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Smart City Observatories implement REsilient Water Management

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BARCELONA 2021

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ABBREVIATIONS

Abb.	Definition
AUDIT	Alcohol Use Disorders Identification Test
BMI	Body Mass Index
CAPI	Computer-Assisted Personal Interviews
CATI	Computer-Assisted Telephone Interviews
CATPCA	Categorical Principal Component Analysis
CCT	Cancer Clinical Trial
CKAN	Comprehensive Kerbal Archive Network
CNAE	National Classification of Economic Activities (equivalent to EU class. of economic activities (NACE))
CNO	National Classification of Occupations
CVD	Cardiovascular Disease
ESCA	Catalan Health Survey
FFQ	Food Frequency Questionnaire
GDP	Gross Domestic Product
HOMALS	Multiple correspondence analysis, Homogeneity Analysis
HWM	Household Waste Management
ICT	Information and Communications Technology
IoT	Internet of Things
IPAQ	International Physical Activity Questionnaire
M	Mean
MAQ	Medical Adherence Questionnaire
MEDAS	Mediterranean Diet Adherence Screener
MET	Metabolic Equivalents of Task
MOS	Medical Outcome Study
MVPA	Moderate-to-Vigorous Physical Activity
NCD	Non-Communicable Disease
OTC	Over The Counter (referred to doses of pharmaceutical drugs)
PA	Physical Activity
PBD	Plant-Based Diet
SD	Standard Deviation
SDG	Sustainable Development Goals
SES	Socio-Economic Status
SIDIAP	Information System for Research in Primary Care (Catalonia)
SME	Small and Medium-sized Enterprise
SRH	Self-Rated Health
WBE	Wastewater-Based Epidemiology
WHO	World Health Organization



PROJECT ABSTRACT

SCOREwater focuses on enhancing the resilience of cities against climate change and urbanization by enabling a water smart society that fulfils SDGs 3, 6, 11, 12 and 13 and secures future ecosystem services. We introduce digital services to improve management of wastewater, stormwater and flooding events. These services are provided by an adaptive digital platform, developed and verified by relevant stakeholders (communities, municipalities, businesses, and civil society) in iterative collaboration with developers, thus tailoring to stakeholders' needs. Existing technical platforms and services (e.g., FIWARE, CKAN) are extended to the water domain by integrating relevant standards, ontologies and vocabularies, and provide an interoperable open-source platform for smart water management. Emerging digital technologies such as IoT, Artificial Intelligence, and Big Data is used to provide accurate real-time predictions and refined information.

We implement three large-scale, cross-cutting innovation demonstrators and enable transfer and upscale by providing harmonized data and services. We initiate a new domain “sewage sociology” mining biomarkers of community-wide lifestyle habits from sewage. We develop new water monitoring techniques and data-adaptive storm water treatment and apply to water resource protection and legal compliance for construction projects. We enhance resilience against flooding by sensing and hydrological modelling coupled to urban water engineering. We will identify best practices for developing and using the digital services, thus addressing water stakeholders beyond the project partners. The project will also develop technologies to increase public engagement in water management.

Moreover, SCOREwater will deliver an innovation ecosystem driven by the financial savings in both maintenance and operation of water systems that are offered using the SCOREwater digital services, providing new business opportunities for water and ICT SMEs.

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EXECUTIVE SUMMARY

The main purpose of this deliverable is to report the design and development of the Lifestyle Habits Survey (LHS-SCOREwater), namely subtask 4.2.4. Within the Barcelona case, we are aiming to compare lifestyle habits conducting to good health, as well as the environmental behaviour of three study areas located in neighbourhoods of different socio-economic status (SES). This is done in two ways: (1) through wastewater-based epidemiology (WBE), and (2) by means of a survey using computer-assisted telephone/personal interviews (CATI/CAPI survey), the outputs of which would serve to double validate those of the WBE study. The design, development, and exploitation of the results of the CATI/CAPI survey is the object of this deliverable. The CATI/CAPI was administered by IERMB and an external fieldwork company between June 21 - July 14, 2021. The survey questionnaire included in its design validation questions matching the biomarkers analysed in wastewater samples from three communities monitored in Barcelona and regarding five main aspects: (1) health status and risk factors, (2) diet and vegetarianism, (3) adherence to medical therapy and OTC intake of pharmaceutical drugs, (4) household waste management, and (5) SES of inhabitants. A total sample of 1,004 interviews were performed: 354 in Carmel low-SES area, 325 in Poblenou middle-SES area, and 325 Sant Gervasi high-SES area. Sample design was made to be representative of the populations living within these sewersheds. Results show differences between the populations of the three study areas in terms of health status, health risk factors, and diet quality in the anticipated directions according to area-level SES status, and for some variables (e.g., self-rated health and body mass index) also according to personal-level SES, namely following the social gradient in health. Antibiotics prescriptions were more frequent in the middle- and high-SES areas of Poblenou and Sant Gervasi (significant), respectively, where people also reported to have kept antibiotics leftovers and used them without prescription more often in comparison to residents in the low-SES area of Carmel. Regarding household waste management, one-use wet wipes were more frequently used in the low- and middle-SES areas of Carmel and Poblenou, respectively, and by young female adults (16-44 years). However, occasional inadequate disposal was more frequent in the high-SES area of Sant Gervasi.

1 INTRODUCTION

The goal within SCOREwater Barcelona case study is to innovate in the digitalization of water services by demonstrating how sensing the sewer system of Barcelona can provide information at the neighbourhood scale on health status, dietary habits and household waste management practices. This information will be used to: 1) reduce the discharge of antibiotics in the environment, 2) promote healthier dietary habits, 3) prevent damaging discharges of wet wipes and oils and greases to the sewer system, and thus 4) decrease sewer maintenance costs. This deliverable describes the design of the survey to fit the SCOREwater goals in the case-study of Barcelona around wastewater-based epidemiology (WBE). The survey is designed to gather information which can potentially be gathered from sewage chemical and microbiological biomarkers. Within the frame of WP4, and in deliverable D4.10, the sewage biomarkers results will be compared with the survey results. The survey is designed to collect the most common life-style habits (environmental behaviour, pharmaceutical drugs consumption, diet, health risk factors, and socio-economic status). Some of the life-style habits will directly be compared with sewage biomarkers results; this is the case of pharmaceuticals and environmental behaviour. The other lifestyle habits will allow characterizing the community and explain differences in pharmaceutical drugs consumption and environmental behaviour; but also, to understand the potential of WBE for other biomarkers. In fact, sewage samples collected in Barcelona have been frozen and can potentially be analysed in the future to demonstrate new capabilities of WBE. In short, conducting the survey will help validate the installation of a lifestyle habits surveillance network to mine lifestyle habits information from the chemical and microbiological analysis of sewage samples, one of the main objectives of the Barcelona case study in the SCOREwater project. The design of the survey follows the research protocol approved by the *Foundation University Institute for Primary Health Care Research Jordi Gol i Gurina (IDIAPJGol)* ethics committee (CEIm Code: 21/066-P) and made available to the SCOREwater project through WP9 deliverables. The document is structured as follows. First, the theoretical grounding to the research is provided, along with the study aim and objectives. Second, details are given on the study design, then the study population followed by the inclusion or exclusion criteria. Afterwards, the sample design and procedure are described. Ethical considerations are later explained, as well as the analysis variables, and finally the results from the survey are provided and discussed.

2 LITERATURE REVIEW

2.1 SOCIAL INEQUALITIES IN HEALTH

The association between socioeconomic status (SES) (or sometimes socioeconomic position) and health is widely documented and consistent across countries. Population health is worse and life expectancy is shorter in societies where income differences are large, leading to social stratification (Mackenbach et al., 2008; Pickett and Wilkinson, 2015; Wilkinson and Pickett, 2006). Moreover, a ‘social gradient’ in health exists in that increasing education, income and SES improves health outcomes in a dose-response relationship (Arcaya et al., 2015). Research in urban areas at the neighbourhood scale further support national and global trends on the negative association between SES and mortality from non-communicable diseases (NCDs) and health risk factors (e.g., smoking and obesity) (Borrell et al., 2014; Mari-Dell’Olmo et al., 2015). Mortality from 14 avoidable causes of death is higher in low-SES neighbourhoods, while mortality rate ratios between areas with different levels of deprivation differ between gender in cities from Europe (Hoffmann et al., 2014). About the effect on risk factors, Kinge et al. (2015) provide evidence from 70 countries that obesity increases with GDP, and that, in rich countries obesity is more common among the lower educated, whilst in poor countries, obesity is more common among the higher educated. There is ample evidence about the social determinants of health inequalities. The WHO Regional Office for Europe published the evidence on their report the *Social determinants of health: the solid facts* (Wilkinson and Marmot, 2003), which lists ten socioeconomic causes of poor health outcomes: (1) the social gradient, (2) stress, (3) early life, (4) social exclusion, (5) work, (6) unemployment, (7) social support, (8) addiction, (9) food, and (10) transport.

SES is usually measured by education, occupation, employment, income, and wealth (Pampel et al., 2010). The relationship between SES and health is complex. Much research has been devoted to clarifying the direction of causality. Three hypotheses have been tested: (1) social causation (SES → health), (2) health selection (health → SES); and (3) indirect selection (common factors influence both SES and health). Recent studies find support for the social causation hypothesis (1), namely SES affects health outcomes at multiple points in the life course (Warren, 2009), especially in the transition from working age to old age (Hoffmann et al., 2018), although prolonged poverty might amplify the effects of deprivation in health (Arcaya et al., 2015). On the other hand, low-SES groups show a tendency to adopt unhealthy behaviours, such as smoking, exercising little, poor diet and excess weight. These have been connected to social and cultural class traits and explained by deprivation leading to stress and fewer benefits of investing in health behaviours for longevity, among other reasons (Pampel et al., 2010). Thus, health inequalities are caused by material deprivation directly (through the purchase of and access to good health) and indirectly (e.g., environmental stress, low education) (Garrison and Rodgers, 2017).

2.2 SOCIOECONOMIC DIFFERENCES IN ENVIRONMENTAL BEHAVIOUR

Many environmental behaviours, including household waste management (HWM) and recycling (Berger, 1997; Sidique et al., 2010), can be partially influenced by education and income, which is relevant to the study of the inadequate discharge of disposable wet wipes and waste cooking oil to the sewer network. However, the evidence is not conclusive in this instance. The research on the matter has produced mixed results on the actual effect of socioeconomic variables on HWM. Although there are exceptions, most meta-analytic studies on household recycling agree in that, when statistically significant, socioeconomic variables (income, education, employment status, etc.) account for only a small portion of the variation in recycling behaviour and waste disposal (Hage et al., 2009; López-Mosquera et al., 2015; Miafodzyeva and Brandt, 2013; Miliute-Plepiene et al., 2016; Saphores and Nixon, 2014).

Despite the rapid growth of the wet wipes market and their direct relation with sewer clogging and the formation of 'fatbergs', there is still a lack of scientific literature on the use and amount of wet wipes flushed down the toilet and its relationship with households SES. Articles found that the raise of wet wipes is due to its ease of use, hygiene, convenience, and consumers' environmental perception as biodegradable, dispersible, and compatible with water treatment systems (Atasağun and Bhat, 2018). Other work mentions a direct relationship between income and their use, as well as with age and working status (edana.org).

The residential disposal of waste cooking oil is also unresearched at the regional wastewater system. A survey on the households recycling of oils and greases developed by the municipality of Cadiz showed that 20% of respondents declared to throw waste cooking oil into the sink or directly into the trash. A survey on the determinants of domestic waste recycling in two municipalities of the Metropolitan Area of Barcelona (AMB) also showed that 40% of the respondents did not recycle waste cooking oil, with the most possible destination being the sink or the toilet (IERMB, 2018). More research is needed to understand the relationship between the discharge of domestic oils and greases and the link of this behaviour with the SES of households.

3 AIM AND OBJECTIVES

The Lifestyle Habits Survey 2021 (LHS-SCOREwater 2021) is aimed at collecting relevant information about environmental and health behaviours of the population residing at three monitored sewersheds in neighbourhoods of different SES in the city of Barcelona. This information is collected with the objective of validating the results from the study on WBE.

Specific objectives are:

- i. To conduct a statistically reliable and valid survey on the lifestyle habits and socioeconomic profile of the population connected to the monitored sewersheds. To this aim, a statistically significant sample size of respondents will be determined.
- ii. To design a questionnaire and experimental design that allow the validation of the results of the study on WBE. The questionnaire should include questions regarding the environmental and health behaviours that match the sewage chemical and microbiological biomarkers potentially collected in the WBE study.

- iii. The questionnaire design should adequately collect information on the SES (i.e., education, occupation, employment, and income) of the populations studied, so as to analyse socioeconomic differences in behaviour and lifestyle habits.
- iv. The questionnaire should allow the collection of information on at least the intake of over-the-counter (OTC) antibiotics and adherence to medical therapy, which can cause antimicrobial resistance, nutritional habits (e.g., vegetarianism) and physical activity, and indicators of overweight and obesity. Questions on other health behaviours may be included to match the WBE analysis.
- v. The questionnaire should allow the collection of information on HWM in relation to the improper disposal of wet wipes and other hygiene products, as well as waste cooking oil and food scraps, which cause the blockage of sewer pipes.

4 STUDY DESIGN

In the definition of the methodology there were several issues that needed to be considered from a good start to meet the objectives of the study. The following is a summary of the main features of the approach taken:

- *Survey research.* It is a specific type of field study that involves collecting data from a representative sample of the population using a questionnaire. Survey research provides the ideal conditions for the analysis of the interactions process x individual differences –the sample of individuals reflects the total heterogeneity of the study population– and allows to accommodate studies with diverse designs: cross-sectional, cross-sectional with repeated measures, panel and mixed (Visser et al., 2000).
- *Cross-sectional study.* It is a type of observational study that analyses data from a population, or a representative subset, at a specific point in time. This design can be used for documenting the prevalence of particular features or behaviours in a population. Cross-sectional surveys can yield correlational evidence, namely signs and magnitudes of associations between pairs of variables. Such correlations do not themselves provide direct evidence of causal processes, but correlations are informative about the plausibility of a causal hypothesis (Visser et al., 2000). Moreover, cross-sectional surveys also allow causal inferences in a number of ways using statistical techniques; e.g., two-stage regression, multilevel models or fixed effect models. Cross-sectional data can also be used to identify mediators and moderators of relationships between variables using path analysis techniques.

5 STUDY POPULATION (UNIVERSE)

The population interviewed included the adult population aged 16 and over living within the limits of the three sewersheds (i.e., sampling areas), and intersecting or adjacent census tracts (i.e., survey areas), in the neighbourhoods of Barcelona: Carmel (low SES), Poblenou (middle SES) and Sant Gervasi-Galvany (high SES).

In selecting the three sampling points we found several limitations due to the specific requirements of the WBE to which we had to adapt, namely, health data from SIDIAP (*Information System for Research in Primary Care*) must be available for the selected census tracts and, at the same time, there must be an existing point in the sewerage system from which it is possible to take a wastewater sample which is representative of the entire population discharging at the sampling point. Such a sample is the integration of urine and faeces from the population living in the area.

When selecting the three sampling points, the following criteria must be met:

- The sampling point collects wastewater only from the desired population (study area).
- Hospitals and medical centres and high-restaurant density areas should be kept out of the study area to ensure that wastewater represents the inhabitants of such area.
- The sampling point collects wastewater of at least 10,000 individuals to ensure statistical quality of the surveys (i.e., ratio sample/population $\leq 10\%$, for a survey sample of approximately 1,000 interviews).
- Health information from the SIDIAP database is available for the area covered by the sampling point.

- Each sampling point (corresponding to a sampling area) is of a different SES (low/middle/high) or different health parameters (e.g., obesity rates).
- A sampling station (cabinet) can be placed in the desired sampling point.

6 INCLUSION AND EXCLUSION CRITERIA

The LHS-SCOREwater survey is aimed at a representative sample of the population aged ≥ 16 years residing in the pre-selected census tracts ($n = 40$) of three areas in neighbourhoods of the municipality of Barcelona. The reporting unit are the individuals, who on 2021 January 1st are 16 years of age or older, and who reside in private homes within these 40 census tracts of Barcelona.

The operation involved the collection of a minimum of 1,000 interviews in compliance with the quotas established in the sample design (see Section 8). Selection of the person to be interviewed (≥ 16 years) was random based on the self-reported household members and according to representative quotas of sex and age (see question S4 below in Figure 1). The survey questionnaire had in the selector the list of household members, which included the sex and age of each member residing at the dwelling. The status of the sample and the status of the quotas, as well as the supervision carried out, was monitored daily during the survey fieldwork.

Question S4. *Starting with the youngest person, can you tell me the age and gender of all the people living in this home?*

	Age ┌───┐ └───┘	Sex
	1 Don't know 2 Don't want to answer	01 Men 02 Women
Member 1 (Surveyed)	Information S6	Information S5
Member 2		
Member 3		
...		

→ RANDOM SELECTION OF ONE OF THE MEMBERS OF THE HOUSE OF 16 YEARS OR MORE

Figure 1: Steps to randomly select the person to be interviewed

As a summary of the process:

- Selection of sample units (dwelling/household):
 - Telephone interviews (CATI) to landline and mobile phone numbers.
 - Personal interviews (CAPI) to complete quotas of sex and age. Personal interviews were carried out at the street.
 - Conducting up to 325 CATI/CAPI interviews (minimum) in each sampling area by cross-quotas of sex and age group.
 - Household selection by means of a procedure of random selection of landlines and mobile phones from the list of subscribers in free database directories, such as Infobel, datosOn or DataCentric, and according to the sampling distribution.
- Selection of the person to interview:
 - Selection of the person in the household through a random procedure based on self-reported household members of ≥ 16 years residing at the dwelling, and according to representative quotas of sex and age.
 - In calls to mobile phones, the telephone user is interviewed.
 - Substitutions due to non-contact after up to five calls on different days and time frames or due to a negative by a person of the same sex and age range.

- Survey information channels: The information telephone 012 of the Government of Catalonia was informed about the implementation of the LIFESTYLE HABITS SURVEY BARCELONA 2021 – SCOREwater and its main characteristics, in order to emphasize the officiality of the survey and minimize mistrust and to answer any doubts. The survey information was also publicised on the IERMB website. In addition, the outsourced fieldwork company made available to the interviewees a free 900 telephone line (with an answering machine 24 hours, 7 days per week, responding to line overloads) to answer doubts regarding the survey. The company had the obligation to answer the calls, collect the contact information of the person (name and surname, telephone number, age, address of residence), and call the person when available to be interviewed (always within the schedule established, namely from 9:30 to 22:00, Monday to Saturday). The phone line was active during the entire survey period.

7 SAMPLE DESIGN AND SAMPLING PROCEDURE

The sample unit were the individuals aged ≥ 16 years and living within the limits of the three sampling areas ($n = 40$ census tracts), roughly estimated at each sampling site based on the Continuous Register Statistics as of January 1, 2020 (Estadística del Padrón Continuo a 1 de enero de 2020) of the National Statistics Institute, population ≥ 15 years. A total of 1,004 interviews were performed (ratio sample/population $\leq 10\%$ and sample error = 3.07%), roughly 350 at each sampling site (total sample error = 3.07%) (see Table 1). The strata were formed by the crossing of the 40 census tracts with the sex and age of individuals aged ≥ 15 years based on the Continuous Register Statistics as of January 1, 2020. Age groups were formed as follows: 16-44 years, 45-64 years, and ≥ 65 years (see Table 2), namely the same age groups as in the Health Survey of Catalonia (in Catalan *Enquesta de salut de Catalunya, ESCA*), so that the results can be contrasted with other secondary sources of information if needed.

The sample design is a fixed sample –not proportional to the population– by sampling area, sex and age group, so as to ensure a minimum sample that allows offering representative results for each of the areas according to the following sample design:

Table 1: Design of the theoretical sample.

	N	n2	Ratio n2/N	Sample error
Zone 1: Carmel	26,434	350	1.32%	5.20%
Zone 2: Poblenou	14,153	325	2.30%	5.37%
Zone 3: St. Gervasi	13,812	325	2.35%	5.37%
TOTAL	54,399	1,000	1.84%	3.07%

Table 2: Design of the theoretical sample stratified by sex and age quotas.

		Zone 1 (n2=350)	Zones 2 & 3 (n2=325)
Sex	Male	175	160
	Female	175	165
Age group	16-44 years	115	105
	45-64 years	120	110
	≥ 65 years	115	105

The interviewing methodology included telephone interviews (CATI) to landline and mobile phones (theoretically 85% of interviews), as well personal interviews (CAPI) to complete quotas of sex and age, when it was difficult (25% of interviews). The final sample of the survey according to interviewing methodology, and stratified by sex and age quotas, is shown in Table 3. Then, Table 4 shows this information by study area.

Table 3: Survey sample according to interviewing methodology and stratified by sex and age quotas.

	CATI	CAPI
Total (n=1004)	77,3%	22,7%
SEX*		
Male (n=495)	71,9%	28,1%
Female (n=509)	82,5%	17,5%
AGE GROUP*		
16-44 years (n=310)	53,2%	46,8%
45-64 years (n=310)	82,9%	17,1%
65+ years (n=310)	94,2%	5,8%
SEX + AGE*		
Male 16-44 years (n=155)	50,3%	49,7%
Female 16-44 years (n=155)	56,1%	43,9%
Male 45-64 years (n=185)	75,7%	24,3%
Female 45-64 years (n=196)	89,8%	10,2%
Male 65+ years (n=155)	89,0%	11,0%
Female 65+ years (n=158)	99,4%	0,6%
ZONE*		
Carmel (n=354)	96,6%	3,4%
Poblenou (n=325)	73,5%	26,5%
Sant Gervasi - Galvany (n=325)	60,0%	40,0%

Note: (*) According to the answers of the interviewees, raw data without cleaning.

Table 4: Survey sample by study zone according to interviewing methodology and stratified by sex and age quotas.

	Carmel		Poblenou		Sant Gervasi - Galvany			
	CATI	CAPI	CATI	CAPI	CATI	CAPI		
Total (n=354)	96,6%	3,4%	(n=325)	73,5%	26,5%	(n=325)	60,0%	40,0%
SEX*								
Male (n=178)	93,3%	6,7%	(n=159)	69,2%	30,8%	(n=158)	50,6%	49,4%
Female (n=176)	100,0%	0,0%	(n=166)	77,7%	22,3%	(n=167)	68,9%	31,1%
AGE GROUP*								
16-44 years (n=110)	89,1%	10,9%	(n=100)	36,0%	64,0%	(n=100)	31,0%	69,0%
45-64 years (n=134)	100,0%	0,0%	(n=125)	94,4%	5,6%	(n=122)	52,5%	47,5%
65+ years (n=110)	100,0%	0,0%	(n=100)	85,0%	15,0%	(n=103)	97,1%	2,9%
SEX + AGE*								
Male 16-44 years (n=55)	78,2%	21,8%	(n=50)	38,0%	62,0%	(n=50)	32,0%	68,0%
Female 16-44 years (n=55)	100,0%	0,0%	(n=50)	34,0%	66,0%	(n=50)	30,0%	70,0%
Male 45-64 years (n=68)	100,0%	0,0%	(n=60)	93,3%	6,7%	(n=57)	28,1%	71,9%
Female 45-64 years (n=66)	100,0%	0,0%	(n=65)	95,4%	4,6%	(n=65)	73,8%	26,2%
Male 65+ years (n=55)	100,0%	0,0%	(n=49)	71,4%	28,6%	(n=51)	94,1%	5,9%
Female 65+ years (n=55)	100,0%	0,0%	(n=51)	98,0%	2,0%	(n=52)	100,0%	0,0%

* According to the answers of the interviewees, raw data without cleaning.

8 ETHICAL CONSIDERATIONS

This study was approved by the ethics committee of the *Foundation University Institute for Primary Health Care Research Jordi Gol i Gurina (IDIAPJGol)* (CEIm Code: 21/066-P). The approved protocol followed the indications described in the Ethics deliverable D9.2 POPD - Requirement No. 2 and D9.1. The variables required to carry out the study are those detailed in the next Section 9 *ANALYSIS VARIABLES* and were obtained directly from the participants of the CATI/CAPI survey with their consent. Only quantitative data based on telephone interviews and a survey questionnaire were collected. The survey contained personal data such as telephone numbers and postal addresses. The former was required to perform the survey quality control, and the latter to validate the information mined from the sewage. The conduction of the survey analysis was done according to the Spanish data protection law, namely Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y garantía de los derechos digitales, therefore the research data and research results from the survey were subject to anonymisation through attribute suppression, concretely of “home address”; telephone numbers were not included in the database.

The Institut of Regional and Metropolitan Studies of Barcelona (IERMB) and the promoter, namely the Institut Català de Recerca de l'Aigua (ICRA), coordinator of the Catalan cluster within the EU project SCOREwater, are responsible for the treatment of data within the framework of this observational study. For the execution of the survey fieldwork, the services of a fieldwork company were subcontracted through an open procedure / public tender. In the contract with the outsourced company, it was specified that the company must completely erase the information collected when requested by IERMB. For its part, after the validation of the transferred data, IERMB obligated itself to remove the fields of the final database that contained the personal information “home address”. This final database was processed statistically to obtain the aggregated results. The project database is hosted on the servers of IERMB, so that IERMB acts as the data controller.

9 ANALYSIS VARIABLES

The analysis variables have been carefully selected to match the class of biomarkers analysed by ICRA in wastewater samples (see Table 5), as well as the variables necessary to satisfactorily assess HWM. In summary, to meet the objectives and test the study hypothesis, the questionnaire in its final form consists of 45 questions structured as shown in the following diagram (Table 6). A copy of the questionnaire is included in Annex 1 of this document.

Table 5: Framework intertwining the study on WBE and the present study including the deployment of a survey questionnaire.

Questionnaire module	Variable	Biomarker in wastewater	Survey variables (scale of measurement)
Diet	Diet type	Microbiome diversity	PBD (plant-based diet) [yes=1] AND 7 types of vegetarianism Selection of questions from the <i>MEDAS (Mediterranean Diet Adherence Screener)</i> (Martinez-Gonzalez et al., 2004; ESCA technical guidelines 2017/20)
Environmental behaviour	Oils and greases discharged to the sink or toilet	Oils and greases	5-item frequency scale validated through a pilot online survey (IERMB)
Pharmaceuticals	Pharmaceuticals consumption	Analgesics Antibiotics Antihypertensives Sedatives	Medical adherence questionnaire (MAQ) Indicators: individuals under medical treatment; pharmaceuticals over the counter (OTC) (ICRA, IERMB)
Other health risk factors	Health status	Microbiome diversity	Self-rated health (SRH). <u>Indicator</u> : The MOS Short Form (SF-36)
	Alcohol consumption	Ethyl sulphate; Cotinine*	<i>AUDIT (Alcohol Use Disorders Identification Test)</i> (WHO, 2001) Indicators: Risky use of alcohol (At risk/Risk free)
	Smoke habits	Nicotine; Cotinine*	<u>Indicators</u> : Non-smoker/Smoker/Daily smoker/ Occasional smoker (ESCA technical guidelines 2017/20)
	Caffeine consumption	Caffeine; 1,(3),7-trimethylxanthine	Own question design.
	Physical activity/health status	Oxidative stress (8-isoprostanes)*	International Physical Activity Questionnaire (IPAQ) and moderate to vigorous physical activity (MVPA) indicators in metabolic equivalents of task (MET)**
	Physical activity/health status	Serotonin (5-HIAA)*	<u>Indicators</u> : MVPA (MET minutes wk ⁻¹); compliance with a minimum of 30 min d ⁻¹ of MVPA
	Obesity	Microbiome diversity	<u>Indicator</u> : Body mass index (BMI) [kg/m ²]
Socioeconomic status (SES)	Socioeconomic status	--	Education level [scale 1 to 4]; employment status [scale 1 to 4]; total household income [scale 1 to 5]; etc. <u>Indicator</u> : personal SES composite index

Notes: (*) To be analysed in the future using the samples collected during the project and frozen. (**) Metabolic equivalents of task (MET) are defined as the energy it takes to sit quietly.

Table 6: The survey questionnaire in a nutshell.

MODULE 0. SELECTOR (random)	<ul style="list-style-type: none"> • Selection of the person to be interviewed (≥ 16 years)
MODULE 1. HEALTH STATUS AND RISK FACTORS	<ul style="list-style-type: none"> • Self-rated health • International Physical Activity Questionnaire, IPAQ (SF-7) • Height and weight • Smoking behaviour • Harmful use of alcohol
MODULE 2. DIET QUALITY	<ul style="list-style-type: none"> • Adaptation of the MEDAS (<i>Mediterranean Diet Adherence Screener</i>) • Caffeine consumption • Vegetarianism
MODULE 3. MEDICAL ADHERENCE QUESTIONNAIRE	<ul style="list-style-type: none"> • Analgesics • Antihypertensives • Sedatives • Antibiotics
MODULE 4. HOUSEHOLD WASTE MANAGEMENT	<ul style="list-style-type: none"> • Household waste management questionnaire
MODULE 5. SOCIODEMOGRAPHIC AND SEGMENTATION VARIABLES	<ul style="list-style-type: none"> • Sex • Age • Education • Employment status (pre-COVID'19) • Professional category (pre-COVID'19) • Net household income

9.1 SELF-RATED HEALTH

The indicator self-rated health (SRH) is asked respecting the original formulation from the Medical Outcome Study Short Form (SF-36). We used the scale from the MOS SF-36 asking participants: “In general, how would you say your health is?” with possible responses being: excellent/very good/good/fair/poor. The answers were further dichotomized by whether people had a “good self-perceived health” (excellent/very good/good) or “poor self-perceived health” (fair/poor), following the same methodology used in previous studies assessing the influence on health outcomes of risk factors like physical activity, mental health or social support (Avila-Palencia et al., 2018; Dadvand et al., 2016).

