KYTHERA
DECIPHERING HEALTHCARE

See the Whole Market,
Act with Confidence

A Playbook for Healthcare Strategy Leaders
to Unlock Complete Market Intelligence

eBOOK

Introduction

Every day, your patients move through a complex healthcare ecosystem—seeing specialists, switching insurers, and seeking care at competing facilities. Without full visibility into those journeys, critical strategic decisions are often made on incomplete information.

At the same time, health systems face relentless pressure to improve market and operational performance with fewer resources. Even with mountains of data, most have struggled to turn it into meaningful strategic value.

This playbook is designed to change that by empowering strategy, population health, and business development teams to make smarter, faster decisions using multi-source data with greater confidence. By unifying internal billing, external claims, and Social Determinants of Health (SDoH) data into a single, privacy-preserving dataset, you unlock:

> **Increased Coverage & Visibility**

Expanding from just in-network activity to the full continuum of patient care. Integrating internal billing with external claims can boost data coverage to over 90%, capturing more encounters, referrals, and patient journeys.

> **More Informed Leakage Strategies**

Linked claims data pinpoints where and why patients leave your network. With that insight, you can target interventions such as expanding partnerships or service lines to retain more patients. In practice, this approach has reduced leakage by 11–35% across various specialties (data from a leading health system).

> **Expanded Strategic Actions**

A unified dataset enables you to benchmark against competitors, negotiate stronger payer contracts, and uncover growth opportunities, helping you expand high-demand service lines, strengthen provider relationships, and realign referral strategies to capture unmet market needs.

Why Hospitals Struggle to Harness Their Data

Despite the benefits of a data-driven strategy, most hospitals today struggle to access true intelligence from their data. Here's why:
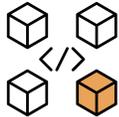
1. Data Fragmentation & Silos

- Different systems (EHR, billing, CRM, supply chain) don't "talk" to each other.
- No unified view of patients, providers, or service lines across systems.
- Mergers and acquisitions often add more disconnected systems.

2. Data Quality & Completeness

- Missing or inconsistent data undermines reliability.
- Limited capture of external factors (e.g., SDoH, competitor activity, payer steering).
- Inaccurate or outdated information creates distrust among decision-makers.

3. Retrospective, Not Predictive

- Analytics have been built around descriptive dashboards (what happened), not forward-looking scenarios.
- Limited ability to model market changes, leakage risk, or site-of-care shifts.

4. Governance & Privacy Barriers

- Privacy concerns and complex governance structures slow data sharing.
- Linking across systems requires data-sharing agreements and trust, which are often slow to establish.
- Privacy regulations (HIPAA, state-level rules) complicate cross-institution patient mastering.
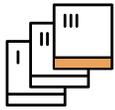
5. Cultural & Organizational Hurdles

- Strategy, clinical, and finance teams often work from different "versions of truth."
- Lack of trust in the data prevents it from being used in board-level decisions.

Bottom line: health systems struggle because their data is siloed, messy, retrospective, and hard to trust. Without unified, high-quality, and accessible datasets, it's nearly impossible to use internal data for confident strategic decisions. Integrating internal data with external data sources, such as claims and SDoH, revolutionizes healthcare strategy; however, there are key steps that must be taken to ensure success.

The Essential Ingredients for Successful Data Integration

1. Patient Mastering

Patient mastering is the process of accurately linking and consolidating patient records from multiple data sources into a single, unified identity—resolving duplicates, correcting inconsistencies, and ensuring each patient has one complete, trusted record. While patient mastering is essential for data integration across systems, it can be notoriously challenging. Pitfalls like data quality issues, including incomplete or inconsistent identifiers (missing SSN, for example), typos or formatting differences (names, addresses, DOB entered inconsistently or incorrectly), duplicate records created (when patients present at different sites), false matches and missed matches (different individuals incorrectly merged into a single record or conversely, the same patient split across multiple records fragmenting their history) are some of the challenges.

