Universal Health Identifiers: Issues and Requirements for Successful Patient Information Exchange
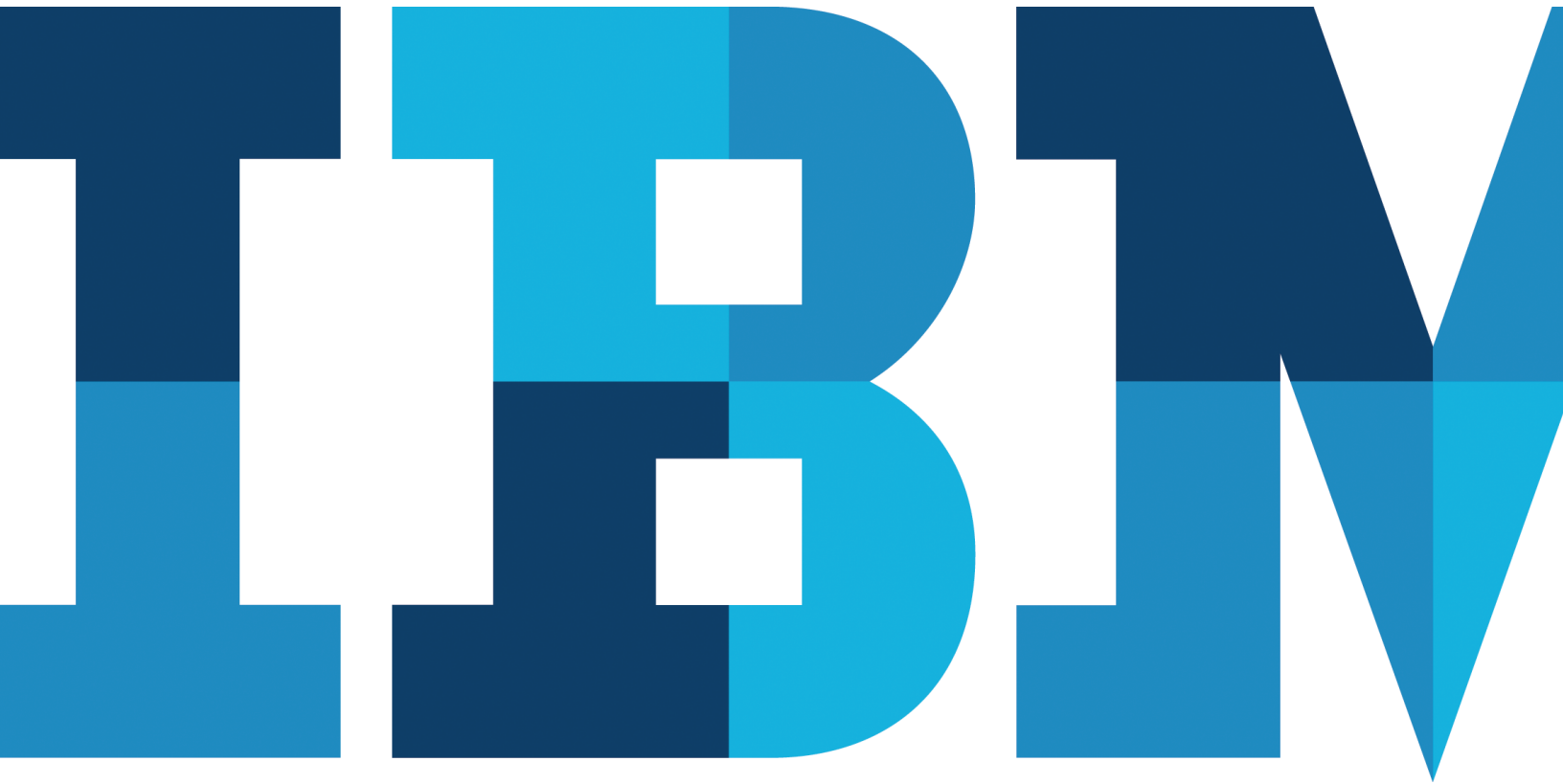
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The healthcare industry is moving toward a future where the electronic exchange of health data will be commonplace. As we enter this new world, there is an increased need to accurately identify an individual across jurisdictions or care-settings so that healthcare providers have a solid foundation for sharing patient health information and providing safer, more cost effective treatment.

A universal health identifier (UHI) has been discussed for years as a method for identifying individuals. UHI proponents point to the many benefits that it delivers to citizens by enabling improvements in healthcare delivery, quality and efficiency. However, now that many countries, such as the U.S., Canada, UK, Singapore and Australia, are well on their way toward implementing national, interoperable healthcare exchanges, there is a renewed debate about whether UHIs are required, or desirable.

