Reconciling and Managing EMPIs (2010 update)

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Editor's Note: This practice brief replaces the following three 1997 practice briefs: "Merging Master Patient (Person) Indexes," "Maintenance of Master Patient (Person) Index (MPI)-Single Site or Enterprise," and "Master Patient (Person) Index (MPI)-Recommended Core Data Elements."

Over the past decade, the healthcare industry has faced a number of new challenges, including the accelerated implementation of electronic health records (EHRs), health information exchange, and electronically linking healthcare information. A number of facilities have also had to deal with mergers, acquisitions, and alliances, requiring that they combine their master patient (person) indexes (MPIs) into one MPI.

These challenges have caused a renewed sense of urgency for effective MPI management. This practice brief outlines the process for effective MPI management, including how to reconcile two MPIs. It also outlines staff roles and responsibilities for MPI management and conversions.

MPI Functions and Benefits

An accurate MPI is one of a healthcare organization's most important resources because it provides the link to access patient health information across all care settings. The MPI:

- Provides the index, location of, and access to a patient's EHR in an enterprise
- Facilitates intraoperability and the accurate creation of a longitudinal record for a patient by linking records across multiple clinical systems, facilities, and provider EHRs
- Ensures accurate and complete linking of EHRs for health information exchange across participating organizations, including healthcare organizations, reference labs, registries, pharmacies, and public health databases
- Establishes a streamlined governance process supported by data management strategies that will ensure the accuracy of data models, stewardship, policies, and procedures
- Accurately matches persons being registered for care with their existing medical records, thus minimizing duplicate records within a facility and across patient care settings

An MPI may index patients, persons, healthcare plan members, guarantors, subscribers, physicians, healthcare practitioners, payers, employees, employers, and others. If it is shared by two or more care centers it may be called an enterprise master patient index (EMPI), enterprise patient index, corporate person index, or multifacility index.

Reconciling MPI Databases

When reconciling two or more MPI databases, preparation activities for each facility frequently occur simultaneously. Best practice recommends that only one MPI at a time be added to the EMPI.

Organizations should evaluate the data integrity and record links of the first databases prior to adding a second database. Data loading errors or data integrity problems in the source databases will be compounded if they are not reconciled before another database is added.

Successful MPI conversions require input from HIM, the EMPI team, database administrators, the integration (interface) team, patient access (admitting or registration), and system or department managers for any computer application where patients are identified. These computer applications could be administrative (such as registration and scheduling systems),

ancillary (such as laboratory and radiology), financial (such as patient accounting or decision support), clinical (such as cardiac, gastrointestinal, or medical transcription), or research.

During the planning stages the integration team should identify all systems that receive admission, discharge, and transfer (ADT) transactions, order transactions from the hospital or clinic information systems, or report result transactions to other systems. This will help identify department managers who may need to be involved in the conversion discussions.

Data Conversion Planning

Several tasks require strong HIM leadership to guarantee a successful MPI conversion and prevent post-conversion workflow issues, data quality problems, and inefficiencies in any or all departments. They include:

- Carefully planning downstream EMPI transaction interfaces for each system that creates a patient record or medical record number.
- Specifying and standardizing data definitions, including exactly what is to be captured in each of the EMPI data fields (e.g., one system might include prefixes or suffixes in the name field, while another may use a separate field). Patient name should be separated in different fields for last name, first name, full middle name, suffix, and prefix. Conversion routines should dictate how to handle hyphen, apostrophes, and other symbols that may be stored in the prior system's name field(s).
- Mapping data fields from the old system to the new system.
- Determining if all previous EMPI records should be converted. The only type of MPI records that an organization should consider not converting to the new EMPI are "shell" records (MPI records with limited patient demographics for which the organization cannot positively confirm the patient's identity) and clinical records attached to "shell" MPI records.
- Specifying which transaction messages and message types and in which message segments and fields each data element will be sent from the new EMPI to each downstream system.
- Converting clean data from the old EMPI.
- Assessing and reconciling existing data integrity issues in old EMPI prior to conversion. Several important tasks under this category include:
    - Analyzing the existing EMPI database for data integrity issues such as invalid data stored in various fields, common default values used, frequency of blank (null) values, highest frequencies of values in various fields, and the identification of potential duplicate, overlap, or overlay records.
    - Validating potential duplicate, overlap, or overlay records.
    - Merging or correcting validated duplicate, overlap, or overlay records. This may require merging records in downstream systems as well as the current EMPI system.
    - Combining or correcting paper medical records or radiology jackets if an efficient method of cross-referencing the retired medical record number or patient ID to the surviving medical record number or patient ID cannot be achieved.

The volume of duplicates, the number of departments or systems involved, and the volume or location of paper records are key variables in determining the cost and timeline of an EMPI clean-up.

