Luxembourg Institute of Socioeconomic Research

Cities and Cardiovascular Health: Heart Healthy Hoods project

@HHHproject

Principal Investigator
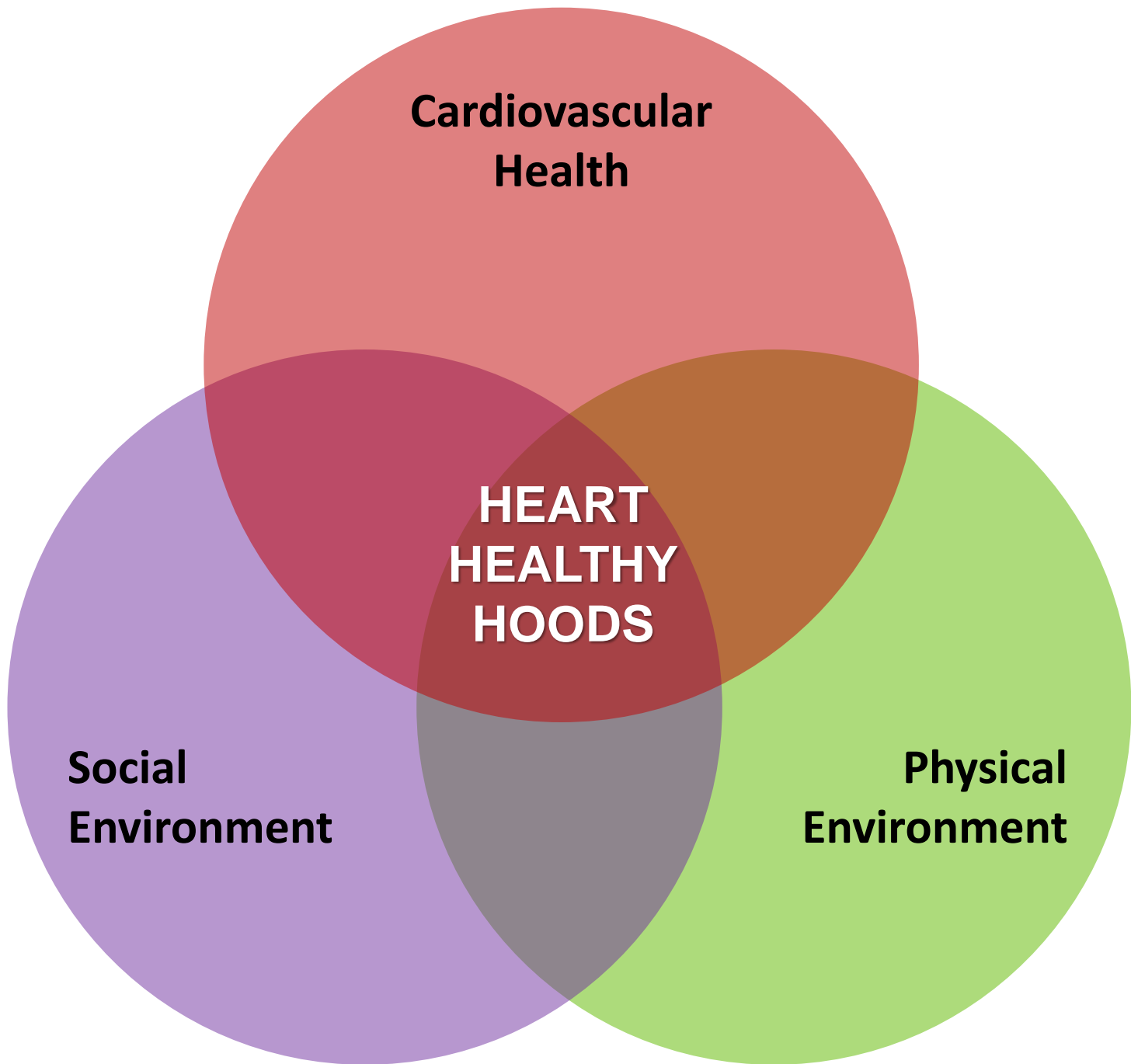
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Cardiovascular Health

First cause of **death** in Europe (47% of all deaths in 2010)

Increasing **prevalence** (50 mill. patients in 2009 in Europe)

Rising social and **economic costs** (196 billion € in 2009)

Traditional medical preventive approaches are **individual**

Social Epidemiology

Studies social determinants of disease

Methodologies from Social Sciences and Public Health

Focus on population preventive approach

Addresses growing social inequalities in health

1. To include **a qualitative approach to understand the context and meanings** of the urban environment in relation to cardiovascular health

2. To develop **measurements to characterize the social and physical urban environments** in a systematic and accurate fashion

3. T**o understand** the already known relation between the urban environment and cardiovascular health in the **United States with this relation in Europe**

To provide scientific evidence to researchers, the general population and policy makers to intervene at the population level to prevent the first cause of death in Europe.

R&I impact: Methods, articles, conferences.

Social impact: Participation, communication, policy making

Geography

University of Alcalá

CRESH Edinburgh

LSHTM

Health Sociology

University of Salamanca
Johns Hopkins School of Public Health

Primary Care System
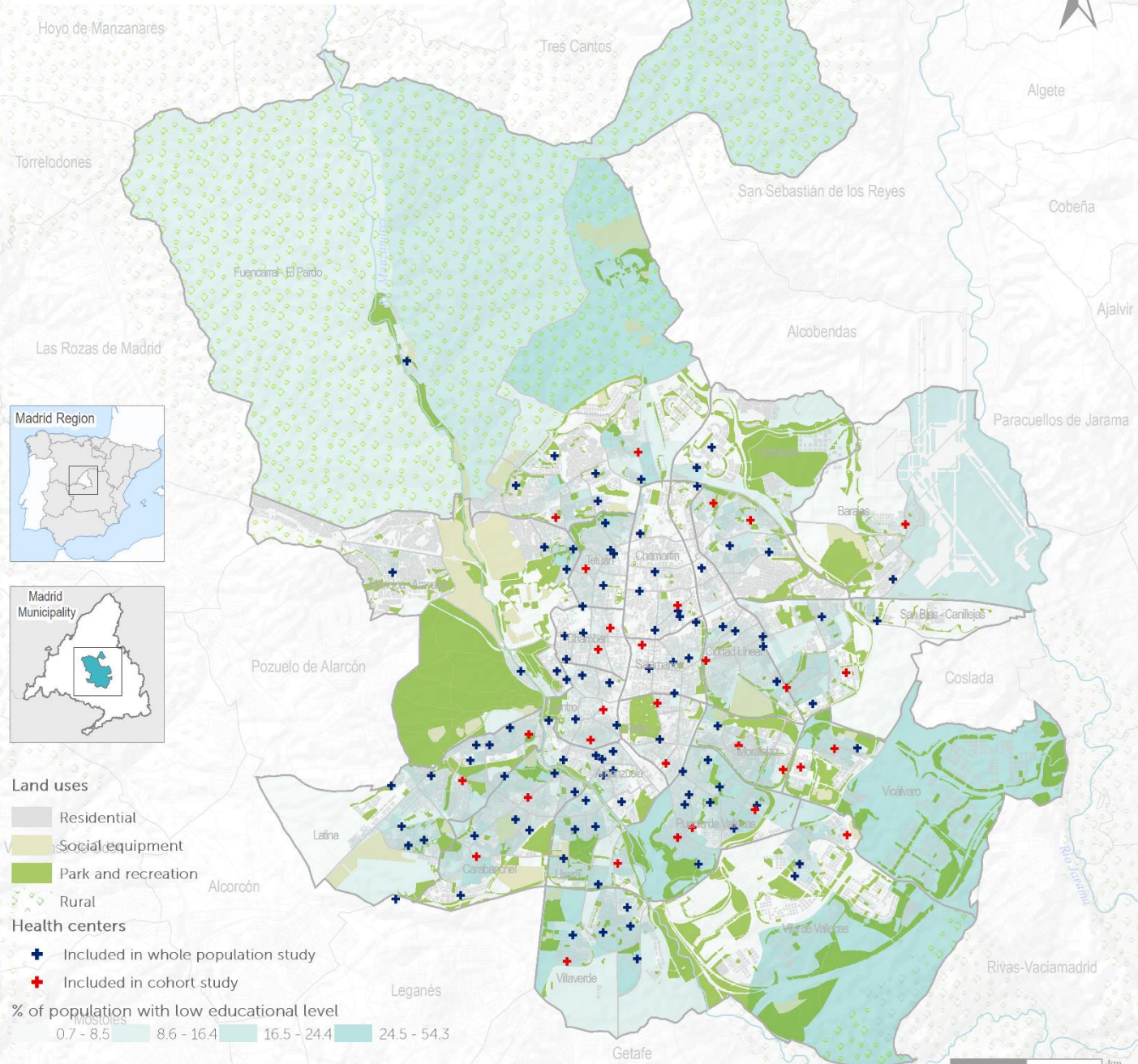
Primary Care Research Unit, Madrid

