

# DATA DRIVEN HEALTHCARE

Nuovi strumenti e soluzioni per una gestione integrata ed intelligente dei nostri dati

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# Microsoft's Vision for Healthcare

## Digital Transformation Pillars in Healthcare



### ENGAGE YOUR PATIENTS

to get—and stay—  
healthy

Give patients information that helps them understand, control and manage their personal health decisions.



### EMPOWER YOUR CARE TEAMS

to improve care  
team productivity

Help care teams connect with patients, increase personal productivity and work together more efficiently.



### OPTIMIZE YOUR CLINICAL & OPERATIONAL EFFECTIVENESS

to drive better  
diagnoses and  
treatment

Harness data to streamline operations and improve care outcomes.

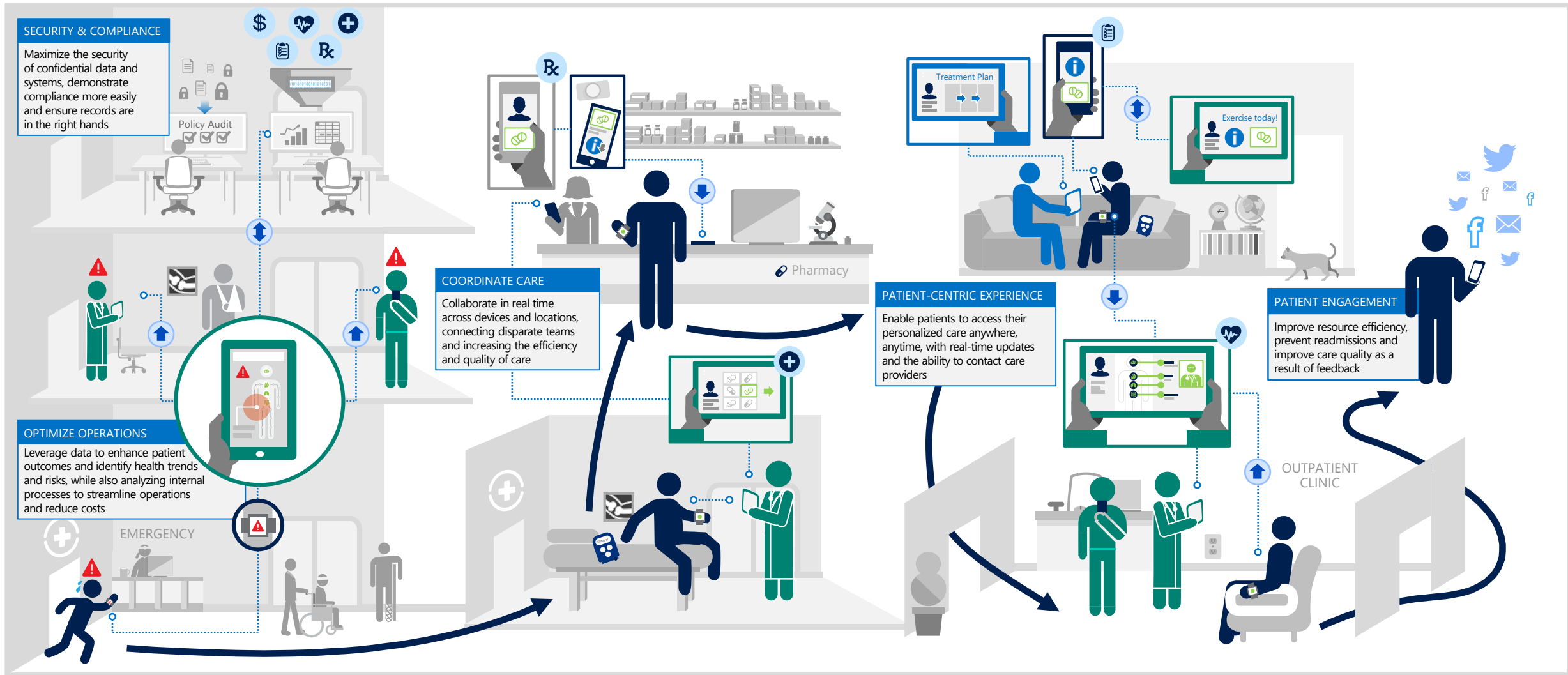


### TRANSFORM THE CARE CONTINUUM

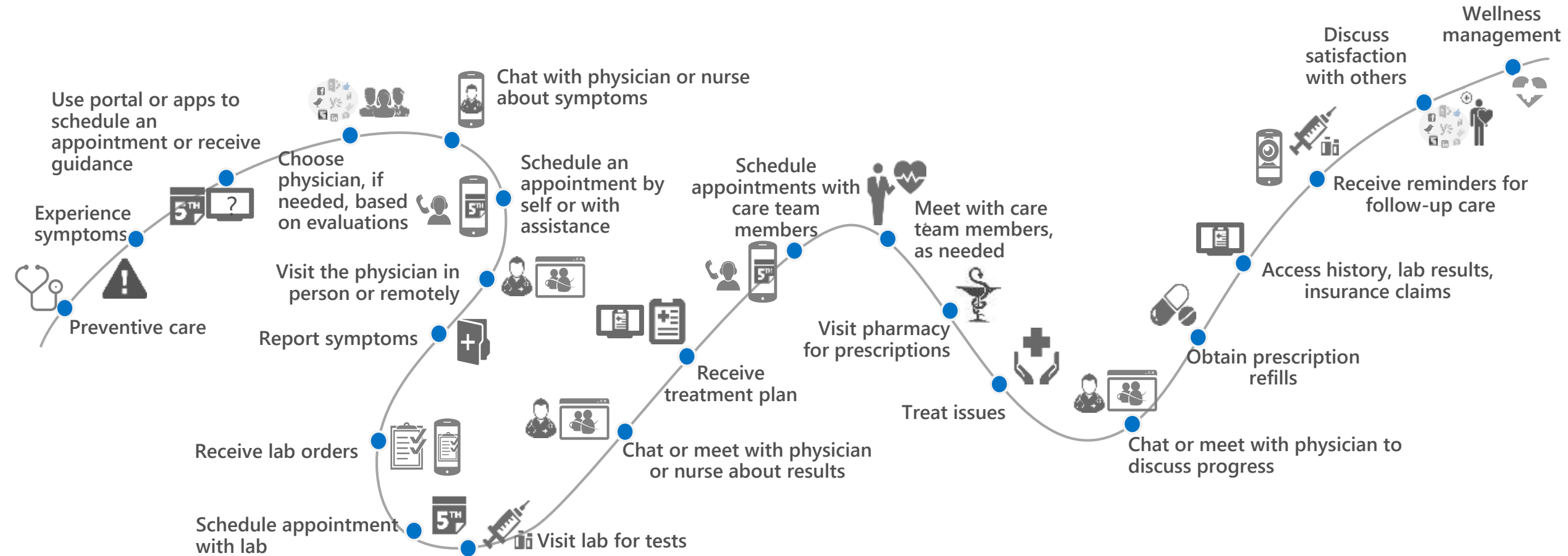
through platforms  
that provide insight

Gain more powerful insights into patient care and operational best practices.

# Empowering health throughout the patient journey



# Empowering health throughout the patient journey







# Exercises

## Exercises

Sample Exercise 1 ▾

Save Delete New

## Exercise Steps

+ × ▶

1 2 3 4

## Step Description

Bend right arm

## Step Conditions

+ Type Angle ▾ ■

Joint ElbowRight ▾

Value 154 °

Min/Max Value 30 - 50

☐ Measure quality reaching step ✕







**Karolinska  
Institutet**

Dyslexia is a neurodevelopmental disorder resulting in persistent reading difficulties

Eye movement as predictor of reading difficulties:

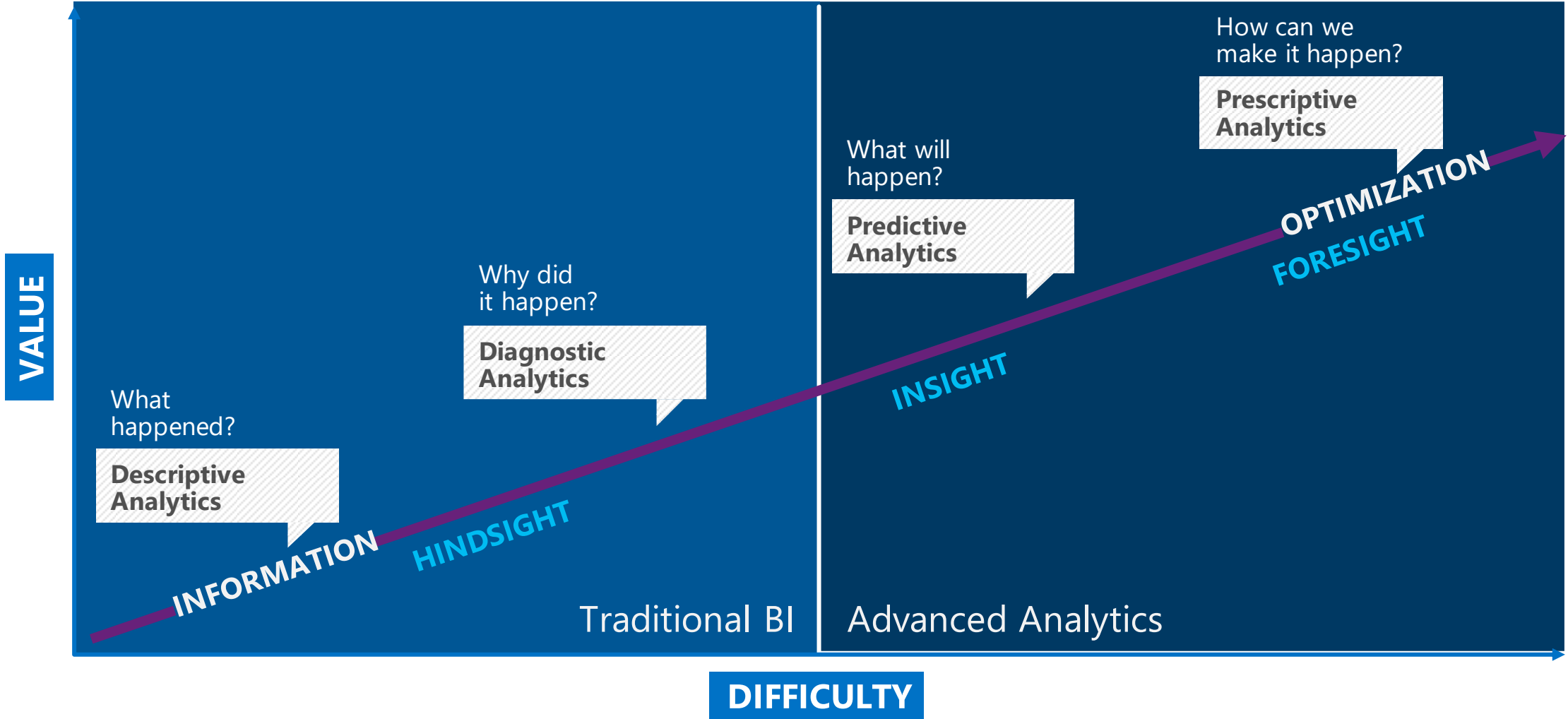
### Normal

Bävern är en mycket skicklig simmare. I vattnet når den hastigheter av mer än elva kilometer i timmen. För att skydda sig mot kylan har bäverns hud tusentals små hårstrån och ett tjockt lager med fett. Med hjälp av sina stora lungor kan den stanna under vattenytan mer än tjugo minuter utan problem.

### Dyslexia

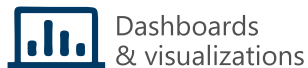
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Azure Machine Learning: Using machine learning to train models on eye movements of dyslexics and controls to quickly predict which children have reading issues and provide appropriate intervention





## DATA INSIGHTS



Dashboards  
& visualizations

+



Big data stores  
Information management

+



Machine learning, IoT  
& analytics

+



Perceptual intelligence  
Personal assistant

### Descriptive

Relational data

Know your business better through manual reports built using structured department data.

