



white paper

4 Emerging Trends in Patient Identification

How developing technologies are shaping patient matching efforts today and into the future

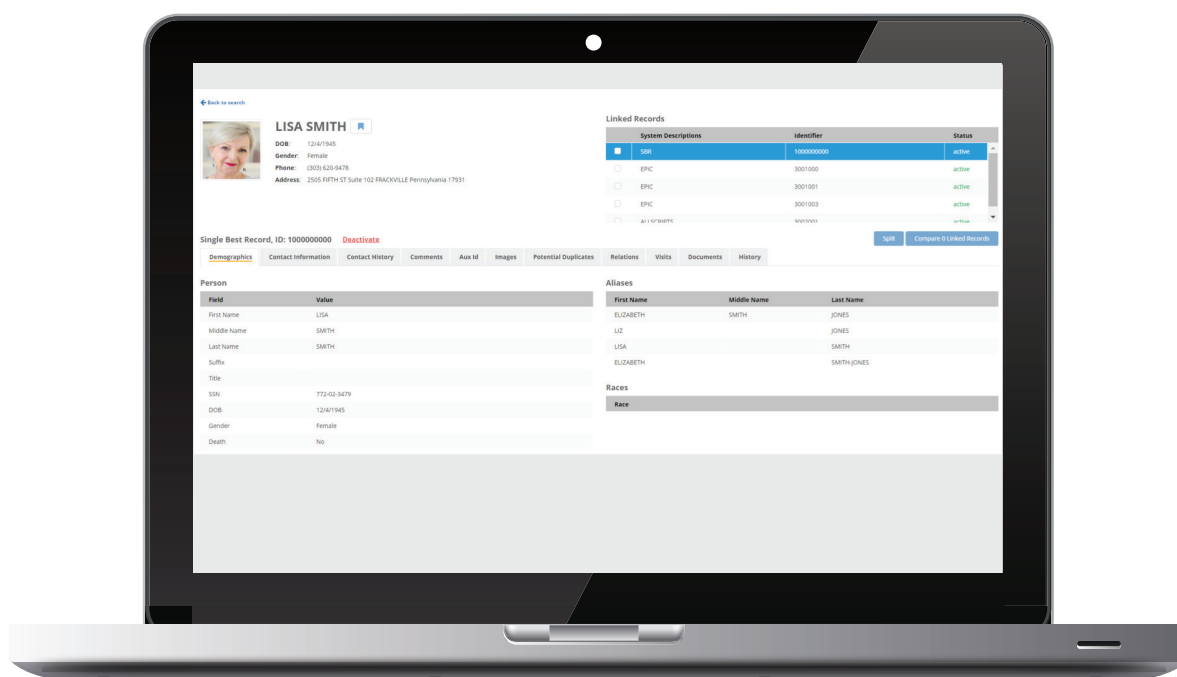
4 EMERGING TRENDS IN PATIENT IDENTIFICATION

Introduction

The issue of inadequate patient matching and duplicate records has grown increasingly complex as more data is generated and more applications are introduced into the healthcare environment. As data sharing matures and the industry pivots toward value, an enterprise view of patient information is essential for informed clinical-decision making, effective episodic care, and a seamless patient-provider experience during every encounter.

Poor patient identification not only places patient safety and an organization's reputation at risk but serves as a sizeable barrier to interoperability while contributing to needless waste and inefficiencies. The financial impact is substantial—duplicate records cost the average hospital \$1.5 million and the US healthcare system over \$6 billion dollars annually.¹

Today's complex health IT environment demands that organizations engage in more comprehensive patient matching approaches. While EHRs have become commonplace, the disjointed, competitive nature of IT systems contributes to a proliferation of incomplete and inaccurate demographic information. NextGate sees four emerging innovations that can extend one's enterprise master patient index (EMPI) platform to help further diminish record duplication rates and reduce the need for manual review and remediation.



LOCATION INTELLIGENCE

While EMPIs remain an invaluable and robust tool for centralizing patient identity and facilitating fluid data exchange, location intelligence is a powerful new trend in patient matching helping healthcare organizations proactively manage, detect and eliminate data quality issues.