- Defining use case scenarios, test scripts, and procedures and test records that will be followed during the data conversion process.
- Testing each and every data field thoroughly and repetitively using a variety of use cases to ensure all records are successfully converted.
- Validating samples of records post-conversion to ensure data integrity.
- Training users and system administrators or analysts.

Additionally, and just as important, a successful data conversion requires strong project management, including:

- Identifying all stakeholders and securing executive sponsorship and support for the project
- Identifying system owners and serving as an arbiter of conflicts or other issues
- Defining the project, scope, finances, and other resources supporting the project

- Outlining the project organization, including management approach, roles and responsibilities, and involved committees
- Outlining the related projects and interdependencies
- Outlining the project plan, including schedules, milestones, tasks, and timeline management
- Detailing the work breakdown structure, including the appropriate stakeholders in this process (a key project management requirement, as each stakeholder brings a different knowledge base that will flush out important variables in planning, defining, and testing)
- Managing risks and planning for contingencies
- Managing issues throughout the conversion
- Defining escalation paths for timely and effective issue resolution
- Outlining the communication methods, frequency, and parties involved
- Creating data flow diagrams to facilitate common stakeholder understanding at appropriate points in the data conversion project

Key Data to Convert

Determining the minimum key data elements to convert requires an organizational analysis of each and every department's use of the EMPI data. Accurate identification of patients and their records in each clinical, ancillary, and administrative department requires minimum data be present in a department's systems.

If a minimum data set exists in the index, that index record can be connected to subsequent visits or treatments for that patient. Without these, subsequent care could be compromised because previous medical records are not connected to a new encounter. The efficiency of the clinical workflow also will be compromised.

At minimum, the elements listed in the table "Recommended Core Data Elements for EMPIs" should be converted (see table below).

Recommended Core Data Elements for EMPIs

Data Element	Definition	Data Type*
Internal patient identification	Primary identifier used by the facility to identify the patient at admission (e.g., the medical record number)	Extended composite ID with check digit
Person name	Legal name of patient or person, including surname, given name, middle name or initial, name suffixes (e.g. junior, IV), and prefixes (e.g., father, doctor)	Extended person name
Date of birth	Year, month, and day of birth (e.g., YYYY/MM/DD)	Time stamp
Gender	For example, male, female, unknown, or undetermined	Coded value
Race	Race is a concept used to differentiate population groups largely on the basis of physical characteristics transmitted by descent. Races currently used by the federal government for statistical purposes are American Indian or Alaskan Native, Asian or Pacific Islander, Black, White, Unknown, Other, and Missing.	Coded value

Data Element	Definition	Data Type*
Ethnicity	Ethnicity is a concept used to differentiate population groups on the basis of shared cultural characteristics or geographic origins. Ethnic designations currently used by the federal government for statistical purposes are Hispanic origin, not of Hispanic origin, and Unknown, Other, and Missing.	Coded value
Address	Address or location of patient's residence. Components include the street address, other designation (e.g., apartment number), city, state/province, zip or postal code, country, type of address (e.g., permanent, mailing).	Extended address
Telephone number	Telephone number at which that patient can be contacted. This may be a home or business telephone number or the telephone number of a friend, neighbor, or relative.	String data
Alias/previous/maiden names	Any names by which the patient has been known other than the current legal name, including nicknames, maiden name, previous name that was legally changed, etc. All previous names available should be converted and retained.	Extended person name
Social Security number	Personal identification number assigned by the US Social Security Administration	String data
Facility identification	The unique identification number of a facility where patients seek care. (The Centers for Medicare and Medicaid Services has developed a provider ID system for healthcare facilities.)	Person location
Universal patient identifier	Not yet established	N/A
Account/visit number	Number assigned by the facility billing or accounting office for all charges and payments for this encounter or visit	Extended composite ID with check digit
Admission/encounter/visit date	Date the patient actually arrived for care (e.g., YYYY/MM/DD/HH/SS)	Time stamp

Data Element	Definition	Data Type*
Discharge or departure date	Date the patient actually left the facility or died (e.g., YYYY/MM/DD/HH/SS)	Time stamp
Encounter/service type	Categorization of the encounter, such as emergency, inpatient, outpatient, home care, or electronic (e.g., e-mail, Internet, telemedicine)	Coded value
Encounter/service location	Location in which the encounter, visit, or treatment occurred	Coded value
Encounter primary physician	Attending physician for the associated encounter, visit, or treatment, identified with the primary physician's National Provider Identifier	Coded value
Patient disposition	Patient's intended care setting following discharge. Examples include discharge home (not to home health service), acute care hospital, nursing facility, home to be under the care of a home health service, or other healthcare facility; left against medical advice; alive, other, or not stated; died; admitted to hospital; admitted to observation; transferred to skilled nursing facility, intermediate care facility, other facility; or other disposition as dictated by type of MPI.	Coded value

*□Data types correspond to those described in Health Level Seven International's Application Protocol for Electronic Data Exchange in Healthcare Environments
Version 2.6. Version 2 Messaging Standard.

