AWS re:Invent

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AIM201

Make sense of your health data with Amazon HealthLake

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Anthem

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Agenda

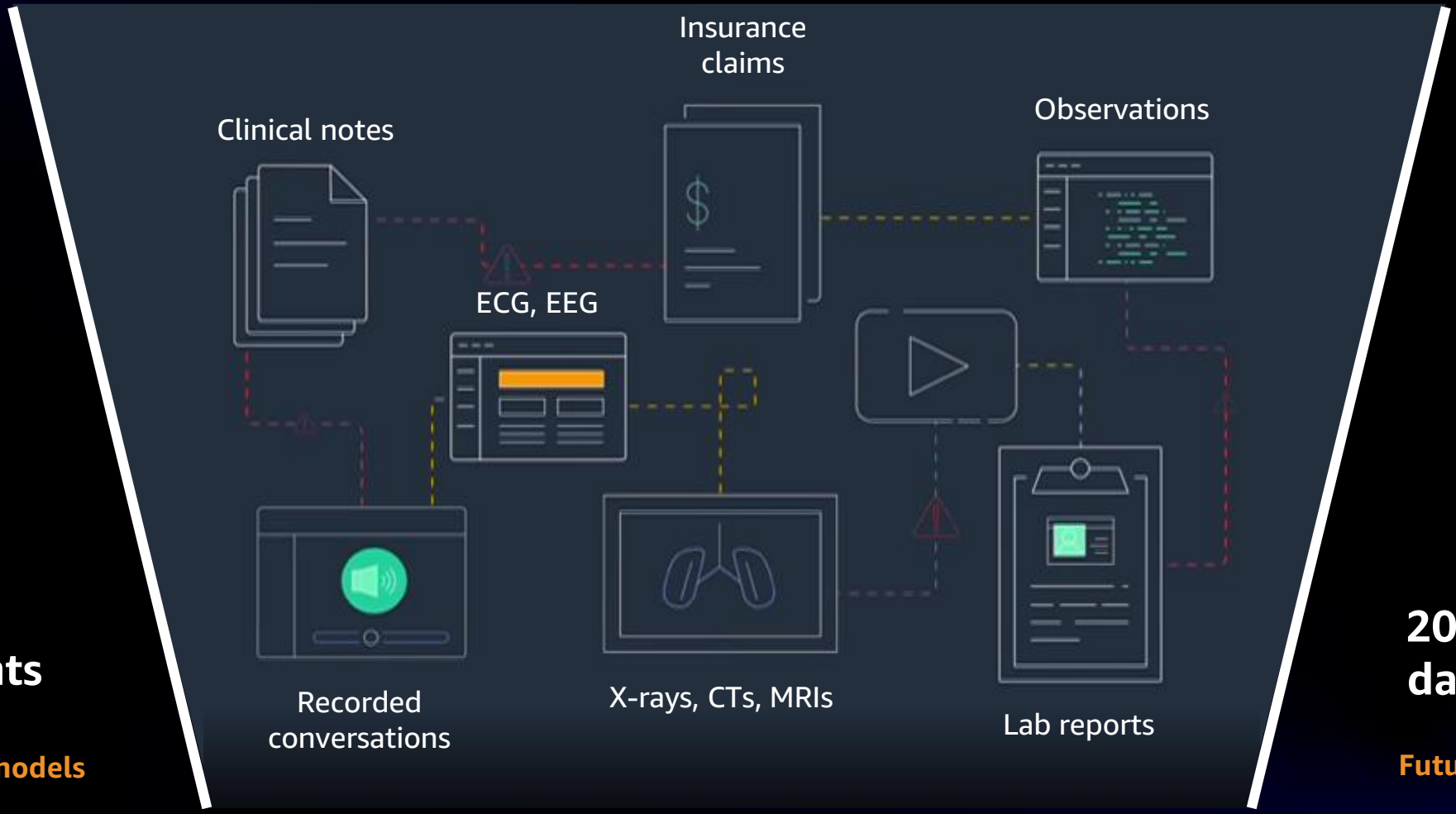
What is Amazon HealthLake?

