ORIGINAL ARTICLE

The importance of achieving a 360-degree view of patient identity: A survey of US healthcare providers

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ABSTRACT

Objective: To describe the perceived importance among healthcare leaders of accurate patient identity in meeting organizational needs and objectives for improved clinical, operational and financial performance.

Methods: Survey of 100 US healthcare executives evaluated priorities and needs of care organizations as impacted by the imperative to ensure accurate patient identity in care delivery, operations, and meeting strategic objectives.

Results: Healthcare executives (72%) reported concern that inaccurate patient identity data reduces care quality/safety and healthcare organization financial performance. Only 14% were highly or extremely satisfied with the accuracy level of their existing patient identity management solutions. Inability to know "who is who" is perceived as increasing risk of patient harm and inferior care outcomes, low patient satisfaction, impeded operational efficiency and financial performance, and a key challenge to achieving strategic initiatives such as digital transformation and effective population health management. Accuracy in patient identity was linked to nearly all strategic priorities, with 60% considering it vital to every aspect of organizational performance, and 64% stating it can improve operational efficiency. Eighty-eight percent regarded accurate patient identity as essential to improving patient experience, care management (75%), and establishing an effective digital front door (73%). Majorities recognized the importance of accurate patient identity to organizational growth initiatives and digital transformation.

Conclusions: Although patient identity impacts most aspects of healthcare operations, leadership of most healthcare organizations surveyed understood the criticality of accurate patient identity in optimizing organizational performance, but lacked confidence in their ability to achieve a complete an accurate 360-degree view of patients.

Key Words: Patient identity, Patient identity accuracy, Patient misidentification, Healthcare errors, Digital transformation

1. INTRODUCTION

The number and nature of challenges faced by healthcare delivery organizations (HDOs) in achieving organizational clinical, operational and financial performance excellence continue to proliferate. Low financial margins and staffing shortages have been exacerbated by the COVID-19 pandemic, causing healthcare leaders to struggle with an expanding array of impediments and imperatives to improving operational effectiveness and efficiency and patient care quality/safety and satisfaction.[1–5] A recent study identified patient adverse events in nearly one in four hospital admissions, with approximately one fourth of the events preventable.[6] In another study, 86% of nurses, physicians, and health information technology professionals reported witnessing or knowing of a medical error due to patient misidentification.[7]

For the purposes of this analysis, "patient identity" is intended to mean the certain and accurate identification of a unique individual patient with a single past medical history

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and electronic health/medical record, and not the social, political or cultural attributes and/or beliefs whereby individuals may define their self-perception or sense of personal identity. Patient identification is the process of matching a patient to diagnostic and care interventions, including communicating accurate information about the patient's identity consistently across all sites where care is delivered. Patient identification encompasses not only physical identification of the patient, but technologies capable of improving the accuracy of patient identification as well. Patient misidentification can arise from one or more of three primary challenges, including duplication of patient records, overlay of patient data from different patients into a single record, and incorrect matching of patient data and identity from disparate patient data sources. Errors in patient identification disrupt care and harm patients in virtually every stage of healthcare delivery, including diagnostic testing and medication administration.[8–24]

As a result of the magnitude of patient misidentification, The Joint Commission has designated improving the accuracy of patient identification as the most important National Patient Safety Goal since 2014.[8,9] Healthcare leaders must consider a range of adaptive and disruptive strategies to increase patient satisfaction and retention, revenue and profitability, and to improve patient safety and outcomes. Tactics to respond to these challenges include merger and acquisitions, digital innovation in patient engagement and care management, and implementing innovative methods for attracting, satisfying and retaining patients. These strategies both impact and depend fundamentally on having highly effective organizational capabilities and solutions to accurately identify patients.

