Connecting Care through EMPIs

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Behind every medical record is a patient whose care depends on a thorough understanding of current and past medical conditions. When that understanding is compromised due to an incomplete record, care suffers. Learn how an enterprise master patient index can be the foundation of medical record integrity.

The enterprise master patient index (EMPI) is more relevant than ever to HIM professionals and provider organizations because of its critical role in achieving patient, facility, and enterprise-level outcomes. It can improve internal operating efficiencies, protect the integrity of the medical record, support initiatives to minimize adverse events, and improve patient service and clinical and financial outcomes. In addition, the EMPI supports HIPAA requirements regarding patient privacy, patient access to medical records, and the consistent management of a patient's information across the covered entity. Finally, the EMPI is an important requirement for advanced applications like the electronic health record (EHR), the value of which partially rests on the ability to link and display patient information collected from previous encounters within and across different facilities.

At first glance, the breadth of the EMPI's role may be surprising, but a closer look reveals a very natural connection between patient experience, medical record integrity, operational efficiencies, patient outcomes, facility priorities, and enterprise priorities. What links these experiences is the concept of patient identity. When a patient is registered, his or her assigned medical record number becomes a proxy for his or her identity, which plays an important role in many processes. Breakdowns in this identity, such as the inability to identify a patient's previous records, undermine the integrity of the medical record as patient information becomes fragmented. The inability to reliably and consistently integrate a patient's information becomes a barrier to achieving many successful objectives.

In this article, we'll explore the importance of a complete medical record for patient care and the facility and enterprise-level ramifications of fragmented patient information. In addition, we'll examine the components of an effective EMPI.

Medical Record Integrity at Stake

The adoption of the medical record as the basis for care is an important acknowledgment by the medical profession of a principle HIM professionals know well: a patient's pertinent information must be maintained in a central location. This mechanism for collecting patient data in a single location foreshadowed the investment by nonhealthcare companies in tools and services to integrate customer data in support of their customer relationship management initiatives. Broadly, the medical record has two primary benefits:

- it connects physicians and others with access to the patient's history collected during previous encounters
- it serves to facilitate coordination of care by multiple caregivers

As information from the current encounter is generated, its capture and storage in the medical record provides a central reference point during the encounter for the multiple caregivers and departments often involved in the care of a patient.

There are two types of variations in medical records that undermine their integrity: errors in patient identification and variation in medical record numbers. First, patient identification errors lead to fragmented information or worse, commingling of patients' information. These errors occur primarily due to:

- changes in a patient's identifying attributes such as name, address, or phone number
- errors such as typos, transpositions, and misspellings in entering patient information
- not capturing important information

- limitations of exact match-based search technology in existing registration systems
- user error as the wrong patient is selected or the correct patient's record is overlooked

The result is the patient is assigned a new medical record number, known as a "duplicate,"or the patient is assigned another patient's medical record, which results in an error commonly called an "overlay." Regardless of the type of error, the integrity of the medical record suffers. While in many cases the quality of care does not suffer because the newly assigned medical record number continues to serve as a coordinating mechanism for the current encounter, these errors disconnect patients from their previous history. This, in turn, limits the organization's ability to improve patient-centric processes that require a longitudinal patient history.

The second form of variation is a result of the natural variation in medical record numbers that occur when the patient visits multiple facilities. Because the patient has different identifiers across the enterprise, the only way to link a patient's different numbers together is to rely on comparing patient demographic data such as name, date of birth, social security number, gender, phone number, and address. However, these attributes may differ due to the first form of variation, which complicates the enterprise-linking process. Experience suggests that older, multifacility MPIs that attempt to link a patient's different medical record numbers together on the basis of exact-match logic often have record level error rates of 18 percent and greater.[1]

Without some mechanism for linking a patient's disparate medical record numbers across the enterprise, no enterprise-level patient identity can be established and no enterprise patient-related processes can exist. Without such processes, the enterprise cannot systematically improve outcomes at the enterprise level. The delivery system remains a collection of discrete facilities.

