



## Brief for Colorado eHealth Commission

Prepared by CedarBridge Group LLC, June 1, 2016

### Master Patient Index (MPI)

#### *Introduction*

Across the U.S. health care ecosystem, a Master Patient Index (MPI) (also referred to as Master Person or Master Client) can be used to ensure accuracy and availability of a person's health information, when and where it is needed to inform the best care possible. A suite of data records and services can link and synchronize a person's (client, member, patient, etc.) data, a provider's, and an organization's data to multiple disparate sources of data into a single, trusted authoritative data source for provider and client information. Different degrees of centralization or federation of data is possible. Planning and using a Master Patient Index together with a Master Provider Index creates additional value by improving attribution of patients to providers and organizations, care coordination, patient-level analytics, and improved quality measurements. Each of these are essential components for value-based payment models. Whether for patient center medical home (PCMH) or accountable care organizations (ACOs), awareness of a patient's care and utilization of services across the care delivery system requires patient demographics and some form of patient matching and indexing technology to accomplish care coordination.<sup>1</sup> For the purpose of this brief, the term Master Patient Index will be used when referencing the Medicaid Master Patient Index, to be developed with federal and state funds as part of Colorado's Department of Health Care Finance and Policy (HCPF) Advanced Planning Document for Health Information Exchange, recently approved by the Centers for Medicare and Medicaid Services (CMS). For all other references, the term Master Person Index will be used.

#### *Master Patient Index Overview*

Identity matching of patients relies on unique data points and a systematic matching process such the use of algorithms to complete the match. Unique data points include patient demographics (e.g., name, address, date of birth) and these data points have a high degree of

---

<sup>1</sup> Office of the National Coordinator "Master Data Management Within HIE Infrastructures: A Focus on Master Patient Indexing Approaches" [https://www.healthit.gov/sites/default/files/master\\_data\\_management\\_final.pdf](https://www.healthit.gov/sites/default/files/master_data_management_final.pdf) September 2012

variability due to data entry and system requirements. Often patient identifying data is acquired and aggregated from multiple health care organizations and systems to maintain consistent, and accurate data. Matching patients outside of a health care organizations' data system, organization, or agency is complex both from a process and governance perspective; policy, technology, and workflow must be considered. To meet current and future advanced payment models needs, patient identify matching and management strategy must encompass public and private payers across the health and care delivery systems. Building and maintain a Master Client Index for Medicaid clients in Colorado will include strategic, technical, and operational considerations, explored at a high-level in this overview brief.

### ***Problem Statement***

Resolving patient identification and matching issues is essential for not only clinical uses, but is also essential for population health uses. The acquisition and aggregation of large data sets across populations can be used in combination with analytics to generate impactful population health data. Patient data, specifically capturing the individual's entire continuum of care, is often incomplete due to disparate documentation across systems. Available patient data must be accurately linked across the health care ecosystem. This is particularly critical when connecting a person's identity across the continuum of sources – each of which interacts separately with the patient (examples include, medical, claims, public health, educational, patient reported and social services data sets).

Errors introduced into data sets lead to discrepancies and duplicate records that complicate the matching process and reduce the validity of patient and population data. Unfortunately, even within clinical applications, many types of errors commonly appear within registration records including:

- Inadvertent transposition of numbers
- Abbreviated names instead of legal names
- Variation and inaccuracy of address
- Variation and inaccuracy of telephone numbers and other contact information
- Inaccurate documentation of insurance coverage
- Methodology for dealing with hyphenated names
- Inaccurate Social Security Numbers (collected/missing/substituted)

### ***Value Proposition***

Lack of a standard data set can lead to patient records not being linked to one another as they are searched for electronically within a single EHR system, or searched for via various health information exchange modalities, including when records are pushed electronically from one system to another. The end result of incorrectly unmatched patients (false negative match) is an incomplete health record. Additionally, there is the potential for different patients being identified as the same patient (false positive match), compromising patient safety and care on the basis of inaccurate patient information. In addition to patient care concerns, sharing inaccurate information also poses the risk of privacy breaches and erodes consumer

confidence. Errors in patient matching will only be compounded as additional health care organizations connect and non-health community person indexes are considered for person matching services.