Self-rated health is a predictor of mortality. Moreover, it predicts mortality independently of other more objective health measures (Lorenz et al., 2020) and provides additional information on patient risk independent of demographic, socioeconomic, and clinical risk factors for mortality (McEwen et al., 2009). The association is further found invariant to changing causes of death, except for a decline in accidental, unanticipated deaths (Schnittker and Bacak, 2014).

9.2 PHYSICAL ACTIVITY

Physical activity (PA) is measured using the scale from the short form of the IPAQ (*International Physical Activity Questionnaire*) (The IPAQ Group, 2005). The IPAQ short form has been validated in the Catalan population of 15 to 69 years using uniaxial accelerometers, and it was validated the sensitivity and specificity of the questionnaire in measuring adherence to PA recommendations (Vinas et al., 2013). The IPAQ questions included follow the wording of the original text of the statements as well as the ordering of the questions. A reference version in Catalan is included in ENSE 2011-2012 and in Enquesta de Salut de Catalunya (ESCA), Departament de Salut, Generalitat de Catalunya. Cleaning of IPAQ data and calculation of indicators is performed following IPAQ processing and analysis guidelines (The IPAQ Group, 2005).

The short form of the IPAQ collects information on the duration and frequency of vigorous- and moderate-intensity PA and walking during the 7 days previous to the interview. In addition, average sitting time per day is usually reported as a proxy for sedentary behaviour. Participants were asked to only report activities lasting 10 minutes or longer. Moderate/vigorous intensity activities were described as activities that require moderate/hard physical effort and cause small/large increases in breathing or heart rate. Vigorous-intensity activities and moderate-intensity activities were assigned a value for their metabolic equivalent of task (MET) of 8 and 4 MET, respectively (The IPAQ Group, 2005). The continuous score is suggested to be expressed as MET-minutes per week (MET min wk⁻¹): MET level x minutes of activity x events per week.

However, walking and sitting time were not asked due to budget constraints that limited the duration of the interviews to 15 minutes only. Instead, it was followed the approach undertaken by Haskell et al. (2007), and we applied the minimum goal of 450 to 750 MET min wk⁻¹. These values were based on the MET range of 3 to 6 for moderate-intensity activity and 150 min wk⁻¹ (3 x 150 = 450 and 5 x 150 = 750), according to that same study. A categorical indicator was estimated that accounted for the compliance with the recommendation of practicing at least 30 minutes of moderate-intensity PA 5 d wk⁻¹ or 20 min of vigorous-intensity PA on 3 d wk⁻¹, or a combination of moderate- and vigorous-intensity PA in the range of 450 to 750 MET min wk⁻¹, which is the minimal amount of activity recommended to achieve substantial health benefits over and above the routine light-intensity activities of daily living (Haskell et al., 2007). In summary, two indicators of PA were estimated and compared among social groups by study area, namely overall MVPA in MET min wk⁻¹ and compliance with a minimum of 30 min d⁻¹ of MVPA.

9.3 ANTHROPOMETRIC MEASUREMENTS

Weight and height were asked and self-reported by participants. The indicator body mass index (BMI), used as a diagnostic method for overweight and obesity or underweight, was calculated as weight in kilograms divided by the square of height in meters. It is only directly applicable to adults and its formula is as follows:

$$\text{Body mass index (BMI)} = \text{weight (kilograms)} / \text{height}^2 \text{ (meters)}$$

According to the specifications of the World Health Organization (WHO) when the BMI is:

- Below 18.5: the person is underweight
- Between 18.5 and 25: the person has an adequate weight
- Between 25 and 30: the person is overweight
- Between 30 and 35: the person is grade I obese
- Between 35 and 40: the person is grade II obese
- Over 40: the person is grade III or morbidly obese

For calculating the prevalence of overweight and obesity from the BMI (age-standardized estimate) amongst children and adolescents aged 5-19 years, the following cut-off points were applied (Abarca-Gómez et al., 2017): more than 2 SD below the median of the WHO growth reference for children and adolescents (referred to as moderate and severe underweight), 2 SD to more than 1 SD below the median (mild underweight), 1 SD below the median to 1 SD above the median (healthy weight), more than 1 SD to 2 SD above the median (overweight but not obese), and more than 2 SD above the median (obesity).

In summary, BMI cut-off points for children and adolescents aged 5 to 19 are as follows:

- Overweight: >+1SD (equivalent to BMI 25 kg/m² at 19 years)
- Obesity: >+2SD (equivalent to BMI 30 kg/m² at 19 years)
- Adequate weight: <-2sd>
- Underweight: <>

The cut-off points have been established in accordance with the WHO reference tables (z-scores and percentiles) for estimating the indicators of overweight and obesity from BMI in the population aged 5 to 19 years (Table 7).

Table 7: Cut-off points in accordance with the WHO reference tables for estimating the indicators of overweight and obesity from BMI (kg/m²) in the population aged 5 to 19 years.

Age (years)	Male		Female	
	Overweight (+1SD)	Obesity (+2SD)	Overweight (+1SD)	Obesity (+2SD)
5.5	16.7	18.4	16.9	19.0
6	16.8	18.5	17.0	19.2
6.5	16.9	18.7	17.1	19.5
7	17.0	19.0	17.3	19.8
7.5	17.2	19.3	17.5	20.1
8	17.4	19.7	17.7	20.6
8.5	17.7	20.1	18.0	21.0
9	17.9	20.5	18.3	21.5
9.5	18.2	20.9	18.7	22.0
10	18.5	21.4	19.0	22.6
10.5	18.8	21.9	19.4	23.1
11	19.2	22.5	19.9	23.7
11.5	19.5	23.0	20.3	24.3
12	19.9	23.6	20.8	25.0
12.5	20.4	24.2	21.3	25.6
13	20.8	24.8	21.8	26.2
13.5	21.3	25.3	22.3	26.8
14	21.8	25.9	22.7	27.3
14.5	22.2	26.5	23.1	27.8
15	22.7	27.0	23.5	28.2
15.5	23.1	27.4	23.8	28.6
16	23.5	27.9	24.1	28.9
16.5	23.9	28.3	24.3	29.1
17	24.3	28.6	24.5	29.3
17.5	24.6	29.0	24.6	29.4
18	24.9	29.2	24.8	29.5
18.5	25.2	29.5	24.9	29.6
19	25.4	29.7	25.0	29.7

Source: Document tècnic de l'Enquesta de salut de Catalunya 2020, any 2020 (període 2017-2020), Direcció General de Planificació en Salut (febrer de 2021).

Obesity is associated with high blood pressure and blood cholesterol and with resistance to insulin action (Sundquist et al., 1999; Swinburn et al., 2011). It should be noted that overweight and obesity increase the risk of CVD, type2 diabetes, musculoskeletal disorders, and some types of cancer, among other health problems, and can lead to disability. However, the BMI only partially explains the risk of suffering certain diseases. It is necessary to consider other additional parameters, such as the distribution of body fat. The measurement of the waist circumference is a very important factor to consider along with the BMI, and together they determine with greater precision the risk to health derived from overweight and obesity.

Often self-reporting can lead to BMI estimation errors because people cheat with weight. Dons et al. (2018) found in a validation study that the respondents of the PASTA survey, conducted in Barcelona and in other six EU cities, reported a lower weight than directly measured ($r = 0.95$; on average 2.4 kg less). Nevertheless, self-reporting of weight and height is considered a reliable approximation, common in survey studies.

9.4 SMOKING BEHAVIOUR

The question about tobacco smoking is formulated to distinguish between “non-smokers”, “ex-smokers”, “daily smokers” and “occasional smokers”, as follows from ESCA (2017/20).¹

¹ Document tècnic de l'Enquesta de Salut de Catalunya 2019. Període 2017-2020. Direcció General de Planificació en Salut, Departament de Salut, Generalitat de Catalunya. Available at: https://salutweb.gencat.cat/ca/el_departament/estadistiques_sanitaries/enquestes/esca/documents_tecnics/.

9.5 HARMFUL USE OF ALCOHOL

Harmful use of alcohol defines a drinking pattern that increases the risk of harmful health consequences for the person and third parties. It is related to both personal (e.g., age, sex) and environmental factors. Harmful use of alcohol is responsible for 5.1% of the global burden of disease (7.1% for males and 2.2% for females), while alcohol is the leading risk factor for premature mortality and disability among those aged 15 to 49 years, accounting for 10% of all deaths in this age group (WHO, 2019). The disadvantaged and especially vulnerable populations have higher rates of alcohol-related death and hospitalization.

Harmful use of alcohol is assessed using the AUDIT (*Alcohol Use Disorders Identification Test*) developed by the WHO (2001), questions 1 to 3 (see Table 8). A score equal to or greater than 1 in question 2 or question 3 indicated consumption at a risk level, consistently with the Audit guidelines. In general terms, higher scores indicate a greater likelihood of risky and harmful use of alcohol.

Table 8: AUDIT (*Alcohol Use Disorders Identification Test*) question wording and scoring for the construction of the indicator harmful use of alcohol.

Question	Scoring 0	1	2	3	4
How often do you have a drink containing alcohol?	Never	Monthly or less	2 to 4 times a month	2 to 3 times a week	4 or more times a week
How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7, 8 or 9	10 or more
How often do you have six or more drinks on occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily

Source: AUDIT manual WHO (2001).

9.6 DIET ASPECTS

Certain diet aspects reported by survey participants will be compared to the results obtained from the microbiome diversity present in sewage and other biomarkers (e.g., plant-based protein vs. animal (meat) protein and biomarkers of artificial sweeteners). The microbiome present in the sewage system includes almost all the human faecal microbiome (Newton et al., 2015). Thus, it can be thought of representing the collective microbiome of the population discharging at a given sewershed. Studies have already been successful in predicting obesity of a population from the human sourced portion of the sewage microbiome (Newton et al., 2015). Many other diseases have been associated with dysbiosis of the human gut microbiome (Table 9), as established in clinical or cross-sectional studies. ICRA is aimed at testing whether sewage microbiome can be used to predict prevalence of certain diseases based on the pre-established correlations. Likewise, certain diet aspects as well as other indicators like the self-rated health indicator are associated with greater mortality and burden of disease (Lorem et al., 2020; McEwen et al., 2009).

Apart from the association of diet to risk of mortality and incidence of diet-related diseases, diet quality is a good marker of SES and social class. This double function was what was sought in this study. In this vein, several studies have analysed the associations between some dietary intakes with several indicators of SES. Metcalf et al (2006) found that employment status, lower family income and non-college education social groups had lower intakes of dietary fibre, calcium, and alcohol and higher intakes of dietary cholesterol, what corresponded to lower intakes of fruit, vegetables, milk, cheese, and wine and higher intakes of eggs. Seemly, studies like Alkerwi et al. (2015) or Kaluza et al. (2009) consistently found that men, unemployed, living alone, below the poverty threshold, and with difficult wealth perception were all significant factors associated with low diet quality, namely low intakes of recommended foods and high intakes of non-recommended foods.

Table 9: Literature reporting associations between microbiome deviations and medical conditions. *Source: ICRA.*

Condition	ICD-10	Ref.
HIV	I	1-3
Thyroid cancer	II	4
Lung Cancer	II	5
Breast Cancer	II	6
Obesity	IV	7-9
Diabetes	IV	10-15
Thyroid function	IV	16
Atrial fibrillation	IX	17
Atherosclerosis	IX	18
Heart Failure	IX	19-20
Schizophrenia	V	21-22
Mental Health	V	23-24
Alzheimer's	VI	25-27
Asthma	X	28-29
IBS/IBD	XI	30-31
Psoriasis	XII	32-33
Arthritis	XIII	34
Kidney Diseases	XIV	35-36

Certain dietary aspects, like sugary drinks and animal protein (red meat) intakes, were assessed in the CATI/CAPI survey using the corresponding questions from the *Mediterranean Diet Adherence Screener (MEDAS)* (Martinez-Gonzalez et al., 2004). The MEDAS was developed by the Research Network PREDIMED (in Spanish, PREvención con Dieta MEDiterránea) for its use as short-form questionnaire in the primary prevention of CVD (Estruch et al., 2013). Its validity was tested against a full-length FFQ in a population at high risk for coronary heart disease (ages 55-80), and results proved it was valid in predicting risk factors such as BMI >25 kg/m², waist circumference, triglycerides, cholesterol or fasting glucose (Schröder et al., 2011). The MEDAS questionnaire was lately adapted to other non-Mediterranean contexts such as in Eastern Europe (Stefler et al., 2017) or North American (Yang et al., 2014). Questions wording and valuation scales followed the standard of the MEDAS shown in Table 10.

Table 10: Questions wording and valuation scales from the MEDAS (*Mediterranean Diet Adherence Screener*) included in the CATI/CAPI survey questionnaire.

Question	Health recommendation
PREDI_5. How many servings of red meat, burgers, sausages or cold cuts do you consume a day? (<i>one serving equals 100-150 grams, sandwich cold cuts = 1/2 serving of red or processed meat</i>).	Less than one a day
PREDI_7. How many sugary drinks (soft drinks, cola, soda) do you consume a day? (<i>one drink is equivalent to 200 ml, a glass or a can</i>)	Less than one a day
PREDI_10. How many servings of fish and seafood do you consume per week? (<i>one serving is equivalent to 100-150 grams of fish or 4-5 pieces or 200 grams of seafood, canned tuna included</i>)	3 or more per week

Source: Martinez-Gonzalez et al. (2004) and ESCA’s technical guide (2017/20).

9.7 VEGETARIANISM

One can distinguish between four types of vegetarians and three more types of semi-vegetarian diets, namely vegan, lacto-vegetarian, ovo-vegetarian, lacto-ovo-vegetarian, pescatarian (considered a “semi-vegetarian”), pollotarian (“semi-vegetarian” diet), and flexitarian. Vegetarians and vegans substitute animal protein for higher intakes of plant protein-dense food (e.g., soy-based products or legumes), and therefore their gut microbiota is different from that of meat eaters. These traits can be distinguished in the analysis of human excreta in the wastewater. Correspondence among self-reported vegetarianism via survey will thus be examined in contrast to outputs from microbiome diversity in wastewater samples.

Regarding SES differences in adopters of plant-based diets, previous research from Allès et al. (2017) indicates that self-reported vegetarians (N = 2,370) from the French NutriNet-Santé study were more likely to be college educated compared to meat eaters (N = 90,664), whereas the educational level of vegans (N = 789) was inferior in general. The demographic profile of vegetarians points to gender (women), age (young adults) and professional status (self-employed or never employed) as traits markers. Regarding diet quality and nutritional inadequacies, vegetarians showed higher adherence to French dietary guidelines and less prevalence of deficits of micronutrients compared to both vegans and meat eaters; vegans did generally show a deficit of vitamin B12.

9.8 ADHERENCE TO ANTIBIOTIC THERAPY

The main objective and novelty of the WBE study is the analysis of over the counter (OTC) intake of antibiotics and subsequent assessment of antimicrobial resistance genes in wastewater. The WHO Global Action Plan on Antimicrobial Resistance 2015 deems antibiotic resistance as the most urgent drug resistance trend occurring everywhere in the world and compromising the ability to treat infectious diseases. Avoiding overuse of antibiotics, as well as encouraging taking antibiotics “exactly as prescribed” (i.e., therapeutic adherence), is key to mitigating the emergence and spread of bacterial resistance to antibiotics (Llewelyn et al., 2017). The unnecessary use of antibiotics (e.g., on coughs and colds; McNulty et al., 2007), sharing medication with others or keeping part of the course for another occasion are widespread behaviours (WHO, 2000), which should be tackled in public campaigns.

Therapeutic adherence is known to be a problem associated with chronic medication in patients with long-term pathologies (Martin et al., 2005). In an extensive meta-analytic review, DiMatteo (2004a) found as many as 25% of patients were nonadherent, while demographic effects (i.e., patients’ age, gender, education, and income/SES) on adherence are small and moderated by sample, regimen, and measurement variables. On the contrary, social support variables (i.e., family cohesiveness as opposed to family conflict/dysfunction) seemed to play a strong significant role in increasing adherence behaviour (DiMatteo, 2004b). Other large studies crossing multiple chronic diseases and drug classes report nonadherence rates around 40-60% (Briesacher et al., 2008; Vink et al., 2009; Yeaw et al., 2009), suggesting that approximately one of every two prescription doses are missed (Stirratt et al., 2015). Nevertheless, reviews like Llewelyn et al. (2017) posed that whereas there is clear evidence of a relation between antibiotic exposure and antibiotic resistance, taking antibiotics for longer than necessary, instead of stopping early, increases the risk of resistance.

Self-report is the most common method for assessing adherence behaviour in research and clinical care (Stirratt et al., 2015), while medical adherence questionnaires (MAQs) are frequently used to assess adherence to long-term medication treatment in individuals with chronic diseases. Yet, there are only few examples of adaptations of a MAQ to assess adherence behaviour to mid- or short-term treatments, such as adherence to antibiotic therapy and antimicrobial resistance (e.g., Axelsson, 2013; McNulty et al., 2007; Raupach-Rosin et al., 2019). The results from these studies are summarised in Table 11. The questionnaires in these studies have been examined in detail in order to compose the questions and question order included in the CATI/CAPI survey. Self-report medication adherence measures vary substantially in their question phrasing, recall periods, and response items, and generally tend to overestimate adherence behaviour although they can significantly predict clinical outcomes (Stirratt et al., 2015). The quality of self-report measures can however be improved by using validated scales, facilitating recall, or reducing social desirability bias; e.g., by means of anonymous computer surveys rather than face-to-face interviews.

Table 11: Literature reporting results of MAQ to assess adherence behaviour to antibiotic therapy.

Study	Region (country)	N	12 months exposure	Nonadherence	Motivations for nonadherence
Axelsson (2013)	2 municipalities in western Sweden	445 being prescribed antibiotics	22,3%	9.4%	<ul style="list-style-type: none"> • 4.3% stop because they felt healthy • 2.7% stop because they experienced side-effects • 1.3% stop because they did not perceive any effect • 1,1% forgot to take the medication
Raupach-Rosin et al. (2019)	4 districts in Lower Saxony (Germany)	872 (panel survey)	32.2%	4,30%	<ul style="list-style-type: none"> • 10.3% stop taking antibiotics as soon as they feel better • 2.0% had antibiotics at home to use when necessary • 0.4% shared medications with their family members
McNulty et al. (2007)	England, Scotland and Wales (UK)	7120	38.0%	11,3%	<ul style="list-style-type: none"> • 4.8% had ever used an antibiotic without being told to do so by a doctor, dentist or nurse • 4.7% had obtained an antibiotic in another country without a prescription • 1.7% had gived antibiotics to someone else to use for whom it was not prescribed

The MAQ as it is formulated in the CATI/CAPI survey includes questions on both exposure and adherence to antibiotics therapy. Exposure to antibiotics is assessed by asking participants: “Please indicate if you have received medical treatment with any of the following types of drugs during the last year... [Antibiotics or penicillin]”, with possible responses being never/1 time this year/2 times this year/3 or more times this year. In addition, a fifth response option is included to record people under relatively long-term treatments of over 15 days. We hypothesise that adherence to long-term treatments with antibiotics might be lower in comparison.

Exposure to other pharmaceuticals such as analgesics, antihypertensives or hypotensives, and sedatives, which are also commonly taken OTC (see previous research by ICRA, Casas et al., 2021) is further assessed through the same multi-response question. Analgesics are described as painkillers, while providing several examples including aspirin, paracetamol, Nolotil, and anti-inflammatory drugs. Antihypertensives or hypotensives are described as drugs that “lower blood pressure”. Lastly, when asking about exposure to sedatives, the following indications and examples are provided: “[Prescribed] sedatives, even if they have a mild effect (tranquilizers, muscle relaxants, anti-depressants, sleeping pills)”.

Adherence to antibiotics therapy is measured by means of two questions, namely “If you took antibiotics/penicillin, thinking of the last time you were prescribed an antibiotic, did you follow the treatment according to the prescribed instructions?” [Followed and finished the treatment as instructed/Did not follow or finish the treatment as instructed/Don’t know or can’t remember]; “If you did not take all the days you were prescribed, why did you stop?” [Forgot or couldn’t be bothered/I decide to miss out a dose/Felt better/ Side effects or antibiotics made me feel unwell/Lost antibiotic/Other (please specify)]. Lastly, overuse of antibiotics is asked by means of the dichotomic questions: “Have you ever taken antibiotics without prescription?” [yes=1], and “Have you kept any antibiotics that you had left?” [yes=1].

A final question was included in this Module 4, a dichotomous question asking participants whether they have been tested positive in COVID-19. This last question was included to control the influence of COVID-19 on therapies with analgesics, antibiotics, etc.

9.9 HOUSEHOLD WASTE MANAGEMENT

The occurrence of solid waste (food waste, waste cooking oil, wet wipes, and other disposable hygiene products) in wastewater causes the clogging of pipes and raises wastewater operational costs. The project partner BCASA (Barcelona Cicle de l’Aigua, SA), as the manager of the Barcelona’s integral water cycle, is decidedly interested to monitor the occurrence of solid waste in wastewater and tackled the main side-effects from sewer blockages, namely odours causing discomfort to citizens. As part of the strategy, new data driven models will be deployed to raise the efficiency of maintenance operations in the sewer system (i.e., sewer hydraulics, retention, release).

Module 5 of the questionnaire includes six questions on household waste management (HWM). Questions phrasing and order have been previously tested in a pilot survey launched during the lockdown due to the COVID-19 pandemic. A total of 1,718 individuals over 18 years from Catalonia (Spain) completed a self-administered online survey (April 27 to May 18, 2020) including a 5-item questionnaire measuring the usage and improper disposal of single-use hygiene products and questions about demographic characteristics and household composition. The results suggested that in Barcelona the use of disposable wet wipes was of some 48% (18% use them daily and 13% about once a week). Largest variations were observed in terms of household composition; household with children under 5 had a prevalence of 78%. When used, wet wipes mainly served as a substitute for toilet paper (20% of answers), for personal care (17%), or face/makeup cleansing (12%). Diaper changes only accounted for some 7%. Regarding the inadequate disposal of solid waste, much of disposal was of disposable wet wipes (biodegradable or not). Some 10% reported flushing them down the toilet sometimes and 4% always. As for waste cooking oil, 19% reported that they eventually flushed it down the toilet (16% did it sometimes and 3% always). The sample was based on volunteers and therefore is not representative of the general population of Catalonia or Barcelona.

In the present CATI/CAPI survey a first question was asked concerning the frequency of usage of disposable wet wipes, with possible answers being “every day”, “a few times a week”, “approximately once a week”, “a few times a month”, “approximately once a month”, “less than once a month”. A second question asked participants about the uses for which they use disposable wet wipes during the past year. A total of thirteen possible answers were pre-coded, including the main uses that emerged from the pilot survey launched in April-May 2020 during the lockdown. These categories of uses were grouped as shown in Table 12 to construct the final indicator, including only five categories of uses: “cleaning and disinfection”, “with children”, “personal care”, “toilet paper”, and “out of home (office or travelling)”. Finally, a set of questions concerned the frequency of improper disposal of solid waste through the toilet (or sink), including so-called “feminine hygiene” products (e.g., pads and tampons), disposable wet wipes (biodegradable or not), waste cooking oil, and food scraps (soups or other leftovers with liquids, breadcrumbs, flours, etc.), using a standard 5-point Likert frequency scale.

Table 12: Use categories of disposable wet wipes for the indicator construction.

Indicator categories	Original categories in the survey questionnaire
01 Cleaning and disinfection	01 House cleaning 11 To disinfect surfaces 12 With pets 13 Cleaning shoes and bags
02 With children	02 Diaper changes 07 With babies or children 10 For meals
03 Personal care	04 Facial cleansing / makeup 06 Personal care
04 Toilet paper	05 As a substitute or complement for toilet paper
05 Out of home (office or travelling)	03 To travel 08 Camping or festivals 09 In the office

9.10 SOCIODEMOGRAPHIC AND SEGMENTATION VARIABLES

Socioeconomic disparities in health are acute among neighbourhoods of European cities (Borrell et al., 2014; Hoffmann et al., 2014; Mari-Dell’Olmo et al., 2015), such that a ‘social gradient’ in health exists, namely increasing education, income and socioeconomic status (SES) improves health outcomes in a dose-response relationship (Arcaya et al., 2015). On the other hand, many environmental behaviours, including household waste management (HWM) and recycling (Berger, 1997; Sidique et al., 2010), can be partially influenced by education and income, which is relevant to the study of the inadequate discharge solid waste into the sewer system (e.g., hygiene products, disposable wet wipes, waste cooking oil, food scraps). Using data from the CATI/CAPI survey launched in June 2021, statistical tests will be conducted to prove or disprove the hypotheses formulated.

In accordance, the questionnaire included questions that can be used to create a sociodemographic profile of each respondent. Information is requested regarding their sex, age, education accomplished, employment status, professional category (grouped according to CNO and CNAE), and household net monthly income with scale ranges being: 1 Less than €600; 2 From €601 to €1,200; 3 From €1,201 to €1,800; 4 From €1,801 to €2,400; 5 From €2,400 to €3,000; 6 More than €3,000. Additionally, some studies on HWM request information on the presence of children (Brekke et al., 2010; Miliute-Plepiene et al., 2016), which is further collected in the home composition grid.

In addition to area-level SES, we estimated personal SES. The literature showed that, in some instances, personal SES might have a greater effect on health outcomes or environmental behaviour. For instance, some studies have found a positive association between higher education, higher income, and household waste recycling (Berger, 1997). Saphores and Nixon (2014) found that young adults tend to recycle less. However, in other instances, the SES of the neighbourhood of residence is a better proxy of health outputs than personal position. This is usually the case in terms of overall health status, all-cause mortality, life expectancy or health risk factors like smoking and obesity (Borrell et al., 2014; Hoffmann et al., 2014; Mari-Dell'Olmo et al., 2015). For instance, a low SES at the area level is associated with a higher prevalence of overweight and obesity among the resident population (Bonney et al., 2015; Doak et al., 2006; Ellaway et al., 1997; Luiggi et al., 2021). In order to unveil these differences a SES index has been estimated for the individuals participating in the CATI/CAPI survey from the personal socioeconomic information collected.

In order to estimate personal-level socio-economic status (SES), we developed a SES index linked to the individual's socioeconomic information gathered through the survey questions. First, we selected relevant variables a priori using information from similar indicators developed in the Spanish context to theory-inform the selection (Antón-Antón-Alonso et al., 2018; Domínguez-Berjón et al., 2008). We used the following personal-level data in the construction of the index: zone (1 "Carmel", 2 "Poblenou", 3 "Sant Gervasi"), sex (1 "Male", 2 "Female"), age group (1 "Less than 65 years", 2 "65 or more years"), university education (1 "No", 2 "Yes"), employment status (1 "Employed", 2 "Unemployed, inactive"), National Classification of Occupations (CNO-2011) (1 "Managers and professionals", 2 "Intermediate occupations", 3 "Working classes"), activity sector (1 Industrial, 2 Construction, 3 Services), professional category (main job) (1 Employer w/ employees/self-employed/liberal professional, 2 Other), household net monthly income (1 Less than €1,200; 2 From €1,201 to €1,800; 3 From €1,801 to €2,400; 4 From €2,400 to €3,000; 5 More than €3,000).

Second, we followed an adaptation of the methodology used by Berjón et al. (2008) to develop the MEDEA socioeconomic index for primary health care (Colls et al. 2020). We performed a categorical principal component analysis (CATPCA) to identify clustered variables whose variation could be explained by one index. We used multiple correspondence analysis (HOMALS) and the analysis indicated the extraction of two components with Eigenvalues of .291 (dimension 1) and .179 (dimension 2). If all variables have a multiple nominal scaling level, as it was the case, then CATPCA is identical to multiple correspondence analysis (HOMALS). In HOMALS model fit and eigenvalues directly depend on the number of categories involved in the model, and the model fit is estimated in relation to the maximum amount of information that could be explained by a given model calculated using the formula (Morales Jacob, 2004): $\left(\frac{\sum \text{number of categories}}{\sum \text{number of variables}}\right) - 1$. The two dimensions extracted explained 28.19% of the total variance of the initial nine variables, where the first dimension accounted for 17,45% of the total variance. We considered that indicators were highly correlated with this first dimension if their component loadings were greater or equal to .50 (adapted from Domínguez-Berjón et al., 2008), which resulted in the selection of three variables related to the economic and educational background of the individuals, namely university education, CNO occupation, and household net monthly income. The rest of the variables were ruled out.

We then conducted a second multiple correspondence analysis (HOMALS) including only the three selected indicators and forced the extraction of one dimension. We used this first (and only) dimension as our personal-level SES index, which explained 28.78% of the total variance of the three indicators "university education", "CNO", and "household net monthly income" (see Table 13 below for indicators and component loadings). The construction of the personal-level SES index results from the combination of these three indicators, using as weight values those of the saturations obtained from this one-dimension extraction (see Table 14). According to their SES index, the individuals from the three study areas were classified into two groups depending on whether individual SES scores were above or below the mean of the whole sample distribution.

