Patient Experience Data Optimizes Utilization of Data Lakes
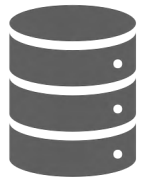
November 2021

AGENDA

Learning Objectives

Key Learning Objectives For Today

Discuss current challenges for hospitals and health systems in managing data

Describe current and future regulations impacting utilization of healthcare data

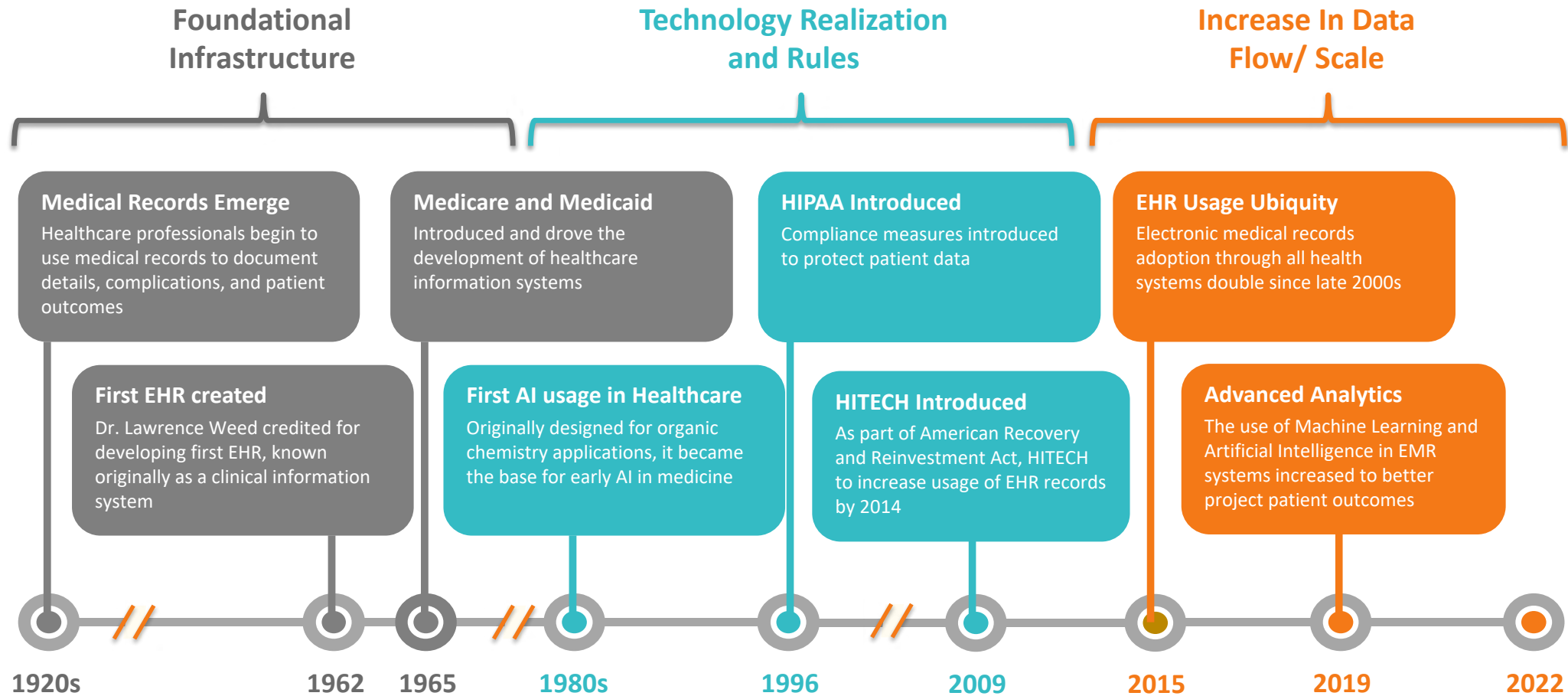Define Data Lakes using examples from AWS, MS Azure to describe key components of data management

Propose for class discussion how to include patient experience data as an essential layer to address long term gaps in care