How Amazon HealthLake can help analyze data to derive trends and make predictions

Anthem: Amazon HealthLake supporting Anthem’s AI-driven journey

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Digital transformation in healthcare



<30 data points

Today's clinical models

200K–300K data points

Future ML models

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Amazon HealthLake

A HIPAA-eligible service that enables healthcare providers, health insurance companies, and pharmaceutical companies to securely store, transform, query, and analyze health data at petabyte scale



Import

Quickly and easily import medical records including clinical notes, lab reports, and more



Store

Stored in the AWS Cloud in a secure, compliant, and auditable way



Transform

Tag and index unstructured data using specialized ML models



Query & search

Powerful query and search capabilities to ask questions of the data



Analyze

Understand relationships in the data with integrated analytics and ML capabilities

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Making sense of health data

See how you can benefit from Amazon HealthLake



Easily extract meaning from health data

Built-in natural language processing (NLP) to automatically extract meaning from unstructured data such as prescriptions, procedures, and diagnoses in minutes. You can then easily search and query the data.



Support interoperability standards

Create a complete view of each patient's medical history and structure it in the Fast Healthcare Interoperability Resources (FHIR) standard format to facilitate the exchange of information across multiple applications.



Analyze data and make predictions

Build machine learning models with Amazon SageMaker and apply Amazon QuickSight analytics to analyze and understand relationships, identify trends, and make predictions with health data.

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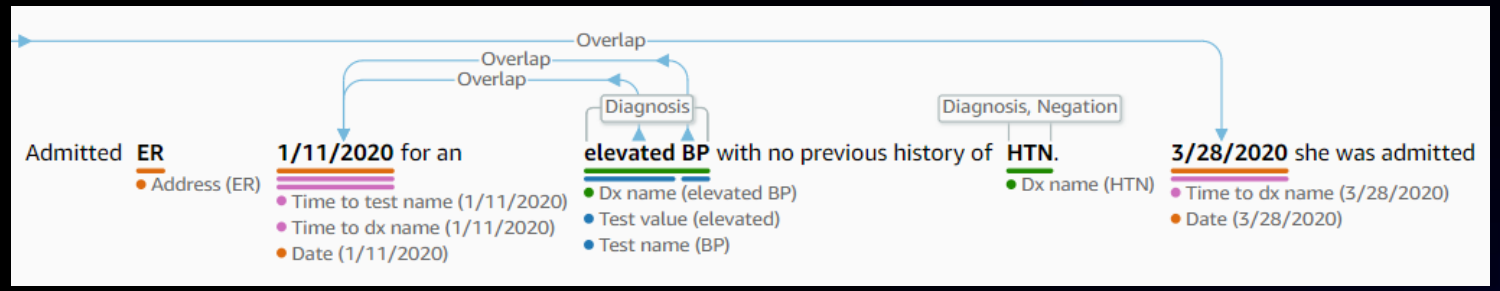
Extract meaning from health data

Patient is a 62-year-old female with a history of Type 2 diabetes mellitus with insulin use (1/14/2019). Admitted ER 1/11/2020 for an elevated BP with no previous history of HTN. 3/28/2020 she was admitted for hypothyroidism and prescribed Metformin 1,000 mg take daily by mouth in evening. Follow-up clinic visit (9/20/2020) with A1C results of…