Epidemiology

University of Alcalá

Johns Hopkins School of Public Health

Photography

Knowledge Transfer

Citizen Science

MADRID MUNICIPALITY

21 Districts

128 Neighborhoods

2.412 Census Sections (≅1.500 ps)

3,2 Mill. Residents

Land uses
- Residential
- Social equipment
- Park and recreation
- Rural

Health centers
- ✚ Included in whole population study
- ✚ Included in cohort study

% of population with low educational level

| 0.7 - 8.5 | 8.6 - 16.4 | 16.5 - 24.4 | 24.5 - 54.3 |

Authors A. Cebrecos y F. Escobar

http://hhhproject.eu

HHH Study Design

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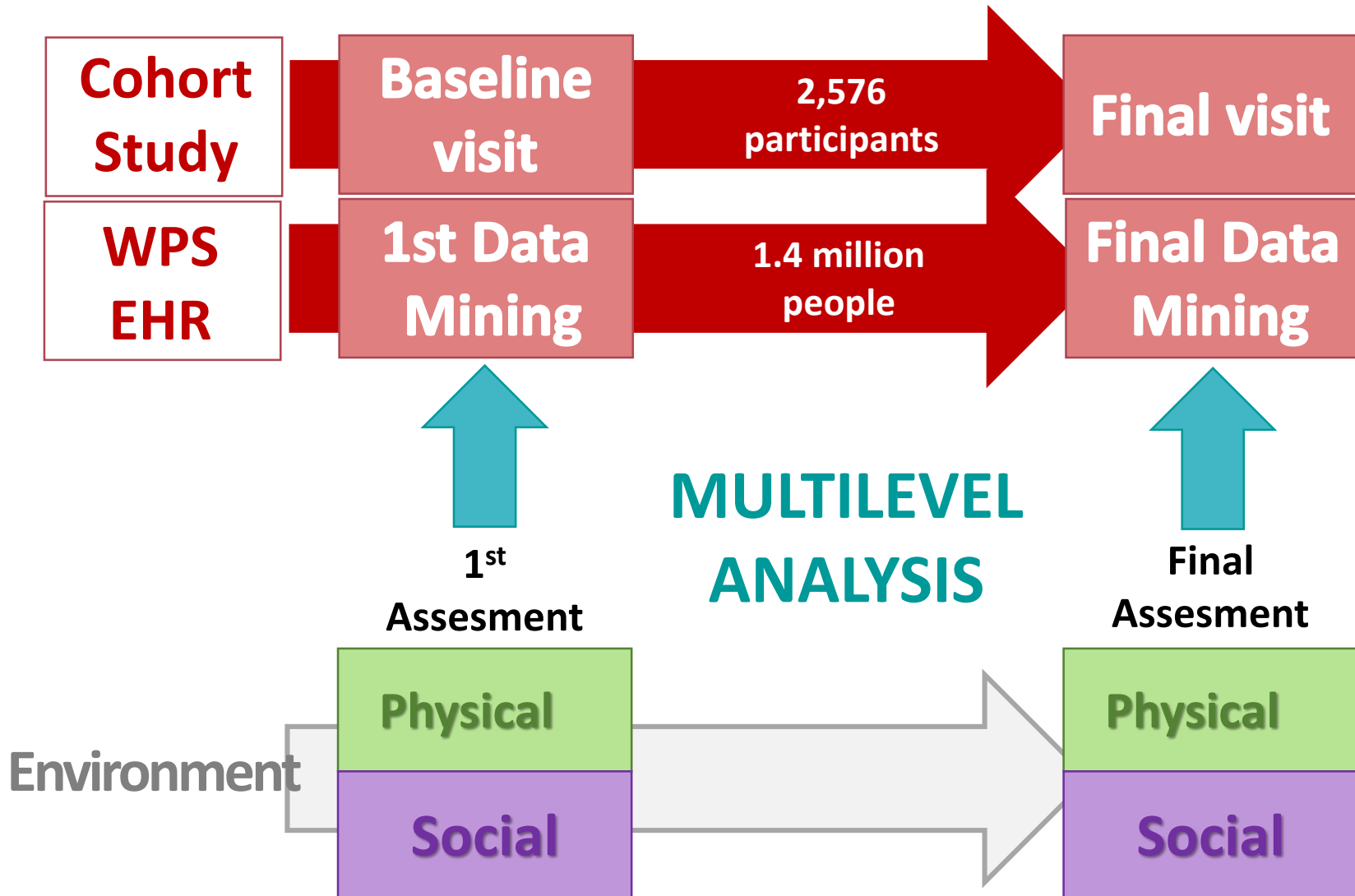
Overall Objective

To describe **CV profile** of adult population (40-75 years) from the city of Madrid. Likewise, to investigate the **association** between social and physical features of **the urban environment** with citizens' **CV health.**

Secondary Objectives

1. To describe CVD annual incidence

2. To describe behavioral and biological risk factors prevalence and incidence

3. To study the Whole-Population results as compared to HHH Cohort results

Main Objective

To study the association between environment characteristics and diet, smoking, physical activity, alcohol consumption, and cardiovascular risk

Cohort Study

128 Primary health care centers

31 participating primary care centers

370 Physicians and nurses trained

Target Population

♀♂ between 40 - 75 years old

Free of cardiovascular disease

Residents of Madrid city Origin:

Ecuador, Colombia, Perú y Bolivia

Variables

Clinical visit — Biological cardiovascular risk factors

Telephone survey — Behavioral cardiovascular risk factors

a) **Exploratory Study in a Median Area of Madrid**

b) **Urban Environment Exposure Measures**

    i.   Food

    ii.   Physical Activity

    iii. Tobacco

    iv. Alcohol

c) **Results by working groups**

    i.   Health Geography

    ii.   Qualitative Research

a) **Exploratory Study in a Median Area of Madrid**

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Exploratory Study

BMC Medical Research Methodology

**RESEARCH ARTICLE**　　　　　　　　　　　　　　　　**Open Access**

Population cardiovascular health and urban environments: the Heart Healthy Hoods exploratory study in Madrid, Spain

Usama Bilal[1,2], Julia Díez[1], Silvia Alfayate[1], Pedro Gullón[1,3], Isabel del Cura[4,5,6], Francisco Escobar[7], María Sandín[1], Manuel Franco[1,2*] and the HHH Research Group

Aim

To conduct an exploratory study to provide an in-depth characterization of a neighborhood's social and physical environment in relation to cardiovascular health.

