

# Harnessing data & AI to tackle heart health inequities in cities

## A global partnership

Studies suggest that only about 20% of our health outcomes are shaped by the healthcare we access, while about 80% are determined by genetics and the socio-economic and environmental conditions in which we live, grow, and age<sup>1</sup>. AI4HealthyCities is a population health initiative designed and coordinated by the Novartis Foundation to improve understanding of what truly drives cardiovascular health in populations by applying analytics and AI on data from health and health-influencing sectors. AI4HealthyCities aims to equip city authorities with tools and data-driven insights to enable population health interventions and better resource allocation.

10-20%



of our health is determined by the healthcare we access.

80-90%



is determined by the conditions in which we are born, grow, live, work and age – factors known as social, environmental and behavioural determinants of health.

## Three steps for better urban heart health

1

### Bring together disconnected data

from healthcare, public health and health-influencing sectors on demographic, social, behavioral and environmental determinants of health as well as cardiovascular risk factors and health outcomes.

2

### Apply advanced analytics

to combined data for better understanding the strongest, non-healthcare-related drivers of unequal cardiovascular risk and health outcomes within the city.

3

### Deliver insights

to political decision makers, health managers, health providers and patients to make better decisions for cardiovascular health and re-engineer reactive care systems into proactive, predictive and preventive health systems.

# AI4HealthyCities worldwide



## AI4HealthyCities in New York City

Launched first in New York City in 2022, AI4HealthyCities brought together data sets that never before had been analyzed in conjunction, to examine potential connections between social determinants of health and the local population's heart health.

Data sets included electronic health records from public and private health systems, and were linked to publicly available demographic, social, and environmental data.

Applying AI and advanced analytics to these data sets uncovered high prevalence of potential leading predictors of hypertension,

diabetes, and other cardiovascular risk factors across town, including long commutes, low education and income levels, air pollution, low broadband rates, family situation, as well as social isolation.

All insights from AI4HealthyCities will be provided to the New York City Department of Health and Mental Hygiene, to inform bespoke interventions per area and support the department's "HealthyNYC" vision for 2030.

Insights from Singapore, Lisbon, Helsinki, and Basel will follow, and will be leveraged for the design of local health interventions.

## Partners in New York City

The New York program for AI4HealthyCities is a public-private partnership between the Department of Health and Mental Hygiene (DOHMH), NYC Health, New York University (NYU) School of Global Public Health,

Health + Hospitals (H+H), University College London (UCL), Weill Cornell School of Medicine, Microsoft AI for Good Research Lab, and the Novartis Foundation.



# What shapes New York City's heart health and where?

Areas with the highest prevalence of **diagnosed hypertension** were primarily located in the Bronx, Northern Manhattan, Eastern Queens, and Southern Brooklyn.

Analyses indicated that **regular commutes above one hour**, reliance on **public assistance income** or **SNAP benefits**, and **living alone above the age of 65** may drive high hypertension prevalence in these neighborhoods.

## Who lives here?<sup>2</sup>

I'm **Elijah**, 38 years old and from Queens.

Recently, I have been put on hypertension medication. During the week, I work as a carer for an elderly gentleman, and I take the subway to his apartment, which takes me an hour and a half one way. To make ends meet however, I have to rely on public assistance income.



I'm **Lizzie**, 70 years young and a retired teaching assistant from Brooklyn.

All my relatives live in other states, and I live on my own in an area that doesn't really have good air quality. Two years ago, I began to notice frequent shortness of breath and felt dizzy quite often. At first, I thought I was just getting old, but my doctor diagnosed me with hypertension shortly after.



Areas with high prevalence of **diagnosed diabetes** were primarily concentrated in the Bronx, Northern Manhattan, Eastern Queens, and Southern Brooklyn.

Analyses suggested that **regular commutes above one hour**, **lower educational attainment**, **low broadband rates**, and **living in single parent households** might act as contributing factors to high diabetes prevalence in these neighborhoods.



## Who lives here?<sup>2</sup>

My name is **Maria**, I'm 52, and I'm from the Bronx.

I dropped out of high school when I was 16 to pursue a career in the hospitality sector. My working day is long, as it takes me an hour to get to and from my workplace, so I tend to grab quick, convenient food for me and my daughter quite often. About a year ago, I was diagnosed with diabetes.

