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July 23, 2020

Dr. Donald Rucker
National Coordinator
Office of the National Coordinator for Health Information Technology
Department of Health and Human Services
Mary E. Switzer Building
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Washington, DC 20201

Dear National Coordinator Rucker,

Patient matching, or the ability to accurately link each individual's records from multiple doctors' offices or hospitals, remains a perennial problem in health care. Recognizing this barrier to coordinate care, Congress charged the Office of the National Coordinator for Health Information Technology (ONC) with assessing current and potential approaches to improve patient matching.[1] In responding to this request, the agency should consider steps that the federal government can take in the near-term to address this problem: specifically, encouraging the use of more information for matching and supporting the use of certain standards. In addition, when evaluating whether to recommend and options for a unique patient identifier, ONC should consider modern solutions that have higher degrees of reliability than alphanumeric characters, such as biometrics.

The Pew Charitable Trusts is a non-profit research and policy organization with several initiatives focused on improving the quality and safety of patient care. Pew's health information technology initiative focuses on advancing the interoperable exchange of health data and improving the safe use of electronic health records (EHRs).

A report commissioned by ONC found that up to half of the information exchanges made by health care organizations may fail to accurately match records for the same patient.[2] Ineffective patient matching can have patient safety and cost ramifications. Patients may receive inappropriate care and face the possibility of medical errors if information used for treatment is missing or inaccurate; one in five hospital chief information officers surveyed said that patient harm occurred within a year due to a mismatch.[3] Given these deficiencies, Congress rightly asked ONC to explore current and potential solutions.

Pew conducted research on ways to address patient matching deficits, and recommends the agency touch on the following data-driven approaches in its report to Congress:

- Adopting additional data elements for patient matching across health IT systems;
- Standardizing demographic data already collected; and
- Investigating innovative solutions for a unique patient identifier.

By promoting work in these areas, ONC can improve patient safety and enhance care coordination by reducing the need for manual review and making sure clinicians have all of the information they need in one place—and for the right patient. The current pandemic also highlights the crucial need to address patient matching and identity issues, which hamper current efforts to mitigate the spread of the virus and could undermine future immunization efforts.

Enhance use of demographic data elements for patient matching across systems

Different health care facilities typically compare patients' names, dates of birth, and other demographic data to determine if records refer to the same individual. They use algorithms to conduct these matches, and employ staff to manually review records. This process often fails to accurately link records because of typos entered into the system; similarities in names, birth dates or addresses among different patients; changing information, such as when individuals move or get married; lack of standardization in demographic data entry; and many other reasons.[4] The COVID-19 pandemic demonstrates the need for short-term interventions to address the challenges and effects on care from incomplete data and inaccurate patient matching. Research has identified two key steps to improve patient identification and matching: adding additional data elements, and standardizing these data.

Use of additional data elements to improve matching

Health information technology systems often contain demographic data routinely collected that they do not typically use or make available to match records, such as email address or prior address. Research published in 2017 showed that more than half of records already contain email addresses.[5] The documentation of email has likely increased given the adoption of patient-facing tools, like portals, that often require this data to register.

As part of recently released regulations implementing the 21st Century Cures Act (Cures), ONC rightly added more demographic data to the U.S. Core Data Set for Interoperability (USCDI), the standard set of data that EHRs must be able to make available for exchange by mid-2022. These additional data elements include current and previous address; phone number and type; and email address.

These data elements represent a clear roadmap that health information technology systems should use to match records. In its report to Congress, ONC should highlight the importance for systems to use those demographic data elements from the USCDI for matching. This goes for all systems—including those not certified to ONC criteria, such as lab information systems (LIS), technology used in long-term care facilities, and public health registries. ONC should coordinate with technology vendors to adopt those data elements, and encourage policymakers at all the federal, state, and local levels of government to embed in policy those elements as critical for exchange to support better patient matching.

Standardize demographic data already collected

Even when systems share the same data, certain elements—such as addresses and phone numbers—may not be standardized to the same format, inhibiting successful matching.

Research has shown that standardizing specific data elements can improve match rates. Use of the U.S. Postal Service (USPS) format for address (which indicates, for example, appropriate street suffixes) can improve the accuracy of matching records by approximately 3%, which could result in tens of thousands of additional correct record linkages per day. [6] An organization with a match rate of 85%, for example, could see its unlinked records reduced by 20% with standardization of address alone.

In the aforementioned regulations implementing Cures, ONC did not adopt the USPS standard for address, stating that it allowed for variation, which could result in multiple "valid" addresses. While possible, the use of a standard would still drastically improve match rates overall. Today, entering address within health IT systems does not check for basic standardization, like making "St" and "Ave" consistent, and formatting zip code. Inconsistent documentation, in addition to data entry mistakes, produces higher variation among addresses than the USPS standard would allow.

Further, ONC stated that the implementation of the available USPS standard would create a burden on provider organizations. However, vendors would be responsible for developing and implementing the standard within health IT systems—not providers. Additionally, USPS operates a free service to conduct this standardization today that is used widely by the shipping industry. Were this service opened and available for health care, the burden of implementation would be greatly reduced.

