
Improving Patient Matching with a Simple Plug-in

Verato® Auto-Steward™ is a cloud-based plug-in that injects the power of Referential Matching into your EHR or EMPI.

- ▶ Instantly and dramatically improve your EHR's or EMPI's patient matching without disrupting its core functionality.**
- ▶ Get the full value from your EHR or EMPI investment and increase patient satisfaction and safety.**

Abstract

Accurate patient matching has simultaneously become 10x more challenging and 10x more important than it was even just a few years ago. But conventional patient matching technologies have reached their breaking points, and duplicate rates are skyrocketing as a result—as are the costs associated with having duplicate records and incomplete patient records.

The simple fact is whether you rely on the patient matching technology built into your EHR, or whether you've invested in an enterprise master patient index (EMPI) technology, your organization is suffering from rising duplicate rates that degrade care, increase costs, and impede revenue collection.

Luckily, there is a simple way to dramatically improve the patient matching of your EHR or EMPI. Verato® Auto-Steward™ is a cloud-based plug-in for EHR and EMPI technologies that uses a powerful new paradigm in patient matching called Referential Matching to automatically resolve 50-75% of the toughest matches your EHR or EMPI cannot resolve. These matches would otherwise have to be manually resolved by a data steward or health information management professional—or worse, remain unresolved duplicate records which represent risk and increase costs of care.

Because it is cloud-based, Verato Auto-Steward does not require any customization, does not disrupt any of your EHR or EMPI's core functionality, and is fast and easy to deploy. So whether you use an EHR from Epic®, Cerner®, Allscripts®, eClinicalWorks®, athenahealth®, McKesson®, or another vendor—or whether you use an EMPI technology from IBM® Initiate™, QuadraMed®, NextGate®, or another vendor—Verato Auto-Steward can improve your patient matching, reduce your duplicates, and reduce the costs required to resolve matches your EHR or EMPI cannot resolve.

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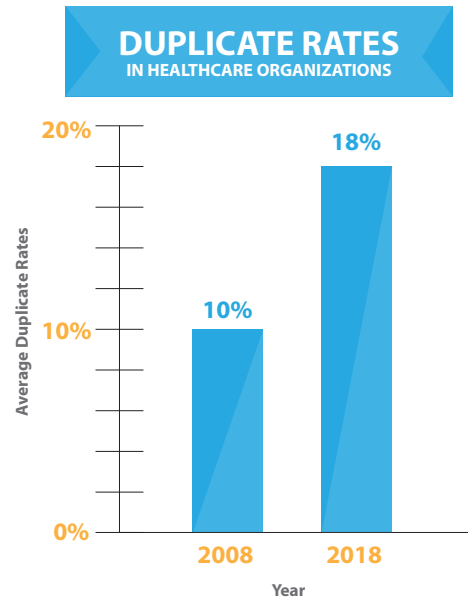
Accurate Patient Matching Is Becoming 10x More Challenging and 10x More Critical

The sheer amount of patient data stored by healthcare organizations is exploding. Large volumes of patient data are entering organizations from new sources and through new channels—such as newly acquired hospitals, newly consolidated EHRs, patient portals, smart medical devices, and personal health record apps. But each new source and dataset has its own data formats, data standards, and data governance rules. In short, there is much more data, much more variance in the data, and much lower quality data—all combining to create an insurmountable challenge for EHR and EMPI patient matching technologies, which must attempt to match and link all this data to the correct patient identities.

This insurmountable challenge has come at the worst possible time. Accurate patient matching is the foundation of almost every critical strategic initiative within today's health systems—from patient engagement and patient experience initiatives, to clinical and quality analytics, to population health analytics, to health information exchange, to interoperability, and to improved revenue cycle management. Every aspect of a health system's operations and care management requires having an accurate and complete view of every patient. But

gaining this accurate and complete view has suddenly become nearly impossible for conventional EHR and EMPI technologies.