Single-File MPI Evaluation Projects

Summary Results

Master Patient Index			Predicted[1]		Estimated			Repeat Patients	
Record Size	File Count	Total Recs	Duplicate Records	% of Total	Patients 1 MR #	Patients 2+ MR#[2]	Unique[3] Patients	Estimated[4] Total	% with Duplicates[5]
less than 300,000	13	3,075,235	149,579	4.9%	2,925,656	71,228	2,996,884	2,097,819	3%
300,001-500,000	20	7,915,764	583,390	7.4%	7,332,374	277,805	7,610,179	5,327,125	5%
500,001-800,000	14	8,632,204	530,977	6.2%	8,101,227	252,846	8,354,073	5,847,851	4%
800,001 and up	23	26,663,257	2,601,555	9.8%	24,061,702	1,238,836	25,300,538	17,710,377	7%
TOTALS	**70**	**46,286,460**	**3,865,501**	**8.4%**	**42,420,959**	**1,840,715**	**44,261,674**	**30,983,172**	**6%**

Notes: 1. Predicted duplicate record percentages based on Madison's probabilistic algorithm have been reduced to account for false-positive results on the basis of a factor empirically derived from Madison's extensive on-site cleanup experience. 2. The number of estimated patients with multiple records is based on the assumption that each patient has on average 2.1 medical record numbers. This estimate is based on Madison's extensive cleanup experience. 3. Unique patients are the estimated number of unique persons represented by the records in the MPI; it's the sum of all patients with a single medical record number plus those with multiple medical record numbers. 4. Of the total unique patients, 65 percent are assumed to be repeat patients. 5. The percentage of repeat patients with duplicates is the estimated number of patients with duplicates divided by the total number of repeat patients.

Average Error Rate of 10 Percent

How often do these errors occur? "Single-file MPI Evaluation Projects" summarizes results from 70 file analysis projects in which the MPIs of various facilities were analyzed for potential duplicate errors. As shown in the chart, the average MPI record error rate for organizations with 800,000 or more patients is approximately 9.8 percent. This means that 9.8 percent of the records in the EMPI are assigned to patients with two or more medical record numbers.

To put this into context, consider the following example. Assume your organization implements an EHR and performs approximately 1,000 registrations per day with a repeat patient rate of 70 percent. As a result, on any given day the EHR will

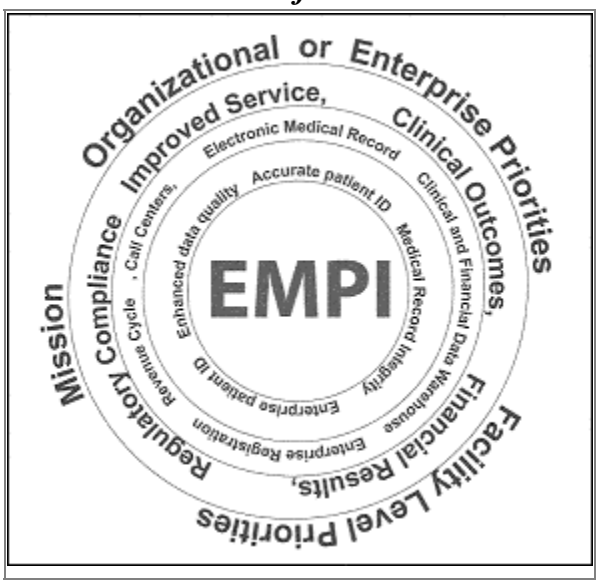
display results for 700 repeat patients of which 48 will have multiple medical records. Because EHRs rely on medical record numbers, these 48 patients will have fragmented or incomplete records. Further, because most facilities do not correct duplicates until after patient discharge, the error, if discovered, will not be corrected while the patient is in house.

Although overlay statistics are impossible to determine by analyzing MPI information, our experience indicates:

- As the total number of duplicates increases, so will the likelihood of overlays. Simply stated, given more choices to select from in the duplicate-infected database, the greater the likelihood the wrong patient will be selected, resulting in the creation of an overlay error
- Though rates can vary greatly, a good rule of thumb is that duplicates are 100 times more likely to occur than overlays

From the perspective of the enterprise, both forms of errors complicate the challenge of creating an enterprise linkage of identifiers necessary to support enterprise processes. The delivery system requires an enterprise-level identifier for each patient to link the patient's episodic information together. This identifier serves as the basis for coordinating care across the enterprise in the same way the medical record number is used within a facility.

The Role of the EMPI



Facility-level Errors Hinder Operations

When errors are detected, limited resources--personnel from different departments--are required to resolve the error, thus limiting operational efficiencies. These errors generate further costs by limiting the return on investment in advanced, expensive technologies like the EHR.

