



HEALTHCARE ANALYTICS

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HEALTHCARE ANALYTICS AND AI PROMISE

According to [Accenture analysis](#), when combined, "key clinical health AI applications can potentially create \$150 billion in annual *savings* for the US healthcare economy by 2026."

Healthcare market in India is expected to reach US\$372 billion by 2022, driven by rising incomes, greater health awareness, lifestyle diseases and access to insurance

Based on [a study by Frost & Sullivan](#), the market for AI has the potential to improve healthcare outcomes by 30 to 40 percent while simultaneously **cutting treatment costs in half by Integrating information** such as medical records with operating metrics which can help assist physicians



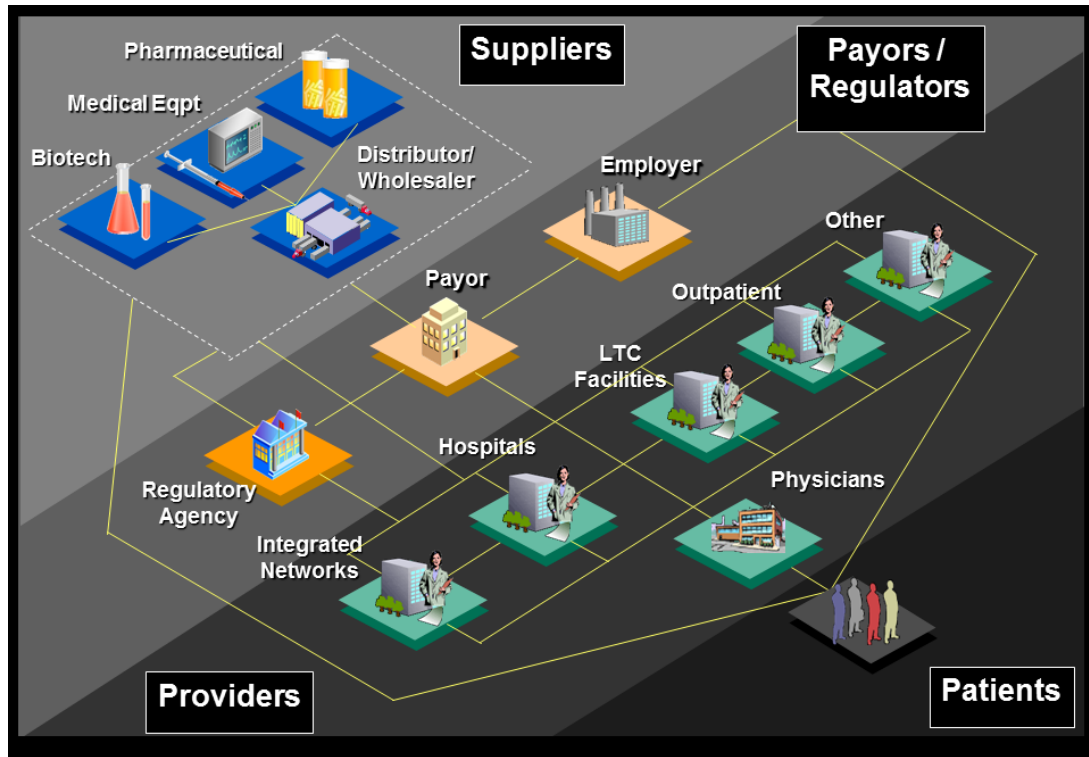
HEALTHCARE ANALYTICS .. WHAT IS?

Healthcare analytics is a method of systematic data analysis that allows healthcare professionals to find opportunities for improvement in health system management, patient engagement, spending, and diagnosis. Healthcare analytics combines real-time and historical data analysis to predict trends, reveal actionable insights, and drive long-term growth

