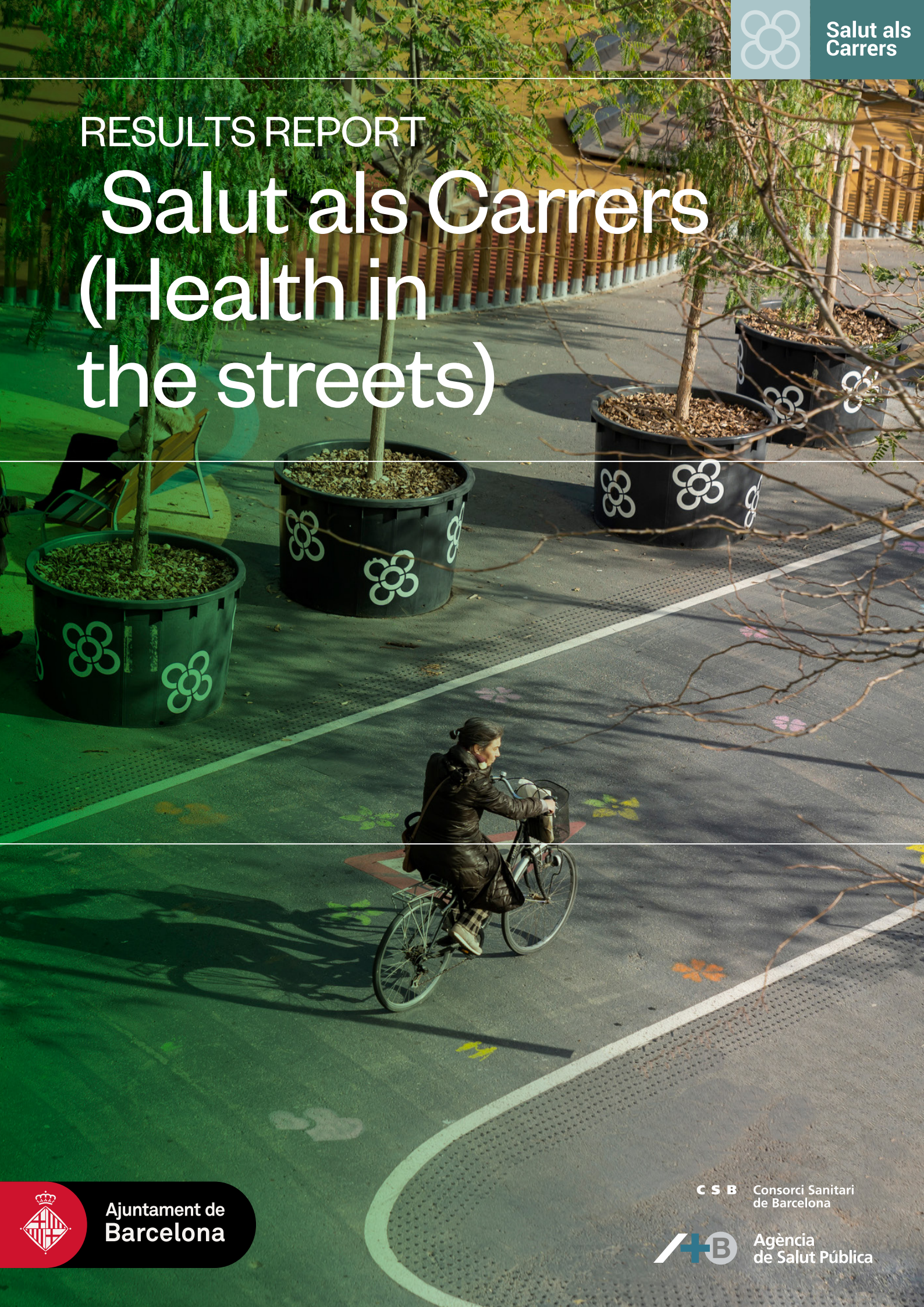




Salut als
Carrers

RESULTS REPORT

Salut als Carrers (Health in the streets)



Ajuntament de
Barcelona

CSB Consorci Sanitari
de Barcelona



Agència
de Salut Pública

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EXECUTIVE SUMMARY

The superblock model is a way of reorganising the city with the aim of improving the inhabitability of public space, advancing sustainable mobility, increasing and improving urban green spaces and biodiversity, and promoting citizen participation and responsibility. Since 2016, interventions have been carried out to implement superblocks in three neighbourhoods of Barcelona: Poblenou, Sant Antoni and Horta. The Agència de Salut Pública de Barcelona, within the framework of the Salut als Carrers (Health in the Streets) project, has assessed the potential environmental and health effects of these urban transformations.

The evaluation was carried out using quantitative and qualitative methods: environmental measures of air quality, an observational study of physical activity, an audit to assess the change in the walkability of the neighbourhood, a pre-post intervention health survey, a qualitative study with focus groups and two ethnographic guerrillas, which combine observation with semi-structured interviews.

The results on air pollution varied according to the area intervened. In Sant Antoni, a 25% reduction in NO₂ levels and a 17% reduction in PM₁₀ levels were observed in the intervention area. Noise levels also decreased. In Horta, no significant changes in pollutant levels were observed, though they remained low overall. In Poblenou, a decrease in pollution was perceived, especially noise pollution, but there is concern that it may have increased in the surrounding streets outside the urban transformations.

As for the use of space, in Sant Antoni, there is a great variety of use and an increase in the use of the intervened space. There is a large number of older adults present, and much fewer young people. In Horta, there are differences in perception between the main street and the interior streets. People considered the intervention on the main street be ineffective and pedestrians feel unsafe. People considered the interior streets where the

entire roadway is used for walking and is accessible for people with reduced mobility, to be an improved use of space. In Poblenou, families with children most frequently use the children's play areas while people who work in the area use the intervention area during lunch or at the end of the day. Young people indicated that the space is not designed for them and older people do not use the superblock as they find it an isolated space.

In general, benefits to the superblocks are reported in terms of emotional health and well-being. People report better rest, less perceived noise and air pollution, and increased socialization. They also indicate that the superblocks are a quieter, more comfortable and safer environment that facilitates interaction between neighbours, favouring social networks.

Lastly, the intervention types, the intervened environment, and the characteristics of the resident population determine the extent of the health effects of the superblocks. More extensive pacification measures should be considered, as well as other complementary measures to increase the potential benefits of the interventions. Inclusive spaces for all stages of life and ages should also be considered.

CHAPTER I

Introduction

The city of Barcelona presents numerous challenges related to urban environment and its relationship with social behaviors and health. Some of these challenges to be solved are the high levels of noise and air pollution, the lack of green spaces, the sedentary behavior of the population and the injuries caused by traffic.

With the aim of bringing the functioning of the city closer to the new environmental challenges and opportunities for improvement in the quality of life of people, in May 2016, the government of the city of Barcelona approved the government measure “Omplim de vida els carrers” (Let’s fill the streets with life). The goal is to make Barcelona a city to live in, to refill the streets of the city with life. The implementation of “Superilles” (superblocks) in Barcelona is the strategy used to pursue this objective. Its objectives are to improve the habitability of public space, advance sustainable mobility, increase and improve urban green and diversity, and promote citizen participation and co-responsibility.



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The Agència de salut Pública has been in charge of evaluating the potential impact on health and its determinants of the superblocs implemented through the “Salut als Carrers” project. To achieve this, a multidisciplinary team of public health professionals has been formed. Research teams from the University of Vic, ISGLOBAL, GESOP, Pere Tarrés Foundation and the Directorate of Gender Services and Time Policies of the Barcelona City Council have also collaborated. The evaluation has been supported by Barcelona City Council and the Partnership for Healthy Cities, an initiative supported by Bloomberg Philanthropies, in partnership with the World Health Organization and Vital Strategies.

To determine the approach to the assessment, a conceptual framework was developed to try to determine the main health outcomes to be explored within the project: Mehdipanah R, et al. Effects of Superblocks on health and health inequities: a proposed evaluation framework. *J Epidemiol Community Health* 2019;73:585-588.

The protocol developed for the evaluation is also published in a scientific journal: Palència L, et al. Study Protocol for the Evaluation of the Health Effects of Superblocks in Barcelona: The “Salut Als Carrers” (Health in the Streets) Project. *Int J Environ Res Public Health*. 2020 Apr 24;17(8):2956]. Likewise, a guide was prepared with all the methodologies used in this evaluation. This guide is available online in Catalan, Spanish and English at <https://www.aspb.cat/documents/salutalscarrers>.

To evaluate the health and environmental effects, a mixed methodology has been adopted, which includes observational, quantitative and qualitative studies, and pre-post evaluation. This report describes the main results grouped by superblock and jointly, as well as the main conclusions and recommendations.

CHAPTER II

Superblock Interventions: Poblenou, Sant Antoni and Horta

INTRODUCTION

The Superblocks model is a way of organizing the City that is based on reversing the distribution of public space between vehicles and people, prioritizing the citizen, to improve the environmental conditions and quality of life of the people [Ajuntament de Barcelona, 2016]. The objective of this program is to improve the habitability of public space, advance sustainable mobility, increase and improve urban green and diversity, and promote citizen participation and co-responsibility [Barcelona City Council, 2016]. During the process, citizen participation and the involvement and co-responsibility of the existing social fabrics in each area in the deployment of the measures are actively sought. The measures implemented can include different types of interventions that according to the degree of intervention are divided into basic (functional change of the streets), tactical (low budget, temporary and reversible that serve to test models and change the uses of the streets without large budgets) and structural (actions of great consensus, stable over time and that may involve more important budgets). We explain below the interventions that have been carried out in the 3 superblocks that we have evaluated in the project.

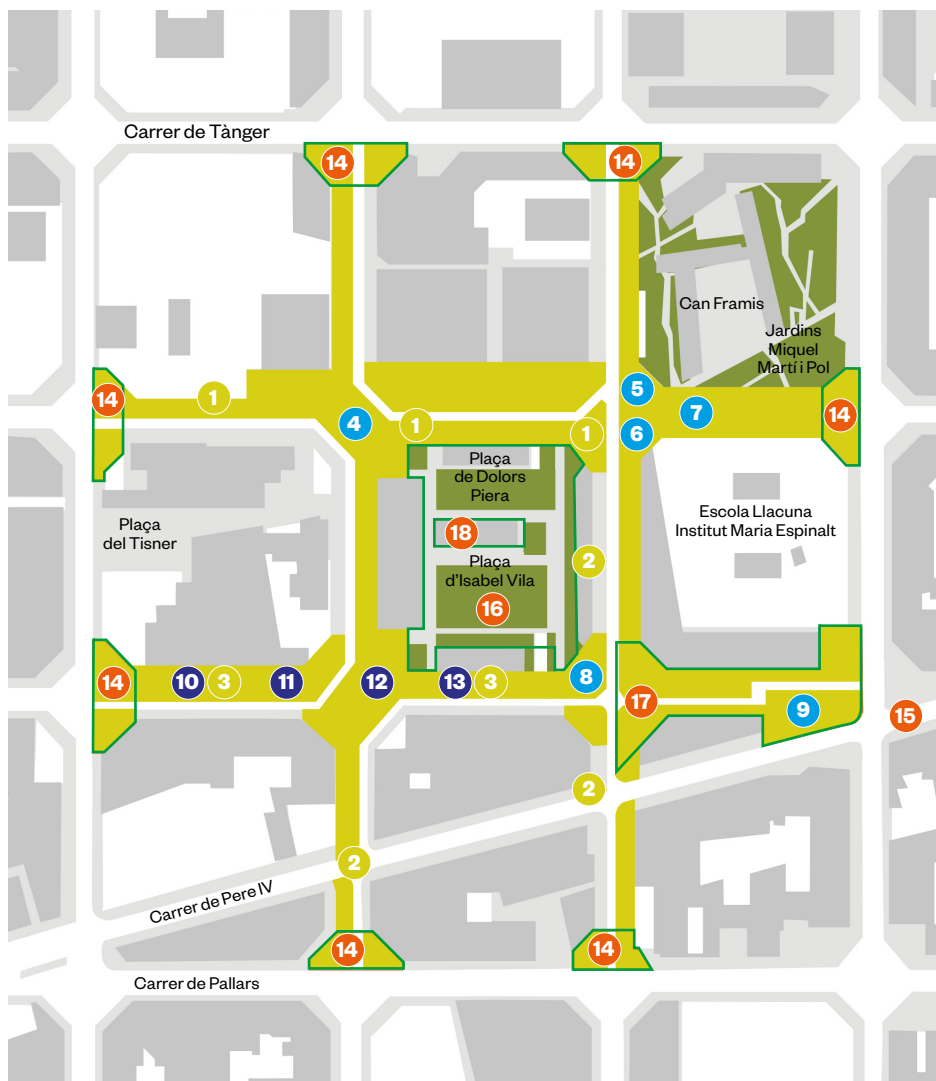


POBLENOU

The superblock of Poblenou was inaugurated in September 2016 and was the first superblock launched by the government of Barcelona en Comú. It is the pacification of an area of 3 x 3 blocks, where in the interior there is a pacification of motorized traffic prioritizing passers-by and bicycles. Initially, basic mobility measures were applied, with temporary, reversible and rapid execution actions that allowed the areas of stay and coexistence to be highlighted, dedicated especially to creatures and citizen interaction. In a second phase, a process of evaluation and proposals was promoted and structuring actions began. Thus, the superblock includes the creation of new spaces for stay in sections of the old streets and their confluences freed from traffic, with picnic tables, literary tours, spaces for occasional markets and sports and children's play areas (Figure 2.1). It can be said that this was a pilot superblock and at the beginning did not have a process of real participation, for which thing generated some suspicion. However, Poblenou's superblock has been gaining support over time.



Figure 2.1. Interventions in the superblock of Poblenou.



Source: Information leaflet on the final mobility in the poblenou superblock.

