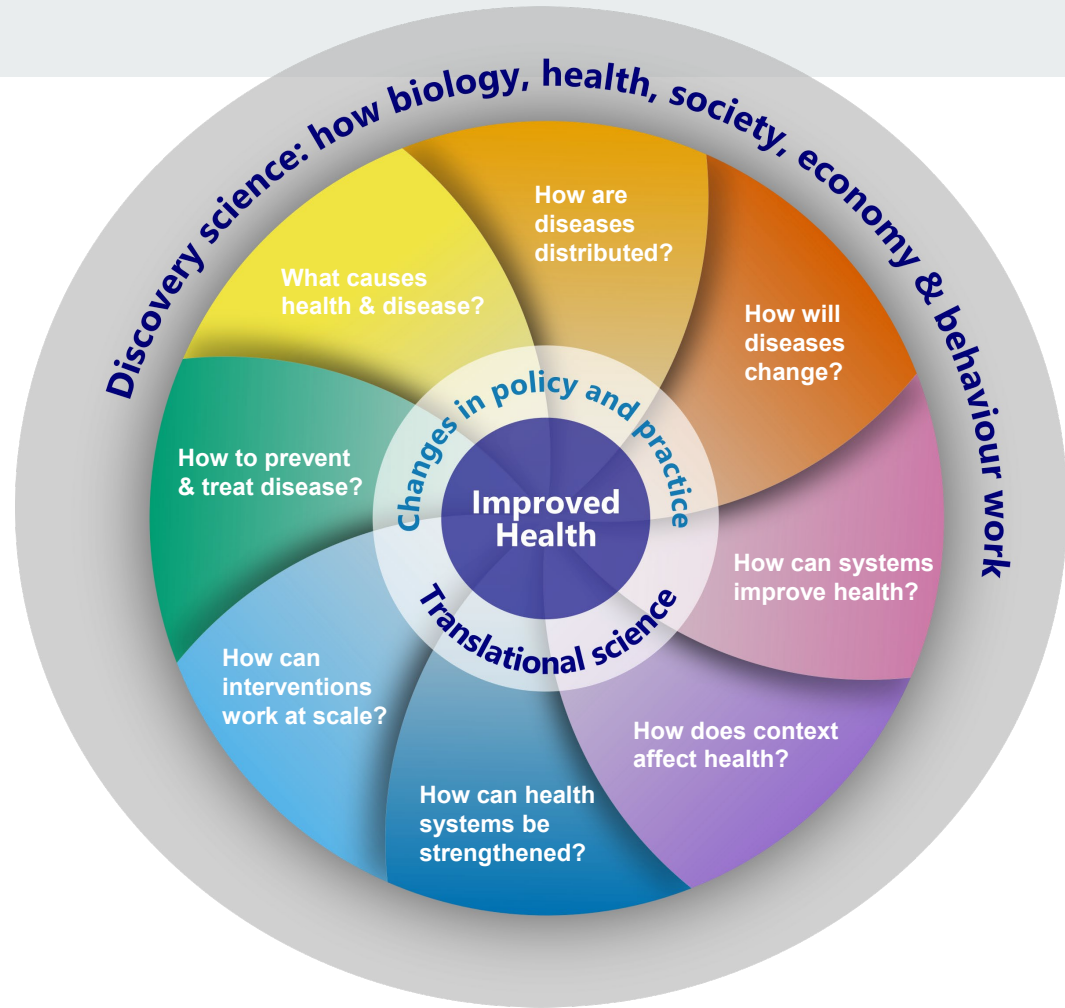# Outline

- **What** needs disrupting

- **Why** it needs disrupting

- **How** LPS can disrupt
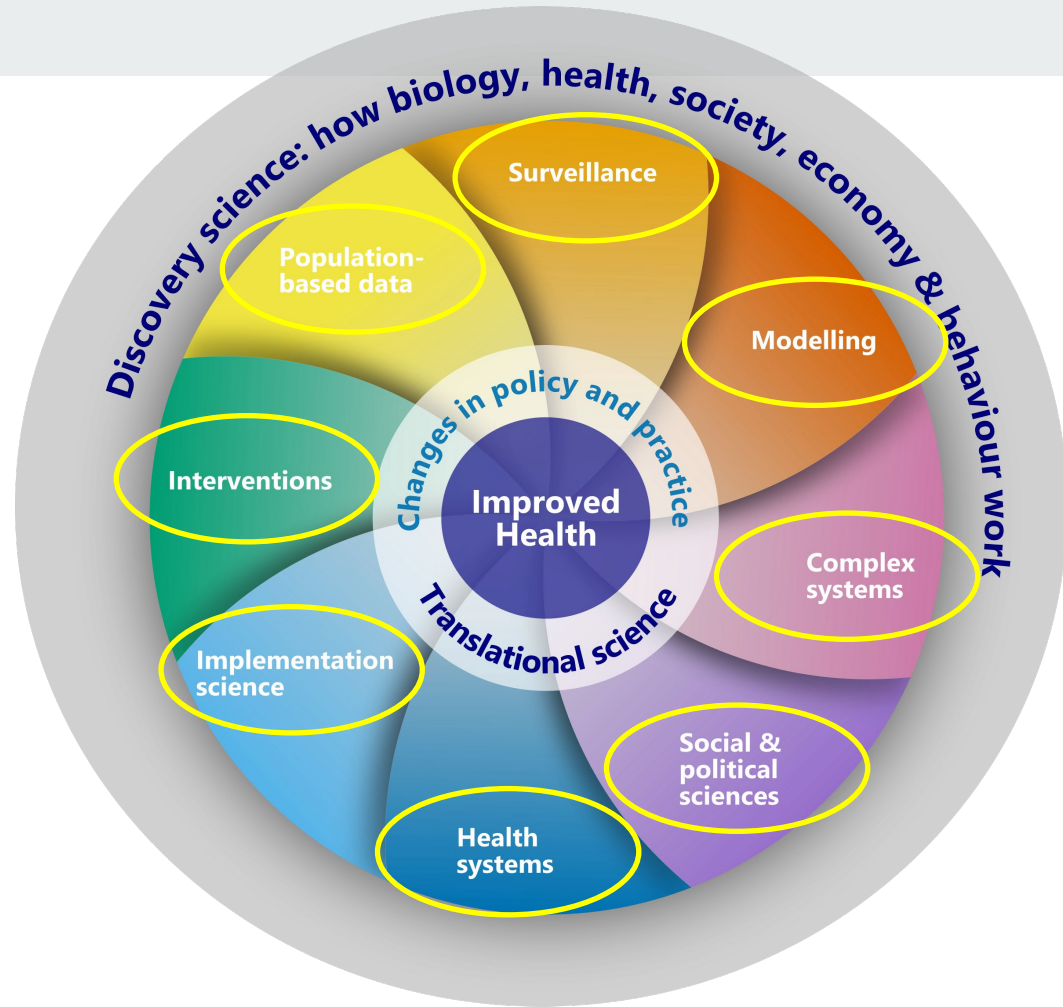
What is Population Health?

Understanding and improving human health, at scale

Population-based science - research questions

Population-based science - research fields

Longitudinal population studies

Why does Population Health need disrupting?

Why Population Health needs disruption

Lack of diversity in populations and topics studied

Too simplistic – people and populations are complex systems

Discovery and translation often considered separately

How can LPS disrupt Population Health?

1. They naturally bridge siloes
2. They include multiple complex systems
3. They are flexible platforms for discovery and translation

Increase diversity

Populations
1. Under-represented populations
2. Minority populations in well-studies countries

Domains
1. Social AND biological
2. Across systems from cells to circuits to individuals to families to communities to nations

Embrace complexity

Anthropology

Neuroscience

Behavioural sciences

Genetics

Immunology

Molecular Biology

Epidemiology

Economics

Sociology

Disciplines

Embrace complexity
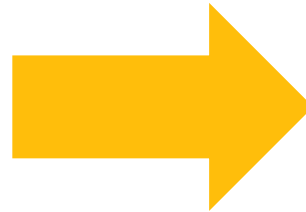
Anthropology
Neuroscience
Behavioural sciences
Genetics
Immunology
Molecular Biology
Epidemiology
Economics
Sociology

Molecules & Cells

Systems & Circuits

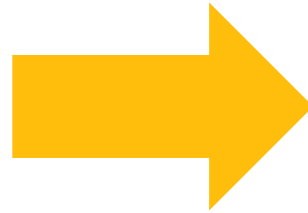Populations & Society

Disciplines

Systems

Embrace complexity at every level

Embrace complexity at every level

Wicked problems are a product of complex systems

Radically different approach to understanding how to change systems to produce different outcomes needed