Healthcare data sources, such as electronic health records (EHRs), imaging or laboratory data frequently contain errors and incomplete or redundant patient data. Identity errors or incomplete patient data can negatively impact patient safety and quality,[6–23] as well as impede strong HDO financial performance, consumer-centric growth and effective marketing efforts. Incomplete patient data can also negatively impact quality scores that are tied to value-based reimbursement, patient outcomes and HDO brand reputation and market credibility and trust.[24] Hospitals in one survey reported a mean rate of patient identity duplication of 5.5%, and a mean overlay rate of 1.9%.[24] Duplication rates of as high as 18% to 24% have been reported as well.[25,26] In addition, risk of patient misidentification increases greatly due to a lack of interoperability of highly accurate patient identity across various critical hospital systems, including not only multiple EHRs but customer relationship management (CRM) and other systems. Data streams which are dependent on high accuracy of patient identity have proliferated in recent years due to the rise of telemedicine, virtual health care, remote patient monitoring, wearables and other new care delivery vehicles. The interoperability of highly accurate patient identity across all hospital systems is foundational and indeed essential to the safety, clinical effectiveness, and operational and financial feasibility and integrity of this emerging healthcare future.

EHRs typically have master patient index (MPI) functionality focused on improving accuracy of patient identity. While the ubiquity of EHRs achieved over the last decade through the US Centers for Medicare and Medicaid Services (CMS) EHR Incentive Program — also known as the Meaningful Use of EHRs initiative — has had a favorable impact on reducing the magnitude of patient misidentification, EHRs have intrinsic limitations and are an incomplete solution. EHR technology is designed to achieve a different suite of patient care, quality and revenue cycle objectives, and are not specifically formulated to maximize accuracy of patient identification. Unlike dedicated patient identity technology solutions, EHRs cannot achieve the highest possible level of accuracy and reduction of misidentification that patient safety and the complex operations of HDOs demand, with the result that many care organizations seek additional identity solutions beyond EHR deployment. HDOs also frequently utilize multiple disparate EHR vendor products, either due to organizational growth through merger and acquisition of other hospitals and care facilities, or because different clinical care settings such as acute hospital and ambulatory care entities use differing EHR products, and/or HDOs may use specialty focused EHR products across various clinical service lines (e.g., for oncology, cardiology or obstetrics/gynecology care delivery).

High accuracy of patient identity can improve the patient experience and patient satisfaction scores, while identity inaccuracies increase unnecessary clinical tests/imaging studies, erroneous mismatched results, delays in treatment which elevate risk of inferior patient outcomes, and reimbursement and claim denials and delays (with 72% of organizations reporting reimbursement delays are frequently caused by inaccurate patient information).[16–24]Patients receiving incorrect or inapplicable information from a provider are more likely to switch to a new provider.[24] This study examines the impact of patient identity challenges and current management on HDO strategic priorities and objectives objectives through a survey of leading US healthcare providers.

2. METHODS

2.1 Study objectives

The purpose of this survey of US healthcare provider executives was to gather insights into HDO critical strategic,

clinical, operational and financial objectives as impacted by the current status of – and specific challenges in – organizational efforts to achieve the highest possible accuracy of patient identity.

2.2 Study design and setting

An online Qualtrics survey was conducted of 100 healthcare executive leaders selected from across the United States and organizations reflective of American healthcare delivery/provider organizations at large. Seventy-two percent of respondents worked in multi-hospital health systems, 15% worked in individual short-term acute care hospitals, and 13% in academic medical centers. The survey was designed to consume no greater than 10-15 minutes for individual completion. Respondent identities were known to a survey implementation team, but not to those analyzing and interpreting the data.

2.3 Respondent selection

Potential survey respondents were drawn from a cross-section of representative US health systems, hospitals and academic medical centers within the Definitive Healthcare database, and all respondents opted in. Initial identification and selection of survey respondents were based on position title or role in the hospital or health system, including titles that indicated a potential understanding and appreciation of existing gaps in accuracy of patient identification and need to reduce patient misidentification (see Table 1). Provider executives were recruited to participate in the survey on the basis of their positional title within the organization indicating an enterprise senior or leadership role in health information technology and management, quality and safety, digital transformation, and/or clinical, operational or financial organizational performance. Furthermore, on a scale of 1 to 5, all respondents needed to have indicated a familiarity score of at least 3 or higher with the issue of accuracy in patient identity in order to be qualified for the survey; almost 80% of respondents had a familiarity score of 5. The Definitive Healthcare database was used to search for and identify a broader list of key titles for provider survey recruitment, and to select candidates for receiving the survey. Invitations to participate in the survey were sent to a total of 24,498 potential respondents. While respondents completed the survey from 29 different US states, no effort was made to ensure that either survey invitations or the completed interviews reflected the population size or density of particular states or the composition of the US population as a whole. However, the number of respondents by state roughly approximated most states population size, with eight participants from New York and four from Texas, whereas California was significantly underrepresented with just a single respondent.

