AAIH
ALLIANCE FOR ARTIFICIAL INTELLIGENCE IN HEALTHCARE

Data and the Life Sciences: Overview of the Changes to Come

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BlackThorn THERAPEUTICS

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THE PHARMACEUTICAL COMPLIANCE FORUM

Overview of Presenters:

ALLIANCE FOR ARTIFICIAL INTELLIGENCE IN HEALTHCARE

Oscar Rodriguez *(BlackThorn Therapeutics)*

- Senior Director, **Innovation & Technology** at BlackThorn Therapeutics; Co-Chair of the **Technology and Standards Committee** at AAIH
- Currently responsible for the **technology vision** and **implementation** of BlackThorn's PathFinder™ platform
- **Past Key Organizations:** Accenture, Google, Cloud Technology Partners, Pfizer, and Cloud Sherpas

Sarah Venable, JD, MS *(GSK)*

- **Risk Analytics Manager** for Independent Business Monitoring within GSK's **Global Ethics and Compliance** organization
- Oversees **analytics initiatives** to support monitoring Pharma, Consumer, and Vaccines related to **Commercial Practices, Scientific Engagement**, and **Anti Bribery** and **Corruption risks**
- **Past Key Organization:** SAS Institute

Agenda

ALLIANCE FOR ARTIFICIAL INTELLIGENCE IN HEALTHCARE

1. Overview of AAIH
2. Data and Life Sciences and the Inevitability of AI
   Data Landscape, Sample Applications, Challenges, Trends
3. BlackThorn and GSK Case Studies
4. Conclusions & Takeaways
5. Q&A and Comments

AI Definitions

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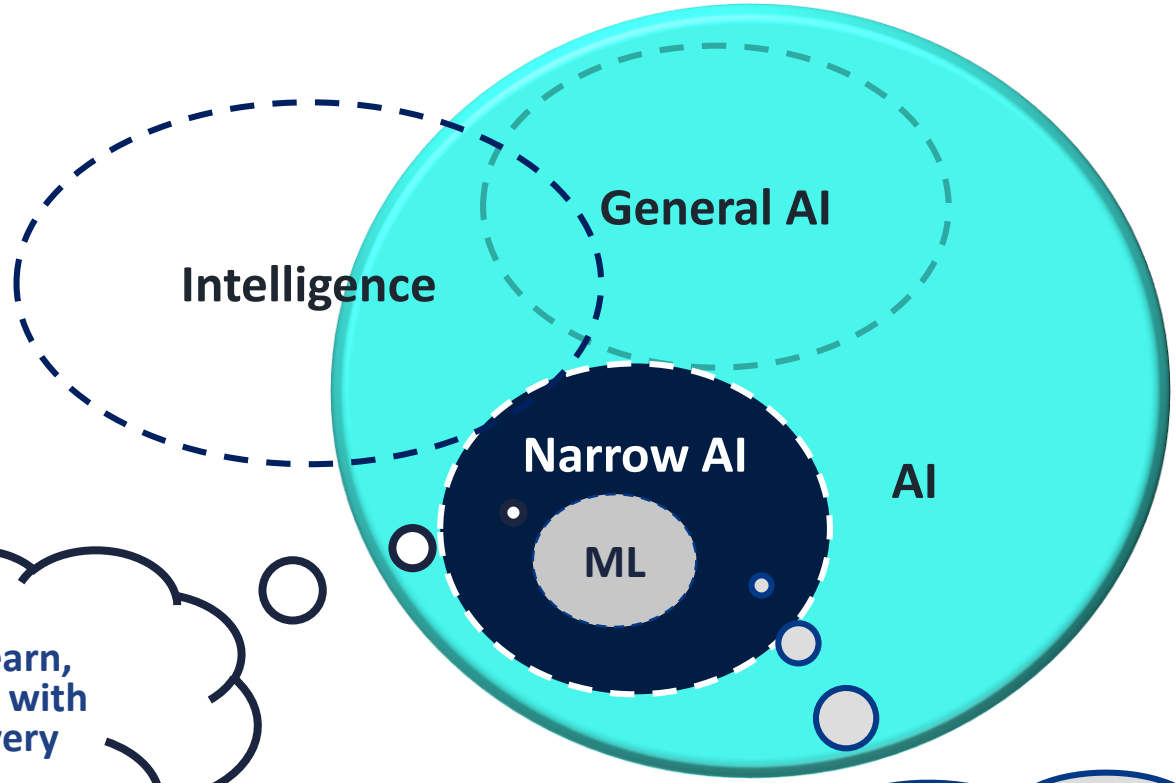