Field of complex systems is small, methods are under-developed, & approach is largely untested

But we have to try

Focus on the problem

Discovery	Translation
Understand causes and consequences of disease	Develop, evaluate and scale interventions to promote health
Understand mechanisms of health and disease through process of intervention	
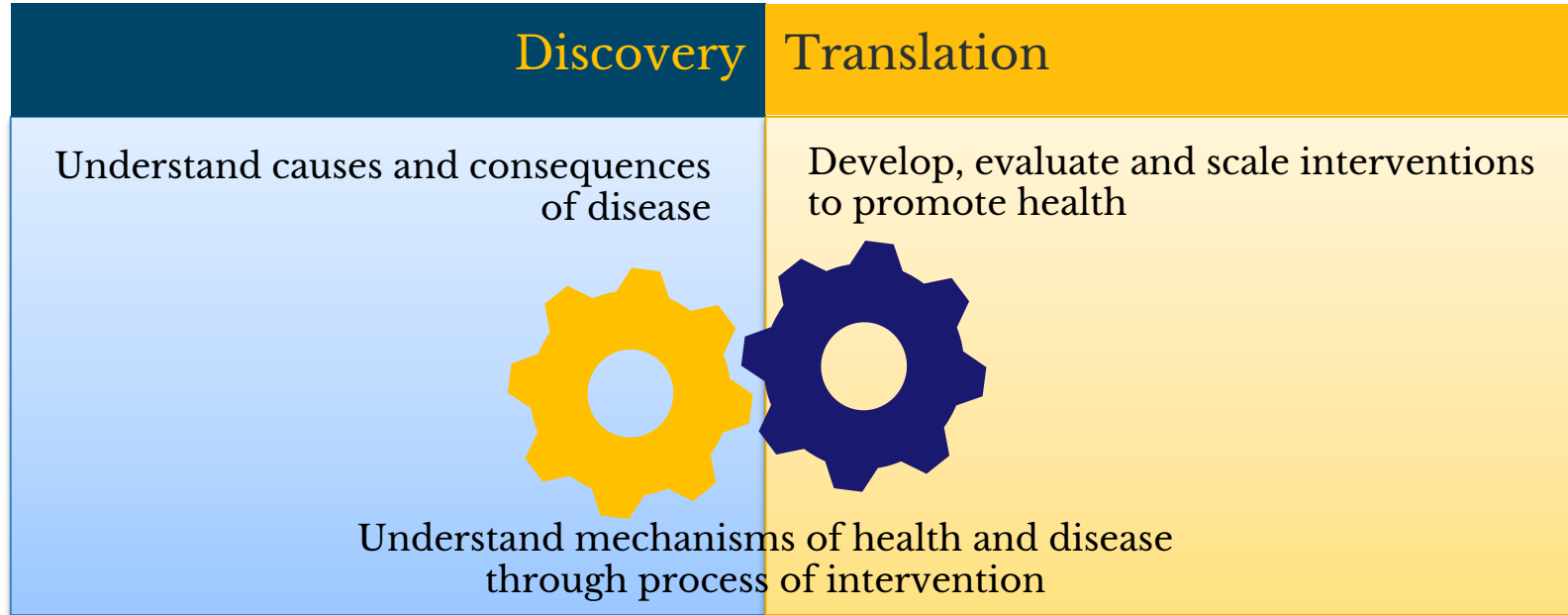
The future of Population Health?

1. Bigger, more diverse, more interoperable LPS
2. Problem-focused Co-Laboratories
3. International networks of harmonised LPS

1. Bigger, more diverse LPS

1 | Breadth of resources with representative samples from diverse populations

2 | High quality multi-dimensional data across life course

3 | Data linkage, interoperability and analysis maximised across resources

4 | Resources are discoverable, accessible, and widely used

5 | Meaningful stakeholder engagement improves quality and impact of resources

**6 |** Improved strategies for translation of findings into health impact

African Population Cohorts Consortium

Vision

Large scale data from Africa is used to change policy and practice to improve health and social outcomes, to contribute towards achieving the SDGs, and to strengthen African-led science.

