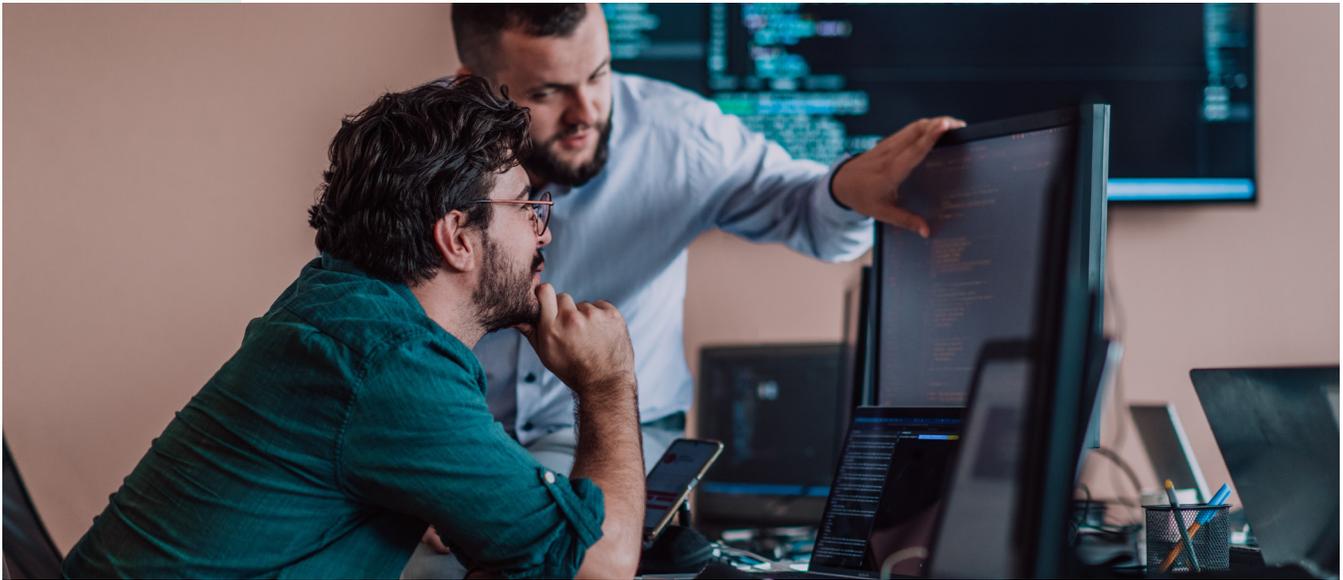


Unlocking the Power of Clinical Data



InterSystems IRIS for Health™ as an Independent Data Repository

Introduction

Application developers and solution partners often need to process healthcare data outside of the **electronic medical record (EMR)** system. EMRs are primarily designed to directly support individual patient care, with a focus on clinical documentation, regulatory compliance, and billing. When applications require more intensive analytics, large-scale data aggregation, or real-time processing, however, performance constraints and inherent data silos can turn EMRs into processing bottlenecks. In addition, EMRs often limit their application programming interfaces (APIs) to be read-only, making it impossible for developers to store genomic, medical device, and other kinds of more technical data, which are the backbone of innovative healthcare applications. Most EMRs were not designed to support such uses.

By leveraging a separate **clinical data repository (CDR)**, solution partners can overcome these limitations and gain greater flexibility, to employ advanced analytics, predictive modeling, population health management, and clinical decision support. All of these typically lie beyond the capabilities of an EMR. Processing data outside the EMR also allows for more seamless integration across multiple systems and data sources.

Healthcare data often comes from diverse sources—multiple EMRs, labs, imaging systems, and even wearable devices. Integrating this data into a single repository enables solution partners to build applications that give a holistic view of patient information, enhancing clinical insights and improving care coordination. This approach also supports compliance with healthcare standards, such as HL7 FHIR, that facilitate data exchange across disparate systems. Ultimately, by using a dedicated CDR outside the EMR, application developers gain a robust, high-performance platform for building data-driven healthcare solutions that are scalable, interoperable, and capable of supporting modern artificial intelligence (AI) and machine learning (ML) tools.

While the focus of the EMR is individual patients and their care and histories, the purposes of a CDR are often more disparate. A CDR can serve to house data not intended for an EMR or data that requires fast access, often for analytical purposes. The creation of a separate repository allows the EMR and the CDR to efficiently serve their respective distinct purposes, complementing each other's functions, without interfering with each other.

Why an Independent Clinical Data Repository?

By focusing on data, an independent clinical data repository enables **data-centric applications**—unlike the priorities of an EMR, which are real-time clinical documentation and support for immediate patient care. A CDR is designed to serve as a comprehensive data hub that can store, normalize, and manage data from multiple sources. This allows for easier integration of diverse data types—such as lab results, imaging, and medical device data—into a unified format, making that data more readily available for secondary uses like analytics, research, and population health initiatives. An example is the **Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM)**, a commonly used open community data standard. A body of data can be exported from a single CDR in a common OMOP format and made ready for population-level research and analytics.

