Leveraging Electronic Health Records for Data Analysis and Reporting

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Agenda

- Overview of electronic health record data
- Electronic health record data at Mount Sinai
- Mount Sinai Data Catalog
- Questions

Introduction to Electronic Health Record Data

- **What is electronic health record (EHR) data?**
  - Data generated using an electronic health record system such as Epic
  - Includes demographic, clinical, operational and financial data captured during patient care

- **Purpose of EHR data in research and operational reporting**:
  - Supports clinical decision-making, operational management, regulatory compliance, and performance analysis
  - Data is used for internal reporting, external reporting to regulatory bodies, and research purposes

Key Types of Electronic Health Record Data

- **Clinical Data**
  - Patient demographics: Age, gender, ethnicity, insurance status
  - Medical history: Diagnoses, chronic conditions, comorbidities
  - Progress notes: Documentation of clinical encounters, treatments, and outcomes
  - Medication data: Current prescriptions, drug interactions, adherence

- **Operational Data**
  - Appointment scheduling: Utilization metrics, wait times, cancellations
  - Clinical workflow: Task completion times, patient flow, staff efficiency

- **Financial Data**
  - Billing and coding: CPT codes, ICD codes, charge data
  - Claims processing: Payment status, claim denials, reimbursements

Types of Data Recorded in Electronic Health Records

Domain	Examples
Demographics	Age, Sex, Race/Ethnicity, Patient address, Vital Status, Insurance
Encounters	Type (Ambulatory, inpatient, ED, etc.), Department, Encounter dates
Diagnosis	Diagnosis description, Diagnosis date
Medications	Orders and administrations, Drug name, Dose, Dates
Lab Tests	Results, Dates
Vitals	Blood pressure, BMI, Temperature, O2 saturation, etc.
Procedures	Radiology studies, Surgeries
Notes	Provider notes, Radiology reports, Pathology Reports

Examples of Using EHR Data for Research and Reporting

Clinical Outcomes Reporting:

Tracking patient progress, treatment success, and recovery times.

Monitoring chronic disease management (e.g., diabetes, hypertension).

Operational Efficiency Metrics:

Patient Flow: Length of stay, patient throughput, wait times.

Resource Utilization: Equipment, room usage, staff allocation.

Quality Improvement:

Data on patient safety, error rates, and adverse events for continuous quality improvement initiatives

EHR Data and Data Analytics

- Data Extraction & Integration
  - Extracting structured and unstructured data (e.g., free-text notes, lab results, medical imaging) from EHR systems for reporting.
  - Integration with Other Systems: Combining EHR data with other healthcare data sources (e.g., billing systems, patient portals) for comprehensive reporting

- Data Cleansing
  - Ensuring data accuracy, completeness, and consistency before generating reports

- Advanced Analytics
  - Predictive analytics to identify trends (e.g., readmission rates, disease progression)
  - Risk stratification for better clinical and operational decisions.

Data Standards and Interoperability

- Data standards
  - Standardized codes ensure consistent reporting internally and externally

Domain	Vocabulary	Content
Conditions	ICD-10-CM	Descriptive diagnoses and codes
Labs	LOINC	Lab orders and results
Medications	RxNorm, ATC	Medications orders and administrations
Procedures	CPT-4	Procedures
Vitals	LOINC	BMI, O2 sat, Pulse, Respiratory Rate, etc.

- Interoperability and data exchange
  - Seamless communication between EHR systems and other health IT platforms (e.g., HIEs (Health Information Exchanges), public health agencies) is critical for holistic data collection and analysis
  - FHIR (Fast Healthcare Interoperability Resources) as a modern standard for exchanging health information.

Electronic Health Record Data at Mount Sinai

Epic is the Primary Source of Electronic Health Record Data at Mount Sinai

Epic Hyperspace
- User interface for Epic
- Where clinical and administrative staff enter data pertaining to patient care in real-time

Epic Chronicles
- Epic's operational database
- Non-relational database allowing for efficient retrieval of data at the point of care
- Optimized for real-time clinical transactions such as placing orders

Epic Clarity
- Epic's SQL-based relational reporting database
- Used for operational reporting, business intelligence and research