Mechanism

Population data platform - leverage existing infrastructure and capacity in Africa to create a network of large LPS including biobanks linked to routine health, social and environmental data where possible.
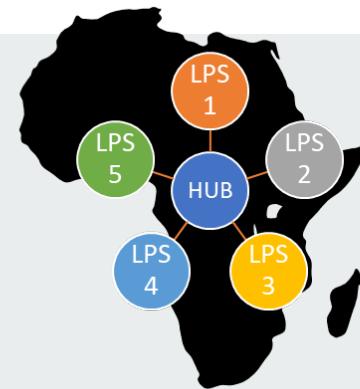
Outcomes

1. Utilise unique diversity of Continent to enable world-leading discovery research "for Africa and the world"

2. Enable African scientists to bring this critical new knowledge to the world

3. Address specific disease burden & inform African-specific interventions to improve health & social outcomes

2. Problem-focused Co-Laboratories

Deep community and local policy maker engagement in diverse communities with co-production of data collection methods and interventions
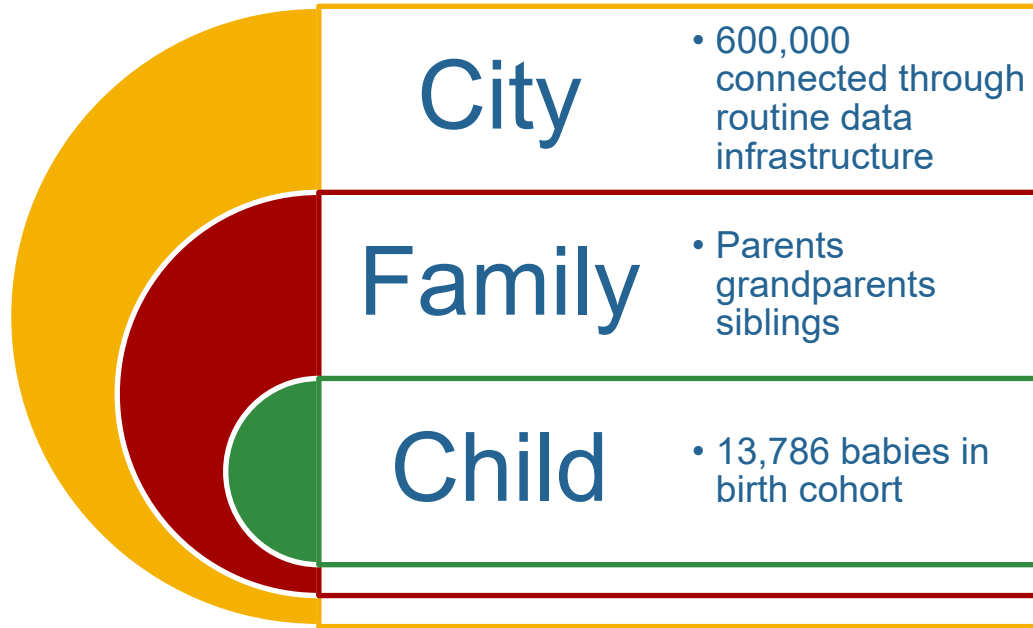
Deeply phenotyped place-based LPS with data collected at multiple levels of system from cells to society

Trials within cohorts - experimental evaluation of interventions at multiple levels of the system from individual to cluster RCTs to policy level interventions

Born in Bradford: "Research that changes a city"

City
- 600,000 connected through routine data infrastructure

Family
- Parents grandparents siblings

Child
- 13,786 babies in birth cohort

Act Early
Improving the environments that influence child health

Healthy places
Healthy learning
Healthy livelihoods

"Each cohort is constrained, however, by its size, ancestral origins, and geographical boundaries, which limit the subgroups, exposures, outcomes, and interactions it can examine."

Manolio, T, Goodhand P, Ginsburg G. The International Hundred Thousand Plus Cohort Consortium: integrating large-scale cohorts to address global scientific challenges. Lancet 2(1) 2020

