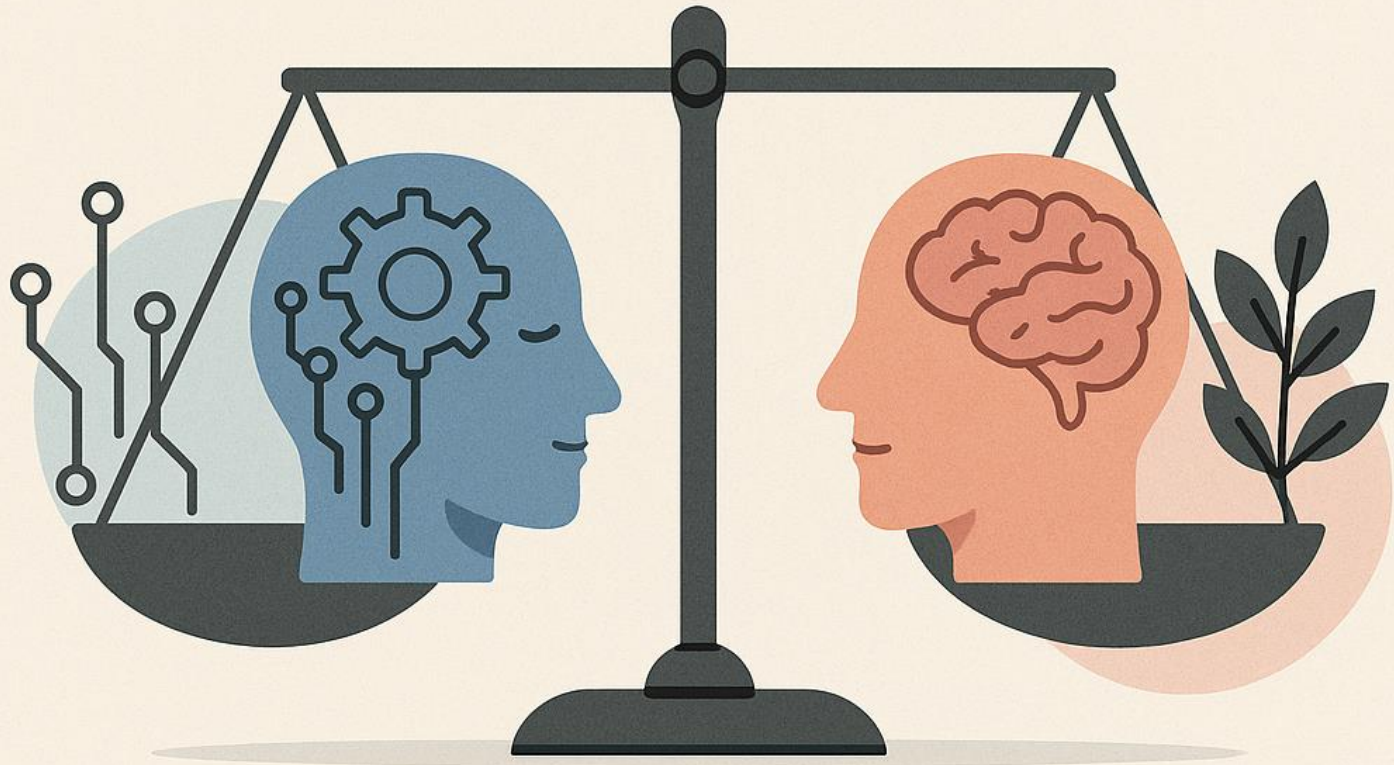
BALANCING ARTIFICIAL AND HUMAN INTELLIGENCE FOR HEALTHY AGING

A NON-EXPERT'S VIEW



Disclaimer

I am not an expert in AI or intelligence.

