Evolution of the Mount Sinai Data Warehouse (MSDW)

Scientific Computing
Icahn School of Medicine at Mount Sinai

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Icahn
School of
Medicine at
Mount
Sinai

Motivation for MSDW Evolution

1. Legacy MSDW not aligned with Mt Sinai's **Epic strategy**
   - Ever more data already in Epic Caboodle data warehouse
   - Hard-to-query bespoke data model no longer justified

2. **Technological limitations** of legacy MSDW
   - Bottlenecks in loading data as volumes grew
   - Opportunity to switch to cheaper database & software

3. Need to **streamline data sharing**
   - Many research networks & programs now using OMOP Common Data Model
   - Leverage tools & resources of OHDSI community

Legacy MSDW in 2010 versus 2020

	MSDW Circa 2010	MSDW Circa 2020
Data Sources	Quickly acquire data from myriad systems by copying **HL7 message** transmissions	Ever more of Mt Sinai's data is/will be in **Epic**
Common Data Models	**Limited data sharing** in research networks (OHDSI not founded until 2013)	Need to support **extensive data sharing** with CTSA, Insight CRN, TriNetX, Sema4 using common data models like **OMOP**
Data Model	EAV-style **single fact table**, similar to i2b2, for easy data ingestion with few resources	Very **difficult** to reconstruct clinical events & transactions, slows data delivery, obscures data lineage
Data Pipeline	Designed to **overcome bottlenecks**	Bottlenecks have **re-emerged**, daily loads are becoming infeasible
Technology Stack	Oracle technology stack aligned with Mt Sinai's purchase of **Oracle Healthcare Analytics (OHA)** platform	Oracle & SAP tools are expensive, no longer aligned with Mt Sinai's **Epic strategy**

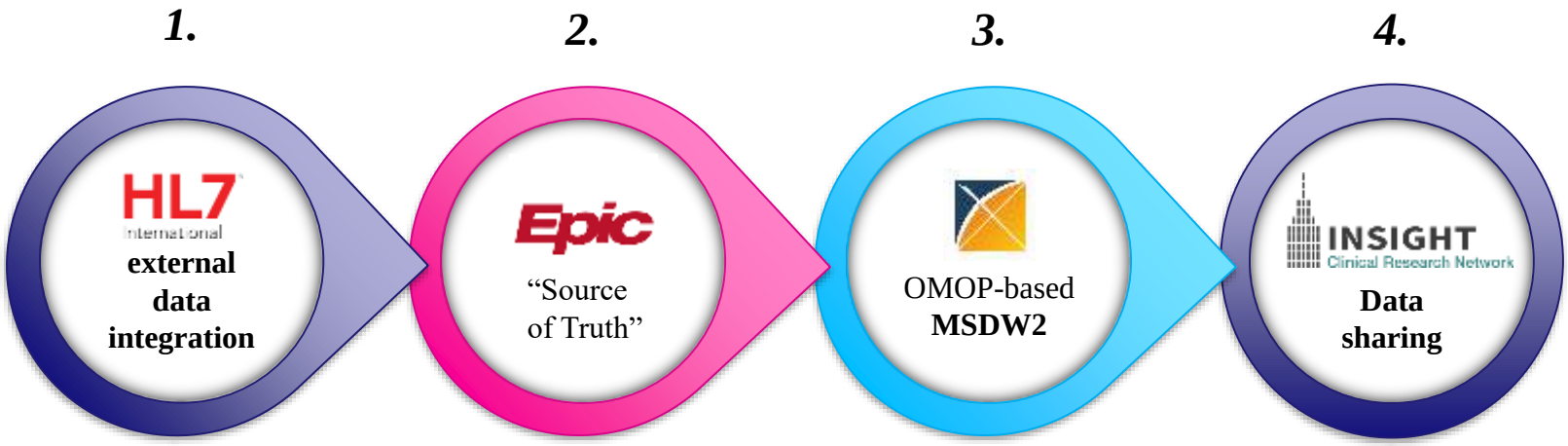
Goals for MSDW2

1. **Improved researcher access & data quality**
   - Self-service query capabilities from OMOP and TriNetX
   - Better integration with other data sets on Minerva
   - Transparency of data lineage & data processing
   - Higher efficiency, quicker data request turnaround

2. **Faster data refreshes**
   - Enable daily incremental updates

3. **Sustainable data infrastructure**
   - Minimize cost of integration, maintenance, data governance

Epic & OMOP-centric Solution for MSDW2



- **Most economical** by leveraging Epic product & IT investment
- **Best solution** to address prior shortcomings
- **Best foundation** on which to build new capabilities