> " Many hospitals treat mastering as an IT project instead of embedding it into an enterprise data strategy. "

Platforms with pipelines configured to automatically apply machine learning (ML) for probabilistic matching, impute missing values, and use predictive modeling to estimate missing data points go a long way toward maintaining and improving the integrity of the dataset and give leaders greater confidence in their strategy.

It is also vital when accessing millions of records to have a platform that can scale, one with matching rules and algorithms that provide ongoing updates (such as names, addresses, and payer changes), rather than one-time matching.

> **IN SHORT**, *patient mastering underpins nearly every strategic use case—from reducing leakage to strengthening payer negotiations. Without a complete, trusted view of each patient, insights remain fragmented and unreliable.*

2. Data Harmonization

Another essential ingredient is data harmonization, which enables side-by-side queries across multiple data sources and integrates internal and external data into a single, unified view of patient activity and market dynamics. Harmonization only works if the records being connected are accurate. Without that, duplication and patient drop-off distort leakage, referral, and coverage analysis. When applied correctly, it provides a reliable foundation with sharper, more detailed views of patient activity and market dynamics.

A common data model (CDM) simplifies and organizes enormous datasets from different sources to be harmonized and used as a cohesive whole. Historically, mapping new data to a CDM has been a slow and manual process that requires both technical skills and deep domain knowledge.

> "Harmonized data gives leadership one trusted version of truth, so every strategic decision is backed by confident answers."

Kythera Labs has developed a dynamic CDM that not only standardizes the data, it also works like a feedback loop that self-informs and improves accuracy by interacting with hundreds of data points. With the right tools and context, generative AI agents can:

- Automatically explore new datasets and generate intelligent data profiles.
- Identify overlaps and gaps between source data and the CDM.
- Propose transformation logic to fit raw data into the model.
- Operate autonomously or with a human-in-the-loop for oversight and refinement.

IN SHORT, *harmonization is what turns "data silos" into a single market view, making every downstream analysis (leakage, growth, payer, equity) more accurate and actionable.*

3. Privacy-Preserving Linkage

De-Identification
Ensuring patient privacy through de-identification is another essential ingredient needed to integrate multi-source data. This process replaces personally identifiable information (PII) with secure, non-reversible tokens to safeguard privacy and is a foundational step for seamless data linking.

Linking
By connecting internal billing data with external claims data, SDoH, and other data sources, a unified, unique, and comprehensive dataset can be created. Advanced data integration capabilities match records across multiple data points, including patient IDs, diagnosis codes, procedure codes, and payer information.

IN SHORT, *privacy-preserving linkage is what makes multi-source integration safe, scalable, and trustworthy, unlocking insights that would otherwise remain siloed.*

> " De-identification and tokenization are the foundation for reliable linkage, ensuring patient journeys stay complete while PHI stays protected. "

Advanced Patient Mastering: Moving Beyond the Pitfalls

Here are our recommendations for implementing advanced patient mastering for data integration.

- **Data Quality by Design** – Validate and enrich data at ingestion; automate deduplication.
- **Advanced Matching Approaches** – ML-driven matching and referential data to reduce errors.
- **Privacy-Preserving Linkage** – Secure, de-identified token-based connections.
- **Enterprise-Embedded Governance** – Treat mastering as strategic, not just technical.
- **Scalability & Flexibility** – Cloud-native architecture with real-time updates.
- **Multi-Source Integration** – Go beyond claims: include billing, labs, pharmacy, and SDoH for a 360° view.