Location intelligence including address verification and geocoding allow organizations to standardize and authenticate address information in real-time to avoid duplicate record creation and identity fraud. When combined with other demographics for patient matching, it ensures the address information is consistently formatted to avoid data errors at the point of capture. The use of such a tool has the added benefit of geocoding the address data which enables location-based searches of the patient population and maximizes the likelihood of successful communications via conventional mail delivery.

Just as the retail industry has made it easy to check-out online using auto-complete to fill in one's shipping address, healthcare organizations can now leverage that same technology to prevent erroneous address data before it even enters the system while cutting down manual entry efforts. Type-ahead technology verifies addresses in real-time with each keystroke using up-to-date data from the U.S Postal Service (USPS) to ensure standardized, verified address information, regardless of language, format or spelling mistakes. In fact, a study published in the May 2019 issue of the Journal of the American Medical Informatics Association (JAMIA)² found that standardizing patient addresses using the USPS format in EHRs improved match rates by up to 3 percent.

The technology can enable front-end, real-time address capture as well as backend batch address verification and enhancement. Location intelligence offered as a part of NextGate's AUGMENT solution can batch process more than 3 million records per hour while appending geocode coordinates to those records. It also reduces data entry errors at the point of capture by more than 20 percent.



Location intelligence for your healthcare organization



Prevents duplicate record creation and data-entry errors at registration



Standardizes and verifies patient addresses using preferred USPS format



Enables location-based searches of patient populations via geocoding

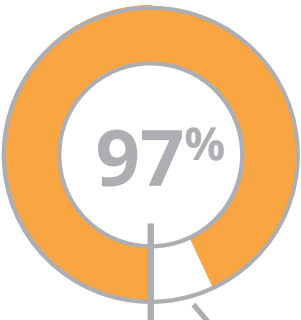
REFERENTIAL DATA

Use of sophisticated patient matching algorithms will continue to be the safest, most effective approach for automated record matching, however, there will always remain a small subset of records where an external source of information is needed.

This typically applies in cases where the records being compared represent widely separated snapshots in time. For example, during an onboarding process of a legacy system with very old information, or when a patient hasn't received care in over a decade.

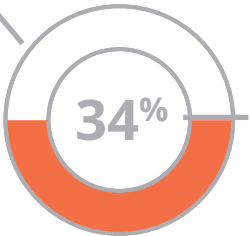
In such scenarios, it may be possible to relate these records together by comparing them to a reference data provider that can correlate older demographic elements like address and phone information. While by no means a substitute for an EMPI, in conjunction, third-party data can be an added tool to help organizations associate demographic data changes.

While reference data using public records and credit bureau information can help organizations build a more complete summary of individuals by correlating demographic elements that have changed over time, certain limitations do inherently exist with such an approach. For instance, identifying and linking health records belonging to minors is difficult to achieve with referential matching, which relies on demographic information from public records that do not exist for children under the age of 18. This includes income and property taxes, utility bills, licenses, loans, voter registrations and court and criminal records. According to a December 2014 HCUP Statistical Brief sponsored by AHRQ³, nearly one out of every six discharges from U.S. hospitals in 2012 was for children aged 17 years and younger—the majority of whom were infants and newborns. Further, the Children's Online Privacy Protection Act (COPPA) prohibits the collection, use, or disclosure of personal information of children under the age of 13.



