Identifying Frequent ED Users through HIE: Corresponding Impact on Case Management

Session 254, March 8, 2018

Jason Shapiro, MD, FACEP
Professor, Dept. of Emergency Medicine, Icahn School of Medicine at Mount Sinai
Tom Moore, Vice President of Innovation, Healthix

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Conflict of Interest

Mount Sinai

Jason Shapiro, MD, FACEP
Professor, Dept. of Emergency Medicine
Icahn School of Medicine at Mount Sinai

Healthix

Tom Moore
Vice President of Innovation
Healthix

No real or apparent conflicts of interest to report.

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Agenda

- Overview of Mount Sinai and Healthix HIE
- Use Cases of HIE
- Clinical Event Notifications: Frequent ED Notifications
- Research Findings
- Technical Overview: Infrastructure, Workflow
- Challenges: NonTechnical and Technical
- The Future of Clinical Notifications

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Learning Objectives

- Describe how a Health Information Exchange (HIE) can be leveraged to increase identification and enrollment of frequent Emergency Department (ED) patients in case management, to reduce ED visits and improve care
- Explain the methodology used in this research, including the role of HIE, and how this methodology can be replicated in other communities (urban, suburban, rural)
- Differentiate how a community-wide data set from an HIE improved the ability to identify frequent ED users, when compared with single-site EHR data
- Discuss how New York State consent policies are managed when working with HIE and community-wide data

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Mount Sinai Healthcare

- An integrated healthcare system
- Serves New York City Metro Area
- 7 hospitals
- 6 Emergency Departments (EDs)
- ED Visits*: 454,399

Healthix

- A public health information exchange (HIE)
- Serves NYC and Long Island
- 63 hospitals
- 43 Emergency Departments (EDs)
- ED Visits*: 3,059,406

* Represents yearly totals in 2016

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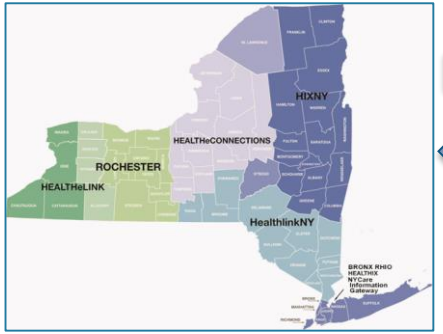
How the HIE Works

Statewide Health Information Network of New York (NY RHIOs)



HEALTHIX

CARE COORDINATION
TREATMENT
QUALITY IMPROVEMENT
16 MILLION PATIENTS

Receiving/sending information 24/7 with each patient encounter

PRIVATE HIEs

PRIVATE HIEs:
- Health Plans
- Large Provider Systems
- PPS
- Pharmacies
- More…

550 Participants ~ 4,400 Sites

Includes: Hospitals, Skilled Nursing Facilities, Labs, Imaging and More

HIE Primary Use Case

- Motivated creation of HIE
- Individual clinician looking up data on an individual patient

- medications
- labs
- radiology images
- procedures
- allergies
- encounters…

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HIE Primary Use Case

- For the first time a "community-wide" real-time clinical data set
- New data layer provides significant opportunities for secondary use cases

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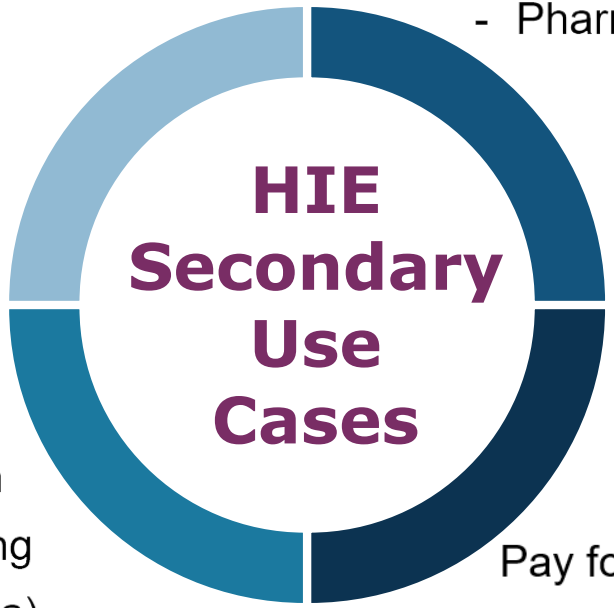
RESEARCH