AI4HealthyCities furthermore explored the prevalence of **undiagnosed hypertension**, which was found to be higher in parts of Lower Manhattan and the more affluent parts of Queens and Brooklyn.

This supports existing research<sup>3</sup> that groups which appear to experience a lower risk of hypertension have a higher chance of remaining undiagnosed should they develop the disease.

## Who lives here?<sup>2</sup>

I'm **Benjamin**. I'm 46 years old and a financial analyst from Lower Manhattan.

I grew up in Upper East Side, and then went to college in California. When I moved back, I chose somewhere closer to work so the commute wouldn't be too far. Apart from a seasonal flu, I feel healthy and haven't seen a doctor in ages. I have a headache every now and then and can get out of breath occasionally, but I don't think it's an issue to be worried about.

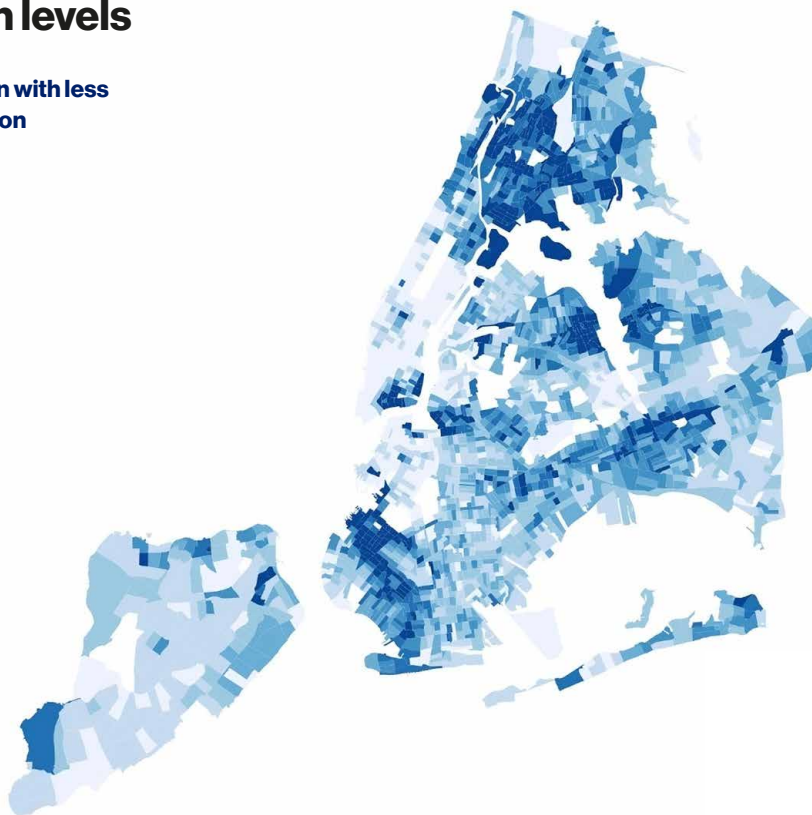
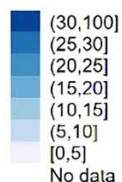


<sup>2</sup> The above personas were developed using data outputs from AI4HealthyCities and publicly available data from US Census and Department of Labor New York City, supported by AI.  
<sup>3</sup> Campbell, E., E. Macey, C. Shine, V. Nafilyan, N. Cadogan Clark, P. Pawelek et al. 2023. Sociodemographic and health-related differences in undiagnosed hypertension in the health survey for England 2015–2019: a cross-sectional cohort study. *Lancet eClinicalMedicine* 65.