Stay areas

- 1 Literary tour
- 2 Literary tour
- 3 Space for occasional markets

Play areas

- 4 Large children's play area
- 5 Small children play area
- 6 Stage for shows
- 7 Play space
- 8 Chessboard
- 9 Children's play area

Sports areas

- 10 Game circuit
- 11 Basketball court
- 12 Basketball court
- 13 Athletics track

Reurbanization works

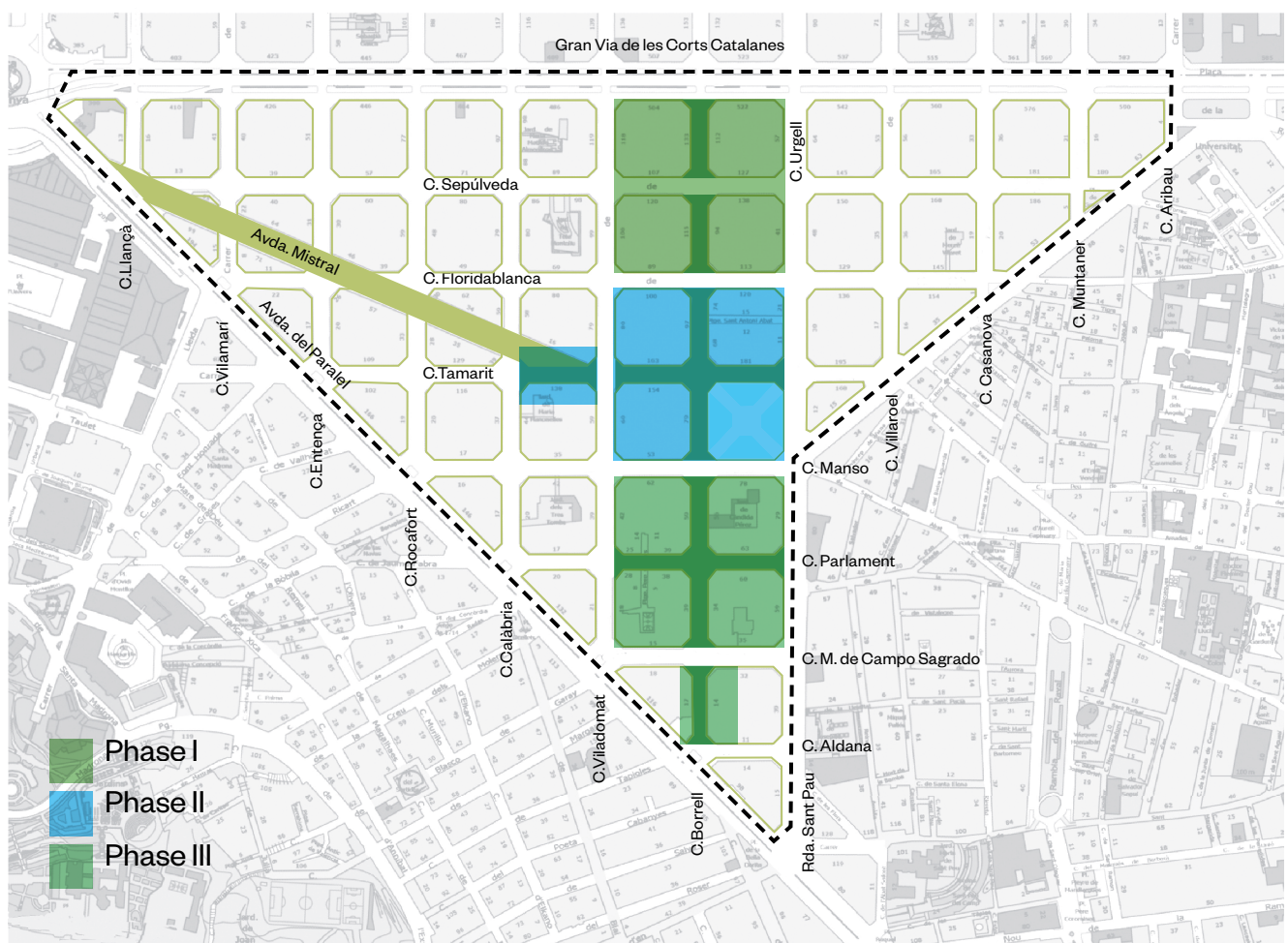
- 14 Superblock access crossings
- 15 Reurbanization works of Pere IV street between Roc Boronat and Bilbao streets
- 16 Dolores Piera and Isabel Vila squares
- 17 Section of Almogàvers street between Roc Boronat and Llacuna streets
- 18 Building works of the PMH, of 11 plants and 68 homes, of between 60 and 84 m².

— Areas of action of the reurbanization works

SANT ANTONI

The first phase of the implementation of the Superblocks program in the Sant Antoni neighborhood concluded in May 2018 with the urbanization of the surroundings of the Sant Antoni market. It includes the pacification of two streets (Comte Borrell between Floridablanca and Manso; and Tamarit, between Viladomat and Comte d'Urgell), in total 4 sections of street forming a cross with the creation of a public square of 1800 m² at its junction. The intervention includes more space reserved for passers-by with living areas for new uses and more presence of green, including trees and shrubs (Figure 2.2).

Figure 2.2. Interventions carried out in the superblock of Sant Antoni.



Source: Adapted from *Superilla de St. Antoni. Consell de barri de Sant Antoni. December 9, 2019.*

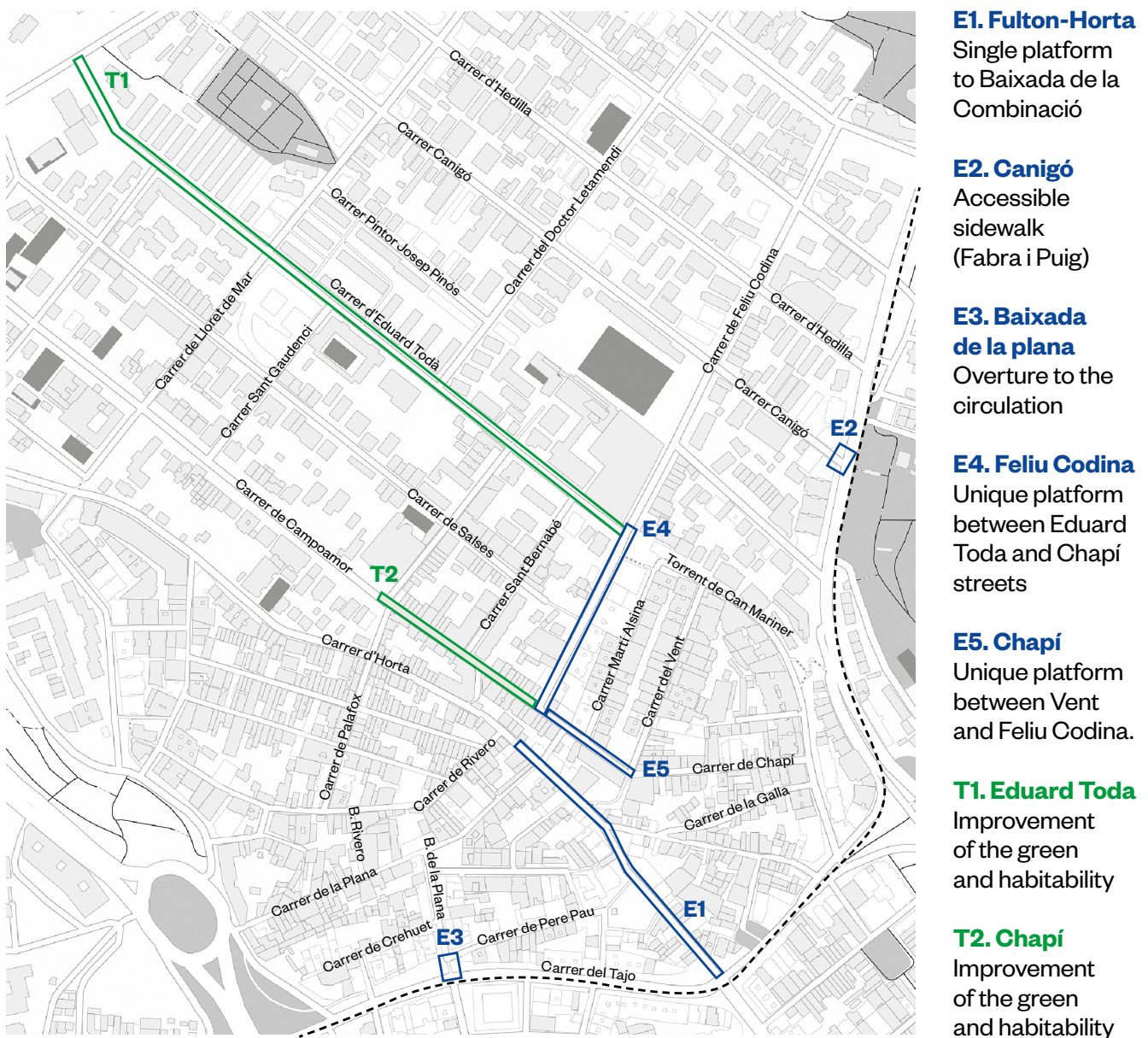
The second and third phases of the implementation of the programme include the expansion of the superblock. On the one hand, with tactical (temporary) and strategic actions at the junction formed by Comte Borrell Street between Manso Street and Paral·lel Avenue, and also on Parlament Street between Ronda de Sant Pau and Viladomat Street. On the other hand, they include the remodeling of a structuring (definitive) nature of comte Borrell streets, between Gran Via and Floridablanca; and Tamarit, between Viladomat and Calàbria.



HORTA

The works related to the superblocks program in Horta began in October 2018 and can be seen in Figure 2.3.

Figure 2.3. Interventions carried out in the superblock of Horta.



Source: Adapted from *Accions funcionals per a la millora de la mobilitat to the superilla d'Horta*. 21 gener 2020.

The works basically included:

1. Pacification of the main entrance street to the neighborhood (Fulton and Horta), with the introduction of a single platform (no difference between the roadway and the sidewalk) and speed limit of 10 km/h.
2. In two streets with several public and private facilities (Feliu Codina and Chapí) and where there was almost no sidewalk, creation of a single platform and reduction of parking space.
3. Tactical intervention (low budget, temporary and reversible) with reduced parking and creation of living spaces on Eduard Toda Street. Tactical interventions have not yet been carried out.

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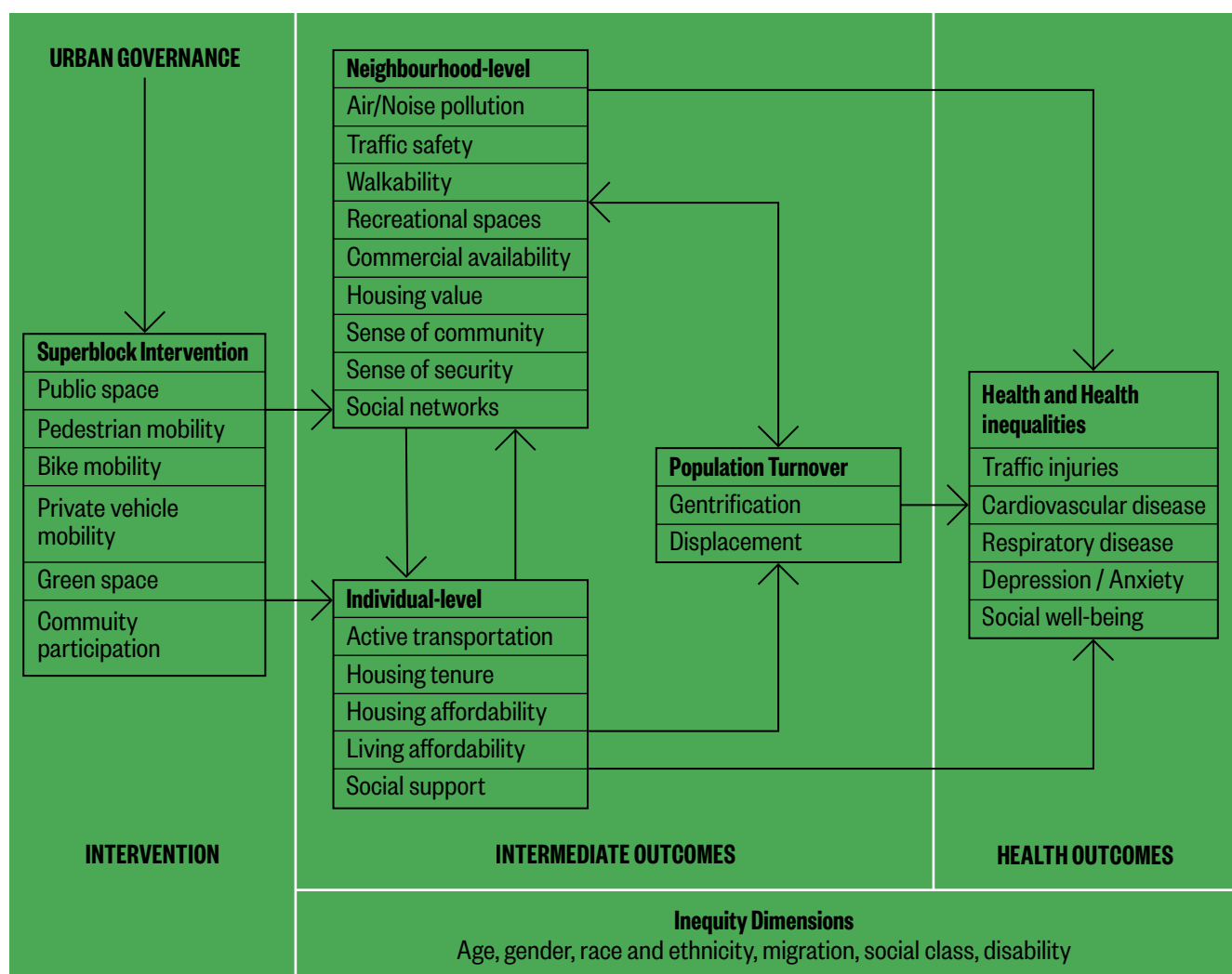
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CHAPTER III

The effect of superblocks on health and their determinants

A conceptual framework was developed to describe the possible effects of superblocks on the health of the population, as well as the mechanisms and relationships between them [Mehdipanah et al, 2019]. It outlines the potential links between superblocks and health, including how different interventions shape urban design, transportation, and housing and ultimately influence various health outcomes. In addition, it also exposes the possible unequal effects of the intervention on different populations depending on their age, gender, social class and other dimensions. Below, we provide an explanation of the main mechanisms through which superblocks have the potential to impact health.