Customer Story:

Collecting Home Health Data on Chronic Conditions

A large health center in Israel consisting of eight medical centers needed a way to collect device data from their patients at home. They also wanted to collect their patient's reports to better manage their chronic medical conditions. Using InterSystems IRIS for Health, they built a CDR to collect this data and made it accessible to their EMR.

Read the customer story [here!](#)

The separation of patient-centric and data-centric functions enables both healthcare organizations and solution providers more direct and immediate access to healthcare data without interfering with the EMR's operational performance. They can support a range of data-driven applications, including real-time decision support, machine learning, and predictive analytics. Because data is stored in a centralized and accessible repository, they can accommodate complex queries and high-throughput data retrieval.

Scenario	Drawbacks of EMR	Benefit of CDR
Multiple EMRs in use	Data locked in silo	Data aggregation & normalization
Population health analytics or research	EMR not optimized for analytics	Advanced queries & tool integration
Longitudinal or cross-platform data needs	Vendor lock-in, upgrades, replacements	Technology-agnostic data continuity
Interfacing with external systems	Limited or proprietary EMR access	Standardized, secure data sharing
Archiving, backups, or disaster recovery	Data loss risk, regulatory needs	Independent, durable data storage



Reducing Hospital Readmissions: A CDR Example

For example, a healthcare provider aims to reduce hospital readmissions by identifying patients at high risk of readmission within 30 days of discharge. To accomplish this, they set up a clinical data repository (CDR) outside the EMR, integrating data from various sources, including lab results, medication histories, socioeconomic data, past hospitalizations, and patient-generated data like activity levels from wearable devices.

With this data in their custom CDR, data scientists can build and train predictive models using machine learning algorithms that analyze multiple variables affecting readmissions, such as comorbidities, patient demographics, and lifestyle factors. The AI model continually learns from new data, improving its accuracy over time. The AI-driven insight helps the healthcare team proactively identify patients at risk, allowing for targeted follow-up care and early interventions that can lower readmission rates. Patients flagged as high-risk can be enrolled in tailored post-discharge programs involving regular check-ins, telehealth sessions, and home care services, significantly reducing the likelihood of readmission.

By aggregating this data independently of the EMR, the organization can use advanced analytics and machine learning models to predict readmission risk, free of the processing limitations of the EMR.

Population Health with Aggregated Clinical Data

Public health is a prime example of how a clinical data repository outside the EMR can save lives. Most states use an Electronic Death Registration System (EDRS), a secure online platform that allows healthcare providers, medical examiners, and funeral directors to complete and file death certificates electronically. Death certificates provide detailed data on the cause of death, demographics, and contributing factors, such as underlying health conditions, which offer a comprehensive view of the population's health status. By analyzing this data across time, regions, or demographic groups, a public health agency can identify patterns, emerging health threats, and areas for health education and prevention efforts.

Preventing Opioid Deaths with Public Health Data: Another CDR Example

As an example, consider a public health agency that tracks an increasing number of opioid-related deaths in several regions, based on death certificate data. Performing a **population health analysis**, they segment the data by factors such as age, geographic location, socioeconomic status, and history of substance use. The analysis reveals that opioid overdose deaths are concentrated among young adults in rural areas with limited access to addiction treatment and mental health support.

The agency can then intervene, deploying mobile health clinics to offer addiction treatment in rural areas, increasing access to naloxone, and creating educational programs that teach about opioid risks. They can also work with healthcare providers to increase screening for substance use and prescribe alternatives, safer than opioids, to manage pain. By analyzing death certificate data in this way, the agency identifies specific community needs and directs limited resources more effectively, ultimately working to reduce opioid-related deaths and improving public health.



