Close Doesn’t Count: Patient Matching Challenges in HIEs

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The more we know about patients, the easier it is to match them. Or at least that’s the theory. Clinical data, patient-generated data, biometrics, social determinants of health: all of this should make patient matching in health information exchanges (HIE) a breeze, right?

Not exactly.

“As the volume of data grows, the matching burden grows as well,” says Shaun Grannis, MD, MS, FAAFP, director of the Center for Biomedical Informatics at the Regenstrief Institute, a collaborative research and learning organization that develops and evaluates innovative solutions for improving patient care. HIEs are caught in the crossfire, trying to make sense of the data and ultimately provide accurate information to its participating providers, according to Grannis.

Experts agree that challenges related to data quality and completeness as well as a lack of data standardization make patient matching in HIEs more difficult today than ever before. However, these challenges present unique opportunities for health information management (HIM) professionals to advocate for solutions that improve patient identity management.

Data Challenges Persist

One challenge is that healthcare providers feeding information into the HIE don’t collect the same data, nor do they collect that data in a consistent format, says Kelly Thompson, CEO at the Strategic Health Information Exchange Collaborative (SHIEC). Some provider organizations, for example, collect data for legal names while others use nicknames (e.g., Jim instead of James). Some electronic health record (EHR) vendors enable registration staff to capture the middle initial only, while others can accommodate the entire middle name.

There’s also no data standardization among other entities—departments of health, departments of transportation, Medicaid, and other agencies—upon which some HIEs rely for matching purposes. For example, some states only permit the choice of male or female for gender on their driver's licenses, while others allow additional options.

These differences that make it difficult to match patients within a single organization or health system are only magnified at the HIE level, says Thompson.

Dan Cidon, chief technology officer at NextGate, an identity management vendor, agrees. “Having to arbitrate these different internal and external sources to determine the source of truth—that’s the challenge,” he says.

Emerging Best Practices for Patient Matching

Deciding to join an HIE is the easy part. Providing that HIE with accurate and complete data? Not so much.

“HIEs complain that the data they receive is so horrendous,” says Cidon. “If an organization is looking for an HIE to magically solve all of its identity problems internally, well, it’s not going to do that.” Instead, he argues, organizations must establish best practices *before* joining an HIE—and continue to follow those practices *after* becoming a participating provider.

Consider the following:

1. Make identity management a priority within the organization. "Few organizations think about patient matching until their accounts receivable goes past 90 days, and they start to realize they have bad patient demographic data because bills are being sent to the wrong address," says Grannis.

Organizations may be tempted to solve the problem of identity management by building their own rudimentary matching algorithm, says Cidon; however, this strategy will only achieve a modest matching rate. It also won't provide the added data management tools of a commercial enterprise-wide master patient index (EMPI) that can include a variety of internal and external sources to construct a single high-quality best record from the data streams, he adds.

Anything organizations can do to clean up their data before joining the HIE is helpful, says Kim Chaundy, senior director of operations at Keystone Health Information Exchange (KeyHIE), which uses an EMPI to link more than 10 million EHR records across 59 counties in Pennsylvania and New Jersey. The EMPI helped the HIE reduce its duplicate record rate to less than one percent.

All participating providers focus on registration performance improvement during the development and testing phase of KeyHIE integration. "We call upon the HIM department to constantly increase the quality of the data," says Chaundy. "They need to understand the importance of certain data elements because that's what enables us to match patients correctly." Even after joining the HIE, participating providers continue to monitor data quality and foster performance improvement, she adds.

2. Standardize data collection. For example, Neysa Noreen, MS, RHIA, inpatient coding and CDI manager at Children's Minnesota in Minneapolis, MN, says her organization implemented standard formatting for patient names and suffixes (e.g., Jr. vs. II or two separate last names vs. one name with hyphens), but hasn't joined an HIE yet because it wants to focus on internal data quality and standardization first.

