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# Hospital and Clinic Executives See Rising Demand for Accurate Exchange of Patient Records

Health care administrators share perspectives on current experiences and needed improvements

## Overview

Increased pressure from government and patients for doctors' offices and hospitals to share information highlights a perennial challenge: linking records for the same individual when those files are held in different places. Patient matching can help better coordinate care when individuals get services from multiple clinicians. Conversely, inaccurate matches can lead to delays in care, or even patients receiving procedures that aren't right for them. In turn, that can lead to patient safety problems and increase the burden and costs for health care organizations.

Patient matching rates vary widely when information is shared among different facilities. Up to half of records may not be correctly linked when exchanged among hospitals and other care settings. Organizations use various approaches for matching, introducing further complications.

To better understand health care providers' perspectives on patient matching, The Pew Charitable Trusts collaborated with the Massachusetts eHealth Collaborative (MAeHC) to interview executives and experts from hospitals, clinics, and other organizations. These interviews focused on organizations' current experience with matching, the factors that influence health care providers to make improvements, and various alternatives that could help solve this problem. Options examined in the interviews included the use of unique identifiers (such as a number specific to a single individual), smartphones, demographic data standardization, and information from third parties like the U.S. Postal Service. This brief summarizes their perspectives on matching and potential solutions.

Across the interviews, a common theme emerged: The rate of accurate patient matching when information is shared between organizations is inadequate and must be improved. Each opportunity examined offers its own benefits, and progress on multiple approaches would help resolve the matching problem.

## Interview methods

Pew and MAeHC developed a structured guide to ensure consistency of information obtained from interviewees from 18 hospitals, doctors' offices, and health information exchanges, which are organizations that help health care providers share data. Interviewees reflected a broad range of entities, including facilities in different regions within the United States and with various practice sizes, patient populations served, and types of providers. Organizations selected for participation included those recommended by industry associations and facilities with an expressed interest in patient matching. All interviewees were granted anonymity to allow them to express their views candidly.

## General perspectives on patient matching

Overall, interviewees agreed on several key points:

- Match rates are far below the desired level for effective data exchange.
- An increased demand for interoperability—the exchange of electronic data among different systems— is fueling the desire for improvements.
- Match rates are difficult to measure.
- The methods in which records are received can affect match results.
- Different types of health care providers vary in their perspectives on the extent of the problem.
- Effective opportunities exist for organizations to more accurately link individuals' health records.

### Progress on external data exchange needed

For the most part, interviewees indicated that they do not have significant challenges with internal match rates—that is, when staff look up the record of a patient they have already seen. While progress could be made to achieve higher internal match rates, this area was not considered a priority. Emergency departments were the exception; here, staff generate more duplicate records due to difficulties obtaining accurate patient data when patients arrive with urgent medical needs.

However, interviewees have more challenges with external data exchange, where current match rates between organizations could be as low as 50 or 60 percent.[1] Interviewees indicated that match rates of 99 percent or higher would be ideal for interoperability, and that improving rates for external exchanges would probably become a bigger priority in the near future.

### Emphasis on improving care coordination increasing demand for matching

Patient safety has historically been the dominant driver for improved matching within facilities and remains a priority among the organizations represented in these interviews. For example, incorrect matches could result in patients getting the wrong medicine, and failure to link records could lead to treatment decisions made without access to up-to-date laboratory test results.

However, federal government incentives that encourage more coordinated care among clinicians treating the same patient have increased the focus on data sharing, which in turn has put more pressure on health care providers to prioritize matching. For example, the Centers for Medicare & Medicaid Services (CMS) rewards providers in accountable care organizations who demonstrate savings from activities that improve care coordination and reduce costs (e.g., by avoiding duplicate tests).[2] Successful participation in these programs requires hospitals and clinicians to share information and have up-to-date patient data from other locations where individuals seek care.

In addition, many health systems are consolidating; in 2017 alone, there were 115 merger deals as part of a growing trend over the last decade.[3] When initiating these mergers, health systems can combine records and may have shared patients. Enhanced matching can help indicate which patients the health systems have in common.

## Match rates are difficult to measure

When asked about their organizations' current match rates, nearly every interviewee had difficulty answering the question. Even when they provided rates, most interviewees included several caveats.