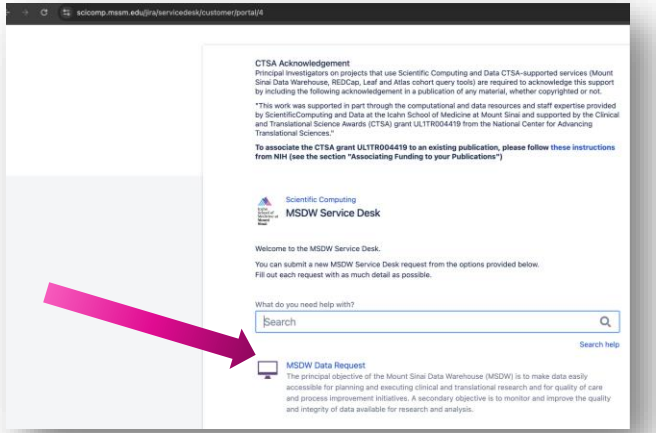
Epic Caboodle
- Epic's enterprise data warehouse
- Optimized for enterprise-wide analytics

Self-Service Query Tools at Mount Sinai

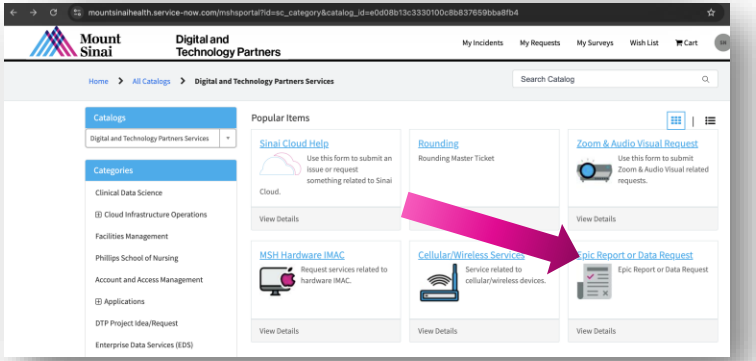
	Leaf	ATLAS	TriNetX	Epic SlicerDicer
Description	Web-based, lightweight drag-and-drop cohort query tool that quickly analyzes population demographics	A web-based cohort query tool for database exploration, standardized vocabulary browsing, cohort definition, and patient cohort-level analysis	A web-based cohort query tool	Embedded in Epic
Access	Use your Mount Sinai network username/password to login.	Use your Mount Sinai network username/password to login	Log in to the TriNetX system using your email address and password.	Epic access request via ServiceNow
Training	Written Tutorial; PEAK Tutorial	Written Tutorial; PEAK Tutorial; Videos	PEAK Tutorial	PEAK Tutorial
Advantages	Can visualize demographic details of cohorts, drag-and-drop query feature; download de-identified patient cohort list	Utilizes common data model and queries	Offers a polished, commercially developed user interface	Offers a polished, commercially developed user interface

Accessing Epic Electronic Health Record Data at Mount Sinai

- **Mount Sinai Data Warehouse**
  - Service providing electronic health record data for Mount Sinai researchers
  - Provides curated data sets for clinical research and analytics including cohort identification and retrospective studies
  - Submit a ticket via Link for MSDW Data Requests



- **Epic Reporting Team**
  - Supports operational and business intelligence reporting
  - Provides data for hospital administration and business intelligence
  - Use ServiceNow for data requests Epic Reporting or Data Requests



Mount Sinai Data Catalog

The Mount Sinai Data Catalog: Streamlining Data Access, Collaboration and Innovation

- **The Mount Sinai Data Catalog** is a user-friendly platform that centralizes and simplifies access to metadata for data sets and data resources within the Mount Sinai Health System

  - **Centralized repository** – A hub for discovering the diverse data sets available at Mount Sinai
  - **Searchable metadata** – Easily find data sets, along with essentials details and contact information

- **Key benefits**
  - Enhanced data set discovery across departments
  - Facilitates cross-department collaboration and data sharing
  - Enables more efficient access to critical data, driving innovation