In fact, no matter how much you have invested in your EHR or EMPI, no matter how small your patient



-2018 Mid-Year EHR Consumer Satisfaction Survey, Black Book Market Research
-2008 Quality Impact of the Master Patient Index, Journal of AHIMA

population is, no matter how clean your data is, and no matter how diligent your registration staff is, your EHR or EMPI is riddled with duplicate records. **According to a recent Black Book Research survey, the average duplicate rate within healthcare organizations is 18%,¹** which is up significantly from the national average of 8-12% just ten years ago.²

1 2018 Mid-Year EHR Consumer Satisfaction Survey, Black Book Market Research
2 2008 Quality Impact of the Master Patient Index, Journal of AHIMA

There Are Substantial—and Growing—Costs to Inaccurate Patient Matching

The risks and costs of duplicate records are skyrocketing. According to the same Black Book survey, each duplicate record costs healthcare organizations over \$800 per emergency department (ED) visit and over \$1,950 per inpatient stay due to redundant medical tests and procedures. In addition to these costs, the survey found that 33% of all denied claims were a result of poor patient matching, costing the average hospital \$1.5M annually and the healthcare industry \$2 billion annually. A different study is not as optimistic, asserting that patient misidentification costs the average hospital over \$17.4M annually in denied claims.³

All of these duplicate records also reflect poorly on healthcare organizations. In fact, 88% of consumers directly blame the hospital system for their dissatisfaction with the lack of portability of their health care records.⁴ In an increasingly competitive healthcare marketplace, patient satisfaction is a commodity—and today's healthcare consumer is savvy enough to expect something as simple as a complete and portable health record from her provider. This is becoming even more important

³ 2016 National Patient Misidentification Report, Ponemon Institute

⁴ 2018 Mid-Year EHR Consumer Satisfaction Survey, Black Book Market Research

as patients gain visibility into their health records through patient portals and personal health record apps—because these portals and apps also give patients instant visibility into any missing health records.

The cost of **INACCURATE** Patient Matching



\$800

per emergency
department visit

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But most importantly, duplicate records can have drastic impacts on patient safety and care quality. A survey of nurses, physicians, and IT practitioners found that 86% of these professionals have witnessed or know of a medical error that was the result of patient misidentification.⁵ Needless to say, this is unacceptable.

⁵ 2016 National Patient Misidentification Report, Ponemon Institute

The Fundamental Reason Conventional Patient Matching Technologies Fail

Conventional patient matching technologies use sophisticated algorithms to compare the demographic data of two records to determine whether the records belong to the same patient. But the fundamental problem with these algorithms is that they are only as accurate as the underlying patient demographic data they are comparing—and patient demographic data is notoriously error prone, frequently incomplete, and constantly changing.

Patients move and change addresses. Patients change their names after marriages and divorces. Some patients prefer to use a nickname or a middle name instead of their given first name. Some patients have similar names to their parents, children, siblings, or spouses. Some patients' cultures have naming conventions that do not align easily with registration forms—such as multiple last names that might be confused for middle names.

Some demographic data is very ambiguous—like a Maryland Avenue address in Washington D.C. Some demographic data is recorded from a driver's license, while other demographic data is self-reported by the patient. And all demographic data is subject to errors and typos, or

can be left incomplete on a form, or might be entered into a registration system with a default value (such as "01/01/1900" for a birthday).

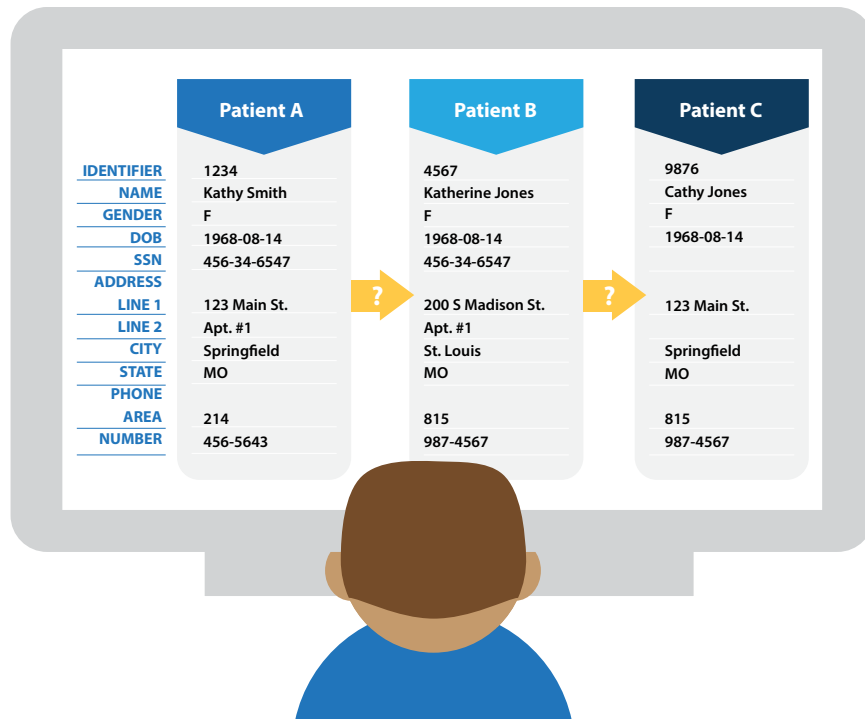
Conventional matching technologies are *only as accurate as the patient demographic data they are comparing*—and patient demographic data is of notoriously low quality.