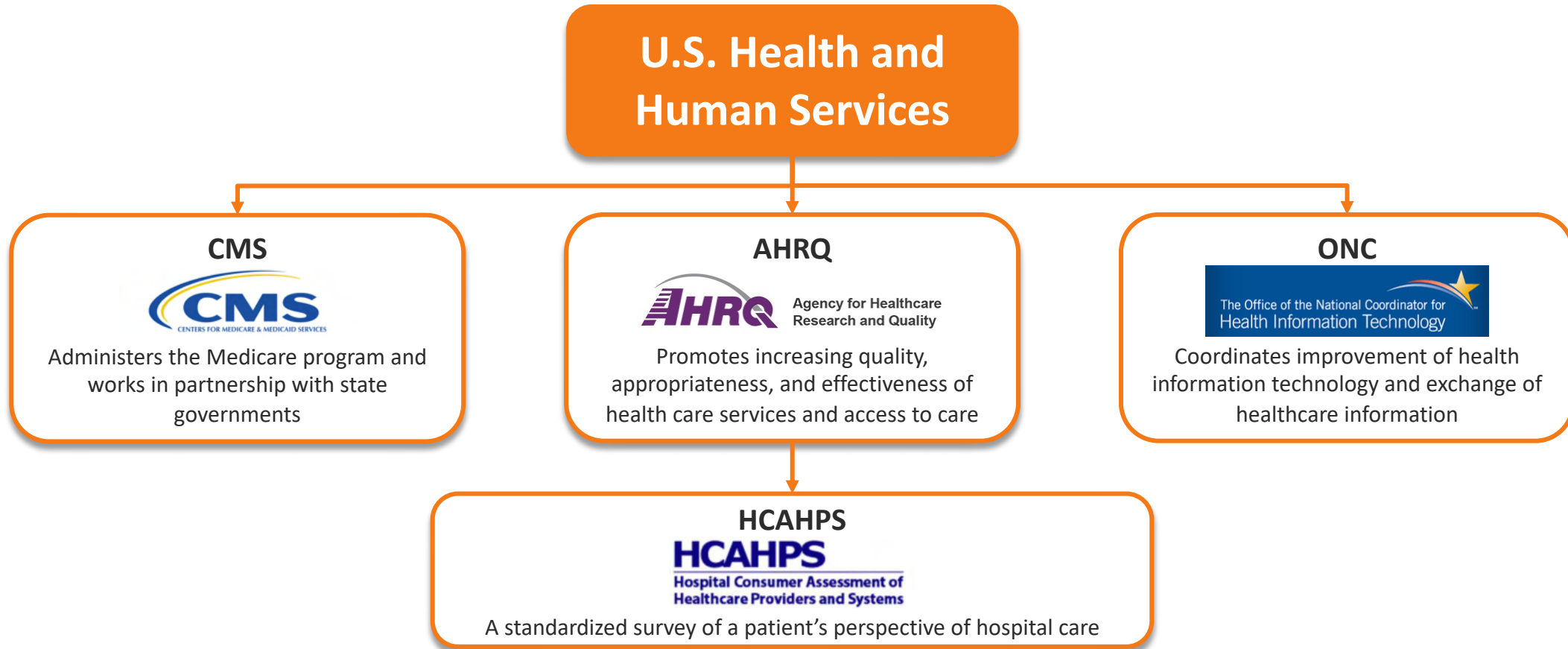# Current Regulation Of Healthcare Data

Timeline Of Healthcare Data Evolution

Three key phases of healthcare data evolution

Foundational Infrastructure

Technology Realization and Rules

Increase In Data Flow/ Scale

Medical Records Emerge
Healthcare professionals begin to use medical records to document details, complications, and patient outcomes

Medicare and Medicaid
Introduced and drove the development of healthcare information systems

HIPAA Introduced
Compliance measures introduced to protect patient data

EHR Usage Ubiquity
Electronic medical records adoption through all health systems double since late 2000s

First EHR created
Dr. Lawrence Weed credited for developing first EHR, known originally as a clinical information system

First AI usage in Healthcare
Originally designed for organic chemistry applications, it became the base for early AI in medicine

HITECH Introduced
As part of American Recovery and Reinvestment Act, HITECH to increase usage of EHR records by 2014

Advanced Analytics
The use of Machine Learning and Artificial Intelligence in EMR systems increased to better project patient outcomes

1920s **1962** **1965** **1980s** **1996** **2009** **2015** **2019** **2022**

Governing Bodies In Healthcare

Three governing bodies for healthcare data under HHS

U.S. Health and Human Services

CMS

Administers the Medicare program and works in partnership with state governments

AHRQ

Agency for Healthcare Research and Quality

Promotes increasing quality, appropriateness, and effectiveness of health care services and access to care

ONC

The Office of the National Coordinator for Health Information Technology

Coordinates improvement of health information technology and exchange of healthcare information

HCAHPS

HCAHPS
Hospital Consumer Assessment of Healthcare Providers and Systems

A standardized survey of a patient's perspective of hospital care

Office of the National Coordinator Manages Interoperability

ONC creates regulations for sharing of information in compliance with HIPAA and privacy rules

Specifically, ONC has launched critical interoperability standards:

- Fast Healthcare Interoperability Resources (FHIR)

- United States Core Data for Interoperability (USCDI)

- HL7
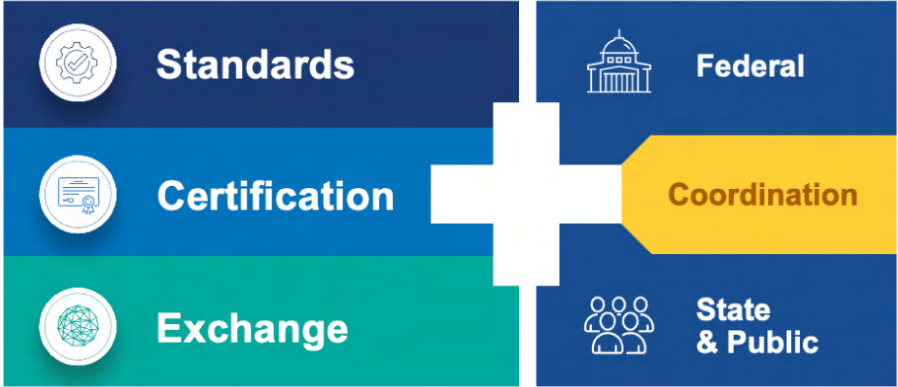
HCAHPS

- HCAHPS is a 29-question survey focused on hospital experience in a quantitative manner

- **Composite Topics:**
  - Nurse/Doctor communication
  - Responsiveness of staff
  - Pharmacy communication
  - Discharge information
  - Care transition
- **Individual Topics:**
  - Cleanliness
  - Quietness
- **Global Topics:**
  - Overall rating
  - Willingness to recommend

Patient survey data from HCAHPS are used to determine a star rating on each topic area