An eligibility criterion applied was that the survey respondent had to indicate that they had a key decision making, influencing and/or stakeholder role in the purchase of information technology, software, identity and access management platforms, and tools to improve patient care safety and quality. A majority (53%) responded that they were key decision makers, with one-third self-describing as influencers (37%) and one-tenth as stakeholders. Respondent eligibility criteria also included confirmation that the hospital or health system where the respondent worked had at lease one fully implemented and operational electronic health record, with over one-half using Epic (53%), a further 22% using Cerner and 21% using Meditech. Health systems frequently had multiple EHRs, usually legacy systems not yet consolidated with a single vendor.

2.4 Data captured and analyses completed

The survey captured HDO executive responses to questions about their organizational role, organizational characteristics, strategic organizational priorities both in general and with a specific focus on HDO leader understanding and perceptions of the function, importance, impact and value of the highest possible accuracy in managing patient identity towards achievement of multiple key care delivery objectives. Respondents were surveyed on their views of the importance of accurate patient identity in improving patient care experience and satisfaction, effective patient engagement, system financial performance, care quality and safety, and clinical care outcomes.

In addition, survey items addressed perceptions of the value of digital transformation to HDO performance and growth, and the importance of accurate patient identity within these efforts, as well as the need/desire to enable expanded patient access through digital solutions. HDO leaders were asked about the importance of accuracy in patient identity for effectively managing risk and population health, reducing health inequities, and the value of social determinants enrichment data in achieving key HDO strategic objectives. Healthcare leaders were asked to estimate the level of accuracy in patient identity achieved presently within their care delivery organizations.

Survey data were analyzed using stratified contingency tables crossing key variables and responses of greatest interest and pertinence to understanding the current status of accurate patient identity in HDOs, gaps in identity capabilities, and resultant concerns, challenges and needs across organizational strategic, clinical, patient engagement, satisfaction, operational and financial priorities.

3. RESULTS

3.1 Respondent role/title in healthcare delivery organization

Forty-three percent of respondents held leadership roles within information technology and data related departments (see Figure 1). Health information management and informatics leaders comprised 50% of respondents, while marketing and analytics executives comprised another 19%. All respondents were from healthcare delivery organizations within the United States.

3.2 Healthcare delivery organization EHR status

With respect to current state of EHR deployment in the HDOs surveyed, 63% reported having a single enterprise wide EHR deployed, while 23% have multiple EHRs but are in the process of consolidating to single one. Only 13% have multiple EHRs and intend to continue to utilize and manage all that are currently deployed.

3.3 Healthcare delivery organization strategic priorities

With respect to top strategic priorities, HDOs are focused on improving patient satisfaction scores (42%) and addressing workforce shortage and resiliency (32%) as top strategic priorities (see Figure 2). Over one-third ranked digital transformation initiatives as a leading strategic priority, and 83% identified improving patient access as the number one value driver for engaging digital solutions. Despite the high reported importance and critical need for accurate patient identity across critical strategic and HDO performance goals, explicitly reducing duplicate patient records was identified as a top priority by only 4% of HDO leaders.

3.4 Key overall HDO challenges

Financial and budget constraints (56%), professional burnout and workforce resiliency (50%), and attracting and retaining top talent were the top three challenges reported by HDOs in achieving strategic priorities. However, one-third indicated that implementing a patient-centric business model, and ensuring high data quality and seamless integration are key HDO challenges. One-fifth stated that inability to engage patients in their care remains a major health system challenge.

3.5 HDO digital transformation priorities and challenges

After identifying the need to improve patient access using digital solutions as their HDO's top priority (83%), healthcare leaders ranked continuity of care and patient experience as their second highest priority (67%) (see Figure 3). A large majority of respondents (86%) indicated that the pandemic accelerated the need for digital transformation to aid in attracting and retaining patients, and to improve patient access and create a seamless clinical care patient experience. Although improving patient experience is a central theme within digital transformation priorities, improving care and organizational efficiency were also key priorities for healthcare leaders. Major reported challenges included being able to provide patients frictionless technology experiences and engagement continuity (53%), and establishing a digital front door for patients to engage the HDO (43%). Competing information resources and integrating disparate information systems and data sources were also a priority (37%). Patient identity was regarded as central to integrating data sources and seamlessly implementing solutions rapidly, with fewer resources.

