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A synthetic population for agent-based modelling in Amsterdam

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Synthetic populations are statistical representations of a population at a given geo-spatial granularity, and provide a fruitful ground to virtually test local policies and interventions. While a synthetic population of the Netherlands exists, it is not open-source and uses health data that may underrepresent ethnic minorities in Amsterdam. We therefore develop a synthetic population of individuals and households at a postcode level for Amsterdam. We do so using SynthEco, an open-source framework that can be adapted to national census data, and can be combined with cohort data to create statistically representative populations through iterative proportional fitting. In our case, we generate the synthetic population by combining microdata from the Central Bureau of Statistics

with the Healthy Life in Urban Settings (HELIUS), and the Geoscience and Health Cohort Consortium (GECCO) dataset. The synthetic individuals have detailed attributes, including age, sex, income, education level, body weight index, and are related into social networks with household members, colleagues, neighbors, and classmates. The resulting synthetic population can be used as input for agent-based models to explore 'what-if' scenarios for neighborhoods in Amsterdam. We present a test case in which the synthetic individuals' social networks can be used to improve health, well-being, and resilience, and how these changes may cascade through the social network to other neighborhoods.

