The Novartis Foundation

Innovation in health delivery
Improving health through data

**Novartis Foundation Workshop at Intelligent Health
September 2023**

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**Advancing digital and data-led approaches to population health**

We are a **non-profit foundation** supported by Novartis

Our initiatives aim to improve the health of low-income populations. They do this by transforming health systems from being reactive to **proactive**, **predictive**, and **preventative**

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Why AI4HealthyCities matters
Current *care* systems unprepared to address global health needs

USD 10 trillion — 2020
USD 20 trillion — 2040
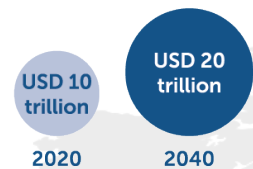
Rapid aging and global healthcare spending
Projected to double over the next 20 years
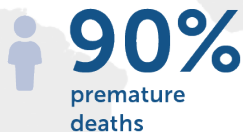
1 to 1 000

Health worker shortage
50% of countries have <1 doctor for 1 000 people

70% by 2050

Rapid urbanization
70% of people will live in cities by 2050, while cities can be drivers of population health

734 m lack access

Underserved populations
>734 million people lack access to essential health services

90% premature deaths

CV disease
World's leading cause of disability and death, often prematurely <60y (90% occurring in LMICs)

COVID-19

Emerging threats
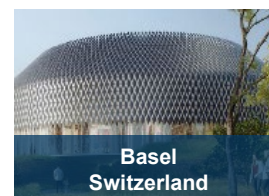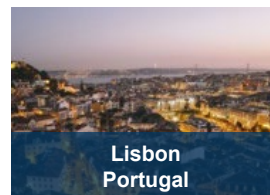COVID-19, climate change, pollution and antimicrobial resistance

Increasing inequities
Putting millions of lives at risk

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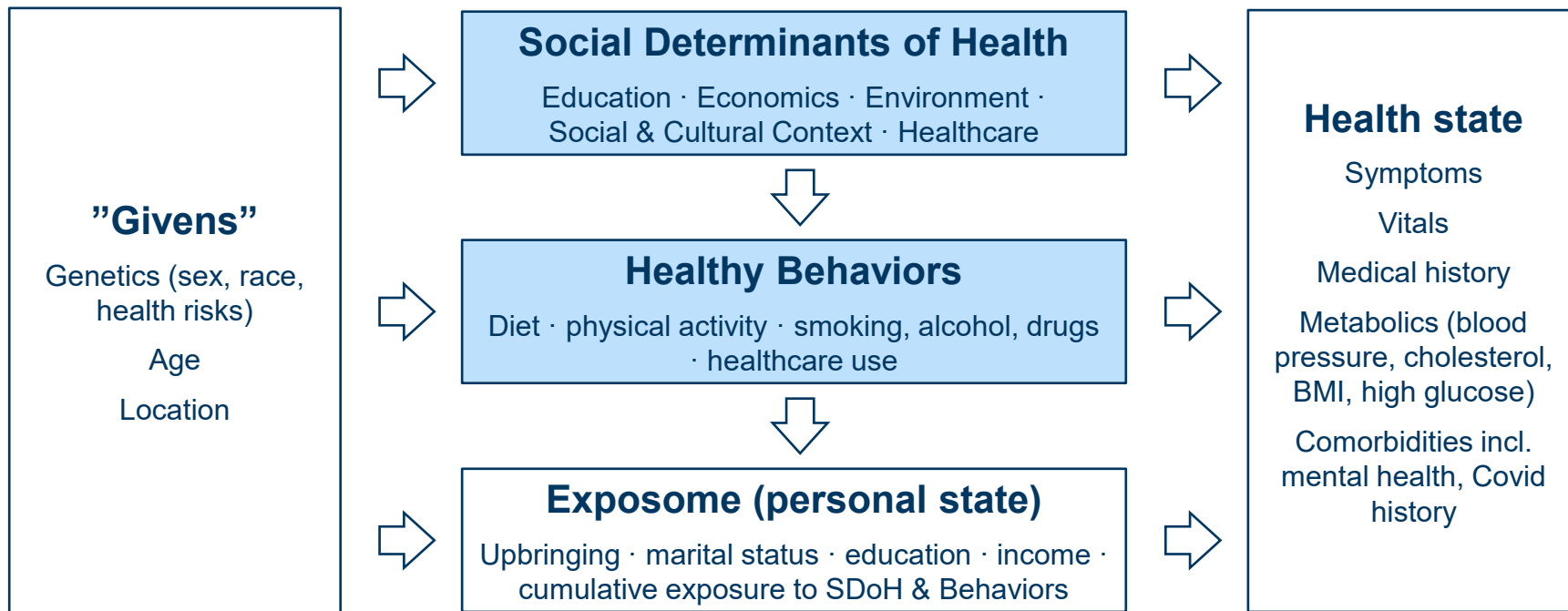
AI4HealthyCities programs