http://hhhproject.eu

Ciudad Lineal

http://hhhproject.eu
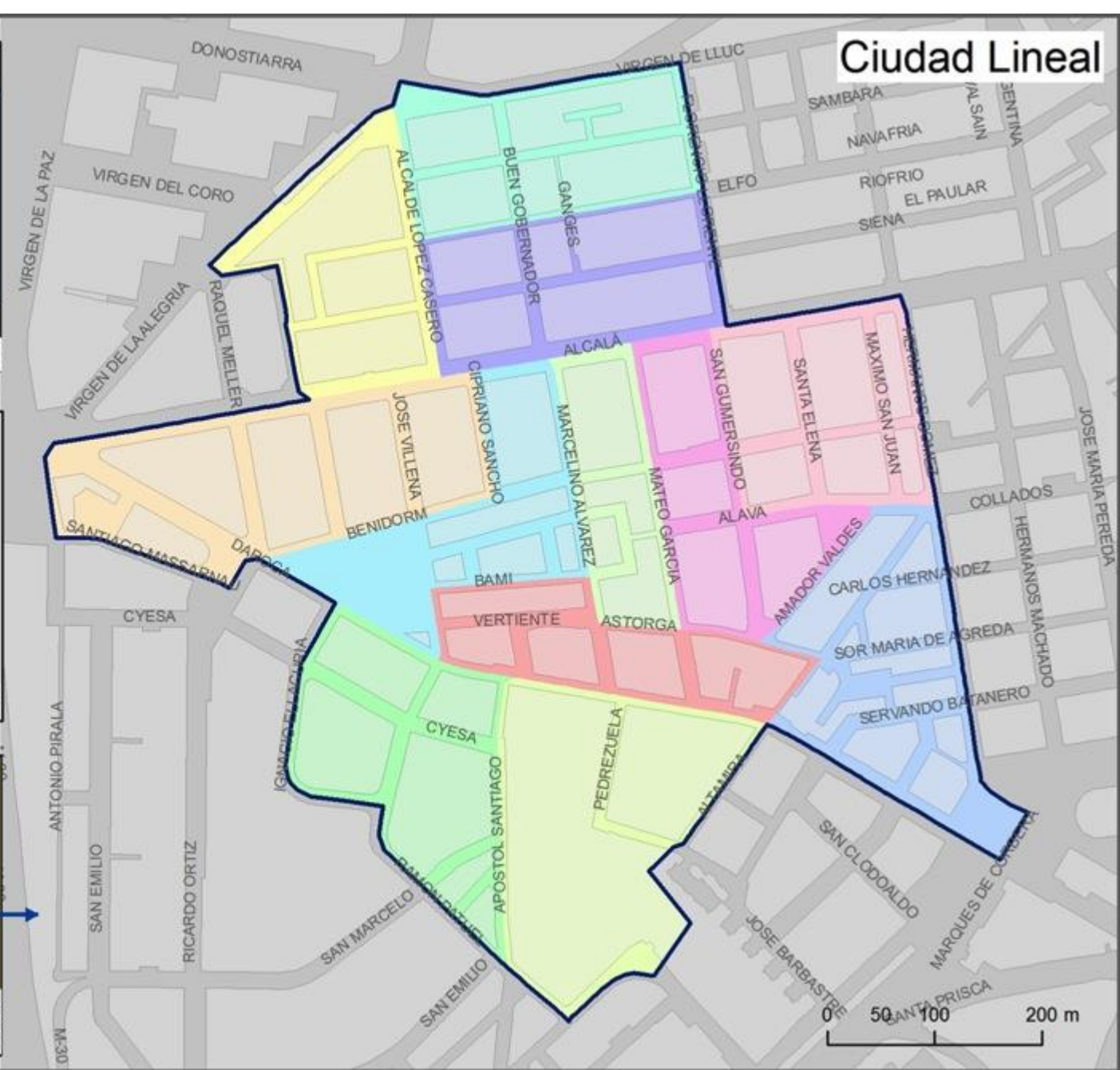
Methods

Mixed Methods Approach

QUALITATIVE METHODS

11 semi-structured interviews with key informants

Questions on health and the target environments

Analysis by triangulation incorporating an interpretative phenomenological analysis.

MMA

QUANTITATIVE METHODS

CARDIOVASCULAR DISEASE

Electronic Health Records

URBAN ENVIRONMENT

Audits tool
- **Food**
- **Physical activity**

Points of sale
- **Tobacco**
- **Alcohol**

Results

- Total Pilot Area Population: 15,751

- 95% of population (14,857) registered in Electronic Health Record

  → Possibility of analyzing data for 1.4 million people

- Cardiovascular and risk factor profile:

Population 45-106 ys. old:	7,252
Diabetes Prevalence:	12%
Diabetes Control (HbA1c<7):	63%
Hypertension Prevalence:	34%
Dyslipidemia, all types:	32%

Results

- Build environment

- 44 small food stores

- Large food market (112 stalls)

- 91 Alcohol outlets (53 bars and

restaurants)

- 64 Tobacco outlets

- Social environment

- Drinking as a socialization mechanism

- Public open spaces mostly used by seniors

- Importance of accessibility

- Availability of destinations to walk

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a) **Exploratory Study in a Median Area of Madrid**

b) **Urban Environment Exposure Measures**

    i.   Food

    ii.   Physical Activity

    iii.   Tobacco

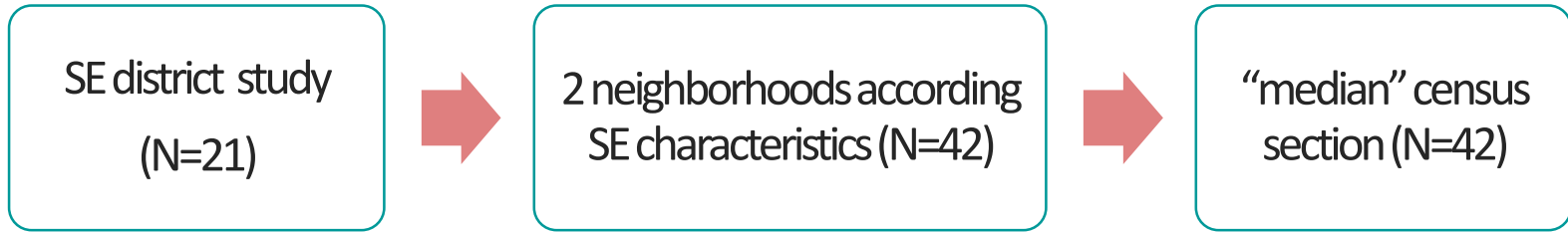   iv.   Alcohol

c) **Results by working groups**

    i.   Urban Geography

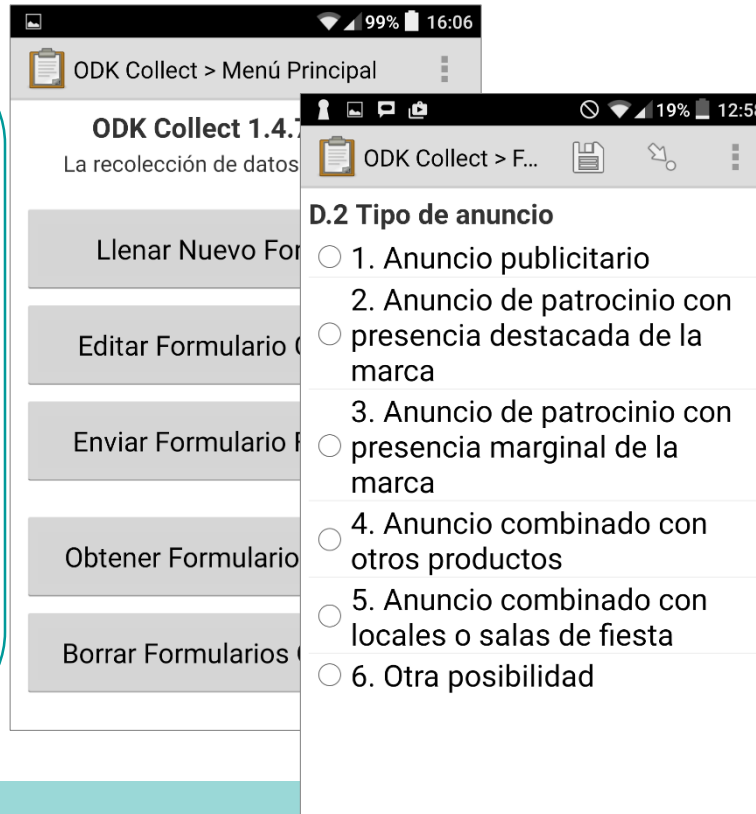   ii.   Qualitative Research

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Exposure measures

Field-work areas selection

| SE district study (N=21) | → | 2 neighborhoods according SE characteristics (N=42) | → | "median" census section (N=42) |