HCAHPS And Human Centered Design

The VA created a key list of pain points in the overall patient experience

Applying Human Centered Design using HCAHPS allowed VA to address declining ratings
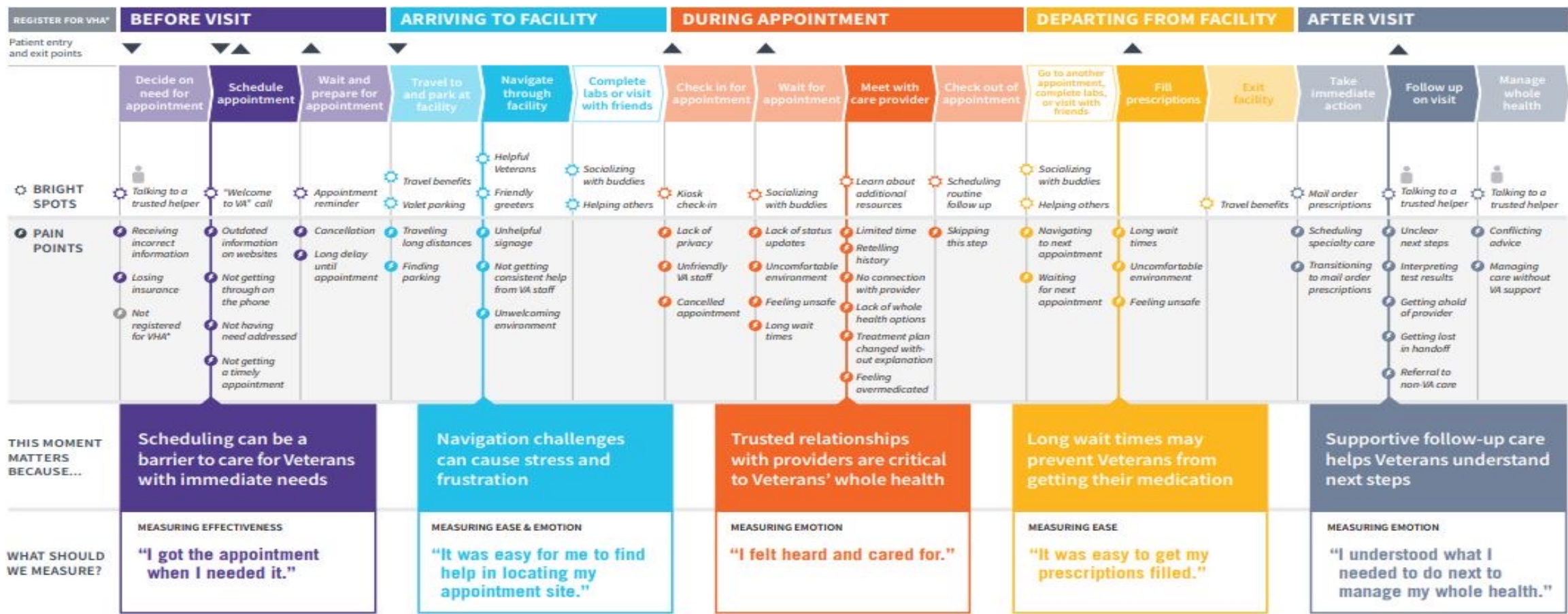
Incorporating Experience Improves Metrics

VA used HCAHPS on their patient journey to develop toolkits that improved feedback

Improvement On Communication With Nurses

Percent of VA Hospitals

	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
VA 2018	7	23	50	17	3
VA 2020	2	10	30	49	9

-40%
+188%
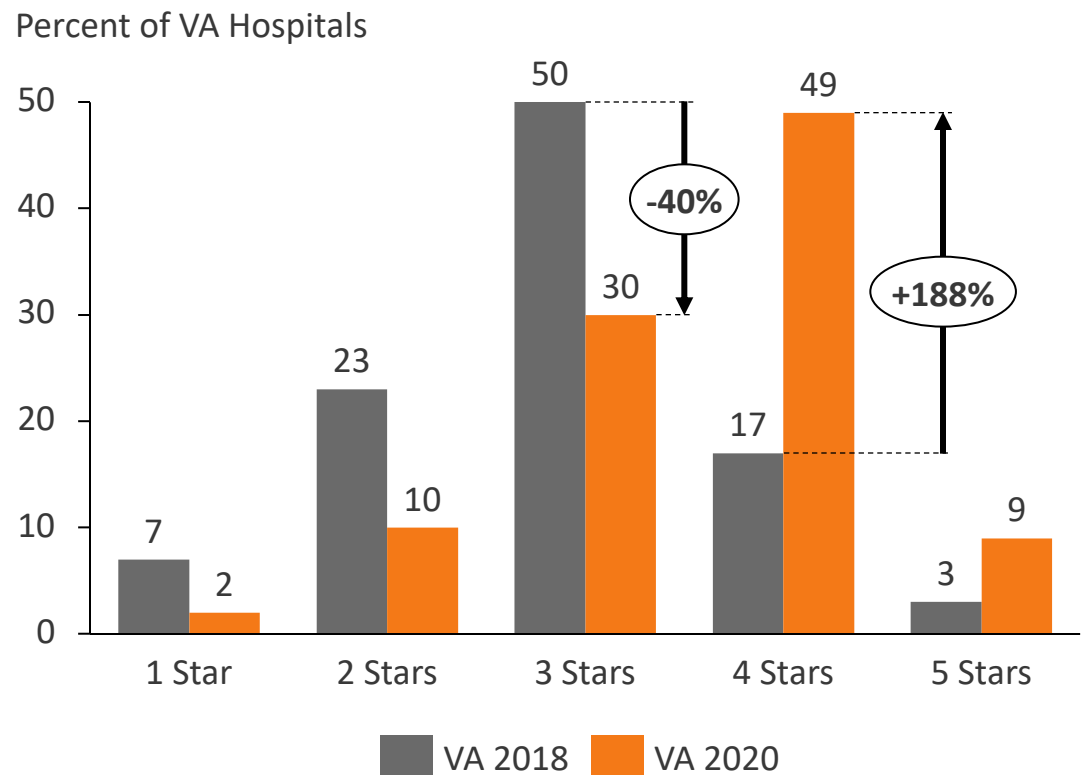
Improvement On Overall Hospital Ratings

Percent of VA Hospitals

	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
VA 2018	1	20	43	31	5
VA 2020	1	8	39	41	12