Advanced patient mastering shifts from manual, error-prone record linkage to automated, scalable, privacy-preserving intelligence that supports both clinical safety and strategic growth.
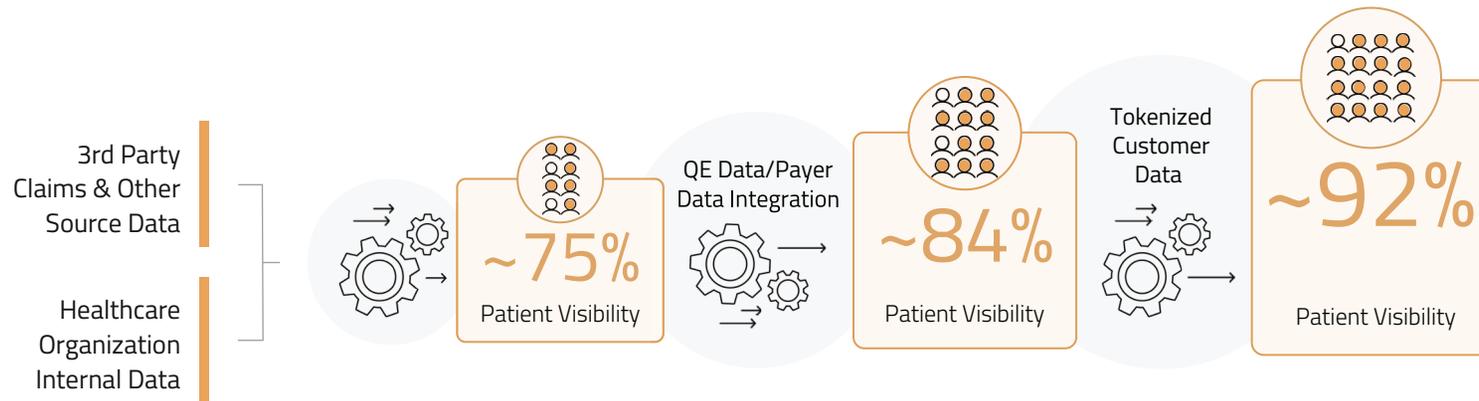
Health System Data Integration
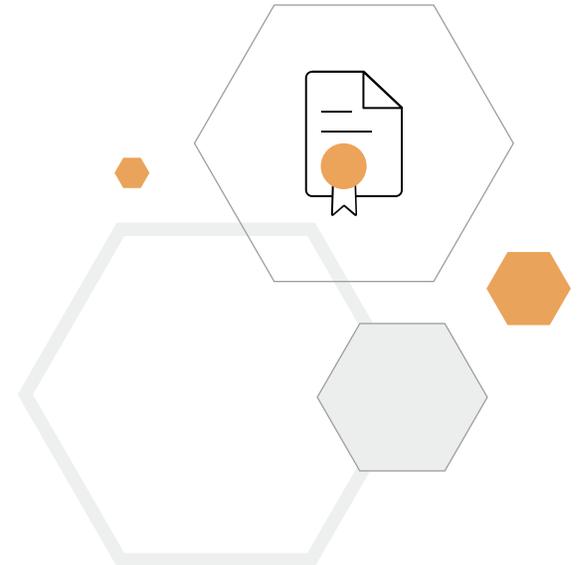
A leading healthcare system faced significant challenges in understanding patient referrals, particularly for surgical events. Their data was spread across multiple systems, and there was limited visibility into referral patterns, including "leaking" surgeries outside their network. This lack of insight hindered their decision-making on resource allocation, market positioning, and identifying potential revenue opportunities. The challenges were compounded by issues with inconsistent and incomplete data across their various data sources, making it nearly impossible to track patient flow and ensure that strategic decisions were based on accurate information. By harmonizing data and preserving complete patient journeys, Wayfinder DataSync gave the health system the ability to see network activity across its own network and beyond.

- Referral Imputation: Using an advanced referral imputation model, they were able to track surgical events back to their referring practices. This was especially valuable for identifying previously hidden referrals from non-network providers.

- Data Enrichment & Cleaning: Wayfinder enhances data by cleaning and enriching the information, ensuring that payer types are assigned correctly and that the system has accurate, actionable data for analysis. This cleanup addressed inconsistencies, ensuring that the health system could make informed decisions based on reliable information.

- Actionable Insights: Through detailed analytics, the system uncovered significant referral trends, gained a better understanding of where patients were seeking care, and identified revenue leakage.