Field-work audit tools

FOOD → NEMS-S

ALCOHOL → OHCITIES

TOBACCO → TOBACCO Questionary

PHYSICAL ACTIVITY → WALKABILITY

ODK Collect > Menú Principal
ODK Collect 1.4.7
La recolección de datos
Llenar Nuevo For...
Editar Formulario
Enviar Formulario
Obtener Formulario
Borrar Formularios

D.2 Tipo de anuncio
○ 1. Anuncio publicitario
○ 2. Anuncio de patrocinio con presencia destacada de la marca
○ 3. Anuncio de patrocinio con presencia marginal de la marca
○ 4. Anuncio combinado con otros productos
○ 5. Anuncio combinado con locales o salas de fiesta
○ 6. Otra posibilidad

Secondary databases

Census of commercial activities and establishments

Socio-demographic (census and "padrón")

Commissioner for the Tobacco Market

Spatial Data

a) **Exploratory Study in a Median Area of Madrid**

b) <u>**Urban Environment Exposure Measures**</u>

   i. <u>**Food**</u>

   ii. Physical Activity

   iii. Tobacco

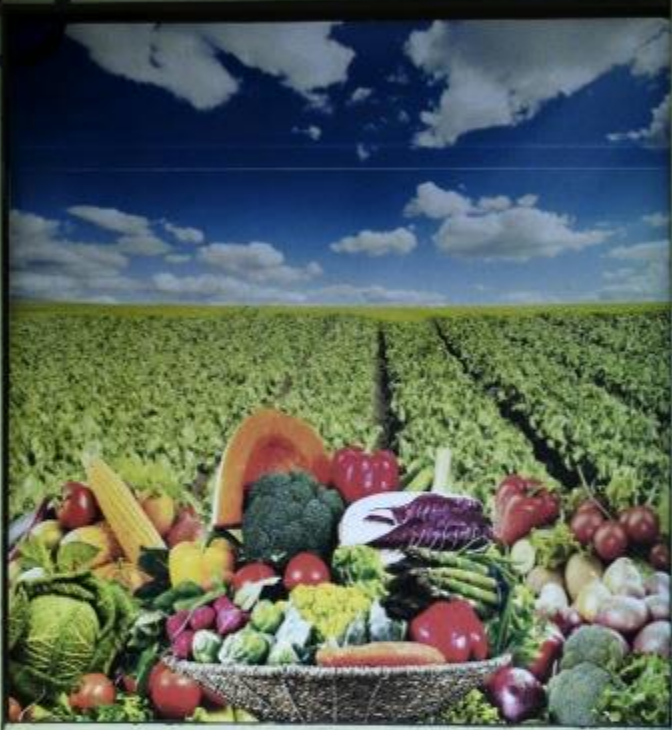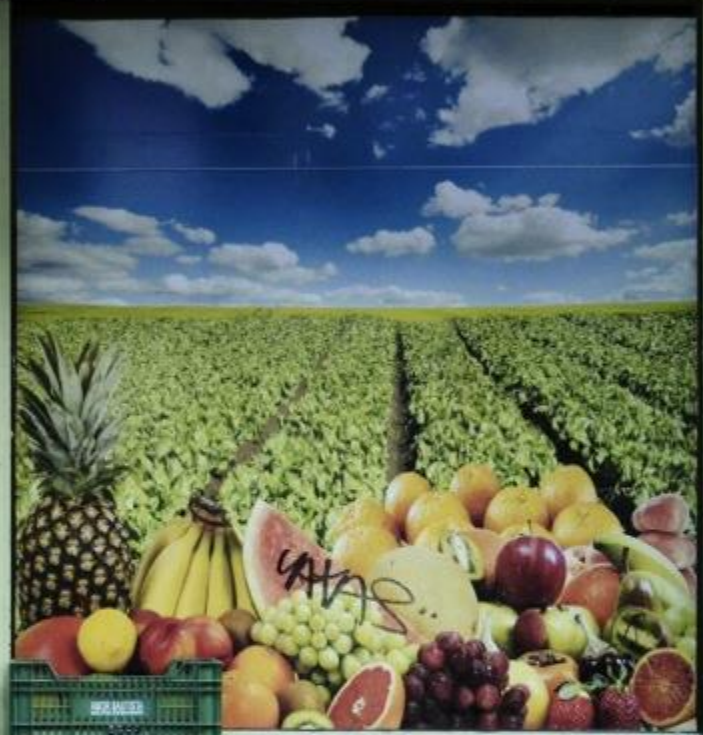   iv. Alcohol

c) **Results by working groups**

   i. Urban Geography

   ii. Qualitative Research

Food

Field validation of municipal food environment data to characterize retail food environments in Madrid

(Work in progress)

Díez J., Bilal, U., Cebrecos, A., Pérez, H., Galán, I. and Franco M

Aim

- To examine whether municipal data are a valid alternative to ground-truthing when characterizing the retail food environment in a Southern- Mediterranean city like Madrid, Spain.

- To test whether indicators of validity differed by area-level deprivation.

Food

Validation results

➢ Municipal database has been validated

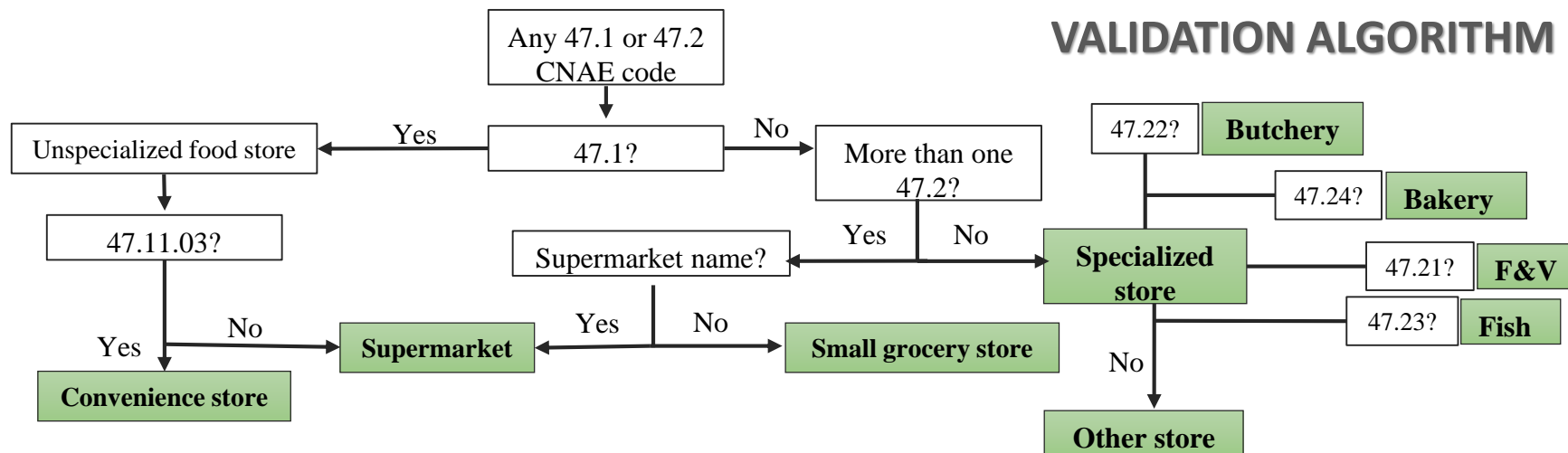| Type of store	Sensitivity	95% CI	PPV	95% CI
All food stores	89.7%	82.8% , 94.6%	**55.3%**	47.9% , 62.5%
Supermarkets	100.0%	83.9% , 100.0%	91.3%	72.0% , 98.9%
Small grocery	86.7%	73.2% , 94.9%	59.1%	46.3% , 71.0%
Convenience	100.0%	87.0% , 100.0%	100.0%	87.0% , 100.0%
Specialized	87.5%	74.8% , 95.3%	42.9%	32.9% , 53.3%