Medical conditions



Abbreviations and time stamps



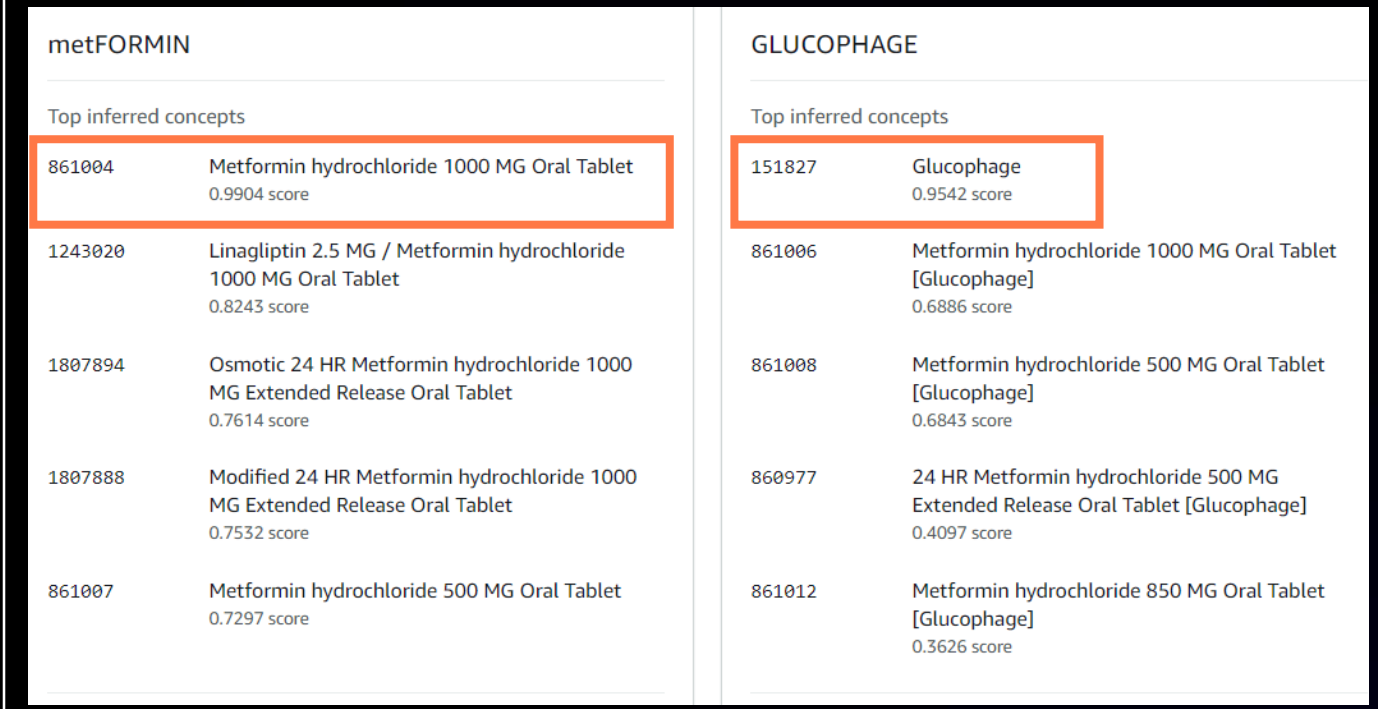

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{
  "Id": 22,
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  "EndOffset": 102,
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  "Category": "TIME_EXPRESSION",
  "Type": "TIME_TO_DX_NAME",
  "Traits": [],
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      "Category": "MEDICAL_CONDITION",
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        }
      ]
    }
}
```


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Assign medical codes to text

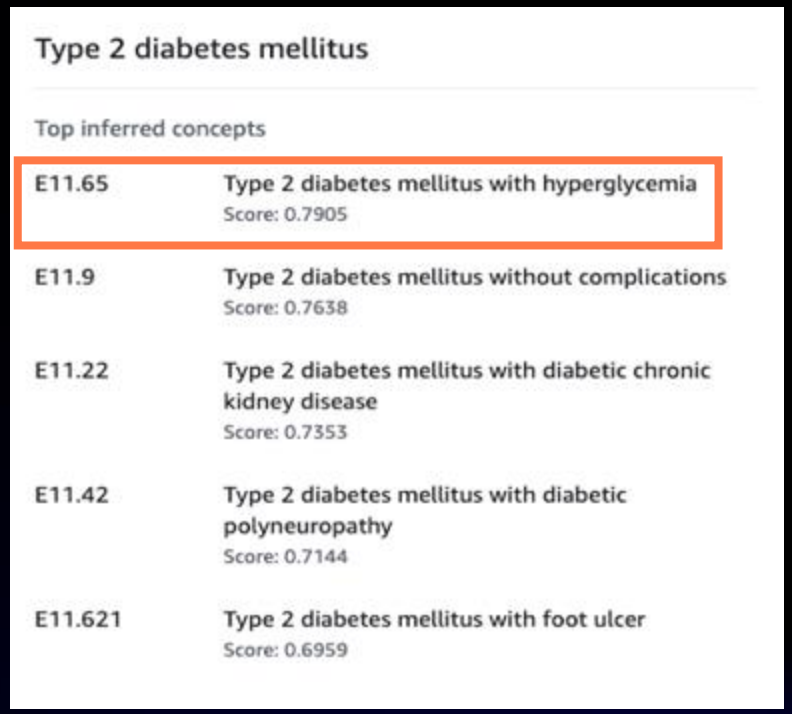
"**METFORMIN** 1,000 mg tablet E 1 AND 1/2 TABLETS BY MOUTH IN THE MORNING... "

RxNorm



"**Type 2 diabetes mellitus with hyperglycemia**, without long-term current use of insulin (HCC)..."

ICD-10



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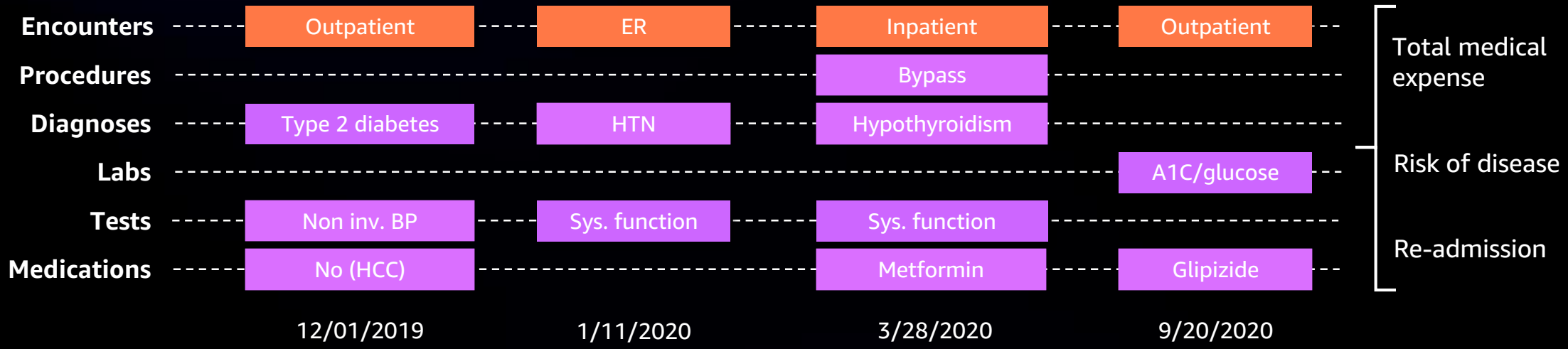
Support interoperability



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Present a chronological view of medical events

FHIR resources

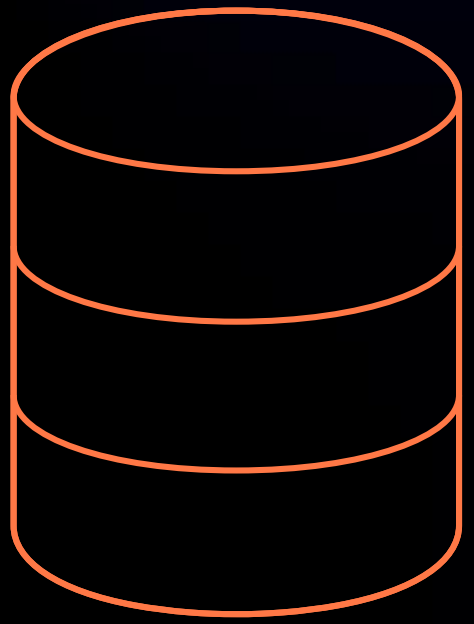


DERIVE TRENDS

Having a complete view of your newly structured data leads to better clinical decisions

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Analyze data and make predictions



Structured, normalized data

Amazon SageMaker

Amazon QuickSight

Third-party applications

IDENTIFY TRENDS

Easily search and query the data

Develop interactive dashboards

MAKE PREDICTIONS