I am relentlessly curious

I am passionate about understanding processes and pathways

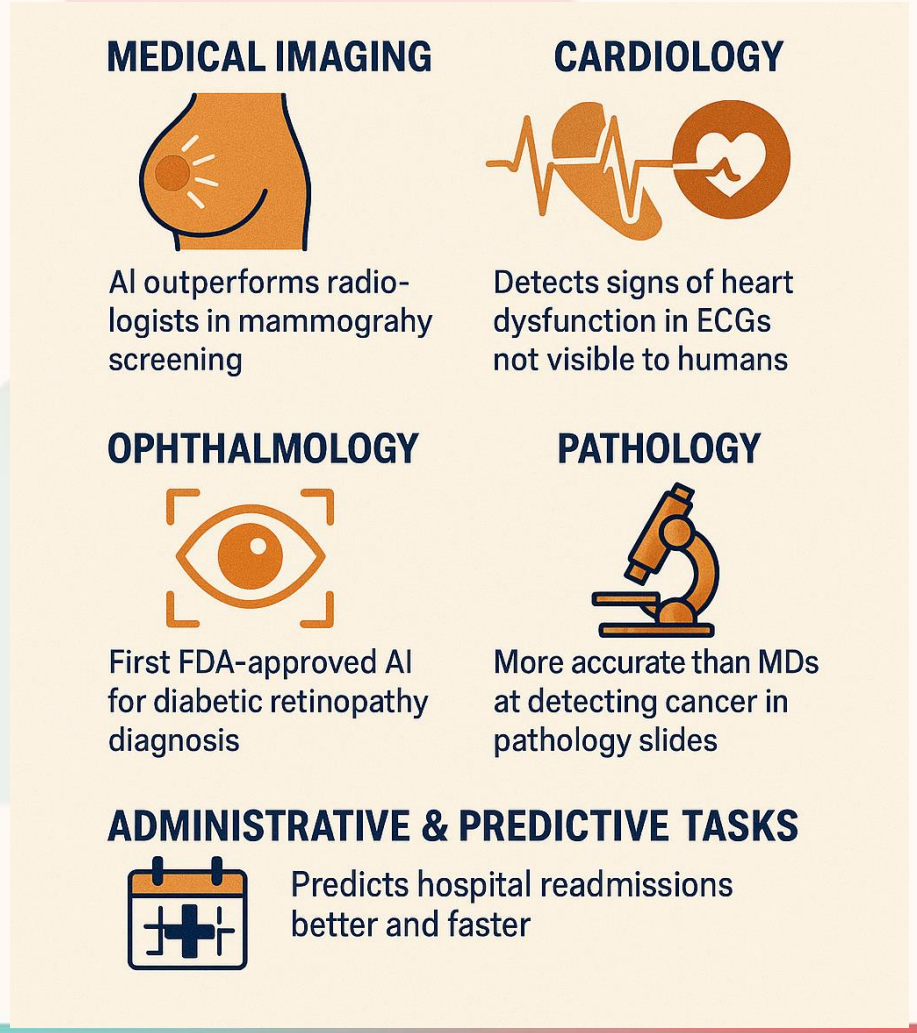
2019

IN THIS WORLD
NOTHING IS CERTAIN
BUT DEATH & TAXES

GenAI is as good, if not better, than people at diagnosing illness

THE NEW STpaul's HOSPITAL

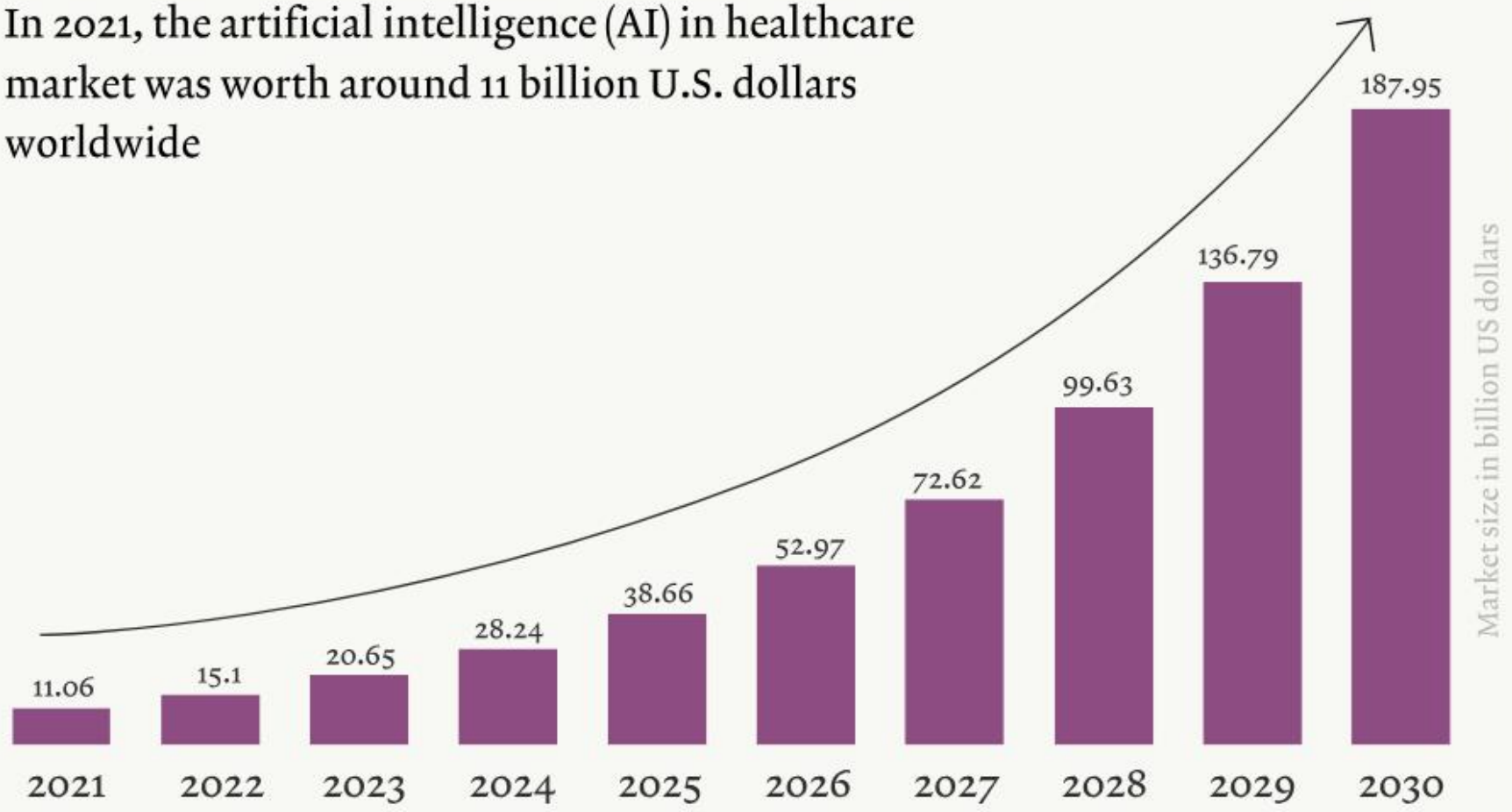
Providence Research
We're all in.



WHO 2021: issued a recommendation that AI be used instead of human readers for the interpretation of chest radiograph images for the screening and triage of tuberculosis.

