

Karls gate

Data-Driven Healthcare

Overcoming Challenges Linking
Identifiable Patient Information

The Healthcare Industry Has a Problem Linking Identifiable Data.

We know how to solve it.

It's no secret that the key to medical breakthroughs, more precise clinical research, and better patient care lies in the ability to leverage healthcare data quickly and accurately. But for organizations across the healthcare continuum, doing so is easier said than done.

In today's data ecosystem, organizations are struggling to keep up with the complexities of data collaboration at scale while maintaining a level of security required as stewards of highly sensitive information. This "linkage problem" poses a significant challenge in managing and analyzing personal data while complying with privacy rights and regulations.

This becomes particularly critical in the context of healthcare, where patient data is generated and stored across multiple systems and organizations. Healthcare providers and researchers often face difficulties in combining data from various sources – whether it be electronic health records, lab results, and even wearable devices – to create a comprehensive view of an individual's health.

Until recently, the industry has had to rely on the best practices available at the time which focused on simple de-identification and linkage methods for maintaining HIPAA compliance when connecting patient data. These methods have come with limitations in terms of what can be connected and with whom, data integrity challenges, and cost concerns.

In addition, de-identification of data "upstream" makes it difficult for "downstream" players to get accurate data at the patient level.

While these methods have been adequate enough to date, in the world of AI-driven technology, where vast amounts of accurate, individual-level data make the difference between medical breakthroughs and the status quo, these limitations and concerns are no longer acceptable.

What is the linkage problem?

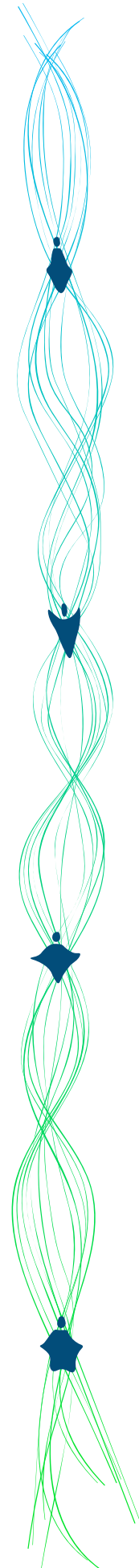
Until now, the quest to unlock the full potential of precision healthcare data while maintaining data privacy and organizational control has been elusive. But in order to solve the linkage problem, we need to explore innovative new solutions that allow us to safeguard Protected Health Information (PHI) while still connecting data at an individual level.

The linkage problem can be defined as:

Two independent entities (public or private) are each managing a dataset about individuals. The understanding of each individual's identity is achieved using various identifiers such as name, postal address, email, and/or social security number. However, these components of personal data are sensitive and are tied to personal privacy rights, regulatory restrictions, and/or ethical handling concerns.

Some real-world examples of the linkage problem in healthcare include:

- Retrieving PHI associated with a patient in the form of EHR data from another health system
- Researching rare disease treatments by gathering longitudinal views of patient data
- Anonymizing contact tracing interactions for viral exposure monitoring
- Verifying patient eligibility to ensure correct insurance coverage



What impact does the linkage problem have on healthcare?

The linkage problem is ultimately delaying progress in medical research, patient care, and public health initiatives. Without a solution, healthcare organizations will continue to face many significant challenges in leveraging the full potential of their data. A few of these challenges include:

Incomplete Patient Profiles

Patients often receive healthcare services from multiple providers, meaning their health information is scattered across different systems. Their primary care provider may have different information than their cardiologist, who may have different information than their pulmonologist, and so on. The linkage problem makes it challenging to create complete and accurate patient profiles that capture the entirety of an individual's medical history. This can lead to fragmented care, duplicated tests, and misdiagnoses, ultimately compromising patient safety and quality of care.

Slower Medical Breakthroughs

Linking disparate datasets is crucial for identifying patterns, trends, and potential breakthroughs in medical research. However, the inability to effectively and accurately link and analyze data of patients from various sources, especially quickly and at scale, limits the ability of researchers to gain comprehensive insights. This hampers the discovery of new treatments, diagnostic techniques, and preventative measures that could save lives and improve health outcomes down the line.