Table 13: Selected indicators in dimension one and component loadings.

	Dimension 1
University education (2 categories)	0.766
National Classification of Occupations (CNO-2011) (3 categories)	0.713
Household net monthly income (5 categories)	0.536

Table 14: Saturations obtained in the one-dimension extraction by indicator category.

	n	Dimension 1
University education [1 Yes]	403	1.060
University education [2 No]	600	-0.726
National Classification of Occupations (CNO-2011)		
1 Managers and professionals	422	0.971
2 Intermediate occupations	258	-0.525
3 Working classes	267	-0.962
Household net monthly income		
1 Less than €1,200	222	-1.026
2 From €1,201 to €1,800	188	-0.482
3 From €1,801 to €2,400	165	-0.015
4 From €2,400 to €3,000	126	0.288
5 More than €3,000	303	0.909

10 METHODOLOGY

10.1 SAMPLE POPULATION

The questionnaire was administered between June 21 - July 14, 2021. A total of 1,004 interviews were performed in three areas of different SES in Barcelona, namely Carmel of low SES, Poblenou of middle SES, and Sant Gervasi of high SES. The sample design was a fixed sample (not proportional to the population) stratified by sampling area and including cross-quotas of sex and age group. The questionnaire was administered in a mixed format, namely computer-assisted telephone interviews (CATI) (n = 776; 77.3%) and computer-assisted personal interviews (CAPI) (n = 228; 22.7%) to complete most difficult quotas per sampling area. The CAPI interviews were conducted on the street. The interviewers received a mobile device, a tablet, and followed the routes designated by the IERMB researchers and marked on a map of each sampling area. Participants were shown this map and asked specifically if they resided within the area of interest. In addition, they were asked for a contact telephone number in case it was necessary to make more checks. This personal data was treated as described in Section 8 on ethics considerations and in the research protocol approved by the ethics committee of the *Foundation University Institute for Primary Health Care Research i Gurina (IDIAPJGol)* (CEIm Code: 21/066-P).

A total of 354 individuals were interviewed in Carmel, of which the 59,6% lived within the borders of the monitored sewershed, 325 lived in Poblenou (54,1% within the sewershed), and 325 lived in Sant Gervasi (31,6% within the sewershed). Final sample composition included 187 (52,8%) interviews to women in Carmel, 170 (52,3%) to women in Poblenou, and 182 (55,8%) to women in Sant Gervasi. Average age by area was of 50,30 ($\pm 19,07$) in Carmel, 48,97 ($\pm 18,32$) in Poblenou, and 50,05 ($\pm 22,94$) in Sant Gervasi. Average household size was of 2,73 ($\pm 1,18$) in Carmel, 2,86 ($\pm 1,11$) in Poblenou, and 3,08 ($\pm 1,35$) in Sant Gervasi. Sample descriptives and tests of significant differences are shown in Table 15, including socioeconomic characteristics.

Table 15: Sample descriptives, including socioeconomic characteristics, and tests of significant differences.

Variable	Carmel (A)	Poblenou (B)	Sant Gervasi (C)	p-value	Test
Participants n	354	325	325		
Participants/sewershed % (n)	211 (59.6%)	176 (54.1%)	103 (31.6%)		
Sex (Female) % (n)	187 (52.8%)	170 (52.3%)	182 (55.8%)		
Age (years) M (\pm SD)	50.30 (\pm 19.07)	48.97 (\pm 18.32)	50.05 (\pm 22.94)		
Persons per HH M (\pm SD)	2.73 (\pm 1.18)	2.86 (\pm 1.11)	3.08 (\pm 1.35)		
HH typology				0.001	14.461
HH w/ children (\leq 16 years)	24.1% (85)	29.4% (96)	16.8% (55)		
HH w/o children (\leq 16 years)	75.9% (269)	70.6% (229)	83.2% (270)		
†Education level % (n)				0.000	153.515
Uneducated	5.3% (19)	0.9% (3)	0.6% (2)		
Compulsory (primary, EGB, ESO)	25.1% (89)	17.0% (55)	4.4% (14)		
General secondary	19.1% (68)	18.3% (59)	25.2% (82)		
Professional secondary	28.9% (102)	17.4% (56)	12.3% (40)		
University	21.6% (76)	46.5% (151)	57.5% (187)		
Employment status % (n)				0.000	48.404
Employed	51.3% (182)	57.1% (186)	44.5% (144)		
Unemployed seeking work	8.2% (29)	8.2% (27)	4.0% (13)		
Unpaid family worker	2.3% (8)	1.4% (5)	4.2% (14)		
Retired	28.3% (100)	24.5% (80)	25.4% (82)		
Student	8.1% (29)	6.2% (20)	19.6% (64)		
Unemployed not seeking work	1.9% (7)	2.6% (8)	2.3% (7)		
Professional category % (n)				0.000	56.856
Employer w/ employees	1.4% (5)	5.3% (17)	10.4% (30)		
Self-employed	7.6% (25)	9.0% (28)	17.9% (51)		
Employee	81.6% (272)	73.9% (230)	61.4% (174)		
Family business	0.7% (2)	1.6% (5)	3.3% (9)		
Civil servant	7.9% (26)	9.3% (29)	6.5% (18)		
Other	0.7% (2)	0.8% (3)	0.5% (1)		
†National Classification of Occupations (CNO-2011) % (n)				0.000	115.461
Managers and professionals	24.0% (80)	47.3% (147)	65.9% (188)		
Intermediate occupations	33.0% (110)	25.6% (80)	19.6% (56)		
Working classes	43.0% (143)	27.2% (85)	14.4% (41)		
†HH net monthly income % (n)				0.000	99.946
Less than € 600	5.1% (15)	2.7% (8)	3.0% (7)		
From € 601 to € 1,200	24.9% (76)	16.1% (45)	8.1% (19)		
From € 1,201 to € 1,800	22.8% (70)	17.0% (47)	13.3% (31)		
From € 1,801 to € 2,400	18.7% (57)	16.2% (45)	14.6% (34)		
From € 2,400 to € 3,000	14.1% (43)	15.3% (43)	8.0% (18)		
More than € 3,000	14.4% (44)	32.7% (91)	53.1% (122)		
Personal-level SES index % (n)				0.000	100.499
Below mean SES	74.6% (264)	50.1% (163)	37.0% (120)		
Above mean SES	25.4% (90)	49.9% (162)	63.0% (205)		

Notes: (†) Variables used to construct the personal-level SES index. HH stands for household. The chi-square statistic (χ^2) is significant at the .05 level.

Significant differences were found regarding household composition at the three sites, where the proportion of households with children under 16 years of age was the highest in Poblenou and the lowest in Sant Gervasi. Regarding the variables contributing to build SES, significant differences were found in terms of education attainment, employment status, professional category, occupation (CNO-2011), and household net monthly income in the direction of Sant Gervasi (i.e., the high-SES area) having a significantly greater proportion of population with university studies, employers with employees at their charge or self-employed professionals, belonging to the managers and professionals CNO's category, and an income of more than € 3,000 per month per household. Accordingly, the estimated personal-level index of SES using a CATACP (HOMALS) was the greatest in Sant Gervasi, followed by Poblenou and Carmel (the lowest), and the proportions of people below and above the mean SES level did match the area-level SES as anticipated. Carmel, the low-SES area, showed the largest proportion of people below the mean level of SES. Proportions below and above mean SES were even in Poblenou (middle-SES area). In Sant Gervasi high-SES area the proportion of people above the mean level of SES was significantly the highest. In summary, sample descriptives and statistical tests for significant differences confirmed the adequate selection of sampling points, stressing out markedly differences in SES levels in the expected direction.

10.2 STATISTICAL ANALYSIS

Data analysis consisted of descriptive statistics and tests of statistically significant differences for the indicators by sampling zone, sampling zone x gender, sampling zone x age group, and sampling zone x personal-level SES using Bonferroni corrections, so as to explore the data structure and main patterns. Results were reported at the .05 level of significance.

11 RESULTS

In what follows the main results are introduced regarding the sample descriptives, health status and risk factors, diet and vegetarianism, adherence to medical therapy, and household waste management. Statistical differences by sampling zone, gender, age group and personal-level SES were reported at the .05 level of significance.

11.1 HEALTH STATUS AND RISK FACTORS

Health status is measured using the self-rated health (SRH) instrument from the MOS SF-36. SRH is a predictor of mortality. It predicts mortality independently of other more objective health measures (Lorem et al., 2020) and provides additional information on patient risk independent of demographic, socioeconomic, and clinical risk factors for mortality (McEwen et al., 2009). The association is further found invariant to changing causes of death, except for a decline in accidental, unanticipated deaths (Schnittker & Bacak, 2014). On the other hand, health risk factors include the level of PA (MET-min wk⁻¹) and compliance with the recommendation of at least 30 minutes daily of moderate-to-vigorous physical activity (MVPA) for adults (16-69 years), prevalence of overweight and obesity based on BMI (age-standardized estimate), smoking, and harmful use of alcohol.

Results on health status and health risk factors followed the expected direction (Table 16). Health status as captured by participants' SRH was poorer in the neighbourhood of low-SES. Population at Carmel further reported exercising relatively little in comparison to those living in middle- and high-SES neighbourhoods, although they had more physical jobs in general. Thus, not significant differences were found overall in terms of physical activity indicators. Overweight and obesity were also significantly higher in Carmel. These results are in line with previous literature and official data from WHO indicating that the disadvantaged suffer more obesity. Yet, smoking and harmful use of alcohol were relatively higher in middle- and high-SES neighbourhoods (Poblenou and Sant Gervasi, respectively), though not significant.

Table 16: Descriptive results and tests of significant differences of the indicators on health status and risk factors by study zone.

Variable	Carmel (A)	Poblenou (B)	Sant Gervasi (C)	p-value	Test
Participants n	354	325	325		
Participants/sewershed % (n)	211 (59.6%)	176 (54.1%)	103 (31.6%)		
Self-rated health [SRH] % (n)				0.000	55.606
Excellent	9.2% (33)	12.3% (40)	21.3% (69)	A B	
Very good	22.4% (79)	31.9% (104)	34.8% (113)	A	
Good	42.9% (152)	38.3% (125)	31.8% (103)	C	
Fair	18.8% (67)	15.5% (51)	10.1% (33)	C	
Poor	6.6% (23)	1.9% (6)	2.0% (7)	B C	
Moderate to vigorous physical activity [MVPA] (MET-min wk ⁻¹) M (±SD)	1375.54 (±2142.12)	1353.75 (±2281.23)	1481.06 (±1917.28)	0.763	0.270
Compliance with MVPA* % (n)				0.447	1.612
Compliant MVPA	31.9% (91)	33.0% (93)	36.8% (94)		
Non-compliant MVPA	68.1% (193)	67.0% (188)	63.2% (160)		
BMI (age-standardized estimate) (kg/m ²) M (±SD)	26.17 (±4.93)	24.88 (±4.65)	23.36 (±3.69)	0.000	32.734
Overweight and obesity (age-standardized estimate) % (n)				0.000	47.756
Underweight	1.9% (7)	2.8% (9)	5.4% (17)	A	
Normal weight	45.6% (157)	56.2% (178)	67.1% (213)	A B	
Overweight	33.6% (116)	27.5% (87)	20.5% (65)	C	
Obesity	18.9% (65)	13.5% (43)	7.0% (22)	C	
Smoking behaviour % (n)				0.030	13.999
Never smoker	47.7% (169)	38.9% (127)	40.0% (130)		
Former smoker	26.1% (92)	32.1% (104)	28.7% (93)		
Someday smoker	5.5% (19)	8.4% (27)	11.6% (38)	A	
Every day smoker	20.7% (73)	20.6% (67)	19.6% (64)		
Harmful use of alcohol % (n)				0.090	4.821
At risk	21.1% (75)	27.1% (88)	27.8% (90)		
Risk free	78.9% (279)	72.9% (236)	72.2% (234)		

Notes: (*) MVPA practice recommendation of at least 30 minutes daily for adults (16-69 years). The chi-square statistic (χ^2) is significant at the .05 level.

Significant differences were additionally estimated by sex (Table 17) and age group (Table 18) per sampling zone for the variables on health status and health risks. In general terms, health status was excellent or very good for a greater proportion of population, both men and women, in Sant Gervasi (high SES) (Table 17). Compliance with a minimum of 30 min d⁻¹ of MVPA was overall greater among males than females, thereby consistent with official data from the WHO surveillance programme. Compliance with MVPA was significantly greater among males of the high-SES area of Sant Gervasi, whereas women of Poblenou and Carmel (middle- and low-SES areas, respectively) amounted for the lowest proportions of non-compliers. BMI and prevalence of overweight and obesity were significantly greater for men and women in Carmel (low SES), while the largest proportions of population with underweight and normal weight were found among women of Sant Gervasi (high SES). Men, not women, suffer more obesity, which was further reflected by data. Gender differences were also observed in terms of smoking and harmful use of alcohol. It was found the largest proportion of women, in comparison to men, who have never smoked. Regarding risky alcohol consumption, and in reference to the territories surveyed, the largest proportions of population at risk were found among men of all three SES areas and women of the high SES area of Sant Gervasi.

As for differences by age group and area (Table 18), typically young adults (16-44 years) showed the highest rates of good health, whereas rates were disproportionately and significantly large in Sant Gervasi (high SES) for this same age group. Seemly, compliance with MVPA is overall largest among young adults. BMI increases with age, being greater among adults (45-64 years) and seniors (65+ years) of Poblenou and Carmel (the largest). The largest proportion of never smokers was observed among the seniors (65+) of Carmel (low SES), whereas young adults (16-44) of Sant Gervasi (high SES) amounted for the largest proportion of someday smokers. The greatest signals of harmful use of alcohol were found among young adults (16-44) of Poblenou and Sant Gervasi (middle- and high-SES areas, respectively).

Significant differences by personal SES (i.e., below the mean SES and above the mean SES) were also tested in contrast to area-level SES for all the indicators to distinguish their independent effects (Table 19). Regarding health status, it was observed that those above the average SES in Poblenou (middle-SES area) had a similar self-reported health status than those below and above the average SES Sant Gervasi (high-SES area), namely a very good to excellent health. On the contrary, health status was significantly poorer in Carmel (low-SES area) and amongst those in Poblenou below the mean SES. This same pattern was found in regard to BMI, percentage of overweight and of obesity were the highest in Carmel (low-SES area) and amongst the disadvantaged in Poblenou (middle-SES area). PA and harmful use of alcohol indicators did not yield significant differences by personal SES among zones. The largest proportion of former smokers was found amongst Poblenou's above the mean SES group, while someday smokers were the highest number amongst Sant Gervasi's below the mean SES group.

Table 17: Descriptive results and tests of significant differences of the indicators on health status and risk factors by sex and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Male (A)	Female (B)	Male (C)	Female (D)	Male (E)	Female (F)		
Participants % (n)	47.2% (167)	52.8% (187)	47.7% (155)	52.3% (170)	44.2% (143)	55.8% (182)		
Self-rated health [SRH] % (n)							0.000	68.158
Excellent	13.3% (22)	5.6% (11)	13.0% (20)	11.7% (20)	20.1% (29) ^B	22.2% (40) ^B		
Very good	24.1% (40)	20.9% (39)	29.6% (46)	33.9% (58)	39.9% (57) ^{A B}	30.7% (56)		
Good	40.6% (68)	45.0% (84) ^E	38.3% (59)	38.4% (65)	28.4% (41)	34.5% (63)		
Fair	17.5% (29)	20.0% (37)	17.1% (27)	14.1% (24)	9.7% (14)	10.5% (19)		
Poor	4.5% (8)	8.4% (16)	2.0% (3)	1.8% (3)	2.6% (3)	2.1% (4)		
Moderate to vigorous physical activity [MVPA] (MET-min wk-1) M (±SD)	1641.86 (±2328.59)	1107.62 (±1907.47)	1686.07 (±2675.25)	1041.64 (±1790.07)	1666.57 (±2013.45)	1325.69 (±1825.73)	0.022	2.651
Compliance with MVPA* % (n)							0.001	20.178
Compliant MVPA	38.1% (54) ^E	25.6% (36)	41.1% (56)	25.4% (37) ^E	44.6% (52) ^{B D}	30.4% (42)		
Non-compliant MVPA	61.9% (88)	74.4% (105)	58.9% (80)	74.6% (108)	55.4% (64)	69.6% (96)		
BMI (age-standardized estimate) (kg/m ²) M (±SD)	26.51 (4.73) ^{D E F}	25.85 (5.11) ^{D F}	25.88 (4.46) ^{D F}	23.96 (4.64) ^F	24.64 (3.54) ^F	22.31 (3.48) ^F	0.000	21.421
Overweight and obesity (age-standardized estimate) % (n)							0.000	85.659
Underweight	0.4% (1)	3.3% (6)	0.9% (1)	4.4% (7) ^A	1.7% (2)	8.5% (15) ^{A C}		
Normal weight	42.6% (71) ^{D F}	48.4% (87) ^F	49.5% (75) ^F	62.3% (103)	60.2% (86) ^A	72.7% (127) ^{A B C}		
Overweight	39.0% (65) ^F	28.6% (51) ^F	32.8% (50) ^F	22.7% (38)	27.5% (39)	14.7% (26)		
Obesity	18.0% (30)	19.7% (35)	16.7% (25)	10.6% (18)	10.5% (15)	4.1% (7)		
Smoking behaviour % (n)							0.000	43.945
Never smoker	38.9% (65) ^{A C E}	55.6% (104)	29.1% (45) ^B	47.9% (81) ^C	35.9% (51)	43.2% (78)		
Former smoker	32.4% (54)	20.4% (38)	36.2% (56)	28.3% (48)	29.3% (42)	28.3% (51)		
Someday smoker	4.4% (7)	6.4% (12)	12.3% (19)	4.7% (8)	11.7% (17)	11.6% (21)		
Every day smoker	24.3% (41)	17.6% (33)	22.3% (35)	19.1% (33)	23.1% (33)	16.9% (31)		
Harmful use of alcohol % (n)							0.000	53.592
At risk	34.7% (58) ^{B D}	9.1% (17) ^{A C E F}	36.2% (56) ^{B D}	18.8% (32) ^{A C E}	33.9% (48) ^{B D}	22.9% (41) ^B		
Risk free	65.3% (109)	90.9% (170)	63.8% (98)	81.2% (137)	66.1% (94)	77.1% (139)		

Notes: (*) MVPA practice recommendation of at least 30 minutes daily for adults (16-69 years). The chi-square statistic (χ^2) is significant at the .05 level.

Table 18: Descriptive results and tests of significant differences of the indicators on health status and risk factors by age group and study zone.

Variable	Carmel			Poblenou			Sant Gervasi			p-value	Test
	16-44 years (A)	45-64 years (B)	65+ years (C)	16-44 years (D)	45-64 years (E)	65+ years (F)	16-44 years (G)	45-64 years (H)	65+ years (I)		
Participants % (n)	43.7% (155)	31.2% (111)	25.1% (89)	46.5% (151)	33.1% (108)	20.4% (66)	39.5% (128)	33.1% (108)	27.4% (89)		
Self-rated health [SRH] % (n)										0.000	286.097
Excellent	15.2% (24) C F	3.4% (4)	6.2% (5)	21.4% (32) B E F B C E F I	4.9% (5)	3.6% (2)	32.0% (41) A B C E F I B C E F I	15.6% (17) C	12.7% (11) C		
Very good	33.9% (52) D G	20.3% (22) D G	5.1% (5)	49.3% (74)	20.6% (22) D G	10.4% (7) D G	45.9% (59)	30.8% (33) G	23.5% (21)		
Good	43.1% (67)	47.2% (52) A D G	37.4% (33) A D G H	22.2% (34)	55.4% (60) G	47.3% (31) A D G H	19.9% (26)	40.0% (43)	39.2% (35) G		
Fair	6.8% (11)	20.8% (23)	37.2% (33) A E	7.0% (11)	17.4% (19)	31.9% (21)	2.2% (3)	11.0% (12)	20.4% (18)		
Poor	0.9% (1)	8.3% (9)	14.2% (13)	0.0% (0)	1.7% (2)	6.7% (4)	0.0% (0)	2.6% (3)	4.3% (4)		
Moderate to vigorous physical activity [MVPA] (MET-min wk-1) M (±SD)	1769.6 (±2204.7) B E	930.9 (±2002.6)	753 (±1826.7)	1855 (±2807.3) B E	779.7 (±1141.0)	728.2 (±1583.7)	1842.5 (±2142.5) B E	1151.5 (±1650.9)	871.9 (±1071.1)	0.000	22.772
Compliance with MVPA* % (n)										0.010	20.119
Compliant MVPA	39.6% (61)	24.2% (27)	14.4% (3)	40.6% (61)	25.7% (28)	16.4% (4)	39.4% (51)	34.0% (37)	35.5% (6)		
Non-compliant MVPA	60.4% (93)	75.8% (84)	85.6% (16)	59.4% (90)	74.3% (80)	83.6% (19)	60.6% (78)	66.0% (71)	64.5% (12)		
BMI (age-standardized estimate) (kg/m ²) M (±SD)	25.0 (±4.5) D G	26.7 (±5.4) A D G H I	27.6 (±4.6) A D G H I	22.8 (±3.5)	26.8 (±5.1) A D G H I	26.5 (±4.3) D G H	22.0 (±2.9)	24.2 (±4.1) G	24.4 (±3.5) G	0.000	4.980
Overweight and obesity (age-standardized estimate) % (n)										0.000	146.255
Underweight	3.4% (5) C	0.7% (1)	0.7% (1)	5.4% (8) A B C E F	0.8% (1)	0.0% (0)	8.3% (11) A B C E F	4.4% (5) C	2.4% (2) C		
Normal	54.8% (83) G	47.1% (52) G	27.0% (23) D G	74.1% (110)	40.6% (43) D G	40.5% (26) D G	77.7% (99)	58.4% (62)	62.1% (53)		
Overweight	29.5% (45)	28.9% (32) D G	47.2% (39) D G	16.5% (24)	36.4% (38) D G	38.3% (25) D G	11.7% (15)	25.7% (27)	27.0% (23)		
Obesity	12.3% (19)	23.4% (26)	25.1% (21)	4.0% (6)	22.2% (23)	21.2% (14)	2.2% (3)	11.4% (12)	8.6% (7)		
Smoking behaviour % (n)										0.000	112.115
Never smoker	50.8% (79)	31.7% (35) A G	62.2% (55) B D E H	36.4% (55)	36.3% (39) A G	49.1% (33) A G	42.2% (54)	36.8% (40) A G	40.6% (36) A G		
Former smoker	14.4% (22)	39.5% (44)	29.8% (26) C	26.3% (40)	35.6% (38)	39.6% (26)	15.7% (20) B C E F	34.0% (37)	41.2% (37)		
Someday smoker	9.3% (14) C	3.8% (4) C	0.8% (1)	15.2% (23)	3.3% (4) C	1.1% (1)	18.7% (24)	7.8% (8)	6.1% (5)		
Every day smoker	25.5% (39)	25.0% (28)	7.2% (6)	22.2% (33)	24.9% (27)	10.2% (7)	23.4% (30)	21.4% (23)	12.2% (11)		
Harmful use of alcohol % (n)										0.000	98.512
At risk	28.0% (43) C F I	22.0% (24) D G	8.1% (7) A D G	43.5% (66) B C E F I	15.8% (17) D G	7.8% (5) A D G	44.2% (57) B C E F I I	25.6% (27)	6.5% (6) A D G H		
Risk free	72.0% (111)	78.0% (86)	91.9% (81)	56.5% (85)	84.2% (89)	92.2% (61)	55.8% (72)	74.4% (79)	93.5% (82)		

Notes: (*) MVPA practice recommendation of at least 30 minutes daily for adults (16-69 years). The chi-square statistic (χ^2) is significant at the .05 level.

Table 19: Descriptive results and tests of significant differences of the indicators on health status and risk factors by personal SES and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Below M SES (A)	Above M SES (B)	Below M SES (C)	Above M SES (D)	Below M NSE (E)	Above M SES (F)		
Participants % (n)	74.6% (264)	25.4% (90)	50.1% (163)	49.9% (162)	37.0% (120)	63.0% (205)		
Self-rated health [SRH] % (n)							0.000	130.929
Excellent	7.1% (19)	15.4% (14) C	3.9% (6)	20.7% (34) A C	21.8% (26) A C	21.0% (43) A C		
Very good	18.3% (48)	34.6% (31) A	24.0% (39)	39.8% (65) A C	39.3% (47) A	32.1% (66) A		
Good	43.1% (114) E	42.4% (38)	46.5% (76) D E	30.2% (49)	27.0% (32)	34.7% (71)		
Fair	22.9% (60) B D E F	6.8% (6)	22.1% (36) B D F	9.0% (15)	9.5% (11)	10.4% (21)		
Poor	8.5% (23) D F	.8% (1)	3.5% (6)	.4% (1)	2.4% (3)	1.8% (4)		
Moderate to vigorous physical activity [MVPA] (MET-min wk ⁻¹) M (±SD)	1436.36 (±2306.16)	1228.27 (±1683.46)	1557.7 (±2857.57)	1185.45 (±1653.58)	1563.07 (±1881.21)	1437.02 (±1940.6)	0.633	0.688
Compliance with MVPA* % (n)							0.729	2.812
Compliant MVPA	30.7% (62)	34.9% (29)	34.5% (44)	31.7% (49)	33.9% (30)	38.4% (64)		
Non-compliant MVPA	69.3% (139)	65.1% (54)	65.5% (83)	68.3% (105)	66.1% (59)	61.6% (102)		
BMI (age-standardized estimate) (kg/m ²) M (±SD)	26.2 (±4.86) D E F	26.06 (±5.18) D E F	25.85 (±4.92) D E F	23.92 (±4.16)	22.62 (±3.24)	23.8 (±3.87)	0.000	17.395
Overweight and obesity (age-standardized estimate) % (n)							0.000	71.234
Underweight	1.7% (5)	2.3% (2)	2.5% (4)	3.0% (5) A B C	5.3% (6) A B C F	5.5% (11) A		
Normal weight	45.3% (117) E	46.5% (41) E	46.0% (73) E	66.2% (106)	77.5% (92)	61.0% (122) E		
Overweight	34.4% (89) D E F	31.4% (27) E	32.2% (51) D E F	22.9% (37)	11.7% (14)	25.6% (51)		
Obesity	18.6% (48)	19.8% (17)	19.2% (30)	7.9% (13)	5.5% (7)	7.8% (16)		
Smoking behaviour % (n)							0.000	42.326
Never smoker	48.9% (129)	44.3% (40)	41.5% (67)	36.4% (59) A E	45.7% (55)	36.6% (75)		
Former smoker	24.1% (64)	31.9% (29)	26.2% (43)	37.9% (62)	19.5% (24) A	34.1% (70)		
Someday smoker	4.7% (12)	7.7% (7)	6.1% (10)	10.6% (17)	16.6% (20)	8.7% (18)		
Everyday smoker	22.3% (59)	16.0% (14)	26.2% (43)	15.1% (24)	18.1% (22)	20.5% (42)		
Risky alcohol consumption % (n)							0.273	6.355
At risk	22.2% (58)	18.2% (16)	26.3% (43)	27.9% (45)	29.7% (36)	26.7% (54)		
Risk free	77.8% (205)	81.8% (74)	73.7% (119)	72.1% (116)	70.3% (85)	73.3% (149)		

Notes: (*) MVPA practice recommendation of at least 30 minutes daily for adults (16-69 years). The chi-square statistic (χ^2) is significant at the .05 level.

11.2 DIET AND VEGETARIANISM

Responses on diet aspects reflected a significantly higher consumption on sugary drinks in Carmel (low-SES area) (Table 20). Therefore, we expect finding higher proportions of artificial sweeteners in wastewater samples at the Carmel EQS. Data showed a low prevalence of vegetarianism; the proportion was higher in the middle-SES area of Poblenou. Although several people indicated not consuming meat (or fish), many did not consider themselves as vegetarians. The low sample sizes of vegetarians precluded further analysis of significant differences by area, sex and age group with respect to the type of vegetarianism and the reasons for the change in diet. This is an important limitation of this study, performed in very small areas of few census tracts.

Table 20: Descriptive results and tests of significant differences of the indicators on diet and vegetarianism by study zone.

Variable	Carmel (A)	Poblenou (B)	Sant Gervasi (C)	p-value	Test
Participants n	354	325	325	--	--
Participants/sewershed % (n)	211 (59.6%)	176 (54.1%)	103 (31.6%)		
Daily number of sugary drinks M (± SD)	0.33 (±0.75) B	0.19 (±0.53)	0.25 (±0.68)	0.020	3.922
Daily servings of red meat* % (n)				0.000	35.321
No servings	10.2% (36)	7.0% (23) A C	11.4% (37)		
Less than 1 serving each day	55.0% (195) B	64.8% (211)	54.9% (179) B		
1 serving or more each day	33.3% (118)	20.6% (67) A	30.0% (98)		
Does not consume meat, neither red nor white	1.5% (5)	7.1% (23)	3.6% (12)		
Servings of fish and seafood per week % (n)				0.022	11.416
No servings	2.6% (9)	7.5% (24) A	4.9% (16)		
2 servings or less per week	62.0% (219)	55.5% (180)	54.4% (177)		
3 servings or more per week	35.4% (125)	37.0% (120)	40.7% (132)		
Vegetarianism % (n)				0.004	10.920
Vegetarian	0.8% (3) B	4.6% (15) A	2.0% (6)		
Non-vegetarian	99.2% (351)	95.4% (310)	98.0% (319)		

Notes: (*) One serving equals 100-150 g and the sandwich sausage counts as half a serving. The answer option "Does not consume meat, neither red nor white" is used as the filter for vegetarianism. The chi-square statistic (χ^2) is significant at the .05 level.

