

A Cost Effective Method to Create a Universal Healthcare Identifier System

Barry R. Hieb

Chief Scientist, Global Patient Identifiers Inc., Tucson, Arizona, USA

Abstract

The prohibitive cost associated with creating a universal healthcare identifier has been one of the primary barriers to the creation of such a system. The Voluntary Universal Healthcare Identifier (VUHID) project takes a radically different approach to solving this problem compared to previous proposals. This article examines the economic impact of this approach and discusses why the unique VUHID approach permits implementation of the system at a small fraction of previously estimated costs.

Keywords: healthcare identifiers, patient identification systems, costs and benefits, integrated health care systems, health care economics and organizations, health care technology

1. Background

Accurate patient identification is critical to the practice of healthcare. Particularly in today's increasingly automated environment it is essential that each piece of clinical information be accurately attached to the correct person. Unfortunately it is becoming more difficult to ensure that this is the case. Clinical care providers are dealing with larger patient populations and more interactions between increasing numbers of care giving organizations as entities such as health information exchanges (HIEs) emerge. Because more and more information exchange is occurring electronically the patient is often not present to provide confirming demographic information if it is needed at the time clinical data must be processed. Varying amounts and quality of patient identification information can lead to errors in patient identification with potentially catastrophic results. The solution to this quandary seems clear – provide each person with their own unique patient identifier that can be used for unambiguous

patient identification across all healthcare venues. Unfortunately, this simple solution has proven to be very challenging to implement.

The ASTM E31 medical informatics standards group began studying issues surrounding standards for healthcare identifiers in the late 1980s. This analysis resulted in the publication of standard E 1714, Standard Guide for Properties of a Universal Healthcare Identifier (UHID) initially published in August of 1995 [1]. The current version of this healthcare standard describes 31 necessary properties of an identifier designed to exclusively serve the needs of healthcare. It also describes a proposed syntax for such an identifier in order to enable evaluation of the feasibility of implementing a system with the various properties described in the standard.

In 1996, the United States Congress passed the landmark Health Insurance Portability and Accountability Act (HIPAA) legislation that mandated, among other things, the establishment

of a national individual healthcare identifier capability. However, the implementation strategy for this system contained significant flaws, including the need for a massive central database of patient identification data. The existing privacy provisions contained in the HIPAA regulations were deemed to be inadequate to protect such a database. As a result, Congress subsequently rescinded this mandate and proscribed expending any additional funds on a national healthcare identifier until it deemed that these deficiencies had been rectified. That proscription remains in effect today and has effectively prevented any U.S Federal Government progress on this issue.

Despite this prohibition numerous analyses have been performed looking at the potential for, and implications of a personal national healthcare identifier [2 - 9]. Based on the perceived benefits of such an identification system many organizations have published statements support the creation of a national healthcare identifier capability, especially if it is

implemented on a voluntary basis [10 - 13].

The potential benefits of a national healthcare identifier are numerous and well-understood, including:

- Eliminates errors in personal identification.
- Enables comprehensive linkage of clinical information across multiple clinical information systems.
- Reduces healthcare costs related to repetitive capture of identifying demographic information, unnecessary or duplicate tests and procedures, etc.
- Reduces the rate of medical errors and unnecessary complications arising from caregivers having incomplete or inaccurate clinical information.
- Reduces the risk of medical identity theft by eliminating the need to repeatedly transmit large amounts of patient demographic information among clinical automation systems for the purpose of patient identification.
- Enables more efficient operation of registration and patient identification operations.
- Enables more effective and secure creation and operation of research databases.
- Empowers patients to establish more effective control of the privacy of their clinical information while maintaining the ability to share information for appropriate approved medical uses.

Unfortunately, although these benefits have long been understood, they have not been sufficient to lead to the creation of a national individual healthcare identification system. The historical barriers that have prevented progress on this issue are substantial.

- Prohibitive cost and effort – Estimates of the investment required to create a national healthcare identifier

range from \$1.5 billion dollars to tens or even hundreds of billions of dollars. Such a project could be expected to require five or more years to implement.

- Technical issues – There has not been any industry agreement on the architecture and operation of a healthcare identification system nor on the structure of a healthcare identifier.
- Lack of enabling federal legislation – The Congressional proscription against funding continues and has precluded any additional federal activity on this issue.
- Lack of national consensus – There has not been agreement across the various healthcare stakeholders on how to address the patient identifier issue.
- Privacy concerns – The potential risks for abuse of a national database of patient-specific information continue to be substantial. Privacy protection legislation for clinical information is inconsistent and continues to evolve.
- System conversion requirements – The time, money and effort necessary to convert existing clinical automation systems to use a new identifier is generally viewed as being prohibitive.
- Synchronous project initiation – There does not appear to be an adequate mechanism to effect the simultaneous implementation of a nationwide healthcare automation system change.