AI with ability to learn, understand, or deal with novel inputs in a very narrow scope

Machine Learning - Algorithm that learns patterns from a training set of data and applies those patterns to make predictions

AAIH Members:

ALLIANCE FOR ARTIFICIAL INTELLIGENCE IN HEALTHCARE

AAIH comprises of 22 founding members with a goal of adding 15+ new members

About AAIH

ALLIANCE FOR ARTIFICIAL INTELLIGENCE IN HEALTHCARE

Our quad-partite mandate to facilitate full adoption & responsible integration of AI in healthcare

MISSION ELEMENTS

1 EDUCATE

- Affirm **value of AI** with all stakeholders
- Produce **credible industry manuscripts**
- Coordinate forums for **public dialogue**

2 ADVOCATE

- Develop informed **guidance & regulations**
- Engage **Government** bodies & **NGO's**
- Champion **IP paradigms** that align with advancement of AI in healthcare

3 PROMOTE

- Foster ***cross-industry*** **collaboration** & **investment**
- Support **pre-competitive data sharing**
- Stimulate dialogue to improve **transparency & access**

4 ESTABLISH

- **Standards** of development & implementation
- Expectations on **testing methods & validation**
- Independent **review and accreditation** services

Standing Committees Serving our Mission

AAIH ALLIANCE FOR ARTIFICIAL INTELLIGENCE IN HEALTHCARE

I Education & Accreditation (EAC)

- Drives **education initiatives**, improving **acceptance of AI** within general populace, investors & legislators
- Leads **workshops** and **training programs** with focus on **workforce development**

II Federal Engagement & Regulatory Affairs (FERAC)

- Engages with **int'l regulatory bodies** & relevant **government agencies** such as FDA, EMEA, DOE, USPTO, NIH, DoD, VA
- Responds to **regulatory guidance** & **reviews**

III Investment & Commercialization (ICC)

- Interacts with **investment community**, on **capital raising** needs, trends & strategies
- Addresses fundraising and **capital requirements** of AAIH member companies e.g., investor events, investor relations support

IV Communications (CC)

- **Positions AAIH** with external entities e.g., industry, affiliates, and other alliances
- Works with partners on coordinating & promoting AAIH related **press releases, conferences**, and **events**

V Technology & Standards Development (TSDC)