Many immunization registries and corresponding information systems have already recognized the value of using the USPS address format for patient matching, and pay to use a shared service to conduct this standardization and validation.[7] They experienced improvements in patient matching and de-duplication within their systems, as well as gained, on average, a 12% increase in mail deliverability when conducting community outreach.[8]

Despite the availability of the USPS address standardization web tools for free to online retailers and e-commerce, the agency's terms and conditions restrict its use solely for shipping purposes. As a result, health organizations cannot use it for patient safety and pandemic response even though it's already made available for free to those other services. ONC should require the USPS address standard for all health IT systems, and coordinate with the USPS to make their technology available for free within health care.

Additionally, the Trusted Exchange Framework and Common Agreement (TEFCA), a policy under development to promote data exchange among health information networks, could serve as another catalyst to advance USPS data standards. Because health information networks get their data from many different EHRs and health care organizations, ONC should ensure that they standardize address to the USPS format. Many current health information exchanges already use different address standardization approaches; specifying the USPS format would simply ensure they all use the same approach when conducting that standardization to enhance the likelihood of a match.

Patient matching amid the COVID-19 pandemic

The COVID-19 pandemic has highlighted the gaps in health data exchange that have and will continue to inhibit the nation's response to this, and future, pandemics if they remain unaddressed. Many of the plans to re-open the country in the midst of the COVID-19 pandemic emphasize two key elements: the ability to effectively trace back the contacts of infected individuals and broad administration of an eventual vaccine. Both factors hinge on public health authorities having complete data for accurate patient identification and matching.

The approaches discussed above—additional data in all health IT systems, and standardizing existing data—will provide more accurate and complete information for providers, hospitals, and public health entities for both contact tracing and a future immunization drive. By requiring the USCDI data set for all health IT systems, and not only EHRs, the data elements can both provide information for contact tracing and enable better match rates across systems.

However, research shows that phone numbers are often not sent from laboratories to public health authorities, and when they are included, the numbers often refer to an ordering physician and not a patient.[9] This not only complicates reaching the patient and conducting contact tracing, but it also makes matching across LIS and other systems—like EHRs and public health registries—challenging. Similarly, patients' address remains an unrequired data element in lab orders and messages, leaving minimal data to use for patient matching.

As patients get tested at different facilities, including commercial labs rather than provider offices, LIS and systems used in pop-up testing sites and other facilities must also include and send complete demographic data from the USCDI.

Recent guidance from Health and Human Services (HHS) helps advance those principles. In June, HHS released guidance on reporting COVID-19 lab results—from all labs, including pop-up sites—that requires the collection and reporting of race and ethnicity data, among other elements. These additional data elements will better position public health authorities and policy makers to understand the disease burden across populations and tailor approaches, as well as mitigate spread within communities. However, demographic information—patients' phone number, email, or address—that is needed for public health activities, such as contact tracing, are only recommended elements. These data should also be required within lab reporting. As research has demonstrated that lab results are often lacking patient phone number, requiring such data will save public health officials time and resources that are currently used to track down this information.

Requiring that addresses meet USPS standards will provide another reliable data element for matching patients across systems and with immunization registries. Upon the availability of a vaccine, clinicians and other health professionals should first check immunization registries for a patient's record to determine whether the individual needs a dose, and then later share information indicating that the inoculation was given. Absent these steps, clinicians may not provide the right number of doses to secure immunity or provide too much of the vaccine when supply is low.

The effectiveness of immunization registries relies on the ability for health care professionals to locate the right record—making accurate patient matching paramount. As many immunization registries are already using the USPS standard, if all health IT systems did the same, the reliability of finding and matching patient records would increase.

Further, multiple delays affect the frequency of formatting the data to the USPS standard. Not all immunization registries convert addresses to the USPS in real time; some use a batch process to bulk-update data on a schedule. Additionally, not all immunization registries receive data in real time from EHRs and other health IT systems, but rather get data in batches on a regular basis. As clinicians need to know at the time of administration whether individuals already received a dose, this delay in information could affect accurate patient matching if the upstream systems are not using the USPS standard.

Given the heightened importance of patients, providers, and public health systems receiving and sharing accurate and complete results and associated demographic information, all health information technology systems should collect and exchange the complete USCDI, and utilize the USPS address standard. The aforementioned HHS COVID lab reporting guidance mentions USCDI, but does not go so far as to require the USCDI demographic data elements across the board, including for non-pandemic response purposes.

The ONC report to Congress at a minimum should address working with state and local public health authorities to expand the USCDI data set to all health information technology systems, including LIS and public health registries. Further, ONC should work with state and local public health authorities to identify ways to implement the USPS address standard across all health information technology systems—including those not certified to federal criteria. ONC should discuss ways for Congress and the USPS to work together to make the standardization tool available to health care, free of charge—as it is for the shipping industry today.