These examples are just the tip of the iceberg, but they are representative of the problem—a problem that is will not change or improve. Because no algorithm—no matter how sophisticated—can definitively determine that two health records belong to the same patient when those records have demographic data that is errored, incomplete, and out-of-date.

EHRs and EMPIs Require Manual Review to Make Up to 30% of Matches

If an EHR or EMPI cannot definitively determine whether two similar records belong to the same patient, it will flag those records as a "task" for a data steward or health information management professional to manually review and resolve. Each day, a typical

Figure 1:
Data Stewardship
Record Review



mid-sized hospital can generate many hundreds of these tasks, outpacing the capacity of the data stewards to process them—resulting in an ever-growing backlog of tasks and an ever-growing number of duplicates in the EHR or EMPI until they are eventually resolved.

Organizations will often invest in large data stewardship programs in order to mitigate the costs of duplicate records, or will go through periodic “clean up” projects that attempt to address these backlogs all at once. But thousands or millions of tasks will be generated each time a new data source is integrated, each time an EHR is migrated, and each time a new patient population is incorporated from a recently acquired hospital. Meaning that even organizations with

a robust data stewardship program will periodically suffer from massive backlogs of tasks and spikes in the number of duplicate records in their systems.

Referential Matching Is a Powerful New Technology that Makes Matches EHRs And EMPIs Could Never Make

Verato uses a new, powerful, and fundamentally different approach to patient matching called “Referential Matching.” Rather than using algorithms to directly compare the demographic data from two records, Verato compares the demographic data from those records to its comprehensive and

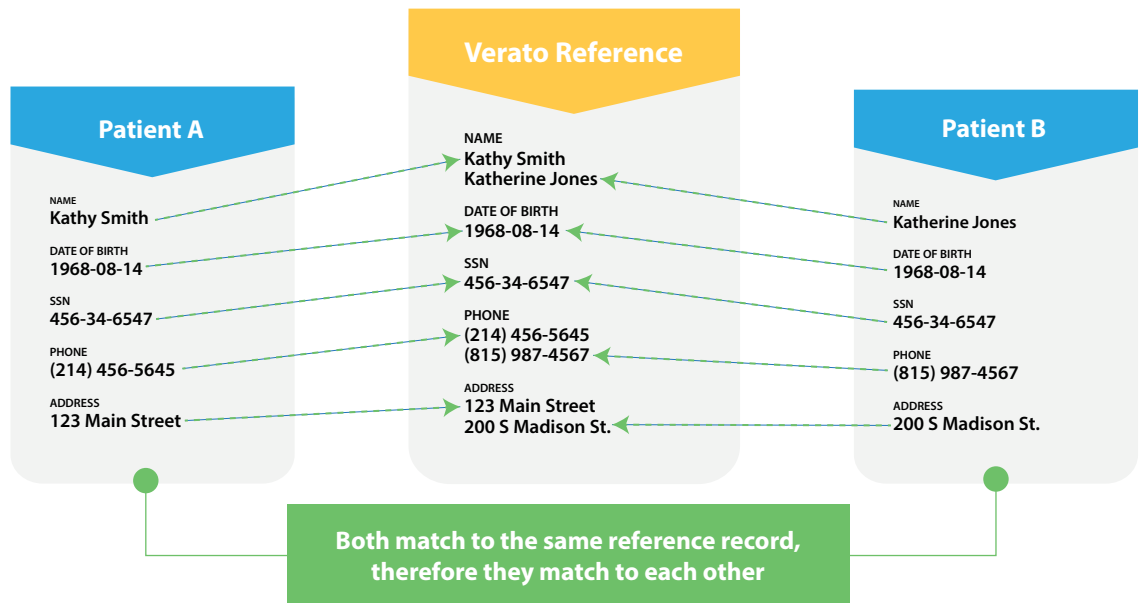
continuously-updated reference database of identities. This database contains over 300 million identities spanning the entire U.S. population, and each identity contains a complete profile of demographic data—including nicknames, aliases, maiden names, common typos, past phone numbers, and old addresses. This database is essentially an “answer key” for demographic data, and Verato uses this answer key to make matches that conventional patient matching technologies could never make.