This is a daunting list of issues preventing progress on any healthcare identifier project and, indeed, essentially no progress on the issue was made in the United States for the decade from 1995 to 2005. It was not until 2005 that the possibility of a new architectural and implementation approach was conceived that could potentially circumvent all of these barriers and enable progress on this issue.

In 2005, members of the ASTM International E31 medical informatics standards committee began to formulate a new approach to the individual healthcare identifier problem based on three fundamental changes in strategy.

- The first was to *make the system a voluntary one*. Rather than mandating use of such an identifier, why not let each person/patient decide whether to use one based on the value that particular individual perceives in having such a capability? By using such a ‘grass-roots’ approach, many (but no means all) of the privacy concerns about such a system could be mitigated. Individuals who feel that the use of such an identifier offers them more benefit than risk are free to participate while those who are convinced otherwise are free to continue their current practices.
- The second major change was to *integrate the identification system with the health information exchanges (HIEs) and regional health information organizations (RHIOs)*¹ that are emerging across the United States as part of the strategy to create a Nationwide Health Information Network (NHIN). This allows the identification system to take advantage of numerous capabilities inherent to the activities of an HIE rather than having to duplicate those functions within the identifier system.
- The third change was to architect the identifier system in a way that permits it to provide full identification and information linkage capabilities while actively *preventing the possibility of creating any centralized repository* containing patient identity, demographic or clinical information. Designing the system to avoid any reliance on such a repository yields numerous secondary benefits. Most significantly it eliminates a large set of privacy and security concerns about the management of a huge central

1. For the purposes of this paper we will consider the terms HIE and RHIO to be synonymous and use HIE as the designated acronym.

repository of sensitive information. It vastly simplifies the data requirements of the information system and also the operational support that it requires. Because of this, the resulting system is sufficiently flexible to concurrently support a wide spectrum of operating models on the part of participating HIEs and other healthcare organizations. The identification system is more flexible because it imposes minimal requirements on each of the participating systems. Finally, the cost of the identification system has been substantially reduced because of the simplicity of the resulting design.

Global Patient Identifiers, Inc. (GPII) was formed as a non-profit organization in 2008, dedicated to healthcare and to the support, development and deployment of the Voluntary Universal Healthcare Identifier (VUHID) system. It is premature to draw any final conclusions, but at this point GPII is proceeding with the VUHID project in the belief that it has 'solved' each of the barriers listed above to the creation of a national individual healthcare identification system. Other documents will explore various aspects of this propo-

sition but this article is focused on an analysis of the costs required to implement the VUHID system.

2. Implementation Strategy

Based on the implementation strategy described in ASTM International standard E 2553 [14], an effort to create what has come to be known as the Voluntary Universal Healthcare Identifier (VUHID) system was formally initiated in 2007. The system is now operational and GPII is actively seeking beta test sites to verify the operational robustness and economic efficiency of the system.

The VUHID system architecture involves a web-based server that communicates via secure communications channels with the enterprise master person index (EMPI) systems that exist at the core of each HIE (see Figure 1). The EMPI in turn is in electronic communication with the various care delivery organizations that are participating in the HIE. Using this architecture means there are a reasonably limited number of organizations that communicate with the server and each EMPI is in charge

of tracking the changes within its organization over time.

Many HIEs will offer VUHID identifiers to their participants as an option. In order to obtain a VUHID identifier in such an organization, a patient must request one from the staff of one of the caregiver organizations participating in the HIE. The staff collects sufficient demographic information on the patient to clearly identify them to the EMPI and passes this information to the EMPI along with the request for an identifier. The EMPI performs a demographic match on the person and verifies that the individual represents a known entry in the EMPI database, or creates a new EMPI record if this is a new person. The EMPI then generates a request for an identifier and submits it to the VUHID server. Note that the request does not contain any information about the patient, nor does it contain any patient-related data, it is simply a request for an identifier. Also note that an HIE may request blocks of VUHID identifiers which can be stored and managed by the EMPI to make the assignment process even more efficient.