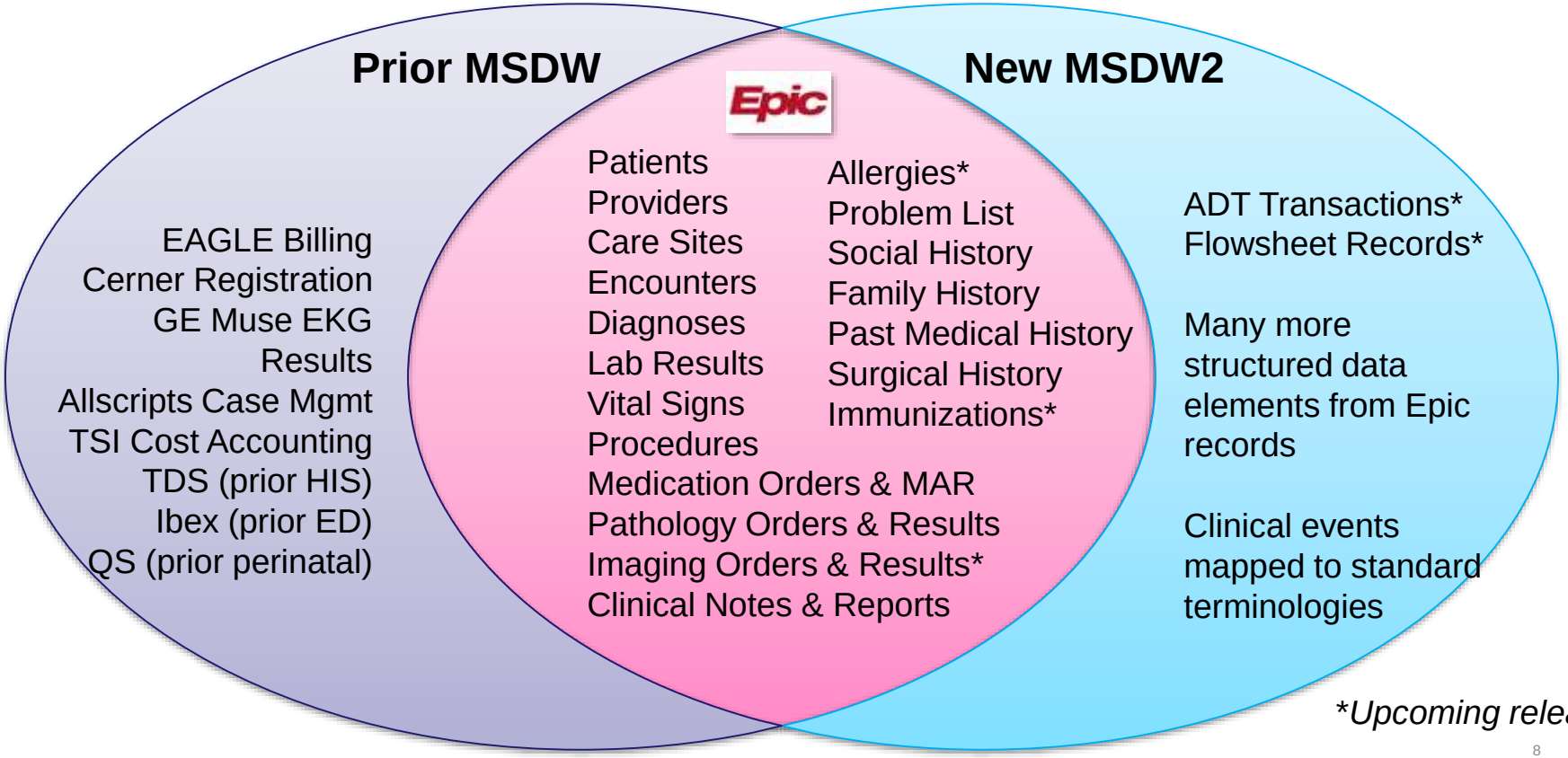
How We're Evolving MSDW

	Legacy MSDW	New MSDW2
Data Sources	Primarily **HL7 messages**; Epic added later	**Epic** as primary data source
Data Model	**Bespoke model** for easy data ingestion, but difficult to query	**OMOP Common Data Model** for standardized structure & content, enables data sharing
Data Pipeline	Original design **no longer supports** daily loads	Restore **daily load** capability, with **full change history**
Technology Stack	Originally aligned with Mt Sinai's purchase of **Oracle Healthcare Analytics (OHA)** platform	Align with **Epic Caboodle** and **Minerva HPC**
Costs	Licenses and labor costs are **unsustainable**	Leverage Mount Sinai's **Epic investment**

Benefits to Mount Sinai

MSDW Evolution	Benefits
Epic as Primary Data Source	• Higher data quality • Transparent data lineage • Access to more data elements
OMOP Common Data Model	• The *de facto* standard data model for research • Standardized structure & content • Vibrant research community & tools • Easier data sharing with research networks
Restore Daily Refreshes	• Faster access to data • Full history of all changes
Change in Technologies	• Lower cost to Mount Sinai • Enable faster development of new features

Gap Analysis: Prior MSDW vs New MSDW2



**Upcoming release*