Restricted Population Health Management

Effective public health initiatives depend on the compilation and analysis of extensive data to detect disease trends, evaluate health risks, and strategize for impactful interventions. However, the absence of robust data linkage significantly constrains our capacity to precisely monitor and comprehend health patterns. This limitation poses obstacles to timely responses to outbreaks, the implementation of preventive measures, and the optimal allocation of healthcare resources.

Addressing the linkage problem is vital for unlocking the transformative potential of healthcare data, paving the way for advancements in healthcare research, enhanced patient care, and the development of more effective public health strategies. However, the challenge lies in finding solutions that facilitate improved data exchange across healthcare organizations without compromising the accuracy and security of this essential patient information. It's imperative to explore innovative technological approaches that ensure seamless data sharing while safeguarding PHI. This calls for a careful examination of new strategies that strike a balance between accessibility and the stringent requirements for accuracy and security in healthcare data management.

The Power of Connecting Identifiable Patient Data

Fresh, accurate, and plentiful data from a wide variety of sources is crucial to fueling AI and ML in healthcare.

As we navigate the challenge of enhancing data exchange while safeguarding patient information, this imperative gains heightened significance in a healthcare landscape increasingly driven by the integration of Artificial Intelligence (AI) and Machine Learning (ML). The healthcare industry continuously seeks ways to enhance patient care, recognizing that data serves as the primary catalyst for driving innovative solutions. Robust data mining has already fueled advancements in remote patient monitoring, facilitated early disease detection, and even contributed to developments in nanotechnology, especially evident during the challenges posed by the COVID-19 pandemic.

In light of these innovations driven by data and analytics, it's no surprise that artificial intelligence (AI) and machine learning (ML) have emerged as powerful tools that promise to revolutionize the healthcare industry. These technologies hold immense potential to improve patient outcomes, reduce costs, and elevate the overall quality of healthcare services. However, their effectiveness hinges on addressing the data linkage problem – a critical step toward ensuring that AI and ML applications receive the diverse and accurate datasets needed to unleash their transformative power in reshaping the landscape of healthcare.

Fresh, accurate, and plentiful data from a wide variety of sources is crucial to fueling AI and ML in the healthcare space. Let's take a closer look at the benefits.

Enhanced Diagnostics & Early Detection:

Accurate and up-to-date data is the cornerstone of AI-driven diagnostics. With access to linked data from medical records, patient histories, and clinical studies, AI algorithms can spot patterns and anomalies that may elude even the most experienced physicians.

Personalized Treatment Plans:

AI plays a pivotal role in tailoring treatment plans to individual patients. Fresh data enables algorithms to keep pace with rapidly evolving treatment options and guidelines. When data is linked at an individual level AI can analyze things like a patient's medical history, genetics, and environmental factors to recommend the most effective treatments, improve patient outcomes, and minimize adverse effects.

Improved Patient Care:

Accurate, individual-level data is crucial for optimizing patient care. It allows AI and ML algorithms to predict patient needs, such as identifying high-risk patients who may need closer monitoring or providing real-time alerts to healthcare providers for critical situations. This level of personalization and early intervention can reduce the burden on healthcare systems and ultimately save lives.

Predictive Analytics:

Linked, longitudinal patient details will enable healthcare providers to leverage AI to anticipate patient needs and allocate resources effectively. Predictive analytics can help hospitals forecast patient admission rates, optimize staffing, and manage inventory levels.

Streamlined Administrative Processes:

When it comes to the burden on healthcare systems, administrative processes are a large part of that. These systems are inundated with tasks that can be both time-consuming and error-prone. With accurate linkage of patient information between systems, AI can automate various administrative processes, such as billing, scheduling, and claims processing. This not only saves time but also decreases costs, freeing up healthcare professionals to focus on patient care.

