Big Data in Healthcare

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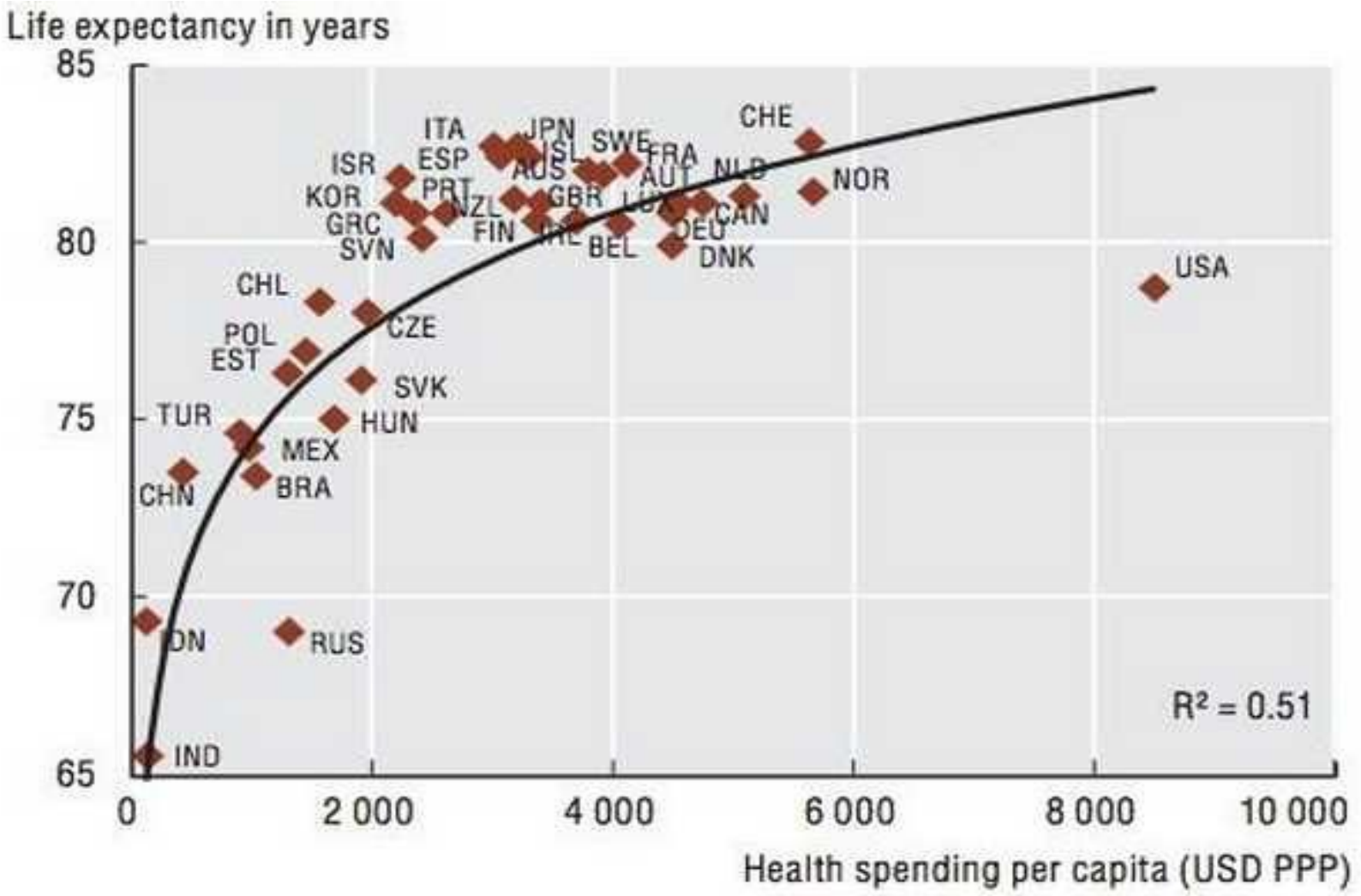
An Industry Rife with Inefficiencies…