Create predictive models, like predicting sepsis in a hospital ICU

SHARE DATA SECURELY

Healthcare providers and patients alike can easily share and access their data

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Use HealthLake for analytics

Transform healthcare data to FHIR format

Using an Amazon HealthLake connector partner



Structured & unstructured data in FHIR format

Create API

Update API

Delete API

Search API

Read API

Fully managed FHIR data store

Structure

Tag and index

FHIR v4 resource definitions

Medical NLP

Search and query

Prepare data for analysis

Amazon SageMaker

Amazon Athena/ QuickSight

Third-party applications

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Amazon HealthLake supporting Anthem's AI-driven journey

Ashok Chennuru

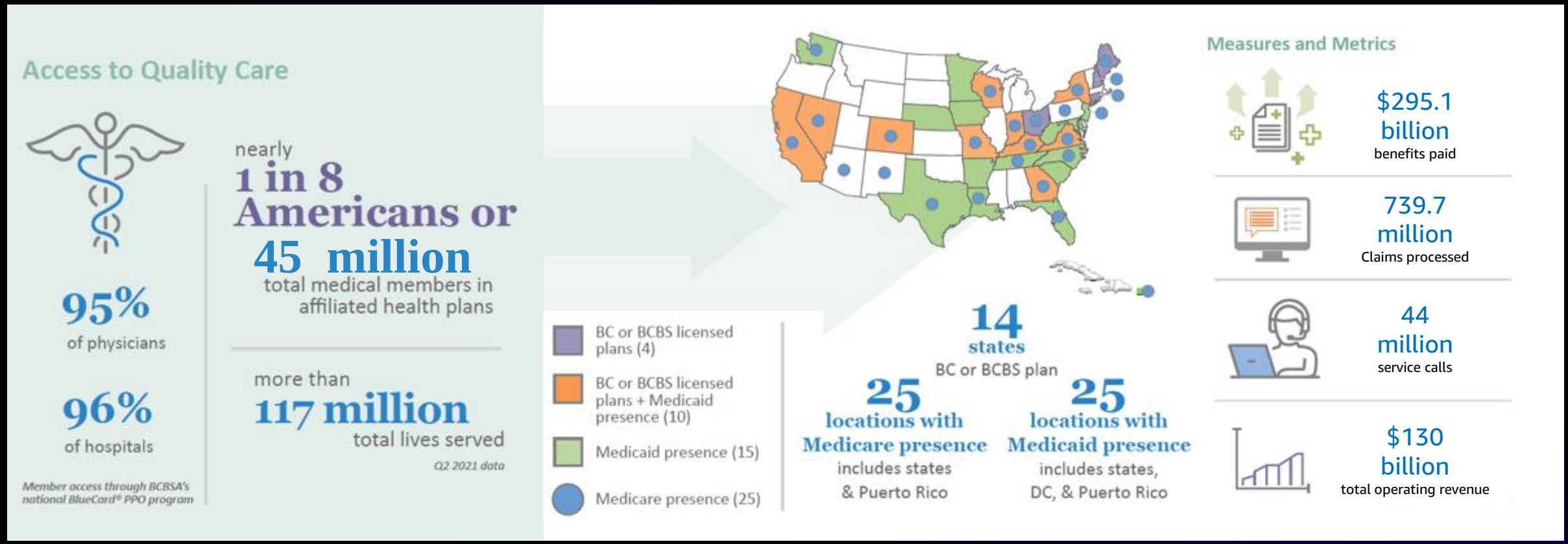
Chief Data and Analytics Officer
Anthem

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Anthem introduction

Mission: **Improving** lives and communities. **Simplifying** healthcare. **Expecting** more.

Vision: To be the most **innovative**, **valuable** , and **inclusive** partner.



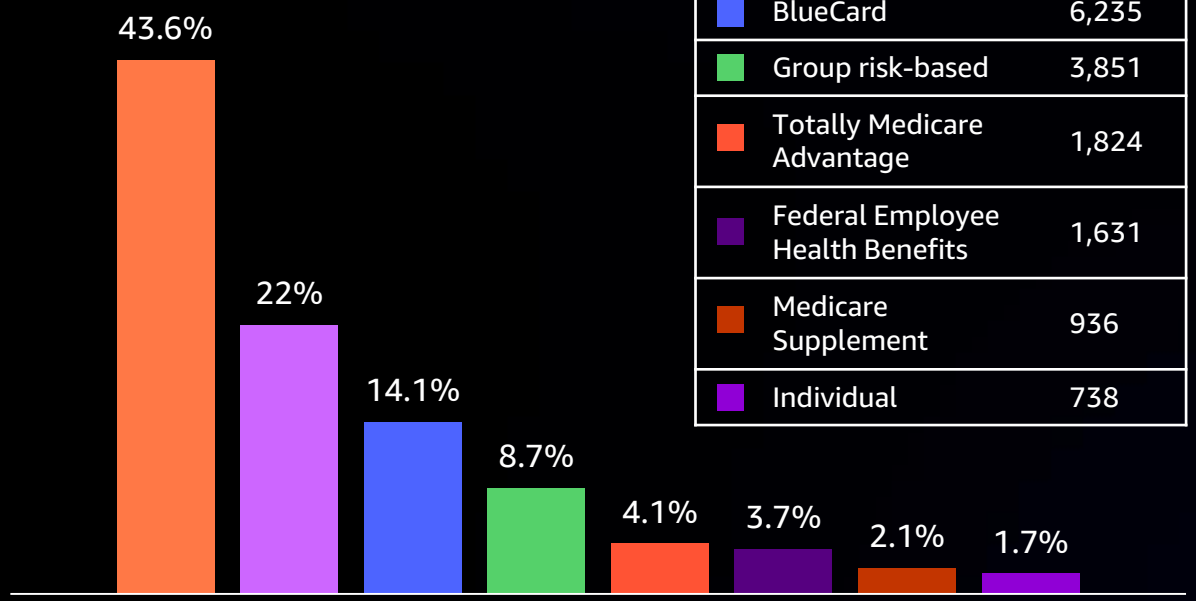
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Anthem introduction

Values: leadership | community | integrity | agility | diversity

Diverse customer base

(in 000's)



Group fee-based	19,372
Medicaid	9,754
BlueCard	6,235
Group risk-based	3,851
Totally Medicare Advantage	1,824
Federal Employee Health Benefits	1,631
Medicare Supplement	936
Individual	738

Subsidiaries

America's 1st Choice
CareMore HEALTH