Market-leading EMPI platforms resolve 97-99% of record duplicates

Reference data resolves 35-40% of the 3% of records that require manual review



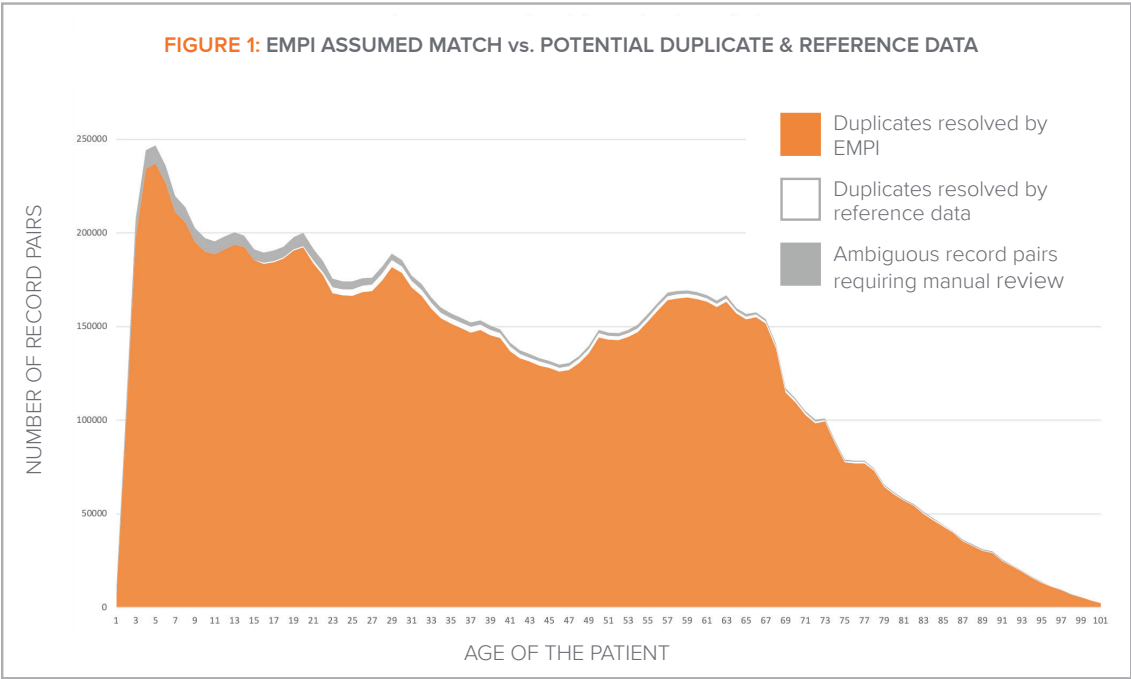
REFERENTIAL DATA

Figure 1 illustrates the usefulness of reference data involving 13 million actual record pairs, distributed by the patient’s age, from a sampling performed by NextGate. The orange area represents record pairs matched purely and automatically with NextGate’s EMPI platform. The grey shading on the top represents ambiguous record pairs that require manual review. The white line in between are records flagged for manual review that were resolved using third-party reference data. Of the small number of ambiguous cases, reference data was able to resolve approximately 35 to 40 percent of the duplicate record pairs.

Since the subset of ambiguous cases resolved by reference data (the white line) is far from 100 percent (otherwise the grey shading would disappear), reference data should be leveraged as a complementary tool to help extend match rates,

but in itself is not a silver bullet solution. However, because the last percent of records that the EMPI cannot identify on its own is the most difficult segment of the patient population, any approach that chips away at the problem is beneficial.

Use of reference data within NextGate’s AUGMENT solution allows for real-time decisioning and validation of one’s identity using as little input as a patient’s name and address in order to get a confidence score on the likelihood of a match between the records. This serves the dual purpose of preventing duplicate record creation while combating identity fraud. By enriching its EMPI platform with plug-and-play access to over 10,000 proprietary data sources containing billions of public records, organizations can instantly validate one’s identity.



MACHINE LEARNING

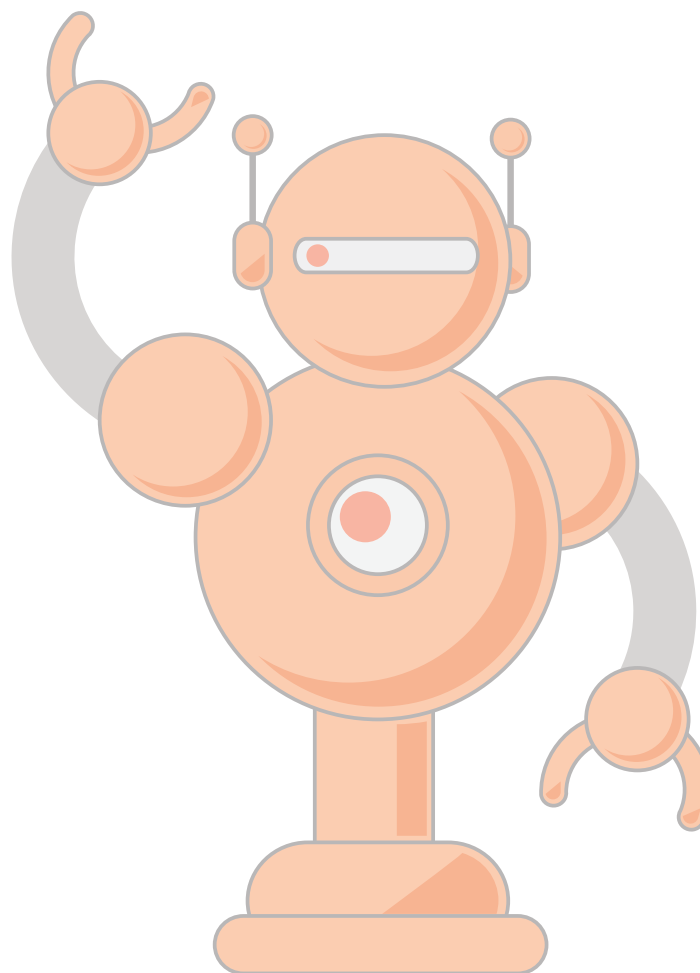
While technologies like biometrics and blockchain have made inroads, the next wave of change in identity management will be driven by machine learning.