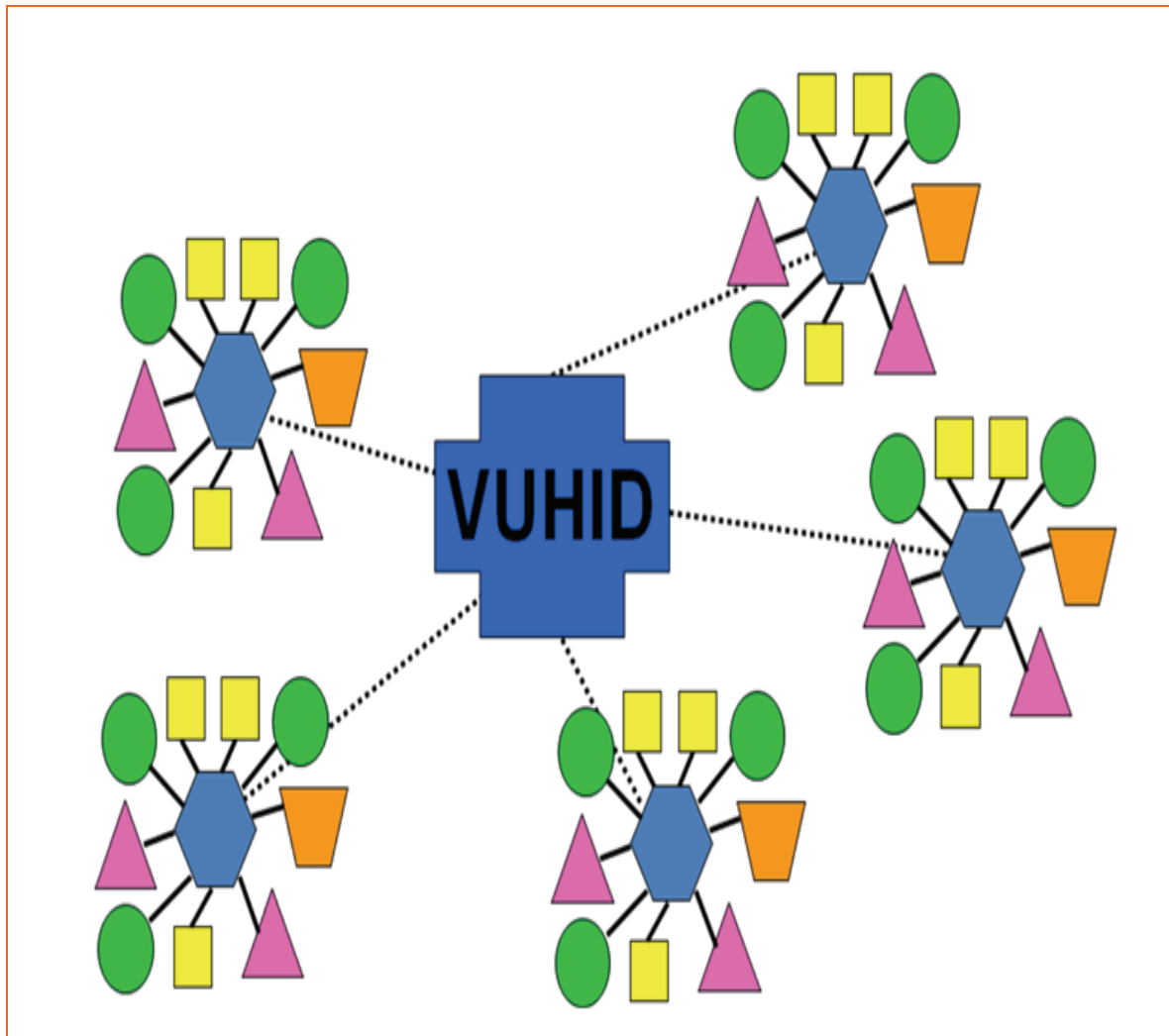


Figure 1: Basic VUHID System Architecture

The VUHID system consists of a web server that communicates exclusively with the EMPI systems at the heart of HIEs represented here as a central EMPI surrounded by a cluster of healthcare provider organizations.

The VUHID server receives the request over a secure channel and in response generates a new unique identifier. It notes the date and time the identifier was generated, marks that identifier as active and notes the EMPI system that will receive it. It then sends the identifier back to the requesting EMPI. The EMPI, upon receipt of the identifier, links it to the patient's demographic information as well as to any other identifiers by which that person is known through-

out the various organizations that are participating in the HIE. The identifier is printed on an ID card either at the EMPI facility or back at the local physician's office and delivered to the patient. From that point on, the person can present their VUHID identifier to any caregiver organization that is participating in the HIE and their current demographic information as well as clinical information can be shared electronically.

Once a person has received a VUHID identifier (see Figure 2), it can be used going forward in time to link all the medical encounters being managed in their HIE. This means that, over time, their comprehensive medical record can be assembled without errors relating to patient identification. This compares to a cur-

rently reported error rate of roughly 8% for patient identification based on demographic matching using an EMPI system. As the practice of healthcare evolves more and more toward the use of electronic information exchange for sharing clinical information, it is clear that an 8% error rate is not tolerable. In addition to the patient safety issues that such an error rate raises, there are substantial associated costs relating to duplicate testing, time spent searching for data, and errors and complications that result from incomplete knowledge about the patient. A primary goal of the VUHID system is to eliminate these errors and their associated costs for any person who chooses to participate in the VUHID network.