- Cohort ID
- Retrospective analyses

PUBLIC HEALTH

- Lab reporting
- Clinician reporting
- Public health investigation
- Clinical care in public health
- Pop level – quality monitoring
- Mass casualty event (Katrina)
- Disaster response (9-11)
- PH alerting at patient & population level
- Biosurveillance



INDUSTRY

- Pharmacovigilance (stage 4 trials)
- Clinical trials enrollment

QUALITY REPORTING & POPULATION HEALTH

- Provider Level:
Pay for Performance, 72hr ED return
- Organization Level:
QA, Present on adm, Core Measures
- Patient Level: chronic disease mgmt/CEN
- Clinical Event Notifications (CEN)

Clinical Event Notifications

Subscription-based

- Based on a list or panel of patients provided to the HIE by the provider organization
- HIE monitors for trigger events
- Typical examples are ED admissions or hospital inpatient admissions and discharges

Analytic-based

- Based on rules (inclusion/exclusion criteria) determine the cohort of patients on whom notifications should be sent
- HIE performs analytics to determine if/when alert is fired
- Examples include frequent ED users, duplicate testing, 30 day readmissions, early ED returns

Frequent ED Notifications

Frequent Emergency Department Visitor

≥ 4 visits per year

21-28%

of Visits

- ubstance abuse issues
- d more complex conditions
- nd have higher mortality
- Incur higher costs
- Often do not limit themselves to a single institution

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Patient Crossover at Different Sites

Number of Sites Visited	# of Patients
1	25,187,992
2	11,766,258
3	7,001,146
4	4,756,632
5-10	8,949,805
11-20	634,432
21-30	8,933
31-40	598
41-50	68
51	1
TOTAL	25,187,922

Research Rationale

- Frequent ED users often visit multiple EDs in a region
- ED case managers may not be aware of a patient's visits to other organizations
- Each ED visit is an opportunity to use case management programs
- HIE may increase identification of frequent ED users by providing a community-wide data set across hospitals

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Research

Objective

Improve identification and enrollment of frequent ED patients in an ongoing case management program