In addition, health systems using multiple EHRs should also ask their vendors to alter or add registration data fields, if necessary, to ensure consistent data collection—again for the benefit of the organization as well as any HIE to which the health system belongs, says Noreen. For example, one EHR may use "street" in the address field while another abbreviates it as "St."

Standardizing addresses systemwide can also greatly help with patient matching. One recent study conducted by Indiana University and supported by Pew Charitable Trusts, found that standardizing addresses using the US Postal Services standard can improve match rates by up to three percent, translating to correct matches for tens of thousands of records or more per day.[1] When standardizing addresses and last names, match rates improve by up to eight percent.

Such standardization would be critical in HIEs. The Office of the National Coordinator for Health Information Technology (ONC) recently issued draft regulations that propose to remove the Common Clinical Data Set definition from the 2015 certification criteria and replace it with the United States Core Data for Interoperability standard that requires patient address and phone number as part of the demographic information that's exchanged.[2] Address standardization would enable HIEs to match patients more easily.

Another option is to consider a centralized registration and/or scheduling model to reduce variation in how staff collect and enter data. Registration scripts may also be helpful. Children's Minnesota developed these scripts when it initially implemented an EHR in the early 90s. "Over time, departments had morphed these documents into their own materials," says Noreen. "Now, we're taking a step back and saying, 'OK, everyone needs to capture the same information.'"

Departments using a "quick registration" (i.e., only asking for patient name, date of birth, and city/state) may also need to reconsider their workflows so that staff capture and/or validate complete demographic information, says Chaundy, adding that contracted labs should be at the top of the list.

3. Collect the right type of data. Children's Minnesota no longer collects the Social Security Number (SSN). Noreen says it's because patients sometimes don't know their own SSN—prompting staff to enter a dummy number to bypass that portion of the registration—or staff accidentally transpose numbers or enter the wrong numbers, compromising data integrity.

Many organizations are moving away from the SSN to prevent medical identity theft, says Chaundy. "Cell phone numbers are really starting to be a great identifier," she adds. "You know nobody wants to change their cell phone number." Email address may also be helpful in terms of matching patients, she adds.

In some cases, organizations may need to look beyond basic demographic data. Children's Minnesota can't necessarily rely on phone number or address because these identifiers are not unique to each patient. That's because the address and phone numbers of the patient are those of their parents and are often the same for siblings. Even patient name can be tricky when there are multiples because parents sometimes name their children a variation of the same name (e.g., twins named Jaime and Jayme). To match patients with more confidence, Children's Minnesota has started to collect information such as birth order, birthplace (city and state), mother's maiden name, and multiple birth indicator.

4. Educate registration personnel. "This is probably the best thing organizations can do," says Grannis. "If you can start with high-quality data at the point of registration, you have gone a long way in terms of dramatically improving your data quality and, subsequently, your matching process."

Organizations may also want to consider requiring registration staff to meet a quality threshold and provide additional training if they don't meet it, says Chaundy.

Education should also include individuals who perform the registration function as a secondary job responsibility. At Kansas Heart Hospital in Wichita, Kansas, for instance, unit clerks (not HIM staff) register patients between 6:00 p.m. and 6:00 a.m. It's important to ensure that these individuals understand the downstream effects of the data they capture, says Stephanie Costello, MS, RHIA, coding and reimbursement specialist at Kansas Heart Hospital.

5. Engage patients. Ask patients to validate demographic information on the computer screen or input information using a keypad to avoid errors and omissions, says Grannis. Enabling patients to complete mobile intakes in advance can also reduce errors.

Vetting the National Patient Identifier

Experts have long touted a National Patient Identifier (NPI)—a unique number assigned to each patient that would travel with them throughout the healthcare ecosystem—as a panacea for patient matching challenges; however, the jury's still out as to whether the NPI will ultimately solve the problem.

"There's no doubt the NPI would improve matching accuracy," says Grannis. "The question is, by how much and at what cost?"

The Regenstrief Institute analyzed data from the Indiana Network for Patient Care and found that a statewide NPI would yield relatively nominal improvements in data quality even though it would cost $250 million to implement.