More specifically, breakdowns in the patient identification process and the resulting medical record number errors can create the following problems:

- Customer service will suffer as repeating patients are treated as if they are new patients because of registration personnel's inability to find their existing information
- Multiple medical record numbers will be assigned to the same patient, thus fragmenting that patient's information within a facility
- Patients and physicians will be frustrated by incompleteness of the medical record because of its fragmentation
- Return on investment in the EHR and clinical data warehouses will be undermined
- Clinical risk will increase due to incomplete information in the physical chart
- Revenue cycle management initiatives to improve cash flow are limited due to the organization's inability to reliably link all accounts for a patient or guarantor
- Negotiations with health plans and insurance companies are weakened due to the inability of the provider organization to accurately measure member activity across facilities or service lines

- Operational inefficiencies surface due to the ripple effect created by a medical record number error as it spreads across departments
- Planning and marketing efforts to understand physician referral patterns and patient activity across multiple service lines will be hindered
- Regulatory risks increase due to the organization's inability to consistently manage a patient's information according to requirements set forth by HIPAA and other legislation. Fragmented patient information also increases regulatory risks. HIPAA mandates that covered entities consistently and accurately manage patient information across their organizations. If a patient's information becomes fragmented within and across facilities, it becomes difficult, if not impossible, to consistently administer privacy policies or provide patients with access to their complete record
- Because the majority of patients in a facility are repeat patients, imagine the damage to the organization's credibility if patients realize their records are mismanaged

Enterprise-wide Errors Limit Improvement Efforts

The variation in attribute values that undermine the integrity of the facility-based medical record and limit the success of outcomes-based initiatives at the facility level lead to a similar set of problems at the enterprise level.

Within a facility, the challenge is maintaining integrity of the facility-specific medical record number. The issue at the enterprise level is compounded. First, there is no enterprise identity for the patient. Second, the data quality issues that fragment patient identities across multiple records within a facility complicate the comparison and linkage of these records into a comprehensive enterprise identity for the patient.

Without a mechanism for establishing an enterprise identity for the patient, all patient-related processes among facilities must be manual, which limits improvement efforts. The results are barriers in improving the following enterprise-level priorities:

- **Customer service levels**: Because medical record numbers are facility specific, there is no way for registration personnel in one facility to access patient demographic and insurance information collected in another
- **Clinical outcomes**: Without an enterprise identity, linking medications and chronic conditions across facilities is impossible
- **Financial results**: There is no mechanism for creating a comprehensive financial picture of the patient. This limits improvements in collection efforts. Another example is the inability to determine the total cost of a specific patient's care to an organization
- **Marketing results**: Without a method to integrate facilities, branding efforts are limited
- **Regulatory requirements**: HIPAA mandates that patient information be consistently managed across the covered entity. Further, the provider organization must provide patient access to their records for review and editing. Without a system for linking a patient's records it will be difficult, time-consuming, and costly to locate them

In general, without an enterprise identity for the patient, enterprise processes are impossible, creating barriers for the delivery system acting in a coordinated or integrated manner.

EMPI Boosts Data Quality

The EMPI provides the most practical and cost-effective strategy for systematically addressing these widespread challenges. An EMPI designed to protect the integrity of the facility-based medical record and provide a mechanism for establishing and maintaining a comprehensive enterprise view of the patient consists of the following components:

- A **mechanism for storing facility-specific identities** of patients consisting of medical record number and patient attributes such as name, address, phone number, date of birth, gender, and social security number. Individual identities should be logically linked together to preserve facility-specific views (see "Creating the Enterprise Identity," below). Logically linking records as opposed to physical merges makes the review of potential errors more efficient, because the reviewer has access to the original records
- A sophisticated **comparison algorithm** comparing and scoring the probability that two or more records or identities represent the same person
- A **threshold capability to interpret comparison scores**. Typically a dual threshold model is used. When scores fall below the lower threshold, the records are assumed to represent different patients, and when they are above the upper

threshold, the records are assumed to represent the same person. If the score falls between the two thresholds, the record is flagged for manual review