AI use in healthcare is set to skyrocket over the next decade

In 2021, the artificial intelligence (AI) in healthcare market was worth around 11 billion U.S. dollars worldwide



Source: Precedence Research, 2024

Aging of the Global Population

Context

- In 2019, about 9% of the world's population was 65+
- The 65+ population projected to double from 703 million in 2019 to 1.5 billion

16%

of the world's population will be aged 65 or older by 2050

Implications

- Social support systems face increased pressure (pensions, elder care)
- Healthcare demand and spending will grow significantly
- Economic impacts such as labor shortages, shifts in consumer behavior

WHO e-library

Canada's Aging Population

24% of Canada's population projected to be aged 65 or older by 2050

KEY DEMOGRAPHIC TRENDS

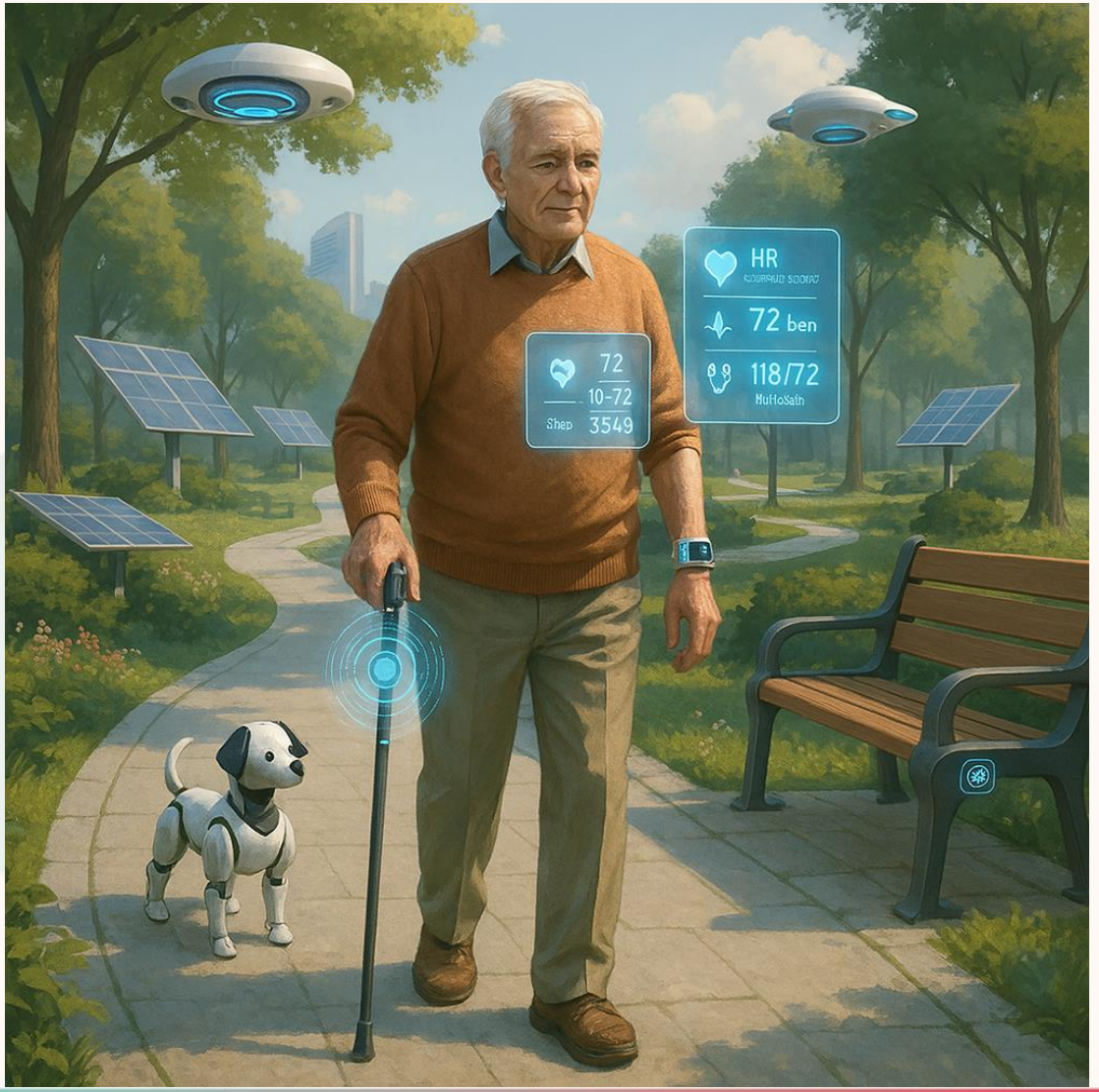
- Baby Boomers Aging: By 2030, all baby boomers will be 65 or older
- Growth of the 85+ Age Group: Projected to triple by 2050
- Dependency Ratio: Expected to rise from 32 % in 48,6 % by 2060

IMPLICATIONS FOR CANADA

- Healthcare System: Increased demand | for healthcare and long-term care
- Economic Impact: Labor shortages and higher pension expenses

Conference Board of Canada, StatsCan

AI to stay healthier for longer



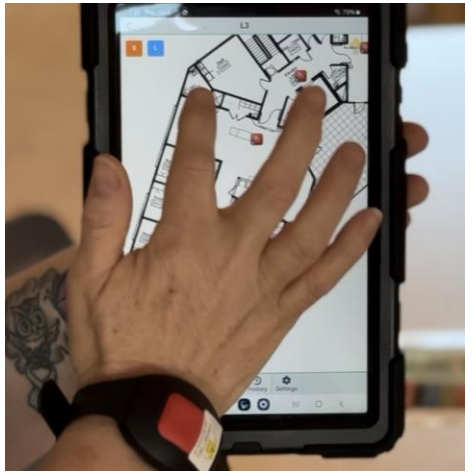
The use of AI agents might:

- Scan medical records to flag early signs of dementia.
- Recommend personalized treatments.
- Help older adults manage medications or appointments through voice or text.