Figure 3.1. Conceptual framework of the effect of superblocks on health and its determinants.



Source: Mehdipanah et al. J Epidemiol Community Health. 2019

CONCEPTUAL FRAMEWORK

Since the intervention aims to improve the use of public space, promote changes in mobility, increase the presence of green areas and biodiversity and promote community participation, the planned changes are expected to:

1. Improve the use of space by pedestrians.
2. Increase the mobility of pedestrians and bicycles and reduce that of private vehicles.
3. Increase the presence of green areas and biodiversity.
4. Strengthen community participation, working together with residents to design, implement and evaluate the superblock.



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The changes are expected to have effects both at the neighborhood level and at the individual level on its residents. On the one hand, at the neighbourhood level, a reduction in air and noise pollution and an increase in road safety are expected, which have direct effects on health and safety. In addition, the spaces will be more walkable, so people are expected to walk more and do more physical activity, and there will be more spaces to be outdoors, so people are expected to use the public space more. The increased presence of recreational spaces, along with the involvement of residents throughout the process, will likely create a greater sense of community and improve social media. The presence of more people and fewer cars on the streets will improve the perception of safety. Pedestrian streets also favor commerce and relationships between people in public space. At the individual level, all these changes in the neighborhood are expected to increase active transportation and therefore physical activity and also social support. However, such improvements can make the neighborhood more attractive and produce adverse effects such as gentrification and displacement.

Most of the above effects positively influence health including a decrease in traffic injuries, a reduction in cardiovascular and respiratory diseases and depression and anxiety, and an improvement in social well-being.

Next, we discuss which of these determinants and health outcomes we can study in this project.

STUDIED HEALTH RESULTS

As explained in the previous section, the scientific literature tells us that urban interventions have the potential to affect health outcomes such as traffic injuries, cardiovascular disease, depression and anxiety or social well-being. Some health outcomes such as social support or mental well-being can be measured through surveys. It is also straightforward to detect changes in traffic injuries. However, due to the length of the evaluation and the size of the interventions, it is unrealistic to think that we can detect changes in more long-term health outcomes such as cardiovascular or respiratory diseases or even mortality.

However, numerous previous studies have shown the link between physical activity and cardiovascular disease, diabetes, cancer, hypertension, obesity and depression, as well as premature mortality [Warburton DE, et al. 2006]. Noise pollution, especially that caused by traffic, can not only damage hearing but can result in lack of sleep and mental health problems [Stansfeld SA and Matheson MP, 2003]. Likewise, green spaces can promote mental and physical health and reduce morbidity and mortality by relieving stress, stimulating social cohesion, promoting physical activity and reducing exposure to air pollution, noise and the island effect of [WHO 2017]. The relationship between air pollution levels and health is also clear [European Environment Agency, 2020]. Though we may not be able to assess certain health effects, if there are positive changes in air quality, the amount of green space, noise or physical activity patterns, there is likely to be an improvement in the health of the population.

The health outcomes analyzed in this report have been classified into three major topics to facilitate understanding which are:

- Air pollution and noise
- Characteristics and use of spaces
- Well-being and social interaction

In the next chapter we go on to describe the concrete methodologies with which we have measured each health outcome.

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CHAPTER IV

Methods

In order to assess the environmental and health effects in the different superblocks, different types of methods have been used, both qualitative and quantitative. The complexity of the intervention makes it advisable to use different types of methods that can complement each other in the different superblocks. The choice of one or the other method has been given by the health outcomes that we wanted to evaluate (according to the conceptual framework defined in the previous section). That is, for some types of variables studied, specific instruments are needed to measure them. But also according to the opportunity, for example in superblocks that were already underway, pre-intervention measures could not be taken and it was better to use qualitative studies to measure changes. The following table shows the different types of study that have been used in each superblock as well as which study areas have been analyzed. More information on the methods used can be found in the article by Palència et al. [Palència et al., 2020] and in a methodological guide we have created [Methodological guide SAC, 2020].

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Table 4.1. Superblock studied, study and type of study performed, areas studied in each study and type of measures taken.

SUPERBLOCK HORTA

Study	Type of Study	Areas studied	Measurement
Survey	Quantitative	General health and well-being, mental health, sleep quality, physical activity, social and neighbourhood context	Pre and post
Mobile unit	Quantitative	Air pollution (NO ₂ and particulate matter)	Pre and post
Sensors	Quantitative	Air pollution (NO ₂ and Black Carbon)	Pre and post
Walkability audit (MAPS)	Quantitative	Walkability	Pre and post
Ethnographic guerrilla	Qualitative	Global assessment of the superblock, use of public space, general health and well-being, proposed improvements	Post

Table 4.1. Superblock studied, study and type of study performed, areas studied in each study and type of measures taken.

SUPERBLOCK SANT ANTONI

Study	Type of Study	Areas studied	Measurement
Audit of the use of spaces (SOPARC)	Quantitative	Physical activity	Post
Ethnographic guerrilla	Qualitative	Global assessment of the superblock, use of public space, general health and well-being, proposed improvements	Post
Mobile unit	Quantitative	Air pollution (NO ₂ and particulate matter)	Pre and post

SUPERBLOCK POBLENOU

Study	Type of Study	Areas studied	Measurement
Focus groups	Qualitative	Use of public space, mobility, air pollution and, general health and well-being, mental health, social context	Post

CHAPTER V

Air pollution and noise

INTRODUCTION

Air pollution is the main environmental risk to health and in a city like Barcelona, traffic is the main source of emissions of air pollutants [Rico M, 2019].

Noise pollution is also a serious public health problem that goes far beyond the nuisances generated by noise. The WHO points out that noise pollution is the second most harmful environmental factor to health in Europe.

The implementation of the superblocks model implies a restructuring of space and urban mobility, and therefore implies potential changes in local traffic emissions and air quality.

The implementation of the superblock model involves a restructuring of the space and urban mobility, and implies potential changes in the local emissions of traffic and the air quality. As traffic is the main source of noise in the city [Ajuntament de Barcelona, 2020], the pacification of the streets is likely to have a positive effect on noise pollution.

The Agència de Salut Pública de Barcelona (ASPB) manages the network of stations for the fixed measurement of pollution in Barcelona and evaluates the air quality in the city. ASPB also conducts complementary studies to deepen the knowledge of air pollution in the city, estimate the impact on the health of neighbors, as well as evaluate urban reordering projects from the point of view of improving air quality. The contaminants selected for evaluation are NO₂ and particulates (PM₁₀ i PM_{2,5}).

The Barcelona Institute for Global Health, ISGlobal, has also performed an evaluation of NO₂ and of black carbon contained in the particulates of Horta superblock. Black Carbon is the black soot material resulting from the burning of fossil fuels and is an important component of the suspended particles present in the air associated with vehicle traffic, especially diesel engines.

The environmental evaluation with measured data of air quality has been complemented with an evaluation, both quantitative and qualitative, of the perception of neighbors, collected through interviews and other methodologies.

HORTA

In Horta air pollution and noise was measured on the one hand through air quality measures and on the other hand with the perception of neighbors.

HORTA: ENVIRONMENTAL ASSESSMENT-AIR QUALITY

As for the environmental measurements, these were carried out with the mobile unit of the Agència de Salut Pública de Barcelona and through black carbon sensors and passive NO₂ collectors by ISGlobal.

The ASPB mobile atmospheric control unit is equipped with analysers and manual sensors in accordance with the reference methods of Directive 2008/50/EC. The environmental measures are compared with the network of air quality monitoring stations in the city, which allows to evaluate the pre- and post-intervention results and reduce the effect of the temporal variability of the environmental measures due to weather conditions or pollutant emission.

In Horta superblock, the pre- and post-intervention air quality evaluations could not be carried out in the same measurement place. The results of the measurements performed are shown in Table 5.1

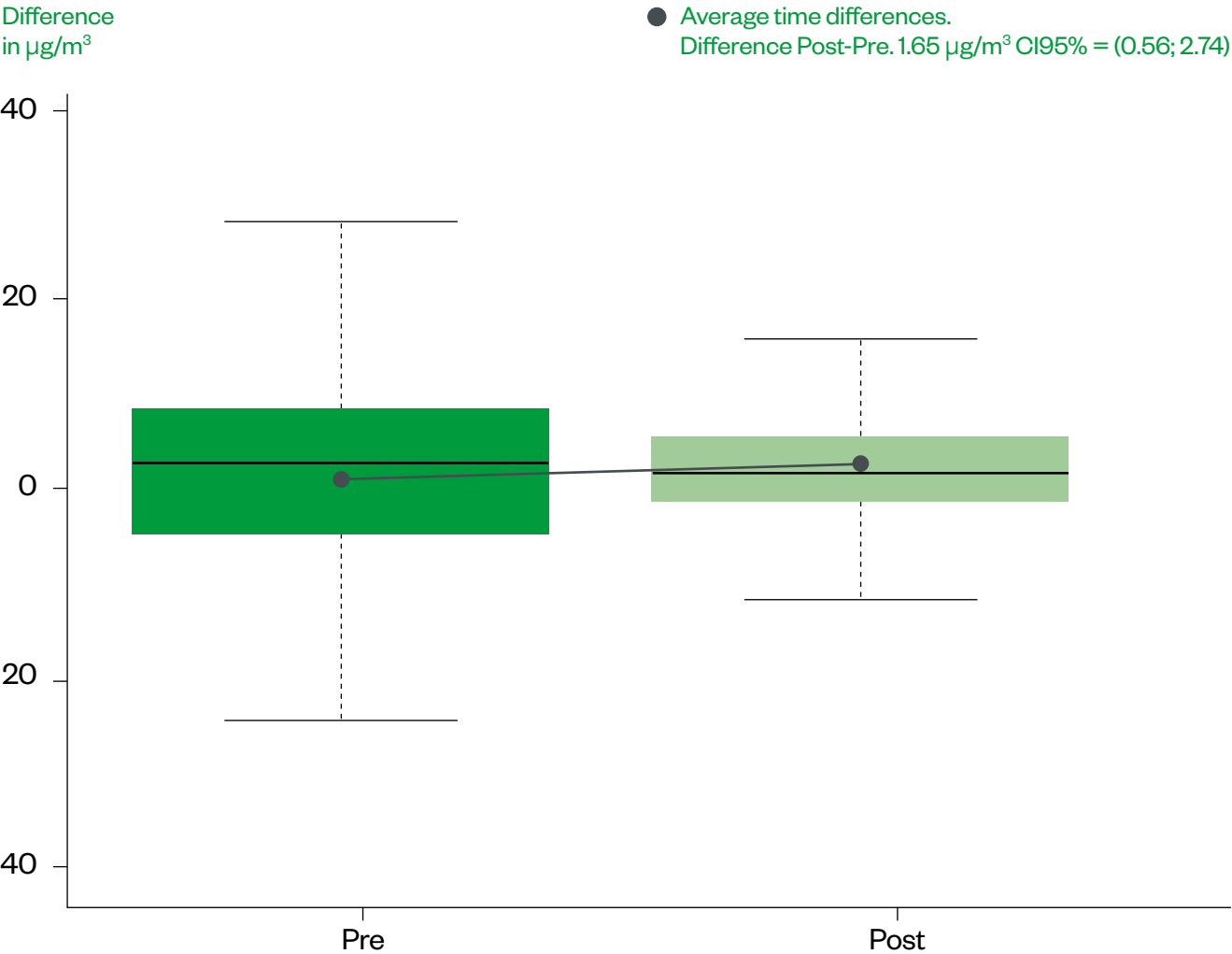
Table 5.1. Concentrations of NO₂, PM₁₀ and PM_{2.5} in two locations of Horta superblock before (pre) and after (post) the intervention.

	Pre- intervention measurement Location Canigó street (crossing Letamendi)	Post- intervention measurement Location Feliu i Codina (crossing Chapí)	EU and WHO límits*
Sampling period	02.10.17–13.11.17	12.12.20–04.02.21	
NO₂			
Period mean (µg/m³)	35.6 µg/m ³	24.6 µg/m ³	40 µg/m ³ (anual mean)
Hourly maximum (µg/m³)	112.0 µg/m ³	102.0 µg/m ³	200 µg/m ³
PM₁₀			
Period mean (µg/m³)	19.7 µg/m ³	14.7 µg/m ³	OMS 20 µg/m ³ UE 40 µg/m ³ (anual mean)
Daily maximum (µg/m³)	37.5 µg/m ³	27.7 µg/m ³	50 µg/m ³
PM_{2.5}			
Period mean (µg/m³)	12.1 µg/m ³	11.2 µg/m ³	OMS 10 µg/m ³ UE 25 µg/m ³³ (anual mean)
Daily maximum (µg/m³)	23.6 µg/m ³	23.1 µg/m ³	OMS 25 µg/m ³

*Limits established by the European Union (EU) and the World Health Organization (WHO) for Health protection.

The pre- and post-intervention pollution levels in the Horta superblock are within the pollution ranges found in the city’s urban background stations, with relatively low levels of pollution. The pollutant concentrations measured in the post-intervention period (2020-2021) are lower than those measured at the previous time (2017) but one has to take into account the situation of lower mobility and emissions due to the COVID-19 pandemic restrictions that have caused a general decrease in air quality levels by 2020-2021 throughout the city. When the pollutant concentrations shown in table 5.1

Figure 5.1. Boxplots of NO₂ concentrations (in µg/m³) before (pre) and after (post) the intervention in the Horta superblock.