At the heart of the technology is the ability to learn, perform and recognize patterns, thereby fine tuning the probabilistic matching process. As part of an augmented patient matching strategy, machine learning can be leveraged to detect common manual data remediation sequences and behaviors. This rule-based intelligence, that continually improves over time, can not only further record matching accuracy but also alleviate considerable data reconciliation burdens for HIM departments charged with piecing together fragmented, disconnected sources.

Unlike traditional algorithms, machine learning algorithms are able to adjust themselves based on the feedback provided by human intervention. For HIM professionals, this manual intervention tends to occur in cases where there is ambiguity between two or more records. The challenge in using this kind of information is in the sheer number of human interactions required for an algorithm of this type to truly outperform human remediation. This is because

the system must be able to detect broad patterns where users consistently take an action of marking a pair of records unique or as a match.

Training, however, is greatly simplified in a cloud environment where usage statistics across many implementations can be gathered to produce a highly intelligent record resolution algorithm, thereby reducing manual duplicate resolution tasks and diminishing false-positive/false-negative errors. Data centralization in the cloud is also cost effective because resources can be dynamically allocated to multiple customers on demand.



CONSUMER ENGAGEMENT & SMARTPHONES

As federal officials at ONC and CMS continue to push for patient data access and ownership, the opportunity for individuals to play a role in monitoring their personal health data is significant.

The vast majority of Americans—95 percent—now own a cellphone of some kind, the share of which, 77 percent, own smartphones.⁴

With the appropriate data governance controls in place, patients can be effective in managing and updating their own health record as changes occur, such as moving to a new address or changing

a phone number. This self-administration, in which personal data is controlled and maintained by the patient using their personal smartphone device, can support patient matching efforts at key stages where errors often occur: during enrollment and at the point of registration.

A study⁵ published in August 2018 by RAND Corporation and Pew Charitable Trusts, which evaluated patient-empowered approaches to improving record matching, found utilizing an individual's mobile or smartphone to be a particularly promising approach to improve the accuracy of the demographic data providers receive from individuals. Practical use cases involve leveraging

information from a patient's mobile phone—such as their phone number—to confirm one's identity and using apps as part of the check-in process prior to a patient's appointment to provide updated ID information.