<b>Stakeholder</b>	<b>Summary of Value Proposition or Potential Use</b>
<b>HCPF (Medicaid, RCCOs)</b>	<ul style="list-style-type: none"> <li>• Improves the quality and completeness of data, collaboration, and reducing associated costs.</li> <li>• Connects Medicaid clients from benefit eligibility, PCP enrollment, care delivery services, care coordination, and client/care giver engagement.</li> </ul>
<b>CDPHE</b>	<ul style="list-style-type: none"> <li>• Support state lab newborn screenings and identity matching, vital statistics, and death records.</li> <li>• Analyzes population health measurement to the individual level across geographic areas, providers, organizations, and commercial/public payers.</li> <li>• Patient’s data is matched, improving patient and population registries.</li> </ul>
<b>CDHS</b>	<ul style="list-style-type: none"> <li>• Can be expanded client/individual data indexes, (e.g., child welfare, foster care system, WIC) to support case management and coordination of services across health and social determinants of health.</li> <li>• Create individual risk stratification scores connecting individuals across government systems to inform professional services and program development.</li> <li>• Opportunities to integrate human services data into clinical systems and workflows to improve patient and population health.</li> </ul>
<b>HIEs</b>	<ul style="list-style-type: none"> <li>• Improves data quality and reliability of patient information to support care coordination following ED visits and hospital admissions providing accurate routing for event notification, transitions of care.</li> <li>• Patient can be identified, supporting notifications / alerts to care team.</li> <li>• Allows for expanded integration of clinical data beyond current geographic area.</li> </ul>
<b>Providers</b>	<ul style="list-style-type: none"> <li>• Reduces redundancy of services provided and workflow inefficiencies.</li> <li>• Improves revenue cycle due to decreased patient identity issues.</li> <li>• Supports coordination of benefits across commercial and public payers upon client registration.</li> <li>• Reduces clinical and claims data silos.</li> </ul>

	<ul style="list-style-type: none"> <li>• Allows for the availability of critical clinical, administrative, and claims based relevant health information to enable effective health care delivery and care coordination.</li> <li>• Increases a provider's ability to report accurately on a patient's treatment and outcomes.</li> <li>• Increases provider efficiency by eliminating paper-chasing efforts, faxing, manual entry of information, and demographic verification.</li> </ul>
<b>Person/ Client/ Patient/ Individual</b>	<ul style="list-style-type: none"> <li>• Improves patient safety by reducing the risk of mistaken identities.</li> <li>• Improves patient safety by increasing a provider's access to relevant and up-to-date health information.</li> <li>• Reduces cost by preventing unnecessary procedures, testing, and paperwork for the patient.</li> <li>• Improves patient satisfaction due to improved communication and reduced lab and service redundancy.</li> </ul>
<b>Payers</b>	<ul style="list-style-type: none"> <li>• Improves revenue cycle time and increases revenue due to lower inefficiencies.</li> <li>• Reduces duplicate enrollee data submissions for new insurance enrollment from HIX to payer.</li> <li>• Reduces costs by preventing duplicative procedures and testing.</li> <li>• Reduces risks of inaccurate billing and payment.</li> <li>• Allows for accuracy in cross-payer analysis and management.</li> <li>• Data import for quality measurement and paying for value.</li> </ul>
<b>Policy/ Research</b>	<ul style="list-style-type: none"> <li>• Improves data accuracy.</li> <li>• Reduces health care costs associated with not correctly identifying the correct patient and providers not having the right information to treat their patients.</li> <li>• Improves accuracy in cross-payer analysis, management and regulatory oversight.</li> <li>• Improves cross-agency coordination and accuracy, while reducing data reporting errors, ultimately reducing cost across agencies.</li> <li>• Population health measurement down to the individual level.</li> </ul>