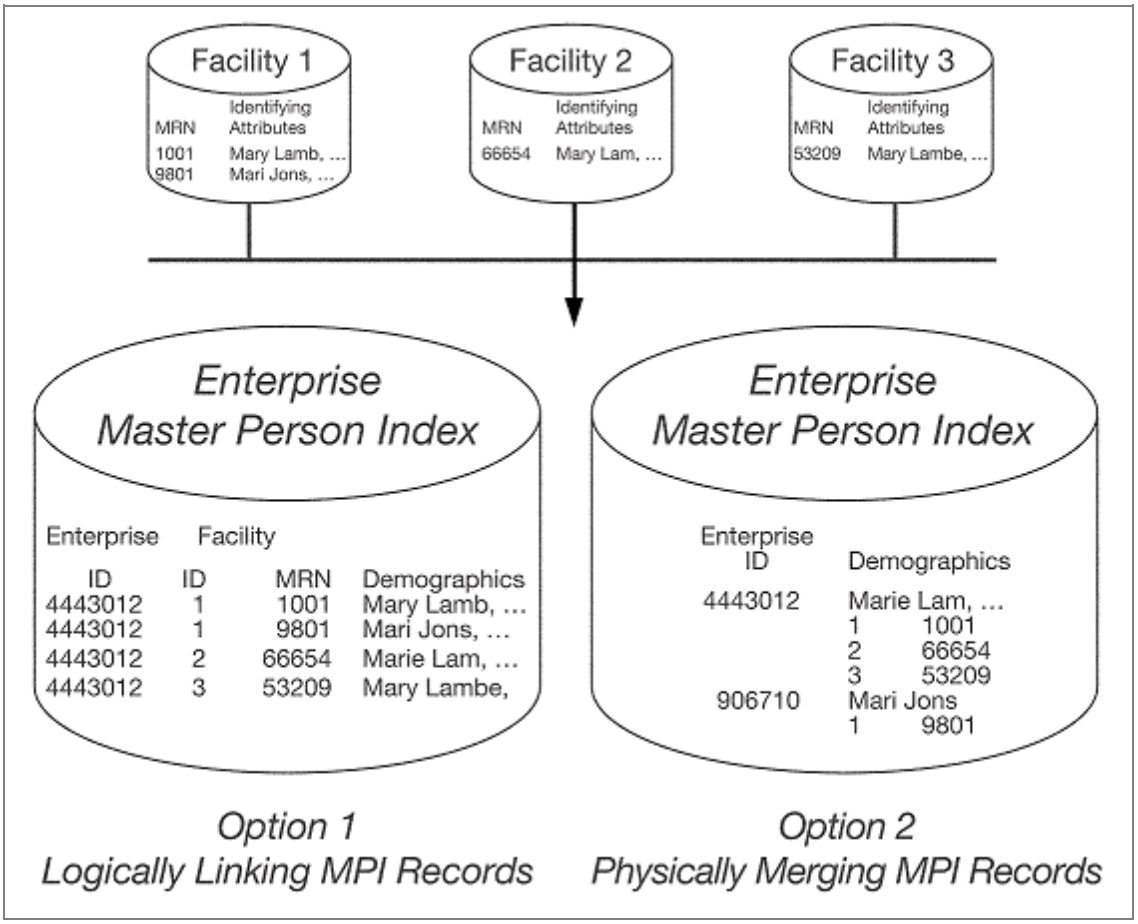
- A **workflow-enabled task management tool** for reviewing, resolving, and managing comparisons flagged for review. These comparisons represent potential duplicates, overlays, and other identity errors such as differing patients with the same social security number
- A sophisticated **person search capability** to assist registration personnel and others in accurately locating a patient's existing records thus preventing the creation of duplicates and overlays. This protects the integrity of the medical record at the facility level and mini-mizes the re-collection of patient information across different facilities

In addition to these components, a key consideration is the ongoing cost of maintaining a certain level of data quality. As increasing amounts of data are stored and accessed online through applications like the EHR, data quality issues become more visible and are less tolerated. If the return on investment for these applications is to be realized, the cost of data quality cannot become prohibitive.

An Investment in Care

An EMPI is the one investment that can be leveraged across all major facility and enterprise initiatives. It serves as the foundation for managing data quality while protecting the integrity of the unit medical record commensurate with the requirements of the EHR and other advanced technologies. Finally, the EMPI provides a method for linking individual, facility-based MPI records to form a comprehensive enterprise view of the patient, a first step in realizing the promise of coordinating care across the enterprise.

Creating the Enterprise Identity



Note

1. Madison Information Technologies, Inc.

Reference

AHIMA MPI Task Force. "Maintenance of Master Patient (Person) Index (MPI)—Single Site or Enterprise."*Journal of AHIMA* 68, no. 9 (1997).

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Article citation:Hewitt, Joseph B., and Michele O'Connor. "Connecting Care through EMPIs." *Journal of AHIMA* 73, no.10 (2002): 33-38.