First, many organizations measure only the number of records they identify as duplicates, but not how often records received from other organizations can be effectively linked to those already on file.

Second, many organizations could not precisely indicate their match rates because they don't know all the records that should be related and thus cannot understand what percentage of those are unlinked. This problem—known as the lack of an accurate denominator—further complicates the ability to calculate match rates.

Without knowing the true denominator for all unique records, organizations often can indicate only how many duplicates are in their systems when personnel manually review files or test new matching technologies. However, measuring the number of duplicate records does not indicate whether additional unlinked records still exist in their database, or how many records were merged incorrectly.

## Whether a provider is expecting a patient record affects ease of match, processes

Organizations try to match records both when they request information and when they receive data unexpectedly from other organizations.

Matching records sent to facilities expecting information is typically easier, particularly when organizations are exchange partners—that is, they already exchange data with each other and may have patients in common. In these cases, such as when a primary care physician receives information that he or she requested from another provider, the facility tries to link the record sought from the external party. Additionally, the received record will probably be returned with a distinctive identifier—such as the medical record number—known to the receiving system when a previous exchange has occurred for a shared patient. In these cases, organizations will use both automated and manual processes to link the record.

However, facilities may receive an unsolicited request for a record from another organization or get patient information that was not requested. For example, specialists may receive the records of patients whom they have not yet seen. These situations—unsolicited inbound records or requests—introduce additional matching

Table 1

# Typical Life Cycle of a Match

| | 1 Data collection | 2 Data validation | 3 Identity matching process | 4 Clinical or administrative action |
|---|---|---|---|---|
| | Capture of key demographic data needed to verify identity and support matching process | Validation of data required to support organization matching process<br><br>Application of matching algorithms to available data | Determination of whether a match has been obtained<br><br>Combination of automated (electronic) and manual processes depending on organization policies and sophistication of electronic tools and processes | Based on output of matching process, execution of treatment, diagnostics, or medical records action (e.g., creating new record or appending information to an existing record) |
| **Intraorganization** | | | | |
| **Patient presents in person** | Registration and identity verification, usually of data obtained from patient during registration process | Match based on registration data | Automated and manual processes | New record created<br><br>OR<br><br>Existing record updated |
| **Interorganization** | | | | |
| **Solicited inbound record from external system** (e.g., hospital requests record from specialist) | Electronic data processed from record or record request | Match based on data provided by record sender | Automated and manual processes | Existing record updated |
| **Unsolicited inbound record from external system** (e.g., specialist sends assessment to primary care physician) | Electronic data processed from external source is received | Match based on data provided by record sender | Automated processes | Existing record updated<br><br>OR<br><br>Orphan record, probably discarded |
| **Unsolicited request for record from external system** (e.g., hospital requests record from primary care physician) | Electronic data processed from record request | Match based on data provided by requester of record | Automated processes | No record returned<br><br>OR<br><br>Record returned |

challenges because the facility may have no record for the specified patient or may have outdated demographic data for the individual. In these cases, organizations typically rely on automated processes only, without dedicating staff time to resolve patient-matching problems.

## Practice characteristics may affect matching perspectives

While all organizations interviewed for this brief expressed a desire for patient-matching improvements, interviewees differed on the extent of the problem and how it affects care.

Health care providers in rural environments, for example, indicated that their patients often do not seek care elsewhere, and therefore require less data sharing with external organizations. As a result, there is less opportunity and need for matching of records.

On the other hand, health care providers in urban settings often share more data with other organizations because their patients obtain care in multiple places. Many of these patients are frequent users of the health care system and often change health insurance—such as moving between Medicaid plans—which can make identification more difficult. This also hampers organizations' ability to coordinate and manage care. Urban providers may also face larger populations with housing insecurity, a situation where obtaining identification information to facilitate a match—such as an address—can be difficult.

## Health care organizations, technology vendors, and government need to address barriers to make progress

Interviewees highlighted two main barriers to improved patient matching: the perceived costs of solutions, and variability in how organizations capture and use information to link records.

Most organizations interviewed purchase software to help automate matching and employ between 0.5 to nine full-time staff to manage mismatched or unmatched records. Interviewees indicated that future improvements to matching would require further investments in both technology and personnel. Additionally, interviewees noted that investments in matching can offer diminishing returns. For example, improving from a 50 to 55 percent match rate may cost less than moving from 90 to 95 percent.