Merging multiple MPIs into an EMPI requires additional considerations, including:

- Whether to use the most recent information for each data element or whether other criteria be followed in determining which name, date of birth, or other key demographic data elements will be stored as the patient's current information.
- Whether the medical record numbering systems from the various MPIs will be collapsed into one for the EMPI. If they are, what are the implications for historical record retrieval, downstream systems, or department records? Will downstream system databases have to be manually corrected or changed?
- How records from different MPIs will be linked for the same person at the enterprise level. If an organization automerges records based on key person demographic data, it should thoroughly review and test the accuracy of the algorithm used for accomplishing the link.
- The volume of overlap records that will not autolink and the manual effort required to merge these records in the EMPI post-conversion. Will the system allow duplicate records to be merged if a patient is still in house? Organizations should determine if any downstream systems are affected by this (e.g., an enterprise PACS or lab system).
- Whether all patient-level records can be converted. If not, how will the organization pull historical medical records for patients quickly for emergent care? State laws should be consulted regarding retention of MPI record data.
- What data should be kept at the patient level and what data should be kept at the encounter level. Organizations should carefully consider this issue to ensure that adequate data are converted for successful record retrieval in every clinical

department and for effective use of that converted record for subsequent patient care visits.

- Whether all encounter- or visit-level data will be converted. If not, how will the organization determine where a patient was seen previously, which is an especially important factor in pulling some historical medical records. Will existing demographic information supportive in patient identity (e.g., address, phone number, name, contact, etc.) be overwritten during the conversion such that the historical information in an EHR is lost?

The table "Additional Recommended EMPI Data Elements" below lists additional data elements to be stored in EMPIs. These data elements may increase the ability to link prior records to a new encounter or across healthcare organizations, expedite emergency care, and facilitate timely retrieval of healthcare information in the future.

Additional Recommended EMPI Data Elements

Data Element	Definition	Data Type*
Mother's maiden name	The given, family, or last name of the patient's mother	String data
Marital status	Marriage status of the patient (e.g., never married, married, separated, widowed, divorced, or unknown). Organizations must determine whether marital status will be tied to a visit or just reflect current status and whether historical information for specific visits will be available.	Coded value
Place of birth	City, state, and country of the patient's birth	String data
County	County in which the patient lives	Coded value
Blood type/Rh	Patient's blood type or Rh factor	Coded value
Employer	Name of patient's employer	String value
Work telephone	Patient's work telephone number	String value
Advance directive and surrogate decision making	An indication that the patient has an advance directive on file. It describes an individual's current preferences about treatment should the person become incompetent or unable to communicate these preferences to medical personnel. Surrogate decision making is an alternative method for medical decision making on the individual's behalf. It is invoked in the absence of an advance directive when the individual is not competent to make an informed decision.	Boolean
Organ donor status	Whether the patient has consented to donate his or her organ(s) in the event of death	Boolean

Data Element	Definition	Data Type*
Emergency contact name	Name of the person whom the patient wishes to be the primary contact if notification is necessary	String data
Emergency contact relationship	Relationship to the patient of the person whom the patient wishes to be the primary contact if notification is necessary	String data
Emergency contact address	Address of the person whom the patient wishes to be the primary contact if notification is necessary	String data
Emergency contact telephone	Telephone number of the person whom the patient wishes to be the primary contact if notification is necessary	String data
Guarantor name	Name of the person responsible for the payment of the patient's bill	String data
Guarantor relationship	Relationship of the person responsible for the payment of the patient's bill	String data
Guarantor address	Address of the person responsible for the payment of the patient's bill	String data
Guarantor telephone	Telephone number of the person responsible for the payment of the patient's bill	String data
Payer information	Type of payer (e.g., commercial insurance, Medicare, self, etc.), including policy information such as payer name, policy number, etc.	String data, separate fields for each data element
Problem list	Master list of all of a patient's health problems or diagnoses	String data
Encounter primary physician contact address	Encounter primary physician business address	String data
Referring physician	Referring physician for the associated encounter, visit, or treatment, identified with the physician's National Provider Identifier	Coded value

Data Element	Definition	Data Type*
Referring physician contact address	Referring physician's business address	String data
Receipt of notice of privacy practices	Whether the notice of privacy practices been given to the patient	Coded value

*□Data types correspond to those described in Health Level Seven International's Application Protocol for Electronic Data Exchange in Healthcare Environments
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Clinical data elements are sensitive, and access to them should be limited to those who have a legitimate need to know.

EMPI Maintenance

The management of a high-quality EMPI database requires constant oversight and evaluation and regular and timely correction of data integrity problems. MPI maintenance-whether for a single site, a facility within an enterprise, or an enterprise-should be centralized under the direction of HIM professionals.