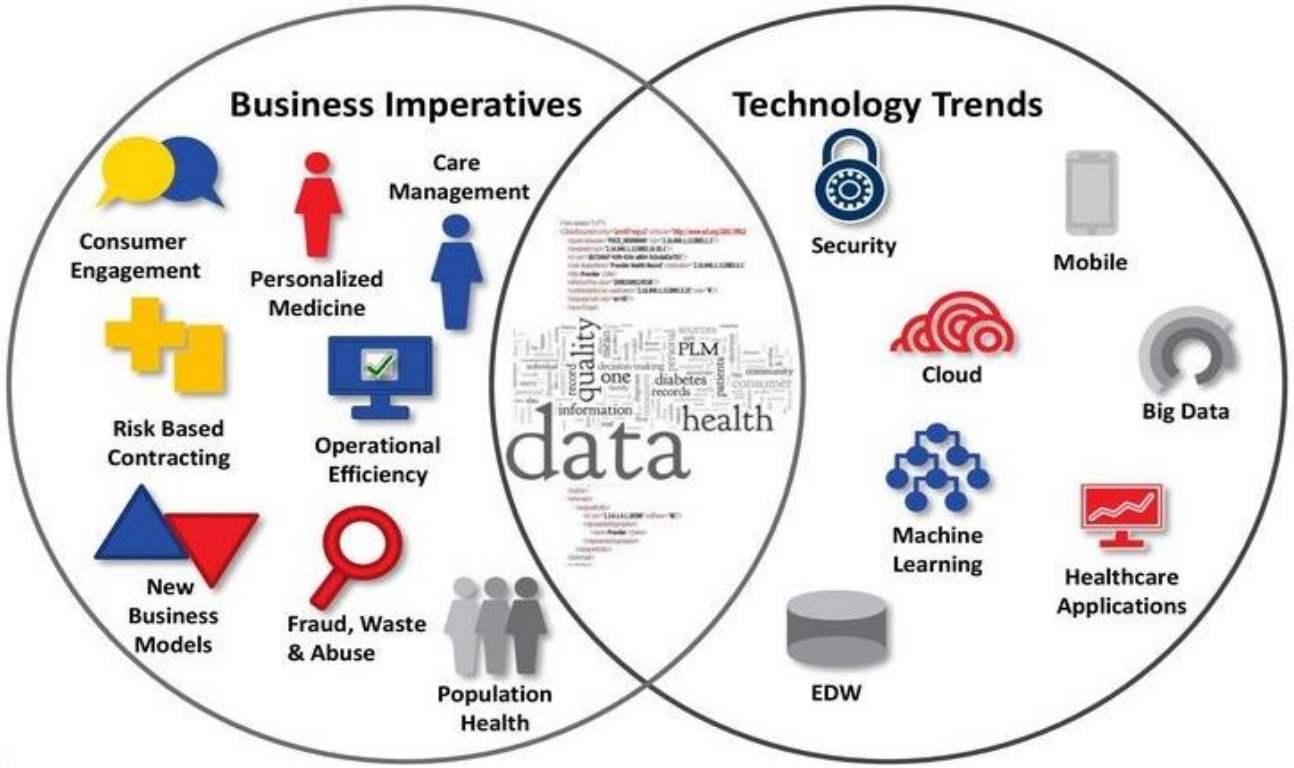
- Drives development of specific **technology sections** through **task forces** & **communication platforms**
- Works to **develop & establish** critical **industry standards**, supporting **infrastructure** and **emerging architecture**

VI Industry Performance Data & Analytics (IPDAC)

- Works in conjunction with partners to **produce & distribute sector analytics**
- Provides **insights & implications** of market trends in AI healthcare sector

Data and Life Sciences and the Inevitability of AI

Data in Life Sciences



https://www.marketexpert24.com/2019/08/28/advance-technology-of-big-data-in-health-and-life-science-market-2019-growing-at-cagr-of-19-2-by-2025-by-mckesson-dell-cognizant-epic-system-cerner-ge-healthcare-siemens/