Note: The concentrations measured with the mobile unit located in Horta are compared with the fixed reference station in Vall d'Hebron (located in the Vall d'Hebron Park). The Y axis shows the difference in concentrations between the mobile unit and the reference station ($Y_{mobile} - Y_{vallhebron}$) and the X axis shows the pre and post-intervention concentrations (see table 5.1).

are contextualised with a fixed reference station (measuring station located in Vall d'Hebron, Vall d'Hebron Park), the concentrations between the two assessment phases can be compared (see figure 5.1).

Comparison of the measurements between the two assessment phases (see figure 5.1) shows a slight increase in NO_2 levels after the intervention, $1.65 \mu\text{g}/\text{m}^3$ on average. For particulate matter (PM_{10} and $\text{PM}_{2.5}$), the measured changes are even smaller.

The NO_2 and particulate data measured by the mobile unit show that the urban intervention carried out in the Horta superblock has not had a significant impact on air quality. The Horta area started with air pollution levels corresponding to an urban background where it is more difficult to achieve a reduction in emissions compared to more polluted areas of the city. Moreover, the interventions carried out have been highly localized in small areas and motorized vehicles have not been completely eliminated in the area of the superblock. Even so, it should be noted that the evaluation carried out with the mobile unit was limited by the fact that the pre- and post-measures could not be carried out at exactly the same point. Further monitoring of air pollution levels in this superblock should be carried out to future trends.



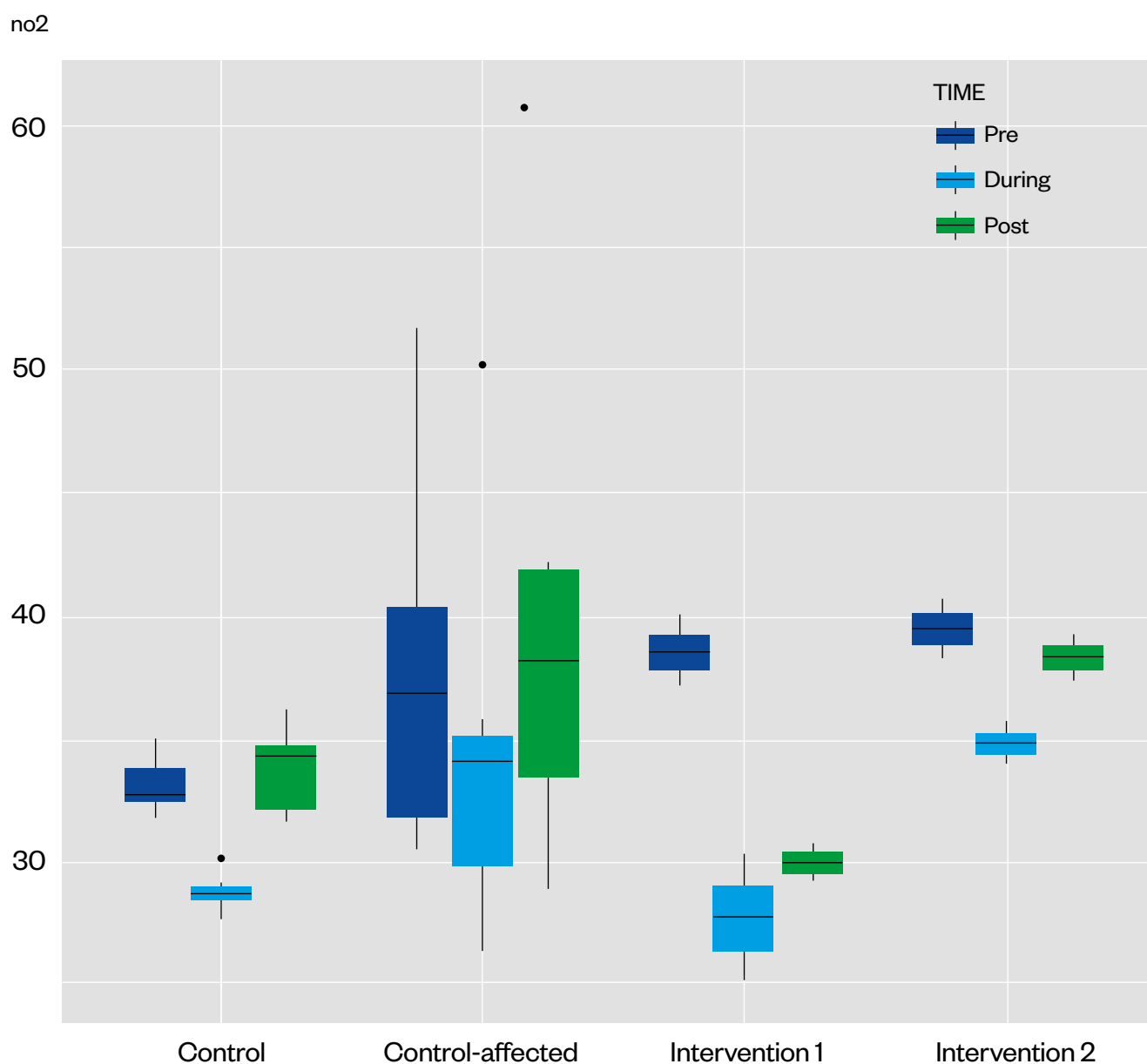
The assessment of NO₂ and black carbon carried out by ISGlobal consisted of taking measurements of black carbon (BC) concentration and passive nitrogen dioxide (NO₂) samplers at a total of 20 points throughout the Horta superblock. The measurement points were classified into three types (for more information see the methodological guide [Methodological guide for the evaluation of environmental and health effects of the superblock model in Barcelona, 2020]):

- 4 points in the intervention area: classified as intervention 1 (Chapí-Feliu Codina) and intervention 2 (Fulton-Horta).
- 9 points in areas close to the intervention (classified as affected controls). These are control points that may be affected by the intervention carried out.
- 7 in areas sufficiently distant from the intervention, classified as controls.

The pre-intervention campaign was carried out in May-June 2018, the campaign during (only NO₂) in May-June 2019 and the post campaign in September-October 2020 and the data were also processed so that there were no seasonal effects and so the results could be compared. The data were processed and referenced with the Vall d'Hebron fixed measuring station to eliminate seasonal effects and to be able to compare the different campaigns.

The NO₂ results from the passive collectors show a decrease in the NO₂ concentration at the points in the Intervention 1 area (Chapí-Feliu Codina street, figure 5.2), specifically 17 and 27% at the two points measured. On the other hand, in the area of Intervention 2 (c. Fulton-Horta), the concentrations have remained fairly similar between the pre- and post-intervention campaigns. We observed some increase in concentration in some points classified as control and affected control.

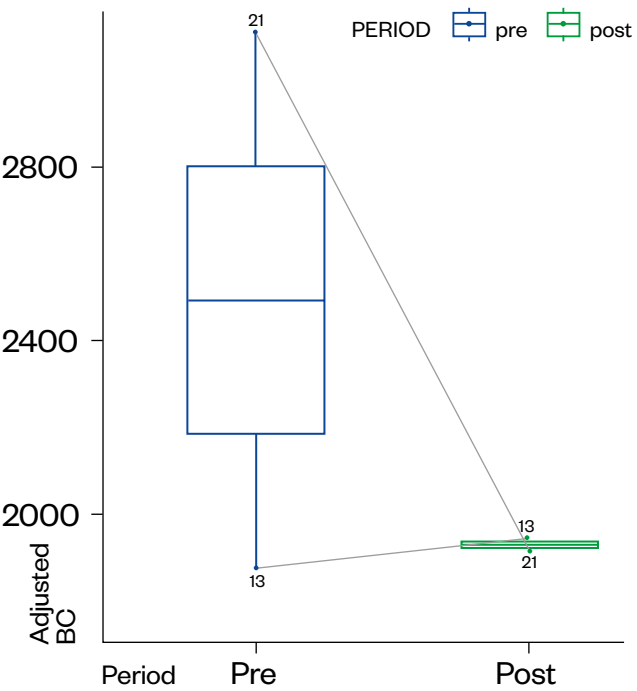
Figure 5.2. Boxplot of the concentrations of NO₂ according to the type of point and sampling campaign



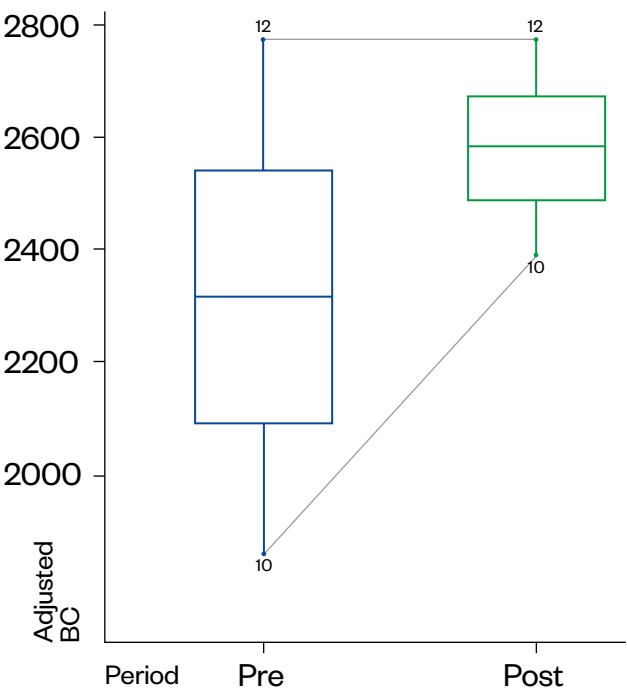
As for BC we found a considerable decrease in the concentration of BC in one of the points of intervention 1 and a moderate increase in one of the points of intervention 2. Some differences are found in BC concentration at some control and control-affected points but the overall does not show significant changes (Figure 5.3).

Figure 5.3. Comparison Black Carbon PRE-POST for the points of the two types of intervention, control and control-affected. Paired data by point type.

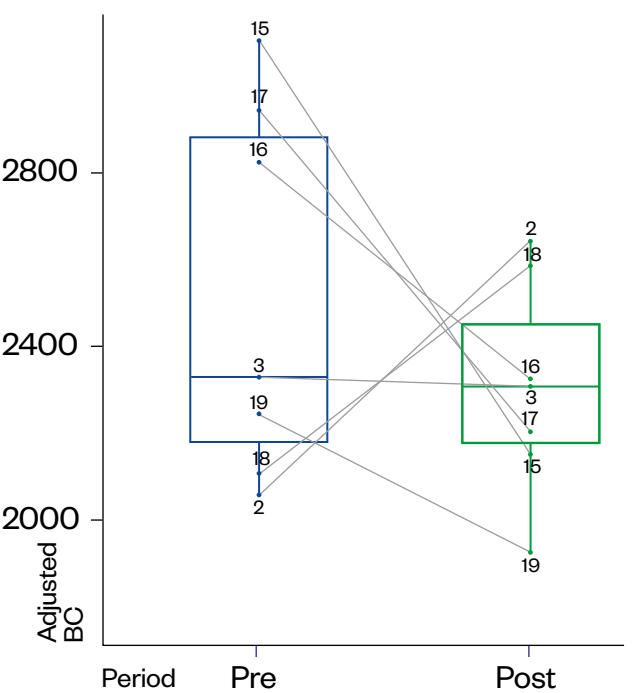
INTERVENTION 1



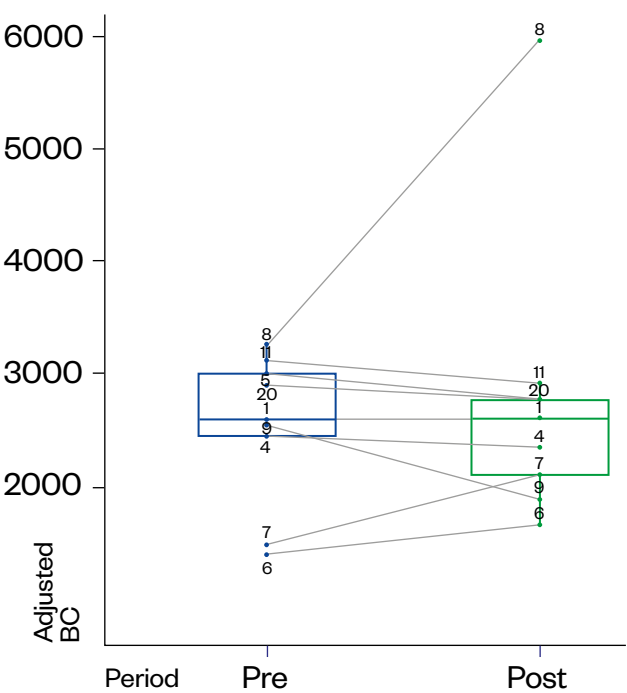
INTERVENTION 2



CONTROL



CONTROL-AFFECTED



HORTA: INDIVIDUAL ASSESSMENT-AIR QUALITY AND NOISE

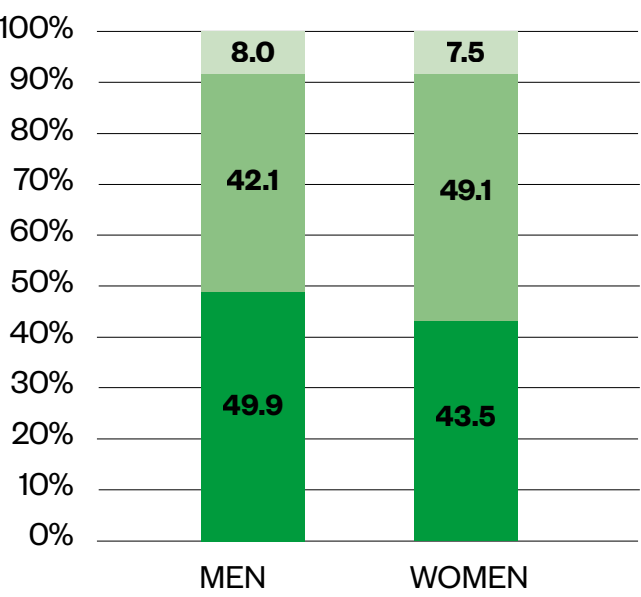
In the Horta superblock, a survey of 1200 people was carried out before the intervention, between May and September 2018, of which 835 answered again after the intervention, in September 2020. About 45% of the women interviewed and 50% of the men thought that the noise had decreased and about 50% thought that the pollution had decreased in the intervened area (Figure 5.4). However, only 15% of men and 10% women thought that noise had decreased in the surrounding streets (the percentages of pollution being similar), which would confirm the effect of the superblock in reducing pollution in the intervened area. However, it must be said that about 23% of the population thought that noise had increased in the surrounding streets and about 28% that pollution had increased.