3.6 Perceptions of the importance of accurate patient identity to effective HDO operations

Healthcare executives reported that accuracy of patient identity is linked to nearly all strategic priorities of their organizations. More than 60% of respondents consider patient identity as important or critical to every function and initiative within their HDO. Eighty-eight percent stated that they view patient identity as important to improving patient experience, and 75% indicated that patient identity facilitates improvement in care management.

3.7 Existing HDO solutions engaged to improve/assure accuracy in patient identity

A large majority (74%) of healthcare leaders reported they rely exclusively on their EHR for achieving accuracy in patient identity. The remaining 26 HDOs used a single technology solution to enhance patient identity, provided by one of 24 different vendors cited. Nearly 60% stated that their HDO has an enterprise master patient index (EMPI); 23% reported they did not and 18% did not know.

3.8 HDO estimated current level of accuracy in patient identity

Approximately 43% of survey respondents estimated their organization to have a 90% or better accuracy rate in identifying patients, with a majority stating that their HDO does not achieve this accuracy level. This represents a clinical, operational and financial performance disadvantage for a majority of HDOs surveyed. A remarkable 30% of healthcare executives estimated their organizational accuracy level in patient identification to be 70% or less, and 57% estimated accuracy at 80% or below (see Figure 4).

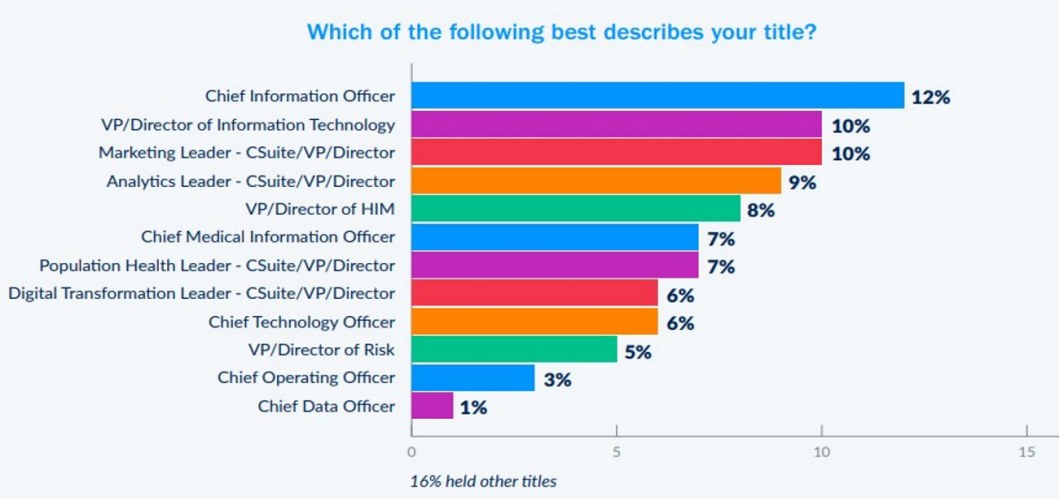

Figure 1. Respondent organizational role/title

Figure 2. Top healthcare delivery organization strategic priorities

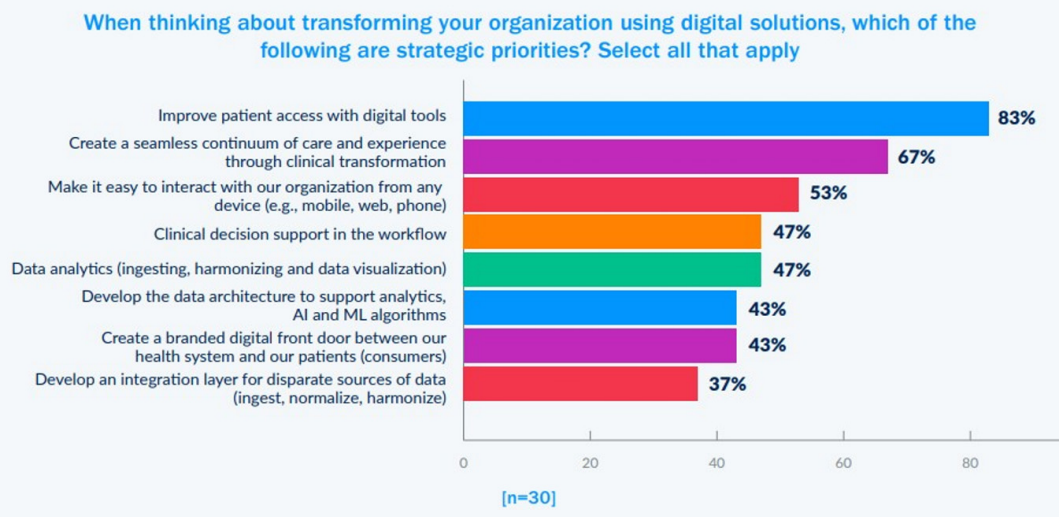

Figure 3. Healthcare delivery organization digital transformation and solution priorities

Figure 4. Estimated healthcare delivery organization accuracy of patient identification

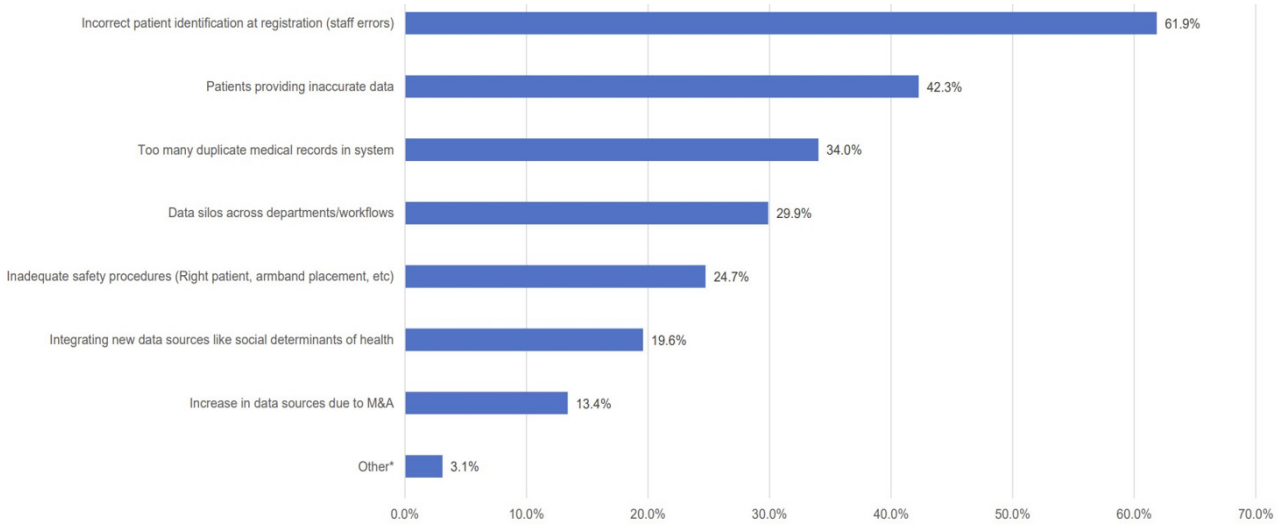

Figure 5. Suspected causes of patient misidentification

Only 14% of healthcare leaders are extremely satisfied with their HDO's current accuracy level in patient identity. A further 54% are only somewhat satisfied with their level of accuracy, 21% are neutral, and 11% are dissatisfied – indicating that despite the adoption and evolution of EHRs, and heavy HDO reliance on EHRs to ensure identity accuracy, the patient identity challenge persists. Figure 5 presents the suspected causes or sources of patient misidentification.

3.9 HDO concerns about the impact of inaccuracy in patient identity

A large majority (72%) of respondents were moderately or extremely concerned that inaccurate patient identity reduces care quality and HDO financial performance (see Figure 6), and 73% regarded high accuracy as critical to enabling a digital front door for effective patient engagement.