Data in Life Sciences

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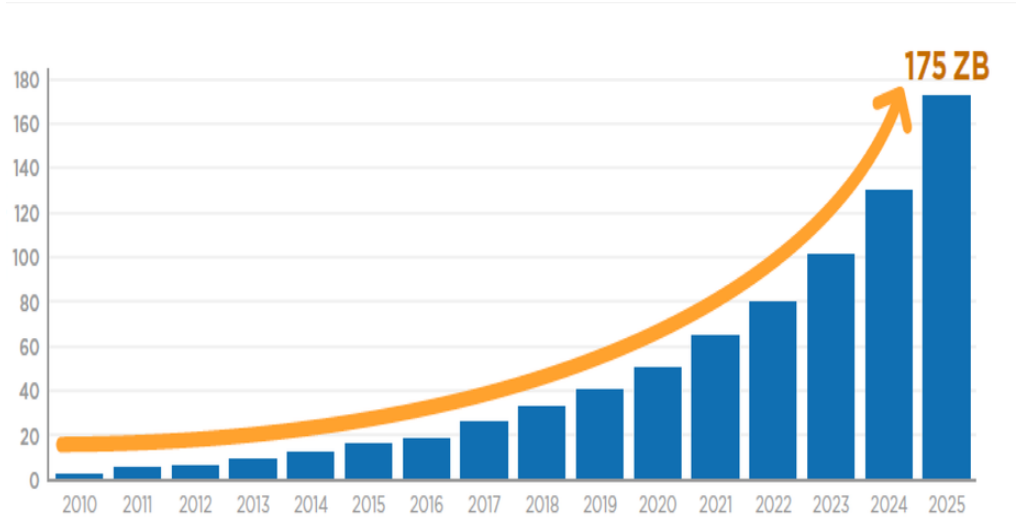
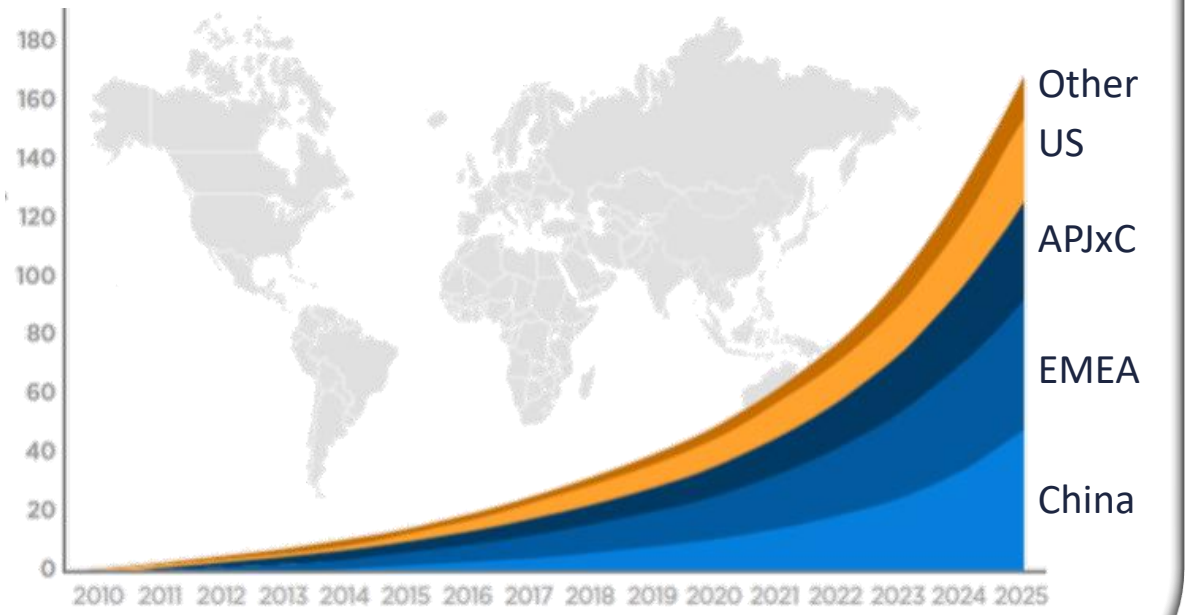
The Global Datasphere quantifies and analyzes the amount of data created, captured, and replicated in any given year across the world

Annual Size of Global Datasphere (ZB)



Global Datasphere by Region



Source. Data Age 2025 by Seagate. April 2017

Illustrative

Sample Life Sciences & Clinical Applications

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AI is being applied to understand & modulate biology, diagnose disease, and predict clinical potential & treatment outcomes

AI for Discovery & Development

- Novel Drug Discovery & Repurposing
- Drug Manufacturing
- Computational Biology
- Real World Evidence*
- -Omics & NGS
- Clinical Trial Design & Management

AI for Clinical Applications

- Patient Electronic Health Records
- Population Health Management
- Predictive Care Guidance
- Digital Imaging
- Digital Pathology
- Diagnostics

* Note: From Frost & Sullivan, Industry experts, Wolters Kluwer, AAIH expert viewpoints. * = For R&D and Clinical Apps