Or just to enjoy life

Family contact
Concerts
Movies

Test case: Providence Living at The Views – Aging with Dignity and AI-driven technology

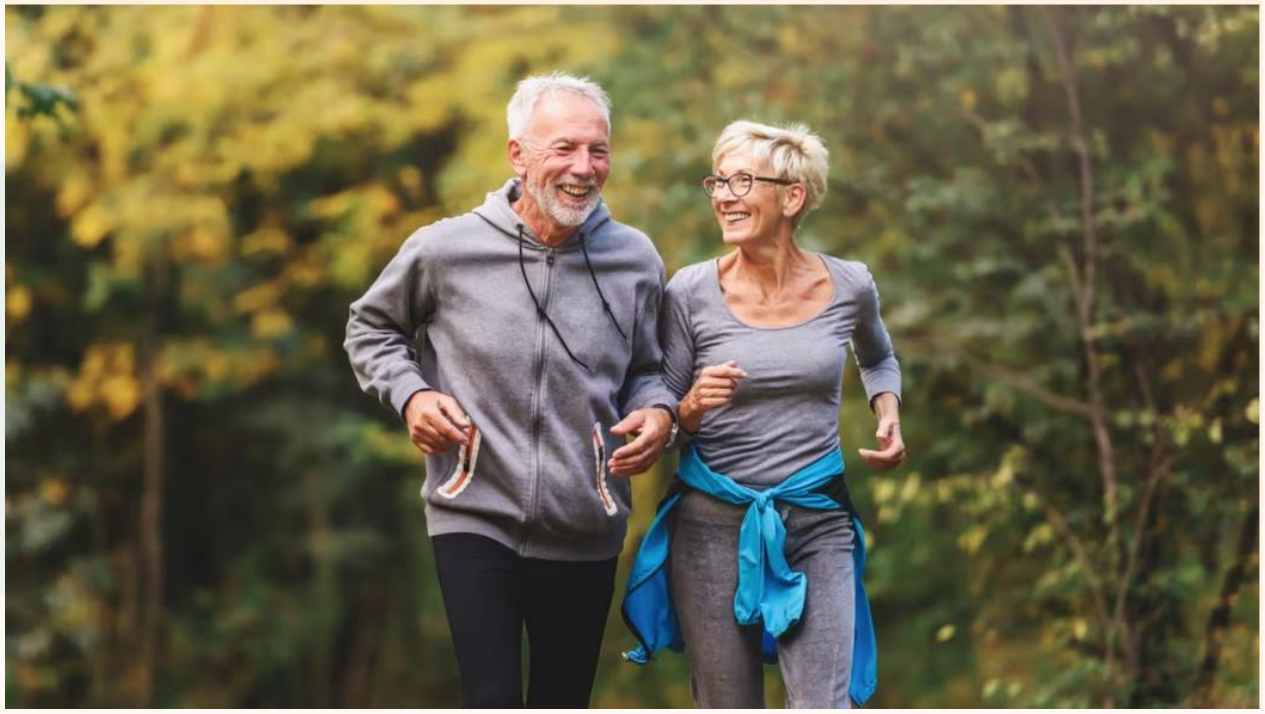


Nurses, physicians, and family members remain the primary source of emotional and medical care

The exposome vs genetics

Environment far outweighs genetics in predicting longevity, study finds

Research highlights how lifestyle and living conditions can substantially increase risk of early death and disease



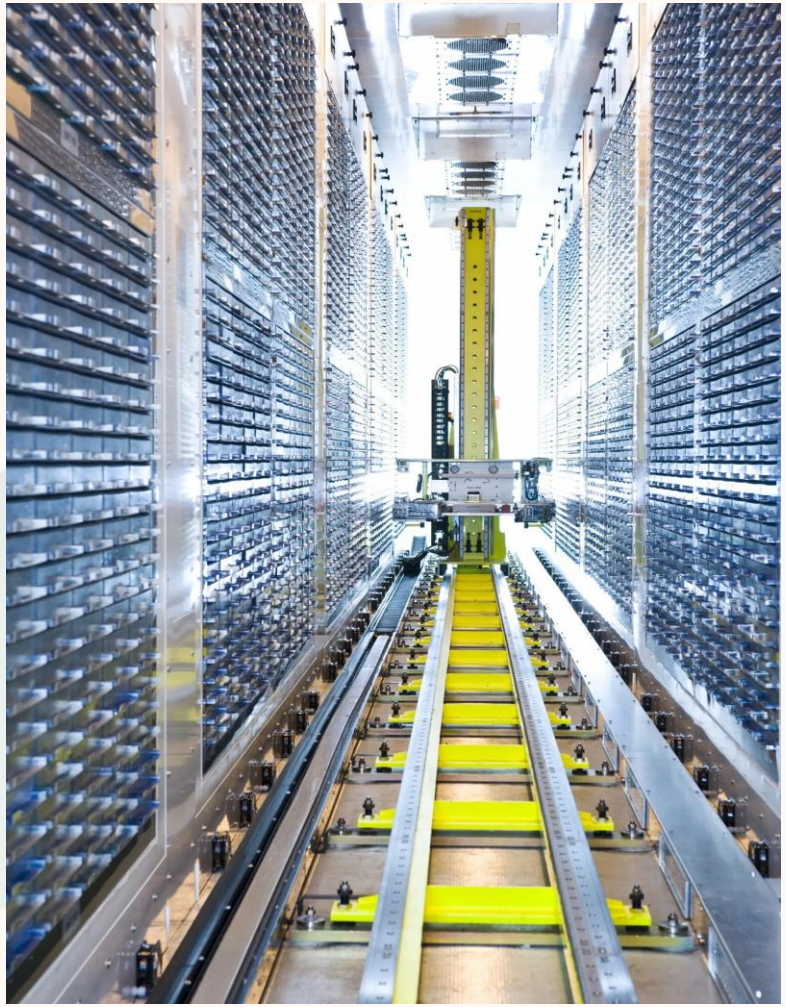
Financial Times, Feb 2025;
Argentieri et al., *Nature Medicine* 2025