Although the arguments for healthcare data exchange are compelling, a UHI is only one solution for identifying individuals, and, by itself, is not sufficient for ensuring patient safety. Many people involved in policy debates about healthcare information exchange have unanswered questions regarding the benefits, costs and processes of UHIs, issues related to implementing them, and how alternative solutions can be used

to achieve the same results. Some of the common questions include the following:

1. What is a UHI and what specific benefits will it provide?

2. What are the costs of implementing a UHI?

3. What steps are required to create a UHI?

4. Are there specific issues that are likely to arise after UHIs are implemented?

5. How will UHIs be governed and how will organizations issuing or using them be held accountable for their security, privacy and accuracy?

6. Are there alternatives to UHIs for jurisdictions that want to share or exchange health data?

7. Will the jurisdictions that implement UHIs be better off than those that don't?

8. Will UHIs impact citizen privacy and consent?

This paper provides an overview of UHIs and attempts to answer the questions above.

UHI Definition, Estimated Costs and Implementation Times

A UHI is a universal number assigned to each individual that is used to identify patient healthcare data across care settings. UHIs can be applied across local, regional or national jurisdictions to support the exchange of healthcare information across care settings. The main benefit of a UHI is that, in theory, when it is in place only one piece of information is needed by providers to accurately identify individuals seeking medical care and to create a complete view of a patient's healthcare information located at multiple providers. However, although UHIs can be useful, they are not the complete answer or the only method for achieving patient identification for the accurate exchange of healthcare data.

Estimates of the implementation costs associated with a UHI vary considerably and depend upon the quality of the proofing system. A 2008 study from the RAND Corporation estimates the costs of implementing a nationwide UHI in the United States to be between $1.5 billion and $11 billion[1] . The upper estimate of $11 billion was based upon the costs associated with Real-ID, the project in the United States to upgrade state driver's licenses and identification cards. Actual costs for implementation will depend on the quality requirements of the UHI, and whether the existing infrastructure can be used, to register patients and distribute UHIs, or a separate infrastructure will need to be created. At the top end, costs for UHI implementation could run $100 per person, or $30 billion for the entire U.S. population.

The legislative and policy making processes that are required to deploy a nationwide UHI system would most likely take between five and nine years and would include the following steps:

2-4 years To debate requirements and specifications, and draft and pass legislation to make UHIs a requirement

2-3 years For healthcare technology vendors to add support for UHIs

1-2 years To assign UHIs to individuals and propagate them into healthcare information

Two issues surrounding the implementation of UHIs that will need to be addressed by all jurisdictions are how UHIs will be governed, managed and audited, and how and whether to apply identifiers to legacy healthcare records.

Governance decisions, such as determining which organization is responsible for issuing UHIs and how their accuracy and auditability will be maintained, must be determined before identifiers are issued. In most cases, jurisdictions will also want to put processes in place that allow them to provide consumers with the ability to request information about where their UHI has been used and who has had access to it. In addition, safeguards must be instituted to ensure that UHIs are not misused, or that their use cannot be easily expanded beyond its original intent.

On the subject of how and whether to apply identifiers to legacy records, jurisdictions have two options: either populate all legacy records with identifiers or decide that UHIs will only be applied to healthcare information moving forward. If the latter option is chosen, there will be an additional lag of between two and seven years until a UHI system will be truly useful, as it will most likely take that long for meaningful patient data to be collected by current systems. If the former option is chosen, the additional costs to implement universal identifiers that adhere to HL7 and ANSI standards will be significant, given the number of records that would have to be appended and the number of existing potential errors and duplicate records that would need to be addressed.

Furthermore, some legacy systems will not support retrofitting with UHI data, as they were not designed to accommodate new data fields or are not standards compliant. For those systems, decisions would need to made about how records should be processed to support the new identifier, which would add yet another layer of complexity.

Ensuring Accuracy of Patient Data With and Without UHIs

A significant problem with using a UHI to identify patients is the potential for errors. When a single token is used for identification, if an error is made when the number is provided or entered, then the person can't be identified at all or may be identified incorrectly, which in the case of healthcare information can be especially problematic. In addition, if someone wants to assume another person's identity to receive healthcare, a UHI makes it easier.

The typical data error rates in systems today -- meaning the number of times that something gets recorded wrong, which leads to fragmented or duplicated patient records -- range from 5 to 15 percent. When dealing with critical healthcare data, that high rate is unacceptable. To prevent such high error rates and achieve better levels of accuracy, systems that rely on

[1]*"IDENTITY CRISIS An Examination of the Costs and Benefits of a Unique Patient Identifier tor the U.S. Health Care System," RAND Corporation, 2008. Study sponsored by Cerner Corporation, CPSI, Intel, IBM, Microsoft, MISYS, Oracle, and Siemens.*

UHIs for patient identification must implement additional methods, such as check digits and other error correcting capabilities, to detect when mistakes are being made. These processes add another layer of complexity to the UHI system and require that additional data be added to each individual's universal identifier.