Those responsible for MPI maintenance must be carefully trained, have adequate tools and procedures, and be supervised to ensure consistent compliance with established guidelines. Organizations should report key EMPI quality indicators routinely to minimize the creation of data integrity issues. Ongoing education of registration and scheduling staff is critical to maintaining low creation rates for duplicates, overlaps, overlays, and other EMPI data integrity problems.

The MPI manager should have the following responsibilities:

- Defining data stewardship policies for the organization regarding the EMPI.
- Determining policies for access to the EMPI; assisting in the development of privacy and security policies for the organization and other interfacility or enterprise record management program policies.
- Working with the organization's integration team to ensure ADT interfaces are properly built and tested.
- Representing the organization on health information exchange efforts.
- Developing policies and procedures for the exchange of health information data.
- Participating in the requirements definition, evaluation, and selection of EHR systems.
- Developing and maintaining the organization's naming convention policy; defining the method to follow in entering a patient's name including use of symbols such as hyphens, suffixes, and prefixes.
- Advising on patient search routines used by patient access staff.
- Defining key demographic data elements captured in the EMPI.
- Establishing algorithmic-based record automatching rules for overlap records within the EMPI and providing recommendations for record-matching rules to be used in each downstream system, based upon the downstream system's record-matching capabilities and types of electronic transactions it receives.
- Managing the staff performing the duplicate, overlap, and overlay record validation process. This staff may also be responsible for merging duplicate or overlap records in the EMPI and various downstream systems.
- Communicating completed data integrity corrections to all required downstream system departments.
- Reporting data integrity issues identified during routine reviews with adequate breakdown of the issues by cause, location, or system; reporting high-level results to the executive management team.
- Providing routine feedback to staff managers creating data integrity issues.

- Providing ongoing training to patient access staff regarding EMPI data integrity, duplicate record creation, and the importance of preventing overlaid records.
- Monitoring missing, default, or invalid capture of EMPI data.
- Reporting on inconsistent capture of key demographic data elements across various departments or facilities.
- Defining the quality control processes for autolinked enterprise records and manual merging of duplicate records or correction of overlaid records.
- Determining processes and communication mechanisms for correcting urgent data integrity issues.
- Staying abreast of new and better technologies that facilitate accurate patient identity.
- Identifying registrations that may involve stolen identities, in accordance with the Red Flags Rule.
- Providing education and training for other staff and stakeholder areas whose actions affect the accuracy of the MPI (e.g., voluntary physicians who submit inaccurate information for patients).
- Directing the decision-making process related to new, revised, or retired data fields (e.g., service type).

These items require robust reporting capabilities in order to minimize the amount of time spent manually tracking data integrity issues by user, location, type, or cause. The number of staff required to maintain EMPI data integrity depends on the organization's size, the frequency of data integrity issues, and the tools available.

The robustness of the duplicate detection algorithm determines the volume of potential duplicates identified. Most hospital and clinic registration systems do not identify a large volume of true duplicate records.

EMPI management is a key strategic activity because the EMPI touches almost every department and patient computer system in a healthcare organization. It is the backbone of the EHR, and managing it successfully requires a leader who combines strong HIM and technology skills. This will ensure the organization's EHR is trusted by all clinicians and supports the facility's need for accurate, reliable information throughout the patient care process.

Definitions

Algorithm: mathematical formula using a combination of weighted MPI data elements to determine the probability of MPI duplicate or overlap entries.
Duplicate: more than one unique identifier (medical record number or person identifier) for the same person in a single facility-level MPI. This causes one patient to have two different medical records within the same facility.

Overlap: more than one EMPI unique identifier for the same person across two or more facilities within an enterprise. For example, patient John Smith has medical record number 12345 at facility A and medical record number 447788 at facility B within the same enterprise-wide system. When both MPI databases are loaded into an enterprise MPI, the database does not link the two records. Thus, Smith ends up with two different enterprise identifiers and providers cannot view all clinical information across the enterprise for that patient.

Overlay: one EMPI record for more than one person (i.e., two people erroneously sharing the same identifier). Overlaid records are frequently caused when staff select another patient's record during a scheduling or registration event. Sometimes interfaces cause the error if the receiving system lacks a robust patient record-matching program and "overlays" another patient's record from the inbound interface transaction. On occasion, overlays are caused by an incorrect merge of two records that belong to two different people.

Duplicate or overlay records may be caused by information capture errors or record-matching rules that are not strict enough. Overlap records may not represent an error, but simply a discrepancy in demographic data across the EMPI's participating databases.

Source: AHIMA. "Managing the Integrity of Patient Identity in Health Information Exchange." *Journal of AHIMA* 80, no. 7 (July 2009): 62–69.

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