Data & AI in Life Sciences - Challenges

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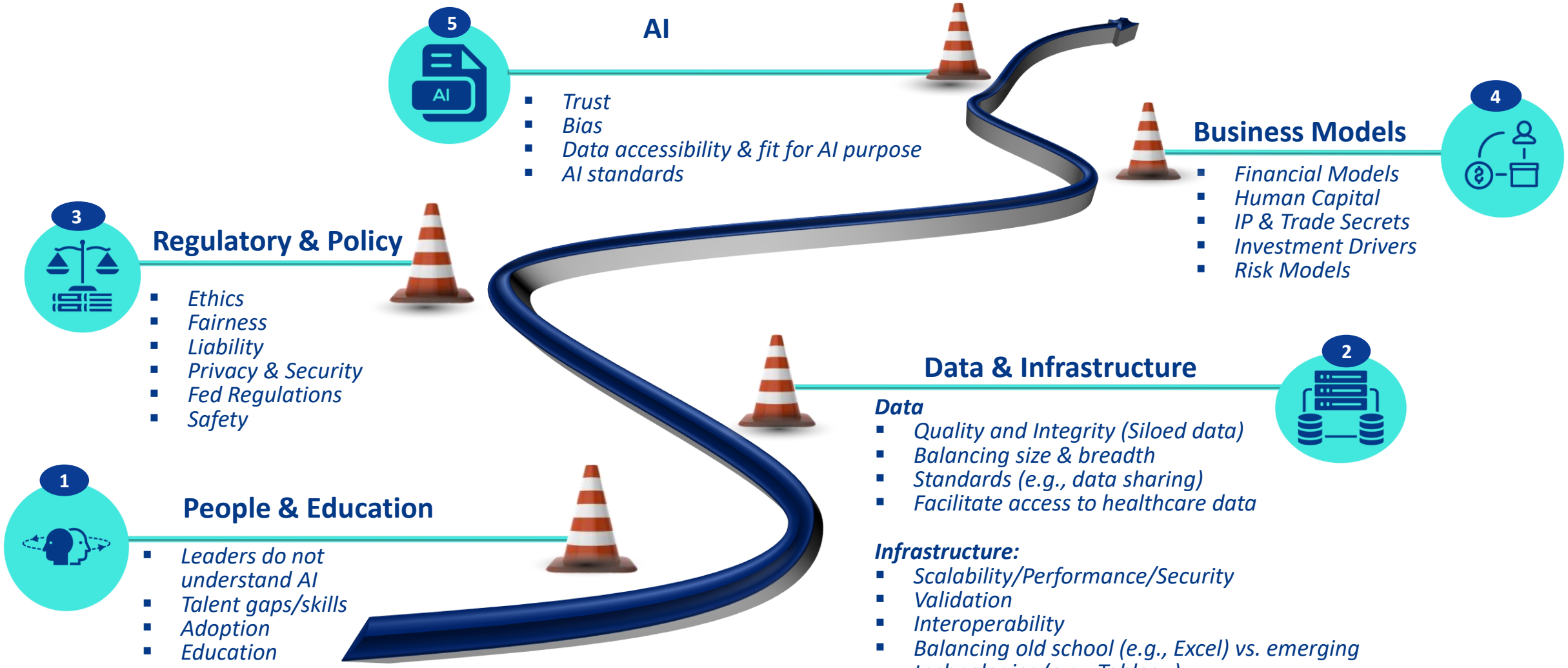

5 AI

- *Trust*
- *Bias*
- *Data accessibility & fit for AI purpose*
- *AI standards*

4 Business Models

- *Financial Models*
- *Human Capital*
- *IP & Trade Secrets*
- *Investment Drivers*
- *Risk Models*

3 Regulatory & Policy

- *Ethics*
- *Fairness*
- *Liability*
- *Privacy & Security*
- *Fed Regulations*
- *Safety*

2 Data & Infrastructure

Data

- *Quality and Integrity (Siloed data)*
- *Balancing size & breadth*
- *Standards (e.g., data sharing)*
- *Facilitate access to healthcare data*

Infrastructure:

- *Scalability/Performance/Security*
- *Validation*
- *Interoperability*
- *Balancing old school (e.g., Excel) vs. emerging technologies (e.g., Tableau)*

1 People & Education

- *Leaders do not understand AI*
- *Talent gaps/skills*
- *Adoption*
- *Education*

Data & AI in Life Sciences - Trends

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REGULATORY & POLICY:

- Expanding data governance and compliance capabilities
- **Usage of AI to identify commercial risk (i.e., off-label promotion, inducement) in emails, social media posts, and other textual records**
- AI applied to process automation (usage of bots)

PEOPLE & EDUCATION:

- Companies are desperate for qualified subject matter experts in AI, Security, Compliance, etc.