Source: evariant

HEALTHCARE - OVERVIEW

The Healthcare System

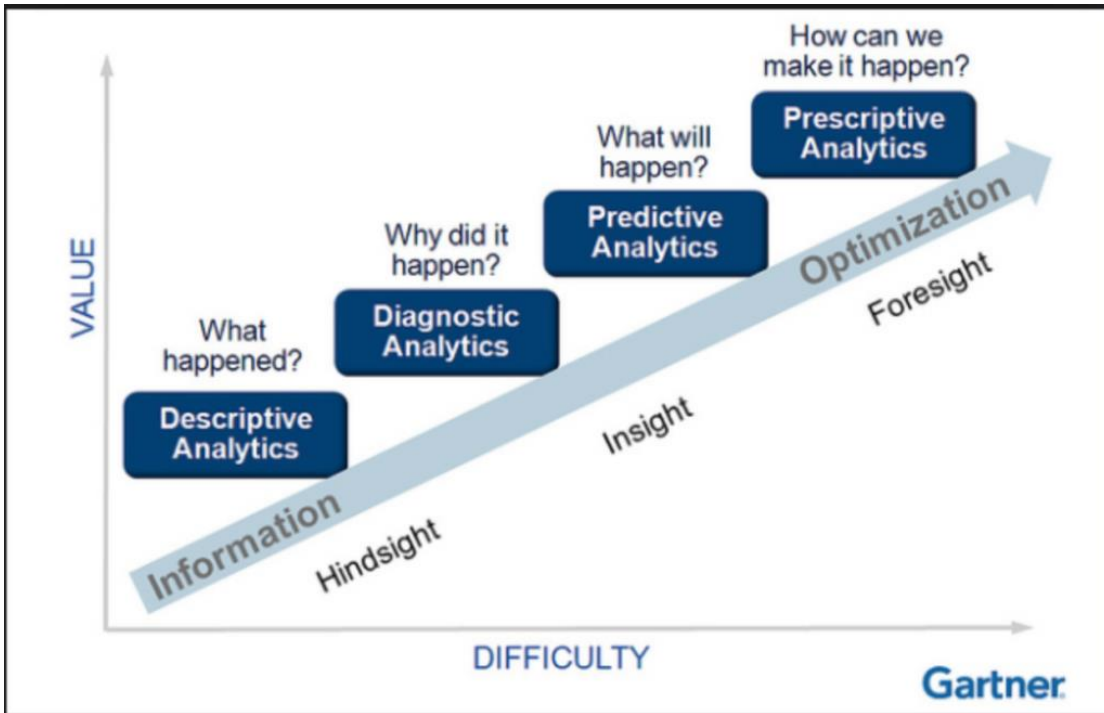


Healthcare value add chain

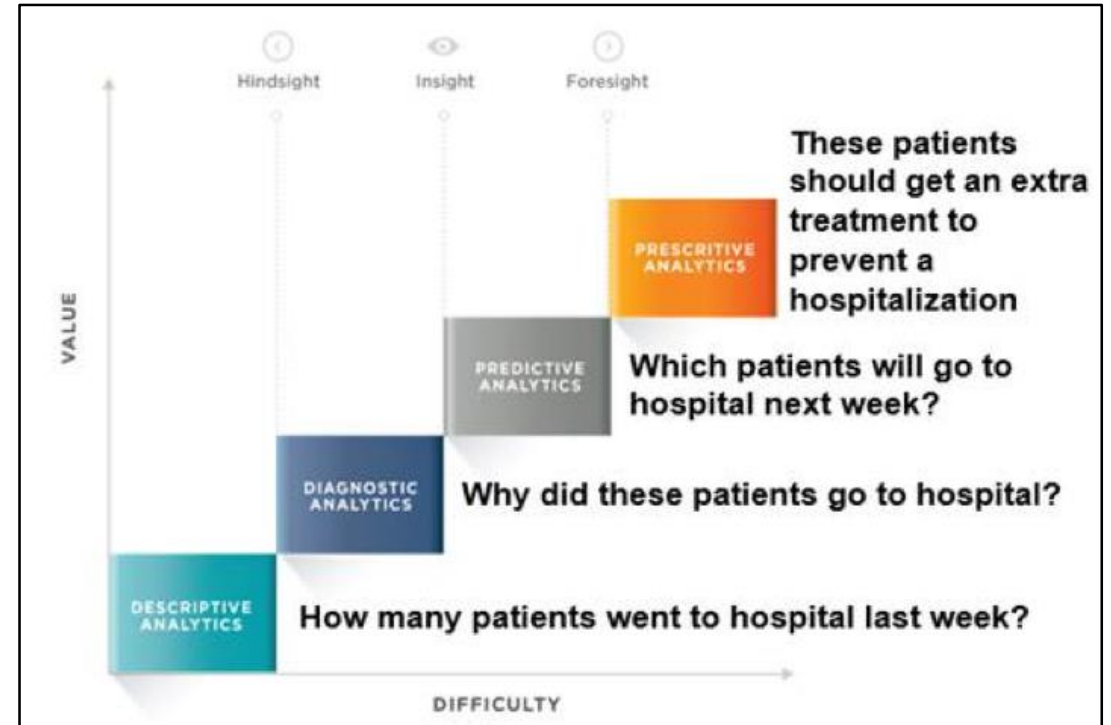


ANALYTICS ... THEN AND NOW

Analytics Progression



In the context of Healthcare



HEALTHCARE ANALYTICS – MARKET SYNOPSIS

Analytics and AI in Healthcare Market

The **global healthcare analytics market** is expected to grow at a **CAGR of around 23.4%** from **2019 to 2026** and reach the market value of around **US\$ 52.2Bn** by **2026**