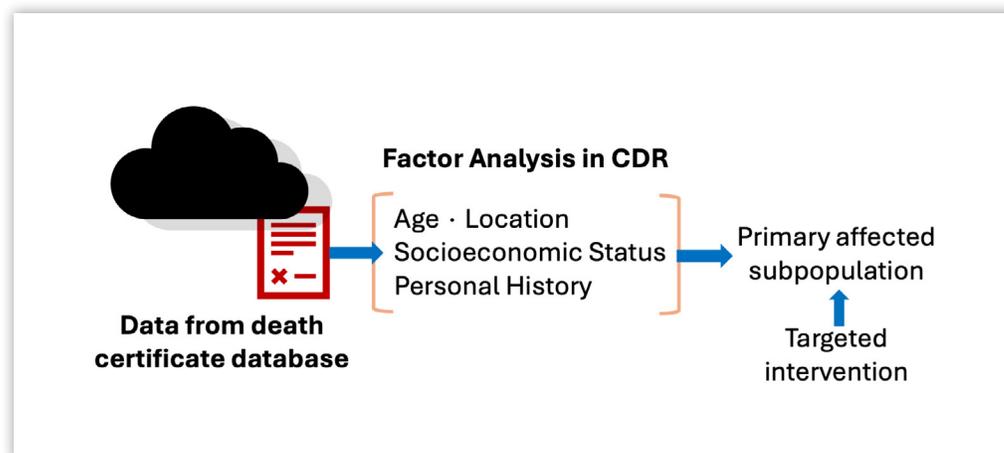


Figure: Example of population health analysis with a CDR

InterSystems IRIS for Health: An Ideal Platform for a CDR

InterSystems IRIS for Health offers distinct advantages for application developers and solution partners to implement a clinical data repository outside the electronic medical record. It consolidates a **multi-model database**, **interoperability**, and **application development** into a single platform. It simplifies the process of creating and maintaining a comprehensive repository that can handle complex, large-scale clinical data efficiently. This integrated approach allows healthcare organizations to ingest, transform, and analyze data from multiple sources—such as EMRs, lab systems, imaging, and external devices—without the need for separate databases or multiple data transfer processes. This centralized repository structure can grow and adapt with the organization’s needs, providing a reliable, long-term foundation for data-driven applications.

This platform is built with native support for interoperability healthcare data standards like **HL7**, **HL7® FHIR®**, and **DICOM**, making it easier to integrate and maintain your healthcare data. FHIR is a great way to obtain data from multiple EMRs, since Federal regulations compel them to make clinical data accessible through a FHIR API. Unlike traditional EMRs, which often lead to data silos, InterSystems IRIS for Health facilitates the seamless exchange and integration of data across disparate systems, allowing for broad accessibility and utility of clinical information. Developers can easily integrate data from multiple EMRs, imaging systems, and external sources into a unified CDR.

Additionally, the platform’s robust **security** features ensure that data is stored and accessed in compliance with healthcare regulations that mandate privacy and security, making it a comprehensive and reliable choice for solution partners.