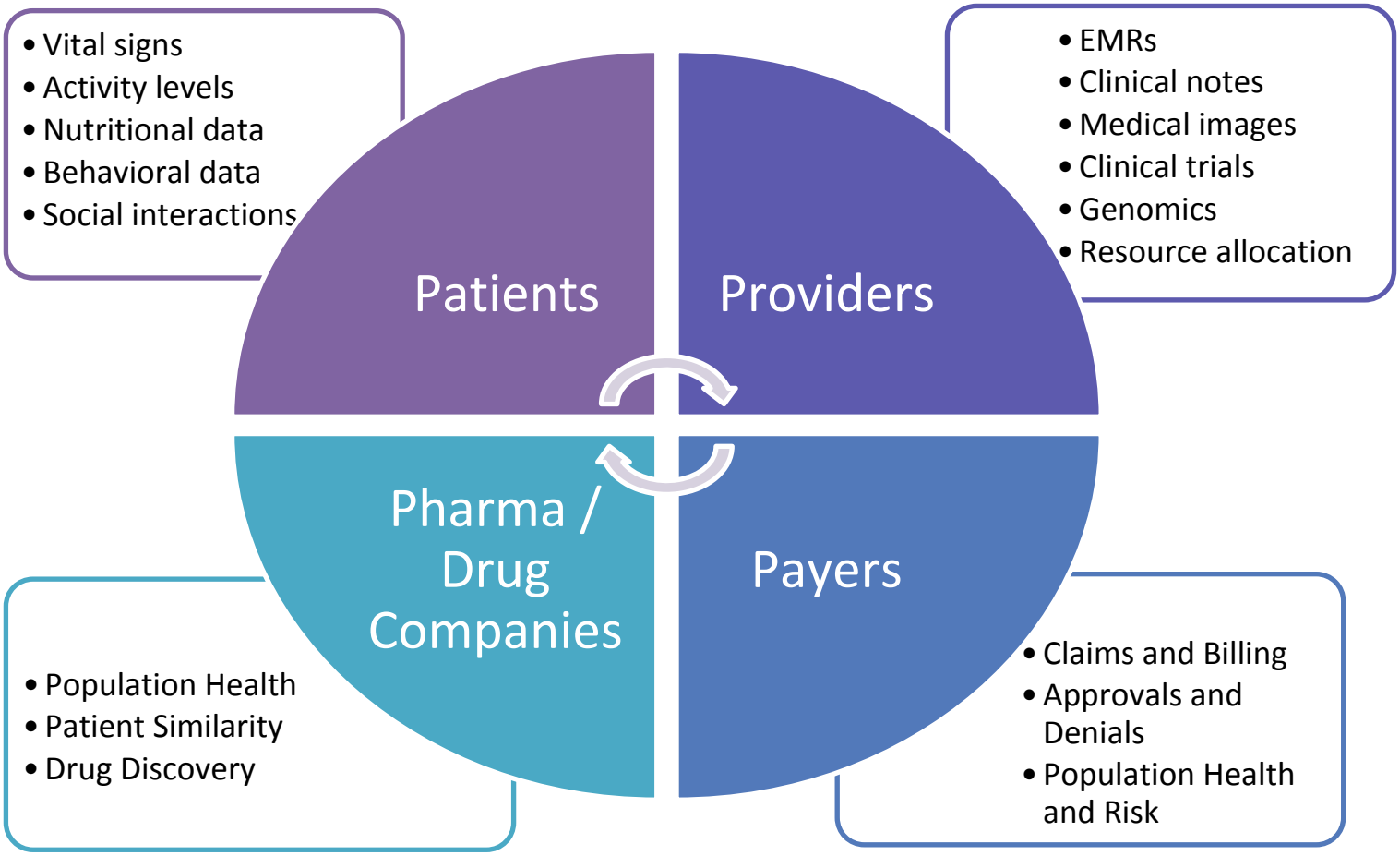


Source: OECD Health Statistics 2013

…And Drowning in Healthcare Data…