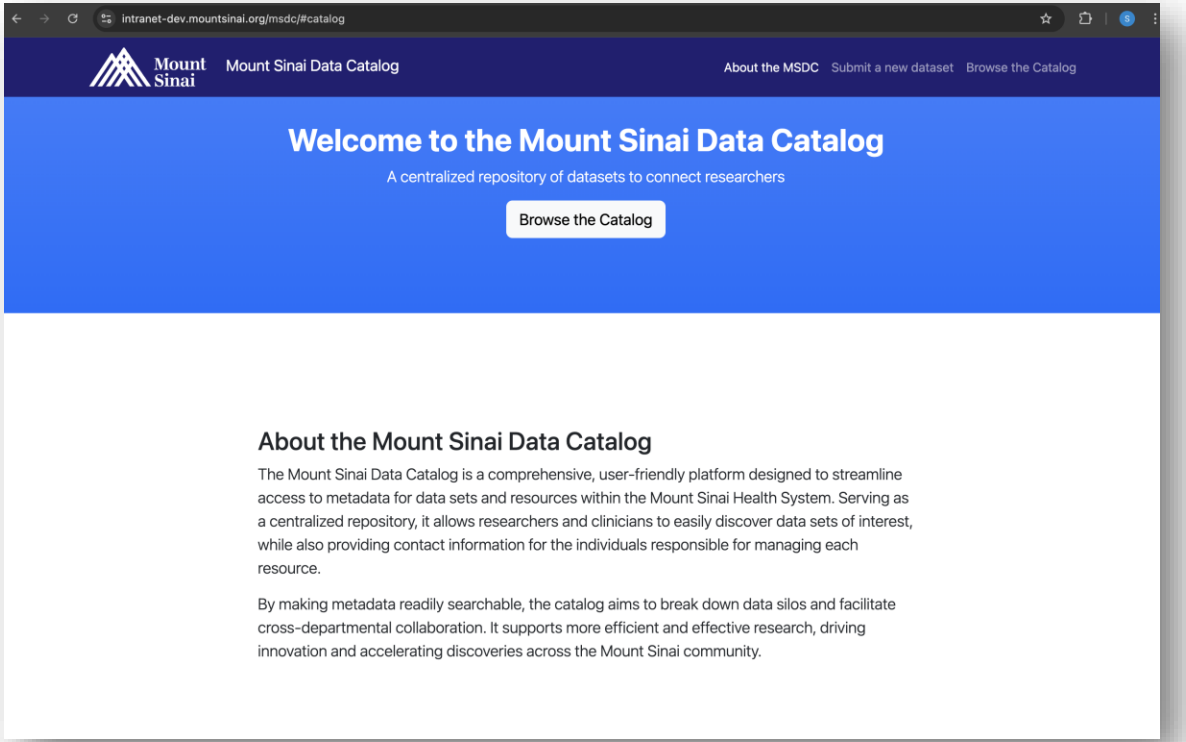
Features of Version 1.0

- **Web-based application**
  - A user-friendly, web-based platform hosted on the Mount Sinai intranet for easy access by all Mount Sinai researchers and clinicians

- **Metadata collection**
  - Metadata is gathered via a REDCap survey and displayed directly on the Data Catalog webpage, ensuring accurate and up-to-date information

- **Current contents**
  - The current iteration includes metadata on 30 datasets, covering a wide range of data types:
    - Clinical
    - Omics data
    - Claims
    - Imaging