-9%
+32%
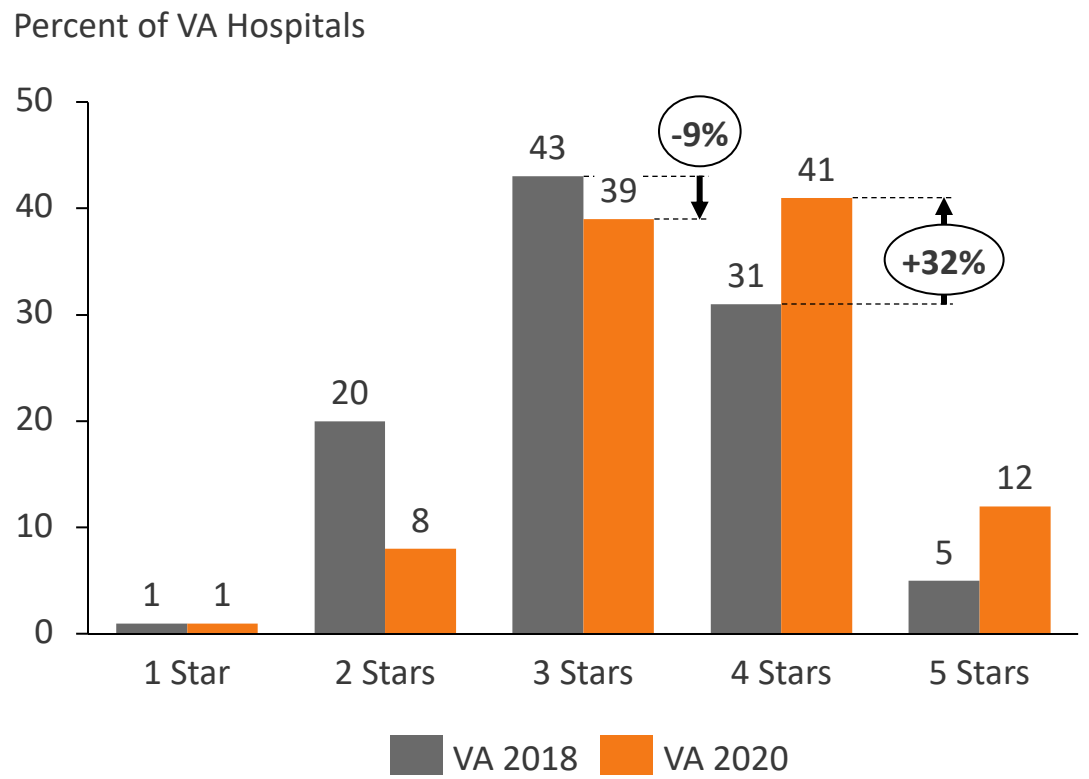
Discussion

VA used standardized measures from HCAHPS to improve key pain points.

Why were their interventions successful in changing the particular metrics on communication with nurses?

Why did success on key pain points not extend to the overall hospital rating?

Evolving Regulations on Data

Providers Are Facing Government Mandated Data Changes

Cures Act and others have impacted consumer-centered healthcare

In the last 10 years, the Cures Act, the Federal Health IT Strategic Plan, the 2015–24 Nationwide Interoperability Roadmap, and the ONC have mandated a shift to consumer-centered healthcare in four key areas:

Providing patients capabilities to access a full, longitudinal set of electronic health information across providers that can be a growing information set

Directing providers to transmit copies of that information wherever the patient finds it useful

Requiring standardized Fast Healthcare Interoperability Resources (FHIR) APIs so that patients and providers can access and use structured data

Requiring providers to integrate the data to receive payment under the Promoting Interoperability Program

In The Meantime, Providers Are Becoming More Integrated

Integrated care requires a greater focus on the patient experience

Less Integrated or Organized Systems · More Integrated or Organized Systems

Patient Experience Matters

| Single MDs; small groups; single hospitals | Independent Physician Associations; single specialty groups; hospital chains | Hospital staffs; some university/ faculty practices | Multispecialty group practices, Ambulatory Surgery Centers | Clinically integrated delivery systems | Clinically and financially integrated systems |

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Providers are highly specialized, and patients need to go to them

Providers have a common experience for their patients but often focused on efficiency

The provider is financially incentivized to give you a better outcome

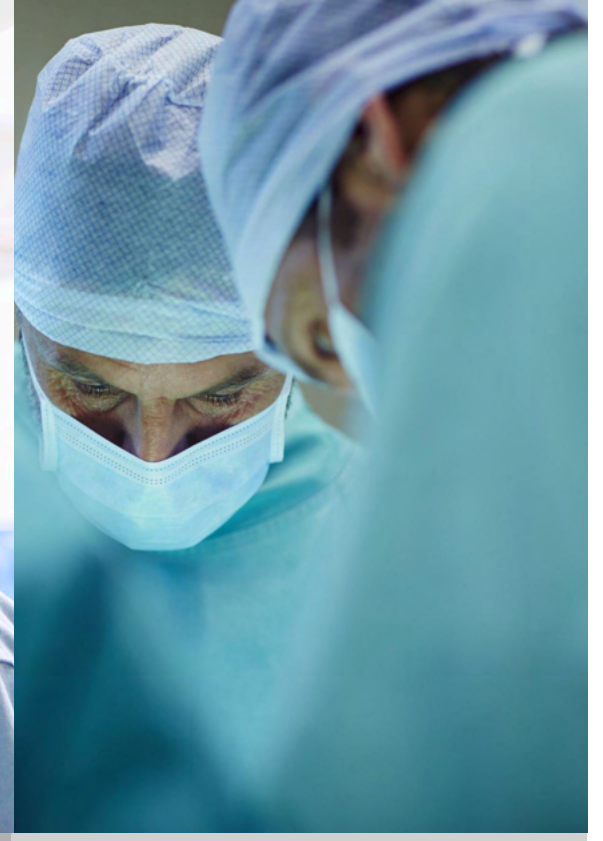# Integrated Providers Seek To Stay Ahead Of Major Changes Impacting Care