#### ACTIVITIES

- **Manual reports:** Request IT to pull data and build reports
- **Historical analysis:** Review business periodically and track against goals
- **Departmental data:** Combine data manually for business-level insights

TIME-TO-DATA: WEEKS 📅

### Diagnostic

Relational & non-relational data, siloed

Make smarter decisions using self-service tools to separately display relational and non-relational data sets available through a virtualized network.

- **Self-service & mobile BI:** Access anywhere, on any device
- **Visualizations and dashboards:** Answer questions by visualizing data
- **External data:** Capture big data for future use

OVERNIGHT 🌙

### Predictive

Any data from any source

Plan for the future by analyzing and modeling diverse data types integrated in real time through a hybrid environment.

- **Real-time insights:** Track business changes up to the minute
- **Integrated data sources:** Combine and analyze all kinds of data
- **Predictive analytics:** Use complex modeling and analysis for predictions

MINUTES ⌚

### Prescriptive

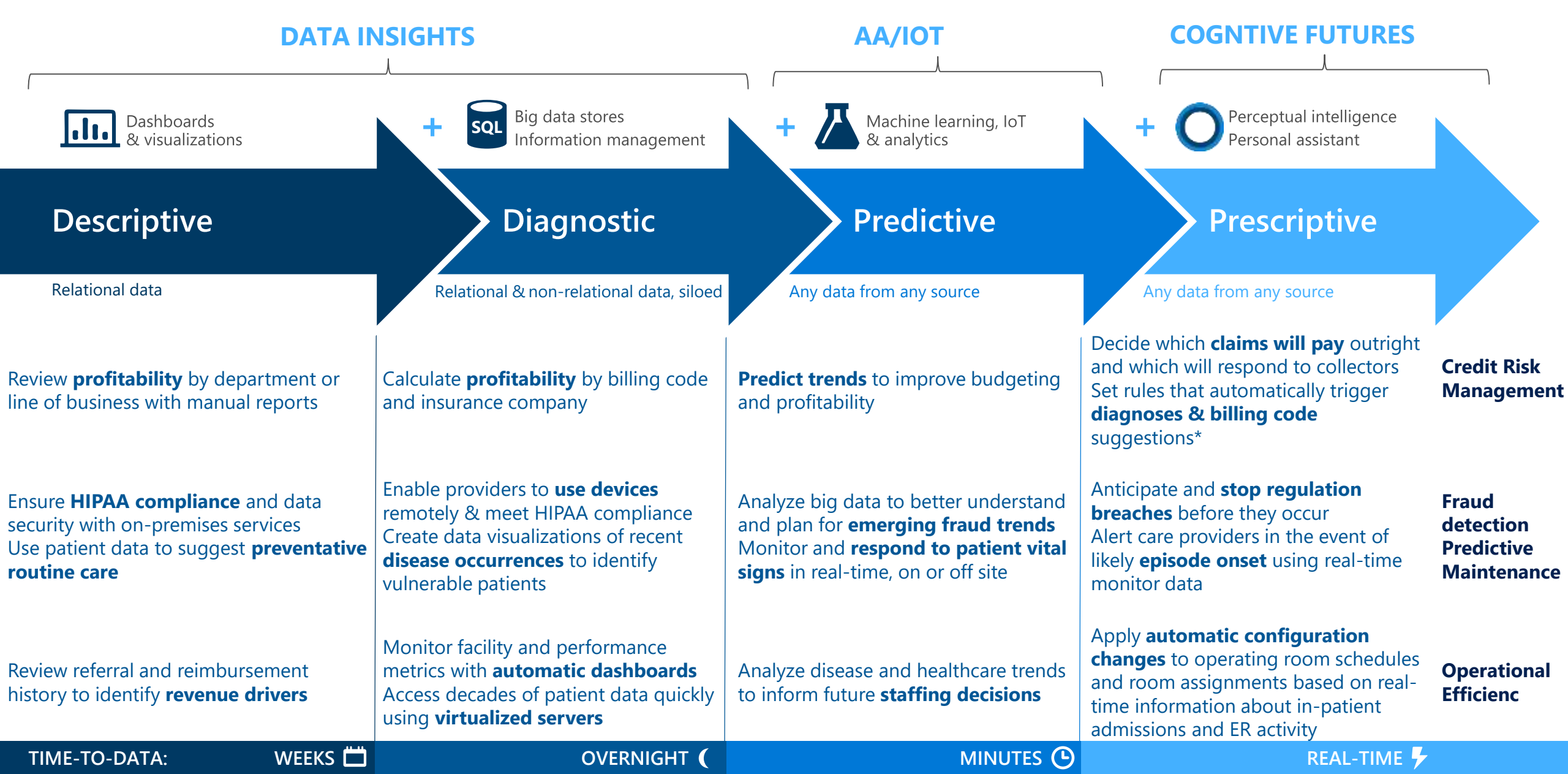
Any data from any source

Trigger automated rules to respond to analysis of data sets integrated in real time through a hybrid environment.

- **Immediate innovation:** Make changes on the fly using realtime data
- **Asset feedback:** Monitor IoT data to identify new business models
- **Automated actions:** Trigger automatic actions to changing trends