By Application

- Diagnostic Imaging
- Virtual Assistant
- Care Management
- Patient Risk Analysis
- Drug Discovery
- Wearables
- Precision Medicine

By End Users

- Hospitals & Providers
- Patients
- Pharma Companies
- Bio-techs
- Others

By Technology

- Machine Learning
- Natural Language Processing
- Voice Analytics
- Context aware computing

Research

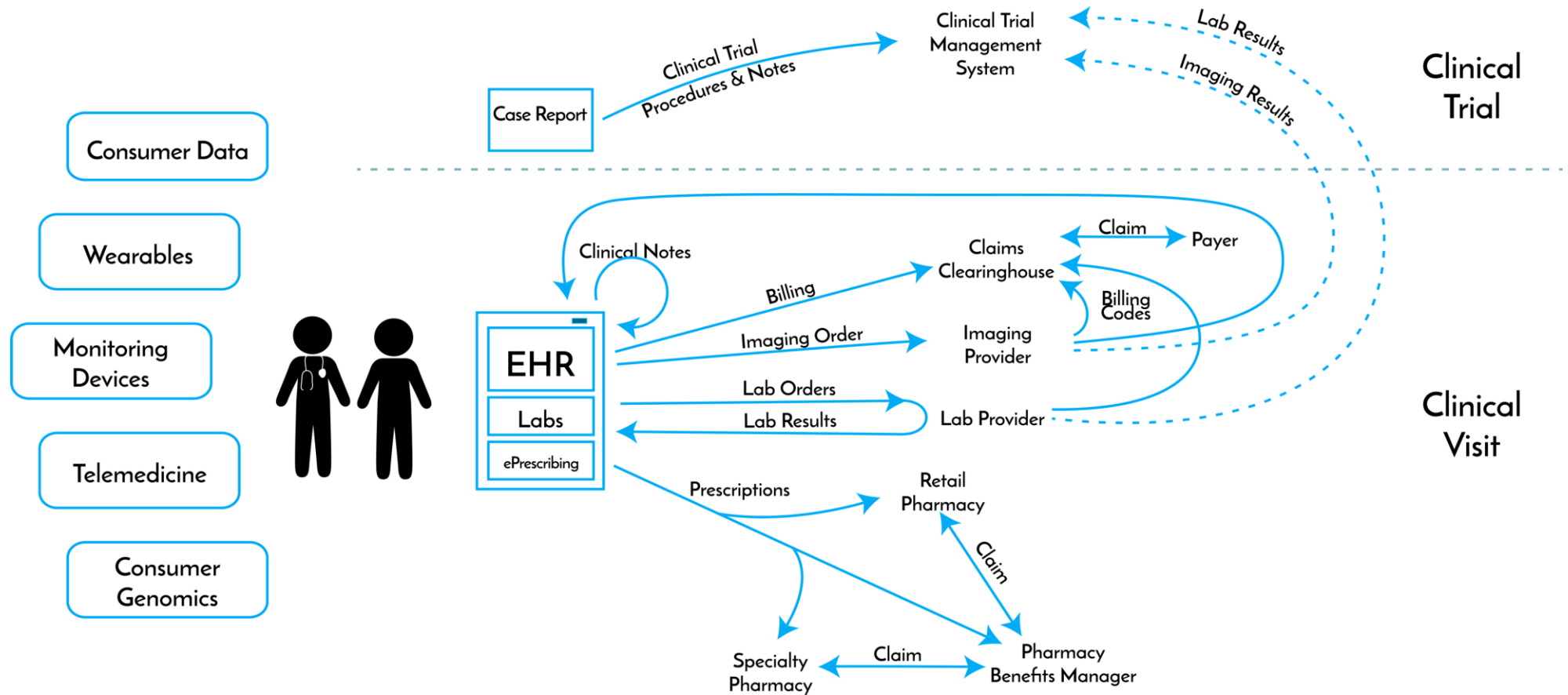
- Genetic research
- Clinical Trials
- Drug Discovery
- Device comparative