Digital Transformation

Workforce Resiliency

Managing COVID-19 Impact

Service Line Efficiency

>50% Of Doctors And Patients Want More Connected Experiences

In digital transformation, the role of the Internet of Things (IoT) is emerging

Consumer experiences are bleeding into expectations for efficient and personalized healthcare from both the providers and patients' perspectives

66% of doctors believe increasing use of digital data can reduce costs and burden on the healthcare system

64% of doctors believe use of digital engagement can reduce the burden on themselves and on nurses

Connected Health Trust Circle

74% of patients think sharing information about lifestyle helps providers deliver better care

Care

55% of patients would share digital information if it reduced costs

Costs

50% of patients are comfortable contacting their provider digitally

Comfort
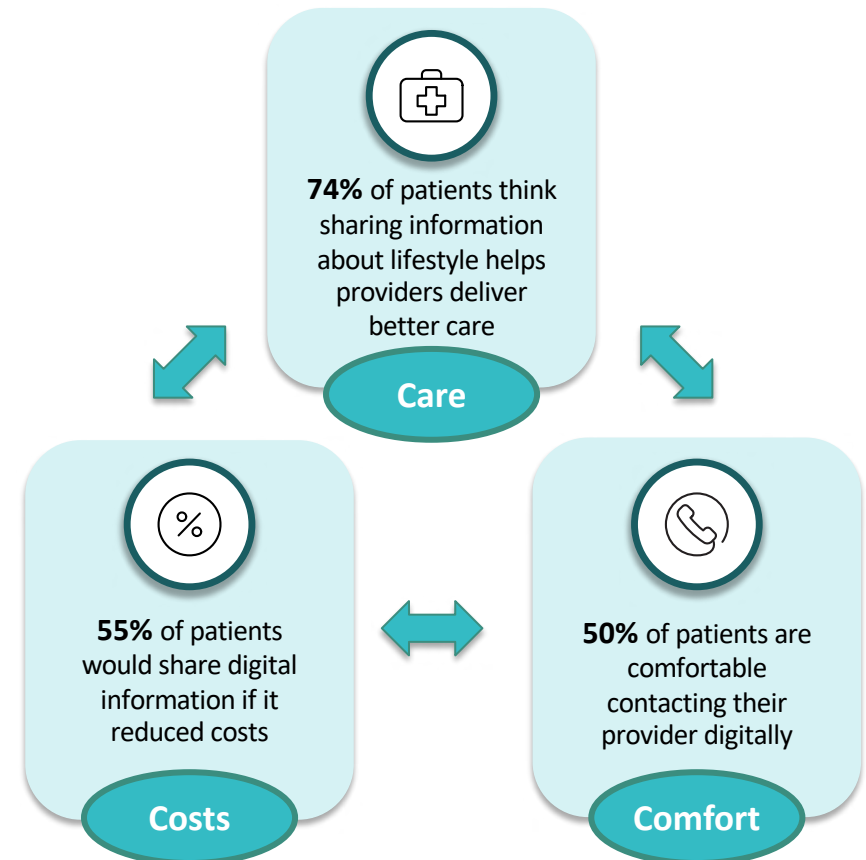
By 2023, HHS Expects Patient Engagement To Be Data-driven

Goals of HHS demonstrate that they want to see improvement of care through data

Today   **2023**

Current Data

Data that learns
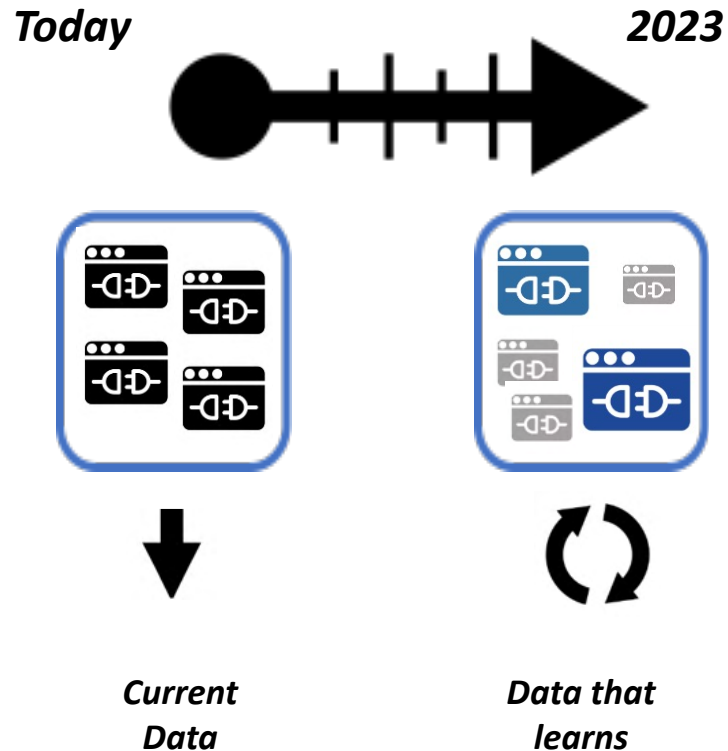
ONC wants organizations to prioritize APIs and utilize them to improve care

- Optimity believes that each organization can create its own unique *Optimizing Data Lake*
- Through an *Optimizing Data Lake* prioritized data leads care improvement
- Organizations can focus on the most important data streams for to achieve ONC metrics

Organizations at different starting points, requiring unique strategies for how to meet demands of ONC and other guidelines