Gender and age differences by sampling area are shown in the following tables. Regarding gender differences (Table 21), it stood out the significantly high amount of daily sugary drinks consumed by males, not women, in Carmel (low SES); in general terms, data show that males have relatively more sugary drinks than women in all three SES areas. On the contrary, both low-meat consumption and rates of vegetarianism are significantly higher among women and male of the middle-SES area of Poblenou and women of the high-SES area of Sant Gervasi.

Regarding age differences (Table 22), young adults (16-44 years) of Carmel (low SES) showed a disproportionately and significantly high consumption of daily sugary drinks. Consumption of red meat was the highest among young adults (16-44) in Carmel (low SES) and Sant Gervasi (high SES). On the contrary, the largest proportion of population not having any servings of red meat were found among adults (45-64) and seniors (65+) of Poblenou (middle SES) and Sant Gervasi (high SES). Contrarily, young adults (16-44) and adults (45-64) in Poblenou (middle SES) and young adults (16-44) in Sant Gervasi (high SES) showed a relatively lower intake of fish, though not significant. The rates of vegetarianism are however the highest among young adults (16-44) and adults (45-64) of Poblenou (middle SES) and young adults (16-44) of Sant Gervasi (high SES).

Dietary aspects according to personal SES were markedly different, and significant, regarding daily intake of sugary drinks, red meat, fish, and vegetarianism (Table 23). The proportion of people who do not consume meat (or having less than one serving of red meat per day) was found in Poblenou (middle SES), for both social groups below and above mean SES, and among those below mean SES in Sant Gervasi (high SES). Regarding fish intake, significant differences were found, though pairwise test could not be run due to the small sample sizes of certain categories and social group. The highest rate of vegetarians was found amongst Poblenou's below SES group, though sample sizes are too small and therefore this result must be taken with caution.

Table 21: Descriptive results and tests of significant differences of the indicators on diet and vegetarianism by sex and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Male (A)	Female (B)	Male (C)	Female (D)	Male (E)	Female (F)		
Participants % (n)	47.2% (167)	52.8% (187)	47.7% (155)	52.3% (170)	44.2% (143)	55.8% (182)	--	--
Daily number of sugary drinks M (± SD)	0.41 (±0.85)	0.26 (±0.63)	0.21 (±0.62)	0.17 (±0.45)	0.29 (±0.66)	0.22 (±0.7)	0.022	2.655
Daily servings of red meat* % (n)							0.000	93.078
No servings	7.2% (12)	12.9% (24)	1.4% (2)	12.1% (21)	2.3% (3)	18.6% (34)		
Less than 1 serving each day	56.1% (94)	54.1% (101)	70.6% (109)	59.6% (101)	54.1% (78)	55.6% (101)		
1 serving or more each day	35.9% (60)	31.0% (58)	22.4% (35)	18.9% (32)	42.4% (61)	20.2% (37)		
Does not consume meat, neither red nor white	0.9% (1)	2.0% (4)	4.6% (7)	9.4% (16)	1.2% (2)	5.6% (10)		
Servings of fish and seafood per week % (n)							0.026	20.414
No servings	3.2% (5)	2.2% (4)	5.7% (9)	9.2% (16)	4.7% (7)	5.1% (9)		
2 servings or less per week	65.8% (110)	58.6% (109)	58.2% (90)	53.0% (90)	59.8% (86)	50.1% (91)		
3 servings or more per week	31.0% (52)	39.2% (73)	36.0% (56)	37.8% (64)	35.5% (51)	44.8% (81)		
Vegetarianism % (n)							0.010	15.038
Vegetarian	0.9% (1)	0.7% (1)	3.7% (6)	5.5% (9)	0.7% (1)	3.0% (5)		
Non-vegetarian	99.1% (166)	99.3% (185)	96.3% (149)	94.5% (161)	99.3% (142)	97.0% (176)		

Notes: (*) The answer option “Does not consume meat, neither red nor white” is used as the filter for asking about being vegetarian. The chi-square statistic (χ^2) is significant at the .05 level.

Table 22: Descriptive results and tests of significant differences of the indicators on diet and vegetarianism by age group and study zone.

Variable	Carmel			Poblenou			Sant Gervasi			p-value	Test
	16-44 y (A)	45-64 y (B)	65+ y (C)	16-44 y (D)	45-64 y (E)	65+ y (F)	16-44 y (G)	45-64 y (H)	65+ y (I)		
Participants % (n)	43.7% (155)	31.2% (111)	25.1% (89)	46.5% (151)	33.1% (108)	20.4% (66)	39.5% (128)	33.1% (108)	27.4% (89)		
Daily number of sugary drinks M (± SD)	0.44 (±0.77)	0.32 (±0.87)	0.15 (±0.47)	0.20 (±0.57)	0.22 (±0.50)	0.12 (±0.48)	0.29 (±0.72)	0.23 (±0.63)	0.21 (±0.69)	0.009	2.582
Daily servings of red meat* % (n)										0.000	118.226
No servings	9.4% (15)	6.2% (7)	16.6% (15)	5.2% (8)	6.6% (7)	11.8% (8)	11.7% (15)	6.8% (7)	16.6% (15)		
Less than 1 serving each day	45.7% (71)	59.0% (65)	66.2% (59)	55.8% (84)	70.8% (76)	75.7% (50)	38.8% (50)	64.5% (69)	66.6% (59)		
1 serving or more each day	43.0% (67)	32.7% (36)	17.2% (15)	27.8% (42)	15.9% (17)	11.7% (8)	42.3% (54)	27.8% (30)	15.0% (13)		
Does not consume meat, neither red nor white	1.8% (3)	2.2% (2)	0.0% (0)	11.1% (17)	5.7% (6)	0.0% (0)	7.2% (9)	0.9% (1)	1.9% (2)		
Servings of fish and seafood per week % (n)										0.000	48.282
No servings	4.7% (7)	0.7% (1)	1.5% (1)	9.1% (14)	8.2% (9)	3.0% (2)	8.9% (11)	3.3% (4)	1.1% (1)		
2 servings or less per week	66.7% (103)	58.2% (64)	58.5% (52)	65.4% (99)	44.6% (48)	50.5% (33)	56.7% (73)	54.4% (59)	51.0% (45)		
3 servings or more per week	28.6% (44)	41.1% (46)	40.0% (36)	25.5% (38)	47.3% (51)	46.5% (31)	34.4% (44)	42.3% (46)	47.8% (43)		
Vegetarianism % (n)										0.000	30.706
Vegetarian	1.8% (3)	0.0% (0)	0.0% (0)	7.0% (11)	4.1% (4)	0.0% (0)	5.0% (6)	0.0% (0)	0.0% (0)		
Non-vegetarian	98.2% (152)	100.0% (111)	100.0% (89)	93.0% (140)	95.9% (103)	100.0% (66)	95.0% (122)	100.0% (108)	100.0% (89)		

Notes: (*) The answer option “Does not consume meat, neither red nor white” is used as the filter for asking about being vegetarian. The chi-square statistic (χ^2) is significant at the .05 level.

Table 23: Descriptive results and tests of significant differences of the indicators on diet and vegetarianism by personal SES and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Below M SES (A)	Above M SES (B)	Below M SES (C)	Above M SES (D)	Below M SES (E)	Above M SES (F)		
Participants % (n)	74.6% (264)	25.4% (90)	50.1% (163)	49.9% (162)	37.0% (120)	63.0% (205)		
Daily number of sugary drinks M (± SD)	0.35 (0.77)	0.29 (0.69)	0.21 (0.58)	0.17 (0.48)	0.35 (0.83)	0.19 (0.57)	0.029	2.502
Daily servings of red meat* % (n)							0.000	47.286
No servings	10.9% (29)	8.3% (7)	7.5% (12)	6.6% (11)	13.6% (16)	10.1% (21)		
Less than 1 serving each day	56.8% (150)	49.8% (45)	66.5% (107)	63.8% (104)	44.7% (54)	60.9% (125)		
1 serving or more each day	30.9% (82)	40.3% (36)	18.7% (30)	22.7% (37)	34.3% (41)	27.5% (56)		
Does not consume meat, neither red nor white	1.4% (4)	1.6% (1)	7.3% (12)	6.9% (11)	7.3% (9)	1.5% (3)		
Servings of fish and seafood per week % (n)							0.014	22.162
No servings	3.1% (8)	1.4% (1)	9.1% (15)	6.0% (10)	3.5% (4)	5.7% (12)		
2 servings or less per week	64.1% (169)	55.7% (50)	59.3% (96)	51.7% (84)	57.7% (69)	52.4% (107)		
3 servings or more per week	32.8% (87)	42.8% (39)	31.6% (51)	42.3% (69)	38.8% (47)	41.9% (86)		
Vegetarianism % (n)							0.002	18.740
Vegetarian	0.5% (1)	1.6% (1)	5.3% (9)	3.9% (6)	4.2% (5)	0.6% (1)		
Non-vegetarian	99.5% (263)	98.4% (89)	94.7% (154)	96.1% (156)	95.8% (115)	99.4% (203)		

Notes: (*) The answer option “Does not consume meat, neither red nor white” is used as the filter for asking about being vegetarian. The chi-square statistic (χ^2) is significant at the .05 level.

11.3 ADHERENCE TO MEDICAL THERAPY

Descriptive results and test for significant differences according to sampling zone on the MAQ are reported in Table 24 for the groups of drugs: analgesics, antibiotics, hypotensives and sedatives. Long treatments (15+ days) with analgesics are significantly higher in the low SES area of Carmel. More antibiotics were prescribed in the middle- and high-SES areas of Poblenou and Sant Gervasi (significant), respectively (see also Figure 2). They also reported to have kept antibiotics leftovers and used them without prescription more frequently in comparison to residents in the low-SES area of Carmel, differences being significant. Adherence to antibiotics therapy was of between 93% to 98% (non-significant). Significant differences were observed regarding analgesics taken without prescription once in a week at Poblenou (middle SES) and sedatives taken without prescription every day in Carmel (low SES) and Sant Gervasi (high SES). COVID-19 results did not show significant differences by study area.

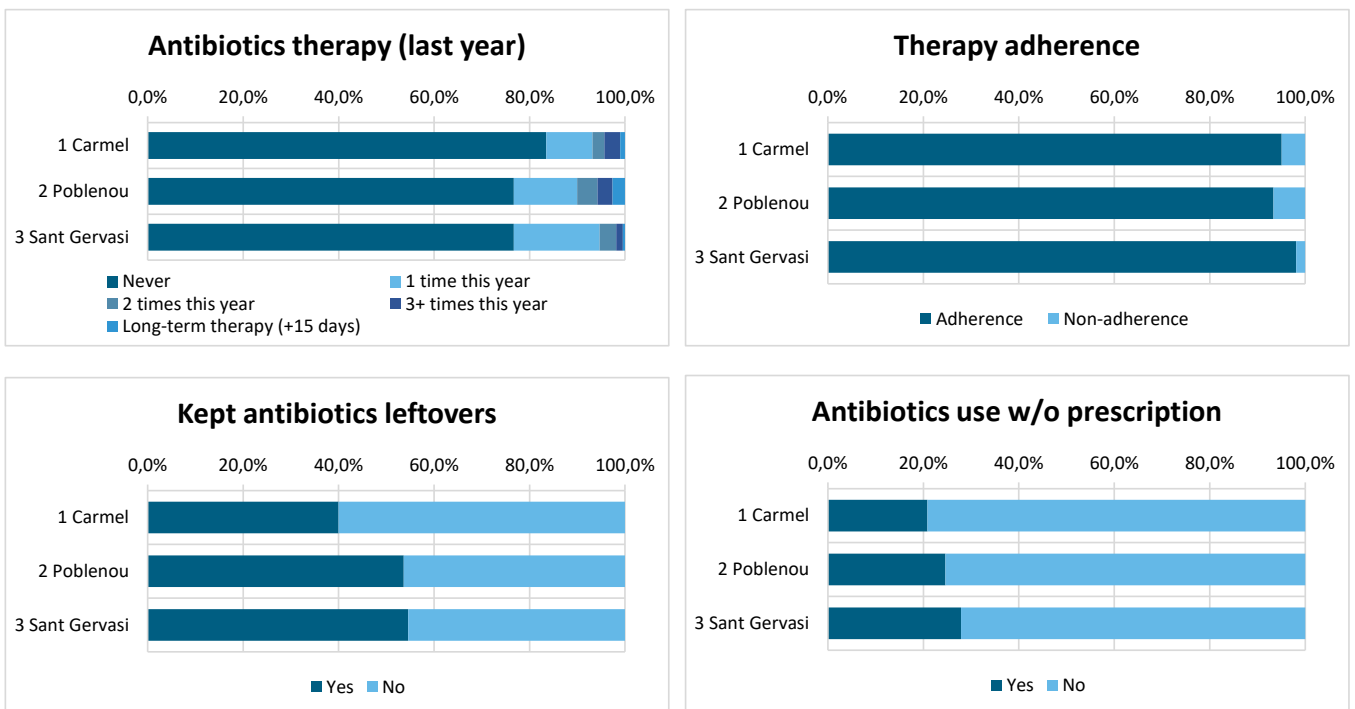


Figure 2: Descriptive results of the MAQ indicators regarding antibiotics therapy by study zone.

Table 24: Descriptive results and tests of significant differences of the MAQ indicators by study zone.

Variable	Carmel (A)	Poblenou (B)	Sant Gervasi (C)	p-value	Test
Participants n	354	325	325		
Participants/sewershed % (n)	211 (59.6%)	176 (54.1%)	103 (31.6%)		
Received medical treatment w/ analgesics (last year) % (n)				0.017	18.648
Never	35.6% (125)	42.0% (135)	38.4% (124)		
1 time this year	10.7% (38)	11.7% (38)	13.5% (44)		
2 times this year	9.6% (34)	6.4% (21)	10.2% (33)		
3+ times this year	21.7% (76)	21.9% (70)	26.0% (84)		
Long-term therapy (+15 days)	22.4% (79)	18.1% (58)	11.9% (38)		
Received medical treatment w/ antibiotics or penicillin (last year) % (n)				0.004	22.358
Never	83.5% (294)	76.7% (248)	76.7% (247)		
1 time this year	9.7% (34)	13.3% (43)	18.0% (58)		
2 times this year	2.5% (9)	4.3% (14)	3.5% (11)		
3+ times this year	3.3% (12)	3.1% (10)	1.4% (4)		
Long-term therapy (+15 days)	1.0% (4)	2.6% (9)	0.5% (1)		
Received medical treatment w/ antihypertensives or hypotensives (last year) % (n)				0.221	8.234
Never	78.6% (277)	81.6% (264)	83.0% (270)		
1 time this year	1.1% (4)	0.0% (0)	0.7% (2)		
2 times this year	0.0% (0)	0.0% (0)	0.0% (0)		
3+ times this year	0.7% (3)	0.2% (1)	0.0% (0)		
Long-term therapy (+15 days)	19.5% (69)	18.2% (59)	16.3% (53)		
Received medical treatment w/ sedatives (last year) % (n)				0.097	13.458
Never	77.0% (272)	77.5% (252)	74.9% (243)		
1 time this year	2.1% (7)	4.1% (13)	4.5% (14)		
2 times this year	1.7% (6)	1.5% (5)	0.9% (3)		
3+ times this year	2.1% (7)	4.8% (16)	2.5% (8)		
Long-term therapy (+15 days)	17.1% (61)	12.1% (39)	17.3% (56)		
Adherence to antibiotics therapy (only those prescribed w/ antibiotics last year) % (n)				0.263	2.670
Adherence	95.1% (54)	93.4% (70)	98.1% (73)		
Non-adherence	4.9% (3)	6.6% (5)	1.9% (1)		
Why non-adherence to therapy (only those prescribed w/ antibiotics last year) % (n)				0.434	3.800
Forgot/Couldn't be bothered	0.0% (0)	30.6% (2)	0.0% (0)		
Decided to miss out a dose	0.0% (0)	0.0% (0)	0.0% (0)		
Felt better	74.0% (2)	69.4% (3)	100.0% (1)		
Side effects/antibiotics made me feel unwell	0.0% (0)	0.0% (0)	0.0% (0)		
Lost antibiotic	0.0% (0)	0.0% (0)	0.0% (0)		
Other	26.0% (1)	0.0% (0)	0.0% (0)		
Kept antibiotics leftovers (everyone) % (n)				0.000	18.283
Yes	40.0% (140)	53.7% (171)	54.6% (175)		
No	60.0% (211)	46.3% (148)	45.4% (146)		
Took antibiotics w/o prescription (everyone) % (n)				0.088	4.859
Yes	20.9% (73)	24.6% (80)	27.9% (91)		
No	79.1% (279)	75.4% (244)	72.1% (234)		
Took analgesics w/o prescription (everyone, last 7 days) % (n)				0.054	15.268
No	74.2% (262)	70.1% (228)	76.4% (247)		
Once	14.4% (51)	22.7% (74)	14.5% (47)		
Two or three times	9.2% (32)	6.7% (22)	7.7% (25)		
More than four times	1.2% (4)	0.3% (1)	0.2% (1)		
Every day	1.1% (4)	0.3% (1)	1.1% (4)		
Took sedatives w/o prescription (everyone, last 7 days) % (n)				0.017	18.609
No	97.0% (342)	97.0% (315)	97.0% (315)		
Once	1.1% (4)	2.1% (7)	0.0% (0)		
Two or three times	0.0% (0)	0.0% (0)	1.5% (5)		
More than four times	0.4% (1)	0.0% (0)	0.3% (1)		
Every day	1.5% (5)	0.9% (3)	1.2% (4)		
Suffered from COVID-19 (everyone) % (n)				0.100	4.614
Yes	13.2% (46)	10.8% (35)	16.7% (54)		
No	86.8% (300)	89.2% (285)	83.3% (269)		

Note: The chi-square statistic (χ^2) is significant at the .05 level.

As for differences by sex or age group, these are reported in Table 25 and Table 26, respectively. Regarding gender differences, these were more notable in terms of long-term treatments (15+ days) with analgesics and sedatives (Table 25). A significantly higher proportion of women of low SES living in Carmel and receiving these drugs therapy was observed compared to other categories. In contrast, there were significantly more men in Carmel, and to a lesser extent in Poblenou (middle SES), who never got prescribed sedatives. The sample sizes of certain categories were too small to analyse significant differences in antibiotic prescriptions between them. Adherence to antibiotics therapy was non-significant. Women of middle- and low-SES in Poblenou and Carmel, respectively, kept relatively more antibiotics leftovers. No gender differences by area level were captured in terms of COVID-19 prevalence.

Age differences were not clearly identified in most instances due to low occurrence (i.e., small sample sizes) (Table 26). Those captured showed relatively high proportions of adults (45-64 years) and seniors (65+ years) of Carmel (low SES) and Poblenou (middle SES) having received medical treatment with analgesics the past year. Age differences were the most notable regarding therapy with hypotensives, where occurrence increased with age in all three study areas. Significant differences by age group were also observed in behaviours like keeping antibiotics leftovers or taking them without prescription. The former was more common among young adults (16-44) and adults (45-64) in all three study areas in contrast to seniors (65+). As for the latter, young adults (16-44) in Sant Gervasi took antibiotics without prescription significantly more often in contrast to the other categories. Having analgesics or sedatives without prescription seem to be significantly more common among young adults (16-44) in all three study areas, relative to senior's (65+) behaviour in the low SES area of Carmel. Significant differences were also observed regarding COVID-19 prevalence. The results showed a larger incidence among young adults (16-44) and adults (45-64) compared to seniors (65+), coinciding with the fourth wave hitting the age groups not yet vaccinated.

Significant differences were found according to personal SES in terms of analgesics therapy (Table 27), most people below mean SES in Carmel (low SES) and Poblenou (middle SES) had received long-term therapy (15+ days) the past year, results being significant. Significant differences by personal SES were also found in terms of antibiotics therapy, though Bonferroni tests could not be estimated due to low sample sizes. People below the mean SES in Carmel (low SES) and Poblenou (middle SES) were more frequently prescribed long-term therapy with hypotensive drugs. As for sedatives therapy, long-term therapy was the most frequent among both extreme SES social groups, namely below the mean SES in Carmel (low SES) and above the mean SES in Sant Gervasi (high SES). Adherence to antibiotics therapy did not yield significant differences. However, those who most frequently kept antibiotics leftovers were all groups above mean SES, regardless of the location, as compared to the below SES group in Carmel (low SES) who mostly did not keep them. Analgesics taken once without prescription (last 7 days) was undertaken by a largest proportion of the above mean SES group in Poblenou (middle SES). Significant differences by personal SES were also found in terms of sedatives taken without prescription, though Bonferroni tests could not be estimated due to low sample sizes. No significant differences were found by personal SES in terms of self-reported COVID-19 cases.

Table 25: Descriptive results and tests of significant differences of the MAQ indicators by sex and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Male (A)	Female (B)	Male (C)	Female (D)	Male (E)	Female (F)		
Participants % (n)	47.2% (167)	52.8% (187)	47.7% (155)	52.3% (170)	44.2% (143)	55.8% (182)		
Treatment w/ analgesics (last year) % (n)							0.000	58.096
Never	42.6% (71)	29.3% (54)	41.3% (63)	42.6% (72)	43.9% (62)	34.1% (62)		
1 time this year	10.9% (18)	10.5% (19)	13.6% (21)	10.0% (17)	10.3% (15)	16.0% (29)		
2 times this year	14.2% (24)	5.4% (10)	5.3% (8)	7.4% (13)	13.9% (20)	7.3% (13)		
3+ times this year	18.7% (31)	24.5% (45)	20.4% (31)	23.2% (39)	20.9% (30)	29.9% (54)		
Long-term therapy (+15 days)	13.6% (23)	30.3% (56)	19.4% (30)	16.9% (28)	11.0% (16)	12.7% (23)		
Treatment w/ antibiotics or penicillin (last year) % (n)							0.020	35.014
Never	84.8% (140)	82.3% (154)	76.6% (118)	76.8% (130)	76.6% (109)	76.7% (138)		
1 time this year	8.6% (14)	10.7% (20)	11.0% (17)	15.3% (26)	19.3% (27)	16.9% (30)		
2 times this year	2.8% (5)	2.2% (4)	6.5% (10)	2.3% (4)	2.6% (4)	4.3% (8)		
3+ times this year	2.6% (4)	4.0% (8)	2.0% (3)	4.1% (7)	0.5% (1)	2.1% (4)		
Long-term therapy (+15 days)	1.3% (2)	0.8% (1)	3.8% (6)	1.6% (3)	1.0% (1)	0.0% (0)		
Treatment w/ antihypertensives or hypotensives (last year) % (n)							0.109	21.965
Never	75.9% (127)	81.1% (150)	80.4% (124)	82.6% (140)	80.4% (115)	85.0% (154)		
1 time this year	1.9% (3)	0.4% (1)	0.0% (0)	0.0% (0)	0.0% (0)	1.3% (2)		
2 times this year	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
3+ times this year	0.0% (0)	1.4% (3)	0.0% (0)	0.4% (1)	0.0% (0)	0.0% (0)		
Long-term therapy (+15 days)	22.1% (37)	17.2% (32)	19.6% (30)	17.0% (29)	19.6% (28)	13.7% (25)		
Treatment w/ sedatives (last year) % (n)							0.000	55.486
Never	89.1% (149)	66.1% (124)	82.0% (127)	73.4% (125)	78.8% (112)	71.8% (130)		
1 time this year	1.0% (2)	3.1% (6)	4.1% (6)	4.1% (7)	4.3% (6)	4.6% (8)		
2 times this year	0.0% (0)	3.3% (6)	1.6% (2)	1.4% (2)	1.4% (2)	0.5% (1)		
3+ times this year	0.8% (1)	3.2% (6)	5.7% (9)	4.0% (7)	3.5% (5)	1.6% (3)		
Long-term therapy (+15 days)	9.2% (15)	24.3% (45)	6.6% (10)	17.1% (29)	12.0% (17)	21.5% (39)		
Adherence to antibiotics therapy % (n)							0.162	7.904
Adherence	88.5% (22)	100.0% (32)	94.6% (34)	92.2% (36)	100.0% (33)	96.6% (39)		
Non-adherence	11.5% (3)	0.0% (0)	5.4% (2)	7.8% (3)	0.0% (0)	3.4% (1)		
Kept antibiotics leftovers % (n)							0.000	28.467
Yes	38.8% (64)	41.7% (77)	45.9% (70)	60.8% (101)	49.2% (70)	58.8% (106)		
No	61.2% (101)	59.0% (110)	54.1% (83)	39.2% (65)	50.8% (72)	41.2% (74)		
Took antibiotics w/o prescription % (n)							0.377	5.332
Yes	20.7% (34)	21.0% (39)	23.3% (36)	25.8% (43)	26.1% (37)	29.3% (53)		
No	79.3% (132)	79.0% (147)	76.7% (119)	74.2% (125)	73.9% (106)	70.7% (128)		
Took analgesics w/o prescription (last 7 days)							0.060	30.641
No	74.2% (124)	74.1% (138)	75.5% (117)	65.2% (111)	80.3% (115)	73.3% (132)		
Once	16.8% (28)	12.3% (23)	18.3% (28)	26.6% (45)	13.7% (20)	15.2% (27)		
Two or three times	7.4% (12)	10.7% (20)	5.6% (9)	7.7% (13)	4.4% (6)	10.4% (19)		
More than four times	0.8% (1)	1.5% (3)	0.0% (0)	0.5% (1)	0.5% (1)	0.0% (0)		
Every day	0.7% (1)	1.4% (3)	0.6% (1)	0.0% (0)	1.2% (2)	1.1% (2)		
Took sedatives w/o prescription (last 7 days)							0.152	26.445
No	99.1% (166)	95.1% (176)	96.9% (150)	97.2% (165)	97.6% (139)	96.6% (175)		
Once	0.0% (0)	2.1% (4)	2.8% (4)	1.4% (2)	0.0% (0)	0.0% (0)		
Two or three times	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.7% (2)	1.3% (2)		
More than four times	0.0% (0)	0.7% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.5% (1)		
Every day	0.9% (1)	2.1% (4)	0.3% (1)	1.4% (2)	0.7% (1)	1.6% (3)		
Suffered from COVID-19 % (n)							0.274	6.345
Yes	15.7% (26)	11.0% (20)	11.6% (18)	10.0% (17)	15.7% (22)	17.6% (31)		
No	84.3% (138)	89.0% (162)	88.4% (136)	90.0% (149)	84.3% (121)	82.4% (148)		

 Note: The chi-square statistic (χ^2) is significant at the .05 level.

Table 26: Descriptive results and tests of significant differences of the MAQ indicators by age group and study zone.