By integrating both internal and external data sources, DataSync improved coverage and visibility, enabling the health system to track patient movement, identify service gaps, and monitor payer trends. These enrichment processes ensured the data were comprehensive and reliable. By linking internal data with external claims data, coverage improved from approximately 75% to 92%, resulting in a 23% increase in Total Leakage Encounters and a reduction in leakage by 11-35%, depending on the medical specialty.

3rd Party Claims & Other Source Data

Healthcare Organization Internal Data

~75% Patient Visibility

QE Data/Payer Data Integration

~84% Patient Visibility

Tokenized Customer Data

~92% Patient Visibility

Integrating internal health system data with third-party claims enhances coverage, improves patient retention insights, and boosts market visibility.

Key Outcomes:

- Surgeon Referrals: The system gained visibility into over 7x referrals not previously identified through their existing data or referral methodology. This drastic increase in visibility enabled the system to plan resources more effectively and identify growth opportunities.

- Revenue Recovery: By identifying previously "leaked" surgeries, the system identified an uplift of 382 missing total knee replacement procedures.

- Strategic Planning: Armed with insights into referral patterns, the system was able to target strategic opportunities, such as increasing market share in specific regions and specialties. It also identified where it needed to invest more resources to retain patients and capture revenue that was previously lost.

Strategic Applications

To get you thinking about the possibilities of connecting data, we've included a few ideas to get you started. From market intelligence and growth strategies to network optimization to filling in important gaps with SDoH data, the ways in which you can glean new insights from data integration are many.

Market Intelligence & Growth Strategy

1. **Referral & Leakage**

   (Third-Party Claims + Provider Directories + Internal Data Assets)

   - **Capability:** Visualize in- and out-of-network referral flows and where outmigration occurs.

   - **Value:** Improve provider alignment, focus service expansion, and reduce outmigration.

Use Cases:
- Identify which primary care providers are sending high-value referrals to competitors.
- Quantify the downstream revenue lost when patients leak out of the cardiology or oncology service lines.
- Target relationship-building with facilities like urgent care or physical therapy to improve referral capture.
- Prioritize specialist recruitment where referral demand exceeds in-network capacity.

2. Network Access Optimization

(Third-Party Claims + Provider Directory + Internal Data Assets)

- **Capability:** Identify when and where patients seek care outside the network, pinpoint leakage, assess timeliness of encounters, and detect bottlenecks.

- **Value:** Target network design, provider recruitment, patient engagement, and informed investments.

Use Cases:

- Detect long wait times for neurology appointments and reassign referrals to underutilized providers.
- Flag geographic regions where patients bypass your system providers for urgent care or specialty visits.
- Optimize scheduling and staffing to reduce delays that drive patients to competitors.
- Guide facility investment decisions (e.g., ASC expansion) based on demonstrated outmigration trends.

3. Unmet Need and Missed Care

(Third-Party Claims + Chronic Conditions Journey + EHR + SDoH)

- **Capability:** Spot patients eligible for annual wellness visits, screenings, and chronic condition management.

- **Value:** Close gaps in care (value-based care) and increase service volume.

Use Cases:

- Identify Medicare patients who are annual wellness visit-eligible but haven't had a visit in the last 12 months.
- Surface diabetic patients overdue for A1c tests or retinal screenings.
- Flag high-ED-utilization patients without documented follow-up care.
- Utilize SDoH overlays to identify patients most at risk for missing preventive services due to transportation or financial barriers.

4. Total Addressable Market Estimation/Demand Forecasting

Third-Party Claims + Procedure Trends + Demographic Data

- **Capability:** Understand market potential.

- **Value:** Size opportunity by service line, geography, or cohort, track payer shifts.

> **Use Cases:**
>
> - Forecast orthopedic demand in fast-growing suburban ZIPs with aging populations.
> - Model oncology service demand in high-incidence regions underserved by current facilities.
> - Estimate the revenue opportunity from expanding GI services in regions with high outmigration.
> - Track payer mix trends to forecast commercial vs. Medicare Advantage demand for cardiology services.