Partnerships with data rich cities to generate insights on what drives CV health outcomes and equity

Current partnerships

New York
US

Singapore
Singapore

Lisbon
Portugal

Helsinki
Finland

Lausanne
Switzerland

Basel
Switzerland

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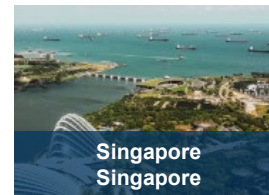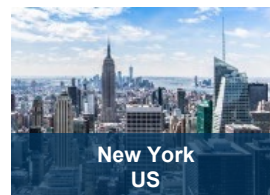
We need to understand a complex set of health determinants

"Givens"

Genetics (sex, race, health risks)

Age

Location

Social Determinants of Health

Education · Economics · Environment · Social & Cultural Context · Healthcare

Healthy Behaviors

Diet · physical activity · smoking, alcohol, drugs · healthcare use

Exposome (personal state)

Upbringing · marital status · education · income · cumulative exposure to SDoH & Behaviors

Health state

Symptoms

Vitals

Medical history

Metabolics (blood pressure, cholesterol, BMI, high glucose)

Comorbidities incl. mental health, Covid history

Examples of Social Determinants of Health (SDoH)

	Domain	Sub-domains
Social Determinants of Health (SDoH)	Education	Education level, literacy, local language, quality of education, health competency
	Economic	Employment/occupation, job insecurity, income, wealth/poverty, food insecurity, housing instability, financial competency, connectivity / digital access (mobile, computer, internet)
	Environment	Climate (temperature, flooding), air pollution, water pollution
	Built environment	Housing, overcrowding, transportation, (healthy) food availability, noise, walkability, recreational/green spaces, sanitation, population density
	Social & cultural context	Marital status, loneliness, number of dependents, immigration status, social cohesion/organized community membership, discrimination, segregation, community socio-economic composition, community health, social services, crime rate/safety, political system
	Healthcare	Insurance coverage, access to care/prevention/medicines, distance from care, healthcare quality
	Digital access	Access to computing devices, access to internet
Individual	«Givens»	Age, sex, race, location, genetic health risks (if available e.g., PRS scores, no genotyping required),
	Behaviors	Diet, tobacco use, alcohol use, physical activity, drug abuse, sleep, stress, healthcare / social services utilization
	Exposome	Birthplace, upbringing, mental health, Covid infection, other co-morbidities; cumulative exposure to SDoH
Outcomes	CV risk factors	Hypertension, high LDL, high BMI, diabetes, kidney dysfunction, Covid, Afib
	CV events	MACE (acute myocardial infarction, ischaemic stroke, cardiovascular death), HF, end-stage renal disease

Connecting health outcomes and SDoH is complex

Challenges

Highly complex interrelation between health outcomes and
- Genetics/demographics
- Current context (social determinants of health - SDOH)
- Behaviors
- People's exposome (cumulative impact of determinants and behaviors)

Interdepartmental collaboration in governments is essential

SDoH data of insufficient quality and often not linkable to individual health data – this results in area estimations that deliver insufficient «signal» for correlations between SDoH and outcomes

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Digital innovation in health delivery

Please capture existing innovation solutions and new ideas to accelerate the delivery of health in a digital era

Workshop

- 15': brainstorm at each table (questions are randomly assigned)

- 30': 3 minutes read-out per group

Choose one of the following **questions**:

Which innovations could **improve measurement and understanding** the drivers of disease, e.g., new measurement methods, analytics, data linkage & privacy, capturing existing evidence?

Assuming we can develop a much deeper understanding of the drivers of disease, how should governments, health systems, payers and healthcare poviders **use these insights to deliver health** rather than «just» treating disease?

What are the **business and revenue models** that you could apply when generating insights and providing insights to deliver health to these cases?

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Thank you

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