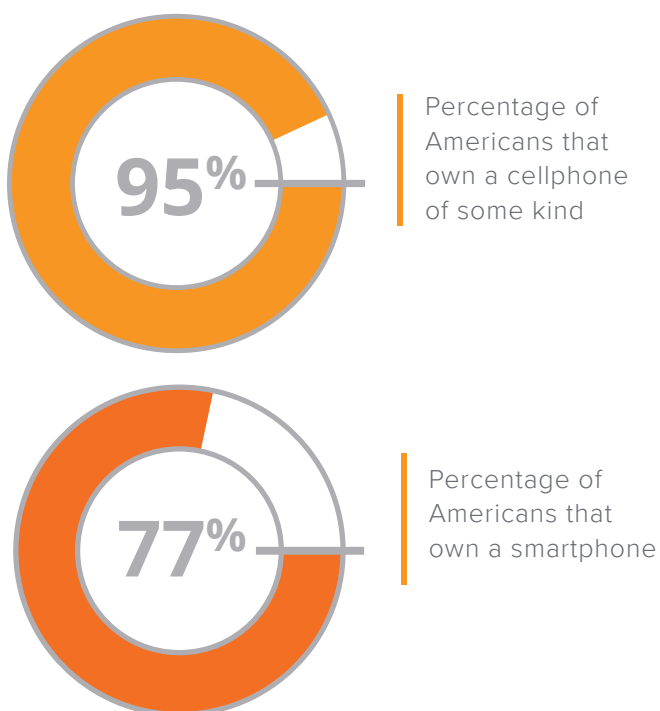
CONSUMER ENGAGEMENT & SMARTPHONES

The report recommends the adoption of a three-pronged mobile and smartphone strategy that aims to “improve the quality of identity information used for record matching; establish new functionalities of smartphone apps to facilitate transfer of this information to providers; and create advanced app functionality to further improve record matching and address other evaluation criteria (e.g., likelihood of adoption, sustainability).”

As smartwatches and other wearable devices with the same capability continue to become more of a commodity, individuals will likely expect these devices to be involved as part of the care process.

Biometric identification solutions, such as facial recognition, can also flourish when used in conjunction with personal smartphones. By leveraging the sophisticated technology already built into a patient’s mobile device, taking a “selfie,” for example, can produce a sufficient biometric signature of a patient’s face. Acting as an additional source of demographic data, an EMPI can manage this external element just as it manages third-party reference data by using its rules engine to enforce a trust policy. This helps hospitals and health systems to simplify deployment of biometrics by offloading enrollment and registration processes to those devices already owned and maintained by the patient.

Additionally, with the patient in control, user anxiety related to physical harm or hygiene concerns are diminished, since palm, fingerprint and iris scanners require individuals to touch or interact with hardware sensors.



HEALTHCARE'S BEST APPROACH

Conclusion

As the U.S. healthcare system continues to struggle with the clinical, operational and financial challenges imposed by poor patient identification, an EMPI approach—backed by one or more of these complementary technologies—can be a powerful advantage in furthering match rates across various settings.

Reliance on EHR functionalities for patient matching can no longer withstand today's growing, complex IT environment. A Pew Charitable Trust study published in October 2018⁶, reported EHR matching rates within facilities as low as 80 percent—meaning one out of five patients may not be completely matched to his or her record. When exchanging records outside the organization, match rates can be far lower—just 50 percent—even when the providers were running the same vendor EHR.

According a 2018 survey⁷ by Black Book Research, hospitals without an EMPI in place for managing patient identification reported duplicate record rates of 18 percent within their organization and 24 percent when exchanging records out-of-network. This is because master patient indexes (MPI) within EHRs were designed for a single vendor-based environment and lack the sophisticated algorithms for linking data across various sources, systems and sites of care.

A complete and accurate view of an individual is a catalyst for delivering highly-coordinated, patient-centric care. As healthcare M&A activity continues and the creation of collaborative care arrangements play a greater role in the business strategy around population health, effectively and accurately identifying patients across the care continuum will be essential.

Duplicate records cost the U.S. healthcare system \$6 billion annually¹ and lead to medical errors, administrative waste, poor data quality and low patient satisfaction scores.

Offered as an extension of NextGate's market-leading Enterprise Master Patient Index (EMPI), AUGMENT is a unique cloud-based solution that combines the power of geocoding, third-party data and mobile application enablement.

Why AUGMENT?

AUGMENT helps organizations tackle their most elusive duplicates by automating a large percentage of records that require manual review. AUGMENT extends patient identification accuracy, while enhancing workflow automation and optimization, using:



Location intelligence to standardize and geocode address information in real-time. When combined with other demographics for patient matching, this feature ensures address information is consistently formatted to avoid duplicate record creation and data errors at the point of entry.



Third-party data, including public record and credit bureau information, to verify the identity of an individual in real-time. This helps organizations build a more complete summary of each patient by correlating demographic elements that have changed over time, such as previous address and phone information.



Mobile application enablement to streamline registration and allow patients to play an active role in managing and updating their health record using their own smartphone device, thereby improving patient matching efforts at key stages where data errors often occur: during enrollment and at registration.

To learn more about AUGMENT and NextGate's market-leading EMPI platform, visit nextgate.com.

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