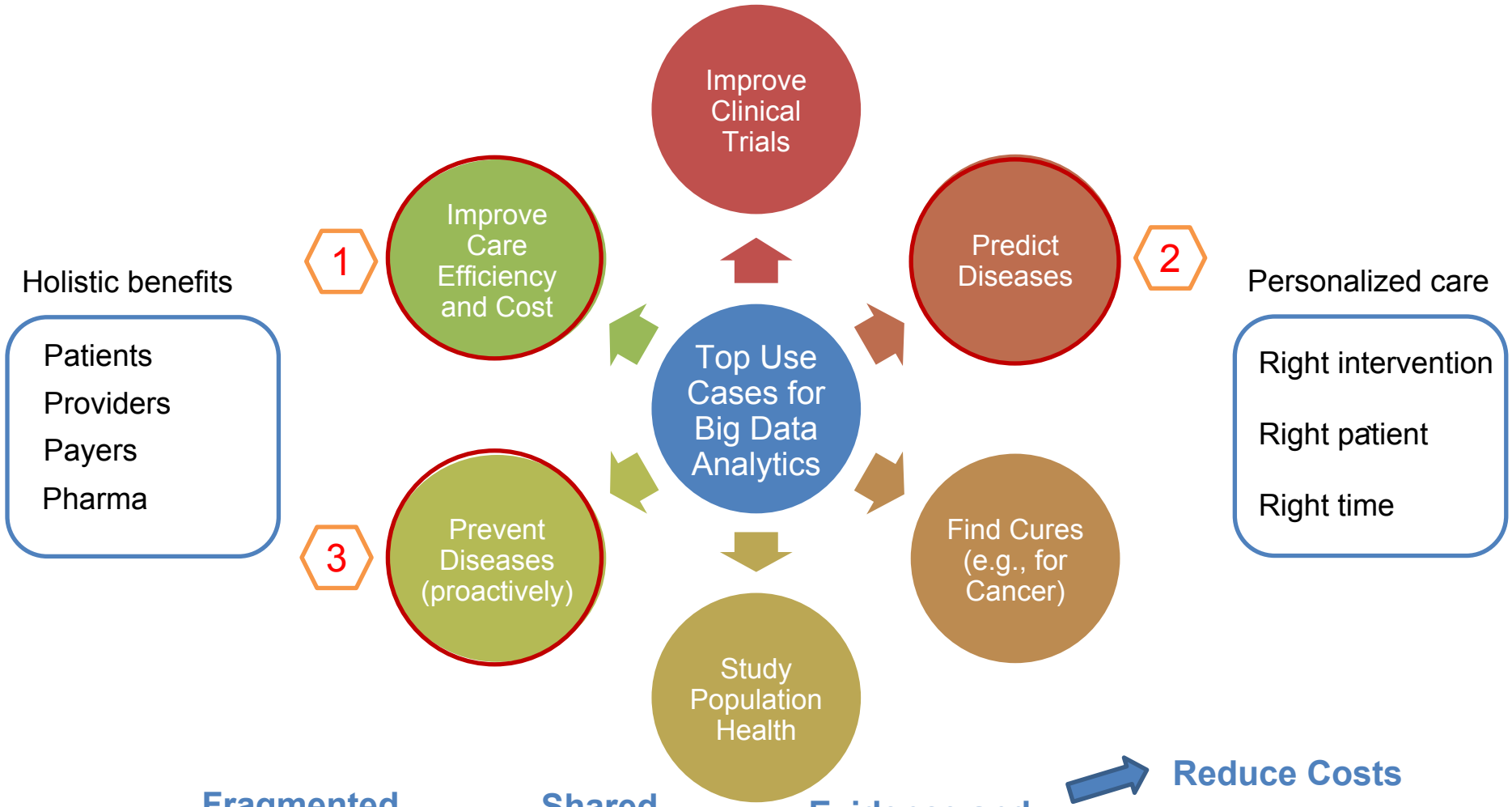
80% of the data is “unstructured” and stored in very different formats & in different silos.