demographic data than her record from before her marriage. No conventional patient matching technology would definitively declare these records to represent the same patient. But most technologies would flag the two records for manual review because they contain the same SSN and birthdate, making them a potential match. The two records would remain duplicates in the EHR or EMPI until a data steward manually reviewed and resolved them.

As an illustration of the power of Referential Matching, consider two records for the same patient, Kathy Smith. Since she last visited her physician, Kathy got married, moved, and changed her last name. So her current patient record contains different

By contrast, using the power of Referential Matching, Verato would match each of these two records to the same Verato reference identity which contains Kathy’s old and new names and addresses [Figure 2]. Since both records match to the same reference identity, Verato would conclude that they match to each other.

Figure 2:
Verato Referential
Matching Approach



Verato Auto-Steward Injects the Power of Referential Matching into Your EHR or EMPI

Verato Auto-Steward is a cloud-based plug-in that integrates with your EHR or EMPI technology to resolve its toughest matches using the power of Referential Matching. Verato Auto-Steward automatically resolves 50-75% of the potential duplicates that your EHR or EMPI has flagged as tasks for data stewards or HIM staff to manually resolve. This enables your organization to reduce duplicates, reduce clinical costs, reduce the costs of data stewardship processes, improve care and patient safety, improve revenue cycle, and get the most out of your EHR or EMPI investment.

How to Integrate Verato Auto-Steward

Fundamentally, Verato Auto-Steward receives pairs of potential duplicate records via API call and returns its match determinations for each pair—either yes, no, or unknown. Importantly, Verato Auto-Steward match determinations can always be sent through your existing business rules—for example, not merging duplicate records for a patient who is still in the hospital until after they have been discharged. Verato match determinations also include supporting demographic data evidence to show how each determination was made.

Below are brief explanations of how to integrate with a few specific EHR and EMPI technologies, but Verato has already integrated with Epic®, Cerner®, IBM® Initiate™, IBM MDM, eClinicalWorks®, Mirth®, and OpenEMPI®, and can integrate with any other technology through standard interfaces and HL7 messages. Integrations can either run in real-time or can be scheduled as batch submissions, whichever is most appropriate.

Epic

Use Epic® Clarity™ to create an “analytical report” of potential duplicate record tasks from Epic® Identity™. Send these tasks from your integration engine to Verato Auto-Steward via API. Verato resolves the tasks and returns its match determinations to your integration engine. The resolved duplicates can then be merged in Epic using simple HL7v2 messages.

Cerner

Extract the task list from the Cerner® EMPI as organized pairs of potential duplicate records. Send these tasks from your integration engine to Verato Auto-Steward via API. Verato resolves the tasks and returns its match determinations to your integration engine. The resolved duplicates can then be inserted into Cerner using CCL, where they will be available for review in the Cerner EMPI.