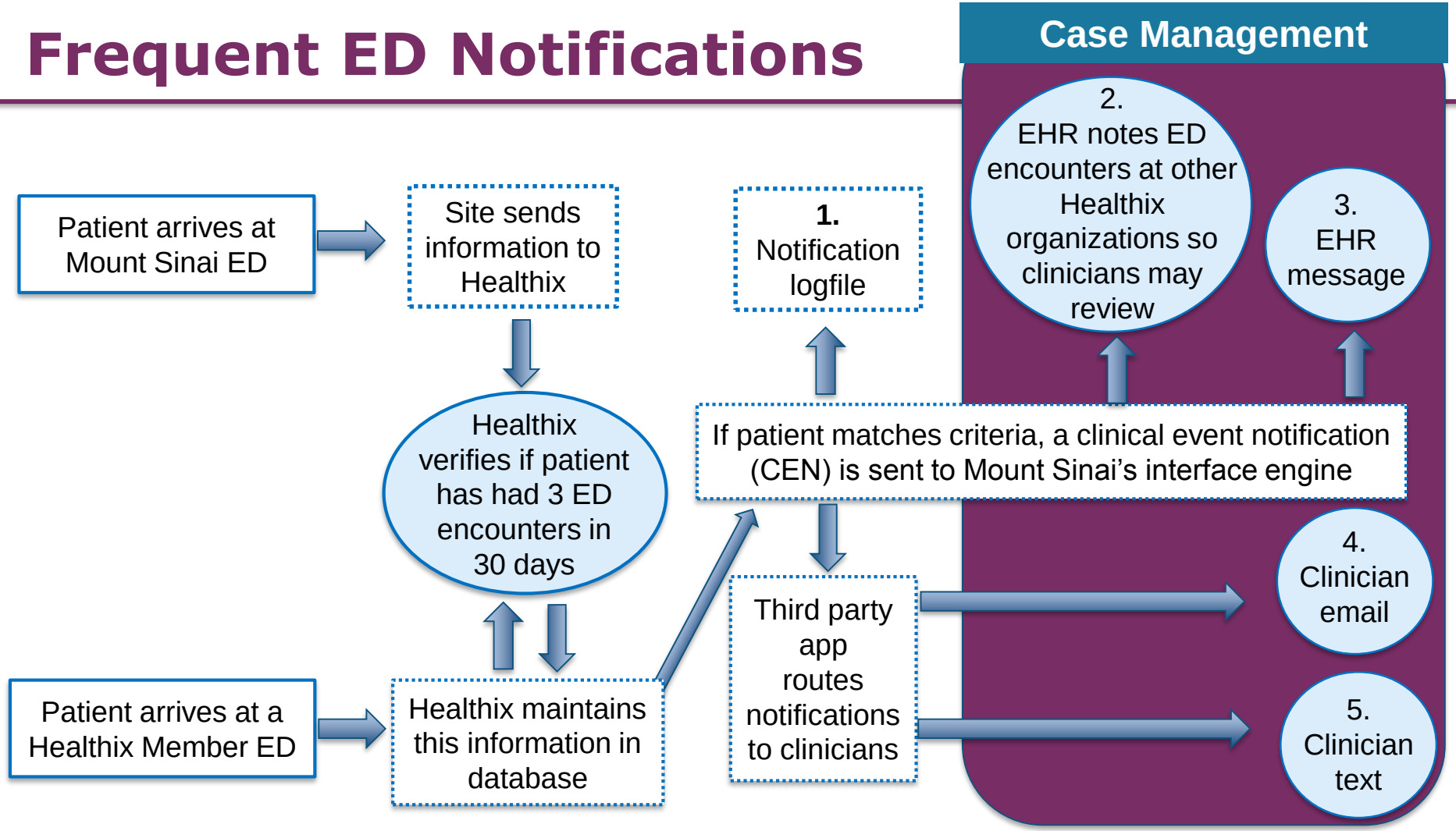
- Designed to reduce ED visits using automatic, real-time, community-wide HIE notifications for frequent ED users across 41 EDs

Methods

Compared HIE notifications to Mount Sinai EHR report (≥ 3 ED visits per month for 90 days)

- Patients identified through the EHR report were targeted for enrollment during future visits
  - Enrollment (8am-8pm) 7 days a week
  - Notifications received outside these hours were not addressed

Frequent ED Notifications



Research Results

	PILOT		ENROLLMENT	
	Frequent ED Users Identification	Enrolled in Case Mgmt	Frequent ED Users Identification	Enrolled in Case Mgmt
Healthix Notifications	**1,020**	**--**	**343**	**16**
Mount Sinai EHR Report Only	**786**	**--**	**89**	**3**
	Timeframe: 7.13.16 to 10.22.16		Timeframe: 10.23.16 to 11.20.16	

Please Note: This research was first presented at the Society for Academic Emergency Medicine (SAEM) May 18, 2017

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Research Conclusions

- Healthix notifications leverage data across multiple hospitals identified a substantially higher number of frequent ED users in the Pilot and Enrollment periods (30% and 34% more respectively)
- There was improved case management enrollment of frequent ED users with 16/343 (4.66%) enrolled through Healthix notifications vs. 3/89 (3.37%) enrolled through the Mount Sinai EHR-based report – a 38.4% relative increase

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Broader Integration of Frequent ED Notifications

- Mount Sinai is integrating the Frequent ED Notifications into a new and broader case management program

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The Technical Story

Tom Moore

Vice President of Innovation

Healthix

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Technical Overview: Infrastructure

Healthix is an HIE with more than 200 interfaces from 63 hospitals and others

HEALTHIX

CARE COORDINATION
TREATMENT
QUALITY IMPROVEMENT
16 MILLION PATIENTS

- **MPI Locator**
- **Clinical Data in Federated Edge Servers**
- **Encounter Database**