3. International networks of harmonised LPS
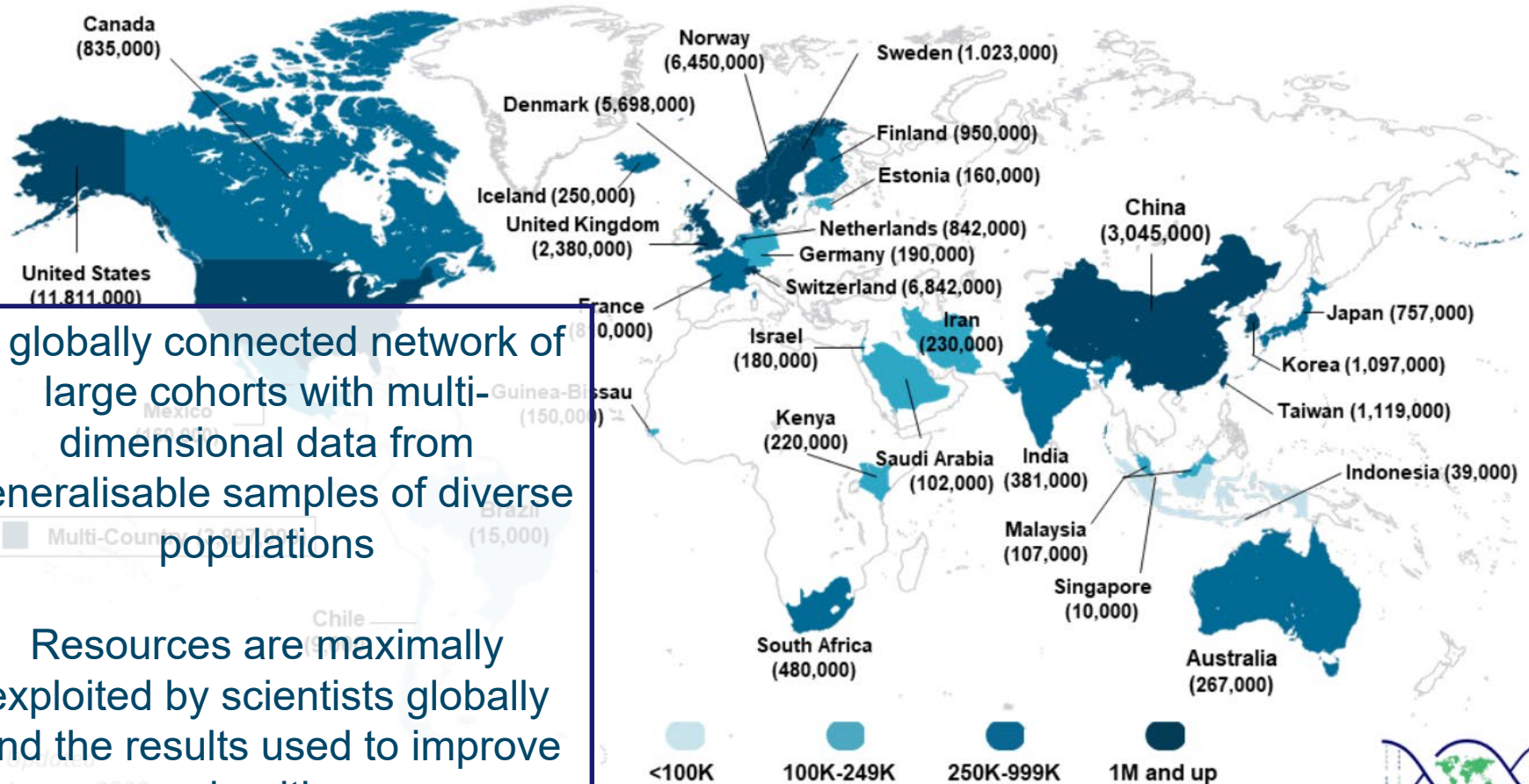
A globally connected network of large cohorts with multi-dimensional data from generalisable samples of diverse populations

Resources are maximally exploited by scientists globally and the results used to improve health

Canada (835,000)
United States (11,811,000)
Mexico (180,000)
Brazil (15,000)
Chile
Multi-Country (3,001,000)
Iceland (250,000)
United Kingdom (2,380,000)
Norway (6,450,000)
Denmark (5,698,000)
Sweden (1.023,000)
Finland (950,000)
Estonia (160,000)
Netherlands (842,000)
Germany (190,000)
Switzerland (6,842,000)
France (8?0,000)
Israel (180,000)
Iran (230,000)
Guinea-Bissau (150,000)
Kenya (220,000)
Saudi Arabia (102,000)
South Africa (480,000)
China (3,045,000)
Japan (757,000)
Korea (1,097,000)
Taiwan (1,119,000)
India (381,000)
Malaysia (107,000)
Singapore (10,000)
Indonesia (39,000)
Australia (267,000)

<100K   100K-249K   250K-999K   1M and up

January 2020

Thanks!

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