IBM Initiate

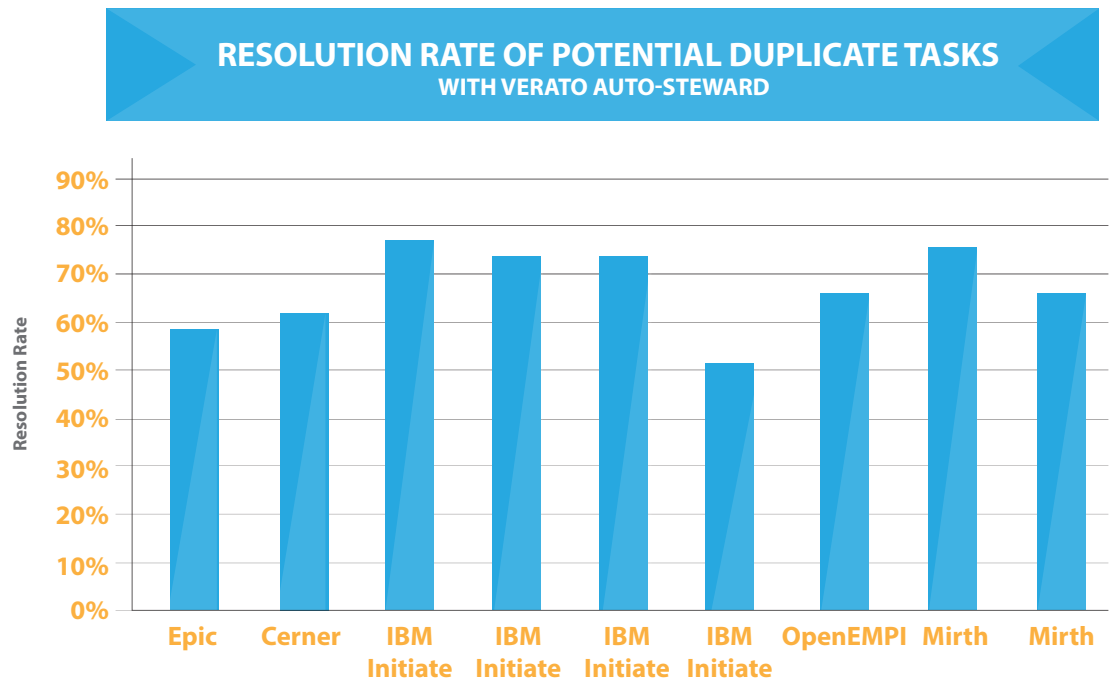
Extract the tasks from the IBM® Initiate™ EMPI via the Initiate Task Get APIs. Send these tasks directly to Verato Auto-Steward via the published API. Verato

resolves the tasks and returns its match determinations to the IBM Initiate EMPI. The resolution is then performed by the IBM Initiate Task Resolution API.

Mirth

Extract the task list from Mirth® Match (along with the corresponding demographics from Mirth Results) as pairs of duplicate records. Send these pairs from Mirth Connect to Verato Auto-Steward via API. Verato resolves the tasks and returns its match determinations to Mirth Connect. The resolution is then performed in Mirth Match and Mirth Results using applicable web services APIs offered by Mirth — (1) Merge patient by alias, (2) Link Identity.

Figure 3: Proven Resolution Rate with Verato Auto-Steward



You Have Already Invested in Your EHR or EMPI. Get the Full Value of Your Investment with Verato Auto-Steward.

You have invested millions of dollars in your EHR and potentially millions more in your EMPI. You had to build an entire business case around each investment and then you picked vendors, purchased the technologies, and have since spent untold amounts of money, effort, and time deploying, integrating, and operating them. You have established workflows and business rules and complex processes that make them all work. But the truth is neither technology is working as promised.

Your EHR's weakest link is its patient matching capabilities, yet these capabilities are foundational to every other function of your EHR. Without accurate patient matching, your EHR's population health, health information exchange, interoperability, managed care, and revenue cycle management functions are severely inhibited. But more importantly, your EHR cannot assemble a complete and accurate view of each patient's health across clinical, specialty, lab, imaging, and pharmacy records. This drastically impacts your organization's ability to provide care and ensure patient satisfaction and safety.

And your EMPI was supposed to solve your patient matching challenges once and for all. It was supposed to use

sophisticated, highly tuned algorithms to make matches your EHR could not make, and to help you manage patient information across EHRs and facilities. Yet no matter how sophisticated and well-tuned your EMPI is, you have been forced to make a terrible choice: either invest in a large data stewardship program to make matches your EMPI cannot make, or suffer the costs of rising duplicate rates.

Verato Auto-Steward is the solution to your patient matching challenges. By automatically resolving 50-75% of your EHR or EMPI technology's potential match tasks, you will greatly increase patient matching accuracy, decrease duplicates, improve your backlog review throughput, and re-focus data stewardship teams and HIM staff on more important business initiatives. More importantly, by reducing your duplicate rate, you will also reduce the liability associated with duplicate records and improve safety and satisfaction across your organization as well as for patients.

You have already invested in your EHR and EMPI—now you can get the most out of that investment. Verato Auto-Steward lets you instantly and dramatically improve your EHR or EMPI with better patient matching and without having to disrupt that technology's core functionality. With Verato Auto-Steward, you can finally ensure your world-class EHR or EMPI technology has world-class patient matching, too.