PRIVATE HIEs

PRIVATE HIEs:
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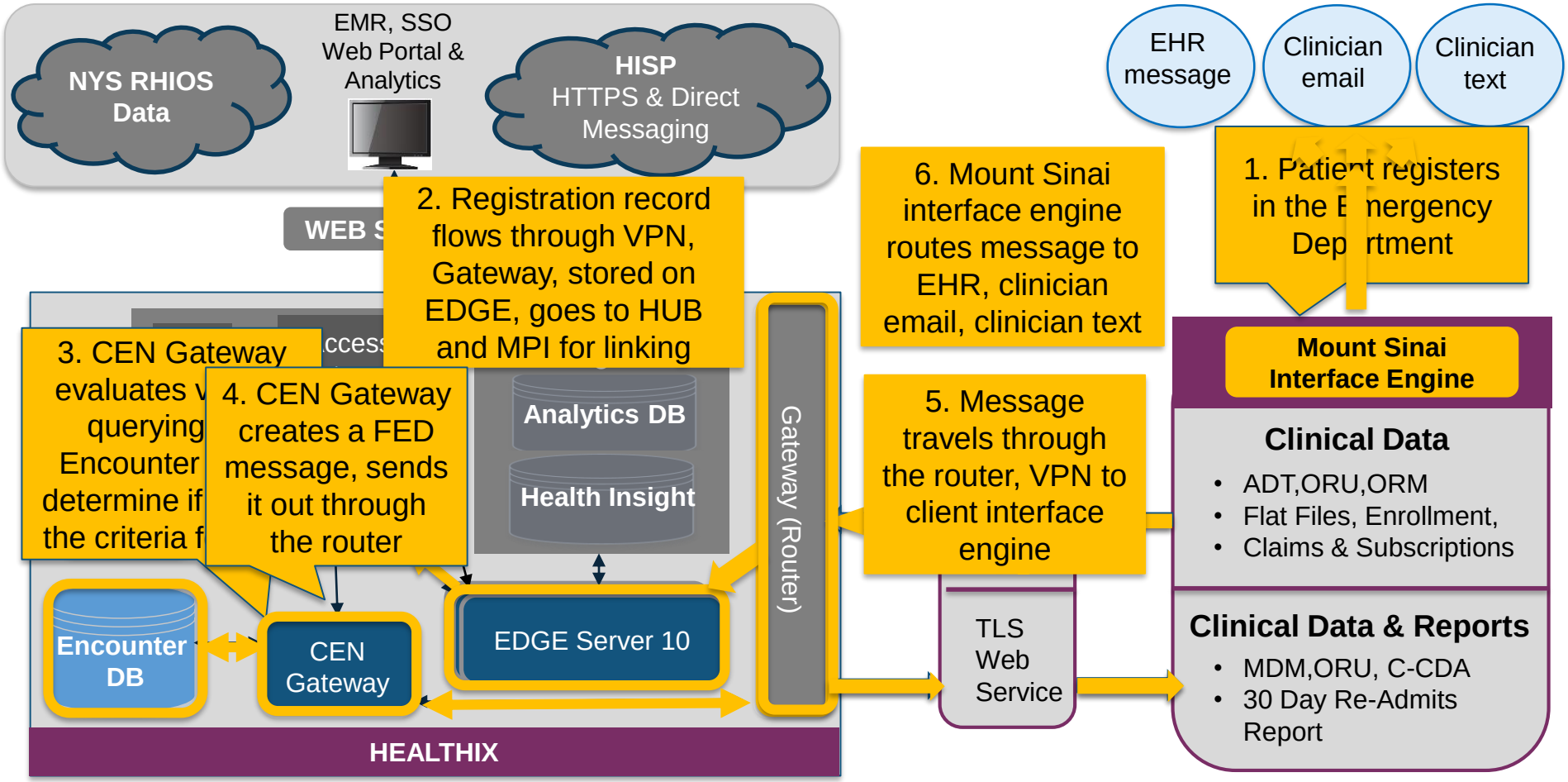