…With Many Ecosystem Stakeholders



…That Need Big Data Analytics

To Reduce Costs and Improve Outcomes



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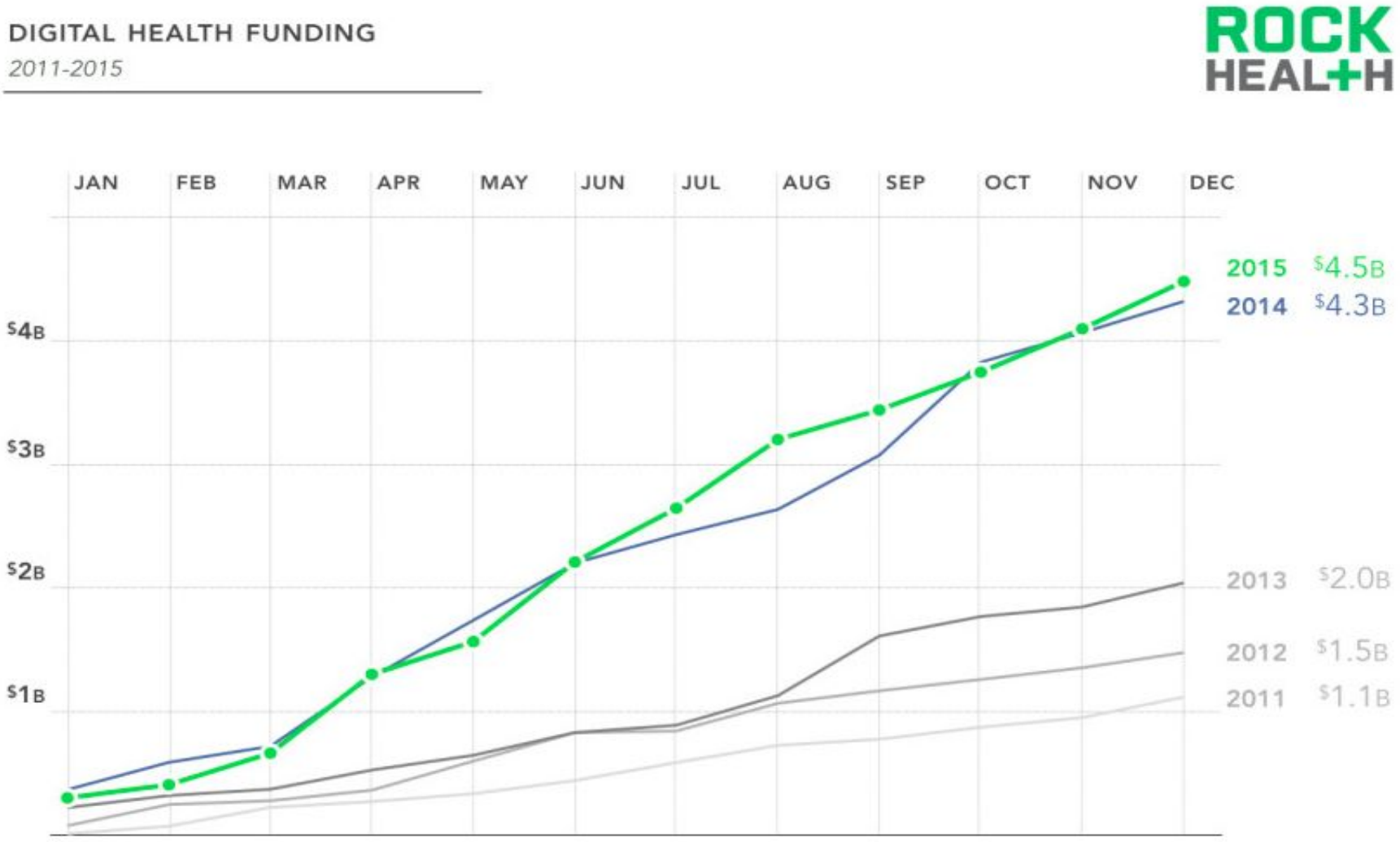
Smart Money Is Fueling Digital Health



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1 Case Study: Improve Care Efficiency and Cost

Goals

- Optimal utilization of resources
- Reduce prescription of antibiotics for children
- Charges based on claim pattern
- Reduce care cost by Genomic analytics
- Reduce claim denials

Example : LeanTaas

- Imbalance between Infusion, appointment, supply and demand
- Frequent mid-day peaks
- Unpredictable long wait
- Sub-optimal utilization of resources
- Manual approach causes over-staffing

Results and Takeaways

Machine learning delivers key results

Stanford Infusion:

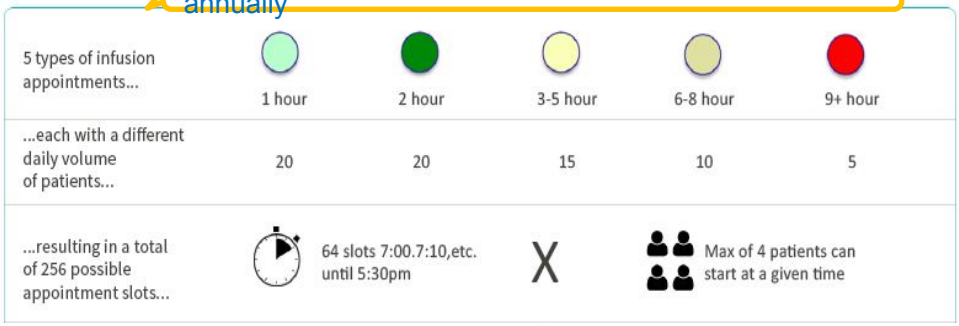
- 25% higher patients, at 15% lower costs
- 30% wait time reduction at mid-day.