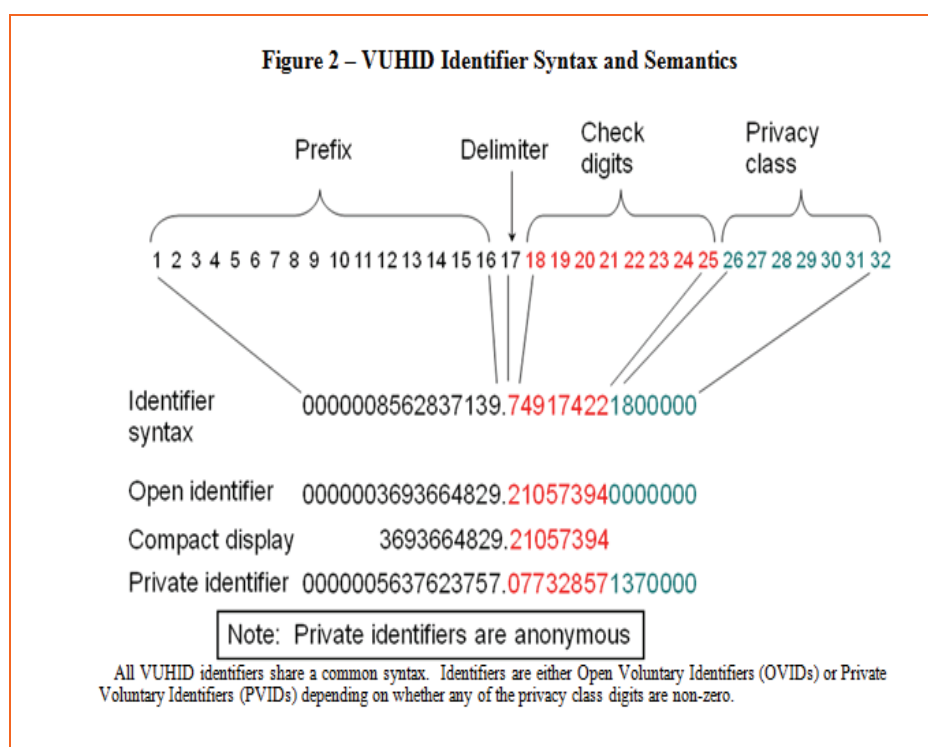


Figure 2 : VUHID Identifier Syntax and Semantics

All VUHID identifiers share a common syntax. Identifiers are either Open Voluntary Identifiers (OVIDs) or Private Voluntary Identifiers (PVIDs) depending on whether any of the privacy class digits are non-zero.

The clinical information automation system changes needed to implement the VUHID system are minimal because EMPI systems act as intermediaries. The VUHID system is anchored by a reliable, high-availability web server that is responsible for generating and tracking the status of healthcare identifiers that are globally unique. Most of the required software changes to implement the system are confined to enhancements of the EMPI system at the core of each HIE. This EMPI system needs to be augmented to support a set of transactions with the VUHID server. There are only a small set of functions required to support this. The transactions involved are:

- EMPI requests an identifier
- EMPI requests the status of an identifier

- EMPI requests retirement of an identifier
- EMPI requests termination of an identifier
- EMPI requests the location of clinical information relating to an identifier

These five transactions form the primary core of EMPI-VUHID communications. Because they are simple and straightforward, the time and effort required to implement them is minimal. The other major application change required is a modification to the HIE's registration systems which capture patient demographic information and the associated request for an identifier, then pass it to the EMPI system for processing. One option is for this to be implemented as a simple web application offered by the EMPI system that can be created with a minimal amount of programming. It is important to note that, by design, patient demographic information is never forwarded to VUHID. This data is used by the EMPI to enable accurate identification of the person at the time they are assigned a VUHID identifier. But the VUHID

server is never aware of the identity of the person associated with any VUHID identifier.

One of the benefits of the VUHID implementation strategy is that the major portion of the required development work to create the system is the creation of the high-performance, high-availability VUHID web server. While this is a significant project, it is well within the bounds of standard practice and has been accomplished efficiently and cost effectively. The minimal data maintained at this facility also contributes to a simplicity of design that yields significant cost savings. Also, secure communication methods are publicly available to handle the transactions between the VUHID server and various HIEs' EMPI systems. The net result is that development and implementation costs for the VUHID server system has been kept to a minimum.

The United States Office of the National Coordinator for Health IT, under direction of the Secretary of Health and Human Services, has indicated that the Nationwide Health

Information Network (NHIN) will be assembled as a network of HIEs. This means that any attempt to identify patients across the NHIN will need to transcend the variations that exist across a large number of independently developed and managed health-care organizations. A national or international standard identifier appears to be the only way to accomplish this task while permitting each HIE to function as an independent entity. The VUHID system permits each HIE to perform internal patient identification using whatever EMPI or EMPI-like functions it chooses while still making patient identification accurate and interoperable across multiple HIE domains throughout the United States due to the consistent syntax and semantics of VUHID identifiers.