Storage Options For Healthcare Data

How Can Health Data Be Stored Today

Level Of Data Organization

Least Structured ← → Most Structured
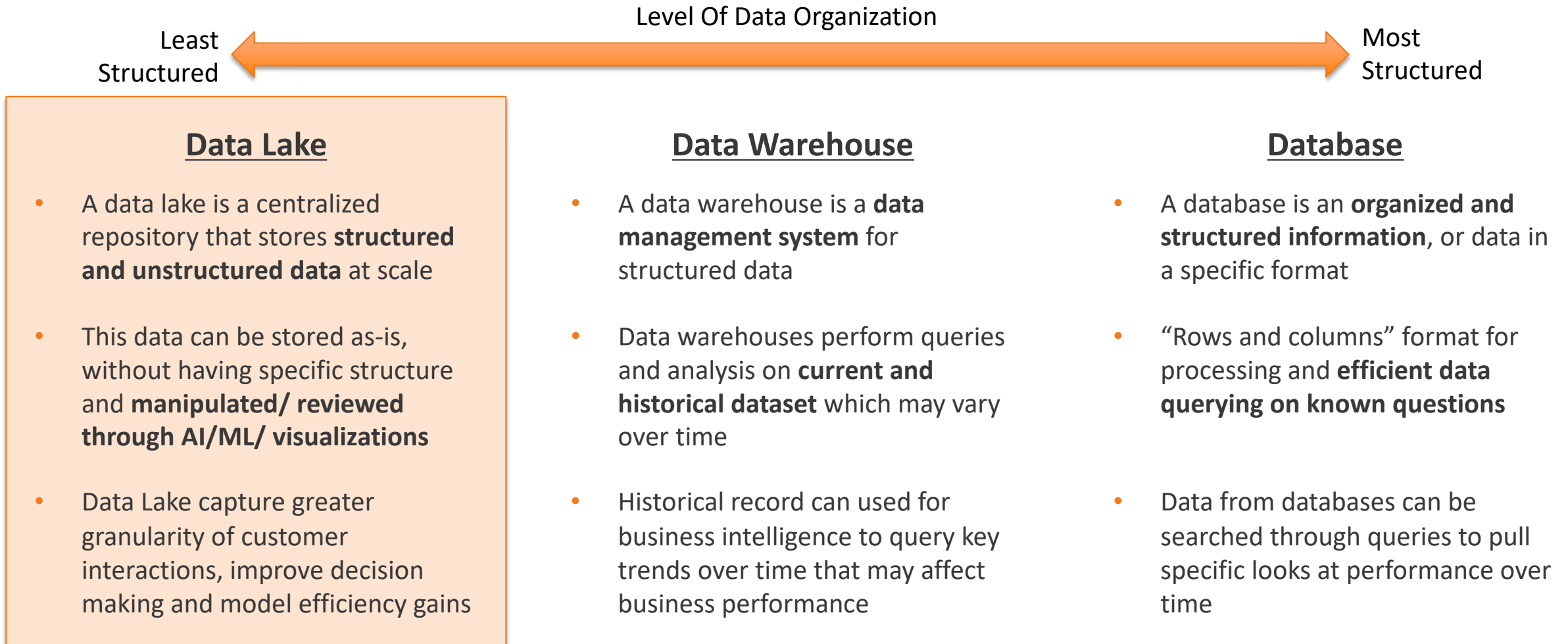
Data Lake

- A data lake is a centralized repository that stores **structured and unstructured data** at scale

- This data can be stored as-is, without having specific structure and **manipulated/ reviewed through AI/ML/ visualizations**

- Data Lake capture greater granularity of customer interactions, improve decision making and model efficiency gains

Data Warehouse

- A data warehouse is a **data management system** for structured data

- Data warehouses perform queries and analysis on **current and historical dataset** which may vary over time

- Historical record can used for business intelligence to query key trends over time that may affect business performance

Database

- A database is an **organized and structured information**, or data in a specific format

- "Rows and columns" format for processing and **efficient data querying on known questions**

- Data from databases can be searched through queries to pull specific looks at performance over time
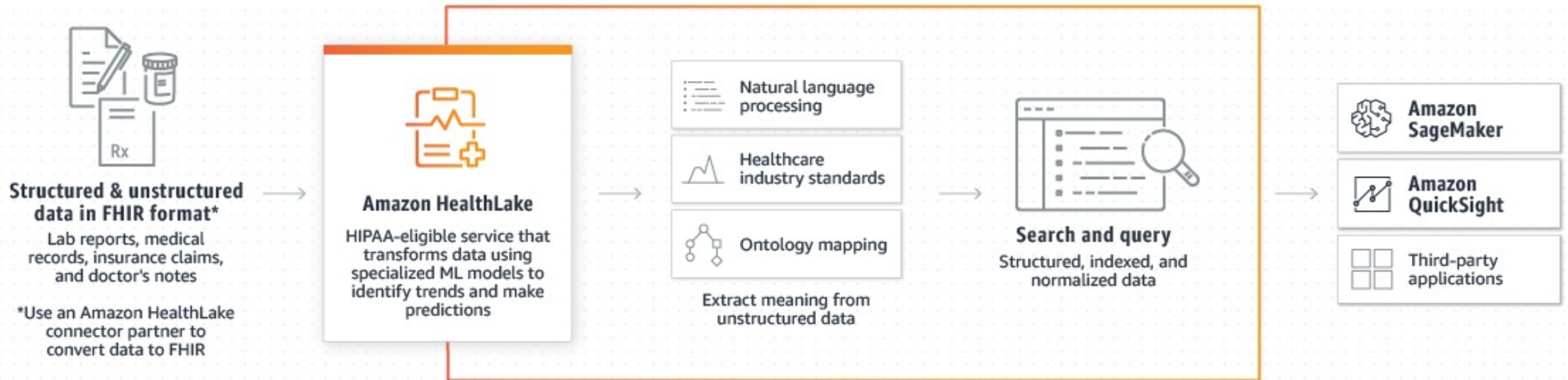
The Healthcare Data Lake