REAL-TIME ⚡

## MODERN DATA PLATFORM



# MODERN DATA PLATFORM

# Advanced Analytics in Health: New Paradigms



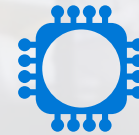
## REAL-TIME & PREDICTIVE ANALYTICS

to shape outcomes



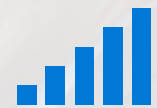
## SELF-SERVICE ANALYTICS

to provide research on-demand



## INTERNET OF THINGS

to connect devices to data bases



## CLOUD ANALYTICS

to erase historical boundaries for data



# OPTIMIZE YOUR CLINICAL & OPERATIONAL EFFECTIVENESS

by using data analytics

**POPULATION**  
health

**PERSONALIZED**  
medicine

**QUALITY**  
control

risk  
**MITIGATION**







# POPULATION HEALTH

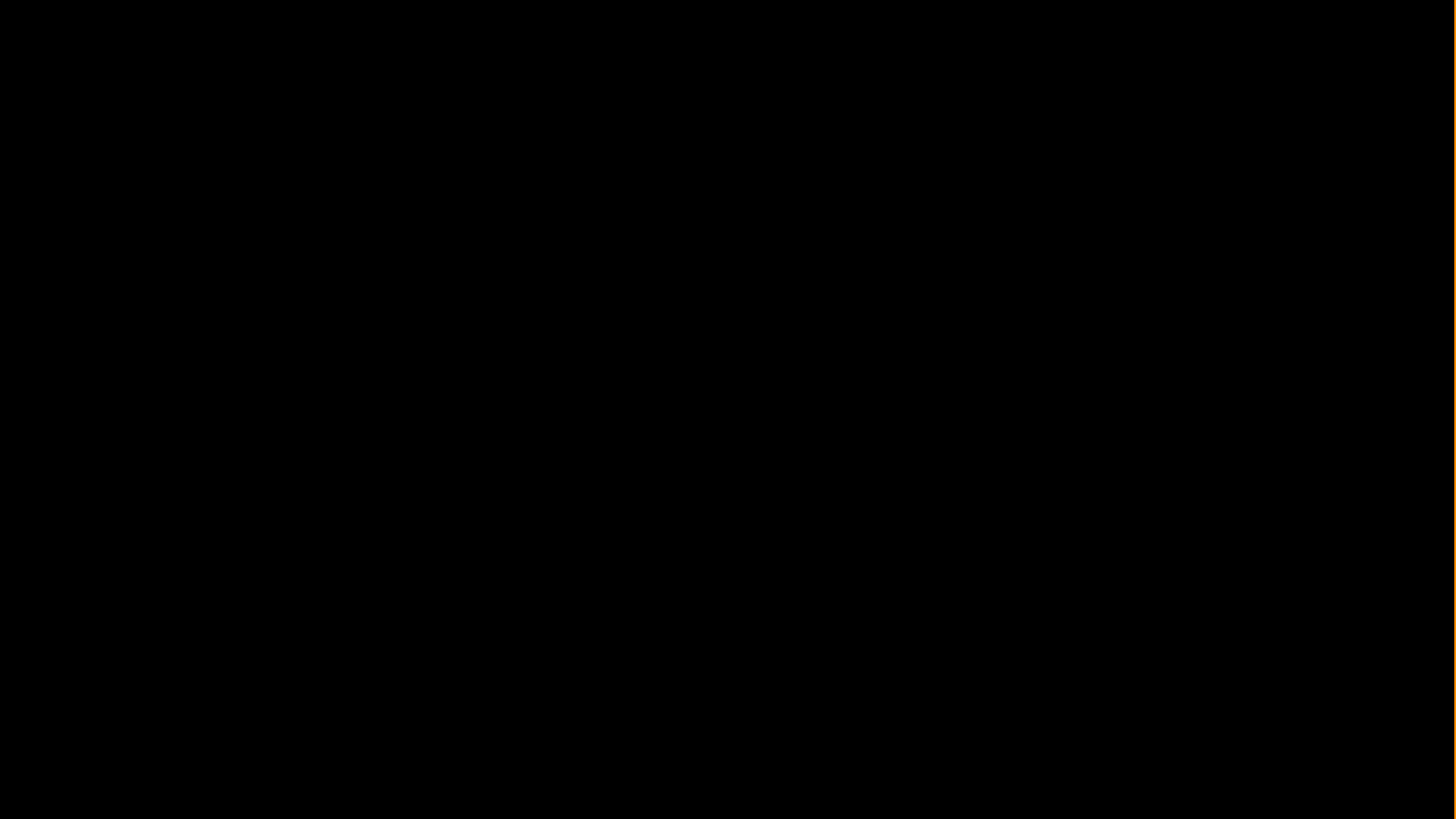
**TREAT**  
chronic disease

**PREDICT** potential  
crises based on  
individual &  
population data

**INTERVENE**  
to prevent  
hospitalization

**INCORPORATE**  
results into data







# POPULATION HEALTH

**COLLECT**  
patient data  
via devices

**COMPARE**  
real-time data  
to historical data

**ANALYZE** individual  
population &  
environmental trends

**UPDATE**  
patient care plan

"It's almost a paradox. We want to look at the whole population, because that's what we're accountable for, but we're going to do it one individual at a time, because we want each patient to have the best possible experience."