3. Results to Date

The VUHID system is the result of over 19 years of intermittent work by the ASTM E31 standards group and is now being spearheaded by Global Patient Identifiers Inc. The initial ASTM task involved determining the necessary functions and operating principles necessary for an identifier approach to serve the needs of health-care and then verifying those results with the industry. Starting in 2005, the architectural foundation for the VUHID implementation project was established and there has been a continuous development effort since that time.

An information-only web site¹ was developed to describe various aspects of the project and to serve as a mechanism for interested parties to communicate with the VUHID staff. A high-performance computer server has been installed and the core software is operational. In parallel, there has been a low-level marketing campaign aimed at testing the various strategies and implementation approaches planned for the system.

VUHID demonstrations were held at both the Towards an Electronic Patient Record and Health Information and Management Systems Society (HIMSS) conferences in 2008 and again at HIMSS in 2009. Numerous presentations have been provided to potentially interested stakeholder groups and a large number of discussions have been held with HIEs, healthcare consortia, medical societies, healthcare standards and oversight groups, medical informatics groups and individuals interested in the patient identifier issue.

One result of this wide range of discussions is that the underlying operational concepts of the VUHID system have been thoroughly vetted by a wide range of healthcare stakeholders. VUHID identification services can be provided over a wide range of geographies and delivered under a spectrum of political and operational constraints. (For example, some organizations may issue these identifiers in a voluntary manner and others may choose to make them mandatory.) This means that the VUHID system can provide its services in virtually any currently existing health-care delivery environment. For this reason the potential of the VUHID system is not limited to any one country or geographic region. If over time the system is shown to deliver adequate value, it can be adopted anywhere. And the simplicity of VUHID operation ensures that it can service a wide variety of such environments simultaneously.

Additional information on the VUHID system can be obtained from our web site at <http://gpil.info>. VUHID also supports batch issuance of healthcare identifiers for specialized healthcare purposes such as testing, research and device identification. Full interactive support for HIE functions is anticipated later in 2010 as beta test sites become operational.

4. Cost Analysis

Thus far, the total investment in the VUHID system has been substantially less than \$100,000 and the project is nearing completion of its phase 1 deployment goals. These development costs will need to increase substantially as actual system deployment begins, with much of the additional expense relating to marketing the system, developing educational materials and providing for the various supporting functions required. Nonetheless, it is clear that the total central cost for creating and operating the system for the first five years will be less than \$10 million. This represents a small fraction of even the lowest previous estimates that have been made of the price to create a universal healthcare identification system.

Recently, a paper was released by the RAND Corporation [15] analyzing the costs and benefits of the current demographic matching approach using an enterprise master person index (EMPI) system compared to patient identification using a unique patient identifier. The paper includes extensive analyses of factors such as error rates and implementation costs. It notes that the implementation costs over the first five years should be significantly less than \$25 million but indicates that this cost would be insignificant compared to the \$1.5 billion dollars needed to deploy the system. This figure is derived by estimating that it will require five minutes to register each of the 300 million U.S. citizens at a cost of \$1/minute.

For purposes of cost comparison let's examine the first five years of operation for 50 million people who are enrolled in the VUHID system compared to 50 million people who continue to be identified using EMPI demographic matching. Assume that each of these two populations reside in 50 HIEs with one million members each. Each HIE has twenty offices

1. More information on the VUHID system can be found at <http://gpil.info>.

that each need to be equipped with software (ADT interface upgrade) and hardware (bar code readers) to handle registration of the patients in that office at an estimated cost of \$1,500. Assume that it requires 5 minutes to collect the demographic data and do a match using a standard EMPI system. Also assume that the average person has three new medical encounters each year where demographic matching is required as part of a patient registration. Finally, assume that it requires one minute to register a person using a bar code

reader once they have a VUHID identifier.

a. To equip each registration site with upgraded software and a bar code reader costs:

50 HIEs * 20 offices/HIE * \$1,500 per office = \$ 1,500,000

b. The cost at \$1/minute of the staff time to do the initial registration is:

50,000,000 persons * 5 minutes/person * \$1/minute = \$ 250,000,000

c. The cost of the staff time to do subsequent VUHID ID registrations:

50,000,000 persons * 1 minute/person * \$1/minute = \$50,000,000

For purposes of this example we have included a cost of \$50 million (\$1 per identifier) as the cost of the identifiers issued.