Assessed genetic profiles vs exposure to 164 different environmental factors.

Susceptibility to 22 major age-related diseases and premature mortality.

Environmental factors collectively were about 10x more important than an individual's genome in predicting premature mortality

Based on data powered by biobanks



The UK Biobank holds extensive environmental, genetic and health records of **500,000 middle-aged Britons**

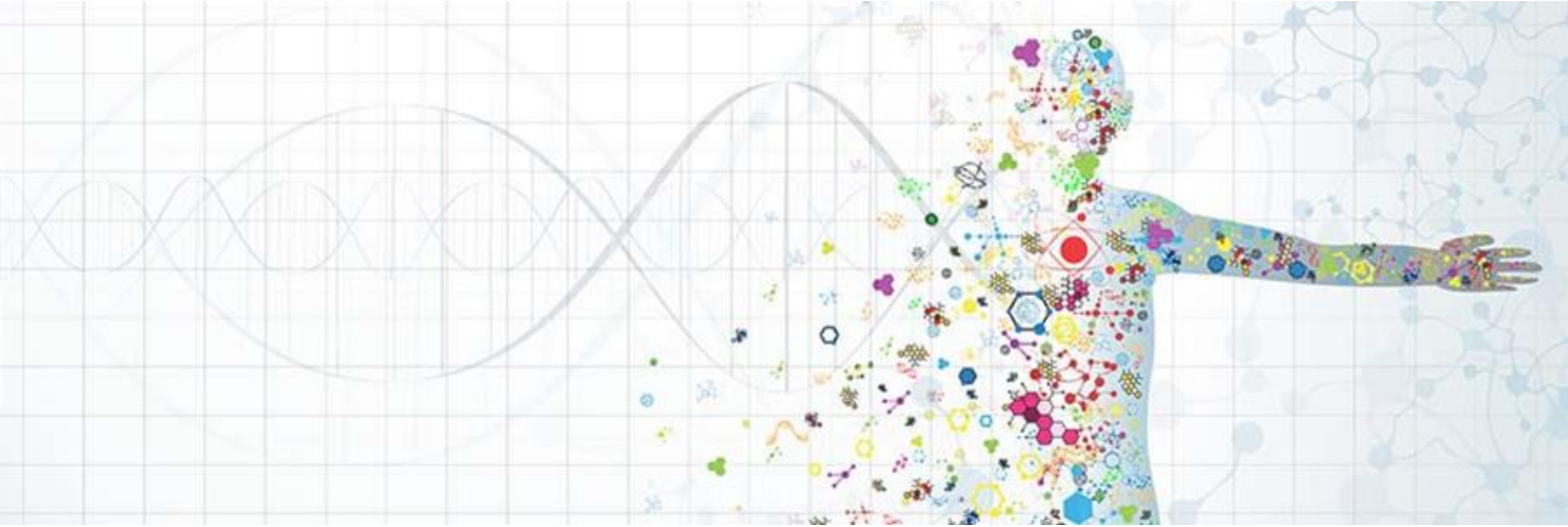
Lamontagne, Hebert, Kho on behalf of the Canadian Clinical Research Network (CCRN) and Sepsis Canada, 2024.