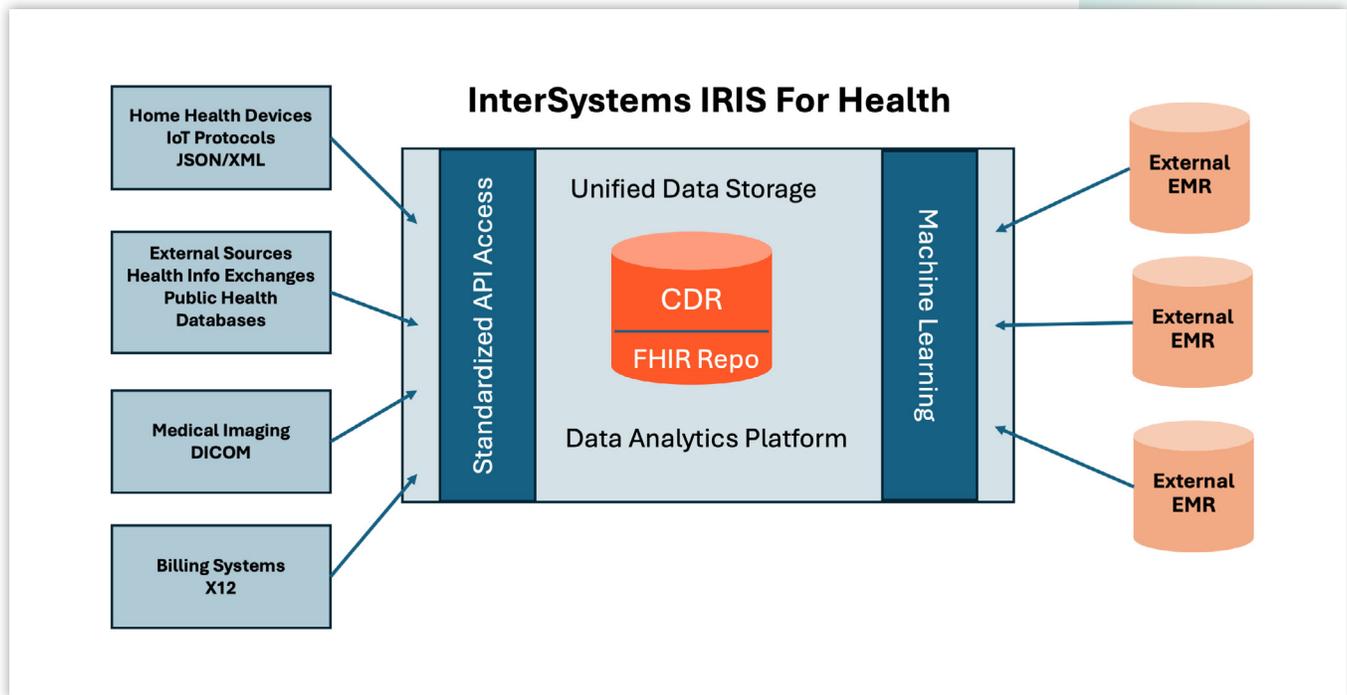


Figure: InterSystems IRIS for Health as a Clinical Data Repository

Customer Story: A Clinical Data Repository for the Full Personal Health Journey

A major US health company chose InterSystems IRIS for Health to implement a comprehensive clinical data repository, based on FHIR. This CDR supports a wide range of initiatives to increase patient engagement and enhance personalized care.

This customer's unique position in the US health system allows it an exceptional view of Americans' healthcare histories. The goal of holistic, real-time, and intelligent approaches to patient care—supporting the whole person along their healthcare journey—is within reach, given the company's accumulated patient data and informatics infrastructure.

Health Analytics with InterSystems: Analyze Data Your Way

With its advanced analytics capabilities, **InterSystems IRIS for Health** facilitates real-time data processing, and supports AI and machine learning, empowering solution builders to create data-driven applications for predictive analytics, population health, and personalized medicine.

The platform enables development to perform FHIR-based analytics with its **FHIR SQL Builder**, which allows data scientists to run complex, SQL-based queries directly on FHIR data without needing deep expertise in FHIR structures. This makes it easier for healthcare organizations and application developers to leverage data stored in FHIR format for analytics, reporting, and population health studies. By eliminating the need to transform FHIR data before analysis, the FHIR SQL Builder accelerates data retrieval and processing, which is particularly useful in time-sensitive applications like clinical decision support and outcomes research.



InterSystems IRIS for Health also provides built-in capabilities through Integrated **machine learning** (ML) and **vector search**. Integrated ML enables healthcare organizations to build and deploy predictive models directly within the platform, simplifying the development and operationalization of AI-driven applications without requiring external tools or complex data migrations. For more advanced use cases, vector search offers efficient retrieval of unstructured data based on similarities, which can be critical for applications in genomics, personalized medicine, and diagnostics.

Solution partners can analyze data using not only the built-in analytics tools, but also **business intelligence** (BI) tools such as Tableau and Power BI, which integrate easily with InterSystems IRIS for Health.

Together, these features make InterSystems IRIS for Health a powerful platform for organizations that need a flexible, interoperable, and AI-ready data platform to support innovative healthcare solutions beyond the confines of a traditional EMR.

Build Your Own CDR with InterSystems

For application developers and solution partners serious about building a clinical data repository outside the constraints of an EMR, **InterSystems IRIS for Health** is an unparalleled choice. This unified platform seamlessly integrates a high-performance database with development capabilities specifically tailored for healthcare. It simplifies data management and interoperability by supporting critical healthcare standards such as HL7 and FHIR, allowing applications to access and utilize data across disparate systems without the typical limitations of an EMR. By consolidating data from multiple sources, the platform enables real-time analytics, advanced FHIR-based querying through the FHIR SQL Builder, and powerful AI capabilities with Integrated ML and vector search—all within one secure, compliant system. With InterSystems IRIS for Health, solution partners can leverage a flexible, scalable, and interoperable platform to drive innovative, data-driven applications that enhance patient care, streamline workflows, and open new possibilities in data aggregation and analysis, population health, and personalized medicine.

InterSystems IRIS for Health and Clinical Data: The InterSystems Difference

InterSystems Knows Healthcare

As a longstanding leader in healthcare data technology and standards-based interoperability, InterSystems has the experience to solve real-world healthcare challenges.

Industry-Leading Support

We're focused on making our customers successful and ready for any challenge, which is demonstrated by some of the highest customer satisfaction ratings in the category.

Comprehensive Healthcare Interoperability

Seamless integration connects you into the greater health and care ecosystem.

Full, Built-In Support for FHIR, Vector Databases, GenAI, ML, and BI

InterSystems provides “ready-to-go” support for FHIR repositories and bulk operations, vector databases and vector search for generative AI, machine learning, and business intelligence.

Unique Architectural Approach

Our integrated, interoperable, multi-model, multi-lingual engine provides the highest performance and resiliency with the lowest TCO.

Highly Flexible

InterSystems IRIS includes the tools to solve unfamiliar problems and adapt as business needs change. Every aspect from data transformations to workflow can be tailored, and low-code tools let you put some customization in the hands of business users.

Powering the World's Most Important Applications

Our software powers mission-critical applications in almost every industry – from healthcare and financial services to supply chain and space exploration.

Ready for a free InterSystems IRIS for Health trial? Try it [here!](#)