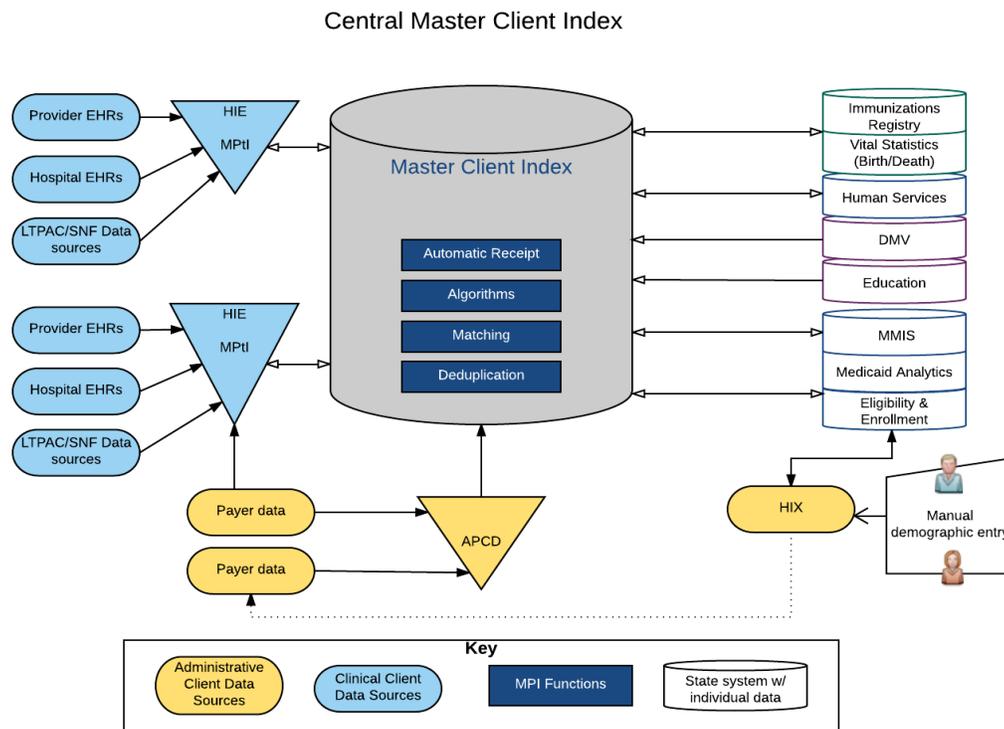
## Technical Overview

1. **Master Person Index** – as more advanced business operations for health systems, and as health information exchange services develop, an MPI will be necessary. Query-based exchange relies on an MPI to work in coordination with a record locator service to pull patient records from various organizations and return the results to a provider querying the Health Information Exchange (HIE). Without the MPI that can resolve identities across these organizations, the query functionality will not work. Master Patient Index can be a built-in MPI and the standalone, full-feature MPI.
2. **Identity matching standards and profiles** describe the method used to send patient data element queries within an organization, or externally to another organization to ask if it has records matching a specific patient and for that receiving organization to respond whether or not it has records.
  - Internal person identifier standards
    - Patient identifier Cross Referencing (PIX)
    - Patient Demographics Query (PDQ)
  - Cross-community patient discovery standards
    - Cross Community Patient Discovery (XCPD)
3. **Algorithms** are used to electronically predict the likelihood of a match between two or more records based on rules and weighting/sensitivity tuning of those rules.
  - **Deterministic matching** (algorithm) – uses sets of pre-determined rules to guide the matching process and normally requires that data elements match exactly.
  - **Probabilistic matching** (tuning) – process where an estimate is made of the probability that two records are for the same person based on the degree to which certain field in the two records match.
4. **Standard data elements for electronic data exchange transactions** are critical for matching records, and in today's current-state, electronic health record systems and other health IT systems do not have sufficient constraints on the optionality for collecting demographic elements. For instance, hyphens are used inconsistently across the industry, creating potential issues with patient matching when 1:1 deterministic matching is used.

The table below identifies common data elements to be considered when developing an identity management strategy.

Nationwide Interoperability Roadmap	MPI Vendors	Other data attributes
<p><b>Data elements for individual mapping</b></p> <ul style="list-style-type: none"> <li>• First/Given Name</li> <li>• Last/Family Name</li> <li>• Previous Name</li> <li>• Middle/Second Given Name (includes Middle Initial)</li> <li>• Suffix</li> <li>• Date of Birth</li> <li>• Sex</li> <li>• Address (current and historical)</li> <li>• Phone Number (current and historical)</li> </ul>	<p><b>A typical minimum data set</b></p> <ul style="list-style-type: none"> <li>• First Name</li> <li>• Last Name</li> <li>• Middle Initial</li> <li>• Suffix</li> <li>• Date of Birth</li> <li>• Social Security Number</li> <li>• Gender</li> <li>• Home Phone</li> <li>• Address</li> <li>• Zip Code</li> </ul>	<p><b>Additional data elements from health and non-health systems that may improve identity management</b></p> <ul style="list-style-type: none"> <li>• Driver's License #</li> <li>• SSN</li> <li>• Medicaid #/Payer #</li> <li>• Medical Record # /Provider #</li> <li>• Family members / care givers</li> <li>• Credit bureau information</li> <li>• Other</li> </ul>

*Conceptual Architecture Diagram of a Master Client Index*



## Colorado Data Sources

Data Source	Owner (agency/org)	Provider data	Client/Person data
HIEs	CORHIO/QHN/CCMCN	Yes	Yes
Vital Statistics (Birth/Death records)	CDPHE		Yes
CIIS	CDPHE	Yes	Yes
PDMP	DORA	Yes	Yes
Licensure	DORA	Yes	
Medicaid Enterprise (MMIS, BIDM)	HCPF	Yes	Yes
BIDM	HCPF	Yes	Yes
Workforce Provider Index	CDPHE PCO	Yes	
APCD	CIVHC	Yes	Yes
Providers	Private providers	Yes	Yes
Payers & Self-funded plans	Commercial/Public	Yes	Yes
Health Insurance Exchange	Connect for Health Colorado/OIT – CBMS	Yes – network data	Yes – person registration, multiple duplicates
CBMS	OIT		
TRAILS	DHS		Yes
Other state systems	DMV, Education, social Services		
<i>Other Colorado data sources to be identified and analyzed for implementation planning.</i>			

### Policy Overview

Data quality is imperative due to the reliance upon patient/client demographic data. Poor data quality in one system or record leads to inaccurate identity matching in another. A common set of standardized data elements is ideal to support accurate patient matching.