➢ Non bias by socioeconomic level

Food

Validation results

➢ Municipal database has been validated

VALIDATION ALGORITHM

➢ Non bias by socioeconomic level

Food

Understanding differences in the local food environment across countries: A case study in Madrid (Spain) and Baltimore (USA)

Julia Díez [a], Usama Bilal [a,b], Alba Cebrecos [a], Amanda Buczynski [c], Robert S. Lawrence [c], Thomas Glass [b], Francisco Escobar [a], Joel Gittelsohn [d], Manuel Franco [a,b,*]

Aim

To understand cross-national differences in the local food environment between Madrid and Baltimore by comparing an average neighborhood in each city in terms of food store types, healthy food availability, and residents' pedestrian access.

a) **Exploratory Study in a Median Area of Madrid**

b) **Urban Environment Exposure Measures**

    i.   Food

    ii.   Physical Activity

    iii.   Tobacco

    iv.   Alcohol

c) **Results by working groups**

    i.   Urban Geography

    ii.   Qualitative Research

Physical Activity

International Journal of Health Geographics

RESEARCH

Open Access

Intersection of neighborhood dynamics and socioeconomic status in small-area walkability: the Heart Healthy Hoods project

Pedro Gullón[1,2†], Usama Bilal[1,3†], Alba Cebrecos[1,4], Hannah M. Badland[5], Iñaki Galán[6] and Manuel Franco[1,3*]

Aim

To study the association between area-level SES and walkability in the city of Madrid (Spain) evaluating the potential effect modification of neighborhood dynamics.

Physical Activity

Method:

Table 1 Area Socioeconomic status, Walkability and neighborhood dynamics indicators

Construct	Domain	Indicator	Operationalization	Source	Level
SES	Education	Low Education	Residents with mandatory studies or below/all residents aged 25 or above	Padron	Census section
		High Education	Residents with university education or above/all residents aged 25 or above	Padron	Census section
	Occupation	Part time Jobs	Workers in part-time jobs/all workers	Social security	Neighborhood
		Temporal Jobs	Workers in temporal jobs/all workers		
		Manual Occupation Class	Workers in manual or unskilled occupations/all workers		
	Wealth	Housing Prices	Average sale price of housing per m^2	Idealista report	Census section
	Living Conditions	Unemployment Rate	Residents registered as unemployed/all residents aged 16–64	Employment service	Neighborhood
Walkability	Density	Residential Density	Occupied Dwellings/km^2	Housing census	Census section
	Density	Population Density	Residents/km^2	Padron	Census section
	Destinations	Retail Destinations	Retail and Service Destinations/km^2	Retail spaces census	Census section
	Street Structure	Street Connectivity	Kernel Density in 3 mx3m pixels of the density of street intersections	CARTOCIUDAD	Census section
Neighborhood dynamics	Gentrification	Increase in Education level	Rank difference in high education from 2005 to 2014 (>p95)	Padron	Census section
	Neighborhood age	Year of construction	Median year of construction (categorized)	Catastro	Census section

Physical Activity

Physical Activity
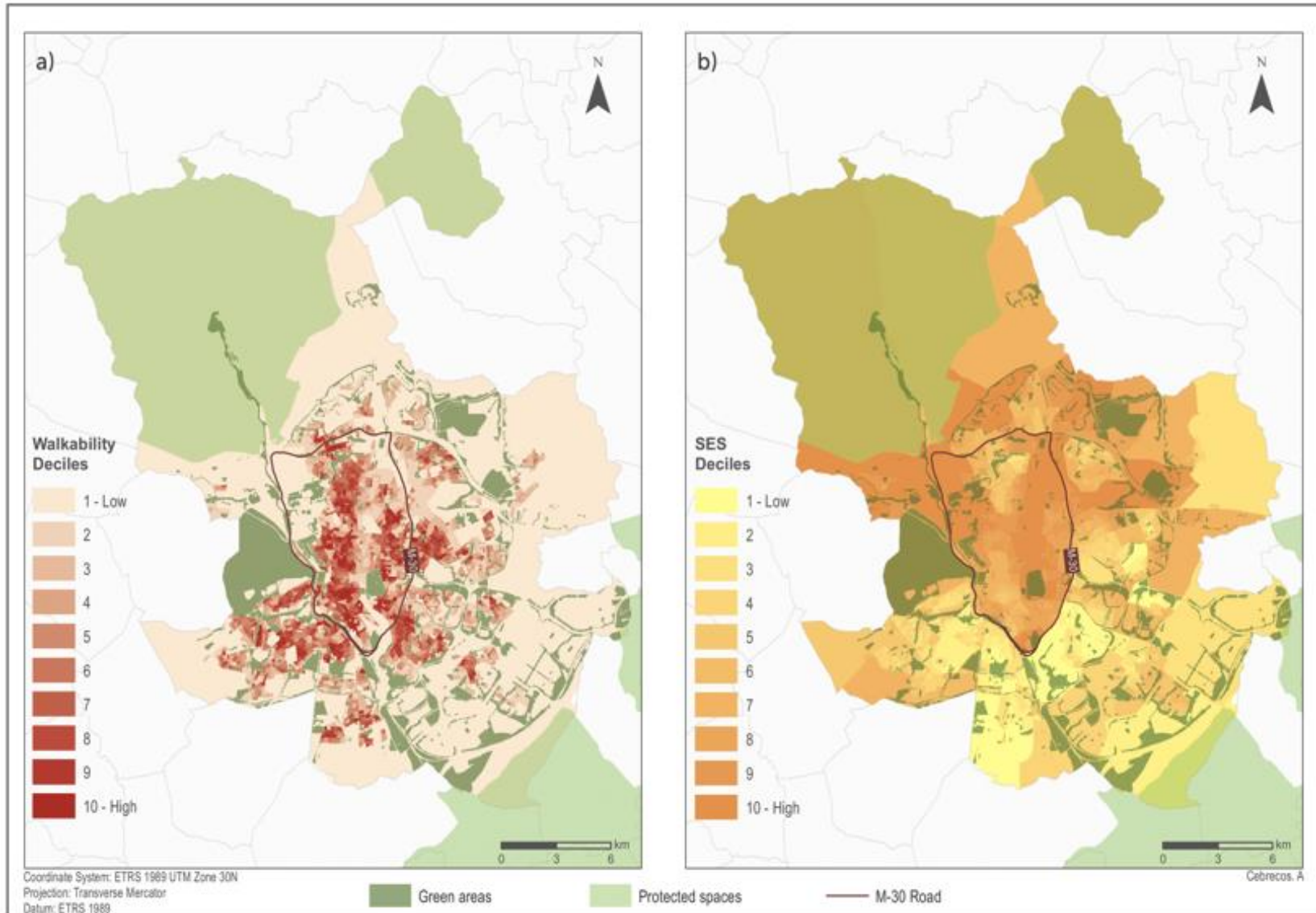
Results:

➢ Area-level SES and walkability were inversely and significantly associated.