Ethnographic guerrillas were also carried out in Horta's superblock, a type of methodology that combines ethnographic observation with semi-structured interviews. The guerrillas took place in an itinerant way through the different streets of the superblock and interviewed individuals and groups.

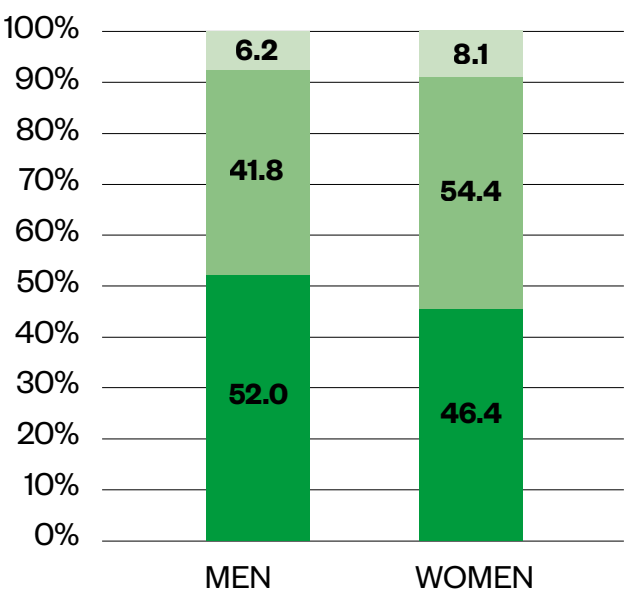
The assessment of the people interviewed on the improvement of air and noise quality is different between the intervention of Fulton-Horta and that of Feliu Codina-Chapí. In Feliu Codina/Chapí the reduction in pollution and noise is appreciated, although it is not considered very noticeable due to the size of the street. However, on Fulton/Horta streets, it is considered that a large number of vehicles still pass, at a speed above what is allowed and where many vehicles stop due to the absence of a sidewalk. This means that in Fulton/Horta there has been little or no reduction in pollution and noise on the street.

Figure 5.4: Percentage of people who think that certain characteristics in the intervened area of Horta have increased or decreased, Salut Als Carrers Survey 2020.

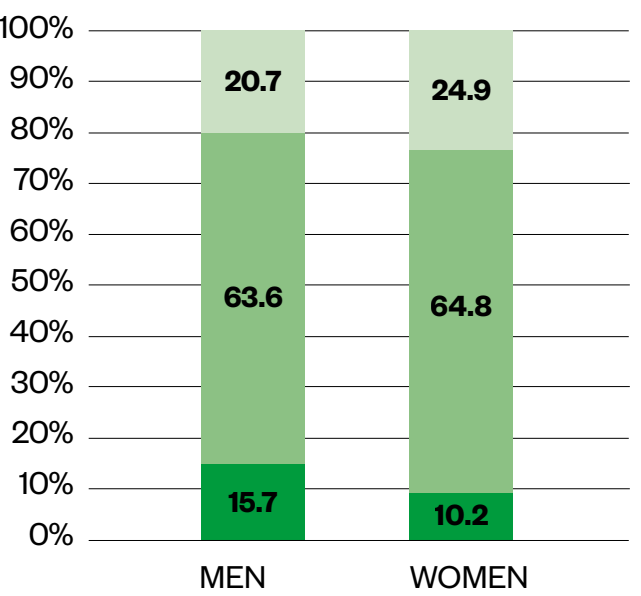
NOISE



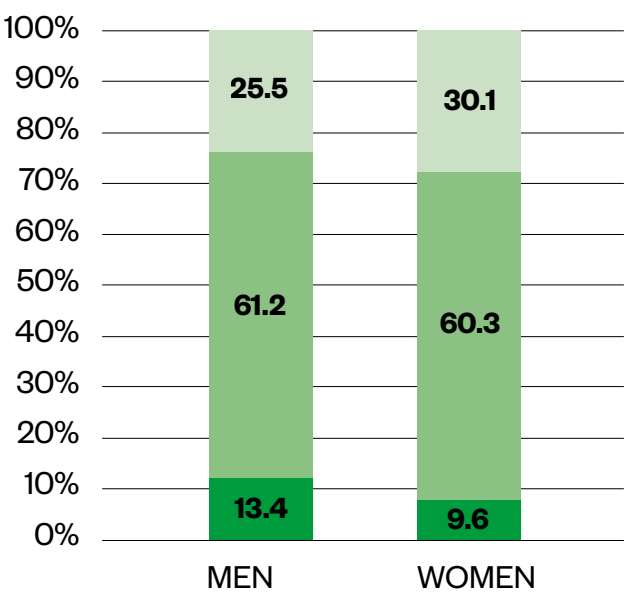
AIR POLLUTION



NOISE IN SURROUNDING AREA



POLLUTION IN SURROUNDING AREA



Decreased No change Increased

SANT ANTONI

In the Sant Antoni superblock, direct measurements of air quality were made and a qualitative assessment was also carried out based on the perception of the neighbourhood.

Taula 5.2: Concentrations of NO₂ and PM₁₀ at the site located at the intersection of Comte Borrell con Tamarit streets within the superblock of Sant Antoni before (pre) and after (post) the intervention.

	Pre-intervention measurement Location Comte Borrell (crossing Tamarit)	Post-intervention measurement Location Comte Borrell (crossing Tamarit)	UE and OMS limits*
Sampling period	07.09.17–23.10.17	01.10.18–16.10.18	
NO₂			
Period mean (µg/m³)	57	38	40 µg/m ³ (annual mean)
Hourly maximum (µg/m³)	130	98	200 µg/m ³
PM₁₀			
Period mean (µg/m³)	25.6	23	OMS 20 µg/m ³ UE 40 µg/m ³ (annual mean)
Daily maximum (µg/m³)	36.8	-	50 µg/m ³

*Limits established by the European Union (EU) and the World Health Organization (WHO) for health protection.

SANT ANTONI: ENVIRONMENTAL ASSESSMENT-AIR QUALITY

The concentrations of air pollutants NO_2 and PM_{10} measured in the Sant Antoni superblock at pre- and post-intervention are shown in table 5.2. In this superblock, measurements could be taken before (2017) and after (2018) the intervention in the same location, at the intersection of Comte Borrell and Tamarit streets.

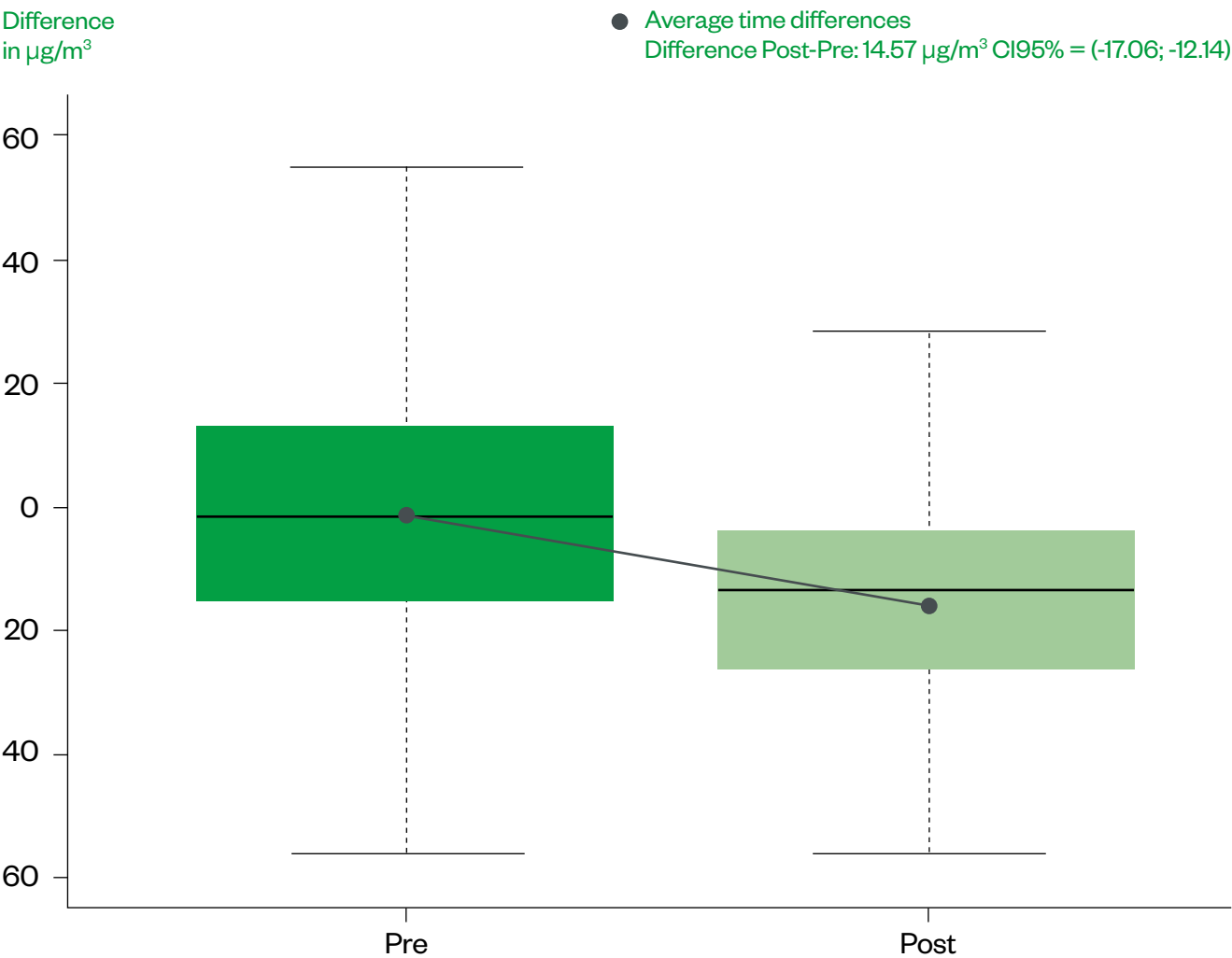
The initial concentrations of pollutants at Sant Antoni site were those of a situation of heavy traffic in the city, very similar to those found at traffic stations in the city, such as the Eixample station (located on Av. Roma-Comte Urgell). After the pacification intervention in the area, NO_2 and PM_{10} concentrations decreased, especially in the case of NO_2 with post-intervention levels equivalent to the Poblenou urban background station (located in Pl. Josep Trueta) (see table 5.2.).

Figures 5.5 and 5.6 show the NO_2 and PM_{10} concentrations measured in the Sant Antoni superblock corrected by a reference station of the fixed monitoring network (Eixample station). This contextualisation with respect to a fixed station allows correction for meteorological effects, as well as other factors that may have changed between pre- and post-intervention measurements and that may have an effect on air quality in the city.

At the intersection of Comte Borrell and Tamarit streets, where traffic-calming measures have been carried out, the assessment of the impact on pollution levels shows an important and statistically significant decrease in NO_2 levels of $14.6 \mu\text{g}/\text{m}^3$ compared to the pre-intervention period (25% decrease, Figure 5.5). For PM_{10} particles, a decrease is also observed, although it is smaller than for NO_2 ($4.1 \mu\text{g}/\text{m}^3$, 17%) (figure 5.6).

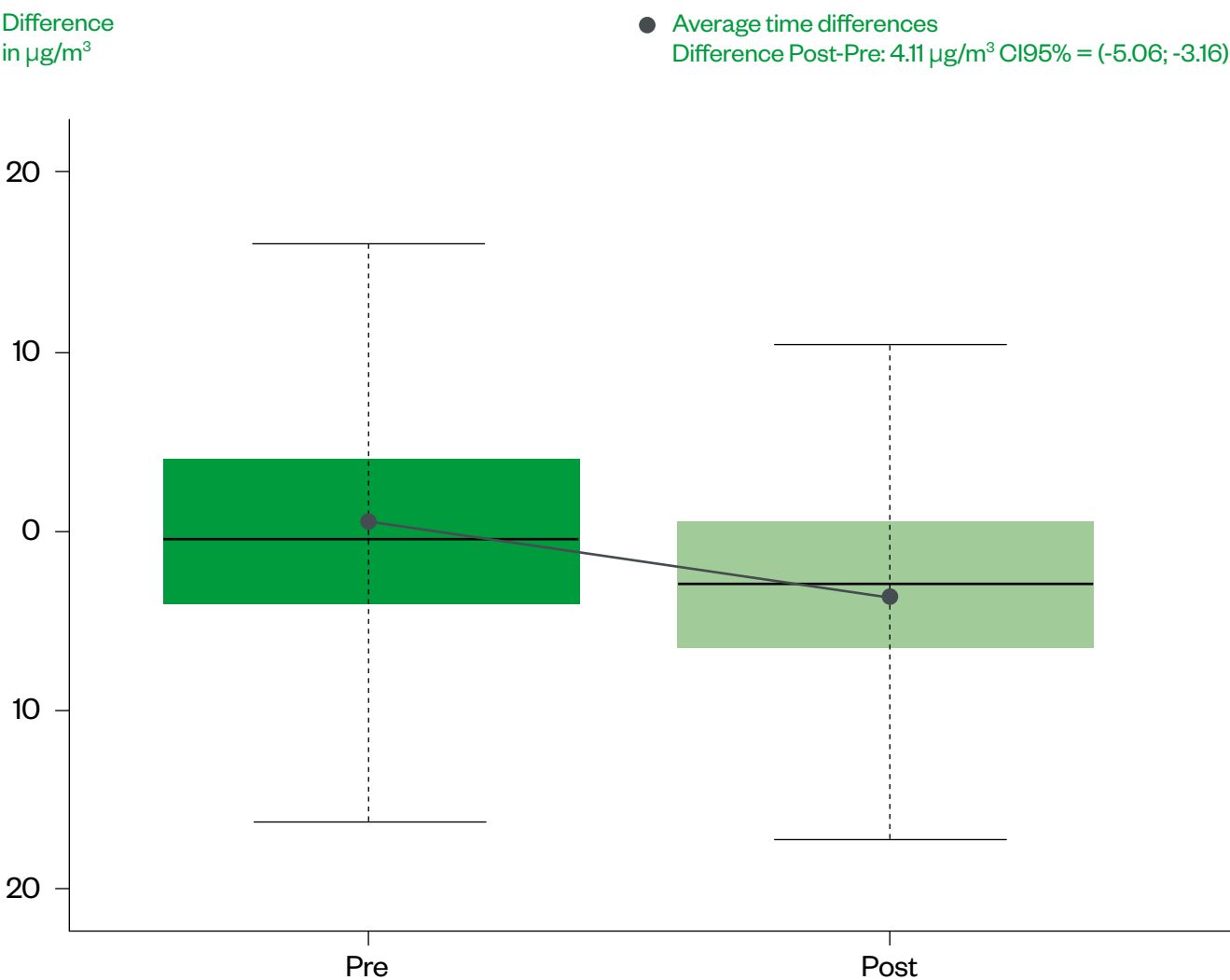
Further environmental monitoring measures will have to be taken in the area around the Sant Antoni superblock to confirm the decreasing trend found and to verify the possible impact on the areas that have not been intervened.