Dr. Robert Greene, Executive Vice President  
Dartmouth-Hitchcock Medical Center







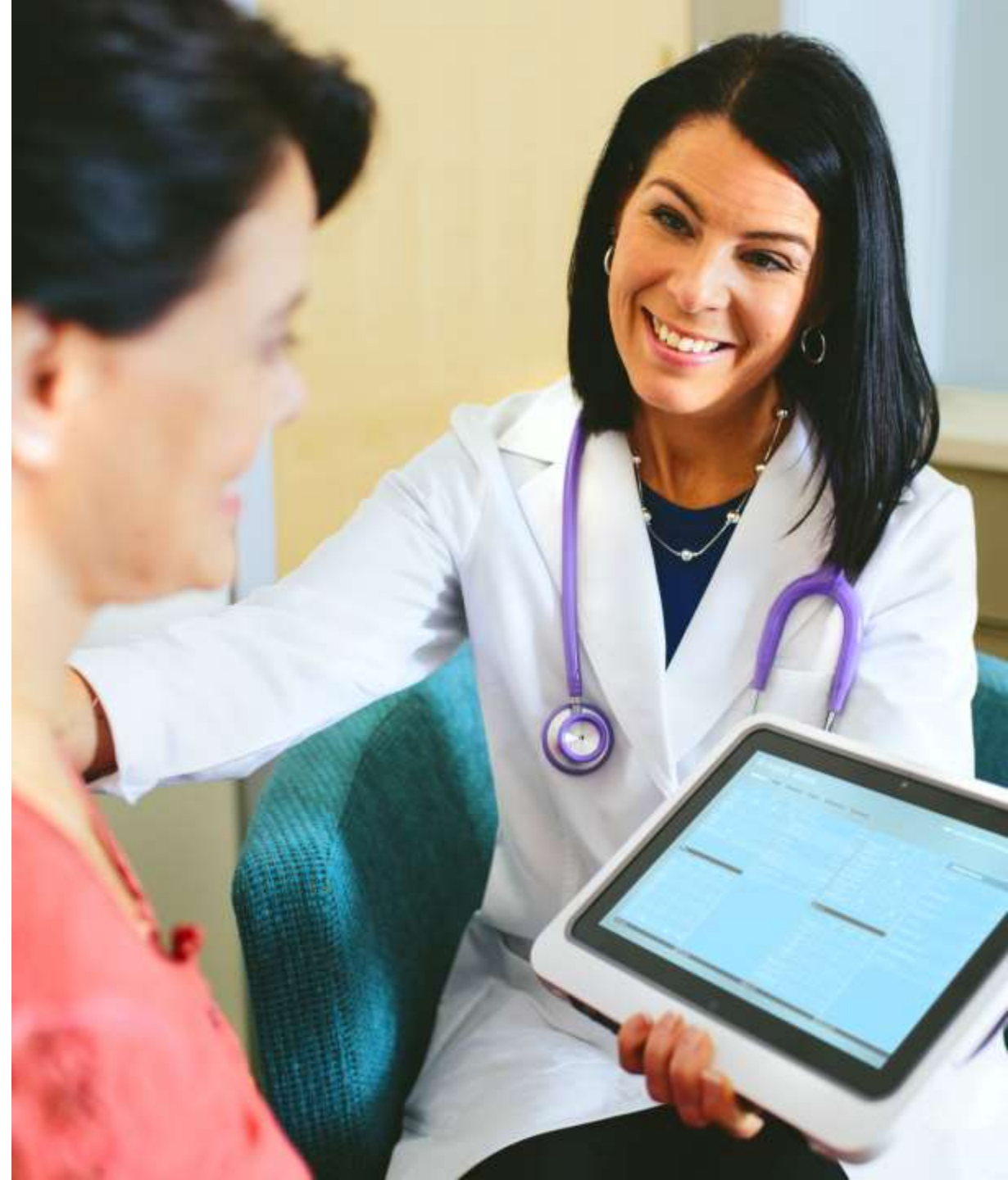
# PERSONALIZED MEDICINE

**ANALYZE**  
patient symptoms  
& attributes

**COMPARE**  
patient with  
similar patients

**DETERMINE**  
best treatment  
options

**TRACK**  
success rates







## QUALITY CONTROL

**USE** data that's  
up-to-date vs.  
months old

**PERFORM** self-  
service research

**ANALYZE**  
data without  
waiting for IT

**MAKE** data-driven  
decisions based on  
current information





## QUALITY CONTROL

**COLLECT** data  
from sub-hospitals

**SEARCH** data using  
natural language

**ANALYZE** near  
real-time data

**GENERATE**  
reports in hours and  
update frequently

"This is a dream. With Power BI, we can understand what is happening in the departments in a few hours, rather than after months."

Eli Marie Sager, CEO, The Clinic for Diagnostics and Intervention, Oslo University Hospital





## RISK MITIGATION

**PREVENT**  
hospital-acquired  
infections

**REDUCE**  
readmissions

**DETECT  
& REMEDIATE**  
fraud

**ENSURE** compliance  
with mandated  
standards of care







## RISK MITIGATION

**ENTER** patient data  
via bedside laptop

**EXTRACT  
& AGGREGATE**  
data on  
quality indicators

**GENERATE** reports  
from 1m+ patients

**IDENTIFY**  
best practices  
& training needs

"The ICU coordinators can effectively be proactive by inspecting their own data and comparing it to the reference benchmark, introducing new training programs depending on their immediate needs."