Consider modern approaches in assessing unique patient identifier

While more consistency in demographic data exchange represent near-term steps for improving matching, Congress also permitted ONC to assess the use of a unique patient identifier.

While Congress in the Health Insurance Portability and Accountability Act (HIPAA) in 1996 required the establishment of a national patient identifier, lawmakers have banned the use of federal funds towards that end.[10] While the House passed legislation to strike that ban in 2019, the restriction remains law today.[11]

Historically, policymakers have conceptualized traditional numeric identifiers, similar to a social security number (SSN)—or, even directly using SSNs. Even though adopting SSN as the unique identifier comes with low overhead and is already in use across many health care organizations, the National Committee on Vital and Health Statistics, a federal advisory committee, in 2006 recommended against adopting SSN as the unique identifier given issues with identify theft and challenges reaching undocumented individuals.[12]

While the use of unique identifiers would improve patient match rates, this approach would not solve the matching problem as evidenced by the experience in other countries. For example, England's National Health Service (NHS) issues a card with a unique number, yet it is inconsistently used by patients or checked by providers, leading to issues with identification.[13] Scotland also uses the NHS identifier, yet implemented an additional solution that employs algorithms and demographic data to aid in patient matching.[14] A similar numeric identifier is now used in the United States for Medicare beneficiaries, and new cards were mailed to every patient covered by Medicare throughout 2019 —and carried with it the potential cost of more than 800 million dollars. [15,16]

Instead of defaulting to using a number as a unique identifier, ONC should consider modern approaches to this problem. In focus groups conducted by Pew, many patients preferred the use of biometrics—the use of physical characteristics, such as a fingerprint or facial image, to identify individuals.[17] The respondents indicated that they already use biometrics in other aspects of their lives—such as to unlock smartphones or board airplanes—and should be able to use the same approach for record matching. They also indicated that a biometric identifier is persistent and present, while a number would need to be memorized or carried on a card. While biometrics are not technically unique, once coupled with demographic data they can provide a high degree of certainty on whether two records refer to the same individual.

Biometrics as an approach to a unique identifier

Many industries—travel, security and border control, the financial sector—use biometrics around the globe to confirm the identity of individuals. The technology and hardware needed to implement biometrics as a tool for identity confirmation are now often affordable and accessible. In fact, an individual's smart phone or a commercial off-the-shelf tablet purchased by health care providers could act as the main tool for collecting and verifying biometrics, with no other hardware needed.

As biometrics become more accessible and are used across industries, health care can learn from early adopters and their best practices. Pew is currently working on a report that details 10 examples of biometrics used globally and across industries to assess the lessons learned for applying this technology to health care in the United States.

Despite the promise of biometrics, privacy and security concerns could inhibit their widespread use in health care. Biometrics are persistent, and were they breached, an individual could not change them, and they would remain compromised for all future use. Further, facial scans could be collected without an individual's knowledge and used without consent.[18] Similarly, many of the same approaches that would address these concerns—such as whether to store the biometric in a proprietary form known as a template—would inhibit its use for interoperability across different vendors.

Pew is conducting additional survey research to assess patients' comfort and preferences on the best approach to use in health care for patient matching, from fingerprints and facial scans to the use of a mobile device. As research in other industries' use of biometrics demonstrates, many users have found the benefits of biometrics outweigh the risks, including privacy concerns, when the technology is designed and maintained with the appropriate safeguards and risk mitigation strategies. Pew is also convening biometric and health care experts to develop a framework for biometric use that would both support interoperability across systems and maintain patient privacy.

In the report to Congress when considering unique identifiers, ONC should evaluate innovative solutions, including biometrics. Rather than defaulting to the use of a traditional number, ONC should incorporate biometrics into the patient matching evaluation and ensure to include safeguards that support patients' privacy and preferences.

Conclusion

Congress called for ONC to issue a report assessing current and potential approaches to improve patient matching. Pew recommends the following actions be addressed in the final report:

- ONC and state and local public health authorities require all information technology systems to document and exchange the USCDI demographic data to improve match rates. This will help ensure that clinicians have complete data for their patients, and support public health use cases, such as COVID-19 response and mitigation efforts.
- ONC and state and local public health authorities mandate adoption of the USPS standard for both EHRs and other systems to further improve patient matching rates.
- ONC, with Congress and USPS, work to open the postal service standardization tool to health care, free of charge, as it does for the shipping industry.
- ONC considers modern approaches to a unique identification, in particular biometrics, for nationwide adoption.

In the midst of a pandemic, accurate and complete health records matched to the right patient are all the more important. ONC, working with state and local public health authorities, can take swift and decisive action to make immediate improvements to patient matching. These actions will have far-reaching effects on patients across the country, and will give providers the information they need to provide the best course of care.

Thank you for the opportunity to provide input to this report to Congress. Should you have any questions or if we can be of assistance, please contact me at 202-540-6333 or bmoscovitch@pewtrusts.org.

Ben Moscovitch
Project Director, Health Information Technology
The Pew Charitable Trusts

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