HealthSun
DeCare Dental
Amerigroup
UniCare.
Aspire Health
Simply healthcare
AIM SpecialtyHealth
HealthCore
National Government Services.
Legato
MERIDIAN
ingenioRx
MMM we walktogether
beacon

88,455 Associates

76.2% Anthem's workforce are women

48.6% of Anthem's workforce are People of Color

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Current data challenges



Data arrives from thousands of disparate data sources in various formats – valuable data remains trapped in unstructured clinical notes



Gaining insights into the data takes weeks to months due to batch and manual processing involved



Current data model requires extensive enterprise knowledge

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Business opportunities

Anthem's cloud platform on AWS enables us to manage large, siloed datasets and harness that data to support our digital products



Ingest data and support bidirectional data interoperability

Amazon HealthLake normalizes data in standard FHIR format in the cloud. Integrated medical NLP models automatically convert unstructured data to structured FHIR format



Derive insights from rich data using machine learning

With integrated analytics and AI/ML services, Amazon HealthLake helps derive insights from rich data in weeks to minutes to improve quality of care and reduce costs



Standardize, streamline, and scale apps

Managed service reduced the burden on our DevOps team and helped us scale quickly to support the many lives we serve

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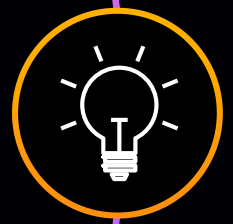