AI:

- **AI Standards**
- **Democratizing AI/ML solutions for non-data scientists**
- Exponential growth of emerging technologies

BUSINESS MODELS:

- Data Partnerships (Academics and Enterprise)
- **Incentives and models for Data Sharing (how we can get people to share data?)**
- Data-driven innovation (e.g., Data-driven Clinical innovation)

DATA INFRASTRUCTURE:

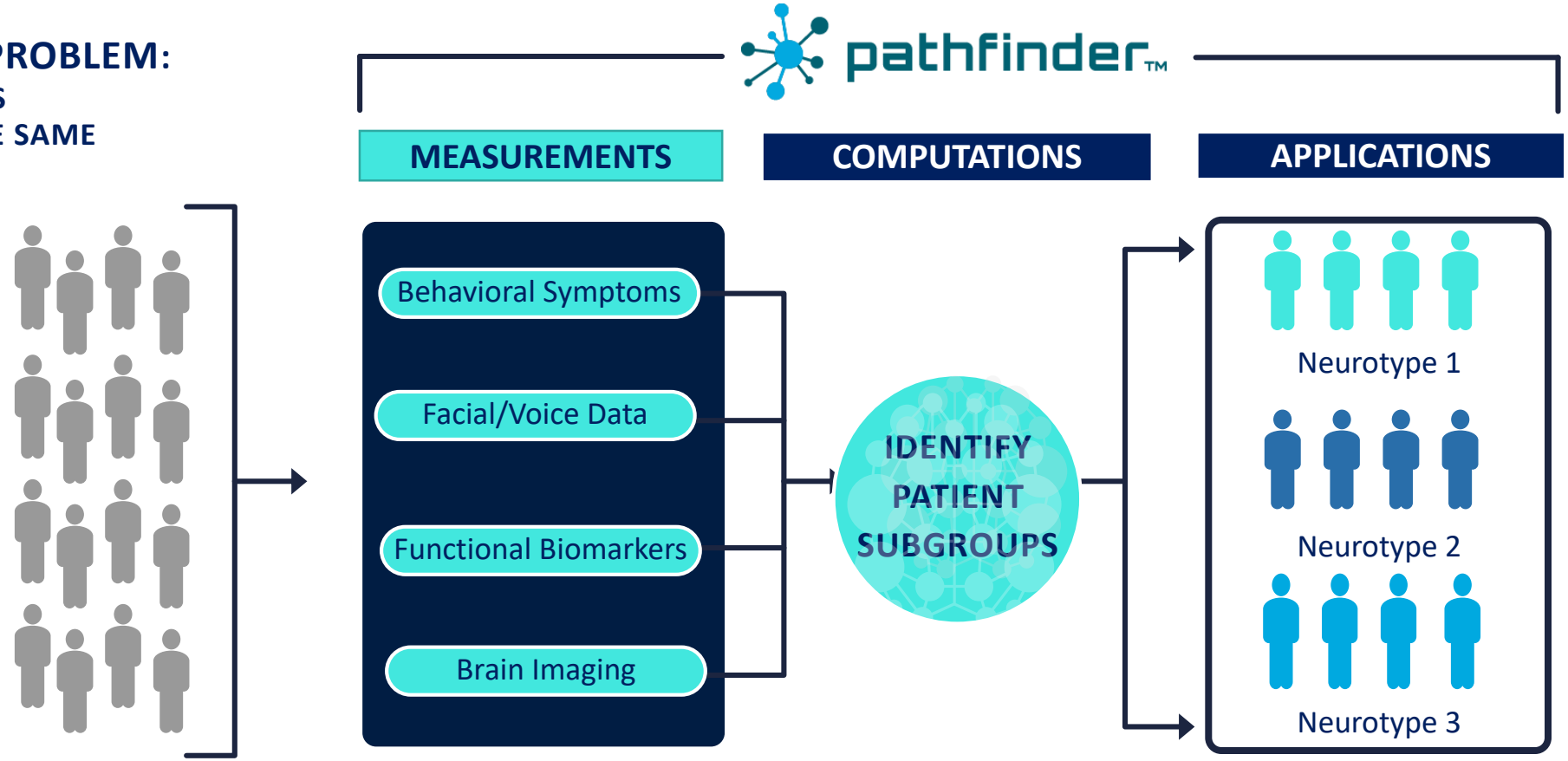
- **Scalable Data Platforms**
- **Integrated Cross-functional databases**