Offerings

- Software
- Hardware
- Services
- Others

HEALTHCARE DATA

Data Origination and Exchange



HEALTH ANALYTICS ECOSYSTEM

Provider

Patient



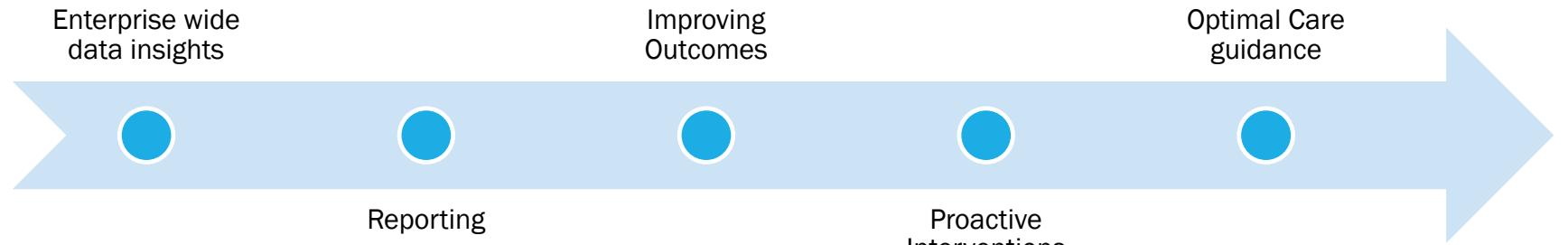
Payer

Life Sciences

HEALTHCARE ANALYTICS ADOPTION MODEL

Improve Health	Level 9	Direct-to-Consumer Analytics & Artificial Intelligence	Putting member data, analytics, and AI in member's hands so they can own more of their health and healthcare decisions.
	Level 8	Personalized Medicine & Prescriptive Analytics	Tailoring member care based on population outcomes and genetic data. Fee-for-quality rewards health maintenance.
	Level 7	Clinical Risk Intervention & Predictive Analytics	Organizational processes for intervention are supported with predictive risk models. Fee-for-quality includes fixed per capita payment.
Reduce Variation	Level 6	Population Health Management & Suggestive Analytics	Tailoring member wellness based upon population metrics. Fee-for-quality includes bundled per case payment.
	Level 5	Waste & Care Variability Reduction	Reducing variability in care processes. Focusing on internal optimization and waste reduction.
Improve Efficiency	Level 4	Automated External Reporting	Efficient, consistent production of reports & adaptability to changing requirements.
	Level 3	Automated Internal Reporting	Efficient, consistent production of reports & widespread availability in the organization.
	Level 2	Standardized Vocabulary & Member Registries	Relating and organizing the core data content.
	Level 1	Enterprise Data Operating System	Collecting and integrating the core data content.
	Level 0	Fragmented Point Solutions	Inefficient, inconsistent versions of the truth. Cumbersome internal and external reporting.