A story of Mr Smith and Mrs Lee

Mr Smith

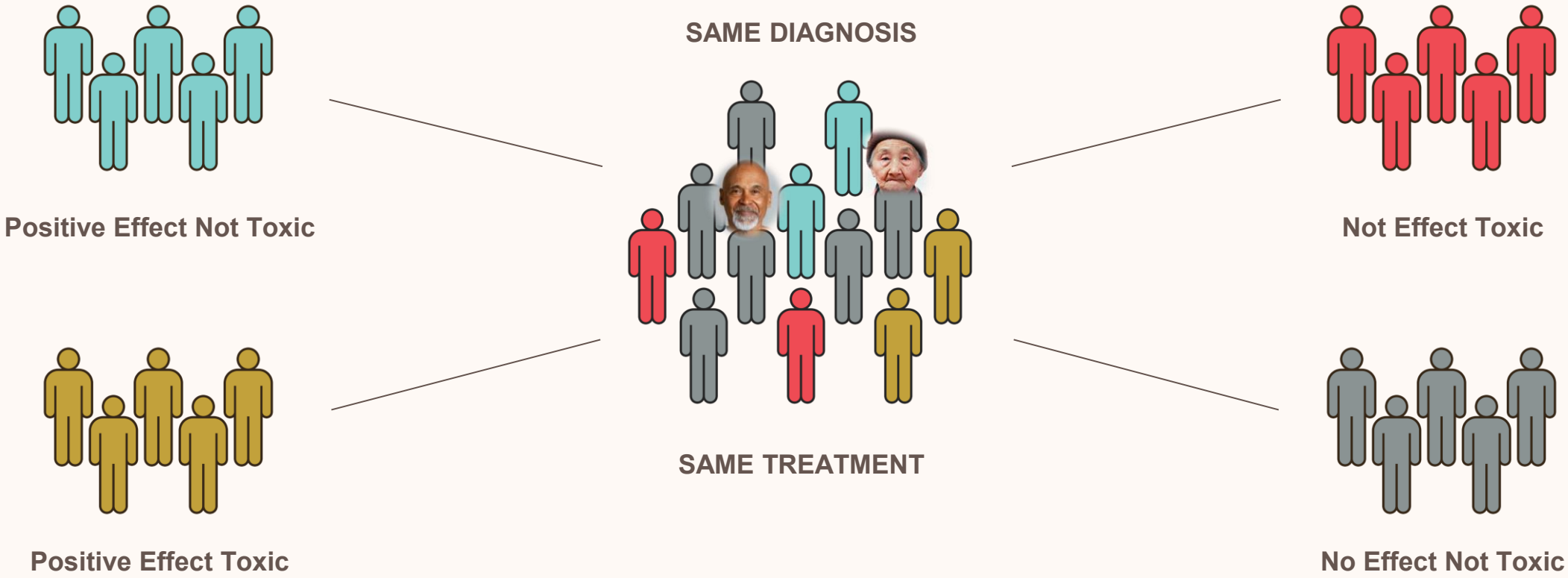
Mrs Lee

AI alone can tell us *the what* and likely *the why*



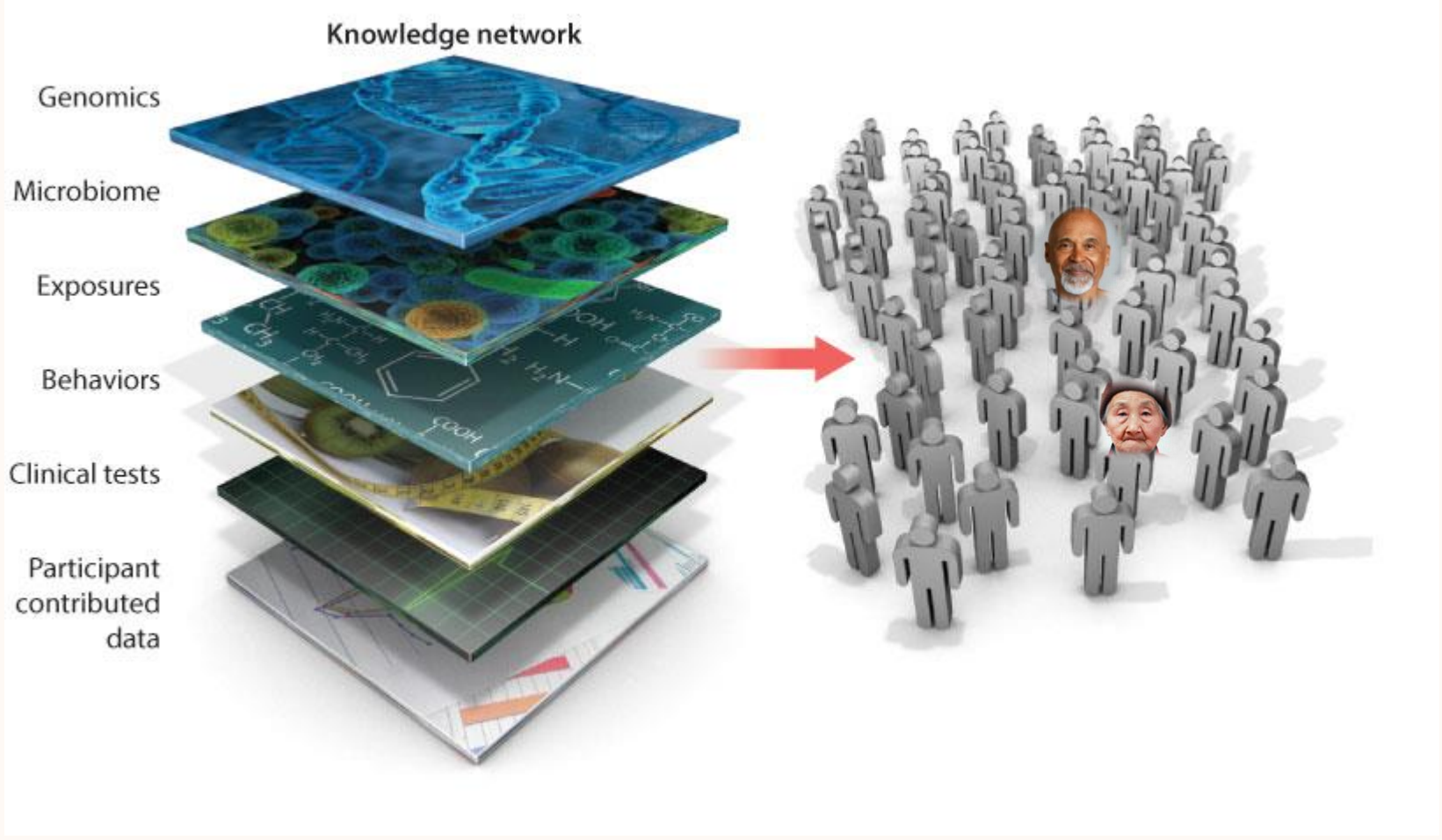
But it can't (yet) tell us *the how*.