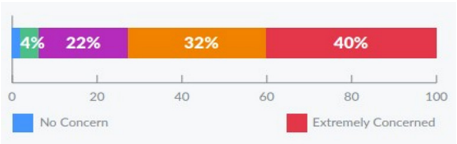

Figure 6. Perceived impact of patient identity challenges on care quality and financial performance

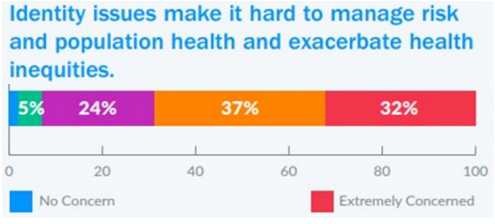

Figure 7. Impact of patient identity challenges on population health management and care inequities

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Figure 8. Healthcare delivery organization growth strategies with patient identity ramifications

3.10 HDO patient identity needs

Patient identity accuracy challenges were viewed as increasing the difficulty of effectively managing risk and population health, and as exacerbating healthcare inequities, with 69% of healthcare leaders moderately or extremely concerned about these issues (see Figure 7). Only 7% of respondents reported being moderately or extremely satisfied with their patient identity management solution(s).

3.11 Importance of social determinants enrichment data

The importance of social determinants of health data was validated by nearly all survey respondents (91%) reporting that it is either extremely or moderately important to have a complete, comprehensive view of patient enrichment data such as race, ethnicity, where people live, etc. This data is regarded as crucial to meeting strategic goals such as improving patient satisfaction scores and completing digital transformation initiatives. Similarly, 92% of healthcare leaders stated that ascertaining social determinants of health are crucial to meeting HDO needs for actionable analytics.

3.12 Patient-focused organizational growth

Eighty-two percent of healthcare executives identified the expansion of service lines as a primary strategy for achieving HDO growth, followed by reducing patient leakage (66%) and acquisition of new patients (66%) (see Figure 8). A substantial percentage of HDOs (43%) intended to utilize mergers and acquisitions to bolster new growth, with ensuing challenges of ensuring accuracy of patient identity across the new combined enterprise. Acquiring systems must often manage multiple EHRs in the new merged entity, exacerbating fragmentation of patient data and increasing patient identity inaccuracies, including duplications and overlays. Most respondents recognized that standardizing operational processes, including patient identity assurance, is a critically important challenge following mergers.

Healthcare leaders appreciated that enhanced patient identity strategies can help solve post-merger challenges, and can also drive combined system revenue gains. Improved patient identity solutions were understood to facilitate increased revenue growth by reducing patient leakage, and more than half of respondents (57%) reported that patient leakage accounts for double digit revenue losses.

4. Discussion

The survey data indicate that while 60% of healthcare leaders claim to be able to identify patients accurately, 54% are only somewhat satisfied with their level of patient identity duplicate, overlay and matching management, and one-third are neutral or dissatisfied with existing performance. Approximately 130 million patients are seen annually in US hospital emergency departments, and this indicates that patient data could be incorrect for greater than 65 million. With 80% of respondents indicating that future enterprise growth will be driven by expanding service lines and acquiring new patients, the challenge of achieving accurate patient identity will be either enabling — or rate limiting — in terms of realizing objectives.

Leaders voiced openness to technology solutions that can help their organizations improve operational efficiency (64%) and patient experience/satisfaction (58%), including those focused specifically on improving the accuracy of patient identity. Furthermore, awareness was high that solutions to increase accuracy of patient identity can enable more robust HDO growth, improved care quality/safety, greater organizational effectiveness and efficiency, and can advance

population health efforts by solving a fundamental problem — accurate identification of patients and patient data — knowing who is who.

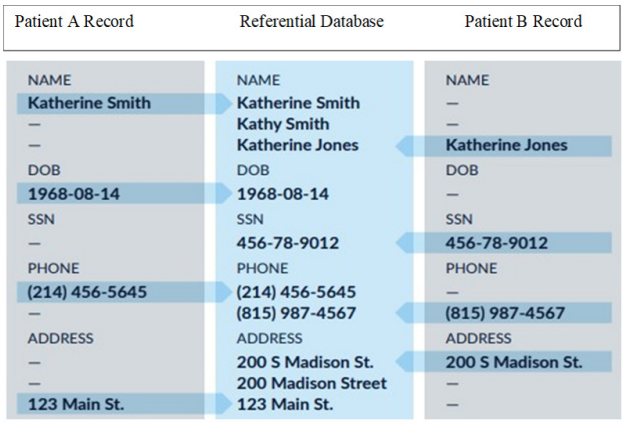

Figure 9. Referential matching database showing matching of disparate patient-member records

Only one in 20 HDOs reported 100% accuracy in patient identity. It should be noted here that organizations reporting perceptions of moderately or very high accuracy may be reporting this based on estimates lacking quantitative evidence or based on a report in their EHR. In neither case are the patient identities matched against an external referential database. Referential patient matching technologies instead match the demographic data from each record to a comprehensive, continuously updated, and highly curated reference database of identities (see Figure 9). A referential database of patient identities draws upon a number of data sources beyond those typically utilized in healthcare in order to accurately identify individuals, including publicly available government data, consumer financial and other data streams.