		EMPI\$	VUHID\$
1\$	Cost for central services\$	\$ -\$	\$ 10,000,000.00 \$
2\$	Cost to equipnregistration offices\$	\$ -\$	\$ 1,500,000.00 \$
3\$	Cost of identifiers\$	\$ -\$	\$ 50,000,000.00 \$
4\$	Initial registration\$	\$ 250,000,000.00\$	\$ 250,000,000.00 \$
5\$	2 additional 1st year registrations\$	\$ 500,000,000.00\$	\$ 100,000,000.00 \$
6\$	Registration costs for years 2-5\$	\$ 3,000,000,000.00 \$	\$ 600,000,000.00 \$
7\$	5 year registration costs only\$	\$ 3,750,000,000.00 \$	\$ 950,000,000.00 \$
8\$	Total 5 year cost\$	\$ 3,750,000,000.00 \$	\$ 1,011,500,000.00 \$

Table 1: Shows a comparison of the costs to register 50 million people using repetitive EMPI matching versus using VUHID identifiers.

Despite the cost associated with equipment to set up the registration offices (line 2), the cost for central services (line 1) and the cost associated with purchasing the identifiers (line 3); in the first year VUHID-based registration is roughly half the cost of EMPI-based registration. In subsequent years the cost avoidance is roughly 80%. At the end of 5 years as is shown in line 8 there would be over \$2.7 billion in cost avoidance using VUHID identifiers. It is for this reason that GPII believes that the attribution of \$1.5 billion in cost to a national healthcare identifier system is misleading without considering the comparable costs of continuing to register people on an EMPI basis. People will need to be registered into

the NHIN whether a unique identifier system exists or not. If a unique identifier is *not* implemented, patients will require *repetitive* capture of their demographic information for identification purposes, using EMPI matching each time there is a new encounter. Using the VUHID approach, only a single initial demographic match is required and subsequent encounter registrations should take about one minute. VUHID thus saves roughly four minutes of registration time for each subsequent encounter a patient has.

The analysis in Table 1 does not include the cost of issuing an identification card to each individual. We assume that every HIE will want to

issue some sort of ID card to people who join the organization regardless of the type of patient identification methodology they use. If, for any reason, there were to be a perceived need to include the cost of issuing an ID card to the analysis above, at a cost of \$2/person it would add \$100,000,000 to the total 5 year cost listed. If the analysis in Table 1 were to be scaled up to the entire U.S. population of 300+ million then the cost avoidance would be proportionately larger and would exceed \$10 billion over 5 years.

Note that this analysis considers only the savings associated with more efficient registration and does not take into consideration *any* of the

additional savings to be expected as a result of avoidance of duplicate tests, better patient outcomes, reduced rates of complications, or other factors considered in the RAND study. RAND indicates that these cost savings would be *substantially more* than those achieved from more efficient registration. It is this analysis that leads us to conclude that the VUHID system is by far the most cost-effective proposal for the creation of a universal healthcare identifier of any publicly available proposal.

Here is a discussion of some of the VUHID implementation aspects that enable the system's cost to be kept to a minimum.

- Non-profit operation – GPII is structured as a non-profit corporation. Other than initial server hardware and software, ongoing salary and operational expenses for its staff, the major GPII expenses will be to market the system. Since there is no need to create an ongoing profit stream, VUHID services can be offered at a minimal price.
- Web-based operation – The core VUHID capabilities are implemented as a series of web-available services. This ensures efficient system operation for VUHID clients regardless of geographic location.
- Highly leveraged deployment strategy – VUHID is designed to operate taking advantage of functions such as registration and marketing that are inherent to the operation of HIEs. This avoids duplication of existing resources leading to efficient and cost-effective operation of the system. VUHID expenses are limited to the incremental items that are not already part of NHIN activities.
- Consistent identifier syntax and operations – All VUHID identifiers, whether 'open' or 'private'¹ have an identical syntax. Further-

more, the transactions that support these identifiers are similar at the level of the VUHID server. As a result, the database modifications, software routines and operational procedures needed for an HIE to support VUHID activities are consistent and uniform across virtually all healthcare environments, thus minimizing the costs associated with adapting existing clinical information and automation systems to use VUHID capabilities.

- Minimal data base – The database supporting the VUHID system is as sparse as possible. Specifically, it does not contain any patient identity, demographic or clinical information. This vastly reduces the complexity of the database and also eliminates costs associated with the need to acquire, verify and update the information in such a database.
- Narrow operational focus – The VUHID system is focused on enabling unambiguous patient identification and enhancing patient privacy. By maintaining this focus not only is the project made feasible, it also is dramatically less expensive than alternative strategies.
- Minimal disruption of existing clinical automation systems – In order for patients to participate in the VUHID system, software enhancements must be made to the EMPI system at the heart of the HIE. An organization's registration systems may need to be enhanced in order to handle requests for VUHID identifiers. Other clinical automation systems such as a computer-based patient record system, an e-prescribing system or a pharmacy system may elect over time to incorporate VUHID identifiers in order to offer additional benefits. However, patients can receive immediate benefit from the system once the EMPI is VUHID-enabled

even though none of the other automation systems are modified.