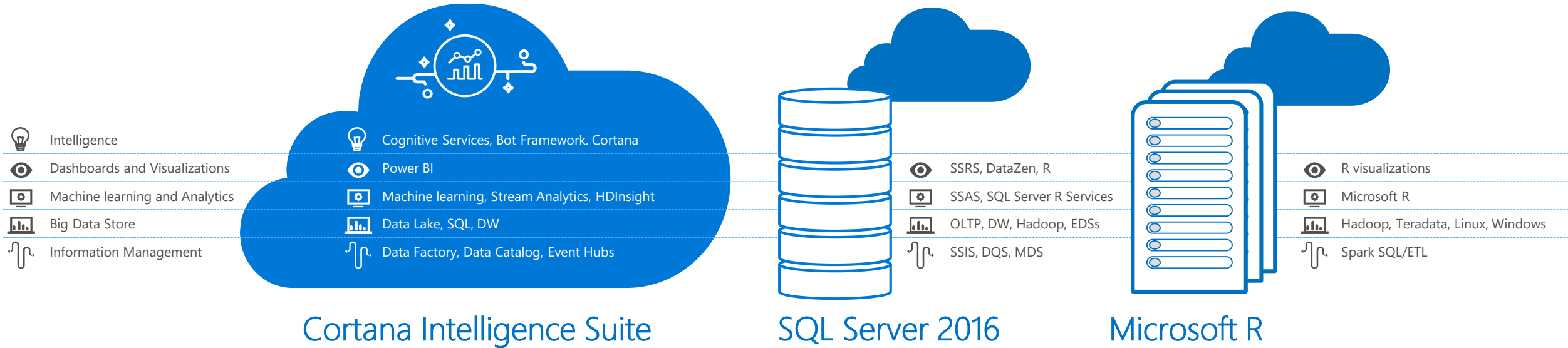
Dr. Joao Pantoja, Corporate Medical Director,  
Rede D'Or Private Hospital network

 Epimed  
solutions

 REDE D'OR  
SÃO LUÍZ



# Microsoft Hybrid Data Platform



Analytics at cloud speed

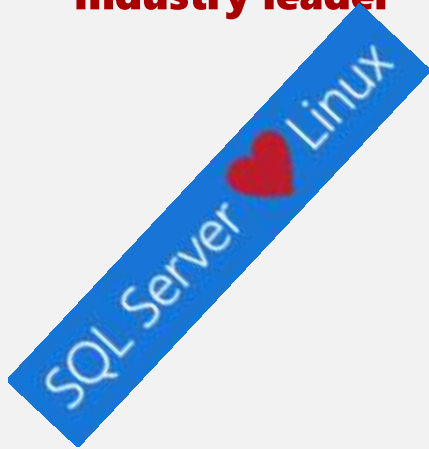
Works with what you have

AI driven innovation

# SQL Server 2016: Everything built-in

Industry Leader

Industry leader



**Its vision for in-memory computing across products, hybrid cloud implementations and a "cloud first" strategy is ahead of its competitors.**

← In-memory across all workloads →

← small data, big data, structured data – any data – un-structured data, data in motion, data at rest →

← on any device →



**Leadership across** on-premises and cloud



[1] Gartner "Magic Quadrant for Operational Database Management Systems," by Donald Feinberg , Merv Adrian , Nick Heudecker, October 2015

[2] Gartner "Magic Quadrant for Data Warehouse and Data Management Solutions for Analytics," by Roxane Edjlali and Mark Beyer, Feb 2015

[3] Gartner "Magic Quadrant for Business Intelligence and Analytics Platforms," by Josh Parenteau, Rita L. Sallam, Cindi Howson Joao Tapadinhas, Kurt Schlegel, Thomas W. Oestreich February 2016

[4] Gartner "Magic Quadrant for Advanced Analytics Platforms," by Lisa Kart, Alexander Linden, and Gareth Hershel, February 2016

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