Harmonized, multi-source data doesn't just describe the market; it drives specific actions, such as recruitment, investment, outreach, and contracting. Let's put some into action. Your health system needs a marketing campaign to re-engage primary care patients and close attribution or care gaps.

Here are some steps to follow:

1. Define recapture goal.
   Example: Identify patients with chronic conditions (e.g., diabetes, hypertension) who haven't had a primary care visit in 12+ months.)

2. Use cohorts to identify targets.
   - Patients with missed annual visits or no PCP attribution.
   - High-ED utilization without follow-up.
   - Chronic disease burden with no preventive care.

3. Overlay SDoH, claims, and EHR Data to add insights into geographic, financial or even transportation barriers to care. Flag no-show risk and access challenges.

4. Export target list to CRM or outreach platform.

5. Run a multichannel campaign.

6. Track re-engagement via claims/EHR and monitor for visit completion, panel updates, and ongoing engagement.

7. Evaluate ROI and iterate by adjusting targeting criteria based on recapture performance.

Bringing SDoH Into the Strategy Conversation

The Power of Combining Third-Party Claims, Internal Data, and SDoH Data

By integrating third-party claims, internal data, and SDoH, strategy, population health, and value-based care leaders can uncover more information about their markets than ever before. Combining claims and SDoH reveals not just where patients leak, but the reasons why. You can see how specific payers steer members toward lower cost facilities or identify transportation gaps or other access-related challenges. It represents a fundamental strategic shift in how to view the market and design strategy.

Here is an example of how you could combine this type of data.

Reducing Referral Leakage in Cardiology

Goal: Identify where patients are leaving the network and quantify lost opportunity.

Data Inputs:

- Claims: Specialist referrals, cardiology CPT/HCPCS codes, procedure dates (e.g., echo, cath, CABG).
- EHR: Encounter history, referral orders, and appointment scheduling data.
- Pricing: Reimbursement rates per procedure and payer-negotiated amounts.
- SDoH: Travel distance, ZIP-level access to care scores, and transportation barriers.

Insights:

- Patients in high-SDoH-risk ZIP codes are 30% more likely to go out of network for cardiology follow-up.
- A 3-day lag in scheduling from referral order increases leakage odds by 50%.
- $8.7M annualized opportunity in recaptured downstream procedures if addressed.

Action:

- Prioritize outreach to high-referral PCPs with high downstream leakage.
- Expand same-week access to cardiology in targeted submarkets.
- Build SDoH overlays into referral decision logic.

CASE STUDY

How A Major Health System is Combining Claims with SDoH Data
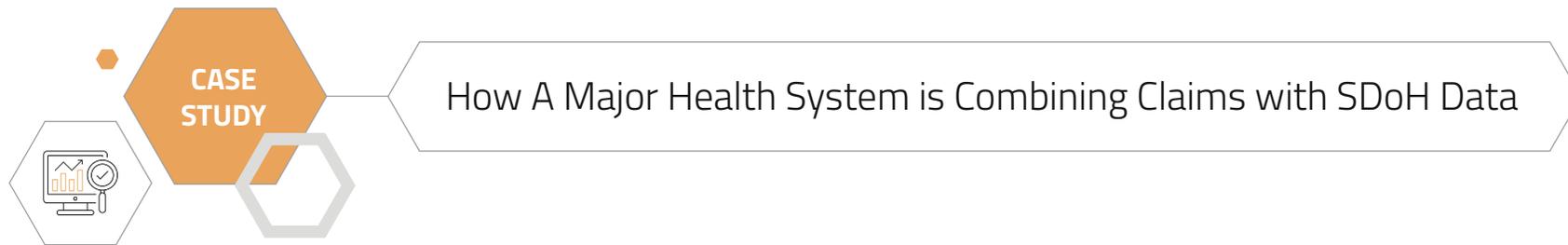
The strategy of a leading health system centers on the patient experience; the belief that solving patient navigation, access, personalization, and convenience is paramount to their success. They are building infrastructure, including standardizing data platforms, integrating clinical and billing data, and emphasizing continuous quality improvement. Using SDoH data, like income, education, housing, or neighborhood disadvantage, combined with clinical and operational data, they are shifting the mindset from using SDoH data as an "equity dashboard" to a powerful tool for growth by embedding SDoH data into their market analysis and growth strategy.