Variable	Carmel			Poblenou			Sant Gervasi			p-value	Test
	16-44 y (A)	45-64 y (B)	65+ y (C)	16-44 y (D)	45-64 y (E)	65+ y (F)	16-44 y (G)	45-64 y (H)	65+ y (I)		
Treatment w/ analgesics (last year) % (n)										0.000	129.112
Never	42.8% (66)	29.0% (32)	31.2% (27)	50.5% (76)	35.9% (38)	32.5% (21)	40.1% (51)	36.6% (39)	38.1% (33)		
1 time this year	16.3% (25)	7.1% (8)	5.3% (5)	15.2% (23)	10.8% (11)	5.1% (3)	19.1% (24)	11.3% (12)	8.1% (7)		
2 times this year	10.9% (17)	11.7% (13)	4.7% (4)	5.3% (8)	9.2% (10)	4.4% (3)	11.2% (17)	11.2% (12)	4.7% (4)		
3+ times this year	22.6% (35)	22.7% (25)	18.9% (16)	21.9% (33)	23.0% (24)	19.9% (13)	24.3% (31)	28.1% (30)	25.8% (23)		
Long-term therapy (+15 days)	7.5% (12)	29.6% (33)	40.0% (34)	7.1% (11)	21.0% (22)	38.2% (25)	3.4% (4)	12.8% (14)	23.3% (20)		
Treatment w/ antibiotics or penicillin (last year) % (n)										0.001	62.513
Never	86.9% (134)	78.7% (86)	83.5% (74)	73.6% (111)	78.4% (84)	80.9% (53)	78.8% (100)	77.1% (82)	73.2% (64)		
1 time this year	8.6% (13)	11.3% (12)	9.7% (9)	18.3% (28)	9.9% (11)	7.0% (5)	18.3% (23)	17.9% (19)	17.6% (15)		
2 times this year	3.7% (6)	2.1% (2)	0.8% (1)	5.0% (8)	3.5% (4)	3.9% (3)	0.8% (1)	3.5% (4)	7.5% (7)		
3+ times this year	0.8% (1)	6.7% (7)	3.6% (3)	3.1% (5)	3.2% (3)	3.2% (2)	2.1% (3)	0.6% (1)	1.2% (1)		
Long-term therapy (+15 days)	0.0% (0)	1.3% (1)	2.4% (2)	0.0% (0)	5.0% (5)	4.9% (3)	0.0% (0)	0.9% (1)	0.6% (0)		
Treatment w/ antihypertensives or hypotensives (last year) % (n)										0.000	239.959
Never	93.2% (144)	81.5% (90)	49.3% (43)	99.0% (150)	78.1% (84)	46.9% (31)	99.0% (127)	84.8% (91)	57.7% (51)		
1 time this year	2.1% (3)	0.7% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.0% (1)	0.9% (1)	0.0% (0)		
2 times this year	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
3+ times this year	0.8% (1)	0.0% (0)	1.4% (1)	0.0% (0)	0.0% (0)	1.0% (1)	0.0% (0)	0.0% (0)	0.0% (0)		
Long-term therapy (+15 days)	3.9% (6)	17.8% (20)	49.3% (43)	1.0% (2)	21.9% (24)	52.1% (34)	0.0% (0)	14.3% (15)	42.3% (38)		
Treatment w/ sedatives (last year) % (n)										0.000	66.726
Never	79.8% (123)	74.7% (83)	74.7% (66)	78.5% (119)	77.4% (83)	75.3% (50)	86.5% (110)	70.8% (76)	63.3% (56)		
1 time this year	2.7% (4)	1.7% (2)	1.4% (1)	5.1% (8)	3.4% (4)	2.9% (2)	6.7% (9)	4.2% (4)	1.6% (1)		
2 times this year	3.1% (5)	1.3% (1)	0.0% (0)	1.0% (2)	2.5% (3)	1.0% (1)	0.8% (1)	1.8% (2)	0.0% (0)		
3+ times this year	1.7% (3)	1.3% (1)	3.7% (3)	6.0% (9)	5.0% (5)	2.0% (1)	0.0% (0)	4.2% (5)	3.8% (3)		
Long-term therapy (+15 days)	12.7% (20)	20.9% (23)	20.2% (18)	9.3% (14)	11.8% (13)	18.8% (12)	6.0% (8)	19.0% (20)	31.4% (28)		
Adherence to antibiotics therapy % (n)										0.335	9.083
Adherence	100.0% (20)	90.0% (20)	95.8% (14)	88.8% (35)	100.0% (23)	95.8% (12)	94.9% (26)	100.0% (24)	100.0% (23)		
Non-adherence	0.0% (0)	10.0% (2)	4.2% (1)	11.2% (4)	0.0% (0)	4.2% (1)	5.1% (1)	0.0% (0)	0.0% (0)		
Kept antibiotics leftovers % (n)										0.000	70.190
Yes	45.7% (71)	47.2% (51)	21.0% (19)	66.5% (97)	50.7% (54)	29.9% (20)	56.4% (72)	64.1% (68)	40.1% (35)		
No	54.3% (84)	52.8% (57)	79.0% (70)	33.5% (49)	49.3% (53)	70.1% (46)	43.6% (56)	35.9% (38)	59.9% (52)		
Took antibiotics w/o prescription % (n)										0.001	26.134
Yes	23.6% (37)	24.8% (27)	11.1% (10)	28.2% (42)	25.6% (28)	14.9% (10)	35.7% (46)	29.0% (31)	15.3% (14)		
No	76.4% (118)	75.2% (83)	88.9% (78)	71.8% (107)	74.4% (80)	85.1% (56)	64.3% (83)	71.0% (76)	84.7% (75)		
Took analgesics w/o prescription (last 7 days)										0.001	62.874
No	66.1% (102)	76.0% (84)	86.0% (76)	62.2% (94)	73.4% (79)	82.6% (55)	72.2% (93)	74.1% (80)	85.2% (74)		
Once	21.3% (33)	13.2% (15)	3.9% (3)	28.9% (44)	20.8% (22)	11.5% (8)	20.6% (26)	14.6% (16)	5.6% (5)		
Two or three times	11.8% (18)	7.5% (8)	6.6% (6)	8.9% (13)	4.0% (4)	5.9% (4)	6.4% (8)	9.8% (10)	7.3% (6)		
More than four times	0.8% (1)	2.0% (2)	0.7% (1)	0.0% (0)	0.8% (1)	0.0% (0)	0.0% (0)	0.6% (1)	0.0% (0)		
Every day	0.0% (0)	1.3% (1)	2.8% (2)	0.0% (0)	0.9% (1)	0.0% (0)	0.8% (1)	0.9% (1)	2.0% (2)		
Took sedatives w/o prescription (last 7 days)										0.024	49.586
No	95.8% (148)	96.9% (107)	99.2% (87)	97.1% (147)	96.7% (104)	97.4% (65)	97.0% (125)	96.5% (104)	97.8% (86)		
Once	2.5% (4)	0.0% (0)	0.0% (0)	2.9% (2)	1.7% (2)	0.8% (1)	0.0% (0)	0.0% (0)	0.0% (0)		
Two or three times	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	3.0% (4)	0.0% (0)	1.2% (1)		
More than four times	0.8% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.9% (1)	0.0% (0)		
Every day	0.8% (1)	3.1% (3)	0.8% (1)	0.0% (0)	1.7% (2)	1.8% (1)	0.0% (0)	2.6% (3)	1.1% (1)		
Suffered from COVID-19 % (n)										0.007	20.963
Yes	15.8% (24)	13.4% (15)	8.6% (7)	15.3% (23)	7.6% (8)	5.9% (4)	22.9% (29)	16.0% (17)	8.6% (8)		
No	84.2% (127)	86.6% (94)	91.4% (79)	84.7% (125)	92.4% (98)	94.1% (62)	77.1% (98)	84.0% (90)	91.4% (80)		

Note: The chi-square statistic (χ^2) is significant at the .05 level.

Table 27: Descriptive results and tests of significant differences of the MAQ indicators by personal SES and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Below M SES (A)	Above M SES (B)	Below M SES (C)	Above M SES (D)	Below M SES (E)	Above M SES (F)		
Treatment w/ analgesics (last year) % (n)							0.000	72.189
Never	32.3% (84)	45.1% (41)	30.8% (50)	53.4% (85)	40.2% (47)	37.4% (76)	A C F	
1 time this year	10.8% (28)	10.5% (9)	12.9% (21)	10.5% (17)	20.3% (24)	9.6% (20)		
2 times this year	7.6% (20)	15.4% (14)	6.9% (11)	5.9% (9)	7.4% (9)	11.8% (24)		
3+ times this year	23.0% (60)	17.9% (16)	23.1% (37)	20.6% (33)	24.0% (28)	27.1% (55)		
Long-term therapy (+15 days)	26.3% (69)	11.1% (10)	26.4% (43)	9.6% (15)	8.1% (9)	14.2% (29)		
Treatment w/ antibiotics or penicillin (last year) % (n)							0.036	32.698
Never	82.4% (217)	86.5% (77)	76.8% (124)	76.6% (124)	77.1% (92)	76.5% (155)		
1 time this year	9.5% (25)	10.2% (9)	12.3% (20)	14.2% (23)	19.7% (24)	16.9% (34)		
2 times this year	3.3% (9)	0.0% (0)	3.1% (5)	5.4% (9)	2.4% (3)	4.2% (8)		
3+ times this year	3.4% (9)	3.2% (3)	4.2% (7)	2.0% (3)	.9% (1)	1.7% (3)		
Long-term therapy (+15 days)	1.4% (4)	0.0% (0)	3.6% (6)	1.7% (3)	0.0% (0)	0.7% (1)		
Treatment w/ antihypertensives or hypotensives (last year) % (n)							0.004	33.780
Never	73.9% (194)	92.4% (83)	75.6% (123)	87.5% (142)	84.1% (101)	82.3% (169)	A C A	
1 time this year	1.5% (4)	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)	0.5% (1)		
2 times this year	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
3+ times this year	1.0% (3)	0.0% (0)	.4% (1)	0.0% (0)	0.0% (0)	0.0% (0)		
Long-term therapy (+15 days)	23.6% (62)	7.6% (7)	24.0% (39)	12.5% (20)	14.8% (18)	17.2% (35)	B B	
Treatment w/ sedatives (last year) % (n)							0.000	52.881
Never	72.8% (192)	89.0% (80)	71.3% (116)	83.7% (136)	85.8% (102)	68.5% (140)	A C F F F	
1 time this year	1.8% (5)	2.9% (3)	5.5% (9)	2.7% (4)	2.0% (2)	5.9% (12)		
2 times this year	2.3% (6)	0.0% (0)	.6% (1)	2.4% (4)	0.0% (0)	1.4% (3)		
3+ times this year	2.0% (5)	2.2% (2)	6.2% (10)	3.5% (6)	.9% (1)	3.4% (7)		
Long-term therapy (+15 days)	21.0% (55)	5.8% (5)	16.5% (27)	7.6% (12)	11.4% (14)	20.7% (42)	B D B D	
Adherence to antibiotics therapy % (n)							0.571	3.849
Adherence	95.4% (43)	93.6% (11)	94.6% (36)	92.2% (35)	94.9% (26)	100.0% (47)		
Non-adherence	4.6% (2)	6.4% (1)	5.4% (2)	7.8% (3)	5.1% (1)	0.0% (0)		
Why non-adherence to therapy % (n)							0.364	8.750
Forgot/Couldn't be bothered	0.0% (0)	0.0% (0)	0.0% (0)	51.9% (2)	0.0% (0)	0.0% (0)		
Decided to miss out a dose	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
Felt better	64.8% (1)	100.0% (1)	100.0% (2)	48.1% (1)	100.0% (1)	0.0% (0)		
Side effects/antibiotics made me feel unwell	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
Lost antibiotic	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
Other	35.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
Kept antibiotics leftovers % (n)							0.000	44.034
Yes	34.1% (89)	56.9% (51)	46.1% (74)	61.4% (97)	47.0% (57)	59.1% (119)	A A A	
No	65.9% (172)	43.1% (39)	53.9% (86)	38.6% (61)	53.0% (64)	40.9% (82)	B D F B D F	
Took antibiotics w/o prescription % (n)							0.167	7.815
Yes	19.0% (50)	26.5% (23)	21.9% (36)	27.3% (44)	27.5% (33)	28.1% (58)		
No	81.0% (213)	73.5% (65)	78.1% (127)	72.7% (117)	72.5% (87)	71.9% (147)		
Took analgesics w/o prescription (last 7 days)							0.003	41.212
No	74.8% (197)	72.3% (65)	79.0% (128)	61.2% (99)	75.2% (90)	77.0% (157)	D D D	
Once	13.6% (36)	16.9% (15)	13.9% (23)	31.5% (51)	12.3% (15)	15.9% (32)	A C E F	
Two or three times	8.9% (23)	10.0% (9)	6.1% (10)	7.3% (12)	11.7% (14)	5.4% (11)		
More than four times	1.3% (3)	.8% (1)	.5% (1)	0.0% (0)	0.0% (0)	0.3% (1)		
Every day	1.5% (4)	0.0% (0)	.6% (1)	0.0% (0)	.9% (1)	1.3% (3)		
Took sedatives w/o prescription (last 7 days)							0.010	37.647
No	97.0% (255)	97.1% (87)	95.8% (156)	98.2% (159)	96.4% (116)	97.4% (199)		
Once	0.5% (1)	2.9% (3)	3.2% (5)	.9% (1)	0.0% (0)	0.0% (0)		
Two or three times	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	2.8% (3)	0.7% (1)		
More than four times	0.5% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.5% (1)		
Every day	2.1% (5)	0.0% (0)	.9% (2)	.9% (1)	.8% (1)	1.4% (3)		
Suffered from COVID-19 % (n)							0.158	7.967
Yes	14.0% (36)	11.0% (10)	12.2% (19)	9.4% (15)	20.1% (24)	14.7% (30)		
No	86.0% (220)	89.0% (80)	87.8% (139)	90.6% (146)	79.9% (95)	85.3% (174)		

Note: The chi-square statistic (χ^2) is significant at the .05 level.



11.4 HOUSEHOLD WASTE MANAGEMENT

There are few studies addressing the issue of behaviour underlying improper solid waste disposal in wastewater. The closest subject areas could be household waste management and household recycling. Although there are exceptions, meta-analytic studies on household recycling agree in that, when statistically significant, socioeconomic variables (income, education, employment status, etc.) account for only a small portion of the variation in recycling behaviour (Hage et al., 2009; López-Mosquera et al., 2015; Miafodzyeva and Brandt, 2013; Miliute-Plepiene et al., 2016; Saphores and Nixon, 2014). There are no previous studies in Barcelona that quantify the use of wet wipes and analyze the socioeconomic factors explaining it, and these are needed and highly relevant if the aim is changing the behaviour of the population.

Results on household waste management were mixed (Table 28 and Figure 3). Wet wipes were more used in low- and middle-SES areas of Carmel and Poblenou, respectively. Yet, inadequate disposal was more frequent in the high-SES area of Sant Gervasi, what resulted in a similar prevalence on daily using and inadequate disposal between low- and high-SES areas (2,2% and 1,9%, respectively, and somewhat higher in Poblenou middle-SES area (3,0%). Seemly, occasional inadequate disposal of waste cooking oil was more frequent in Sant Gervasi (high SES), as well as in Poblenou (middle SES). Wet wipes are mainly used for personal care purposes, some 48%. Yet, around 25% use them as a substitute for toilet paper. No significant differences by area level were found in other instances.

Table 28: Descriptive results and tests of significant differences of the HWM indicators by study zone.

Variable	Carmel (A)	Poblenou (B)	Sant Gervasi (C)	p-value	Test
Participants n	354	325	325		
Participants/sewershed % (n)	211 (59.6%)	176 (54.1%)	103 (31.6%)		
Disposable wet wipes use (frequency) % (n)				0.016	24.730
Every day	C 22.2% (78)	C 23.0% (75)	13.8% (45)		
A few times a week	C 12.4% (44)	C 12.2% (40)	6.7% (22)		
About once a week	3.8% (13)	4.5% (15)	5.3% (17)		
A few times a month	3.1% (11)	3.8% (13)	3.0% (10)		
About once a month	4.4% (15)	2.9% (9)	3.5% (11)		
Less than once a month	4.2% (15)	3.8% (12)	5.4% (17)		
Never used them	50.0% (176)	49.7% (162)	62.4% (202)	A B	
Disposable wet wipes use for % (n)				0.005	21.971
Cleaning and disinfection	12.6% (22)	14.4% (23)	14.4% (17)		
With children	12.5% (22)	21.8% (36)	11.1% (13)		
Personal care	45.6% (80)	38.4% (63)	50.4% (61)		
Toilet paper	27.1% (47)	25.4% (42)	17.9% (22)		
Out of home (office or travelling)	2.2% (4)	0.0% (0)	6.2% (7)		
Wet wipes disposal % (n)				0.753	5.041
Never	80.3% (141)	80.0% (131)	74.5% (90)		
Occasionally	8.7% (15)	4.7% (8)	10.0% (12)		
Half the time	0.9% (2)	0.9% (2)	0.8% (1)		
Often	2.8% (5)	4.8% (8)	3.9% (5)		
Always / Every time	7.2% (13)	9.6% (16)	10.9% (13)		
Female hygiene products disposal (only women) % (n)				0.372	8.654
N/A	21.5% (40)	17.6% (30)	24.4% (44)		
Never	76.1% (142)	80.5% (137)	71.1% (129)		
Occasionally	1.1% (2)	2.0% (3)	1.5% (3)		
Half the time	0.0% (0)	0.0% (0)	0.0% (0)		
Often	0.0% (0)	0.0% (0)	0.8% (1)		
Always / Every time	1.4% (3)	0.0% (0)	2.2% (4)		
Waste cooking oil disposal % (n)				0.023	20.798
N/A	0.8% (3)	0.6% (2)	0.8% (2)		
Never	B C 80.8% (285)	70.6% (229)	68.5% (215)		
Occasionally	12.0% (43)	A 21.4% (69)	A 22.5% (71)		
Half the time	0.8% (3)	1.9% (6)	2.6% (8)		
Often	3.0% (11)	1.9% (6)	2.2% (7)		
Always / Every time	2.6% (9)	3.7% (12)	3.4% (11)		
Food scraps disposal % (n)				0.556	8.750
N/A	0.8% (3)	0.2% (1)	1.1% (3)		
Never	73.9% (260)	73.1% (238)	74.0% (237)		
Occasionally	19.6% (69)	22.5% (73)	19.0% (61)		
Half the time	1.4% (5)	2.3% (7)	2.1% (7)		
Often	1.8% (6)	1.2% (4)	2.6% (8)		
Always / Every time	2.5% (9)	0.7% (2)	1.3% (4)		

Note: The chi-square statistic (χ^2) is significant at the .05 level.

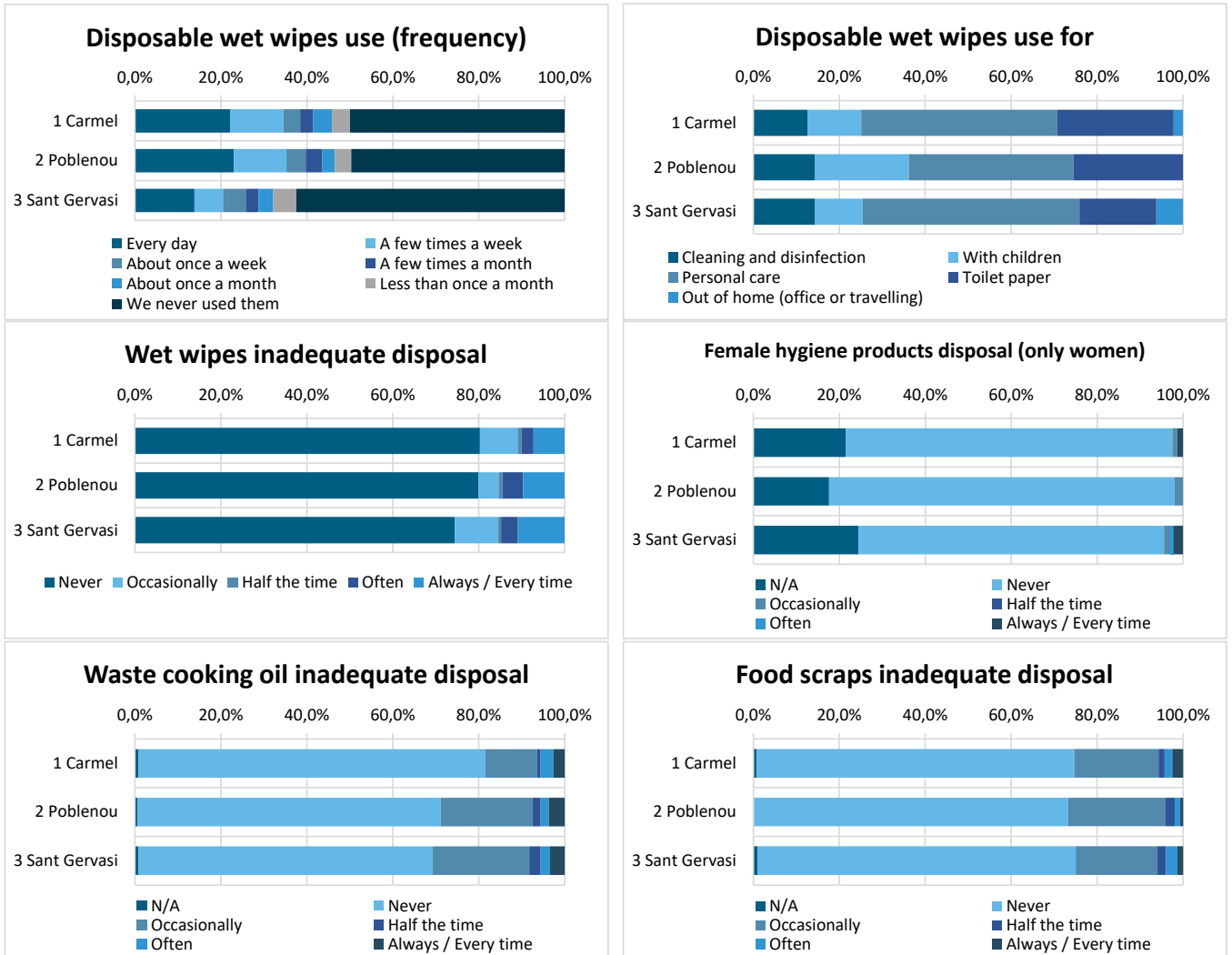


Figure 3: Descriptive results of the HWM indicators by study zone.

Table 29: Descriptive results and tests of significant differences of the HWM indicators by sex and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Male (A)	Female (B)	Male (C)	Female (D)	Male (F)	Female (G)		
Participants % (n)	47.2% (167)	52.8% (187)	47.7% (155)	52.3% (170)	44.2% (143)	55.8% (182)		
Disposable wet wipes use (frequency) % (n)							0.000	64.829
Every day	16.1% (27)	27.7% (51) E F	20.9% (32)	24.9% (42)	12.7% (18)	14.7% (27)		
A few times a week	10.3% (17)	14.4% (27) E	13.7% (21)	10.9% (19) E	2.9% (4)	9.7% (17)		
About once a week	4.9% (8)	2.9% (5)	4.0% (6)	5.0% (8)	7.3% (10)	3.7% (7)		
A few times a month	0.4% (1)	5.5% (10)	1.7% (3)	5.8% (10)	1.2% (2)	4.4% (8)		
About once a month	3.9% (7)	4.8% (9)	5.0% (8)	1.0% (2)	2.2% (3)	4.5% (8)		
Less than once a month	4.5% (7)	3.9% (7)	3.5% (5)	4.1% (7)	6.1% (9)	4.8% (9)		
Never used them	60.0% (100) B	40.9% (76)	51.2% (79)	48.3% (82)	67.6% (96) B D	58.4% (105) B		
Disposable wet wipes use for % (n)							0.020	35.113
Cleaning and disinfection	14.6% (10)	11.4% (12)	14.6% (11)	14.2% (12)	19.2% (9)	11.4% (8)		
With children	10.1% (7)	14.1% (15)	22.8% (17)	21.0% (18)	8.9% (4)	12.4% (9)		
Personal care	45.2% (30)	45.5% (50)	38.6% (29)	38.2% (34)	42.4% (20)	55.5% (41)		
Toilet paper	25.5% (17)	28.5% (31)	24.0% (18)	26.7% (23)	18.4% (9)	17.6% (13)		
Out of home (office or travelling)	4.6% (3)	0.7% (1)	0.0% (0)	0.0% (0)	11.1% (5) B	3.2% (2)		
Wet wipes disposal % (n)							0.122	27.475
Never	75.1% (50)	83.5% (91)	78.2% (59)	81.5% (72)	69.0% (32)	77.9% (59)		
Occasionally	10.5% (7)	7.7% (8)	4.6% (3)	4.8% (4)	6.8% (3)	11.9% (9)		
Half the time	2.4% (2)	0.0% (0)	0.0% (0)	1.7% (2)	0.0% (0)	1.2% (1)		
Often	2.2% (1)	3.2% (3)	2.8% (2)	6.5% (6)	7.4% (3)	1.8% (1)		
Always / Every time	9.9% (7)	5.6% (6)	14.4% (11)	5.5% (5)	16.8% (8)	7.3% (5)		
Female hygiene products disposal (only women) % (n)							0.372	8.654
N/A	--	21.5% (40)	--	17.6% (30)	--	24.4% (44)		
Never	--	76.1% (142)	--	80.5% (137)	--	71.1% (129)		
Occasionally	--	1.1% (2)	--	2.0% (3)	--	1.5% (3)		
Half the time	--	0.0% (0)	--	0.0% (0)	--	0.0% (0)		
Often	--	0.0% (0)	--	0.0% (0)	--	0.8% (1)		
Always / Every time	--	1.4% (3)	--	0.0% (0)	--	2.2% (4)		
Waste cooking oil disposal % (n)							0.112	33.829
N/A	0.9% (1)	0.7% (1)	0.7% (1)	0.4% (1)	1.8% (2)	0.0% (0)		
Never	80.7% (134)	80.9% (151) F	72.6% (112)	68.8% (117)	70.2% (96)	67.2% (118)		
Occasionally	13.1% (22)	11.1% (21)	22.4% (34)	20.5% (35)	19.5% (27)	24.8% (44) B		
Half the time	0.4% (1)	1.1% (2)	0.9% (1)	2.8% (5)	2.9% (4)	2.4% (4)		
Often	3.2% (5)	3.0% (6)	1.9% (3)	1.8% (3)	1.9% (3)	2.4% (4)		
Always / Every time	1.8% (3)	3.3% (6)	1.5% (2)	5.7% (10)	3.7% (5)	3.1% (6)		
Food scraps disposal % (n)							0.645	21.831
N/A	0.4% (1)	1.1% (2)	0.3% (1)	0.0% (0)	1.4% (2)	0.8% (1)		
Never	77.9% (129)	70.4% (131)	75.3% (117)	71.1% (121)	77.8% (110)	70.9% (127)		
Occasionally	15.8% (26)	22.9% (43)	20.6% (32)	24.3% (41)	16.6% (23)	20.9% (37)		
Half the time	1.4% (2)	1.5% (3)	2.2% (3)	2.4% (4)	2.1% (3)	2.0% (4)		
Often	2.6% (4)	1.0% (2)	1.6% (3)	0.9% (2)	2.1% (3)	3.1% (6)		
Always / Every time	1.9% (3)	3.1% (6)	0.0% (0)	1.3% (2)	0.0% (0)	2.3% (4)		

Note: The chi-square statistic (χ^2) is significant at the .05 level.

Table 30: Descriptive results and tests of significant differences of the HWM indicators by age group and study zone.

Variable	Carmel			Poblenou			Sant Gervasi			p-value	Test
	16-44 y (A)	45-64 y (B)	65+ y (C)	16-44 y (D)	45-64 y (E)	65+ y (F)	16-44 y (G)	45-64 y (H)	65+ y (I)		
Participants % (n)	43.7% (155)	31.2% (111)	25.1% (89)	46.5% (151)	33.1% (108)	20.4% (66)	39.5% (128)	33.1% (108)	27.4% (89)		
Disposable wet wipes use (frequency) % (n)										0.062	63.871
Every day	26.7% (41)	17.6% (19)	19.9% (17)	26.5% (40)	19.0% (20)	21.4% (14)	12.5% (16)	17.3% (18)	11.6% (10)		
A few times a week	14.0% (22)	15.2% (17)	6.1% (5)	15.4% (23)	9.1% (10)	10.1% (7)	9.4% (12)	3.3% (4)	6.7% (6)		
About once a week	4.4% (7)	3.1% (3)	3.7% (3)	4.1% (6)	5.0% (5)	4.6% (3)	6.3% (8)	5.8% (6)	3.0% (3)		
A few times a month	3.6% (6)	1.7% (2)	3.8% (3)	3.1% (5)	5.1% (5)	3.5% (2)	3.1% (4)	1.8% (2)	4.1% (4)		
About once a month	6.0% (9)	2.5% (3)	3.9% (3)	4.0% (6)	3.2% (3)	0.0% (0)	2.2% (3)	5.3% (6)	3.1% (3)		
Less than once a month	6.5% (10)	3.0% (3)	1.5% (1)	4.0% (6)	4.1% (4)	2.9% (2)	6.3% (8)	4.3% (5)	5.3% (5)		
Never used them	38.7% (60)	56.9% (63)	61.1% (54)	42.9% (65)	54.5% (59)	57.4% (38)	60.1% (77)	62.2% (66)	66.1% (58)		
Disposable wet wipes use for % (n)										0.000	78.174
Cleaning and disinfection	15.7% (15)	13.6% (6)	1.9% (1)	12.0% (10)	22.0% (11)	8.4% (2)	19.4% (10)	10.7% (4)	10.6% (3)		
With children	14.8% (14)	8.8% (4)	11.6% (4)	36.0% (31)	5.4% (3)	7.0% (2)	15.4% (8)	11.3% (4)	3.4% (1)		
Personal care	46.1% (44)	38.1% (18)	55.1% (18)	33.9% (29)	37.8% (19)	52.7% (15)	38.6% (20)	51.2% (20)	69.8% (21)		
Toilet paper	20.1% (19)	39.5% (19)	29.2% (10)	18.1% (16)	34.7% (17)	31.9% (9)	19.1% (10)	21.9% (9)	10.6% (3)		
Out of home (office or travelling)	3.2% (3)	0.0% (0)	2.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	7.6% (4)	4.9% (2)	5.6% (2)		
Wet wipes disposal % (n)										0.551	30.337
Never	78.4% (74)	80.1% (38)	86.1% (29)	73.2% (63)	85.3% (42)	91.5% (26)	68.9% (35)	70.5% (28)	89.4% (27)		
Occasionally	9.4% (9)	9.6% (5)	5.7% (2)	5.5% (5)	3.7% (2)	3.9% (1)	12.8% (7)	8.8% (4)	6.6% (2)		
Half the time	1.7% (2)	0.0% (0)	0.0% (0)	1.8% (2)	0.0% (0)	0.0% (0)	0.0% (0)	2.3% (1)	0.0% (0)		
Often	3.6% (3)	3.1% (1)	0.0% (0)	7.5% (6)	1.7% (1)	2.0% (1)	8.3% (4)	0.0% (0)	1.6% (0)		
Always / Every time	6.9% (7)	7.3% (3)	8.2% (3)	12.1% (10)	9.3% (5)	2.6% (1)	10.0% (5)	18.4% (7)	2.3% (1)		
Female hygiene products disposal (only women) % (n)										0.000	81.832
N/A	6.1% (5)	30.0% (17)	34.7% (18)	6.2% (5)	27.4% (15)	26.2% (10)	8.1% (6)	36.5% (22)	31.5% (17)		
Never	88.8% (69)	68.7% (40)	65.3% (34)	89.5% (68)	72.6% (39)	73.8% (29)	79.9% (54)	63.5% (38)	68.5% (37)		
Occasionally	1.7% (1)	1.3% (1)	0.0% (0)	4.3% (3)	0.0% (0)	0.0% (0)	4.0% (3)	0.0% (0)	0.0% (0)		
Half the time	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
Often	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	2.0% (1)	0.0% (0)	0.0% (0)		
Always / Every time	3.4% (3)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	5.9% (4)	0.0% (0)	0.0% (0)		
Waste cooking oil disposal % (n)										0.000	81.160
N/A	0.8% (1)	0.7% (1)	0.8% (1)	0.0% (0)	0.0% (0)	2.8% (2)	1.2% (1)	0.9% (1)	0.0% (0)		
Never	75.5% (117)	78.8% (87)	92.4% (82)	61.9% (93)	74.3% (80)	84.6% (55)	65.6% (83)	66.4% (70)	75.7% (62)		
Occasionally	15.3% (24)	13.4% (15)	4.6% (4)	26.0% (39)	21.5% (23)	10.6% (7)	22.7% (29)	23.9% (25)	20.5% (17)		
Half the time	0.8% (1)	1.3% (1)	0.0% (0)	4.1% (6)	0.0% (0)	0.0% (0)	4.2% (5)	2.7% (3)	0.0% (0)		
Often	4.3% (7)	3.7% (4)	0.0% (0)	4.0% (6)	0.0% (0)	0.0% (0)	1.1% (1)	5.2% (5)	0.0% (0)		
Always / Every time	3.2% (5)	2.1% (2)	2.1% (2)	4.1% (6)	4.2% (4)	2.1% (1)	5.2% (7)	0.9% (1)	3.8% (3)		
Food scraps disposal % (n)										0.064	54.408
N/A	0.8% (1)	0.7% (1)	0.8% (1)	0.0% (0)	0.0% (0)	0.8% (1)	1.9% (2)	0.9% (1)	0.0% (0)		
Never	69.4% (107)	75.0% (81)	80.6% (72)	68.5% (103)	72.9% (78)	83.9% (56)	64.0% (82)	76.9% (83)	85.5% (72)		
Occasionally	22.7% (35)	19.9% (22)	13.8% (12)	25.3% (38)	23.7% (26)	14.3% (9)	24.4% (31)	17.8% (19)	12.1% (10)		
Half the time	1.8% (3)	2.1% (2)	0.0% (0)	3.2% (5)	2.5% (3)	0.0% (0)	4.3% (6)	0.0% (0)	1.2% (1)		
Often	1.9% (3)	2.4% (3)	0.8% (1)	2.1% (3)	0.9% (1)	0.0% (0)	4.3% (6)	1.8% (2)	1.2% (1)		
Always / Every time	3.4% (5)	0.0% (0)	4.1% (4)	1.0% (2)	0.0% (0)	1.0% (1)	1.1% (1)	2.6% (3)	0.0% (0)		

Note: The chi-square statistic (x²) is significant at the .05 level.