Figure 5.5. Boxplots of NO₂ concentrations (in µg/m³) before (pre) and after (post) the intervention in the Sant Antoni superblock.



Note: The concentrations measured with the mobile unit located in Sant Antoni are compared with the fixed reference station in Eixample (located in Roma avenue with Comte Urgell street). The Y axis shows the difference in concentrations between the mobile unit and the reference stationa ($Y_{\text{mòbil}} - Y_{\text{Eixample}}$) and the X axis shows the pre and post-intervention concentrations (see table 5.2).

Figure 5.6. Boxplots of PM₁₀ concentrations (in µg/m³) before (pre) and after (post) the intervention in the Sant Antoni superblock.



Nota: The concentrations measured with the mobile unit located in Sant Antoni are compared with the fixed reference station in Eixample (located in Roma avenue with Comte Urgell sreet). The Y axis shows the difference in concentrations between the mobile unit and the reference station ($Y_{m\acute{o}bil} - Y_{Eixample}$) and the X axis shows the pre and post-intervention concentrations (see table 5.2).

SANT ANTONI: ENVIRONMENTAL ASSESSMENT-ACCOUSTIC QUALITY

In Sant Antoni, noise data is available for the intervened crossing for the year after the inauguration (May 2018) and the year before it, provided by the Department of Environmental Assessment and Management of Barcelona City Council. The data are recorded by sensors and sonometers, every minute and second respectively, and rainy days and events that distort normal operation such as works, festivals or maintenance checks are discarded. Monthly averages of daytime and nighttime noise are shown (Tables 5.3 and 5.4).

The results show that the average daytime noise decreased in the months after the intervention by 3.5 decibels, a decrease of 5.2%. Noise at night decreased in some months and increased in others, and overall remained at similar levels as before the intervention.

Table 5.3: Daytime sound levels in the superblock of Sant Antoni (Comte Borrell 81). Decibels in the pre-intervention period, decibels in the post-intervention period, absolute change and relative change between periods.

	PRE (June 2017-April 2018)	POST (June 2018-April 2019)	Absolute change	Relative change %
June	66.8	NA	–	–
July	66.6	NA	–	–
August	65.7	NA	–	–
September	66.5	64.6	-1.9	-2.9
October	66.9	64.7	-2.3	-3.4
November	68.7	63.4	-5.3	-7.7
December	68.3	66.9	-1.4	-2.0
January	67.1	62.4	-4.7	-7.0
February	67.3	62.5	-4.8	-7.1
March	67.0	62.7	-4.3	-6.5
April	NA	64.4	–	–
Total	67.4	63.9	-3.5	-5.2

Note: NA Stands for Not Available

Table 5.4: Nighttime sound levels in the superblock of Sant Antoni (Comte Borrell 81). Decibels in the pre-intervention period, decibels in the post-intervention period, absolute change and relative change between periods.

	PRE (June 2017-April 2018)	POST (June 2018-April 2019)	Absolute change	Relative change %
June	63.5	NA	–	–
July	61.3	NA	–	–
August	60.2	NA	–	–
September	61.0	57.0	-4.0	-6.5
October	60.9	56.1	-4.7	-7.8
November	59.1	55.6	-3.5	-5.9
December	52.8	56.2	3.4	6.4
January	53.6	54.8	1.2	2.2
February	51.9	54.7	2.8	5.4
March	53.0	54.3	1.3	2.5
April	NA	55.0	–	–
Total	56.0	55.5	-0.5	-0.9

Note: NA Stands for Not Available

SANT ANTONI: INDIVIDUAL ASSESSMENT-AIR QUALITY AND NOISE

In Sant Antoni, a qualitative evaluation was also carried out through ethnographic guerrillas. In this case the assessment of the superilla by the neighbors is very positive. The reduction of the presence of cars provides a reduction in noise, and this means more tranquility and better rest, as well as a reduction in pollution.

POBLENOU

In the case of the Poblenou superblock, it was not possible to take environmental measures, but a qualitative study was carried out by means of focus groups with various population profiles: young people (third-year ESO students from an institute in the area), adults with children under 10 years of age, adults without dependent children, elderly people, workers of the superblock, and women. In general, in all groups, there is consensus that the number of motor vehicles has been reduced and that this implies a reduction in pollution and an improvement in air quality. It also highlights the positive effect of a decrease in noise pollution. For some groups, such as young people and workers, the effects on health are very positive, but in others it is also manifested that in the streets around the superblock the pollution could have been increased and therefore produce negative effects on the people who live in these streets.



CONCLUSIONS

The initial (pre-intervention) situation of the levels of the main critical pollutants in the city (NO_2 and PM_{10} particles) is different in the three superblocks analyzed. The improvement in air quality due to the traffic-calming interventions carried out in environments with more traffic and high pollutant concentrations is more significant than the improvement observed in the background urban environments.

The pacification works carried out in the Sant Antoni superblock show a remarkable improvement in air quality with a very significant reduction in NO_2 , a pollutant closely related to traffic emissions, in the pacified area (crossing Borrell with Tamarit streets) with a pre-post intervention difference of $-14.57 \mu\text{g}/\text{m}^3$ on average (-25% with respect to the initial measurement). On the other hand, in the case of the Horta superblock, the improvement in air quality is much lower and is only detected in one of the intervention areas (Feliu Codina-Chapí). In the other intervention area located in the streets Fulton-Horta no improvement is detected. The perceptions of the residents of the two superblocks are consistent with the trends found in the environmental measure.

The traffic calming actions within the superblock areas are shown to be very effective in reducing the levels of air and noise pollution at the specific point of action. Future evaluations are also needed to analyse the potential impact on air quality in non-intervened streets within the superblock area that can act as traffic channels.

The interventions carried out so far in the superblock projects have been very localized to specific points of action. At these points, an improvement in air quality is achieved when streets are pacified and motorized traffic is removed. However, the positive impact is as localized as the action, and more extensive calming measures are needed to achieve a more generalized improvement in air quality levels. In order to estimate the potential

health impact of the environmental improvement brought about by the calming interventions, the area affected and the potential population receiving the benefit also need to be larger.

KEY POINTS

- The air quality assessment carried out in the Horta superblock did not detect relevant changes in NO₂ and particulate matter concentrations before and after the intervention. However, around 50% of the women and men interviewed thought that noise and air pollution had decreased in the intervention area. The two intervention areas are valued differently: in Feliu Codina-Chapí the reduction in noise and air pollution is noticeable, while no changes are seen in the Fulton-Horta area
- In Sant Antoni, the evaluation detected a significant reduction in NO₂ concentrations, a pollutant closely related to traffic emissions, in the pacified area (Borrell-Tamarit crossroads) with a pre-post intervention difference of -14.57 µg/m³ on average (-25% compared to the initial measurement). The assessment of the neighbors is very positive due to the improvement of air quality and the reduction of noise.
- In Poblenou, the different groups interviewed reported a perception of reduced air and noise pollution but also stated that in the streets around the superblock pollution may have increased.

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CHAPTER VI

Characteristics and use of spaces

INTRODUCTION

The lack of quality public spaces in neighborhoods can be a serious constraint on well-being. Their absence limits the development of healthy lifestyles, including spending time outdoors, walking, playing, etc. [Holt NL, et al., 2008; Croucher K, et al., 2007]. Evidence from the literature indicates the existence of an association between the built environment, health and well-being, and physical activity levels [Holt NL, et al., 2008; Kaczynski AT and Henderson KA, 2007; Giles-Corti B, et al., 2005]. There is also a confirmed relationship between spending less time outdoors and a number of chronic diseases such as obesity, type II diabetes, cardiovascular diseases, asthma, back and joint pain [WHO, 2006; Lee ACK and Maheswaran R, 2011].

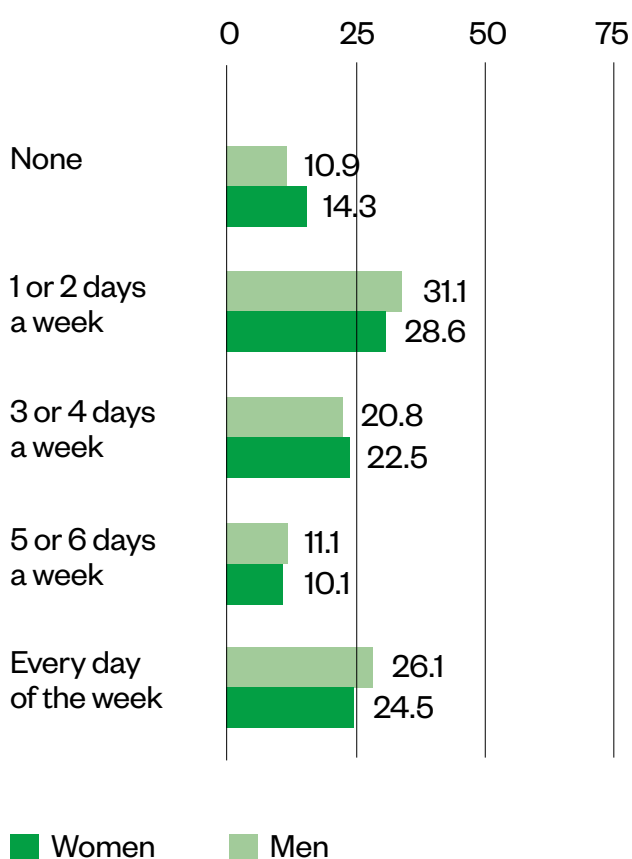
Moreover, regular physical activity (PA) practice improves population health [Kohl HW 3rd, et al., 2012] and the construction of environments that promote physical activity promotes benefits economic growth, community strengthening, healthy city planning, environmental sustainability, climate change mitigation and safety [Ding M, et al., 2020]. Increasing levels of citizen PA contributes to the achievement of 13 Sustainable Development Goals 2030 [WHO 2018] and to this end, the Global Plan of Action on Physical Activity 2018-2030 recommends the creation of active environments that promote equitable access to outdoor public spaces [Kaczynski AT and Henderson KA, 2007]. The superblocks of Barcelona are an opportunity to combat physical inactivity by creating safe and close urban environments for PA.

HORTA

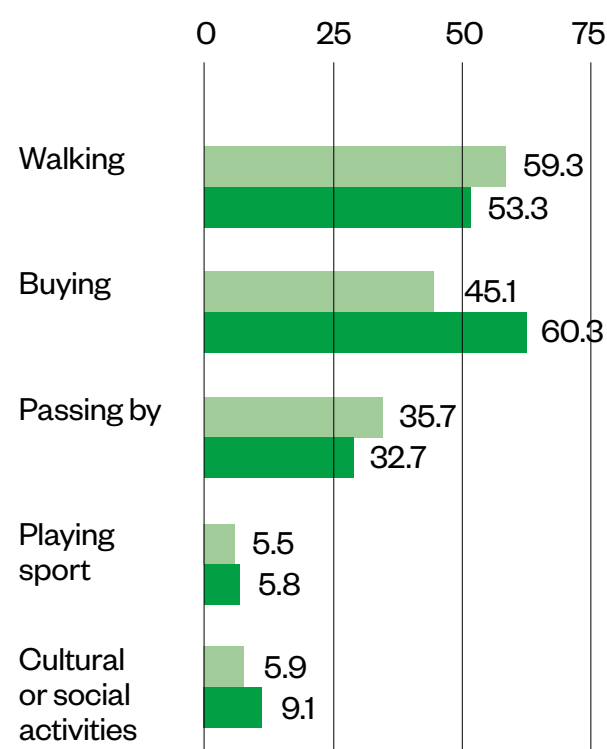
Horta's survey asked about the use of the spaces involved. 90% of men and 85% of women visited the intervened area at least once a week, while 25% passed every day. More than 50% used it for walking or shopping, but only about 6% used it for physical activity.

Figure 6.1. Percentage of frequency of passage and activities carried out in the superblock of Horta, Salut Als Carrers Survey 2020.