Simplify healthcare

Analytics-centered products



Predictive

Integrate predictive member insights, powered by machine learning and advanced analytics to provide early intervention and better manage chronic disease



Proactive

Improve our member experience with more proactive outreach regarding their health, while generating insights to improve outcomes – fueled by our cloud platform



Personalized

Enhancing our analytics allows for a more personalized whole person view that puts the member at the center of their care – delivering personalized content so members can better manage their health

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Powering our products

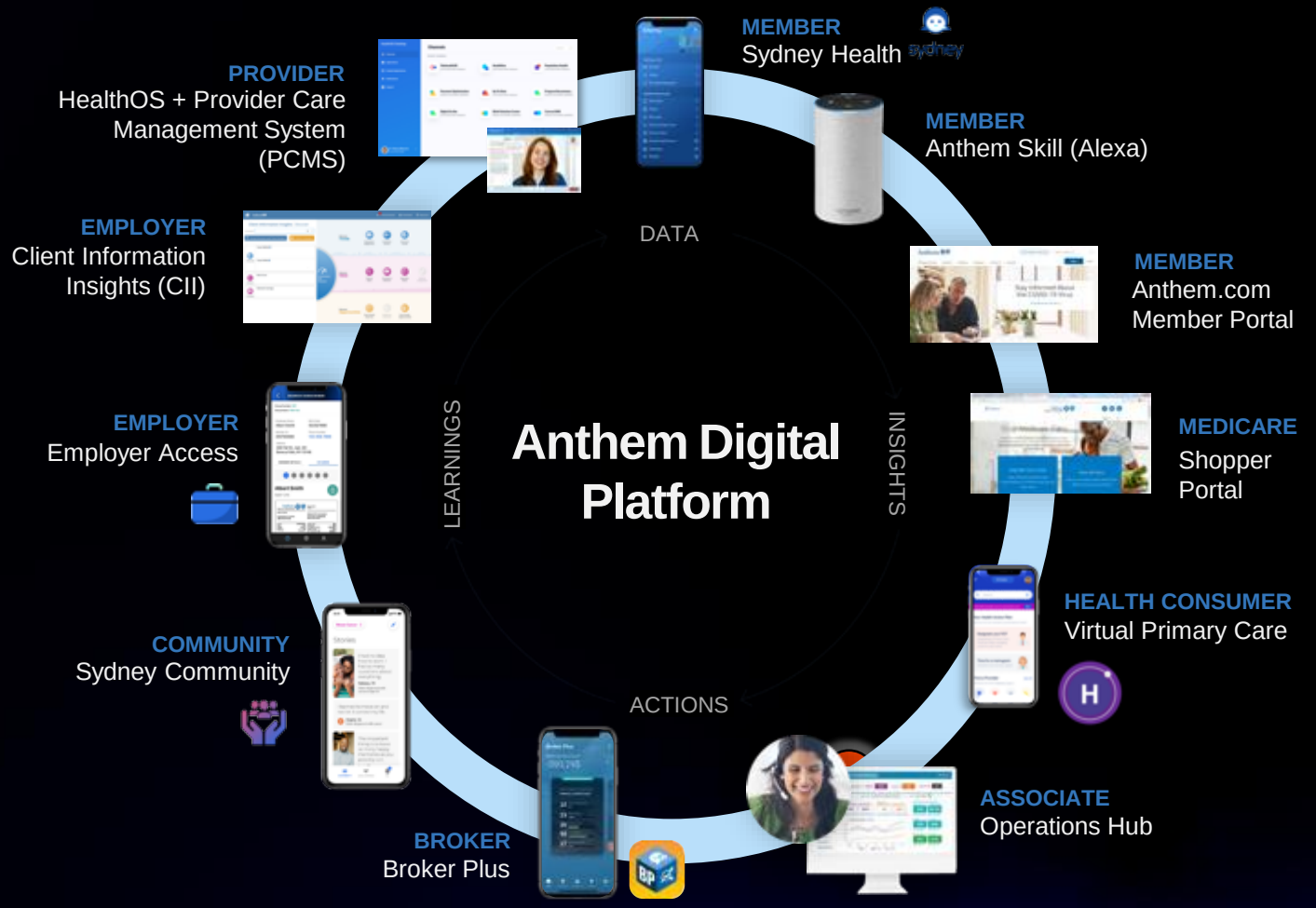
Anthem's platform on AWS will support our digital flywheel of products

Create exceptional experiences for payers, providers, members, and care teams

Allow for new data types to continually enter our ecosystem

Ingest a multitude of data sources, including both structured and unstructured

Central execution for AI/ML models to derive insights, yielding meaningful business value



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Building a digital Health OS platform

The Health OS platform is a digital payer-provider platform that combines data, insights, and solutions to address providers' needs and enable payers' business goals



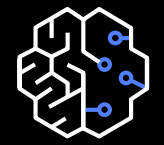
Enable bidirectional data interoperability between payers and contracted provider network