Case Studies

Case Study 1: PathFinder™ - Computational Psychiatry Platform

Our approach targets treatments to those most likely to benefit

TODAY'S PROBLEM:
ALL PATIENTS TREATED THE SAME



SOLUTION:
IDENTIFY PATIENTS MOST LIKELY TO RESPOND TO TREATMENT

Case Study 2: Global Ethics & Data Analytics

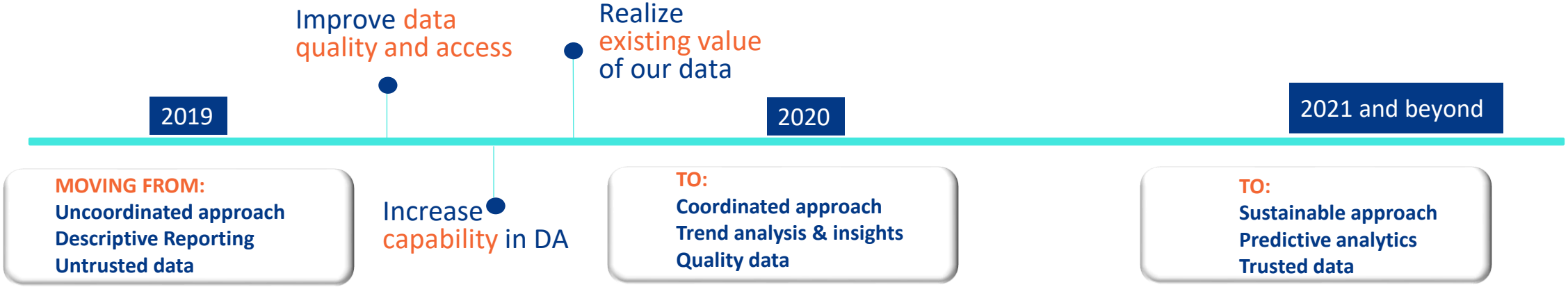
Our vision is to deliver a transformative approach to the creation, storage and use of trusted data that drives actionable insights and risk- based decisions

Imagine a GEC function that:

ENABLES the business to manage and reduce current and emerging risk, and understand compliance **trends and patterns**

PROTECTS the business by identifying risk before actual issues occur or become widespread

Is **data driven** and supported by the right **people, processes & technology**



Case Study 2: Global Ethics & Data Analytics

Development of Key Risk Indicator Dashboards to Better Understand and Manage Risk

What are they?

KRIs help to **signal** where there are **potential problems** in an activity. They are a tool to help manage risk. ***They are only indicators.***

KRIs are **not** designed to highlight every potential problem. They are **not** Key Performance Indicators.

What do they do?

They are designed to provide a **health check on risk** for your organisation.

They should help you to have **focused risk discussions** and take action to manage risk. ***The value is in the discussions with the business.***

The Future

Transforming the way GSK Manages Risk

Feedback from the business will help us continuously improve.

KRIs will help to simplify and focus Monitoring.

Key Risk Indicators are evolving quickly.

KRIs are a new tool to help manage risk.

Key Takeaways

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- AI in Life Sciences is still in the **very early stages**.
- The collection, organization, protection, compliance and dissemination of **data** is both **an issue, and an opportunity,** in all fields.
- Large amount of **generated data in the coming years** will require a **scalable platform** otherwise nothing will come of it.
- Organizations should enable a **proactive and data-driven** identification of risk, which results in:
  - Effective **mitigation of risk** through **targeted interventions**
  - **More efficient** use of **audit and monitoring** resources
- Disruption in Life Sciences is in **rapid growth** mode and desperate for **qualified subject matter experts** in various “hot” areas, including Compliance, Digital Health, AI/ML, Cybersecurity, and Analytics.

Comments, Questions & Answers

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BlackThorn THERAPEUTICS

Oscar Rodriguez
oscar.rodriguez@blackthornrx.com

gsk

Sarah Venable
sarah.e.venable@gsk.com

THANK YOU

Paper: AI in Healthcare– A Technical Introduction

ALLIANCE FOR ARTIFICIAL INTELLIGENCE IN HEALTHCARE

This 45-page primer document seeks to introduce and address current issues in AI in Healthcare, and begin the process of standardizing terminology during the adoption phase of new technology

Both the full whitepaper and an executive summary are available for download on the publications section of the AAIH website: https://www.theaaih.org/publications