Implications for treatment are significant



European Respiratory Journal 2017 50: 1701655

Precision phenotyping is the next step



Providence Health Care
How you want to be treated.

STpaul's FOUNDATION

The Mr. and Mrs. P.A. Woodward's Care Coordination Centre

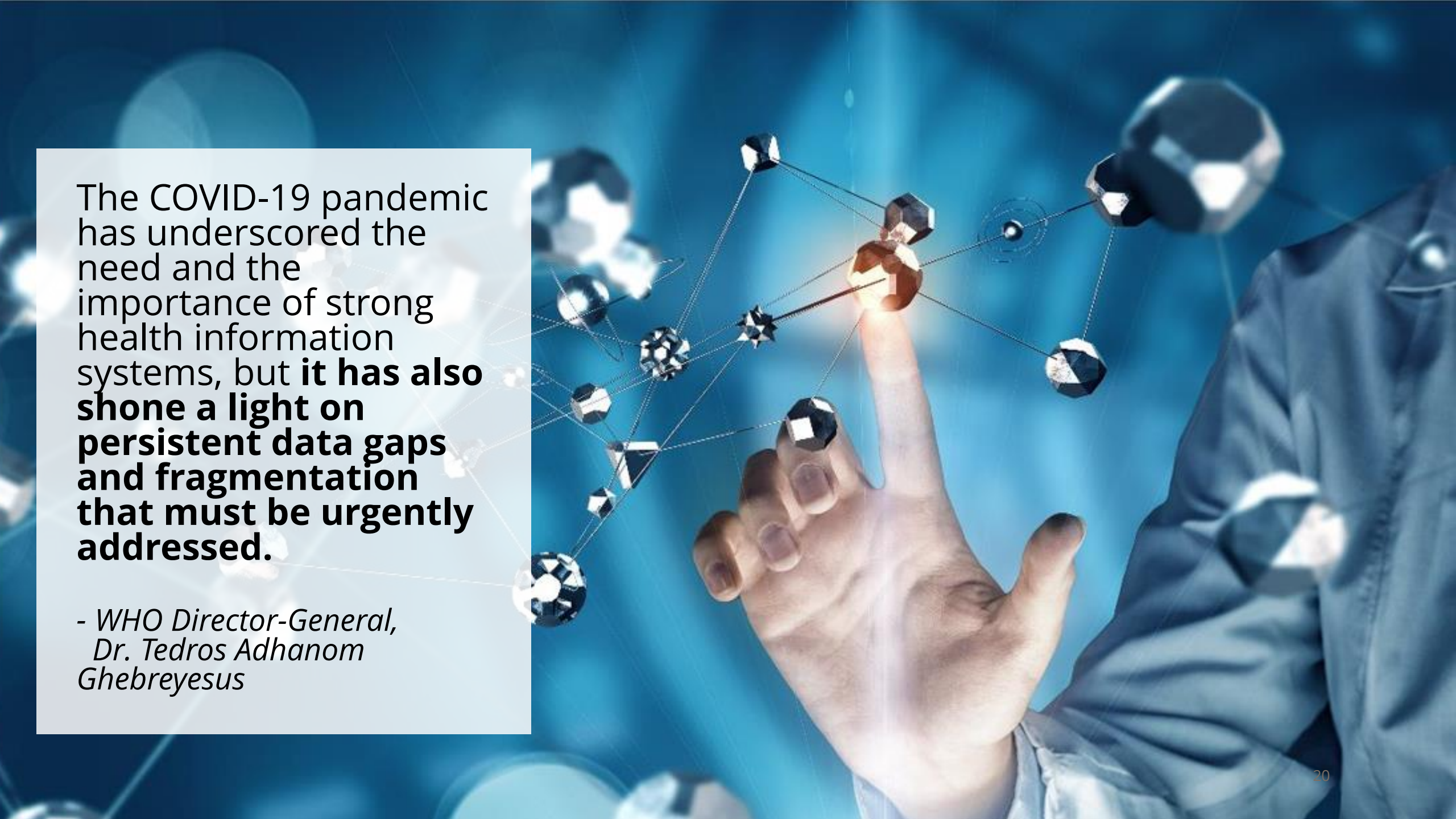
Key Capacities

- Molecular Profiling
- Cell & Tissue Imaging
- Nanotech/Regenerative Medicine
- Innovation Centre
- Phase I-III Clinical Trials Unit
- Simulation & Experimental Learning Centre
- **Health Informatic Data Platforms & Services**
- Health Outcomes & Policy
- 3D Printing/Bioprinting
- Pre-clinical Models
- **Biobanks**

