Next-Generation Patient Mastering How Unified Patient Data Can Help Save Lives and Reduce Costs

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Every medical provider believes in patient safety, but medical errors are still one of the leading causes of death in the US. Each year, a silent pandemic of as many as 440,000 deaths can be attributed to errors in care, including preventable adverse effects, mistakes involving the type and dose of medication, or a breakdown in communication. Many of these errors result from providers simply not having the information they need at the point of care. Bad data is an issue in every industry, but in the case of patient care, bad data can have real-world consequences. Recognizing the need to improve data access for patients and providers, the Centers for Medicare and Medicaid Services (CMS) and the Office of the National Coordinator for Health Information Technology (ONC) have implemented interoperability rules and compliance timelines. There is a great unmet medical need for next-generation data mastering solutions that can dramatically increase the quality of patient data to improve patient care while reducing costs.



The Need for Next-Generation Patient Mastering

Getting unified patient data in the right hands can avoid medical errors, readmissions, and unnecessary treatment. The right data can also save lives, reduce costs, and improve patient care. For years, government agencies and health organizations have tried to achieve these benefits by compiling and sharing an overwhelming amount of patient data. However, the time and effort needed to break down data silos to clean and curated data have made traditional methods obsolete when managing a firehose of patient data. Next-generation methods, using human-guided and cloud-native machine learning, are the only way to unify patient records and make them available in real time to improve healthcare operation and improve medical decision-making.



I. Data Challenges in Patient Mastering

To be used effectively, patient data needs to be integrated. Traditionally, data analysts used an enterprise master patient index (EMPI) to try and maintain consistent and accurate information about each patient. However, the reality is that healthcare data is diverse and kept in data silos. The number of silos is an increasing problem as the sources for patient data continues to grow, including multiple electronic health record (EHR) systems (Epic, Cerner, Meditech and the customized instances of these third-party products for each provider institution), prescription data (CVS Caremark, OptumRx, Express Scripts), insurance claims (UnitedHealth, Anthem, Aetna), lab results (Quest, LabCorp) and many more. Additionally, every patient is now generating their own data as each patient begins to manage their health using a combination of personal health and fitness applications/systems. In order for patients and their primary care providers to deliver a higher quality of care at a lower cost, patients and providers must use longitudinal data regardless of where the data is generated. There is a trend by health organizations to include a broader array of human health information. This may include information on metal health, child welfare, and law enforcement/correctional history. True outcome based long term care will require the integration of patient generated data with data that is generated by their provider inside of healthcare institutions.



However, differences between EHR systems and other sources often cause irregularities between EMPIs, and reduce the possibility of exchanging clean

data unless they can be reconciled and matched. Reconciling different data schema from each system to make them interoperable requires complicated, manual efforts requiring frequent and ongoing maintenance by a team of data engineers. In addition, many patient records are missing vital information (e.g., changes in prescriptions or contact information) or are potential duplicates that need to be merged or resolved.

360-view of patient care



Persistent Patient ID

Agile onboarding of sources

(figure 1: 360-view of patient care)

Writing rules to dictate specific matching criteria can help automate some of this effort. Still, rules-based approaches will always be limited in their ability to solve these problems at any scale and rules-based approaches do not have the flexibility to maintain accuracy in the face of a dramatic increase in the number of new and increasing frequency of updating datasets.

The Tamr solution uses a human-guided and cloud-native machine learning approach that can handle data volume and variety and accelerate the process of bringing new datasets together continuously to meet the time and regulatory challenges associated with modern patient data. Machine learning generates continually updated referential records for individuals and households that unify patient, hospital, and insurance records and update them on demand. Data from each source system is connected and matched across domains to generate persistent IDs for individuals in a rapid, scalable, and cloud-native process. Healthcare information and management professionals can provide direct feedback to the model to improve results. This human-machine feedback loop dramatically improves results and continues to perfect results when given more data—the opposite of a human-controlled rules-based system. The human subject matter experts are not data analysts but healthcare professionals who understand the patient data's significance and care more than any other stakeholders to ensure that the data is as accurate and up to date as possible.

The result is a Next-Generation Master Patient Index synthesizing patient information from many sources into a complete 360-degree view of patients and families that can also be rapidly updated as new patient information is entered. Many traditional solutions are unable to leverage the power of cloud based services. This is critical as organizations expand their data strategies and grow from local to regional or national coverages.



II. Investing in Next-Generation MDM for Patient Mastering +

Creating a Next-Gen Patient Mastering process is an investment in analytical and operational capabilities that will better serve patients, make healthcare providers more efficient and reduce overall costs.

Analytical benefits of Next-Gen Patient Mastering:

- Enriching data in a Master Patient Index by grouping individuals as a family or by community demographics to better understand how they are accessing care, especially to understand the needs of underrepresented populations.

• Applying social determinants of health (SDoH), or other third-party data to power public health initiatives, including finding at-risk individuals and communities that can benefit from additional resources and preventative care.

• Facilitating efficient and frequent data exchanges with timely and accurate data. All while safeguarding patient health information and ensuring the lineage of patient data in each patient record and report meets governance requirements.



Operational benefits of Next-Gen Patient Mastering:

- Providing long term value-based care by monitoring longitudinal performance measures to improve the quality of care and reduce the cost of care by disincentivizing unnecessary treatments.
- Improving the patient experience by coordinating follow-up appointments and care, and identifying opportunities for preventative care and other interventions to reduce future hospitalizations across the many silos within the healthcare system.
- Reducing the likelihood of adverse events, mistreatment, and medical errors due to unknown patient data and interactions.

• Providing a 360-degree longitudinal view of a patient's entire medical history, including military or information from other sources including patient generated data from modern health and wellness apps.

• Patients can provide data to enrich their own mastered patient profile to include recent changes (e.g. changes in drinking, smoking, allergies, and OTC medications) as well as patient reported outcomes. Patients will also be able to augment their institutionally generated data with their own data generated from the many health and wellness apps and digital therapies that are coming to market by the dozens.

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III. The Collateral Benefits of Patient Mastering

Everyone wins when patient mastering improves patient outcomes and reduces healthcare costs. There are system-wide collateral benefits when mastering patient data:

- State and federal agencies and public-private partnerships can efficiently transfer unified patient data with greater frequency and reduce operational and data sharing costs while improving their public health initiatives with SDoH and other data enrichment.
- Hospitals can easily access and share unified patient data, prevent mistakes from happening, and improve coordination of patient care within their system and in other care settings (Urgent care, retail clinics, ancillary providers, ambulatory care, EMT and ER care).

• Payers can lower costs by better assessing the quality of care provided and patient outcomes, reducing overtreatment, improving patient engagement, and managing personalized care.

• Patient care, safety, and outcomes will all be improved when providers have a complete view of their patient's medical records.

• Patient confidence in the healthcare system and their providers increases when those people and institutions serving them have accurate and current information on their health - regardless of where the information/data were generated.





IV. Next Steps

It is more important than ever to embrace the broader access and variety of patient data to find ways to improve patient outcomes and reduce healthcare costs. Organizations and agencies that invest in a modern data mastering solution see significant results and are further on their transformation and critically delivering better care for communities.







Tamr helps organizations address the challenge of unifying and mastering large volumes of highly-variable data. Our cloud-native data mastering solutions make it easy for you to quickly connect internal and external data sources. And machine learning helps you accelerate business outcomes by consolidating, cleansing, and categorizing your data at scale. The result? Better business outcomes, faster.