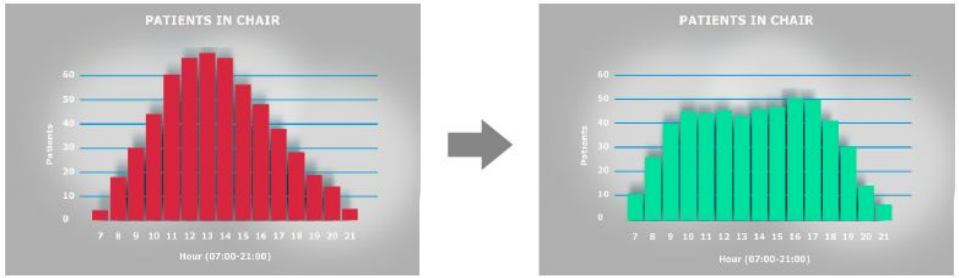
Colorado Cancer Center:

- 16% higher patients
- 28% lower overtime
- Significant staff satisfaction

LeanTaaS iQueue used advanced data science

Stanford infusion treatment handling 65,000 cases annually





Colorado Cancer Center facing mid-day peak & long wait

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Credits: LeanTass.com

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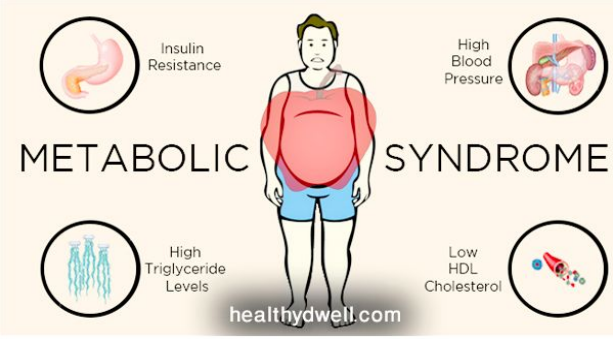
Case Study: Disease Prediction



About Metabolic Syndrome

- People with three or more of these risk factors have metabolic syndrome: insulin resistance, high BP, high triglycerides, low HDL
- More than one in three U.S. adults have metabolic syndrome
- Metabolic syndrome increases risks of heart disease, stroke and diabetes. It is costly to treat.

Goal

Accurately predict subsequent risk of metabolic syndrome and its various factors on both population and individual level

Data Sources and Big Data Analytics Platform

- Aetna's database of 37K individuals
- Demographic (age, body mass index etc.)
- Medical claim, pharmacy claim
- Laboratory test and Biometrics engineering results
- GNS Healthcare Analytics platform for accurate prediction of intervention outcomes

Results

- Reverse engineering and Forward simulation (REFS) can learn models directly from data which capture the underlying mechanisms and processes consistent with the data
- Generated individual insights with accuracy
- Developed targeted cost-effective care management programs for individuals with or at risk for metabolic syndrome

Case Study: Disease Prevention

Objectives

- Prevent diseases and deliver more effective healthcare through proactive intervention and lifestyle changes
- Infer insights from patient data and correlate with population health
- Patient data: profile, vital signs, activity, diet, sleep, physiological and behavioral indicators

Players

- **Welltok (startup with >$145M raised):** Caféwell Concierge and Insights apps for personalized health solutions for everyday consumers
- **IBM Watson Health:** "cognitive computing" backend in the cloud