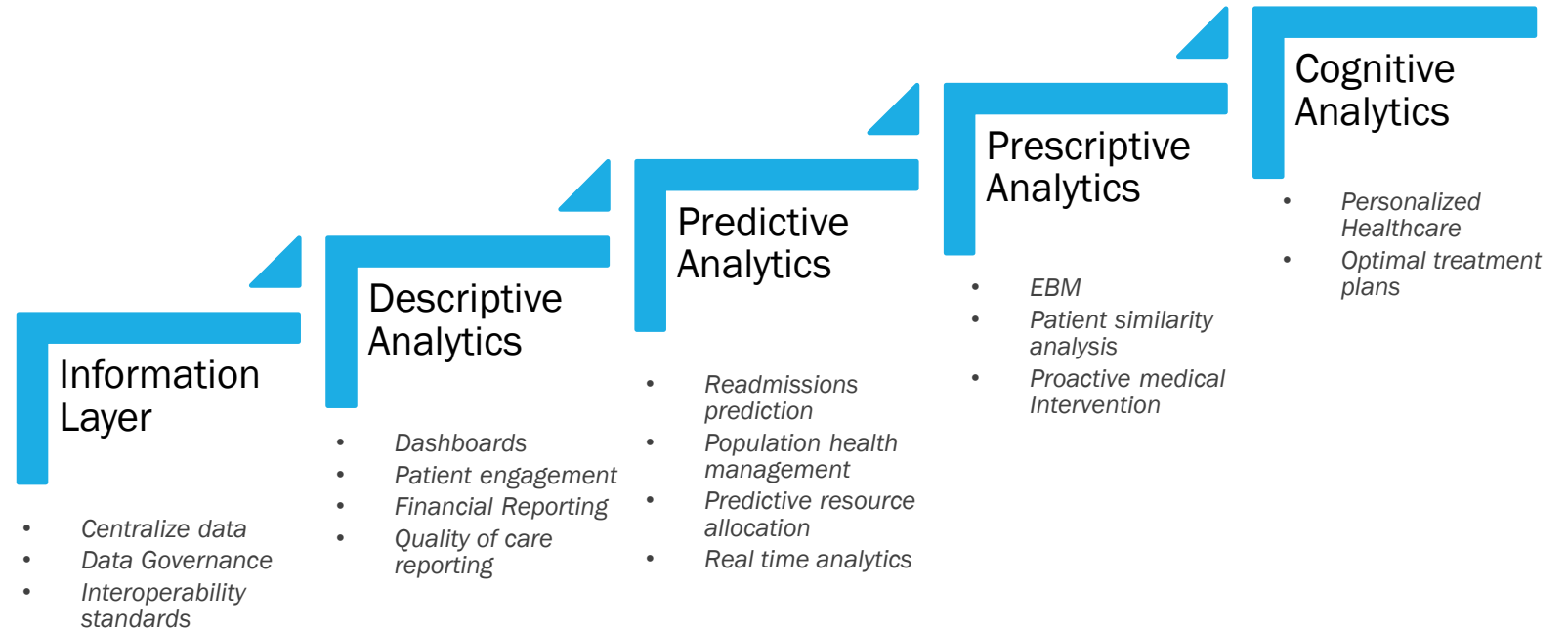
HEALTH ANALYTICS JOURNEY



Industry moves in a transformative phase from descriptive to predictive to cognitive with various maturity levels ..

Leveraging the **right Talent and the latest Technology** to deliver the future of healthcare.

Driven by the desire to **automate** key tasks and provide **deeper insights** **Anywhere. Anytime.**



OPPORTUNITIES AND CHALLENGES

Expectation Vs Reality

Pilots & PoCs promising and already revolutionizing the thought process

Lack of right infrastructure, robust processes and concerns about reliability of resulting data source

Better Insights Vs Privacy

Continuous learning with more data points exposure and better outcome every time

Concerns around PII, Medical history – blockers to participation

Data availability Vs Interoperability

No dearth of information assets both structured and unstructured

However, hosted on disparate and heterogeneous sources and lacks interoperability

Ease of care Vs Adoption

Transformation through the best in data & technology for accurate analysis over traditional

Trust deficit in safety and reliability of AI tech



TOP USE CASES

● Compiling and analyzing information (like medical records and other past history), data management is the most widely used application of artificial intelligence and digital automation. Robots collect, store, re-format, and trace data to provide faster, more consistent access. **Medical Records and Other Data analysis**