➢ This pattern did not hold for areas with an increase in education level

➢ The association was attenuated in newly built areas

Assessing Walking and Cycling Environments in the Streets of Madrid: Comparing On-Field and Virtual Audits

Pedro Gullón, Hannah M. Badland, Silvia Alfayate,
Usama Bilal, Francisco Escobar, Alba Cebrecos, Julia Diez,
and Manuel Franco

Aim

To test if the Madrid Systematic Pedestrian and Cycling Environment Scan (M-SPACES) discriminates between areas with different urban forms and to validate virtual street auditing using M-SPACES.

a) **Exploratory Study in a Median Area of Madrid**

b) **Urban Environment Exposure Measures**

 i. Food

 ii. Physical Activity

 iii. Tobacco

 iv. Alcohol

c) **Results by working groups**

 i. Urban Geography

 ii. Qualitative Research

Tobacco

A GIS-Based analysis to evaluate the spatial distribution of tobacconist: the case study of Madrid, Spain

R. Valiente; X. Sureda; U. Bilal; M. Franco; Ana Navas-Acién; J. Pearce; F. Escobar

(work in progress)

Aim

To study the distribution of tobacco stores and the extent in which they comply the tobacco market regulations in Madrid.

Distances from stores to schools

N tobacco stores: 638

Median distance between tobacco stores and schools: 208,68 m

Minimum distance between tobacco stores and schools: 19,28 m

Tobacco stores classified by distance to their closest school

- Less than 100 metres — (14%)
- From 100 to 150 metres — (15%)
- From 150 to 200 metres — (18.5%)
- From 200 to 300 metres — (28.7%)
- Further than 300 metres — (23.8%)
- Residential areas
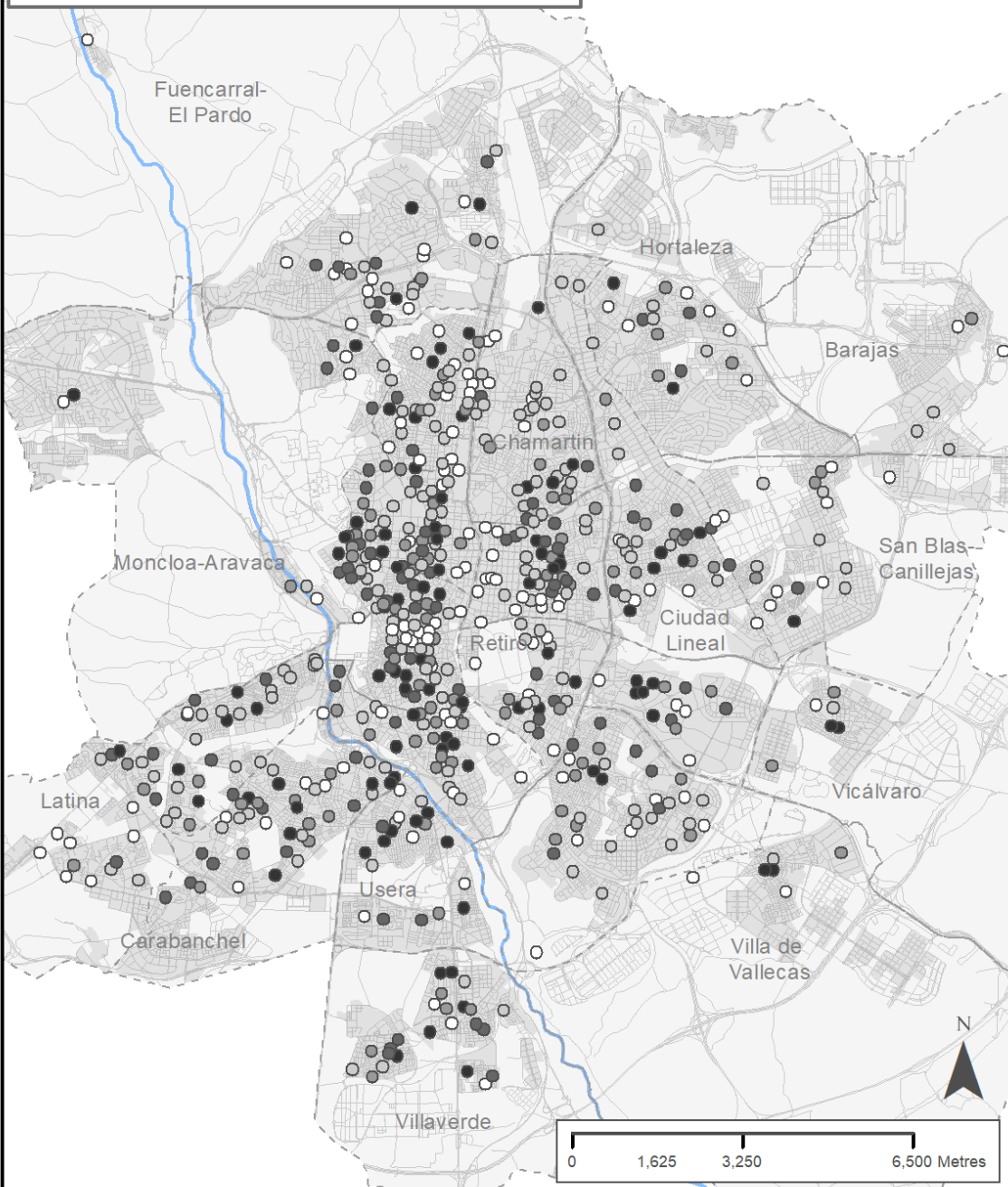
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a) Exploratory Study in a Median Area of Madrid

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c) Results by working groups