A proven method of ensuring the accuracy of individual identities is to use the demographic data that already exists in a patient's record and a method called probabilistic matching to verify the accuracy of their identity. Probabilistic matching is a well-established and accepted technique for matching patient records that uses highly accurate, advanced statistical algorithms to understand the basic errors in demographic information and conclude when two records are referencing the same individual. The method uses statistics from the data to determine the optimal way to put those data together for identification and accounts for the varying degrees and quality of information within those demographic data.

Probabilistic matching is already used by many healthcare organizations worldwide in their patient and client registries, in conjunction with a UHI and without, to universally identify patient records across multiple healthcare systems and providers. Probabilistic matching can help achieve interoperability with legacy healthcare information without having to retrofit legacy data with identifiers.

Managing 100 Million Records With Probabilistic Matching and No UHI

A large, national healthcare delivery system, that handles more that 100 million patient records without UHIs, wanted to deploy technologies to facilitate the sharing of clinical information across more than 100 data silos.

The organization implemented a probabilistic matching solution that enabled it to create and deliver a complete, holistic view of patient information. In less than a minute, users can readily determine what benefits patients are qualified to receive and where their records reside.

The end result of the deployment is that the organization is able to provide better, more cost effective care information and increase customer satisfaction, without adding a universal identifier to patient records.

Resolving High UHI Error Rates With Probabilistic Matching

A well-controlled geographic jurisdiction had issued UHIs to its more than four million residents for use when receiving healthcare services. The assignment of identifiers was well managed and residents were appropriately informed about how to use them. However, when data was analyzed, it was discovered that several hospitals had an error rate of approximately five percent. These errors typically resulted from data entry and completeness errors that were never detected and corrected, and from temporary identifiers, issued to patients entering emergency departments without their proper identification, that were never reconciled with the patient's permanent identifier.

The jurisdiction deployed probabilistic matching technologies to reduce duplication rates and improve existing UHI processes. Today, when patients visit a healthcare provider and do not have their identifier available, a temporary identifier does not have to be issued. The patient simply provides their name and other demographic data, as they routinely would, and the system locates the UHI and all of the records within the jurisdiction that apply to the individual. Also, when an identifier number is entered incorrectly, the demographic information that is presented to registration personnel will most likely alert them that the identifier number is inaccurate.

Even within jurisdictions where UHIs are well managed, it is inevitable that some patients won't have their numbers with them at the time of care, or that errors will be made when entering numbers into the system. By adding probabilistic matching, this jurisdiction was able to decrease error rates and increase the accuracy of patient records.

"Jurisdictions that deploy UHIs could also use probabilistic matching to achieve interoperability with legacy healthcare information without having to retrofit legacy data with identifiers."

Detecting Fraud and UHI Misuse With Probabilistic Matching

Another jurisdiction with more than 4 million residents had a data error rate of 1.5 percent, even though the use of identifiers was fairly well managed. When this jurisdiction's data was analyzed, it was discovered that, for a variety of reasons, there were different people using the same UHI. The misuse included people coming into the jurisdiction to receive free, government-financed healthcare, residents using a false identifiers to receive services that they did not want tied to their permanent record, and residents who had never signed up for a UHI and were using a friend's number when they needed care.

The result of multiple people using the same UHIs was that their clinical information was combined into one health record, which increased medical risks and compromised care. To eliminate this problem, the jurisdiction deployed a probabilistic matching solution to better identify patients using a combination of their UHI and other demographic data.

In the future, when a patient presents a UHI to receive healthcare, the probabilistic matching system will determine if the identifier has been used before and whether the demographic data being presented now is consistent with the data used previously. If the data does not match, the system will alert registration personnel of the potential error. By adding probabilistic technologies, the jurisdiction will be able to reduce medical risks and improve patient safety and quality of care.

How to Increase Healthcare Data Accuracy and Reduce Patient Risk

As policy makers evaluate the use of UHIs as a method for identifying individuals, we recommend that they conduct a complete cost benefit analysis that includes implementation, management and maintenance processes, additional technologies necessary to ensure proper accuracy rates, and, if applicable, requirements for incorporating legacy healthcare data. When implemented correctly, UHIs can deliver a higher level of accuracy to healthcare exchange systems than without them, especially for certain types of individuals such as multiple births. However, the benefits of implementing and maintaining a UHI system may not justify the costs. Each jurisdiction will need to evaluate their specific situation to determine whether UHIs are warranted.

Organizations that decide to deploy UHIs should use existing patient demographic data combined with probabilistic matching technologies to augment the accuracy of the system, instead of opting for adding check digits and other complex error correcting capabilities.

Some will choose to begin building health information exchange systems without creating a UHI, as some countries and other jurisdictions already have. Those that do should be sure to select a client registry or enterprise master person index that employs probabilistic matching systems that will enable them to add UHIs at a later date, should they be mandated, without causing a lot of disruption to healthcare delivery or record keeping.

Another issue healthcare data exchange policy makers need to consider is protecting customer data and privacy to ensure that consent and preferences are properly managed. These topics are beyond the scope of this paper, but are worth noting, as they are also critical components of any system dealing with the safe exchange of healthcare data.

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