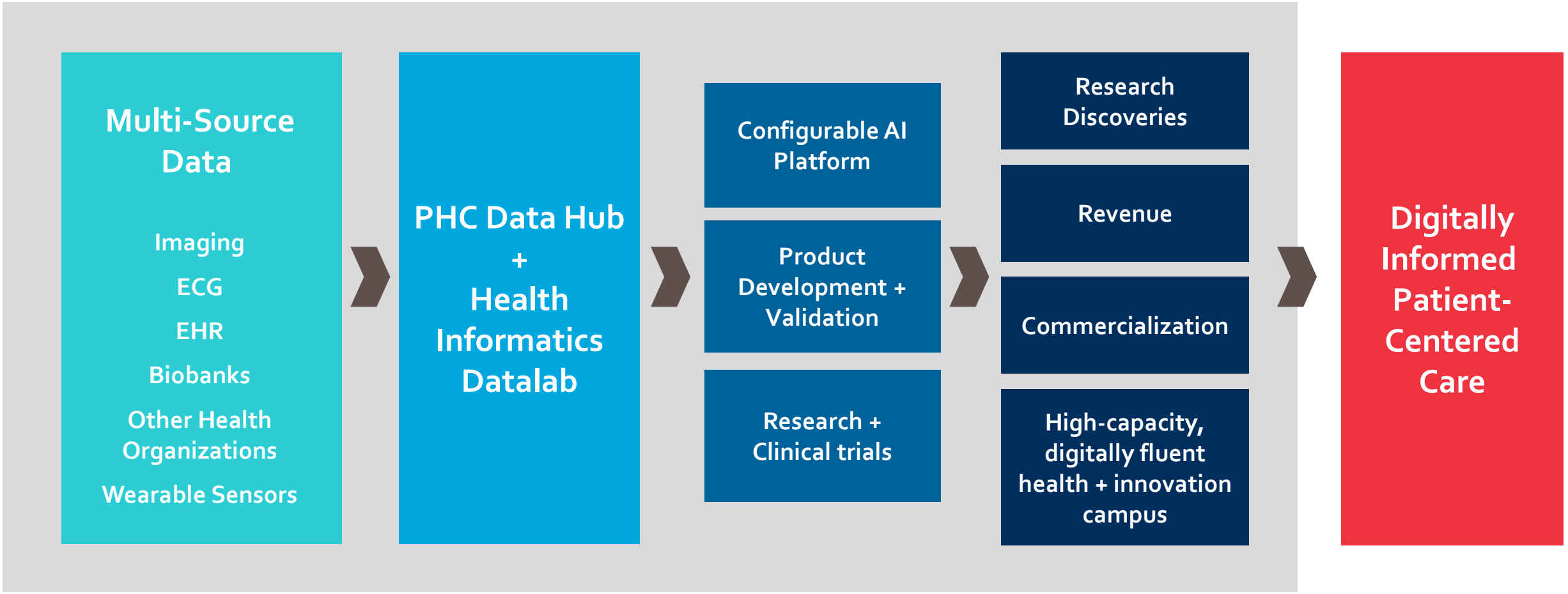
THE NEW STpaul's

The COVID-19 pandemic has underscored the need and the importance of strong health information systems, but **it has also shone a light on persistent data gaps and fragmentation that must be urgently addressed.**

- WHO Director-General, Dr. Tedros Adhanom Ghebreyesus

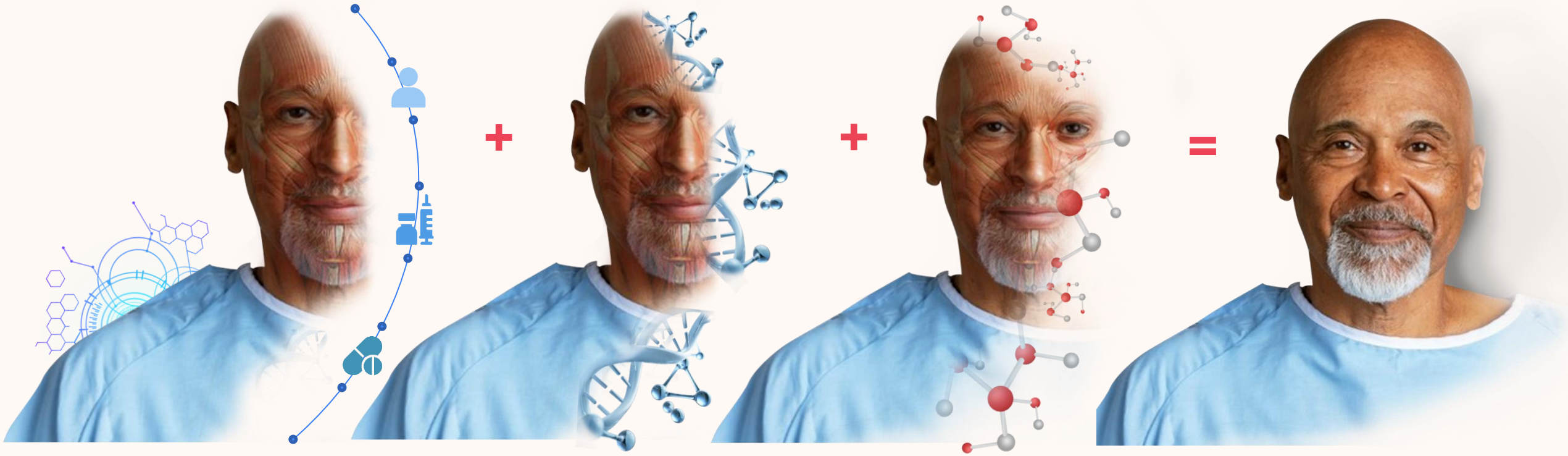


IHID- An AI-driven data solution to aging and health research



DIGITAL SUPERCLUSTER Genome BritishColumbia Medtronic GE Healthcare METAOPTIMA thrive health

Data, Biology and genAI technology will be needed to unlock complex disease pathways



Electronic Health Data/Imaging/SDOH

Genetic Data

Biospecimens/ ‘omic Data

The Complete Picture

Necessary capacity and the right people

BC Regen Med Network, iCORD VCH, SBME UBC

Star Institute and Gerontology Res Ctr SFU

Inst Aging Life Long Health UVic

Edwin SH Leong Centre for Healthy Aging UBC

Centre for Healthy Aging PHC

Data Science Institute

Centre for Health Lung Innovation PHC/UBC

Centre for Wound Healing and Regenerative Medicine, VCHRI

Courtesy of Dr David Granville

A final thought: What about precision prevention?