They have partnered with Kythera to integrate SDoH data into claims and internal data for a variety of use cases, including to better understand leakage and the reasons why individuals leave the system, to understand individuals who are willing and likely to use telehealth, and to understand utilization patterns of those using their system versus other healthcare providers.

To uncover these insights, Wayfinder DataSync de-identifies and tokenizes patient encounters, then harmonizes them with claims, clinical data, and SDoH datasets. With this type of data integration, they will be able to uncover how transportation barriers correlate with ER visits, how language differences impact follow-up care, or how income gradients influence site-of-care choices.

If you are considering integrating SDoH data with your other data, here are some ideas to help ensure success.

Success Factors

- Build a Scalable Foundation: Utilize cloud-native infrastructure that can efficiently handle high-volume claims and SDoH data without requiring extensive data movement.

- Prioritize Data Quality: Start with high-fidelity data and common data models to standardize frameworks and align SDoH with claims and clinical data.

- Embed Privacy-Preserving and Governance-Ready Linkage: Implement de-identification, tokenization, and expert determination so compliance never becomes a barrier.

- Go Beyond Pilots: Embed SDoH data into your market analysis and growth strategy.

- Trust & Validation: Ensure SDoH data is viewed and trusted as fit-for-purpose.

- Cross-Team Buy-In: Align strategy, population health, and finance stakeholders.

- Choose the Right Partners: Combine complementary expertise to deliver decision-grade intelligence for planning, contracting, and equity initiatives.

Conclusion

Turning Multisource Data into Strategic Advantage

Health system strategy and business development teams are being asked to do more than ever. Drive growth, optimize networks, and compete for market share while relying on fragmented, siloed, and often untrusted data. This playbook has shown that it doesn't have to be that way.

By unifying internal billing data, external claims, and SDoH into a single, privacy-preserving foundation, strategy teams can gain a comprehensive view of patient journeys, market dynamics, and payer behaviors—unlocking insights that were previously invisible.

With this foundation, health system leaders can:

- Detect and reduce patient leakage before revenue is lost.
- Understand not only where, but also why patients leave the network.
- Align providers around high-value referral pathways.
- Forecast market demand and negotiate smarter with payers.
- Incorporate social risk insights to drive equity and value-based care.

This is not about building more dashboards or adding more data feeds. It's about transforming data into decision-ready intelligence. With Kythera Lab's Wayfinder DataSync, organizations can move faster, negotiate smarter, and execute growth strategies with confidence, aligning clinical, financial, and operational teams around one trusted version of truth.

About Kythera Labs

Kythera Labs is a data and technology company that enables organizations to rapidly ingest, de-identify, standardize, and analyze healthcare data with scale and speed. The Wayfinder platform, built on Databricks, makes complex data more accessible, helpful, and reliable through pre-configured data pipelines, data science toolkits, and remastered datasets, providing competitive advantages across markets. By accelerating time to value and improving data quality, Kythera Labs' technology supports better patient outcomes, enhances decision-making, and strengthens the impact of data investments across clinical, regulatory, and commercial objectives.

About Wayfinder DataSync

DataSync can be paired with Kythera's Business Development Package, which includes preformatted, easy-to-use market intelligence dashboards within Wayfinder WorkBoard, or with Wayfinder WorkSpace, a suite of robust data analysis, AI, and ML tools designed for more technical users. Together, these solutions empower hospitals with data consistency, compliance, and traceability to deliver encounter-level insights that drive long-term value from every referral.

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