# The lay of the land: Examples of SDOH mapped across New York City

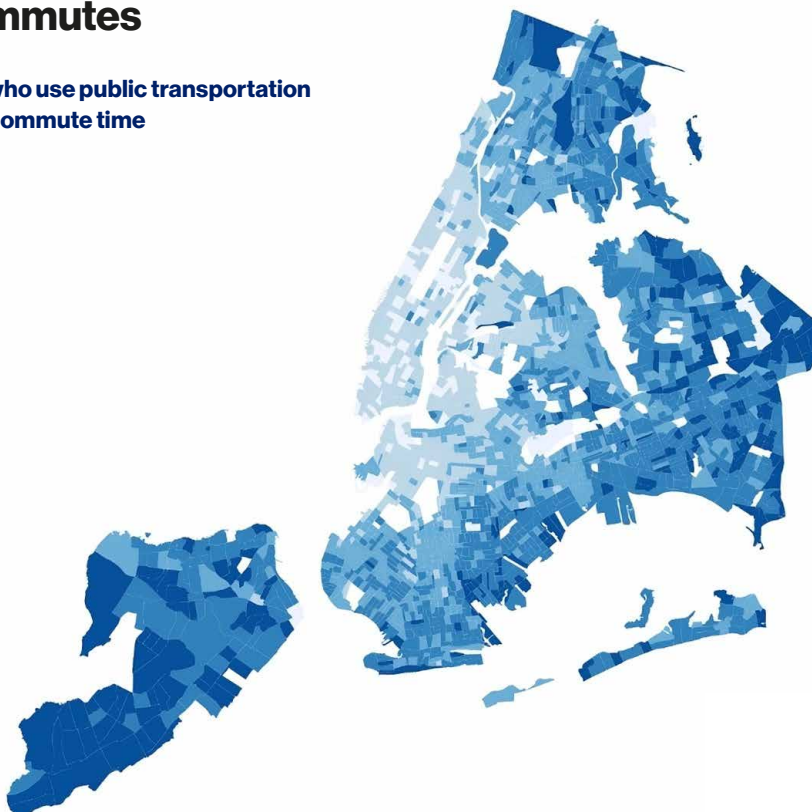
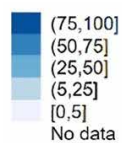
## Low education levels

Percentage of population with less than high school education



## Long daily commutes

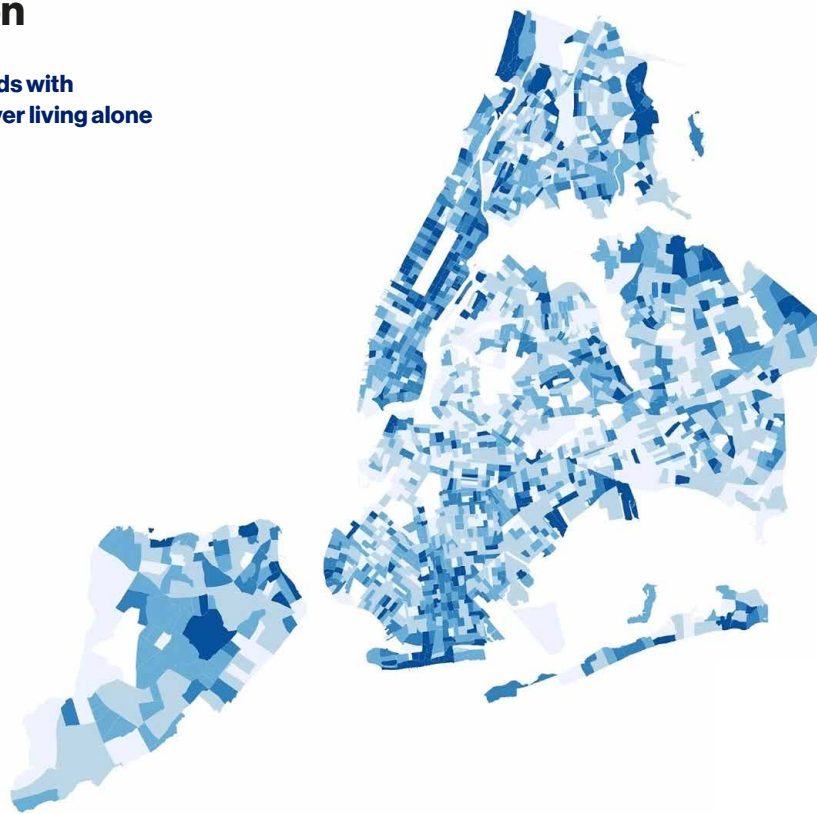
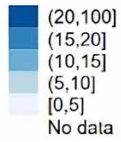
Percentage of workers who use public transportation with at least 60-minute commute time





## Social isolation

Percentage of households with a person 65 years and over living alone



## Low income

Percentage of households with public assistance income or food stamps – SNAP