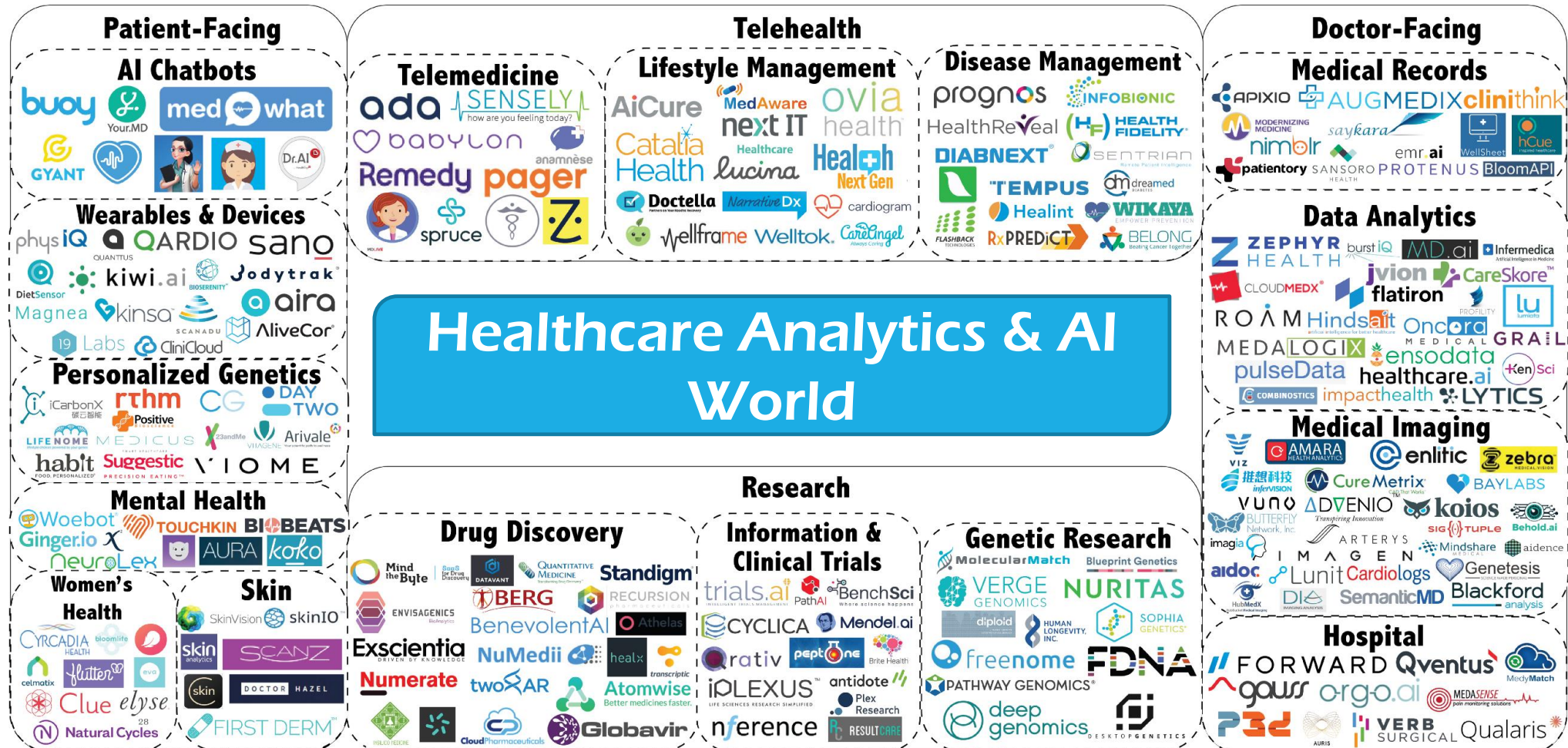
● Analyzing tests, X-Rays, CT scans, data entry, and other mundane tasks can be done faster and more accurately by robots. Cardiology and radiology are two disciplines where the amount of data to analyze can be overwhelming – experts shall only look at the most complicated cases where human supervision is useful. **AI led process automation**

● Apps like Babylon in the UK use AI to give medical consultation based on personal medical history and common medical knowledge. Users report their symptoms into the app, which uses speech recognition to compare against a database of illnesses. Babylon then offers a recommended action, taking into account the user's medical history **Digital Consultation**

● **Virtual Nurses**
The startup Sense.ly has developed Molly, a digital nurse to help people monitor patient's condition and follow up with treatments, between doctor visits. The program uses machine learning to support patients, specializing in chronic illnesses.

● **Treatment Design** AI systems have been created to analyze data – notes and reports from a patient's file, external research, and clinical expertise – to help select the correct, individually customized treatment path. The NIH have created the AiCure app to monitor the use of medication by a patient. **Medication Management**

HEALTHCARE - ANALYTICS AND AI COMPANIES



AROUND THE WORLD...

With Watson Health, AHMC healthcare improved sepsis management, achieving 100% compliance

NHS UK .. You are now talking to Alexa! NHS team worked with Amazon's Alexa to offer health information by voice search.

Healthcare start up RDMD is using big data to treat rare diseases by identifying commonalities

At Texas Children hospital, improved data access drives Effective Care Delivery – enabled by HealthCatalyst

SigTuple, an Indian startup, wants to use AI to improve the speed, accuracy, and consistency of various screening processes.