PASSING FREQUENCY



ACTIVITIES



The MAPS instrument audited the characteristics of the built environment on a micro scale that influence the walkability and PA of pedestrians in the surroundings of four streets of Horta (Fulton-Horta, Feliu Codina, Chapí, which was only partially intervened, and Eduard Toda, which was not intervened). The characteristics that are audited are categorized into 3 sections: A. Route: destination and use of the land (houses, shops, restaurants-leisure, institutional-services, public services, parking and stops of means of transport), characteristics of the urban landscape (presence of stray dogs, graffiti or garbage on the ground) and structural characteristics (presence of traffic signs, signs for pedestrians or presence of garbage); B. Crossings: characteristics in the design of crossings (pedestrian crossings, quality of curbs, regulation of intersections, width of streets and presence of obstacles); and C. Segments: height of buildings, ratio between the height of buildings and width of the street, space of separation, infrastructure intended for bicycles, trees, the aesthetics and design of buildings, the presence of obstacles and hazards on the sidewalk or the design of wide one-way and slope streets.

PRE-INTERVENTION RESULTS (BEFORE THE IMPLEMENTATION OF THE SUPERBLOCK).

In the streets of Horta, the characteristics of the built environment with a lower score and negative influence on the physical activity of the citizenry were found in the crossings section, with an average score of 1.85 (out of a maximum of 8). Likewise, the features in the segments section also showed low scores especially for the elderly, with an average score of 5 (out of a maximum of 16). The streets with the most room for improvement were Chapí street in the characteristics of the route section, and Eduard Toda in the characteristics of the segments section.

POST-INTERVENTION RESULTS (AFTER THE IMPLEMENTATION

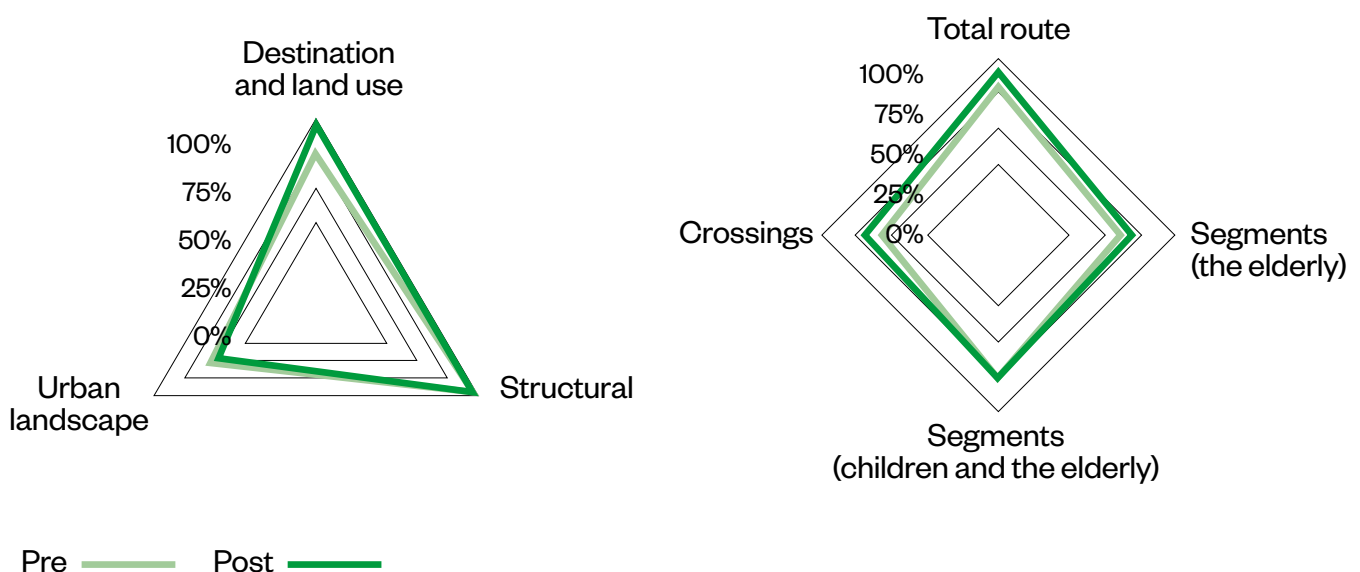
OF THE SUPERBLOCK)

Fulton Street

On Fulton Street, improvements were observed in the characteristics of destination and land use with an increase in shops and the presence of new public services (+6 points out of a maximum of 21). There was an increase in the presence of road signs, and specifically signs indicating speed limitation (+2.5 points out of a maximum of 11). An increase in temporary obstructions that hindered the passage of pedestrians was observed, decreasing the score on the characteristics related to the aesthetics of the environment (-1,5). At the global level, an improvement in the audited characteristics in the route section was observed with an increase of +5 points (out of a maximum of 33). In the characteristics of the segments section, an increase in signaling and infrastructure for bicycles was observed. In the characteristics of the crossings section, an improvement of the signaling at the crossings and also of the marks on the ground (+ 2 on a maximum of 8) was observed (Figure 6.2).

Feliu Codina Street

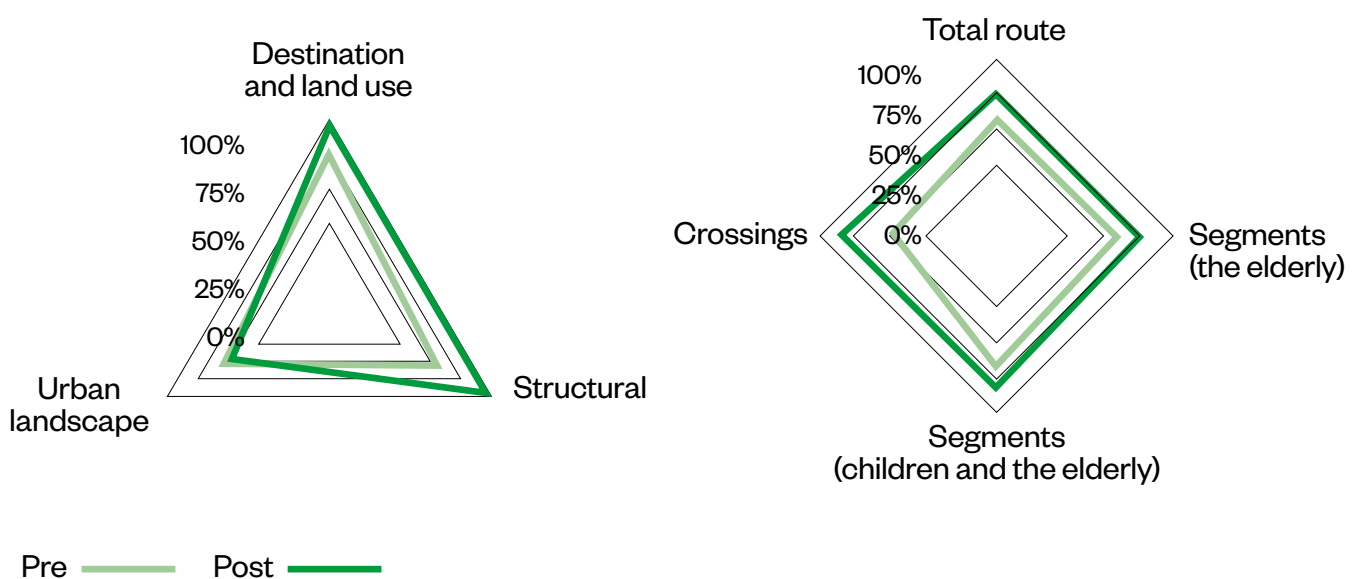
Figure 6.2. Changes observed before and after the implementation of the superblock in the microscale characteristics of the subscales of the routes section (left), subscales of the segment section and total of each section (route, segment and junctions, right) according to the MAPS instrument.



In Feliu Codina street, improvements were also observed in the characteristics of destination and land use with an increase in shops and the presence of new public services (+ 5 out of a maximum of 21). In the section audited, there was an increase in the number of road signs, and specifically speed limitation signs. Overall, an improvement in the characteristics of the route section was observed with an increase in the total score of +7.5 (out of a maximum of 33). In the segments section, there was an increase in pedestrian crossing areas, an increase in priority areas for bicycles and infrastructures that favor the use of bicycles, and an improvement in the painting of buildings or houses increasing the score of these characteristics by +3 (out of a maximum of 17). In the crossings section, an increase in the safety of the crossings, better visibility and the disappearance of slopes increased the score by + 4.5 (out of a maximum of 8) was observed (Figure 6.2).

Chapí Street

Figure 6.2. Changes observed before and after the implementation of the superblock in the microscale characteristics of the subscales of the routes section (left), subscales of the segment section and total of each section (route, segments and crossings, right) according to the MAPS instrument.

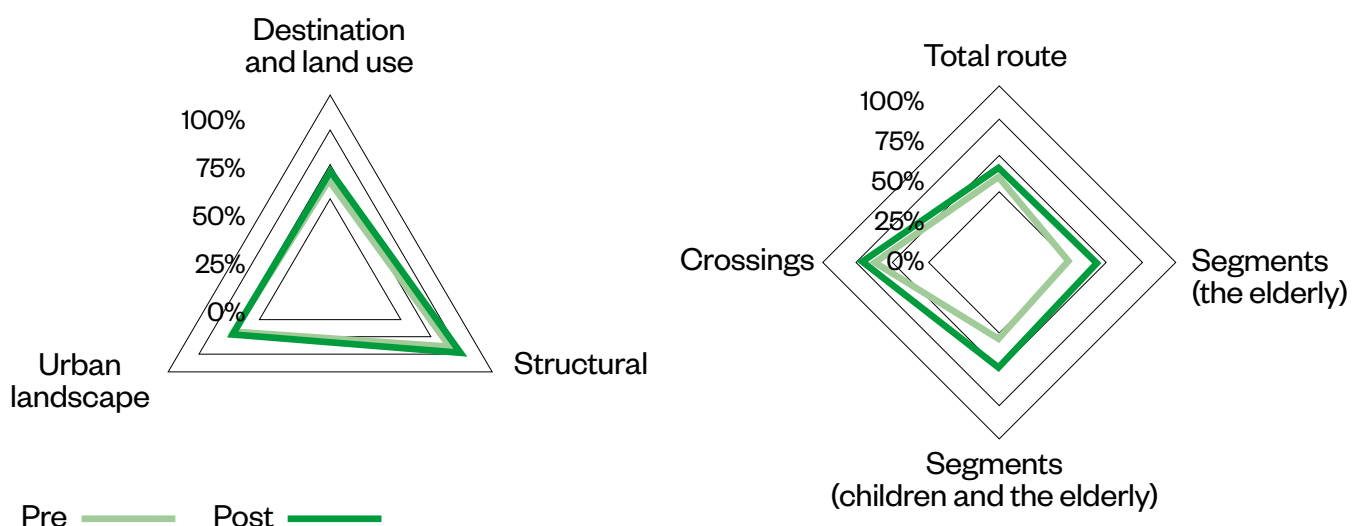


In the characteristics of destination and land use, there was an increase in the number of restaurants, but not in the rest of the services (+1 out of a maximum of 21). There was an increase in the presence of traffic signs, specifically signs for pedestrians, and an increase in the sections that level the sidewalk with the street (+1 over a maximum of 10). At the global level, an improvement in the audited characteristics was observed in the route section with an increase of +2 points (out of a maximum of 33) (Figure 6.2).

In the segment section, there was an increase in the appearance of bike lanes, signage and infrastructure for bicycles, an increase in trees along the street and an extension of sidewalks, increasing the score by +2.5 (out of a maximum of 17). In the section of crossings there was an increase in signage, increased visibility and improvements in the ramps that join the street with the sidewalk increasing the score by +2 (out of a maximum of 8) (Figure 6.2).

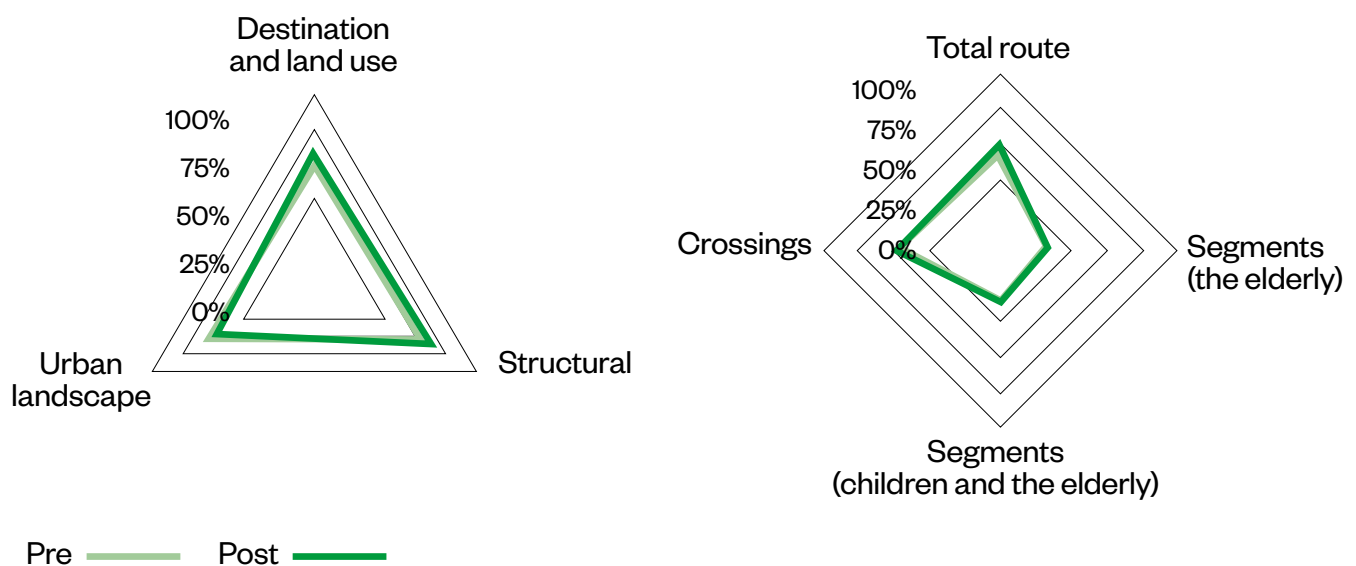
Eduard Toda Street

Figure 6.2. Changes observed before and after the implementation of the superblock in the microscale characteristics of the subscales of the routes section (left), subscales of the segment section and total of each section (route, segments and crossings, right) according to the MAPS instrument.