AWS Healthlake® Data Lake flows and rules allows analytics across structured/ unstructured data

- Data Lakes enable multiple data connection between structured and unstructured data sets such as:
  - Clinician notes
  - Images (X-Ray, MRI, photos)
  - Wearable devices
  - Devices used outside of the hospital for home monitoring

Structured & unstructured data in FHIR format*
Lab reports, medical records, insurance claims, and doctor's notes

*Use an Amazon HealthLake connector partner to convert data to FHIR

Amazon HealthLake
HIPAA-eligible service that transforms data using specialized ML models to identify trends and make predictions

Natural language processing

Healthcare industry standards

Ontology mapping

Extract meaning from unstructured data

Search and query
Structured, indexed, and normalized data

Amazon SageMaker

Amazon QuickSight

Third-party applications

Data Lake Storage Scales Well Beyond Hospitals

Microsoft Azure® published the desire to create consortium data to improve patient experience

Using the Azure Data Lake across different members, Microsoft creates a member data store that enables sharing across providers for:
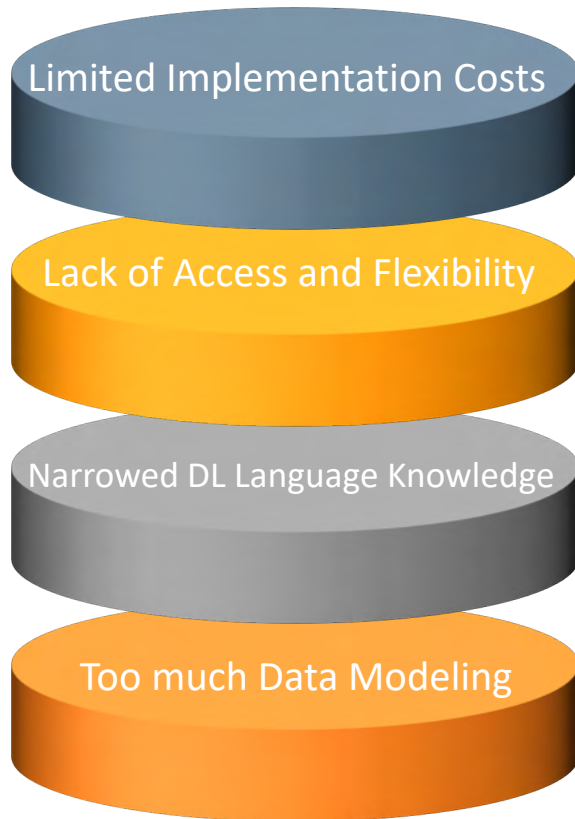
- Telemedicine

- Clinical Trial Integration

- Real-world observational studies

- Personalized or precision medicine

- Genomic tracking studies
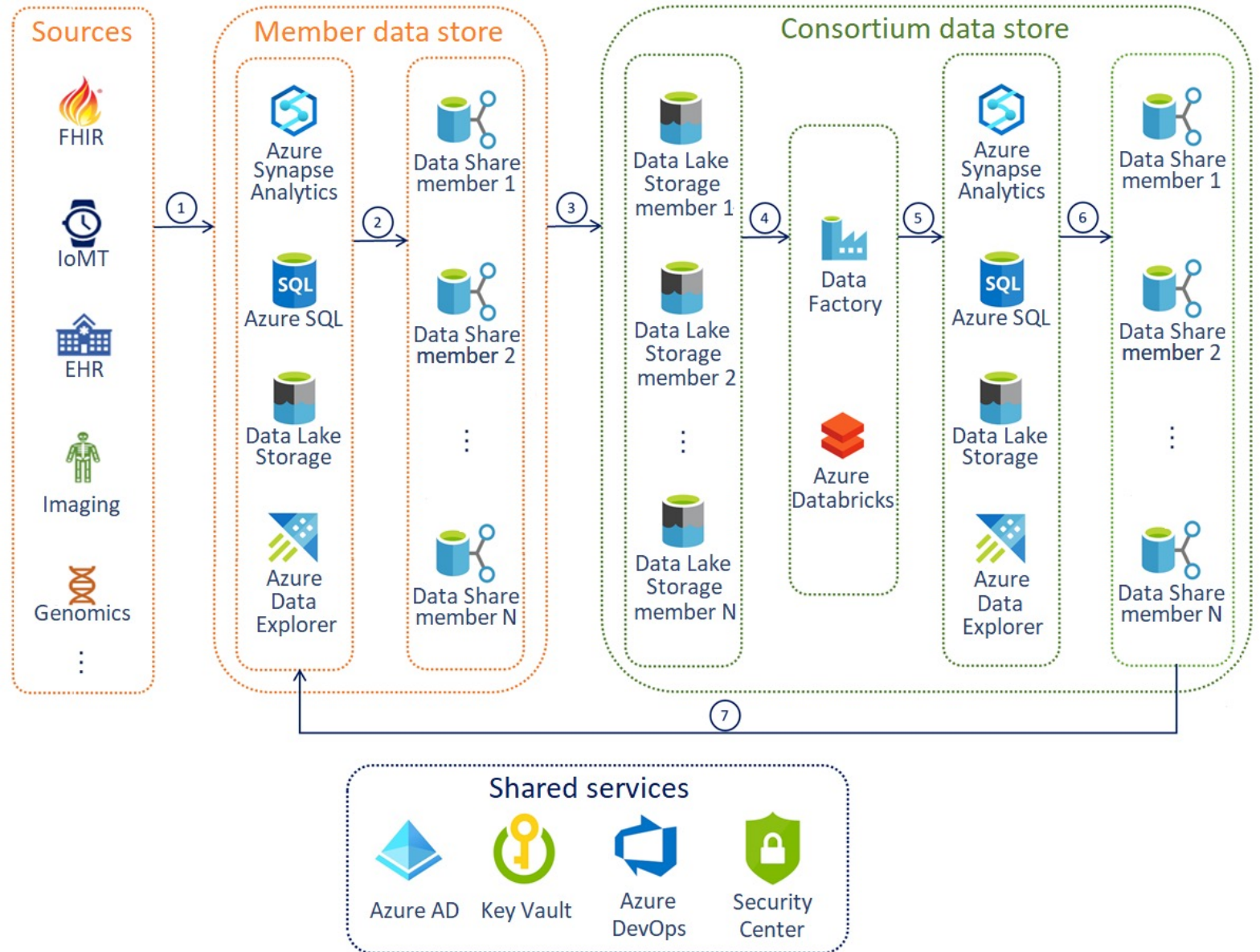
Data Lake Benefits Summary