- Incremental implementation – As a voluntary system, VUHID can be incrementally implemented over time. It is not necessary to orchestrate a 'big-bang' start for all automation systems or all patients. As a result, many of the costs to transition to the use of VUHID identifiers can be folded into planned future marketing activities and maintenance upgrades at a reduced overall cost.
- 'Near-canonical' open identifier strategy – The VUHID system makes available open voluntary identifiers (OVIDs) in a manner that encourages but does not enforce the concept that each person should only have one open identifier. (Note that any OVID identifier only ever points to one person so identifiers are unique.) There are safeguards that should eliminate the vast majority of inadvertent duplicate OVID issuance, but there is no attempt to defeat intentional acquisition by one individual of multiple OVIDs. The system is thus "near-canonical" rather than being able to guarantee that each person has only one identifier. This design choice eliminates the need for a massive central database. Not only does this eliminate significant costs, it also removes a major set of privacy challenges.

In addition to the centralized cost savings enabled by the VUHID architecture, it is also important to note the significant cost savings (potentially in excess of \$8.5 billion annually) that result from eliminating the 8% error rate from EMPI matching errors². False negative matching errors (erroneously deciding that two medical records represent different people) lead to fragmented medical records, unavailability of information, dupli-

1. Open identifiers are used for information that the patient wants generally available to all caregivers. Examples might be a broken arm, a bout of pneumonia and an episode of appendicitis. Private identifiers are anonymous and are linked to data a patient wishes to be kept private such as psychiatric records.

2. The RAND report [15] estimates that the elimination of just three factors: adverse drug events, duplicate testing and imaging would lead to an annual savings of \$8.5 billion per year. Other cost savings would be incremental to this amount. 1

cate testing and the potential for adverse clinical outcomes resulting from incomplete medical information in the hands of clinical therapists. False positive errors (incorrectly identifying two different people as being the same person) lead to the potential of disastrous medical outcomes resulting from treating a patient based on information relating to a different patient. The savings resulting from eliminating these errors represent a major systemic healthcare source of savings that far offsets the one-time cost of implementing the VUHID system.

Implementation costs for the VUHID project to date, as noted above, have been substantially under \$100,000. This figure will, of course, rise as we now proceed into initial implementation of the actual system. It is clear, however, that the overall cost to create and operate the central VUHID system, as well as initial marketing efforts and ongoing support overhead, will remain below \$10 million for the first five years of operation. In future years most of the central costs will likely be related to ongoing support functions and the marketing and educational activities needed to ensure adoption continues to increase around the globe. The VUHID system is currently functioning and is now ready for beta-test deployment.

A comment should be made about the deployment costs of an identifier with respect to the ID card that is actually issued to the patient. Because of the potentially large number of such cards (300 million for the entire U.S. population) it is clear that costs related to the issuance of these cards can have a significant financial impact. At GPII our operating assumption is that the least inexpensive approach to issuing these cards will be to print the card image on a plain-paper color printer, cut out the card and laminate it. This would likely have a mass production cost in

the range of \$0.25 per card. Individual HIEs are, of course, free to adopt other deployment approaches including plastic cards, magnetic stripes and smart cards that would have correspondingly higher expenses. However, each HIE will be responsible for establishing its own policy concerning the card type(s) it will approve. Further, whatever these costs may be, it is reasonable to consider them a part of the expense of registering patients into the HIE. At a cost of \$0.25 per card the net expense of issuing 300 million ID cards would be \$75 million. While this is not an insignificant sum it pales in comparison even to the lowest \$1.5 billion deployment cost estimate in the RAND report. Note that the RAND cost estimate, based on information produced by the Social Security Administration, assumes a higher quality (hence higher cost) secure card. The RAND cost estimate also assumes that the patient has been authenticated during the card issuance process. VUHID registration permits but does not demand these features so the probable actual cost of the authenticated VUHID card deployment would likely be in the \$300-\$600 million range if these costs are included.

While it is difficult to establish a true apples-to-apples cost comparison, the RAND Corporation estimates that the cost to establish a mandatory unique patient identification (UPI) system would range between \$3.9 and \$11.1 billion¹. At the end of their analysis, RAND states "... the value of a UPI may be considerably higher than the possible \$11.1 billion cost." Since the VUHID system and its approach to implementation can be accomplished for less than \$10 million the cost to benefit ratio of the proposed system is very high. Even if an estimated \$600 million cost for ID cards is attributed to the VUHID identification system rather than to the formation of HIEs, the resulting total system cost of \$610 million is dramatically less than the various

\$1.5 billion and \$11.1 billion costs given in the RAND report. Clearly if RAND felt that those costs would be justified by the return on investment then a \$610 million investment would be justified many times over.