Table 31: Descriptive results and tests of significant differences of the HWM indicators by personal SES and study zone.

Variable	Carmel		Poblenou		Sant Gervasi		p-value	Test
	Below M SES (A)	Above M SES (B)	Below M SES (C)	Above M SES (D)	Below M SES (E)	Above M SES (F)		
Participants % (n)	74.6% (264)	25.4% (90)	50.1% (163)	49.9% (162)	37.0% (120)	63.0% (205)		
Disposable wet wipes use (frequency) % (n)							0.030	46.138
Every day	24.0% (63)	16.9% (15)	20.3% (33)	25.7% (42)	11.8% (14)	15.0% (31)		
A few times a week	11.0% (29)	16.7% (15)	12.7% (21)	11.8% (19)	7.1% (8)	6.5% (13)		
About once a week	4.6% (12)	1.4% (1)	4.9% (8)	4.1% (7)	4.0% (5)	6.0% (12)		
A few times a month	3.7% (10)	3.0% (3)	2.5% (4)	5.2% (8)	3.1% (4)	2.9% (6)		
About once a month	4.8% (13)	3.0% (3)	4.4% (7)	1.4% (2)	3.1% (4)	3.7% (7)		
Less than once a month	3.7% (10)	5.6% (5)	2.3% (4)	5.3% (9)	8.0% (10)	3.8% (8)		
Never used them	48.2% (127)	54.9% (49)	52.9% (86)	46.5% (75)	63.0% (76)	62.1% (126)		
Disposable wet wipes use for % (n)							0.003	41.322
Cleaning and disinfection	10.3% (14)	20.2% (8)	12.2% (9)	16.3% (14)	14.8% (7)	14.1% (11)		
With children	11.8% (16)	15.1% (6)	15.5% (12)	27.4% (24)	3.0% (1)	15.8% (12)		
Personal care	46.8% (63)	41.4% (17)	40.6% (31)	36.3% (32)	57.1% (25)	46.5% (35)		
Toilet paper	29.3% (40)	19.6% (8)	31.7% (24)	19.9% (17)	15.2% (7)	19.5% (15)		
Out of home (office or travelling)	1.7% (2)	3.6% (1)	0.0% (0)	0.0% (0)	10.0% (4)	4.0% (3)		
Wet wipes disposal % (n)							0.489	19.504
Never	77.5% (105)	89.7% (36)	74.5% (57)	84.8% (74)	81.7% (36)	70.3% (54)		
Occasionally	9.9% (13)	4.9% (2)	4.4% (3)	4.9% (4)	6.1% (3)	12.2% (9)		
Half the time	1.2% (2)	0.0% (0)	0.0% (0)	1.8% (2)	0.0% (0)	1.2% (1)		
Often	3.6% (5)	0.0% (0)	8.1% (6)	1.9% (2)	3.0% (1)	4.4% (3)		
Always / Every time	7.8% (11)	5.4% (2)	13.0% (10)	6.6% (6)	9.3% (4)	11.8% (9)		
Female hygiene products disposal (only women) % (n)							0.178	25.641
N/A	23.6% (33)	14.7% (7)	22.7% (19)	12.6% (11)	17.4% (14)	29.7% (31)		
Never	73.7% (105)	83.7% (37)	77.3% (65)	83.5% (72)	79.1% (62)	65.0% (67)		
Occasionally	0.9% (1)	1.6% (1)	0.0% (0)	3.9% (3)	1.7% (1)	1.3% (1)		
Half the time	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)		
Often	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.3% (1)		
Always / Every time	1.8% (3)	0.0% (0)	0.0% (0)	0.0% (0)	1.8% (1)	2.6% (3)		
Waste cooking oil disposal % (n)							0.002	50.097
N/A	1.0% (3)	0.0% (0)	1.1% (2)	0.0% (0)	1.2% (1)	0.5% (1)		
Never	82.4% (217)	76.2% (69)	70.5% (114)	70.6% (115)	68.2% (80)	68.7% (135)		
Occasionally	11.3% (30)	14.2% (13)	23.6% (38)	19.2% (31)	21.5% (25)	23.1% (45)		
Half the time	1.0% (3)	0.0% (0)	0.0% (0)	3.8% (6)	4.5% (5)	1.5% (3)		
Often	1.6% (4)	7.4% (7)	.9% (1)	2.9% (5)	.6% (1)	3.1% (6)		
Always / Every time	2.7% (7)	2.2% (2)	3.9% (6)	3.5% (6)	4.0% (5)	3.0% (6)		
Food scraps disposal % (n)							0.056	37.137
N/A	1.0% (3)	0.0% (0)	.3% (1)	0.0% (0)	1.2% (1)	1.0% (2)		
Never	76.0% (200)	67.8% (61)	73.2% (119)	73.0% (118)	68.3% (80)	77.3% (156)		
Occasionally	16.9% (44)	27.3% (24)	22.5% (37)	22.6% (37)	21.5% (25)	17.5% (35)		
Half the time	1.9% (5)	0.0% (0)	1.1% (2)	3.5% (6)	3.5% (4)	1.2% (2)		
Often	0.7% (2)	4.9% (4)	1.5% (2)	1.0% (2)	4.4% (5)	1.6% (3)		
Always / Every time	3.4% (9)	0.0% (0)	1.4% (2)	0.0% (0)	1.2% (1)	1.4% (3)		

Note: The chi-square statistic (χ^2) is significant at the .05 level.

Gender differences were observed in terms of frequency of use of wet wipes (Table 29). A larger proportion of women in Carmel low-SES area used wet wipes every day or few times a week. Regarding use purpose, a significantly large proportion of men in Sant Gervasi high-SES area reported using wet wipes out of home (at the office or travelling) in comparison to the other population segments. Women used more wet wipes on a daily basis than men, but men flushed them down the toilet more often. Except in Carmel (low SES), the prevalence of daily use and toilet disposal was higher for men than for women, the maximum being 3,6% among men in Poblenou (middle SES) and 1,3% among women in Sant Gervasi (high SES).

As for age differences (Table 30), most seniors (65+ years) never used wet wipes compared to young adults (16-44 years), specially young adults of Carmel (low SES) who show a relatively high usage rate. A significantly larger proportion of young adults (16-44) in Poblenou (middle SES) used wet wipes with children, compared to their peers in Carmel or Sant Gervasi. Combining the variables of frequency of usage and inadequate disposal of wet wipes, young adults (16-44) in all three study areas showed a higher prevalence compared to the other age groups, except for the adults (45-64) in Sant Gervasi (high SES). Young adults (16-44) residents in Poblenou showed the highest prevalence (5,19%) and seniors in Sant Gervasi (high SES) the lowest (0,45%). Age differences were also found regarding the disposal of solid waste, like female hygiene products (only women) or waste cooking oil. A larger, and significant, proportion of young female adults (16-44) of Carmel (low SES) and Poblenou (middle SES) reported never flushing hygiene products down the toilet compared to the same age group population of Sant Gervasi high SES area. Waste cooking oil was never improperly disposed of by seniors (65+) at Carmel low-SES area; results being significantly different from other group categories.

Significant differences were found by personal SES in terms of frequency of usage of disposable wet wipes (Table 31); a comparatively large amount of people above mean SES in Sant Gervasi (high SES) did never use them. Wet wipes are significantly more used with children amongst those above mean SES in Poblenou (middle SES). No significant differences were observed regarding the disposal of wet wipes and female hygiene products by personal SES. Waste cooking oil is occasionally improperly disposed significantly more often by people below the mean SES in Poblenou (middle SES) and above the mean SES in Sant Gervasi (high SES), in contrast to a vast majority of people below the SES mean in Carmel (low SES). No significant differences were observed regarding the disposal of food scraps by personal-level SES.

12 CONCLUDING REMARKS

The goal within SCOREwater Barcelona case study is to innovate in the digitalization of water services by demonstrating how sensing the sewer system of Barcelona can provide information at the neighbourhood scale on health status, dietary habits and household waste management practices. This information will be used to: 1) reduce the discharge of antibiotics in the environment, 2) promote healthier dietary habits, 3) prevent damaging discharges of wet wipes and oils and greases to the sewer system, and thus 4) decrease sewer maintenance costs. The present report has dealt with the design and deployment of a CATI/CAPI survey in Barcelona, administered by IERMB, with the objective of validating the results from a WBE study. The survey questionnaire included in its design validation questions matching the biomarkers analysed in wastewater samples from three communities monitored in Barcelona, and regarding five main aspects: (1) health status and risk factors, (2) diet and vegetarianism, (3) adherence to medical therapy and OTC intake of pharmaceutical drugs, (4) household waste management, and (5) SES of inhabitants. The survey was executed between June 21 - July 14, 2021. A total sample of 1,004 interviews were conducted: 354 in Carmel low-SES area, 325 in Poblenou middle-SES area, and 325 Sant Gervasi high-SES. Sample design was made to be representative of the populations living within these sewersheds. In future outputs, namely deliverable D4.10, survey data (IERMB) and wastewater data (ICRA) will be analysed in tandem and contrasted; discrepancies, if any, will be carefully re-examined. In addition, D4.10 will synthesize the main scientific achievements, whereas D4.9 will translate these findings into novel public awareness campaigns and insights for effective policy design regarding health surveillance through WBE and the management of sewerage disturbances caused by human misbehaviour.

As a summary of the main outputs obtained from the Lifestyle-Habits Survey, Barcelona 2021:

Health status and risk factors

- Self-rated health was significantly poorer in the low-SES area of Carmel, compared to the middle- and high-SES areas of Poblenou and Sant Gervasi, where significantly more people had a very good to excellent health. Both men and women, and young adults (16-44) in Sant Gervasi (high-SES area) had a very good to excellent health. As for personal SES differences, people below and above the mean SES in Carmel (low-SES area) and below the mean SES in Poblenou (middle SES) had a significantly poorer health. In contrast, people above the mean SES in Poblenou (middle SES) and below and above the mean SES in Sant Gervasi (high SES) had a better health. The results thus followed the expected direction of the social gradient in health.
- No significant differences between the three study areas (low, middle, and high SES) were found in terms of self-reported levels of physical activity. Physical activity levels were however significantly higher among males and young adults (16-44) in all three areas invariantly. Compliance with a minimum of 30 min d⁻¹ of MVPA was significantly larger amongst males of the high-SES area of Sant Gervasi, in contrast to women of Poblenou (middle-SES area) and Carmel (low SES). No significant differences in physical activity levels were found according to personal SES.
- Prevalence of overweight and obesity were significantly higher among the residents of the low-SES area of Carmel compared to the other areas. In general terms, prevalence of overweight and obesity were higher for men, rather than women, and increased with age, which is consistent with official data. Differences according to personal-level SES indicated greater prevalences among individuals below and above the mean SES in Carmel (low-SES area) and below the mean SES in Poblenou (middle-SES area). These results also confirmed the social gradient described in the literature, namely that overweight and obesity affect the poor disproportionately (Templin et al. 2019).
- There were significant differences in terms of smoking behaviour according to study area (low, middle, and high SES), specifically regarding the number of someday smokers, which was relatively higher in Sant Gervasi high-SES area (significant). The never smoker were mostly women, in contrast men, and the seniors (65+) in Carmel low-SES area. Sant Gervasi's young adults (16-44) and those below the mean SES amounted for the largest proportions of someday smokers.
- No significant differences between the three study areas (low, middle, and high SES) were found in terms of harmful alcohol consumption. Harmful alcohol consumption was however significantly more extended among men of all three SES areas and women of the high SES area of Sant Gervasi, as well as among young adults (16-44) of Poblenou and Sant Gervasi. No significant differences were found according to personal-level SES.

Diet and vegetarianism

- Sugary drinks were the most consumed in Carmel low-SES area (significant), and by males and young adults (16-44) in this study area (also significant).
- Both low meat and fish consumption as well as higher rates of vegetarianism were found in the middle-SES area of Poblenou (by both men and women), and among women of the high-SES area of Sant Gervasi, these results being statistically significant. In all three neighbourhoods, women, more frequently than men, did not consume meat, neither red nor white. Young adults (16-44) of Poblenou and Sant Gervasi most typically identified themselves as vegetarians. Significant differences were also identified according to personal SES, namely middle classes reported eating less meat and fish and higher rates of vegetarianism.

Adherence to medical therapy

- More antibiotics were prescribed (past 12 months) in the middle- and high-SES areas of Poblenou and Sant Gervasi (significant), respectively, where people also reported to have kept antibiotics leftovers (significant) and used them without prescription more often in comparison to residents in the low-SES area of Carmel. Women and young adults (16-44 years) and adults (45-64) were more prone to keep antibiotics leftovers than other social groups. Adherence to antibiotics therapy was of 93% to 98% (non-significant).

- Significant differences between the three study areas (low, middle, and high SES) were found in terms of medical treatment with analgesics; long-term therapy (+15 days) was more frequently prescribed to residents in Carmel low-SES area (significant). No significant differences between the three study areas were found in terms of medical treatment with hypotensive or sedative drugs.
- Gender differences were more notable in terms of long-term treatments (15+ days) with analgesics and sedatives; significantly more women in Carmel low-SES area were prescribed analgesics and sedatives compared to other categories. In contrast, there were significantly more men in Carmel, and to a lesser extent in Poblenou (middle-SES area), who never got prescribed sedatives.
- A relatively high proportion of adults (45-64) and seniors (65+) of Carmel (low-SES area) and Poblenou (middle SES) had received medical treatment with analgesics the past year, which might be influenced by the COVID-19 vaccination campaign.
- Age differences were the most notable in terms of therapy with hypotensives, namely occurrence significantly increased with age in all three study areas.
- COVID-19 results did not show significant differences by study area, study area x sex, or study area x personal SES. Yet, a higher prevalence was recorded among young adults (16-44) and adults (45-64) in all three study areas, compared to seniors (65+), coinciding with the fourth wave hitting the age groups not being vaccinated by June 2021. These results were statistically significant.

Household waste management

- To the best of our knowledge, this is the first time that usage and inadequate discharge to the sewerage of improper solid waste is quantified by means of a representative survey in specific neighbourhoods of Barcelona. The following results therefore offer relevant information to the public authorities managing the water cycle.
- Wet wipes were significantly more used “every day” in low- and middle-SES areas of Carmel and Poblenou, respectively. Yet, occasional inadequate disposal was more frequent in the high-SES area of Sant Gervasi, although not statistically significant.
- In general, wet wipes were mainly used for personal care purposes (some 48%) or as a substitute for toilet paper (some 25%). Yet, wet wipes were significantly more used with children by young adults (16-44) and by those above mean personal-level SES in Poblenou (middle-SES area), these results being statistically significant.
- A larger proportion of women in Carmel low-SES area used wet wipes every day or a few times a week. In general terms, women used more wet wipes on a daily basis than men, but men flushed them down the toilet more often. Most seniors (65+ years) never used wet wipes compared to young adults (16-44 years).
- A larger and significant proportion of young female adults (16-44) of Carmel (low SES) and Poblenou (middle SES) reported never flushing hygiene products down the toilet compared to the same age group population of Sant Gervasi high-SES area.
- Occasional inadequate disposal of waste cooking oil was significantly more frequent in Sant Gervasi (high-SES area) (21.4%; 69) and Poblenou (middle-SES area) (22.5%; 71), compared to Carmel (low-SES area) (12.0%, 43). It was never improperly disposed of by seniors (65+) at Carmel low-SES area; results being significantly different from other group categories.

All in all, relevant insights were obtained that can further help understand behaviour from the analysis of wastewater samples, as well as improve knowledge for the management of the water cycle by public authorities.



13 FUTURE STEPS AND DISSEMINATION PLAN

The D4.8 report is public, and this is considered a dissemination action in itself. In future outputs, namely deliverable D4.10, survey data (IERMB) and wastewater data (ICRA) will be analysed in tandem and contrasted; discrepancies, if any, will be carefully re-examined. In addition, D4.10 will synthesize the main scientific achievements, whereas D4.9 will translate these findings into novel public awareness campaigns and insights for effective policy design regarding health surveillance through WBE and the management of sewerage disturbances caused by human misbehaviour. The outputs from D4.8 will be also presented in a scientific publication in the form of a co-authored peer-reviewed paper published in a JCR journal.



14 REFERENCES

References in Table 9: Literature reporting associations between microbiome deviations and medical conditions. Source: ICRA.:

- [1] Coleman, S. L., Neff, C. P., Li, S. X., Armstrong, A. J., Schneider, J. M., Sen, S., ... & Palmer, B. E. (2020). Can gut microbiota of men who have sex with men influence HIV transmission?. *Gut microbes*, 11(3), 610-619.
- [2] Tuddenham, S., Koay, W. L., & Sears, C. (2020). HIV, sexual orientation, and gut microbiome interactions. *Digestive diseases and sciences*, 65(3), 800-817.
- [3] Annavajhala, M. K., Khan, S. D., Sullivan, S. B., Shah, J., Pass, L., Kister, K., ... & Uhlemann, A. C. (2020). Oral and gut microbial diversity and immune regulation in patients with HIV on antiretroviral therapy. *Mosphere*, 5(1), e00798-19.
- [4] Zhang, J., Zhang, F., Zhao, C., Xu, Q., Liang, C., Yang, Y., ... & Zhang, L. (2019). Dysbiosis of the gut microbiome is associated with thyroid cancer and thyroid nodules and correlated with clinical index of thyroid function. *Endocrine*, 64(3), 564-574.
- [5] Zheng, Y., Fang, Z., Xue, Y., Zhang, J., Zhu, J., Gao, R., ... & Ji, H. (2020). Specific gut microbiome signature predicts the early-stage lung cancer. *Gut Microbes*, 11(4), 1030-1042.
- [6] Parida, S., & Sharma, D. (2019). The microbiome-estrogen connection and breast cancer risk. *Cells*, 8(12), 1642.
- [7] Newton, R. J., McLellan, S. L., Dila, D. K., Vineis, J. H., Morrison, H. G., Eren, A. M., & Sogin, M. L. (2015). Sewage reflects the microbiomes of human populations. *MBio*, 6(2), e02574-14.
- [8] Turnbaugh, P. J., Hamady, M., Yatsunenko, T., Cantarel, B. L., Duncan, A., Ley, R. E., ... & Gordon, J. I. (2009). A core gut microbiome in obese and lean twins. *nature*, 457(7228), 480-484.
- [9] Le Chatelier, E., Nielsen, T., Qin, J., Prifti, E., Hildebrand, F., Falony, G., ... & Pedersen, O. (2013). Richness of human gut microbiome correlates with metabolic markers. *Nature*, 500(7464), 541-546.
- [10] Wu, H., Esteve, E., Tremaroli, V., Khan, M. T., Caesar, R., Mannerås-Holm, L., ... & Bäckhed, F. (2017). Metformin alters the gut microbiome of individuals with treatment-naïve type 2 diabetes, contributing to the therapeutic effects of the drug. *Nature medicine*, 23(7), 850-858.
- [11] Sedighi, M., Razavi, S., Navab-Moghadam, F., Khamseh, M. E., Alaei-Shahmiri, F., Mehrtash, A., & Amirmozafari, N. (2017). Comparison of gut microbiota in adult patients with type 2 diabetes and healthy individuals. *Microbial pathogenesis*, 111, 362-369.
- [12] Navab-Moghadam, F., Sedighi, M., Khamseh, M. E., Alaei-Shahmiri, F., Talebi, M., Razavi, S., & Amirmozafari, N. (2017). The association of type II diabetes with gut microbiota composition. *Microbial pathogenesis*, 110, 630-636.
- [13] Zhao, L., Lou, H., Peng, Y., Chen, S., Zhang, Y., & Li, X. (2019). Comprehensive relationships between gut microbiome and faecal metabolome in individuals with type 2 diabetes and its complications. *Endocrine*, 66(3), 526-537.
- [14] Qin, J., Li, Y., Cai, Z., Li, S., Zhu, J., Zhang, F., ... & Wang, J. (2012). A metagenome-wide association study of gut microbiota in type 2 diabetes. *Nature*, 490(7418), 55-60.
- [15] Karlsson, F. H., Tremaroli, V., Nookaew, I., Bergström, G., Behre, C. J., Fagerberg, B., ... & Bäckhed, F. (2013). Gut metagenome in European women with normal, impaired and diabetic glucose control. *Nature*, 498(7452), 99-103.
- [16] Zhang, J., Zhang, F., Zhao, C., Xu, Q., Liang, C., Yang, Y., ... & Zhang, L. (2019). Dysbiosis of the gut microbiome is associated with thyroid cancer and thyroid nodules and correlated with clinical index of thyroid function. *Endocrine*, 64(3), 564-574.
- [17] Zuo, K., Li, J., Li, K., Hu, C., Gao, Y., Chen, M., ... & Yang, X. (2019). Disordered gut microbiota and alterations in metabolic patterns are associated with atrial fibrillation. *Gigascience*, 8(6), giz058.
- [18] Koren, O., Spor, A., Felin, J., Fåk, F., Stombaugh, J., Tremaroli, V., ... & Bäckhed, F. (2011). Human oral, gut, and plaque microbiota in patients with atherosclerosis. *Proceedings of the National Academy of Sciences*, 108(Supplement 1), 4592-4598.
- [19] Madan, S., & Mehra, M. R. (2020). Gut dysbiosis and heart failure: Navigating the universe within. *European journal of heart failure*, 22(4), 629-637.

- [20] Madan, S., & Mehra, M. R. (2020). The heart-gut microbiome axis in advanced heart failure. *The Journal of Heart and Lung Transplantation*, 39(9), 891-893.
- [21] Kelly, J. R., Minuto, C., Cryan, J. F., Clarke, G., & Dinan, T. G. (2021). The role of the gut microbiome in the development of schizophrenia. *Schizophrenia research*, 234, 4-23.
- [22] Ma, X., Asif, H., Dai, L., He, Y., Zheng, W., Wang, D., ... & Chen, X. (2020). Alteration of the gut microbiome in first-episode drug-naïve and chronic medicated schizophrenia correlate with regional brain volumes. *Journal of psychiatric research*, 123, 136-144.
- [23] Misiak, B., Łoniewski, I., Marlicz, W., Frydecka, D., Szulc, A., Rudzki, L., & Samochowiec, J. (2020). The HPA axis dysregulation in severe mental illness: Can we shift the blame to gut microbiota?. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 102, 109951.
- [24] Nguyen, T. T., Hathaway, H., Kosciulek, T., Knight, R., & Jeste, D. V. (2021). Gut microbiome in serious mental illnesses: A systematic review and critical evaluation. *Schizophrenia research*, 234, 24-40.
- [25] Nagpal, R., Neth, B. J., Wang, S., Craft, S., & Yadav, H. (2019). Modified Mediterranean-ketogenic diet modulates gut microbiome and short-chain fatty acids in association with Alzheimer's disease markers in subjects with mild cognitive impairment. *EBioMedicine*, 47, 529-542.
- [26] Seo, D. O., & Holtzman, D. M. (2020). Gut microbiota: from the forgotten organ to a potential key player in the pathology of Alzheimer's disease. *The Journals of Gerontology: Series A*, 75(7), 1232-1241.
- [27] Kowalski, K., & Mulak, A. (2019). Brain-gut-microbiota axis in Alzheimer's disease. *Journal of neurogastroenterology and motility*, 25(1), 48.
- [28] Barcik, W., Boutin, R. C., Sokolowska, M., & Finlay, B. B. (2020). The role of lung and gut microbiota in the pathology of asthma. *Immunity*, 52(2), 241-255.
- [29] Hufnagl, K., Pali-Schöll, I., Roth-Walter, F., & Jensen-Jarolim, E. (2020, February). Dysbiosis of the gut and lung microbiome has a role in asthma. In *Seminars in immunopathology* (Vol. 42, No. 1, pp. 75-93). Springer Berlin Heidelberg.
- [30] Casen, C., Vebø, H. C., Sekelja, M., Hegge, F. T., Karlsson, M. K., Ciemniejewska, E., ... & Rudi, K. (2015). Deviations in human gut microbiota: a novel diagnostic test for determining dysbiosis in patients with IBS or IBD. *Alimentary pharmacology & therapeutics*, 42(1), 71-83.
- [31] Ricciuto, A., Sherman, P. M., & Laxer, R. M. (2020). Gut microbiota in chronic inflammatory disorders: A focus on pediatric inflammatory bowel diseases and juvenile idiopathic arthritis. *Clinical Immunology*, 215, 108415.
- [32] Damiani, G., Bragazzi, N. L., McCormick, T. S., Pigatto, P. D. M., Leone, S., Pacifico, A., ... & Fiore, M. (2020). Gut microbiota and nutrient interactions with skin in psoriasis: A comprehensive review of animal and human studies. *World journal of clinical cases*, 8(6), 1002.
- [33] Komine, M. (2020). Recent advances in psoriasis research; the clue to mysterious relation to gut microbiome. *International journal of molecular sciences*, 21(7), 2582.
- [34] Ricciuto, A., Sherman, P. M., & Laxer, R. M. (2020). Gut microbiota in chronic inflammatory disorders: A focus on pediatric inflammatory bowel diseases and juvenile idiopathic arthritis. *Clinical Immunology*, 215, 108415.
- [35] Wang, X., Yang, S., Li, S., Zhao, L., Hao, Y., Qin, J., ... & Ren, F. (2020). Aberrant gut microbiota alters host metabolome and impacts renal failure in humans and rodents. *Gut*, 69(12), 2131-2142.
- [36] Vairakkani, R., Fernando, M. E., & Raj, T. Y. (2020). Metabolome and microbiome in kidney diseases. *Saudi Journal of Kidney Diseases and Transplantation*, 31(1), 1.