Challenges

NonTechnical

- **Patient Consent:**
  New York State requirements and evolution of consent policy around ED notifications
- **Workflow:**
  The “Final Mile”

Technical

- **Unprecedented Volume of Data:**
  - Over 55M message per month
  - 904,646 CENs in Oct’ 17
  - Constantly trying to expand capacity
  - Volume can create latency in ADT feeds and Encounter DB
- **Time Boundaries:**
  ED discharge dates are not reliable for measuring time between ED visits

Moving Forward

Clinical Facility patient
Listen for any patient
who has been for
specific criteria
or presents

Future

We will proactively notify a Clinical Facility when a patient is in crisis, based on a more complex set of circumstances:

- Finding patients lost to care
- Patients with severe and persistent mental illness unsuccessfully discharged from clinics
- Extend to other chronic diseases
- Significant change in lab result (spikes unexpectedly, exceeds threshold)

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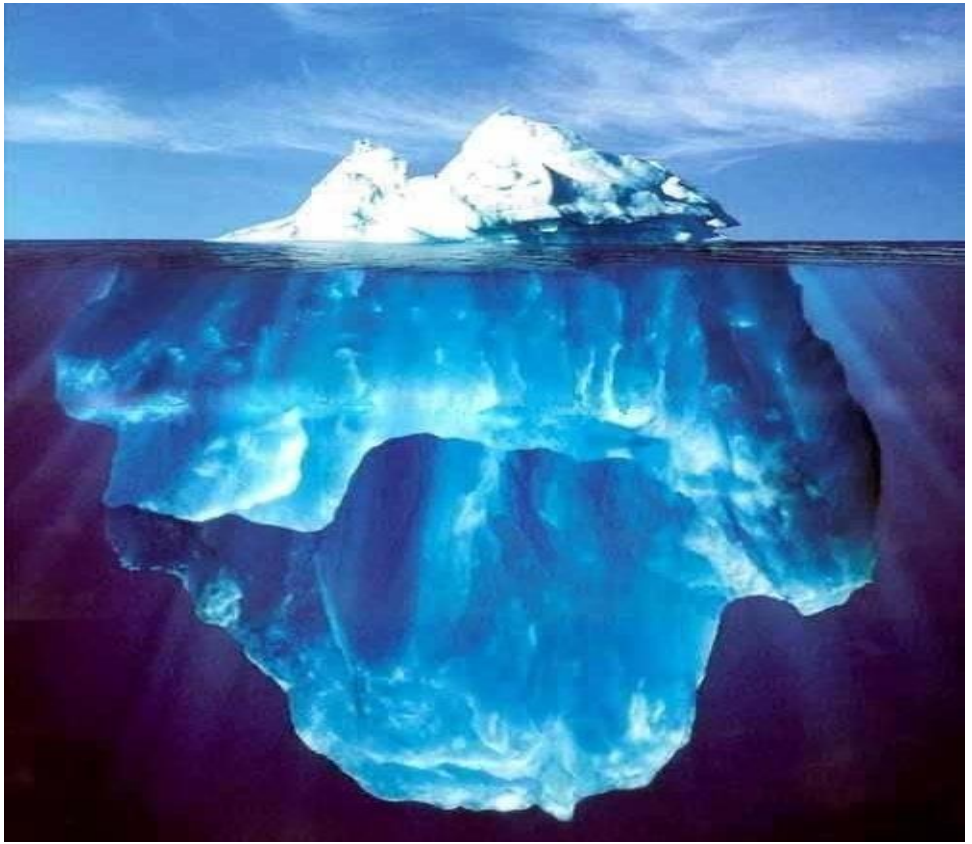
Future Possibilities:

We have just begun to explore the possibilities of analytic notifications



Questions

Mount Sinai

Jason Shapiro, MD, FACEP
Professor
Dept. of Emergency Medicine
Icahn School of Medicine at Mount Sinai
Jason.Shapiro@mountsinai.org

Healthix

Tom Moore
Vice President of Innovation
Healthix
TMoore@healthix.org

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