Provide a simplified healthcare platform that yields better member experiences



Empowering value-based care agreement with providers



Build and deploy AI-based solutions

aws

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Improve time to insight

With a cloud-based technology stack we can move faster

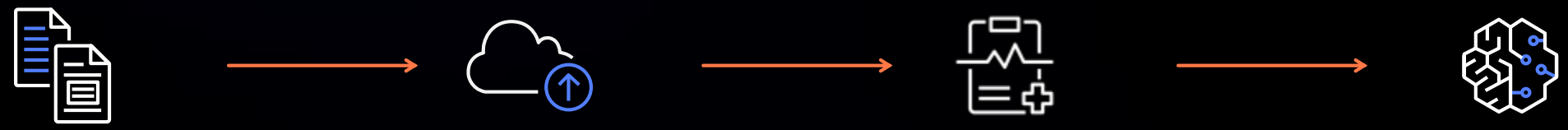
1. Automated data preparation across thousands of sources
2. Data-driven proactive and predictive insights from ML models allows us to move toward real time
3. Faster time to insights inform decision-making, improving the quality of care
4. Seamless interoperability with providers using FHIR standards brings insights directly to the provider

- Care management
- Population health management
- Value-based care
- Care gap closure
- Risk adjustment
- Automated prior authorization

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Reducing hospital re-admission rates

Hospital re-admission is costly to the hospital, the consumer, and the payer



- Partner with providers to reduce re-admission through care management and care coordination
- Ingestion of admit, discharge, and transfer (ADT) and clinical data to AWS HealthLake allows us to compile a view of a person's whole health history
- This view enables ML to assess the risk of re-admission and tailor interventions for our members

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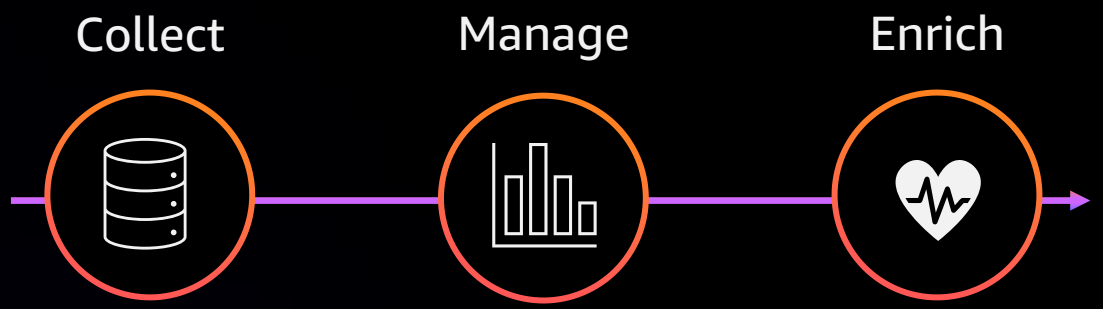
Responding to COVID-19 with personalized care

The ability to leverage data for a public health response has never been more important