Drug Discovery & Development:

Fresh, accurate data is invaluable in the field of drug discovery. When diverse data sources are linked at an individual level, AI can analyze data from clinical trials, medical research, and patient records to identify potential drug candidates and predict their efficacy and safety. This can significantly accelerate the drug development process, potentially leading to breakthroughs in treatment and disease management.

Continuous Learning & Improvement:

The healthcare field is constantly evolving with new research findings, emerging diseases, and innovative treatments. Fresh, individual-level data from diverse sources enables AI and ML models to adapt and learn continuously. As they process new information, they can refine their algorithms and improve predictive capabilities.

Connecting Identifiable Patient Data Comes with Significant Challenges

The common thread among these benefits is their dependence on timely, accurate, and diverse data. This data forms the bedrock of the power and inherent potential in these technologies to revolutionize the healthcare industry. However, obtaining this data and scaling the processes related to data collection pose significant challenges for healthcare organizations. Issues such as data access, data quality, and interoperability often present formidable obstacles in the path to harnessing the full potential of transformative technologies.

Addressing these challenges is essential to unlock the full potential of healthcare AI and enhance patient care:

- **Timely Data for Real-Time Decision Making:** Timeliness in data ensures healthcare AI systems can detect emerging health issues or trends in real-time. Early detection and immediate decision support empower healthcare providers to make informed and prompt decisions, potentially saving lives or halting the progression of diseases.
- **Data Accuracy for Precise Diagnostics, Trials, & Patient Care:** The precision of patient data, including medical history, genetic information, and current condition, is critical for personalized treatment recommendations. Accurate data is crucial for identifying potential drug candidates, assessing their efficacy, and predicting potential side effects. Precise data matching – ensuring data from various sources align accurately – is equally vital in enabling effective diagnostics and trials. Matching accuracy ensures data is correctly associated with the right patients, resulting in accurate diagnoses, improved trial precision, better coordination of care, and more efficient healthcare delivery.
- **Varied Data for Comprehensive Patient Profiles & Predictive Analytics:** Diverse data sources provide a comprehensive view of patients' health, encompassing not only medical records but also lifestyle, environmental, and social data. A holistic view is invaluable for understanding and addressing health disparities, making well-informed decisions, and improving the accuracy of predictive analytics through a more complete dataset.

Until we overcome the significant challenges with data access, data quality, and interoperability, the full potential of healthcare AI remains untapped.

KarlsGate: Unlocking Precision Healthcare Data with Speed, Automation, and Scalability

Gone are the days of thinking about healthcare data linkage as a problem. Data interoperability should be easier – and it can be. Moving beyond the historical challenges in healthcare data linkage, KarlsGate emerges as an innovative solution.

KarlsGate provides the data pipeline tools for healthcare organizations to scale their ability to connect identifiable patient data. Global data to create a complete health history can be easily connected to supercharge AI learning engines, including patient-level data such as demographics, claims data, real-world data, economics, mortality data, SDoH data, labs, genomics, morbidity data, and diagnostics.

KarlsGate redefines the landscape by offering advanced automation that accelerates AI and other data workflow efforts with unparalleled precision and speed. This solution not only leads to faster healthcare insights and improved outcomes but also prioritizes data security. Unlike conventional approaches, KarlsGate ensures that PHI never leaves the data owner's custody, remaining safeguarded during all touchpoints of the data-sharing process. Privacy-enhancing measures are embedded directly into data workflows, minimizing the potential for re-identification and establishing a secure foundation for advancing healthcare data interoperability.

KarlsGate

Data is a critical component to driving better business outcomes and fueling AI-driven solutions. At the same time, industries face significant challenges when it comes to data access, data quality, interoperability, personal privacy, security, and integration with existing workflows.

KarlsGate's revolutionary advancements allow you to free yourself from the usual complexities of data collaboration. The KarlsGate Identity Exchange (KIE™) provides a privacy-enhancing layer that is easily integrated into existing data workflows, mitigating the risks associated with data collaboration and minimizing the potential for re-identification, while automating all components associated with data access, high-fidelity matching, and integration.

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