**Data Attributes** – identify the key data attributes for collecting, exchanging, comparing patient identification information to strengthen identity management services.

**Accuracy rates** – establish acceptable accuracy rates for patient/client/person matching.

**Data governance** – encompasses the management and ownership of data within and across organizations. The processes associated with the ownership and management of data including the availability, usability, integrity, and security of an organization's data; a system of accountable information-related processes for shared services identifying agreed-upon models and what circumstances and enforcement is needed and can be taken; establishing the resources, processes, information, and technology required to create a consistent and proper handling of data; and the activities that ensure data-related work is performed according to policies and practices as established through governance.

**Processes** – Develop automated and manual processes including regular reviews for potential duplicates, data governance programs that work to establish current rates and then improve false positive and false negative rates, training programs that can be replicated, policies that apply across a health system with multiple sites, and processes for a central entity to notify participants of matching errors and corrections.

**Education and Communication** – Develop best practices and policies at registration and enrollment data entry points, consistent identity management data standards at source systems.

**Data integrity** – Improve integrity of data with the elimination of free text documentation and the utilization more discrete data documentation and alignment of national data standards. Free-text entry is necessary for patient names, but capture of the complete legal name in discrete fields minimizes data entry errors.

### *Operational Considerations*

#### **Financing**

HITECH, Medicaid, and SIM funding sources may apply to identity management planning and design, development, and implementation (DDI). There are HITECH and Medicaid funding possibilities and implications identified in three State Medicaid Directors Letters:

- 11-004: Use of Administrative Funds to Support HIE.
- 10-016: Federal Funding for Medicaid HIT.
- 16-003: Availability of HITECH Administrative Matching Funds to Help Professionals and Hospitals Eligible for Medicaid EHR Incentive Payments Connect to Other Medicaid Providers.

HIE 90/10 funding is available for HIE implementation (provider directory and master patient indexes in support of expanding HIE) activities provided that the funds are used for time-limited design, development and implementation activities. Under HITECH, the funding can only support Medicaid providers. States must leverage efficiencies with other federal HIE funding. HIE costs are divided equitably across other payers based on the “fair share” principle and are appropriately allocated.

While patient index projects are potentially eligible for HITECH administrative federal financial participation (FFP), in some cases project activities may be more appropriately funded by Medicaid Management Information System (MMIS) or Eligibility & Enrollment (E&E) FFP, also at a 90 percent match for design and development costs. States can leverage these existing CMS funding authorities to build out provider directories, as well as other tools of master data management (master person indexes, identity proofing and management, etc.) within their Medicaid/CHIP systems enterprises. MMIS funds are not allowable for infrastructure outside the MMIS environment and for either MMIS or E&E funding, cost allocation with other entities accruing benefit is still required.

## **Sustainability**

- Policy Levers
- Managed care contracts
- Qualified health plans

## **Accountability**

- Objectives
- Metrics
- Progress reporting
- Auditing

## **Evaluation**

- Data quality from various data sources
- Training and communication plans for improving data quality
- Technology assets
- Management of operations
- Return on investment

## ***Next steps and considerations for implementing a Medicaid Master Client Index strategy and solution, with broad extensibility***

The following list identifies key implementation planning considerations for a successful identity management strategy and statewide Master Patient Index.

- Identify priority uses for the patient index.
- Discuss and develop a phased approach for additional uses cases identifying additional data sources, standards, and procedures for processing person data attributes.
- Define Rules of Engagement and phasing for individual data source participation and other required policies, procedures, data use agreements to support a cooperative, shared master patient index service, algorithm, and matching/de-duplicating.
- Conduct a technical system assessment of current and developing master patient index services to assess capacity to support near term and long-term statewide goals.
- Develop technical scope of Medicaid Master Client Index considering potential future uses.
- Identify and align other policy, program, and technical efforts requiring identity management functions and indices (e.g., State Innovation Model Quality Measurement and Reporting Tool + (SIM QMRT+)).
- Recommend data attributes for provider, payer, technical organization data sources to increase accuracy of information.
- Identify current and future funding for master person index understanding current funding is limited to Medicaid clients and additional expansion to the broader statewide health community would require cost allocation.