All references outside of Table 9:

- Abarca-Gómez, L., Abdeen, Z. A., Hamid, Z. A., Abu-Rmeileh, N. M., Acosta-Cazares, B., Acuin, C., ... & Cho, Y. (2017). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128· 9 million children, adolescents, and adults. *The lancet*, 390(10113), 2627-2642.
- Alkerwi, A. A., Vernier, C., Sauvageot, N., Crichton, G. E., & Elias, M. F. (2015). Demographic and socioeconomic disparity in nutrition: application of a novel Correlated Component Regression approach. *BMJ open*, 5(5).
- Allès, B., Baudry, J., Méjean, C., Touvier, M., Péneau, S., Hercberg, S., & Kesse-Guyot, E. (2017). Comparison of sociodemographic and nutritional characteristics between self-reported vegetarians, vegans, and meat-eaters from the NutriNet-Santé study. *Nutrients*, 9(9), 1023.
- Antón-Alonso, F., Porcel, S., Cruz, I. i Pruna, M. (2018). Monogràfic ECURB 2017: Dinàmiques de mobilitat residencial i transformació dels barris metropolitans. Bellaterra: AMB i IERMB.
- Arcaya, M.C., Arcaya, A.L., Subramanian, S.V., Inequalities in health: definitions, concepts, and theories. *Global Health Action* 2015, 8: 27106.
- Atasağun, H. G., & Bhat, G. S. (2018). Advancement in flushable wipes: Modern technologies and characterization. *Journal of Industrial Textiles*, 1528083718795910.
- Avila-Palencia, I., Panis, L. I., Dons, E., Gaupp-Berghausen, M., Raser, E., Götschi, T., ... & Nieuwenhuijsen, M. J. (2018). The effects of transport mode use on self-perceived health, mental health, and social contact measures: a cross-sectional and longitudinal study. *Environment international*, 120, 199-206.
- Axelsson, M. (2013). Report on personality and adherence to antibiotic therapy: a population-based study. *BMC psychology*, 1(1), 24.
- Berger, I. E. (1997). The demographics of recycling and the structure of environmental behavior. *Environment and behavior*, 29(4), 515-531.
- Bonney, A., Mayne, D. J., Jones, B. D., Bott, L., Andersen, S. E., Caputi, P., ... & Iverson, D. C. (2015). Area-level socioeconomic gradients in overweight and obesity in a community-derived cohort of health service users-a cross-sectional study. *PLOS one*, 10(8), e0137261.
- Borrell, C., Marí-Dell'olmo, M., Palència, L., Gotsens, M., Burström, B., Domínguez-Berjón, F., ... Díez, È. (2014). Socioeconomic inequalities in mortality in 16 European cities. *Scandinavian Journal of Public Health*, 42(3), 245-254.
- Brekke, K. A., Kipperberg, G., & Nyborg, K. (2010). Social interaction in responsibility ascription: The case of household recycling. *Land Economics*, 86(4), 766-784.
- Briesacher, B. A., Andrade, S. E., Fouayzi, H., & Chan, K. A. (2008). Comparison of drug adherence rates among patients with seven different medical conditions. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, 28(4), 437-443.
- Casas, M. E., Schröter, N. S., Zammit, I., Castaño-Trias, M., Rodríguez-Mozaz, S., Gago-Ferrero, P., & Corominas, L. (2021). Showcasing the potential of wastewater-based epidemiology to track pharmaceuticals consumption in cities: Comparison against prescription data collected at fine spatial resolution. *Environment International*, 150, 106404.
- Castiglioni, S., Senta, I., Borsotti, A., Davoli, E., & Zuccato, E. (2015). A novel approach for monitoring tobacco use in local communities by wastewater analysis. *Tobacco control*, 24(1), 38-42.
- Choi, P. M., Tschärke, B. J., Donner, E., O'Brien, J. W., Grant, S. C., Kaserzon, S. L., ... & Mueller, J. F. (2018). Wastewater-based epidemiology biomarkers: past, present and future. *TrAC Trends in Analytical Chemistry*, 105, 453-469.
- Colls, C., Mias, M., & García-Altés, A. (2020). Un índice de privación para reformar el modelo de financiación de la atención primaria en Cataluña. *Gaceta Sanitaria*, 34, 44-50.

- Dadvand, P., Bartoll, X., Basagaña, X., Dalmau-Bueno, A., Martinez, D., Ambros, A., ... & Nieuwenhuijsen, M. J. (2016). Green spaces and general health: roles of mental health status, social support, and physical activity. *Environment international*, 91, 161-167.
- Daughton, C. G. (2018). Monitoring wastewater for assessing community health: Sewage Chemical-Information Mining (SCIM). *Science of The Total Environment*, 619, 748-764.
- Daughton, C. G., & Ternes, T. A. (1999). Pharmaceuticals and personal care products in the environment: agents of subtle change?. *Environmental health perspectives*, 107(suppl 6), 907-938.
- DiMatteo, M. R. (2004a). Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Medical care*, 200-209.
- DiMatteo, M. R. (2004b). Social support and patient adherence to medical treatment: a meta-analysis. *Health psychology*, 23(2), 207.
- Doak, C. M., Visscher, T. L. S., Renders, C. M., & Seidell, J. C. (2006). The prevention of overweight and obesity in children and adolescents: a review of interventions and programmes. *Obesity reviews*, 7(1), 111-136.
- Domínguez-Berjón, M. F., Borrell, C., Cano-Serral, G., Esnaola, S., Nolasco, A., Pasarín, M. I., ... & Escolar-Pujolar, A. (2008). Construcción de un índice de privación a partir de datos censales en grandes ciudades españolas:(Proyecto MEDEA). *Gaceta Sanitaria*, 22(3), 179-187.
- Dons, E., Rojas-Rueda, D., Anaya-Boig, E., Avila-Palencia, I., Brand, C., Cole-Hunter, T., ... & Götschi, T. (2018). Transport mode choice and body mass index: cross-sectional and longitudinal evidence from a European-wide study. *Environment international*, 119, 109-116.
- Ellaway, A., Anderson, A., & Macintyre, S. (1997). Does area of residence affect body size and shape?. *International journal of obesity*, 21(4), 304-308.
- ESCA (Enquesta de Salut de Catalunya). (2017/20). Document tècnic de l'Enquesta de Salut de Catalunya 2019. Període 2017-2020. Direcció General de Planificació en Salut, Departament de Salut, Generalitat de Catalunya. Available at: https://salutweb.gencat.cat/ca/el_departament/estadistiques_sanitaries/enquestes/esca/documents_tecnics/.
- Estruch, R., Ros, E., Salas-Salvadó, J., Covas, M. I., Corella, D., Arós, F., ... & Martínez-González, M. A. (2013). Primary prevention of cardiovascular disease with a Mediterranean diet. *New England Journal of Medicine*, 368(14), 1279-1290.
- Garrison, S.M., Rodgers J.L. (2017). Decomposing the Causes of the Socioeconomic Status-Health Gradient with Biometrical Modeling, *Multivariate Behavioral Research*, 52(1):118-119.
- Hage, O., Söderholm, P., & Berglund, C. (2009). Norms and economic motivation in household recycling: Empirical evidence from Sweden. *Resources, Conservation and Recycling*, 53(3), 155-165.
- Haskell, W. L., Lee, I. M., Pate, R. R., Powell, K. E., Blair, S. N., Franklin, B. A., ... & Bauman, A. (2007). Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation*, 116(9), 1081.
- Hoffmann et al. (2014). Social differences in avoidable mortality between small areas of 15 European cities: an ecological study. *International Journal of Health Geographics* 2014 13:8.
- Hoffmann, R., Kröger, H., & Pakpahan, E. (2018). Pathways between socioeconomic status and health: Does health selection or social causation dominate in Europe?. *Advances in Life Course Research*, 36, 23-36.
- IERMB (2018) Enquesta de Recollida Selectiva a l'AMB - ERSAMB 2018. Informe de resultats. Barcelona, IERMB-AMB.
- Kaluza, J., Håkansson, N., Brzozowska, A., & Wolk, A. (2009). Diet quality and mortality: a population-based prospective study of men. *European Journal of Clinical Nutrition*, 63(4), 451-457.

- Kinge, J. M., Strand, B. H., Vollset, S. E., & Skirbekk, V. (2015). Educational inequalities in obesity and gross domestic product: evidence from 70 countries. *J Epidemiol Community Health*, 69(12), 1141-1146.
- Llewelyn, M. J., Fitzpatrick, J. M., Darwin, E., Gorton, C., Paul, J., Peto, T. E., ... & Walker, A. S. (2017). The antibiotic course has had its day. *Bmj*, 358.
- López-Mosquera, N., Lera-López, F., & Sánchez, M. (2015). Key factors to explain recycling, car use and environmentally responsible purchase behaviors: a comparative perspective. *Resources, Conservation and Recycling*, 99, 29-39.
- Lozem, G., Cook, S., Leon, D. A., Emaus, N., & Schirmer, H. (2020). Self-reported health as a predictor of mortality: A cohort study of its relation to other health measurements and observation time. *Nature scientific reports*, 10(1), 1-9.
- Luiggi, M., Rey, O., Travert, M., & Griffet, J. (2021). Overweight and obesity by school socioeconomic composition and adolescent socioeconomic status: a school-based study. *BMC public health*, 21(1), 1-12.
- Mackenbach, J.P., Stirbu, I., Roskam, A.J.R., Schaap, M.M., Menvielle, G., Leinsalu, M., Kunst, A.E., et al. (2008). Socioeconomic inequalities in health in 22 European countries. *The New England Journal of Medicine* 358(23):2468-2481.
- Marí-Dell'Olmo, M., Gotsens, M., Palència, L., Burström, B., Corman, D., Costa, G., ... & Borrell, C. (2015). Socioeconomic inequalities in cause-specific mortality in 15 European cities. *J Epidemiol Community Health*, 69(5), 432-441.
- Martin, L. R., Williams, S. L., Haskard, K. B., & DiMatteo, M. R. (2005). The challenge of patient adherence. *Therapeutics and clinical risk management*, 1(3), 189.
- Martinez-Gonzalez, M. A., Fernández-Jarne, E., Serrano-Martinez, M., Wright, M., & Gomez-Gracia, E. (2004). Development of a short dietary intake questionnaire for the quantitative estimation of adherence to a cardioprotective Mediterranean diet. *European journal of clinical nutrition*, 58(11), 1550-1552.
- McEwen, L. N., Kim, C., Haan, M. N., Ghosh, D., Lantz, P. M., Thompson, T. J., & Herman, W. H. (2009). Are health-related quality-of-life and self-rated health associated with mortality? Insights from Translating Research Into Action for Diabetes (TRIAD). *Primary care diabetes*, 3(1), 37-42.
- McNulty, C. A., Boyle, P., Nichols, T., Clappison, P., & Davey, P. (2007). Don't wear me out—the public's knowledge of and attitudes to antibiotic use. *Journal of Antimicrobial Chemotherapy*, 59(4), 727-738.
- Metcalfe, P., Scragg, R., & Davis, P. (2006). Dietary intakes by different markers of socioeconomic status: results of a New Zealand workforce survey. *Special Series*.
- Miafodzyeva, S., & Brandt, N. (2013). Recycling behaviour among householders: synthesizing determinants via a meta-analysis. *Waste and Biomass Valorization*, 4(2), 221-235.
- Miliute-Plepiene, J., Hage, O., Plepys, A., & Reipas, A. (2016). What motivates households recycling behaviour in recycling schemes of different maturity? Lessons from Lithuania and Sweden. *Resources, Conservation and Recycling*, 113, 40-52.
- Morales Jacob, J.F.E. (2004). Aplicación e interpretación de técnicas de reducción de datos según escalamiento óptimo. Análisis de correspondencia múltiple u análisis de componentes principales categórico. Graduated Thesis, Universidad de Chile.
- Newton, R. J., McLellan, S. L., Dila, D. K., Vineis, J. H., Morrison, H. G., Eren, A. M., & Sogin, M. L. (2015). Sewage reflects the microbiomes of human populations. *MBio*, 6(2).
- Pampel, F. C., Krueger, P. M., & Denney, J. T. (2010). Socioeconomic disparities in health behaviors. *Annual review of sociology*, 36, 349-370.
- Pickett, K. E., & Wilkinson, R. G. (2015). Income inequality and health: a causal review. *Social science & medicine*, 128, 316-326.

- Raupach-Rosin, H., Rübsamen, N., Schütte, G., Raschpichler, G., Chaw, P. S., & Mikolajczyk, R. (2019). Knowledge on Antibiotic Use, Self-Reported Adherence to Antibiotic Intake, and Knowledge on Multi-Drug Resistant Pathogens-Results of a Population-Based Survey in Lower Saxony, Germany. *Frontiers in microbiology*, 10, 776.
- Rousis, N. I., Zuccato, E., & Castiglioni, S. (2017). Wastewater-based epidemiology to assess human exposure to pyrethroid pesticides. *Environment international*, 99, 213-220.
- Ryu, Y., Gracia-Lor, E., Bade, R., Baz-Lomba, J. A., Bramness, J. G., Castiglioni, S., ... & Thomas, K. V. (2016). Increased levels of the oxidative stress biomarker 8-iso-prostaglandin F 2 α in wastewater associated with tobacco use. *Scientific reports*, 6(1), 1-7.
- Saphores, J. D. M., & Nixon, H. (2014). How effective are current household recycling policies? Results from a national survey of US households. *Resources, Conservation and Recycling*, 92, 1-10.
- Schnittker, J., & Bacak, V. (2014). The increasing predictive validity of self-rated health. *PLoS one*, 9(1), e84933.
- Schröder, H., Fitó, M., Estruch, R., Martínez-González, M. A., Corella, D., Salas-Salvadó, J., ... & Covas, M. I. (2011). A short screener is valid for assessing Mediterranean diet adherence among older Spanish men and women. *The Journal of nutrition*, 141(6), 1140-1145.
- Sharrocks, K., Spicer, J., Camidge, D. R., & Papa, S. (2014). The impact of socioeconomic status on access to cancer clinical trials. *British journal of cancer*, 111(9), 1684.
- Sidique, S. F., Lupi, F., & Joshi, S. V. (2010). The effects of behavior and attitudes on drop-off recycling activities. *Resources, conservation and recycling*, 54(3), 163-170.
- Stefler, D., Malyutina, S., Kubinova, R., Pajak, A., Peasey, A., Pikhart, H., ... & Bobak, M. (2017). Mediterranean diet score and total and cardiovascular mortality in Eastern Europe: the HAPIEE study. *European journal of nutrition*, 56(1), 421-429.
- Stirratt, M. J., Dunbar-Jacob, J., Crane, H. M., Simoni, J. M., Czajkowski, S., Hilliard, M. E., ... & Nilsen, W. J. (2015). Self-report measures of medication adherence behavior: recommendations on optimal use. *Translational behavioral medicine*, 5(4), 470-482.
- Sundquist, J., Malmström, M., Johansson, S. E. (1999). Cardiovascular risk factors and the neighbourhood environment: a multilevel analysis. *International journal of epidemiology*, 28(5), 841-845.
- Swinburn, B. A., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011). The global obesity pandemic: shaped by global drivers and local environments. *The Lancet*, 378(9793), 804-814.
- The IPAQ Group (2005). Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire. Available at: <http://www.ipaq.ki.se>.
- Templin, T., Cravo Oliveira Hashiguchi, T., Thomson, B., Dieleman, J., & Bendavid, E. (2019). The overweight and obesity transition from the wealthy to the poor in low-and middle-income countries: A survey of household data from 103 countries. *PLoS medicine*, 16(11), e1002968.
- van Nuijs, A. L., Covaci, A., Beyers, H., Bervoets, L., Blust, R., Verpooten, G., ... & Jorens, P. G. (2015). Do concentrations of pharmaceuticals in sewage reflect prescription figures?. *Environmental Science and Pollution Research*, 22(12), 9110-9118.
- Vinas, B. R., Barba, L. R., Ngo, J., & Majem, L. S. (2013). Validación en población catalana del cuestionario internacional de actividad física. *Gaceta Sanitaria*, 27(3), 254-257.
- Vink, N. M., Klungel, O. H., Stolk, R. P., & Denig, P. (2009). Comparison of various measures for assessing medication refill adherence using prescription data. *Pharmacoepidemiology and drug safety*, 18(2), 159-165.
- Visser, P. S., Krosnick, J. A., & Lavrakas, P. J. (2000). Survey research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 223-252). New York, NY, US: Cambridge University Press.

Warren, J. R. (2009). Socioeconomic status and health across the life course: A test of the social causation and health selection hypotheses. *Social forces*, 87(4), 2125-2153.

WHO (World Health Organization). (2000) Communicable Diseases Cluster. (2000). Overcoming antimicrobial resistance. World Health Organization. <https://apps.who.int/iris/handle/10665/66672>.

WHO (World Health Organization). (2001). AUDIT: the Alcohol Use Disorders Identification Test : guidelines for use in primary health care / Thomas F. Babor ... [et al.], 2nd ed. World Health Organization. Retrieved from: <https://apps.who.int/iris/handle/10665/67205>.

WHO (World Health Organization). (2019). Global status report on alcohol and health 2018. World Health Organization.

Wilkinson, R., Marmot, M. (eds): *Social determinants of health: Solid facts*. 2nd edition. World Health Organization Europe. WHO Library Cataloguing in Publication Data. 2003. ISBN 978 92 890 1401 4.

Wilkinson, R. G., & Pickett, K. E. (2006). Income inequality and population health: a review and explanation of the evidence. *Social science & medicine*, 62(7), 1768-1784.

Yang, J., Farioli, A., Korre, M., & Kales, S. N. (2014). Modified Mediterranean diet score and cardiovascular risk in a North American working population. *PLoS One*, 9(2), e87539.

Yeaw, J., Benner, J. S., Walt, J. G., Sian, S., & Smith, D. B. (2009). Comparing adherence and persistence across 6 chronic medication classes. *Journal of Managed Care Pharmacy*, 15(9), 728-740.

ANNEX 1 – SURVEY QUESTIONNAIRE

ORIGINAL LANGUAGE (CATALAN)



LIFESTYLE HABITS SURVEY BARCELONA 2021

SCOREwater D4.8

Smart City Observatories implement REsilient Water Management

Número de qüestionari	
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Mètode de recollida d'informació	
Telèfon	
Hora d'inici	
Hora d'acabament	
Durada	
Data de realització	
Enquestador/a	
Supervisió	

WWW.SCOREWATER.EU



BON DIA/BONA TARDA, EM DIC [NOM] DE L'EMPRESA GESOP I TRUCO DE PART DE L'INSTITUT D'ESTUDIS METROPOLITANS. ESTEM REALITZANT UN ESTUDI EUROPEU SOBRE L'ESTAT DE SALUT I ELS HÀBITS DE VIDA DE LA CIUTADANIA. PODRIA CONTESTAR-ME UNES PREGUNTES?

[ENQUESTADOR/A, SI DEMANA MÉS INFORMACIÓ: Pot trobar més informació a la web del projecte europeu SCOREwater:]

L'INFORMO QUE L'ENTREVISTÀ PODRÀ SER GRAVADA PER VERIFICAR LA QUALITAT DE LA INFORMACIÓ. L'ENQUESTA ÉS CONFIDENCIAL I ANÒNIMA. LA INFORMACIÓ NOMÉS ES TRACTARÀ DE FORMA AGREGADA I EXCLUSIVAMENT PER AQUEST ESTUDI. EL RESPONSABLE DEL TRACTAMENT ÉS L'IERMB. PER A MÉS INFORMACIÓ SOBRE EL TRACTAMENT DE DADES I PER A EXERCIR ELS SEUS DRETS POT CONSULTAR LA POLÍTICA DE PRIVACITAT DEL PORTAL WEB DE L'IERMB. GRÀCIES PER LA SEVA COL·LABORACIÓ.

MÒDUL 0. SELECCIÓ DE LA LLAR A ENTREVISTAR

S1. VOSTÈ VIU A BARCELONA? [Espontània. Només una resposta]

- 01 Sí → S2
02 No → FINALITZA

S2. Em pot donar la seva adreça per comprovar el barri on viu? Només necessitem el carrer i el número de l'edifici. (Si no vol donar el número, seria suficient amb la cruïlla de carrers.)

Adreça: _____ Núm.: ____

Cruïlla de carrers: _____

[INSTRUCCIÓ: Codificació de les coordenades X,Y.]

S3. Em pot dir el número de persones que viuen habitualment en aquest habitatge, inclòs/a vostè?

Persones que hi viuen:

99 No ho vol contestar [NO LLEGIR]

[Si només 1 membre, salta a S5. Si no contesta, salta a S5.]

S4. Començant per la persona més jove, em pot dir l'edat i el sexe de totes les persones que viuen en aquest habitatge?

	Edat <input type="text"/>	Sexe
	3 No ho sap [NO LLEGIR]	03 Home
	4 No ho vol contestar [NO LLEGIR]	06 Dona
Membre 1 (Enquestat/da)	Informació S6	Informació S5
Membre 2		
Membre 3		
...		





S5. Estic parlant amb un home o una dona?

- 01 Home
- 06 Dona

S6. Em pot dir el seu any de naixement?

Any de naixement:

9998 No ho sap [NO LLEGIR]

9999 No ho vol contestar [NO LLEGIR]

MÒDUL 1. ESTAT DE SALUT I FACTORS DE RISC

P.1. En general, vostè diria que la seva salut és: [SRH1]

[LLEGIR SEMPRE]

- 01 Excel·lent
- 02 Molt bona
- 03 Bona
- 04 Regular
- 05 Dolenta
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

Ara li faré unes preguntes sobre activitat física els DARRERS 7 DIES. Pensi en TOTES les activitats que fa com a part de la feina, a casa, per desplaçar-se d'un lloc a un altre i les que fa també en el temps de lleure, exercici o esport.

En primer lloc, pensi en les activitats físiques intenses, que són les que requereixen d'un gran esforç físic i li fan respirar molt més fort del normal.

P.2. Durant els ÚLTIMS 7 DIES, quants dies ha realitzat alguna activitat física INTENSA com aixecar objectes pesants, cavar, córrer, tennis, bàsquet, futbol, esquaix, aeròbic o pedalejar a velocitat ràpida en bicicleta (ciclisme), durant ALMENYS 10 MINUTS SEGUITS? [IPAQ1]

Nombre de dies durant els darrers 7 dies:

Si és 0 → Salta a P.4

98 No ho sap → Salta a P.4

99 No ho vol contestar → Salta a P.4

P.3. Quant temps va dedicar a fer activitats físiques INTENSES en un d'aquests dies? [IPAQ2]

Hores i minuts al dia: hrs (0:24) mins (0:59)

98 No sap

99 No ho vol contestar

[EXEMPLE: Si va practicar 20 minuts, cal anotar 0 hores i 20 minuts.]





Ara pensi en totes les activitats físiques d'intensitat moderada, que són les que requereixen d'un esforç físic moderat que li fa respirar una mica més fort del normal.

P.4. Durant els DARRERS 7 DIES, quants dies ha realitzat alguna activitat física MODERADA com portar pesos lleugers, pedalejar a velocitat regular en bicicleta, nedar, jugar a voleibol o a dobles de tennis, ioga o pilates, durant ALMENYS 10 MINUTS SEGUITS? No s'inclou caminar. [IPAQ3]

Nombre de dies durant els darrers 7 dies:

Si és 0 → Salta a P.9

98 No ho sap → Salta a P.9

99 No ho vol contestar → Salta a P.9

P.5. Quant temps va dedicar a fer activitats físiques MODERADES en un d'aquests dies? [IPAQ4]

Hores i minuts al dia: hrs (0:24) mins (0:59)

98 No ho sap

99 No ho vol contestar

[EXEMPLE: Si va practicar 20 minuts, cal anotar 0 hores i 20 minuts.]

Canviem de tema.

P.9. Quina alçada fa vostè? (sense sabates)

Alçada en centímetres: cm (230)

98 No ho sap

99 No ho vol contestar

[INSTRUCCIÓ: Si indica una xifra en metres i centímetres, cal anotar la xifra indicada en centímetres. Per exemple: si és 1 metre i mig, cal anotar 150 cm. Si indica només metres, per exemple: 2 metres, s'annotaria 200 cm.]

P.10. Quant pesa vostè? (en quilograms)

Pes: kg

998 No ho sap

999 No ho vol contestar

[INSTRUCCIÓ: Si indica una xifra en quilos i grams, cal anotar els decimals. Per exemple: si és 60 quilos i mig, cal anotar 60,5 kg. Si indica només quilos, per exemple: 72 quilos, s'annotaria 72 en el camp de kg.]

P.11. De les situacions següents, quina descriu millor el seu comportament respecte al tabac? (inclou cigarretes, cigars i pipes)

[LLEGIR SEMPRE]

01 Actualment no fuma gens. No ha fumat mai.

02 Actualment no fuma gens. És ex-fumador.

03 Actualment fuma ocasionalment (menys d'1 cop al dia).

04 Actualment fuma cada dia.

98 No ho sap [NO LLEGIR]

99 No ho vol contestar [NO LLEGIR]



Ara li faré algunes preguntes sobre el seu consum de begudes alcohòliques durant l'ÚLTIM ANY.

- P.12_NA. Amb quina freqüència consumeix alguna beguda alcohòlica? [\[Llegir les opcions de resposta.\]](#)

[\[LLEGIR SEMPRE\]](#)

- 01 Mai → [Salta a MÒDUL 2 i no fa P20B](#)
- 02 Una o menys vegades al mes
- 03 De 2 a 4 vegades al mes
- 04 De 2 a 3 vegades a la setmana
- 05 4 o més vegades a la setmana
- 98 No ho sap [\[NO LLEGIR\]](#)
- 99 No ho vol contestar [\[NO LLEGIR\]](#)

P.12_NB. Quantes consumicions de begudes alcohòliques sol realitzar en un dia de consum normal, en els dies feiners (DE DILLUNS A DIJOURS)? [\[Resposta espontània.\]](#)

[\[NO LLEGIR\]](#)

- 01 Cap
- 02 1 ò 2
- 03 3 ò 4
- 04 5 ò 6
- 05 7, 8 ò 9
- 06 10 ò més
- 98 No ho sap [\[NO LLEGIR\]](#)
- 99 No ho vol contestar [\[NO LLEGIR\]](#)

P.12_NC. Quantes consumicions de begudes alcohòliques sol realitzar en un dia de consum normal, en cap de setmana (DIVENDRES, DISSABTE I DIUMENGE)? [\[Resposta espontània.\]](#)

[\[NO LLEGIR\]](#)

- 01 Cap
- 02 1 ò 2
- 03 3 ò 4
- 04 5 ò 6
- 05 7, 8 ò 9
- 06 10 ò més
- 98 No ho sap [\[NO LLEGIR\]](#)
- 99 No ho vol contestar [\[NO LLEGIR\]](#)

P.12_ND Amb quina freqüència pren 6 o més begudes alcohòliques en un sol dia?

[\[LLEGIR SEMPRE\]](#)

- 01 Mai
- 02 Menys d'una vegada al mes
- 03 Mensualment
- 04 Setmanalment
- 05 Diàriament o gairebé diàriament
- 98 No ho sap [\[NO LLEGIR\]](#)
- 99 No ho vol contestar [\[NO LLEGIR\]](#)

MÒDUL 2. ALIMENTACIÓ

Parlem ara de la seva alimentació habitual.

P.14. Utilitza l'oli d'oliva com a principal greix per cuinar? [PREDI1]

[NO LLEGIR]

- 01 Sí
- 02 No
- 98 No ho sap
- 99 No ho vol contestar

P.15. Quant oli d'oliva consumeix en total AL DIA? Incloent-hi el que fa servir per fregir, en els àpats fora de casa, a les amanides, etc. [PREDI2]

[LLEGIR SEMPRE]

- 01 Cap cullerada
- 02 3 cullerades soperes d'oli diàries o menys
- 03 4 cullerades soperes d'oli diàries o més
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.16. Quantes racions de verdura o hortalisses consumeix AL DIA? Una ració equival a un plat i les guarnicions i acompanyaments equivalen a mitja ració. [PREDI3]

Racions diàries:

- 98 No ho sap
- 99 No ho vol contestar

P.17. Quantes racions de fruita (sencera, trossejada o triturada, no en forma de suc) consumeix AL DIA? [PREDI4]

[LLEGIR SI CAL: Una ració equival a una peça estàndard, és a dir, una poma, una pera, un parell de mandarines, un plàtan, un parell de talls de meló, un bol de maduixes, etc.]

Racions diàries:

- 98 No ho sap
- 99 No ho vol contestar

P.18. Quantes racions de CARNS VERMELLES, hamburgueses, salsitxes o embotits consumeix AL DIA? L'embotit dels entrepans compta com a mitja ració. [PREDI5]

- [ACLARIMENT (llegir si cal): S'entén per carn vermella tot tipus de carn, excepte les aus (que no siguin de caça) i el conill.]

[LLEGIR SEMPRE]

- 01 Cap ració
- 02 Menys d'1 ració cada dia
- 03 1 ració o més cada dia
- 04 No consumeix carn, ni vermella ni blanca → **FILTRE VEGETARIANISME**
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.19. Quantes racions de mantega, margarina o nata consumeix AL DIA? [PREDI6]

[LLEGIR SI CAL: Una ració equival a 12 grams, la pastilla o quadradet de mantega.]

[LLEGIR SEMPRE]

- 01 Cap ració
- 02 Menys d'1 ració cada dia
- 03 1 ració o més cada dia
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.20. Quantes begudes ensucrades (refrescs, coles, tòniques, biter) consumeix AL DIA? [PREDI7]

[LLEGIR SI CAL: Una beguda equival a un got o a una llauna.]