Separately, variations in how organizations conduct matching further inhibit the linking of records between health care facilities.[4] Organizations may collect and use different data for matching, have divergent ways to code information in their systems, use null or dummy data when required information is missing, and document demographic data inconsistently, among other factors. As a result, the success of organizations trying to match records relies on the practices of exchange partners. The organization may also lack the ability to directly confirm information with patients.

Interviewees largely face the same issues and challenges when attempting to improve interoperability and patient matching, regardless of how well their organization is currently doing.

## Interviewees react to different opportunities

In 2018, Pew released a report ("Enhanced Patient Matching Is Critical to Achieving Full Promise of Digital Health Records") examining options that could help better link records if widely adopted, based on a review of publicly available literature and conversations with matching experts.[5] Interviewees were asked to react to the four potential solutions Pew examined to improve patient matching rates in the future: using unique identifiers;

smartphone use; standardizing demographic data; and using referential data, or information from third parties. Interviewees noted that all these opportunities show promise and should be considered, though none of them would be likely to resolve the matching problem on its own.

Table 2
## Patient-Matching Opportunities

| Potential opportunity | Description |
|---|---|
| Unique patient identifier | Patients could receive a unique number—via a card or some other mechanism—to present when they seek care. Biometrics, while not unique to an individual, are highly reliable once coupled with demographic data. |
| Smartphone use | A patient could provide identity information, such as an address, to health care providers via a smartphone. For example, patients could enter and update their information in a smartphone application and have their device scanned to transmit the data when they seek care. |
| Data standardization | Provider organizations could agree on standard ways to collect demographic data. Standardizing each data element—and what information to collect—has been recommended by many organizations and experts to address variability across health care providers. |
| Referential matching | Provider organizations could utilize third-party data, such as credit bureau and postal service information, to improve upon the information they already have. This approach, for example, allows organizations that have different addresses for a single individual to know whether both refer to the same patient. |

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## Unique patient identifier

Most interviewees indicated that a unique patient identifier would help address some matching problems. Despite the federal restriction on using funds to establish a national patient identifier, a private organization or organizations could create a voluntary one. However, interviewees indicated that, to increase adoption, government would probably need to play some role, such as by CMS requiring its use.

Interviewees also noted some possible limits to its effectiveness. First, they indicated that this approach is unlikely to be universally adopted by patients due to privacy concerns. Second, implementation by health systems could be costly, as they would need to determine a method for capturing the information, storing it in their systems, and using it—along with other demographic data—for matching. Third, human errors will continue to contribute to data quality issues common with incorrectly entered numbers or other data fields. Fourth, if issued by a nongovernmental third party, the utility of an identifier relies on the viability of the organization that manages and maintains the system to remain in existence and not, for example, go bankrupt. Fifth, interviewees cautioned that, like a Social Security number, it could be shared, misused, or stolen. Finally, they indicated that this approach, when used internationally, has still not eradicated patient-matching issues.

Among different patient identifier options, interviewees perceived several benefits to using biometrics—such as an iris or fingerprint scan that can be a distinctive characteristic. For example, they indicated that biometrics

could be used in emergency situations—such as when patients arrive at the hospital unconscious—to prevent misidentification.

Interviewees also indicated that many technology vendors increasingly support the use of biometrics, and some large health systems are already using these methods internally for patient identification. If used for matching across organizations, this information would supplement—not supplant—demographic data already collected, interviewees indicated.

Despite the growing interest in biometrics, including outside of health care, interviewees expressed some concerns specific to this approach. Like other patient identifier options, it may be difficult and costly to implement. Additionally, technology developers would need to agree on standards for documenting and using this information, especially given that different health care providers could choose different types of biometrics to use. One organization that researched different biometrics, and ultimately piloted one, mentioned that patients even asked about the sanitary condition of scanning devices used in clinics. Infection control has also been a reported concern for hospitals considering implementing biometrics to improve matching.[6] Finally, interviewees also expressed concern that some patients, in particular certain vulnerable or immigrant populations, would resist the use of biometrics.

