial Banks. Though financial banks fall into the category mentioned above, they warrant an additional note due to the HIMSS Medical Banking Project, begun in 1995 by John Casillas. Mr. Casillas recently discussed the very real opportunities for using online banking as a platform for promoting PHRs.[58] Financial banks are already highly regulated regarding privacy and security, have robust consumer authentication processes, and established consumer and business relationships. All these attributes could be leveraged to promote rapid uptake of PHRs or HRBs.

Consumers. Consumers, as the ultimate recipients of most all of the value from an HRB, should be the most incented to support its ongoing operations. Multiple surveys performed by Accenture have shown that consumers are interested in accessing and even paying for PHRs – with 52% of consumers indicating they would be willing to pay $5/month or more in 2005, and 51% indicating they would be willing to pay a "reasonable fee" in 2007.[59] [60]

Existing examples of HRB-like services being proposed or offered directly to consumers include Cognovant's PocketHealth, Patient Command and MotherKnows listed above.

Community-based Non-Profit. A combination of stakeholders – such as insurers, providers, government, community HIEs, and/or employers – may wish to form a non-profit to share the costs of implementing an HRB and reap the community benefits from its presence. The combined visibility, consumer engagement, and marketing power of these organizations could be utilized to promote rapid adoption by the community. Many such organizations have already formed as Health Information Organizations (HIOs) throughout the United States. Though most HIOs have been working to establish Query-based Exchange in their communities, the lower cost and potentially higher value of HRBs may make them a suitable alternative or additional business line for HIOs.

Others. This list of possible HRB sponsors and customers is most likely not complete, and additional unanticipated market entrants seem likely. One such innovative entrant that does not fit into the above categories is Harvard University, which launched the MyDataCan Health Record Bank in early 2012, based on the Indivo PHR.[61] [62]

III. Summary

As discussed, various entities can benefit in multiple ways from HIE business models that are based on an HRB infrastructure. For example, as HRBs lower healthcare costs, insurers/payers (including self-insured employers and government payers) may wish to pay for HRB accounts for all beneficiaries in order to capture these savings, but may also see the opportunity to build an HRB as an investment and future business. Similar savings and opportunities are available to other entities, also. The chart suggests potential roles of various entities relative to HRBs:

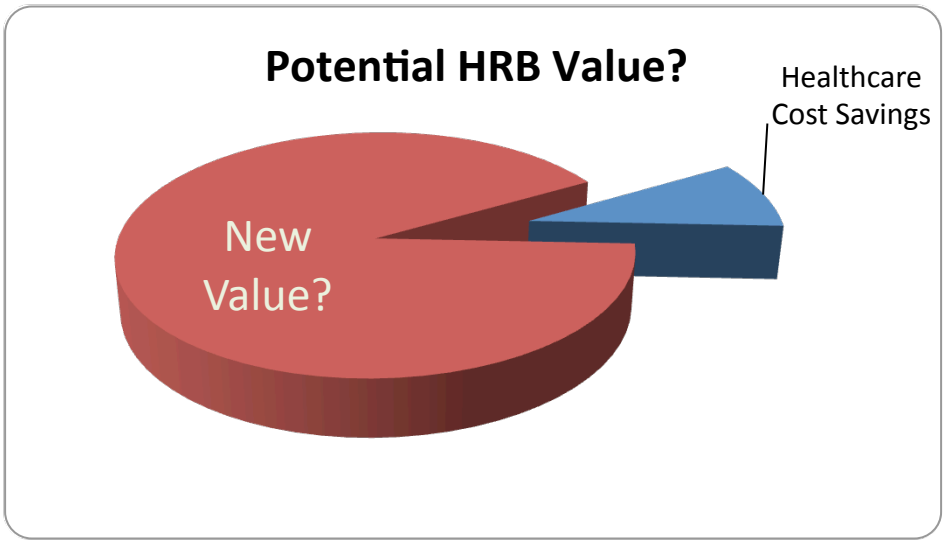
Entity	Own/Create/Sponsor	Paying Customer
Insurers/Payers*	X	X
Employers*	X	X
Government*	X	X
Providers	X	X
Consumers*		X
Advertisers		X
Researchers		X
Investors/Entrepreneurs	X	
Financial Banks	X	
Community-based Non-Profits (e.g., Health Information Organization)	X	
Others	X	

*These entities could also accrue the estimated $87 per member per year in healthcare cost savings

Pricing/revenue models could include any of the following (paid for by potential customers indicated above):

- Free basic accounts
- Subscription fees for accounts
- Charging a percentage of app purchase price for any third-party apps purchased
- Charging for advertising or the elimination of advertising
- Charging for access to data for research purposes
- Charging for additional related services, such as Direct secure messaging for providers and/or consumers

Health Record Banks offer tremendous opportunities to establish a variety of sustainable business models. HRBs compile patient/consumer information in one place and make it immediately available in a secure repository. They use a centralized, platform-based architecture, combined with relatively low startup and operational costs. With these architectural and systems advantages, HRBs produce healthcare cost savings and create new value for a variety of stakeholders. HRBs are not merely sustainable, but potentially highly valuable, profitable businesses that positively affect their stakeholders, the nation's and world's health, and the economy. Until large-scale HRBs are created, it is difficult to accurately quantify their real value, but the existing evidence clearly demonstrates that their centralized, platform-based architecture and consumer control represent a very promising new paradigm for HIE value and business models (and therefore, sustainability) and should be explored.



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