5. Conclusion

Cost has been a major inhibitor preventing the creation of a national individual healthcare identification system. That, coupled with a Congressional proscription against using federal funds for individual healthcare identifier work, has blocked progress on the issue for more than a decade. Numerous analyses have indicated that, even if a national identification system were to cost over \$10 billion, the projected benefits in terms of elimination of duplicate testing, avoiding adverse drug events, improved operational efficiency, better patient outcomes, etc., mean that the costs would be recouped in less than a year. The VUHID system takes this debate to another level by reducing the project cost of the system to a fraction of previous estimates. Clearly, at this level of expenditure, the return on investment for implementing such a system becomes compelling. At Global Patient Identifiers Inc., we look forward to the implementation of this system in beta sites during 2010, anticipating that all of healthcare can benefit from these early experiences as the VUHID system is deployed to collaborating HIEs and other healthcare organizations.

Acknowledgements

I would like to thank the ASTM International E31 medical standards committee for their ongoing support of the VUHID project. I would also like to thank Epic Systems Corporation and Stratus Technologies for their support of this project.

1. RAND report [15].

References

1. ASTM. Standard Guide for Properties of a Universal Healthcare Identifier (UHID), ASTM, E1714-07. 2007. www.astm.org
2. Appavu S I. Analysis of Unique Patient Identifier Options: Final Report. U.S. Department of Health and Human Services. November, 1997. <http://www.ncvhs.hhs.gov/app0.htm>
3. Greenberg M, Ridgely M S. Patient Identifiers and the National Health Information Network: Debunking a False Front in the Privacy Wars. *Journal of Health and Biomedical Law*. Vol. IV, No. 1, 2008.
4. Hieb B. A Voluntary Approach Can Solve the Healthcare Personal Identifier Dilemma. *Gartner*. March, 2006.
5. Hieb, B. The Case for a Voluntary National Healthcare Identifier. *Journal of ASTM International*. 2006.
6. Health Information and Management System Society. A Call for Action: Enabling Healthcare Reform Using Information Technology. 2009. www.himss.org/2009CallToAction.
7. Hillestad R, Bigelow J, Bower A, et al. Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, and Costs. *Health Affairs*. September/October, 2005.
8. The National Alliance for Health Information Technology. Safety in Numbers: Resolving shortcomings in the matching of patients with their electronic records. December, 2007.
9. U.S. Department of Health and Human Services (HHS). Unique Health Identifier for Individuals: A White Paper. 1998. <http://www.epic.org/privacy/medical/hhs-id-798.html>.
10. Booz Allen and the Federation of American Hospitals. Toward Health Information Liquidity: Realization of Better, More Efficient Care from the Free Flow of Health Information. January, 2009. <http://www.boozallen.com/media/file/health-information-liquidity.pdf>
11. Health Information and Management System Society. Voluntary Patient Identifier Resolution Position Statement., December, 2003.
12. The National Alliance for Health Information Technology. The National Alliance for Health Information Technology Calls for Creation of Voluntary Unique Patient Identifiers for Exchanging Electronic Health Records. December, 2007. http://www.nahit.org/cms/index.php?option=com_content&task=view&id=328&Itemid=214
13. Piechowski, R. IT from Coast to Coast. *Hospitals and Health Networks*. January, 2009. http://www.hhnmag.com/hhnmag_app/jsp/articledisplay.jsp?dcr-path=HHNMAG/Article/data/01JAN2009/090113HHN_Online_Piechowski&domain=HHNMAG
14. ASTM. Standard Guide for Implementation of a Universal Healthcare Identification System, ASTM E2553-07. 2007. <http://www.astm.org>
15. Hillestad, R, et al. Identity Crisis: An Examination of the Costs and Benefits of a Unique Patient Identifier for the U.S. Health Care System. RAND Corporation. October, 2008. http://www.rand.org/pubs/monographs/2008/RAND_MG753.pdf.

Acronym key: Explanation

ASTM International
 EMPI - Enterprise master person index
 GPI - Global Patient Identifiers Inc.
 HIE - Health information exchange
 HIMSS - Healthcare Information and Management Systems Society
 NHIN - Nationwide Health Information Network
 OVID - Open voluntary identifier
 PVID - Private voluntary identifier
 RHIO - Regional health information organization
 TEPR - Towards an Electronic Patient Record
 VUHID - Voluntary Universal Healthcare Identifier

Correspondence

Dr. Barry R. Hieb M.D.
 Chief Scientist
 Global Patient Identifiers, Inc.
 2515 E. 7th Street
 Tucson, AZ 85716

Phone: +1-520-320-6220
 Fax: +1-520-320-1230
<http://gpil.info>

bhieb@vuhid.org