The ingestion of ADT, immunization, and lab data to our platform allowed for development of AI/ML analytics to assess the COVID-19 impact within our membership

- Hospitalization analysis
- Community risk
- Employer impact

Combined with our SDoH and HRSN data, Anthem was able to target vulnerable populations and provide outreach to assist with vaccines using risk-based preventative protocol



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What is next

With Amazon HealthLake, we can harness the power of machine learning to improve care for our members

Continue to focus on interoperability to remove data silos and increase time to insight

Deliver member-centric care services informed by data in new, emerging use cases

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You might be interested in …

- LNG016 – **Building compliant HCLS solutions with AWS services**
  - Lounge Nov 30th from 1:00–2:00 PM at Level 2, Hall C, Expo, APN Booth Mini-Theater, Venetian
- AIM316 – **AI workflow automation for document processing**
  - Workshop Dec 1st from 3:00–4:30 PM at Level 1, Forum 118, Caesars Forum
- HLC307 – **Using Fast Healthcare Interoperability Resources (FHIR) on AWS**
  - Workshop Dec 1st from 5:30–7:45 PM at Level 1, Upper Level, Cristal 3, Wynn
- GPS309 – **Creating interoperable real-time clinical applications**
  - Breakout Dec 3rd from 10:00–11:00 AM at Level 4, Lando 4202, Venetian

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Thank you!

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