   i.   Urban Geography

   ii.   Qualitative Research

Alcohol

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Open Access   **Research**

BMJ Open   Development and evaluation of the OHCITIES instrument: assessing alcohol urban environments in the Heart Healthy Hoods project
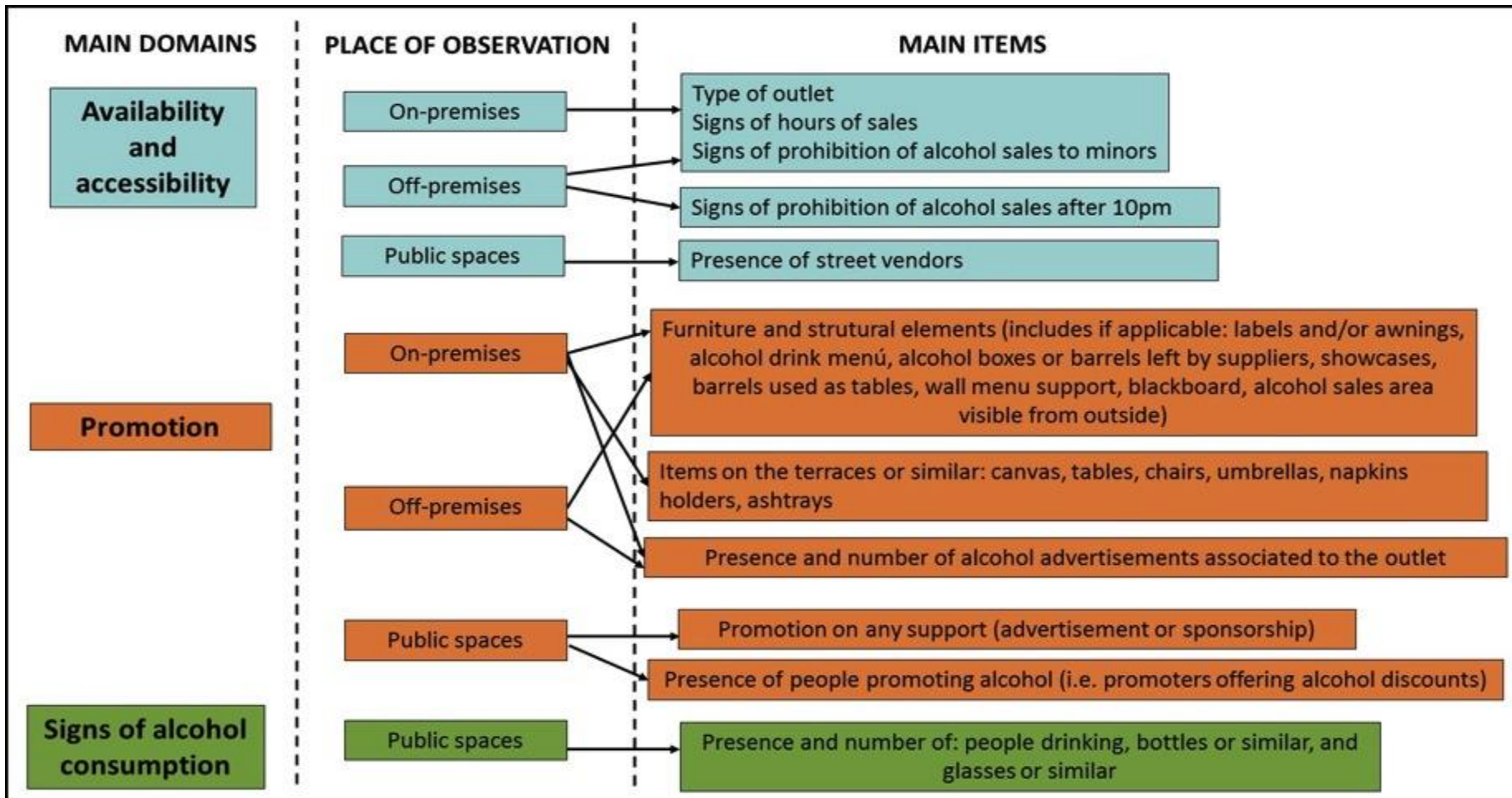
Xisca Sureda,[1] Albert Espelt,[2,3,4,5,6] Joan R Villalbí,[2,3,5,7,8] Alba Cebrecos,[1,9] Lucía Baranda,[10] Jamie Pearce,[11] Manuel Franco[1,12]

Aim

To describe the development and test–retest reliability of OHCITIES, an instrument characterizing alcohol urban environment in terms of availability, promotion and signs of consumption.

Alcohol

OHCITIES DESING

Alcohol

A. Availability of alcohol products in a convience store, 2015, Madrid

B. Signs of alcohol consumption in a public square, 2015, Madrid

C. Promotion of alcohol products in a spanish restaurant chain, 2015, Madrid

Photographs: Victor G. Carreño

http://hhhproject.eu

Alcohol

Results

➢ Percent-agreement in on-premise and off-premise alcohol outlets greater than 80%

➢ Inter-rater and test–retest reliability were generally above 0.80

➢ 26 streets and 3 public squares with signs of alcohol consumption

a)   **Exploratory Study in a Median Area of Madrid**

b)   **Urban Environment Exposure Measures**

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    iv. Alcohol

c)   **<u>Results by working groups</u>**

    i.   **<u>Health Geography</u>**

    ii.   Qualitative Research

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International Journal of Health Geographics

METHODOLOGY

Open Access

CrossMark

Characterizing physical activity and food urban environments: a GIS-based multicomponent proposal

Alba Cebrecos[1,2], Julia Díez[1], Pedro Gullón[1,3], Usama Bilal[1,4], Manuel Franco[1,4] and Francisco Escobar[1,2*]

Aim

To design and implement a multicomponent method to characterize and evaluate environmental correlates of obesity: the food and the physical activity urban environments.

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A multicomponent proposal to assess cardiovascular healthy environments:
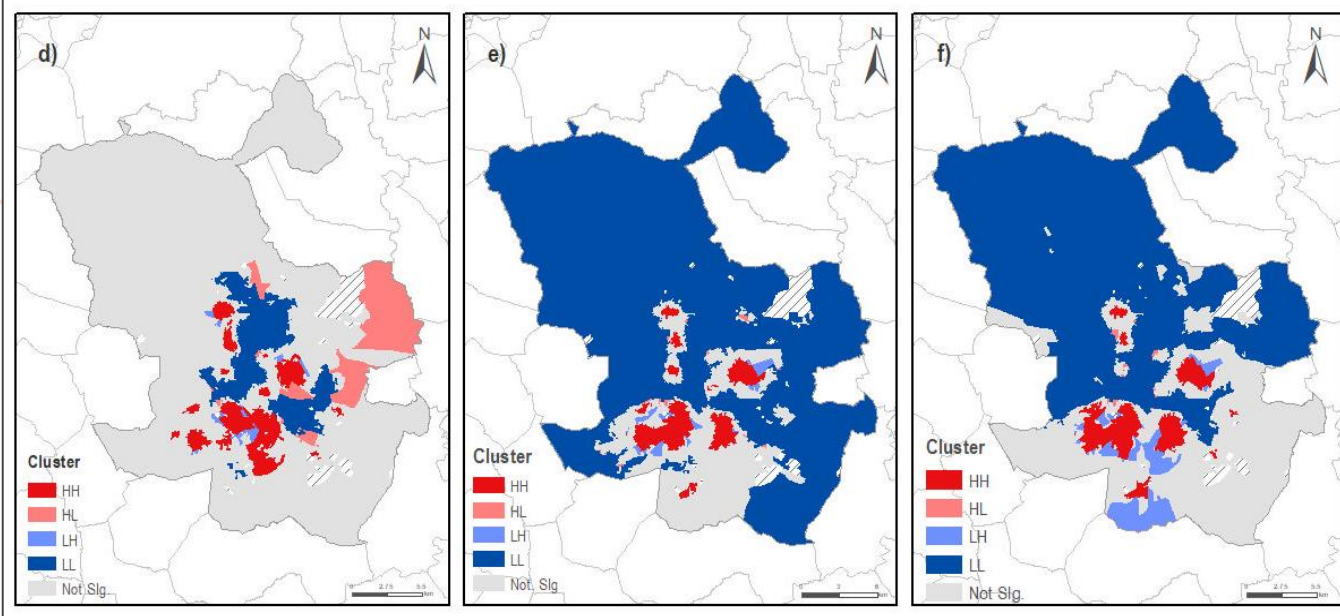*Heart Healthy Hoods Index*

Cebrecos A., Escobar F., Klein O., Díez J., Gullón P., Sureda X,. Borrel L., and Franco M.
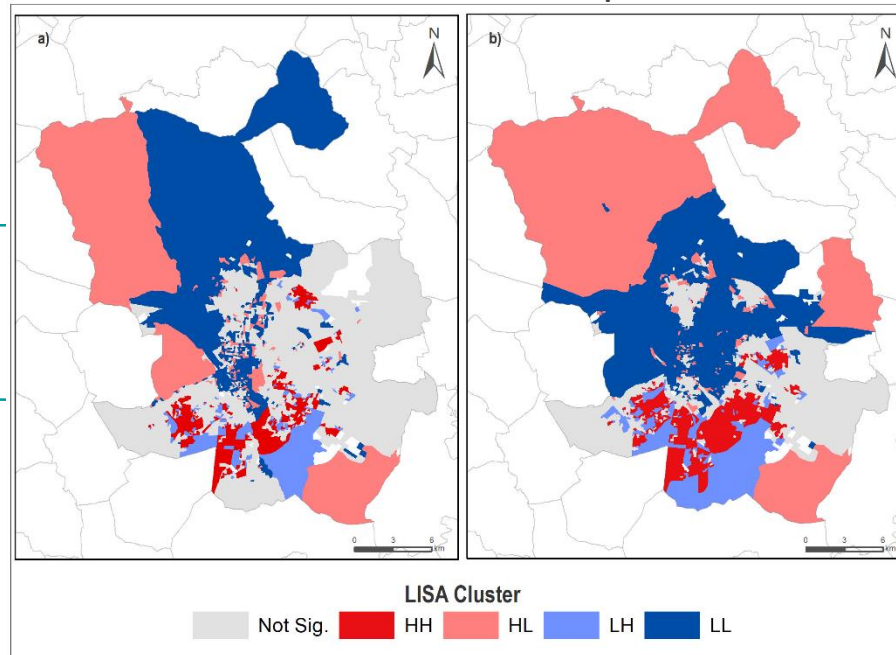
(work in progress)

