**Practical Data Management Case Study - Healthcare**

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**1. Introduction**

As we know healthcare demands a lot of data management and for the sake of this document, we selected two companies which provides two solutions in the market with different approaches, techniques and behaviors.

The first company is called Astera which has been bringing solutions in the fields of data since 2010.

The second company is called Intersystem which also brings solutions in the fields of data and laboratory research.

**2. Astera**

2.1 Data Collection: The data is collected via medical records in an electronic format or Electronic Health/Medical Records ( HER/EMR).

These records include:

* Demographic information: age, address, gender
* Health records: lab reports, prescriptions, doctors’ visits, treatment history
* Medical administrative data: insurance claims, billing, invoices

2.2 Data Storage: Theses electronic records are consolidated in a centralized data repository.

2.3 Data Organization: The data is structured in an easy way to use and good way to the software organize the extracted data there, see example from Astera.

A screenshot of a computer

Description automatically generated

2.4 Data Analysis : From the Astera website, our source , we could find that they use four types of analytics : Descriptive , Prescriptive , Predictive and Diagnostic.

2.5 Data Security and Privacy : Astera implemented modern cybersecurity measures while following GDPR and HIPPA guidelines.

**3. InterSystems ( IRIS for Health Care):**

3.1 Data Collection : InterSystems IRIS for Health facilitates the integration of disparate data sources, enabling healthcare organizations to collect comprehensive patient data efficiently. Generally, healthcare data is collected from various sources such as electronic health records (EHRs), medical devices, laboratory tests, and patient-reported outcomes.

3.2 Data Storage : InterSystems IRIS for Health offers a scalable and high-performance data platform for storing healthcare data. It utilizes a multi-model database architecture, allowing healthcare organizations to store structured and unstructured data in a unified environment. Additionally, InterSystems IRIS for Health provides built-in data encryption and access controls to ensure data security and compliance with healthcare regulations.  
  
3.3 Data Organization : Healthcare data in InterSystems IRIS for Health is organized and structured for efficient access and retrieval. The platform supports standard healthcare data models such as HL7 and FHIR, enabling interoperability and seamless exchange of patient information between different healthcare systems. Moreover, InterSystems IRIS for Health includes tools for data modeling and data governance, allowing healthcare organizations to define data structures and enforce data quality standards.

3.4 Data Analysis : InterSystems IRIS for Health offers advanced analytics capabilities for deriving insights from healthcare data. It provides built-in support for SQL queries, business intelligence (BI) tools, and machine learning algorithms. Healthcare organizations can leverage these analytical tools to perform clinical research, population health management, and predictive analytics to improve patient outcomes and operational efficiency.

3.5 Data Security and Privacy : InterSystems IRIS for Health prioritizes data security and privacy to protect sensitive patient information. The platform implements robust security features such as role-based access control (RBAC), audit logging, and data masking to prevent unauthorized access and ensure compliance with healthcare regulations such as HIPAA. Additionally, InterSystems IRIS for Health supports encryption of data at rest and in transit to safeguard patient privacy.

**4. Challenges :**

One key challenge in healthcare data management is ensuring data interoperability and integration across disparate systems. Healthcare organizations often struggle with siloed data sources and incompatible data formats, hindering the seamless exchange of patient information. Another challenge is maintaining data security and privacy in the face of evolving cyber threats and regulatory requirements.

**5. Strategies :**

To address these challenges, healthcare organizations can implement interoperability standards such as HL7 and FHIR to facilitate data exchange between different systems. Additionally, investing in data integration platforms like InterSystems IRIS for Health can streamline the process of integrating and harmonizing heterogeneous data sources. To enhance data security, organizations should adopt a multi-layered approach that includes encryption, access controls, and regular security audits.

**6. Impact :**

Implementing the proposed strategies can have a significant impact on healthcare organizations' operations, efficiency, and decision-making processes. By improving data interoperability and integration, healthcare providers can achieve a holistic view of patient health information, leading to more informed clinical decisions and better patient outcomes. Enhanced data security measures can mitigate the risk of data breaches and protect patient privacy, enhancing trust and compliance with regulatory requirements.

# References

Safa G. (2024). Health Data Management: Challenges and Best Practices.

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InterSystems – Creative data technology. Database Management.

<https://www.intersystems.com/data-platform/database-management/>