UK-HDAN, a community of 400+ health data scientists across UK - work together to map UK health data analytics landscape

TECH RESOURCES

Healthcare.ai by HealthCatalyst

Python and R Packages:

`pip install https://github.com/HealthCatalyst/healthcareai-py/zipball/master`

<https://cloud.r-project.org/package=healthcareai>

More R Packages:

EHR: Electronic Health Record (EHR) Data Processing and Analysis Tool

<https://CRAN.R-project.org/package=EHR>

pubh: A Toolbox for Public Health and Epidemiology

<https://CRAN.R-project.org/package=pubh>

NHSRdatasets: NHS and Healthcare Related Data for Education and Training

<https://CRAN.R-project.org/package=NHSRdatasets>

Python Ref.:

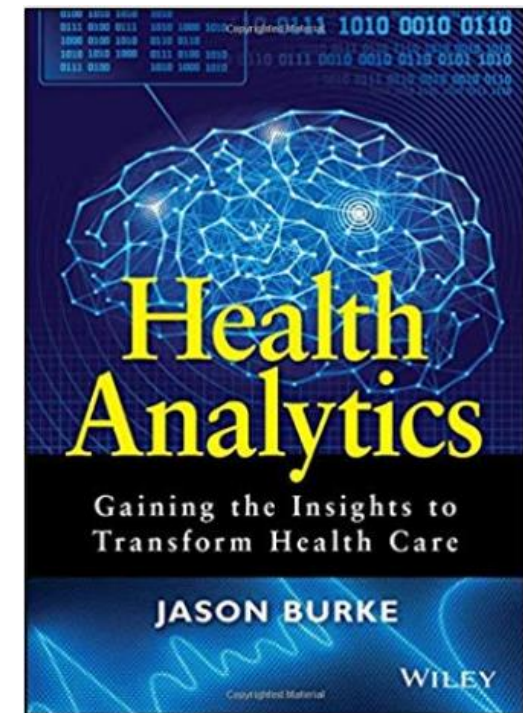
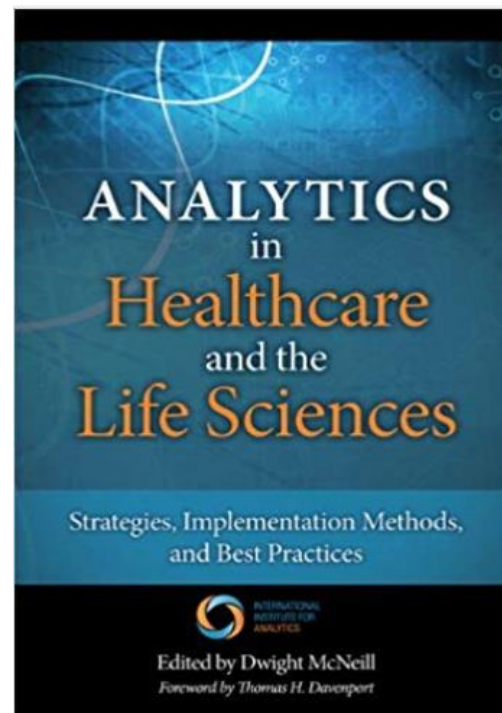
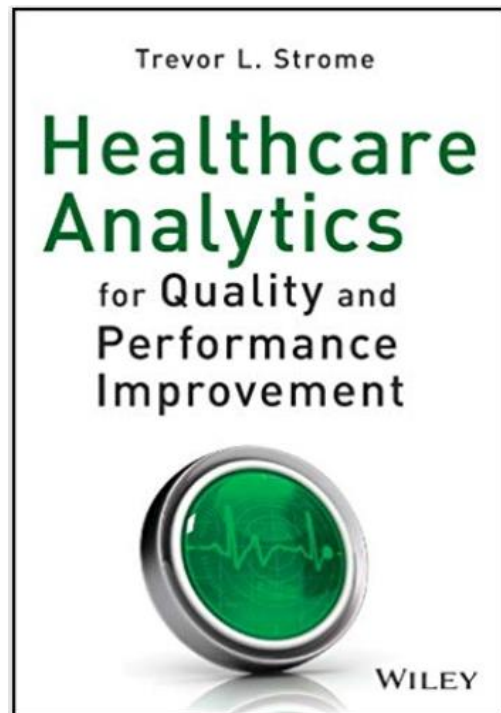
Healthcare Analytics made simple by Vikas Kumar (Packt Publishing)

<https://github.com/PacktPublishing/Healthcare-Analytics-Made-Simple>

Python Healthcare Org

<https://pythonhealthcare.org/>

HEALTHCARE ANALYTICS ... FURTHER READING





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