In addition to probabilistic matching techniques, the referential algorithm uses a curated reference dataset of all US adults and additional logic adapted to the data characteristics that vary by combination of patient and reference data. Reference data derives from commercially available, non-healthcare sources, including credit header data and federal, state, and local government person records. Matching against a referential database yields additional duplicates, or overlays.[26] In order to assess the quality of the identities captured in patient records, provider organizations need to test against the highest possible quality, most inclusive data (typically exceeding the identity content and capabilities of EHRs), or a robust referential dataset.

The survey results indicate that inaccuracy in definitively ascertaining patient identity is a pervasive problem adversely affecting many core and essential operating functions of hospitals. These findings parallel those recently reported by the Patient ID Now coalition of hospitals.[24] Healthcare leaders appear to have an understanding of the critical contribution that accurate patient identity data makes to operations, and how, in key areas and organizational objectives, it is foundational. Responses from these leaders indicate that existing solutions are not adequately solving patient identity accuracy challenges. Innovative new solutions are required, especially those capable of exceeding the performance of basic master patient index functionality existing in current EHRs, which cannot be relied on as a silver bullet fix for patient identity duplications and overlays. Resolving one medical record duplication or overlay of multiple patients' data affecting a single patient requires the time and effort of multiple staff members. Organizational gaps and needs for patient identity enrichment data, such as social determinants of health, are also regarded as very important to advancing clinical care excellence, and absent this understanding of who a patient truly is culturally, socially and economically, sub-optimal patient engagement and clinical outcomes may result.

Improving the accuracy of patient identity is viewed as potentially enabling healthcare organizations to reduce loss of revenue attributable to patient leakage, which over one-half of executive leaders indicated produces substantial financial losses, a somewhat lower figure than the 72% found by the Patient ID Now coalition. Improving financial performance through better accuracy in billing, claims, reimbursement and reduction of denials is a major operational effectiveness and efficiency issue. The clinical care quality and safety implications of duplicate and overlaid patient electronic health records are equally critical to HDO achievement of an essential organizational objective — delivery of the safest possible clinical care with zero erosion in care excellence due to the inability to accurately identify patients across the lifecycle of their healthcare.

5. Conclusions

Preventable healthcare related errors are responsible for 210,000-400,000 deaths a year in the US, making them a leading cause of death.[28,29] Prior to the COVID-19 pandemic, healthcare related deaths were the third greatest cause of mortality in the nation, a challenge likely to return and persist as COVID-19 incidence rates and care demand continue to decline. Error caused morbidity, avoidable increases in hospital length of stay, readmissions and care costs – and human suffering – resulting from this patient safety crisis are likely orders of magnitude greater. Failure to accurately identify patients, which can result in clinicians managing patients without complete EHR clinical data, as well as records combining clinical data from more than a single individual, are significant contributors to the nation's ongoing patient

safety crisis.

However, powerful existing technological solutions deploying referential patient matching are currently available that can help healthcare delivery organizations dramatically increase the accuracy of patient identity, reducing patient record duplication and overlay rates.[27] HITRUST-certified, next generation cloud-based identity platforms exist which enable interoperability across the complex digital healthcare ecosystem with unprecedented accuracy of patient identity. These technology solutions can ensure that healthcare delivery organizations get patient identity right – from the very start of their digital journeys, and into the indefinite future of their care needs. Given the ongoing US crisis in patient safety producing an epidemic of preventable healthcare related deaths every year, engaging an enterprise-wide single source of truth for patient identity should be an imperative, not a luxury, for all American healthcare delivery organizations.

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CONFLICTS OF INTEREST DISCLOSURE

GA Gellert is a medical advisor to Verato, and ME Erwich and S Krivicky Herdman are employees of Verato. The authors declare they have no other apparent or actual potential conflicts of interest.

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