Aim

Implementing and improving a multicomponent method to characterize the built environment related with the four main behavioral risk factors of cardiovascular health studied in the HHH project: diet, physical activity, tobacco and alcohol.
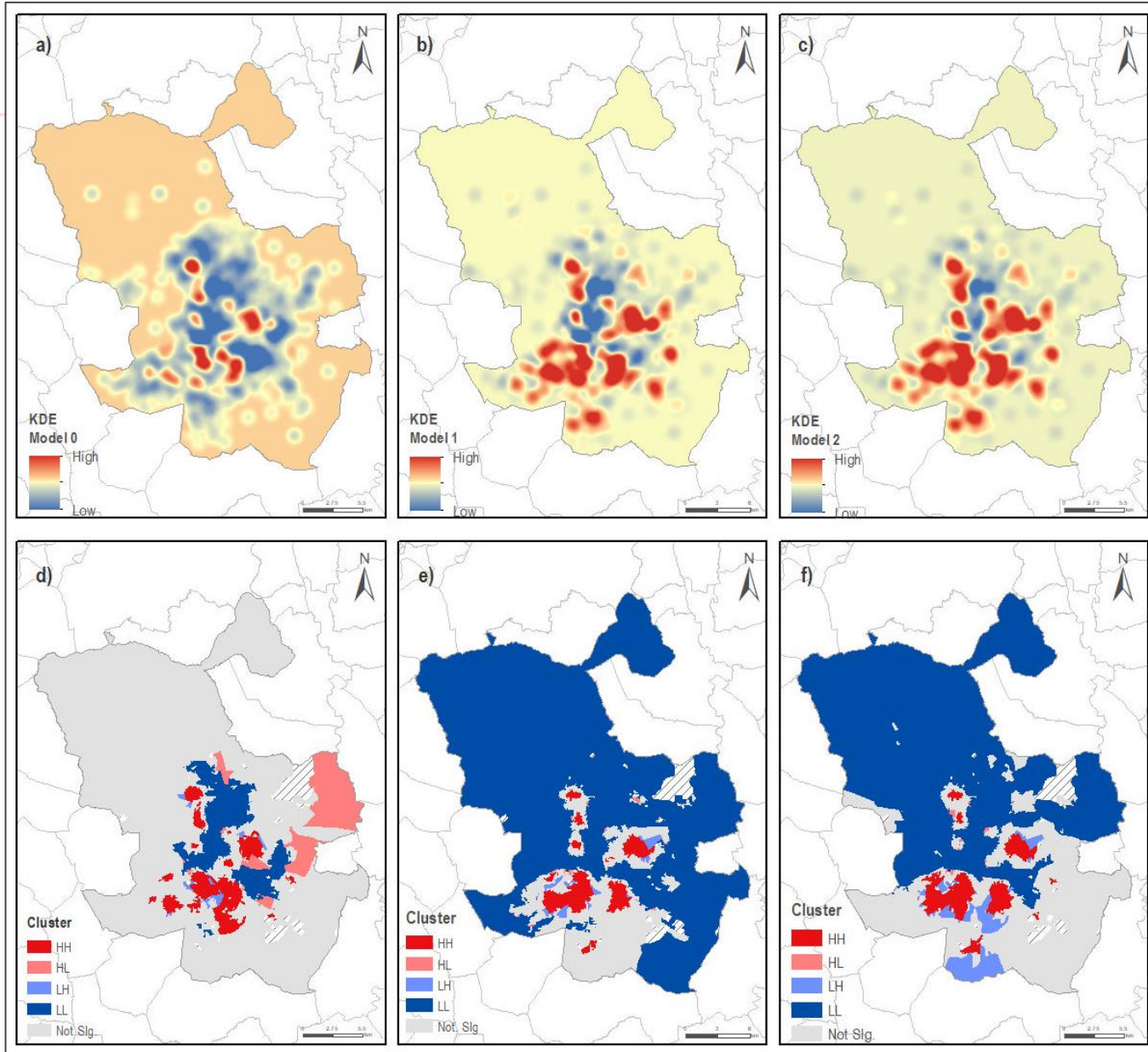
CVD Prevalence

Deprivation

HHH WPS

EHR: 1,446,994

2014

45-70 yrs

14 indicators
- **Socioeconomic**
- **Demographics**

PCA
-Manual workers
-Unemployment
-Eventual employees
-Insufficient instruction

Health Geography

Results

➤ Statistically → Model B

➤ Areas ↑ CVD and ↓ Environment → (r = - 0.69**)

- CVD and deprivation (r=0.09*)
- Model and deprivation (r=0.19**)

➤ Areas ↑ CVD and ↑ Environment → (r= 0.65**)

- CVD and deprivation (r=0.46**)
- Model and deprivation (r=0.47**)

** 0.01 *0.05

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c) **<u>Results by working groups</u>**

    i.   Urban Geography

    ii. <u>Qualitative Research</u>

Universidad de Alcalá

Neighborhoods under change and residents´ health perceptions: The Heart Healthy Hoods qualitative study (bmc public health)

Conde P, Gutiérrez M, Sandín M, Díez J, Rivera J, Franco M.

(under review)

Aim

To describe the social and neighborhood changes occurring in a middle low socioeconomic area of Madrid according to their residents.

To explore how these neighborhood changes are connected to residents' health perceptions.

Qualitative research

Methods

Exploratory qualitative study within 12 months (from January 2014 to January 2015) using 16 semi-structured interviews. Residents + professionals.

Interview topic guide

➢ **Neighborhood description**

➢ **Uses of the neighborhood**

➢ **Health related to neighborhood**

SOCIAL CHANGES	NEIGHBORHOOD CHANGES	RESIDENTS' HEALTH PERCEPTIONS
New Demographic composition →	**Generation and cultural fracture** →	Loss of trust relationships **(-) Loneliness and lack of social support** New diet practices **(-) Not very healthy diets**
New socio-cultural values →	**Breakdown of traditional forms vs Individualism Rapid rhythms of life (-) Lack of time Change in gender/age role** →	New uses of public spaces **(-) Loss of public space use** Associative networks support **(+) Strengthen self-esteem (+) Decreases anxiety (+) Increases social cohesion** Participation of elderly in health promotion and education programs **(+) Promotes Active ageing**
Economic aspects →	**Economic crisis Impoverishment and lack of resources High working hours** →	Unemployment and job insecurity **(-) Unhealthy diets (-) Stress, Anxiety (+) Intergenerational solidarity**

HHH Ancillary Studies

1. HHH Retrospective Study 2015-2016

2. Smoking in the City 2016-2019

3. Urban environment and health: Qualitative approach in the Heart Healthy Hoods Study 2017-2020

4. Physical and social tobacco environment in neighborhoods in Madrid city 2017-2020

5. Photovoice Villaverde 2015

Photovoice Villaverde

(click for the video)

Acknowledgements

- **Participants**

- **Whole HHH Madrid team and collaborations**

- **Different funding agencies:**
  - European Research Council
  - Council and Region of Madrid
  - Health Research Fund
  - National Research Plan
  - National Drug Plan
  - Mapfre Foundation
  - Center for a Livable Future, Johns Hopkins

Merci pour votre attention

Thanks for your attention

Gracias por su atención