Even if adopted, the NPI wouldn't be a perfect solution, says Grannis. Matching algorithms will continue to play an important role in emergency scenarios where patients are unable to provide any identifying information.

There could also be duplicates and typographical errors at the national level when NPIs are initially assigned, necessitating the need for matching algorithms at the provider and HIE levels, says Chaundy.

"An identifier is certainly one way to incrementally improve the accuracy of matching," adds NextGate's Cidon. "It's a lot easier to match one number with another number."

However, Cidon says even England and Scotland, both of which have used a unique identifier for more than a decade, continue to have problems with matching patients, most notably the resource-intensive process of enriching existing registrations with the unique identifier and matching that number to the right patient internally.

There's also a massive onboarding process in terms of creating the identifiers at a national level that takes time, he adds. "Don't hang your hat on this," he says. "We're talking about a decades-long process before you can rely on this single identifier, and even then, I'd be hesitant."

When asked whether using biometrics is a reasonable alternative to the NPI, Cidon says implementing fingerprint or iris scanners at every place of service also takes time. "There have always been practical reasons why we continue to come back to this lowest common denominator approach of taking in the data streams, looking at demographics, and making the best match we can safely make," he adds.

Decentralized identity management (i.e., allowing patients to manage their own identity and present it to various providers) is a potential solution but one that wouldn't yield immediate results, says Cidon. "This, to me, is the only solution that's substantially different as a model that may succeed," he adds. "But it will take a lot of time to get to that point."

The healthcare industry may have the opportunity to explore the NPI as a potential solution if the Senate joins the US House of Representatives in repealing a ban on federal funds to adopt a unique patient identifier. Using federal funds to create this identifier was originally banned out of privacy concerns; however, repealing the ban would allow collaboration between the US Department of Health and Human Services and the private sector to identify solutions for reducing medical errors and protecting patient privacy.

How HIEs Can Help

Fortunately, the burden of patient identity management doesn't lie solely with healthcare organizations. Experts say HIEs themselves can also improve identity management in a variety of ways.

For example, many HIEs differentiate between authoritative and nonauthoritative sources, depending on the quality and completeness of a participating provider's admission, discharge, and transfer data, says Grannis.

Authoritative sources can create and update identities while nonauthoritative sources can only link to existing identities. This distinction helps maintain data integrity throughout the HIE, he adds.

KeyHIE employs a group of individuals whose sole responsibility is to help organizations improve and validate their data, says Chaundy. “We view ourselves as an extended member of the team at each organization to make sure we’re constantly scrubbing the data.”

HIEs can—and should—educate providers, says Thompson. “HIEs are leaders in patient matching, They’re very skilled at this and can offer insights into best practices and lessons learned.”

Jaime Bland, CEO of the Nebraska Health Information Initiative (NEHII), agrees, adding that all HIEs must look beyond data query and retrieval to focus on data quality and provider education. “We see all kinds of challenges with using different EHRs and different EMPI solutions,” she says. “The more diverse your data sources, the more challenges there are from a comprehensiveness perspective. HIEs are uniquely positioned to inform providers about this.”

NEHII helps organizations prioritize performance improvement initiatives based on recurring errors and omissions. It also helps them merge and manage duplicates as well as educate registration staff.

The feedback and assistance that HIEs provide is especially helpful for smaller specialty hospitals where HIM professionals wear many hats, making it difficult for them to focus on identity management, says Costello.

HIEs may even be able to establish an HIE-level patient identifier that would ease the matching burden on a state or regional level, says Bland.

SHIEC recently launched a patient matching workgroup that includes HIE representatives as well as technology vendors to discuss quality standards and best practices for developing intake forms, resolving identity conflicts, and more. SHIEC is also exploring partnerships with various federal agencies to deploy predictive analytics for population health. “There’s a genuine interest to make healthcare better one community at a time,” says Thompson. “It’s not enough to share information. It needs to be good-quality data.”

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