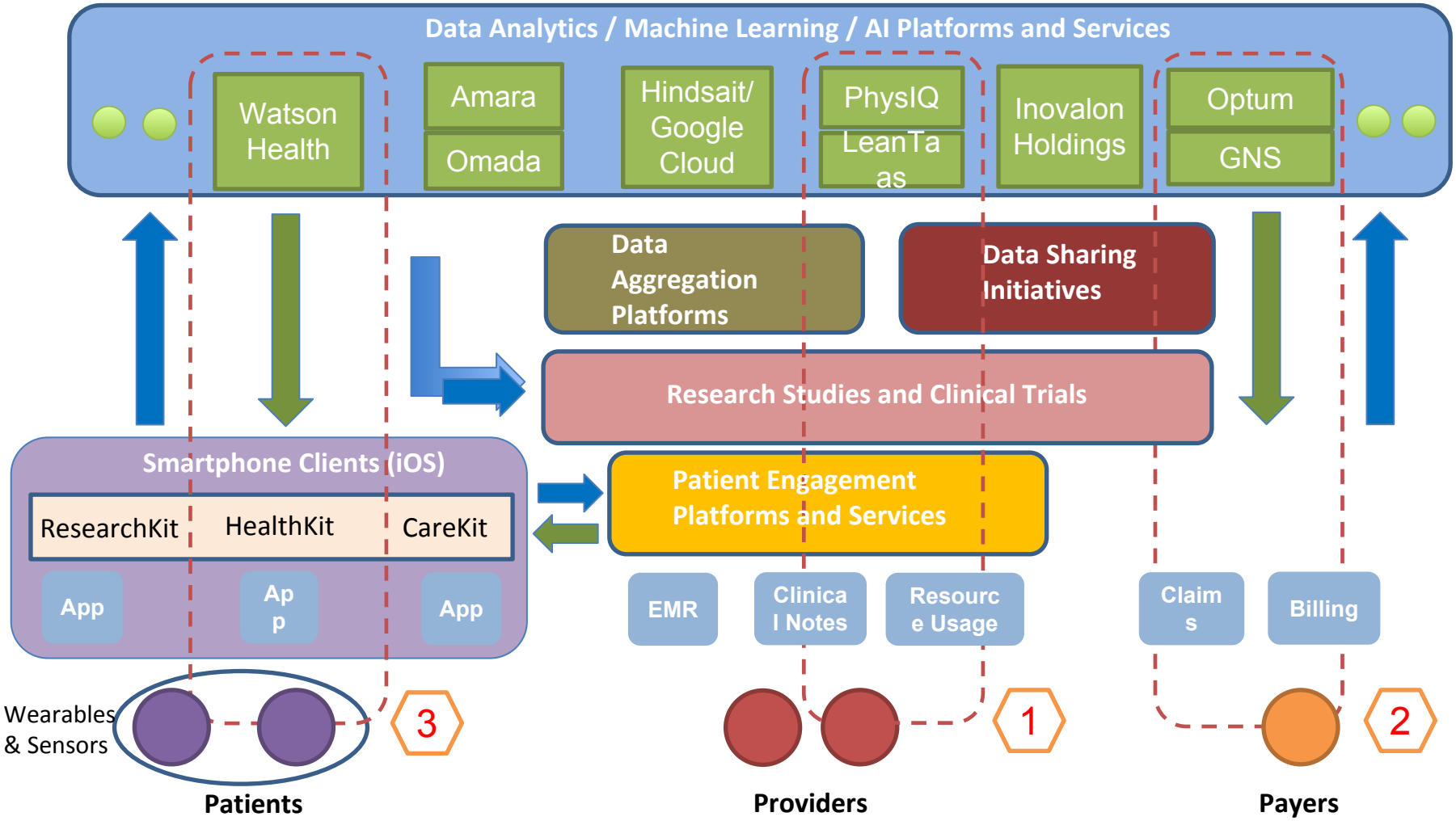
Engagement and Analytics Platform

- Cafewell Health Optimization Platform
- For population health managers and consumers
- Personalized plan that engages consumers in healthy behaviors via rewards, streamlined communication, actionable insights
- Intelligent Health Itinerary – action plan with recommendations that get better with use and over time
- Watson Health platform provides natural language processing to assess user's activity goals and provide prompts

Results

- State of Colorado engagement
- Co-sponsored by United Healthcare and Kaiser
- 50% participation in program
- 650% increase in health assessment completion
- $100K awarded for healthy behaviors
- Other successful rollouts with Centura Health, Community Health Plan (Washington), Coventry HealthAmerica

Emerging Landscape...Digital Health Gold Rush



Data

Insights

Share with Care - or Catch Me If You Can

Privacy (keep secure)

Ownership (who owns?)

Relevance (too much?)

Accuracy (noise?)

Misuse (penalize?)

In 2014, medical records accounted for 43% of all data stolen and the healthcare sector has seen the biggest increase in data theft since 2010 (far more so than business or government sectors).

Are We There Yet?…Long Road, Bumpy Ride!

The best way to predict the future is to create it.

- Abraham Lincoln and Peter Drucker

Likely Winners and Losers

Patients will win but might pay more

Better, more efficient, and timely care with more choices

Might pay higher premiums based on fitness and lifestyle data (for poor choices)

Providers – hospitals will win but doctors could see tradeoffs

Higher efficiencies and lower costs

Some specialties will benefit, but not all

Private practices may struggle / lose

"Intelligent machines" may complement doctors, but also squeeze them more

Payers – insurance companies could win but it depends

Depends on mix of healthy vs unhealthy population

Back To The (Healthy) Future

Q & A