Advantages of utilizing a data lake

Current Challenges For Hospital Data Management

- Limited Implementation Costs
- Lack of Access and Flexibility
- Narrowed DL Language Knowledge
- Too much Data Modeling

Benefits Of Data Lakes For Hospitals

Scalability

Data Lakes are relatively inexpensive when compared to a traditional data warehouse

Agility

Increases availability of the data to the whole organization decreasing decision time

Supports multiple languages beyond SQL

Data Warehouse technology primarily supports SQL, but Data Lakes allow for other database languages

Data Storage

Data is stored in its native format, which removes the need for data modeling at the time of ingestion

Incorporating Patient Experience Data

Wellness, Entitlement, And Recovery Impact Expectations

WELLNESS
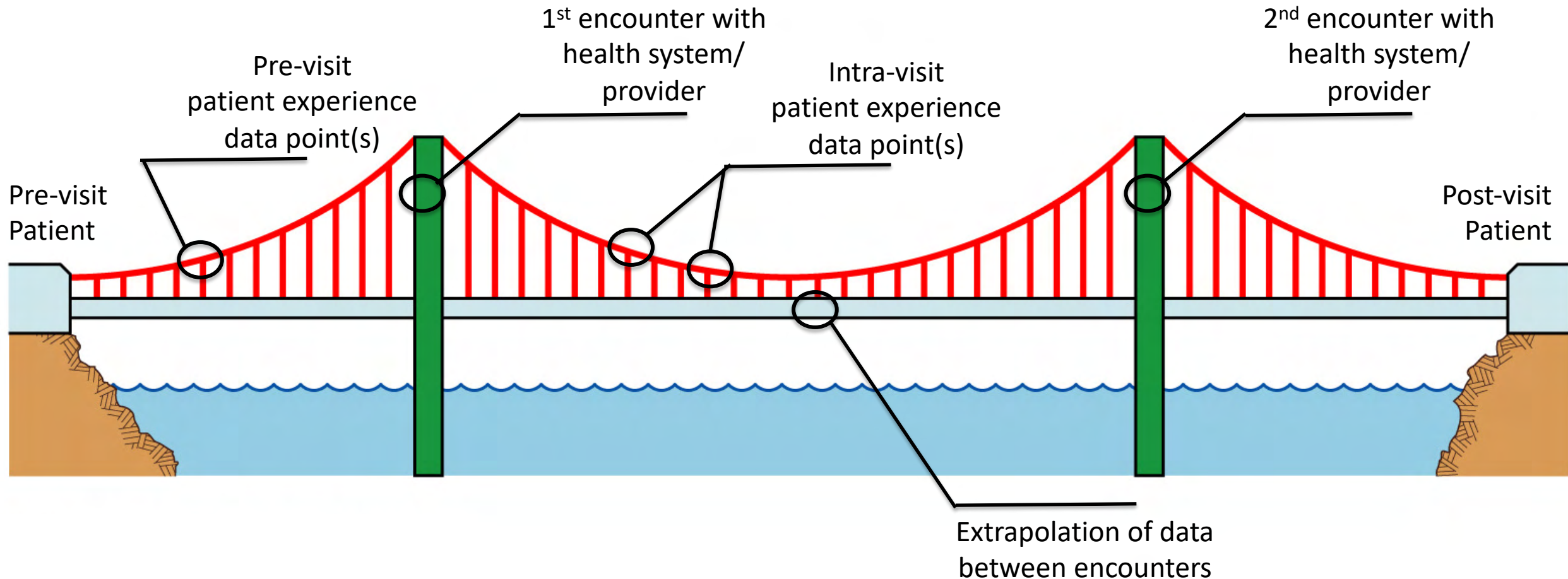
ENTITLEMENT

RECOVERY

Patient Experience Data Creates Care Continuity

- Patient experience data provides insights on impacts of HOW the hospital is providing care

- Data in the health data lake can better associate with other data through experience

- Outcomes can be tied to specific engagement experiences similar to how consumer experiences are managed in retail/ social media

ION

Patient Experience Data Explains Outcomes

Well crafted patient experience strategies can be used to support/ outcomes analyses

Pre-visit patient experience data point(s)

1st encounter with health system/ provider

Intra-visit patient experience data point(s)

2nd encounter with health system/ provider

Pre-visit Patient

Post-visit Patient

Extrapolation of data between encounters

A Spectrum Of Patient Experience Data Exist

Most Direct
Data Sources

Least Direct
Data Sources

Patient Surveys

Electronic Medical Records

Administrative Databases

Claims Data

Optimized Data Lakes Create Opportunities For Compliance

Ingesting new patient experience data **preserves current care delivery workflows** without forcing providers to ask additional questions

Providers will want to **deploy analytics against experience data** when historical outcomes do not provide the right level of compliance

Patient experience capture across service lines can be used to improve efficiencies

Discussion

Patient Experience Data can add to current analyses for hospitals and health systems

What level of data would hospitals need to compete with companies like Walmart/ Google?

How would you advise a hospital on how to get started with patient experience data?

Thank You

Let's Build Better Experiences Together.

For more information, please contact:

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