Racions diàries:

- 98 No ho sap
- 99 No ho vol contestar

P.20B. [Preguntar si P.12_NA#1] Si beu vi (o begudes fermentades del raïm com el cava, lambrusco, etc.), quant en beu EN UNA SETMANA? [PREDI8]

[LLEGIR SEMPRE]

- 01 No beu vi
- 02 6 gots/copes o menys
- 03 7 gots/copes a la setmana o més
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.21. Quantes racions de llegums (cigrans, llenties, pèsols, fesols, faves, soja, etc.) consumeix A LA SETMANA? [LLEGIR SI CAL: Una ració equival a un plat (uns 150 grams).] [PREDI9]

[LLEGIR SEMPRE]

- 01 Cap ració
- 02 2 racions o menys a la setmana
- 03 3 racions o més a la setmana
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.22. Quantes racions de peix i/o marisc consumeix A LA SETMANA? [PREDI10]

[(LLEGIR SI CAL: Una ració de peix equival a 100-150 grams, i una ració de marisc a 4-5 peces o 200 grams.)]

[ENTREVISTADOR/A: S'inclouen les llaunes de peix (tonyina, sardines, etc.) i les escopinyes i musclos dels vermutts.]

[LLEGIR SEMPRE]

- 01 Cap ració
- 02 2 racions o menys a la setmana
- 03 3 racions o més a la setmana
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.23. Durant els DARRERS 7 DIES, quants cafès AMB CAFEÏNA ha pres?

Cafès amb cafeïna (darrers 7 dies):

- 98 No ho sap
- 99 No ho vol contestar



[FILTRE VEGETARIANISME. Desplegar si P.18=04 (no consumeix carn).]

P.24. [INSTRUCCIÓ: Només si P.18=04.] És vostè vegetarià/na?

[NO LLEGIR]

- 01 Sí
- 02 No → Salta a MÒDUL 3
- 98 No ho sap → Salta a MÒDUL 3
- 99 No ho vol contestar → Salta a MÒDUL 3

P.25. [INSTRUCCIÓ: Només si P.24=01.] Quin tipus de vegetarià és vostè?

[LLEGIR SEMPRE]

- 01 Lacto (consumeix productes lactis però no ous)
- 02 Ovo (consumeix ous però no productes lactis)
- 03 Lacto-ovo (consumeix productes lactis i ous)
- 04 Vegà (no consumeix productes d'origen animal)
- 05 Semi (consumeix aus de corral o peix ocasionalment, però no carn vermella)
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.26. [INSTRUCCIÓ: Només si P.24=01 i P.25≠98/99.] Quin ha estat el motiu principal per convertir-se en vegetarià? [Espontània. Només una resposta.]

[NO LLEGIR]

- 01 Per a una millor salut / nutrició
- 02 Ètica animal
- 03 Raons religioses
- 04 Raons ecològiques / ambientals
- 05 Control de pes
- 06 Els meus amics o familiars són vegetarians
- 07 No m'agrada la carn
- 97 Altres. *Especifiqui'l:* _____
- 98 No ho sap
- 99 No ho vol contestar



MÒDUL 3. ADHESIÓ AL TRACTAMENT MÈDIC

P.28. Durant el darrer any ha rebut TRACTAMENT MÈDIC (AMB PRESCRIPCIÓ/RECEPTA MÈDICA) amb algun dels següents tipus de fàrmacs? [Llegir les opcions de resposta.]

	Mai	1 cop aquest any	2 cops aquest any	3 o més cops aquest any	Tractament de llarga durada (+15 dies)	NS/NC
01 Analgèsics per calmar el dolor (aspirina, paracetamol, Nolotil, antiinflamatoris)	1	2	3	4	5	98/99
02 Antibiòtics o penicil·lina	1	2	3	4	5	98/99
03 Antihipertensius o hipotensors, que abaixen la pressió arterial	1	2	3	4	5	98/99
04 Sedants, encara que siguin d'efecte fluix (tranquil·litzants, relaxants musculars, anti-depressius, somnífers)	1	2	3	4	5	98/99

P.30. [INSTRUCCIÓ: Preguntar si P.28.02≠1/98/99 (antibiòtics prescrits durant l'últim any).] Pensant en l'última vegada que se li va receptar un antibiòtic, va seguir i acabar el tractament segons les instruccions prescrites?

[NO LLEGIR]

- 01 Sí, ha seguit i ha acabat el tractament segons prescripció → Salta a P.32
- 02 No, no ha seguit o no ha finalitzat el tractament segons prescripció
- 98 No ho sap / No ho recorda [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.31. [INSTRUCCIÓ: Preguntar si P.30=02 (antibiòtics prescrits durant l'últim any).] Si no es va prendre tots els dies indicats, per què va interrompre el tractament?

[LLEGIR SI CAL]

- 01 Em vaig oblidar / No m'hi vaig molestar
- 02 Vaig decidir saltar-me una dosi
- 03 Em vaig sentir millor
- 04 Efectes secundaris / Els antibiòtics em van fer sentir malament
- 05 Vaig perdre l'antibiòtic
- 97 Altres. *Especifiqui'ls:* _____
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.32. [INSTRUCCIÓ: A tothom.] Ha conservat mai algun antibiòtic que li hagi sobrat?

[NO LLEGIR]

- 01 Sí
- 02 No
- 98 No ho sap / No ho recorda
- 99 No ho vol contestar

P.33. [INSTRUCCIÓ: A tothom.] Vostè ha pres mai antibiòtics sense prescripció mèdica? [Espontània. Només una resposta.]

[NO LLEGIR]

- 01 Sí
- 02 No
- 98 No ho sap
- 99 No ho vol contestar

P.34. [INSTRUCCIÓ: A tothom.] Durant els DARRERS 7 DIES, ha pres algun analgèsic (aspirina, paracetamol, Nolotil, antiinflamatoris) pel dolor sense que li hagin prescrit?



[LLEGIR SEMPRE]

- 01 No
- 02 Un cop
- 03 Dos o tres cops
- 04 Quatre cops o més
- 05 Cada dia
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.34B. [INSTRUCCIÓ: A tothom.] Durant els DARRERS 7 DIES, ha pres algun sedants, encara que siguin d'efecte fluix (tranquil·litzants, relaxants musculars, anti-depressius, somnífers), sense que li hagin prescrit?

[ACLARIMENT: Són sedants medicaments com Valium, Orfidal, Lexatín, Cefalexín, Venlafaxina, Zolpidem, Alprazolam, Lorazepam, Diazepam, Clonazepam, Bromazepam, Lormetazepam o Estazolam.]

[LLEGIR SEMPRE]

- 01 No
- 02 Un cop
- 03 Dos o tres cops
- 04 Quatre cops o més
- 05 Cada dia
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

[INSTRUCCIÓ ENTREVISTADOR/A: Recollir en observacions si diu que pren tranquil·litzants naturals, com valeriana, melatonina, triptòfan, etc.]

P.35. [INSTRUCCIÓ: A tothom.] Ha patit COVID-19?

[NO LLEGIR]

- 01 Sí
- 02 No
- 98 No ho sap
- 99 No ho vol contestar



MÒDUL 4. COMPORTAMENT DE GESTIÓ DE RESIDUS

Canviem de tema.

P.37. Amb quina freqüència usa tovallolletes humides d'un sol ús?

[LLEGIR SEMPRE]

- 01 Cada dia
- 02 Unes quantes vegades a la setmana
- 03 Un cop a la setmana aproximadament
- 04 Unes quantes vegades al mes
- 05 Un cop al mes aproximadament
- 06 Menys d'un cop al mes
- 07 No n'usa mai → Salta a P.39
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

P.38. [INSTRUCCIÓ: Només si P.37≠07/98/99.] Per què ha usat tovallolletes humides d'un sol ús EL DARRER ANY principalment? [Espontània. Només una resposta (motiu principal).]

[NO LLEGIR]

- 01 Neteja de la llar
- 02 Canvis de bolquer
- 03 Per viatjar
- 04 Neteja de la cara/maquillatge
- 05 Com a substitut o complement del paper de vàter
- 06 Cura personal
- 07 Amb els nadons i/o nens
- 08 Càmping i/o festivals
- 09 A l'oficina
- 10 Pels menjars
- 11 Per desinfectar superfícies
- 12 Amb les mascotes
- 13 Neteja de sabates i bosses
- 97 Altres. *Especifiqui's:* _____
- 98 No ho sap
- 99 No ho vol contestar

P.39. Durant els **DARRERS 7 DIES**, amb quina freqüència vostè va llençar els residus higiènics següents al vàter per desfer-se'n? [\[Llegir les opcions de resposta.\]](#)

	0 No n'utilitzo	1 Mai	2 De tant en tant	3 La meitat de les vegades	4 Sovint	5 Sempre/ cada vegada	NS/NC
• [INSTRUCCIÓ: Només a dones.] 01 Productes anomenats d'"higiene femenina" (com compreses i tampons)	0	1	2	3	4	5	98/99
• [INSTRUCCIÓ: Només si P.37≠07/98/99.] 02 Tovallotes humides d'un sol ús biodegradables o no	0	1	2	3	4	5	98/99
03 Bastonets per a les orelles	0	1	2	3	4	5	98/99
04 Cotonets, tovallotes desmaquillats o gasses	0	1	2	3	4	5	98/99
05 Medicaments caducats	0	1	2	3	4	5	98/99

P.40. Durant els **DARRERS 7 DIES**, amb quina freqüència vostè va llençar l'oli de cuina usat o restes de menjar (sopes o altres restes amb líquids, oli sobrant de llaunes de tonyina, farines) a l'aigüera o al vàter? [\[Llegir les opcions de resposta.\]](#)

	0 No n'utilitzo	1 Mai	2 De tant en tant	3 La meitat de les vegades	4 Sovint	5 Sempre/ cada vegada	NS/NC
01 Olis i greixos (oli de cuina usat o sobrant de llaunes de tonyina, etc.)	0	1	2	3	4	5	98/99
02 Restes de menjar (sopes o altres restes amb líquids, engrunes de pa, farines, etc.)	0	1	2	3	4	5	98/99

MÒDUL 5. VARIABLES SOCIODEMOGRÀFIQUES I DE SEGMENTACIÓ

Acabarem l'enquesta amb unes preguntes de classificació.

P.42. Em pot dir quin és el seu nivell màxim d'estudis acabats? [\[Resposta espontània.\]](#)

[\[NO LLEGIR\]](#)

- 01 No ha acabat els estudis obligatoris
- 02 Obligatori (primària, EGB, ESO)
- 03 Secundaris generals (batxillerat, PREU, BUP, COU)
- 04 Secundaris professionals (comerç, FP1, FP2, mòduls, grau mitjà/superior)
- 05 Universitaris (graus, diplomatura, llicenciatura, enginyeria tècnica, enginyeria, màster, postgrau, doctorat)
- 97 Altres estudis reglats. *Especifiqui'l:* _____
- 98 No ho sap
- 99 No ho vol contestar

P.43. Quina és la seva situació principal a nivell laboral?

[\[INSTRUCCIÓ: Si és estudiant, confirmeu que no és aturat/da o mestressa de casa que estudia algun curs de formació o prepara oposicions. Si treballa i estudia, pregunteu a què dedica més temps. Si és pensionista i treballa, anoteu pensionista.\]](#)

[\[NO LLEGIR\]](#)

- 01 Treballa
- 02 No treballa però busca feina
- 03 Dedicació a les tasques de la llar (no remunerades) i no treballa a part
- 04 Prejubilat/ada, jubilat/ada, incapacitat/ada permanent
- 05 Estudiant (alumne/a) o pràctiques sense remunerar
- 06 No treballa, ni estudia i no busca feina
- 97 Altres. *Especifiqui-les:* _____
- 98 No ho sap → [Salta a P.47](#)
- 99 No ho vol contestar → [Salta a P.47](#)

P.44. A la seva feina principal, quina és (o era) l'ocupació, la professió o ofici que exerceix (o exercia)? [\[Pregunta oberta. Resposta espontània.\]](#)

Ocupació, professió o ofici: _____

- 00 No ha treballat mai → [Salta a P.47](#)

[\[FILTRE: Només per a les persones ocupades o que han treballat alguna vegada.\]](#)

P.45. Quina és (o era) l'activitat de l'establiment on treballa (o treballava)? [\[Pregunta oberta. Resposta espontània.\]](#)

Sector d'activitat: _____

P.46. Quina és (o era) la seva situació professional en la seva feina principal?

[\[LLEGIR SI CAL.\]](#)

- 01 Empresari/ària amb assalariats
- 02 Empresari/ària sense assalariats, treballador/a independent o professional liberal
- 03 Assalariat/ada
- 04 Ajuda a l'empresa o negoci familiar
- 97 Una altra situació professional. *Especifiqui-la:* _____
- 98 No ho sap
- 99 No ho vol contestar



P.47. Aproximadament quin és el volum d'ingressos MENSUALS NETS de la seva llar? (Tots els membres que contribueixin als ingressos de la llar.)

[INSTRUCCIÓ: LLEGIR OPCIONS. Només una resposta.]

- 01 Menys de 600 €
- 02 De 601 a 1.200 €
- 03 De 1.201 a 1.800 €
- 04 De 1.801 a 2.400 €
- 05 De 2.401 a 3.000 €
- 06 De 3.001 a 3.500 €
- 07 De 3.501 a 4.000 €
- 08 De 4.001 a 4.500 €
- 09 De 4.501 a 5.000 €
- 10 Més de 5.000 €
- 98 No ho sap [NO LLEGIR]
- 99 No ho vol contestar [NO LLEGIR]

[CONTROL: NS/NC desplegar ACLARIMENT: Les dades que li demanem s'usaran únicament a nivell estadístic.]

EN NOM DE L'IERMB, MOLTES GRÀCIES PER LA SEVA COL·LABORACIÓ. SI HO DESITJA POT FER EL SEGUIMENT DE LA RECERCA AL WEB OFICIAL DEL PROJECTE EUROPEU SCOREWATER, CAS D'ESTUDI BARCELONA (www.scorewater.eu).

Observacions dels enquestadors: _____



ANNEX 2 – STOCKTAKING

A final Annex of stocktaking was included in all Deliverables of SCOREwater produced after the first half-year of the project. It provides an easy follow-up of how the work leading up to the Deliverable has addressed and contributed to four important project aspects:

1. Strategic Objectives
2. Project KPI
3. Ethical aspects
4. Risk management

STRATEGIC OBJECTIVES

Table 32 lists those strategic objectives of SCOREwater that are relevant for this Deliverable and gives a brief explanation on the specific contribution of this Deliverable.

Table 32. Stocktaking on Deliverable’s contribution to reaching the SCOREwater strategic objectives.

Project goal	Contribution by this Deliverable
<p>SO4 Demonstrate benefits of smart water management for increased water-system resilience against climate change and urbanisation by applying the SCOREwater approach in 3 high-profile, large-scale, cross-cutting innovation demonstrators across Europe. (SDG 3, 6, 11, 13, 14). (Digital Water Actions SW.1; AW.1-3)</p>	<p>Contributing to initiate a new domain “sewage sociology” mining biomarkers of community-wide lifestyle habits from sewage (indirectly contrasting self-reported information with real-time data, namely wastewater samples).</p> <p>Providing an innovative service to design health and environmental awareness campaigns based on sewage sensing and self-reported life-style habits.</p> <p>Contributing to the prediction of local pollutant levels and early warning of sewage clogging using sewer sensing (indirectly contrasting self-reported information with real-time data).</p> <p>Demonstrating the effectiveness of health surveillance through wastewater (e.g., quantification of SARS-CoV-2 in wastewater). (Indirectly contrasting self-reported information with real-time data).</p>
<p>SO5 Identify and mitigate key barriers to implementation of smart, resilient water management at city trans-European level by: i) providing best-practice on social and organisational enablers, ii) apply novel smart metering and advanced control procedures. (SDG 3, 6, 9 11, 12, 13). (Digital Water Actions I&S.1-2; SW.1, 4-6)</p>	<p>In what regards to identifying behavioural barriers and mitigation options to: (1) prevent sewer disturbances (odour, fibrous and grease blocking), (2) promote healthier dietary habits, and (3) reduce the OTC consumption of antibiotics; namely the goals of the Barcelona demonstration case for resilient sewer systems using “sewer sociology” (indirectly by providing insights on people’s behaviour and motivations to shift habits).</p>

Project goal	Contribution by this Deliverable
<p>SO6 Increase citizen involvement and engagement in the transition to a water-smart, resilient society by increasing the public perception of the value of water and public engagement and commitment. (SDG 3, 6, 12, 13). (Digital Water Actions AW.1-3)</p>	<p>The number of involved and engaged citizens was increased by publicizing and performing a total of 1,004 interviews to citizens living in three areas of different SES in Barcelona between June 21 - July 14, 2021. The questionnaire invited them to reflect on the health and HWM topics relevant to the Barcelona case.</p>

PROJECT KPI

Table 33 lists the project KPI that are relevant for this Deliverable and gives a brief explanation on the specific contribution of this Deliverable.

Table 33. Stocktaking on Deliverable’s contribution to SCOREwater project KPI’s.

Project KPI	Contribution by this deliverable
<p>KPI 6</p>	<p>In Barcelona, to reduce the release of wet wipes and discharge of oils and greases and antibiotics to the sewer systems (indirectly by providing insights to improve the design of awareness-raising campaigns and target population). However, the scope of KPI 6 is much broader and includes the effects and synergies among all the actions foreseen in task 4.2 and the dissemination in schools of a serious game (WP7).</p>
<p>KPI 11</p>	<p>Regarding the identification of behavioural barriers and mitigation options to: (1) prevent sewer disturbances (odour, fibrous and grease blocking), (2) promote healthier dietary habits, and (3) reduce the OTC consumption of antibiotics; namely the goals of the Barcelona demonstration case for resilient sewer systems using “sewer sociology”.</p>
<p>KPI 15</p>	<p>The number of involved and engaged citizens was increased by publicizing and performing a total of 1,004 interviews to citizens living in three areas of different SES in Barcelona between June 21 - July 14, 2021.</p>

ETHICAL ASPECTS

Table 34 lists the project’s Ethical aspects and gives a brief explanation on the specific treatment in the work leading up to this Deliverable. Ethical aspects are not relevant for all Deliverables. Table 34 indicates “N/A” for aspects that are irrelevant for this Deliverable.

Table 34. Stocktaking on Deliverable’s treatment of Ethical aspects.

Ethical aspect	Treatment in the work on this Deliverable
<p>Justification of ethics data used in project</p>	<p>This research study based on a survey uses personal data. The study protocol was approved by the ethics committee of the <i>Foundation University Institute for Primary Health Care Research Jordi Gol i Gurina (IDIAPJGol)</i> (CEIm Code: 21/066-P). The variables required to carry out the study were obtained directly from the participants of the CATI/CAPI survey with their consent. Only quantitative data based on telephone/personal interviews and a survey questionnaire were collected. The survey contained personal data such as telephone numbers and home addresses. This was required to perform the quality control of the survey and to validate the information mined from the sewage monitoring sites.</p>
<p>Procedures and criteria for identifying research participants</p>	<p>The LHS-SCOREwater survey is aimed at a representative sample of the population aged ≥ 16 years residing in the pre-selected census tracts ($n = 40$) of three neighbourhoods of different SES in the municipality of Barcelona. The reporting unit are the individuals, who on 2021 January 1st are 16 years of age or older, and who reside in private homes within these 40 census tracts of Barcelona.</p> <p>The operation involved the collection of a minimum of 1,000 interviews in compliance with the quotas established in the sample design (see Section 5). Selection of the person to be interviewed (≥ 16 years) was random based on the self-reported household members and according to representative quotas of sex and age. The survey questionnaire has in the selector the list of household members, which includes the sex and age of each member residing at the dwelling. The status of the sample and the status of the quotas, as well as the supervision carried out, was monitored daily during the survey fieldwork.</p> <p>As a summary of the process:</p> <ul style="list-style-type: none"> • Selection of sample units (dwelling/household): <ul style="list-style-type: none"> ○ Telephone interviews (CATI) to landline and mobile phone numbers. ○ Personal interviews (CAPI) to complete quotas of sex and age. Personal interviews were carried out at the street. ○ Conducting up to 325 CATI/CAPI interviews (minimum) in each sampling area by cross-quotas of sex and age group. ○ Household selection by means of a procedure of random selection of landlines and mobile phones from the list of subscribers in free database directories, such as Infobel, datosOn or DataCentric, and according to the sampling distribution. • Selection of the person to interview: <ul style="list-style-type: none"> ○ Selection of the person in the household through a random procedure based on self-reported household of members of ≥ 16 years residing at the dwelling, and according to representative quotas of sex and age. ○ In calls to mobile phones, the telephone user is interviewed.

		<ul style="list-style-type: none"> ○ Substitutions due to non-contact after up to five calls on different days and time frames or due to a negative by a person of the same sex and age range. <p>Survey information channels: The information telephone 012 of the Government of Catalonia was informed about the implementation of the <i>LIFESTYLE HABITS SURVEY BARCELONA 2021 – SCOREwater</i> and its main characteristics, in order to emphasize the officiality of the survey and minimize mistrust and to answer any doubts. The survey information was also publicised on the IERMB website. In addition, the outsourced fieldwork company made available to the interviewees a free 900 telephone line (with an answering machine 24 hours, 7 days per week, responding to line overloads) to answer doubts regarding the survey. The company had the obligation to answer the calls, collect the contact information of the person (name and surname, telephone number, age, address of residence), and call the person when available to be interviewed (always within the schedule established, namely from 9:30 to 22:00, Monday to Saturday). The phone line was active during the entire survey period.</p>
Informed consent procedures	consent	<p>In reference to the content of the data protection section for the participants in the telephone/personal interviews, the participants will be informed of the following by the interviewee:</p> <p>ORIGINAL LANGUAGE (CATALAN)</p> <p>BON DIA/BONA TARDA, EM DIC [NOM] DE L'EMPRESA [.....] I TRUCO DE PART DE L'INSTITUT D'ESTUDIS METROPOLITANS DE BARCELONA. ESTEM REALITZANT UN ESTUDI EUROPEU SOBRE L'ESTAT DE SALUT I ELS HÀBITS DE VIDA DE LA CIUTADANIA. PODRIA CONTESTAR-ME UNES PREGUNTES?</p> <p>[ENQUESTADOR/A, SI DEMANA MÉS INFORMACIÓ: Pot trobar més informació a la web del projecte europeu SCOREwater.]</p> <p>L'INFORMO QUE L'ENTREVISTA PODRÀ SER GRAVADA PER VERIFICAR LA QUALITAT DE LA INFORMACIÓ. L'ENQUESTA ÉS CONFIDENCIAL I ANÒNIMA. LA INFORMACIÓ NOMÉS ES TRACTARÀ DE FORMA AGREGADA I EXCLUSIVAMENT PER AQUEST ESTUDI. EL RESPONSABLE DEL TRACTAMENT ÉS L'IERMB. PER A MÉS INFORMACIÓ SOBRE EL TRACTAMENT DE DADES I PER A EXERCIR ELS SEUS DRETS POT CONSULTAR LA POLÍTICA DE PRIVACITAT DEL PORTAL WEB DE L'IERMB. GRÀCIES PER LA SEVA COL·LABORACIÓ.</p>
Informed consent procedure in case of legal guardians	consent	<i>Ídem.</i>
Filing of ethics committee's opinions/approval	ethics	After assessment by the ethics committee the study protocol was approved by the <i>Foundation University Institute for Primary Health Care Research Jordi Gol i Gurina (IDIAPJGol)</i> (CEIm Code: 21/066-P) on April 28, 2021.
Technical and organizational measures taken to safeguard data subjects' rights and freedoms	and	<p>In accordance with Article 35 GDPR (11), the project does not meet the necessary characteristics that require the performance of data protection impact assessment. Data processing which may be a high risk for the rights and freedoms of participants in the research project, e.g., use of AI tools, Big Data technology, biometrics systems, or geolocation would suppress those which may apply.</p> <p>As specified in the research protocol approved by the ECI (CEIm Code: 21/066-P), there will not be international data transfers.</p>

<p>Implemented security measures to prevent unauthorized access to ethics data</p>	<p>As specified in the research protocol approved by the ECI (CEIm Code: 21/066-P), the databases and other files were be stored in one of the file servers installed within the campus of the Autonomous University of Barcelona (UAB), where the IERMB’s offices are located. These servers can only be accessed from within the campus. The specific unit used by the IERMB, and where the data was stored, is a restricted unit that can only be accessed by IERMB workers based on the users and credentials of the UAB S2002 domain (https://www.uab.cat/web/connexio-al-domini-uab-1096478626489.html). The only way to access this server from off campus is via VPN connection and secure UAB credentials. As for the security of the UAB Network, it has a series of security measures that can be obtained at this link: https://www.uab.cat/web/des-del-campus/connexio-a-laxarxa-fixa/configuracio-i-suport-1096480678333.html. In any case, the security measures of the UAB facilities that we used were under review and will be updated shortly. This information is available at the following link: https://csirt.uab.cat/content/pol%C3%ADtica.</p> <p>The data that IERMB will receive from the outsourced fieldwork company, in charge of data security while the fieldwork is taking place, will be copied to our server through the VPN connection. The outsourced fieldwork company is expressly subject in the execution of the service to the General Regulation (EU) of Data Protection (2016/679) and the Organic Law 3/2018 on the protection of personal data and guarantee of digital rights. To the extent that the provision and fulfilment of the contract implies access by outsourced fieldwork company to personal data for which the IERMB is the controller, the outsourced company will be considered the data processor in the terms of article 4.8) and 28 of the GRDP.</p>
<p>Describe anonymization techniques</p>	<p>Personal data from the survey were subject to anonymisation through attribute suppression, concretely of “home address”; telephone numbers were not included in the database. In the contract with the outsourced company, it was specified that the company must completely erase the information collected when requested by IERMB. For its part, after the validation of the transferred data, IERMB obligated itself to remove the fields of the final database that contain the personal information “home address”. This final database was processed statistically to obtain the aggregated results.</p>
<p>Interaction with the SCOREwater Ethics Advisor</p>	<p>The study protocol approved by the ethics committee of the <i>Foundation University Institute for Primary Health Care Research Jordi Gol i Gurina (IDIAPJGol)</i> (CEIm Code: 21/066-P) included the appropriate references to the ethical considerations that apply in accordance with the SCOREwater Grant Agreement (No. 820751). The protocol follows the indications described in the Ethics deliverable D9.2 POPD - Requirement No. 2 and D9.1, available to all project partners via the SCOREwater Sharepoint: Deliverables - submitted to EU.</p>

RISK MANAGEMENT

Table 35 lists the risks, from the project’s risk log, that have been identified as relevant for the work on this Deliverable and gives a brief explanation on the specific treatment in the work leading up to this Deliverable.

Table 35. Stocktaking on Deliverable’s treatment of Risks.

Associated risk	Treatment in the work on this Deliverable
Data comparability WBE study vs. life-style habits survey (study period)	Execution extended to M24 and submission deadline of D4.8 to M30. Ideally, the survey had to be conducted in the middle of the wastewater monitoring period (starting from M17) to ensure that the data obtained on life-style habits were representative of this period. Moreover, sampling points were not decided until M12. We considered these technical criteria a sufficient justification to delay the fieldwork of the survey to M24 and to extend the submission deadline of D4.8 to M30. This was notified in a timely manner to the EC and said extension was obtained.
Data comparability WBE study vs. life-style habits survey (analysis variables)	Analysis variables and indicators were carefully selected to match the class of biomarkers analysed by ICRA in wastewater samples, as well as the variables necessary to satisfactorily assess household waste management (HWM). The questionnaire in its final form consisted of 45 questions structured in several modules covering for: sample descriptives and personal SES, health status and risk factors, diet and vegetarianism, adherence to medical therapy with antibiotics, and HWM, including the use and disposal of wet wipes solid wasted, waste cooking oil, and food scraps. In addition, a question was included asking participants whether they have been tested positive in COVID-19. This last question was included to control the influence of COVID-19 on therapies with analgesics, antibiotics, etc., and to incorporate the latest project developments related to monitoring the spread of the pandemic through wastewater.
Data comparability WBE study vs. life-style habits survey (sample size and budget constraints)	For small populations survey effort is high and this automatically increases the costs of the operation. Mitigation actions included the widening of the sampling areas to the adjacent census tracts with equal SES in two locations (i.e., Sant Gervasi - Galvany and Poblenou). This was done to minimise survey effort and adjust the costs to the budget while maintaining the quality and representativeness of the results.
Low response rate	These difficulties were addressed in two ways: (1) the sampling area was widened when necessary to cover the adjacent census tracts with equal SES (see the previous study developed in D4.6); and (2) a mixed CATI/CAPI interviewing design was chosen to complete the pre-established cross-quotas of sex and age group that normally are more difficult to obtain through telephone interviewing (e.g., the youth segments of the population). Personal interviews were carried out at the street.



Poor quality of results	The IERMB implemented a quality control and supervision protocol of the survey fieldwork to guarantee the quality and reliability of the information collected. In addition, a protocol of partial deliverables (status of the sample and the status of the quotas, data files, call-back files, interview recording files, negatives, tracking, etc.) was established. The IERMB carried out the tasks of controlling the inconsistencies and validating the data collected (daily). A valid interview was considered one that passed all internal controls (recording, coding, debugging and review).
Unexpected scientific findings	During the fieldwork, the IERMB implemented a quality control and supervision protocol. In addition, a protocol of partial deliverables (data files, call-back files, interview recording files, negatives, tracking, etc.) was established. The IERMB carried out the tasks of controlling the inconsistencies and validating the data collected (daily).





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