## Smartphone use

Some interviewees indicated that using smartphones for matching could have merit—both via passing demographic data to electronic health records (EHRs) and through the validation of a mobile number. They indicated that use of smartphones could also gain traction, given the high adoption of these consumer devices. They also said that including smartphones in matching could give patients a sense of control and support other efforts to better engage individuals in their care, such as by enabling them to access and aggregate medical data or to collect information prior to an appointment. While some organizations expressed interest in this approach and testing other patient-facing applications, facilities with high patient portal utilization indicated that a smartphone-based solution would be less useful. Interviewees pointed to a challenge: the need to have a business associate agreement with third-party software vendors to send information back into EHRs.

This option also has some potential drawbacks. First, interviewees noted that some patients may not adopt a smartphone-based solution—particularly the elderly, who are less likely to own a smartphone than younger Americans.[7] Second, they indicated that such a system would probably require reliable broadband access, which may not be available in certain rural areas. Third, some interviewees expressed concern with receiving data from patients' phones into health care providers' technology systems, as hackers could use this as a gateway to steal data or otherwise breach the EHR system.

## Data standardization

All of the interviewees from health care facilities indicated that standardizing which data elements providers should collect and how to format them could improve match rates if adopted nationally. However, interviewees noted several steps that would have to occur to ensure the effectiveness of this strategy.

First, health care providers and technology developers would need to agree on which data elements to use for matching, including increasingly available information such as email addresses, as well as how to code and record different data elements. Second, EHR vendors, and others with which they exchange data, would need to adapt their systems to be able to exchange data according to the standards identified. Finally, health care providers must then train their staff to adhere to those agreed-upon standards, such as which data elements to record.

## Referential matching

Interviewees explained that health care could learn from other industries about how records for the same person are linked, including via referential matching. In the banking industry, for example, organizations use data sources, such as credit bureaus, to confirm addresses, telephone numbers, and other information provided by individuals. Some interviewees said that the health care industry should employ similar approaches to match records; a few indicated they already use third-party data to verify patient information.

Some of the reservations raised by interviewees around referential matching included noting that these third-party data sources may contain inaccurate information. For example, one organization that uses Social Security Administration data for disability determinations found cases in which patients were incorrectly reported as deceased. Interviewees stated that, to be useful, third-party data for referential matching should be of equivalent quality as the information captured in health records.

Additionally, interviewees expressed concerns about the costs of using referential matching services and the potential challenges of entering into business agreements to enable this approach. Despite these concerns, many health care organizations are adopting referential matching.[8]

## Conclusion

The widespread deployment of EHRs has allowed for easier data sharing among health care providers, but a key problem remains: the inability to effectively link records associated with the same person. That, in turn, can risk delays in care or lead to patients receiving improper treatment.

Health care executives and experts interviewed for this brief agreed that achieving greater interoperability relies on enhancements to patient matching on a nationwide scale. While no single solution is likely to solve the problem outright, concurrent progress on several fronts could begin to address matching deficiencies.

Pew's 2018 report highlights two key opportunities to improve patient matching that many executives interviewed also supported. First, many individuals interviewed indicated that matching would improve through the capture of common data and the use of standards for demographics, such as address. To further accelerate this, government—such as the Office of the National Coordinator for Health Information Technology, the federal agency that oversees EHRs—could encourage the recording, sharing, and use of different data elements according to specific standards. Similarly, large national data exchange networks—including Carequality, a public-private collaborative that relies on consensus-based processes for inter-network interoperability, and the CommonWell Health Alliance, a not-for-profit association of health information technology companies—can encourage and enforce the use of standards among their members.

Additionally, many interviewees supported a second approach examined in the 2018 Pew report: biometrics. The use of iris scans, facial recognition, and other biometrics—increasingly used by consumers in their daily lives—may help address this problem once policy and technology experts address key questions around privacy, cost, and adoption. The development of a framework—supported by patients, technology vendors, and health care providers—would accelerate the use of this approach for matching.

Ultimately, nationwide progress on matching will require collaboration among health care organizations, technology vendors, and government, along with a mix of technological and policy solutions. Only with such a multistep process can the health care industry address this fundamental barrier to the effective exchange of patients' health information.

# Acknowledgments

# Endnotes

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