Explore the Mount Sinai Data Catalog on the Intranet

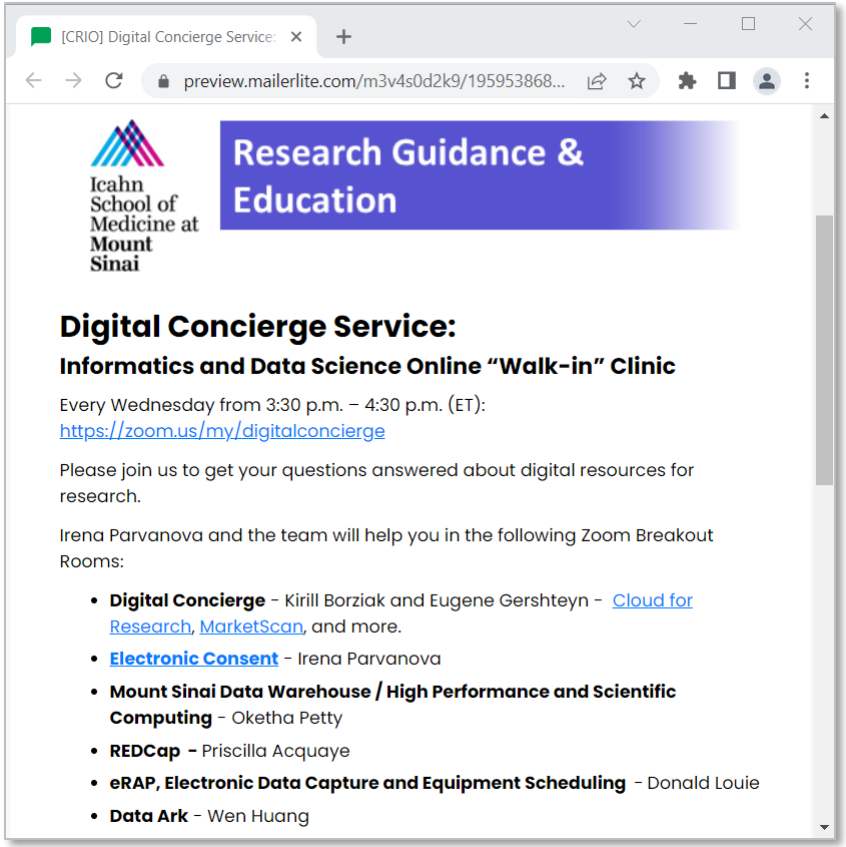
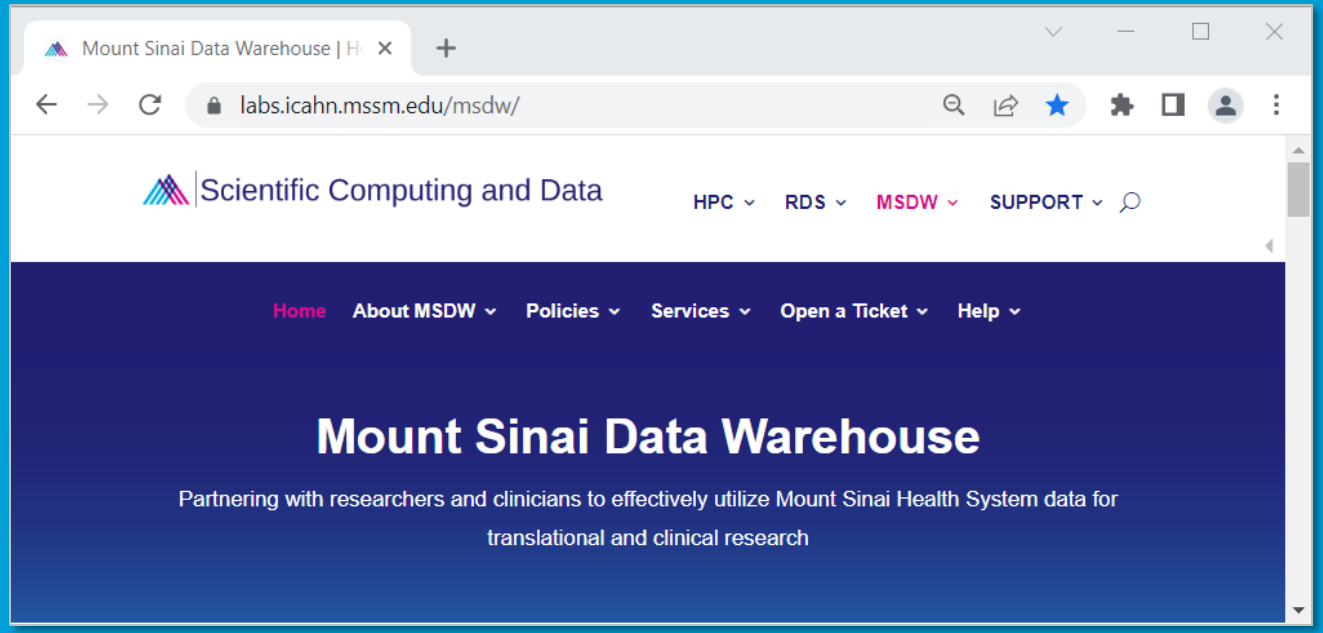


https://intranet1.mountsinai.org/msdc/

How to Contact Us

Digital Concierge – Walk in Clinic

- "Walk-in" **Digital Concierge** service hosted by the MSDW team **every Wednesday from 3:30 PM to 4:30 PM**
- Reminder notifications sent by the ORS team every week



Thank You!
For help and more information:
https://labs.icahn.mssm.edu/msdw