In the audited section of Eduard Toda Street, the superblock was not finally implemented, observing very similar results of the characteristics in the pre- and post-intervention built environment. However, improvements were observed in some structural features, noting an increase in signage and infrastructure for bicycle use and new pedestrian crossings along the stretch (Figure 6.2).

Figure 6.2. Changes observed before and after the implementation of the superblock in the microscale characteristics of the subscales of the routes section (left), subscales of the segment section and total of each section (route, segments and crossings, right) according to the MAPS instrument.

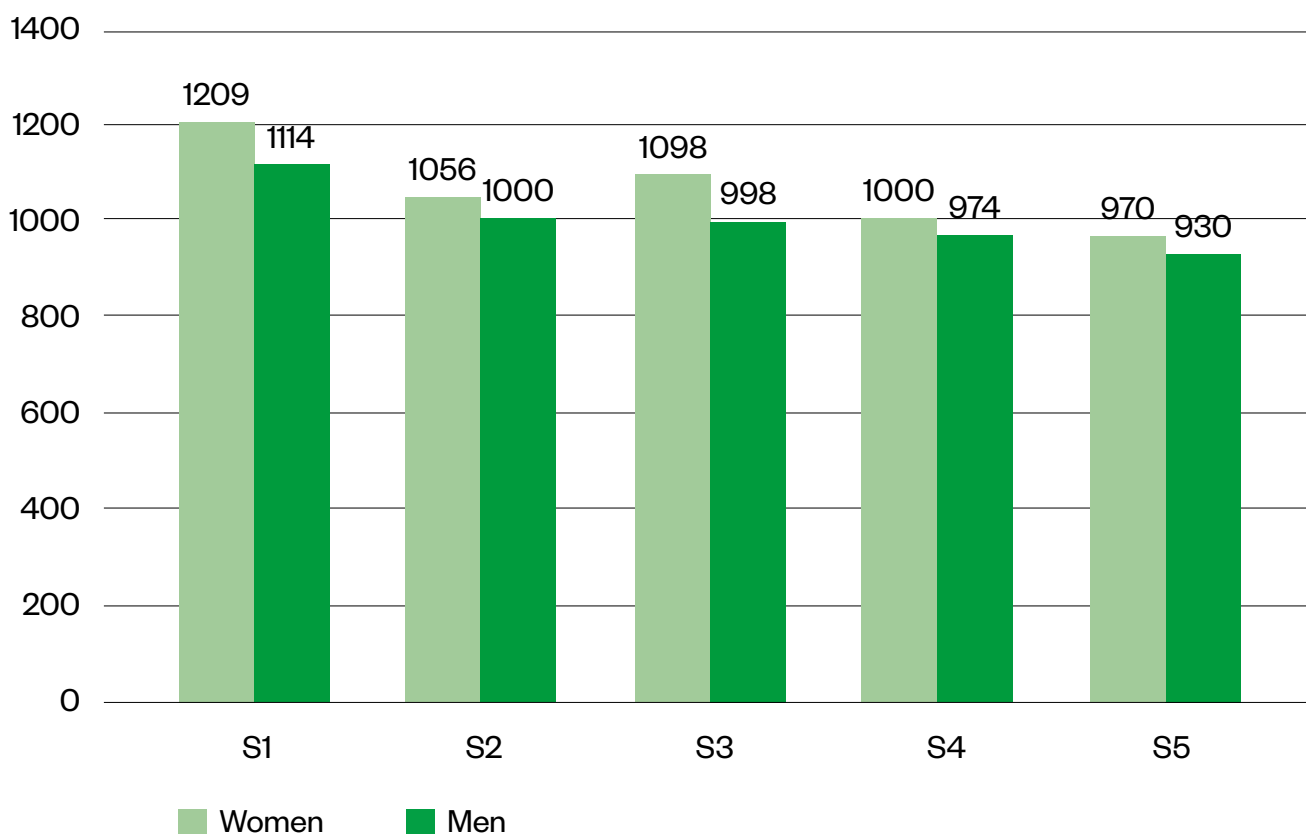


SANT ANTONI

In the case of Sant Antoni, the uses of the spaces were evaluated quantitatively and qualitatively. Quantitatively, the profiles of use of space by people were counted and qualitatively ethnographic guerrillas were carried out on people who used the superblock.

Figure 6.3. Evolution of the number of people per hour counted in the superblock of Sant Antoni during the week, in the weeks of measurement. S1 (May 2018), S2 (October 2018), S3 (November 2018), S3 (March 2019), S4 (April 2019), S5 (May 2019).

Number of people per hour

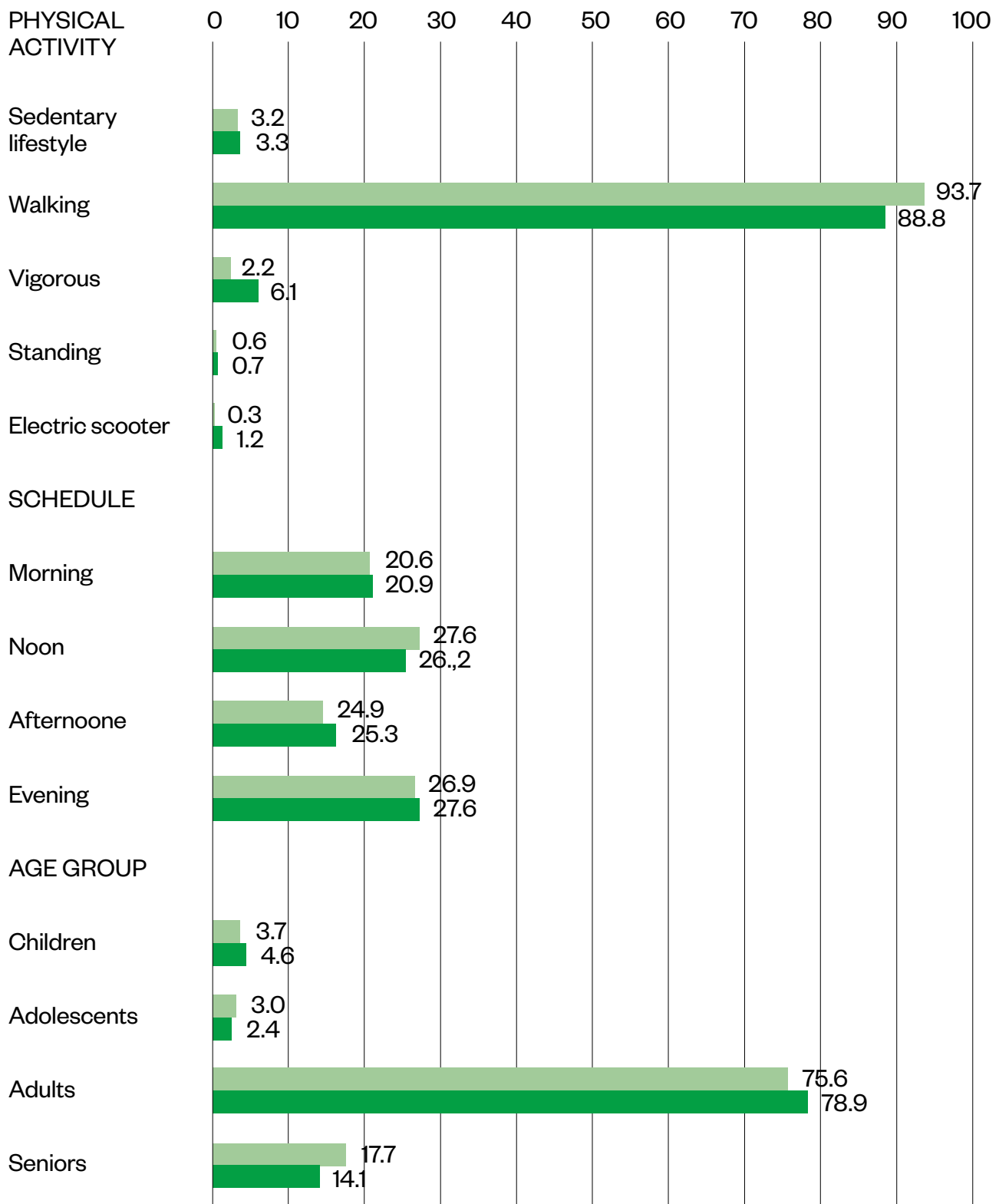


The use of the superblock remained above 900 people per hour in the superblock during the course of the study. The first week (S1), which coincided with the measurement after the inauguration of the superblock, was the one that presented a greater number of people per hour.

Figure 6.4. Average utilization of the superblock of Sant Antoni per hour during the week in men and women.

PERCENTAGE OF PEOPLE

Women Men



As we can see in Figure 6.4, during the study it was observed that on average the superblock was used most frequently by adults, both men and women, at noon and in the afternoon/evening and mainly for walking. The second most common age group that used the Sant Antoni superblock is the group of elderly people in both men and women. Only 2% of women and 6% of men were doing a vigorous activity. Ninety-four percent and 89 percent, respectively, were walking.

As for the guerrillas, this research found that in the superblock there are multiple and diverse uses: people passing through, sitting, shopping, walking, playing or exercising. In general, this represents a displacement of activities that previously occurred in other parts of the neighborhood (both stay and passing) but also of people who now use more public space or who change the use of public transport for the active one. There is a large presence of older people but few young people. Families with children consider that it is a space that allows to circulate comfortably but that generates some stress since it gives a feeling of false security, considering that there is still too much traffic.

POBLENOU

In the case of Poblenou, discussion groups were held with various groups: adults with minors in charge, adults without minors in charge, elderly people, adolescents who study in the superblock, people who work in or near the superblock and a group formed exclusively of women. All the groups agreed that in the case of the superblock of Poblenou the groups that use it most frequently are families with children (especially mothers for their greater role in reproductive work), who use the children's play areas, and working people, who frequent it to eat or when the day ends. The other collectives use it above all in passing. Young people mostly think that it is a space that is not designed for them. While the elderly people mention that they do not make

use of the superblock and that it seems to them a secluded space. As far as mobility is concerned, there is some consensus that the presence of motorized vehicles has been reduced and this has positive effects on mobility. In the case of the elderly, they consider that the superblock has negative effects on mobility due to changes in the bus network or difficulties in accessing certain sites such as the Primary Healthcare Centre. Also, as mentioned above, in some groups it is stated that traffic could have been displaced to other streets.

CONCLUSIONS

The use of the space is determined by the design of the environment and by the people who live there. The Sant Antoni superblock is very popular, especially because it is in a district with a high population density and a large elderly population, such as the Eixample. Thus, it is used by many elderly people as a place to stay. On the other hand, the superblock of Poblenou is located in an area of industrial origin where many young families currently live. This, together with the existence in the superblock of play areas (which do not exist in Sant Antoni) makes it used a lot by families with creatures. It is also an area of companies so workers are another very present group. In the two superblocks there is agreement that there are no things designed for young people and therefore they do not use them.

In Horta, the implementation of the MAPS instrument indicates that superblocks improve the micro-scale characteristics of the built environment that influence the walkability and physical activity of citizens. It would be advisable for the superblocks program to improve the micro-scale factors of Horta streets that have a low initial score and/or that have been modified to a lesser extent with the implementation of the superblocks. Modifying these factors implies the creation of a more “active-friendly” urban environment that implies a lower investment in time and money than the reconfiguration of macro-scale factors such as interconnectivity, land use or residential density.

In general, few people use superblocks for vigorous physical activity but a very significant percentage use them for walking. The Superblocks program is a good opportunity to increase the PA of the population by creating public, outdoor and proximity urban spaces where citizens can perform PA. To maximize the effectiveness of the promotion of PA in superblocks, it would be advisable to create specific areas for PA that target different age groups and that allow a subsequent dynamization of their practice. Increasing the population's physical activity is key to achieving the 2030 Sustainable Development Goals.

KEY POINTS

- Most people in the Horta neighborhood pass through the streets at least once a week. In general they use it to walk or go shopping, a small percentage for sports.
- In Horta, the superblock improves the micro-scale characteristics of the built environment, making this urban space more “active friendly”.
- The superblock of Sant Antoni presents a lot of use and diversity of types of uses (in general as a space of stay or passage). The results obtained suggest that the superblock promotes little physical activity despite being a car-free space.
- The superblock of Sant Antoni is widely used by adults and older adults.
- Poblenou's superblock is mostly used by families with, as well as people working in the area.
- Both in the superblock and Sant Antoni and Poblenou there is little presence of young people.

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CHAPTER VII

Well-being and social interaction

INTRODUCTION

Health is a state of complete physical, mental and social well-being, and not just the absence of disease or infirmity [WHO]. Similarly, mental well-being has been defined in a positive way, focusing on the positive part of the health-illness process [Oramas, 2017]. Well-being is also a positive health outcome that tells us that people perceive that their lives are going well. It includes assessments of satisfaction with one's life and feelings that can range from joy to depression, and is a global measure that integrates both physical and mental health. Results from different types of studies have seen its relationship with perceived health, longevity, health behaviors or physical and mental illness [CDC]. In addition, well-being can be a measure that helps policy makers to shape and compare the effects of different policies [CDC] (such as superblocks in this case).

The effects of social interactions (both quantity and quality) on health are also multiple, ranging from mental health, health behaviors and physical health to mortality risk [Umberson D et al., 2010]. Social interactions, trust in others and community cohesion have an effect on personal health through different mechanisms: such as mitigating the effects of stress and anxiety, giving self-esteem and mutual respect, reducing unhealthy behaviors such as smoking or alcohol and increasing healthy ones such as physical exercise, or even promoting the dissemination of health information and contacts [Fiorillo i Sabatini, 2011].

As we have explained in previous sections, the presence of spaces that facilitate community networks and social support have a potential benefit on health and well-being through the feeling of community, the feeling of security and social networks in the neighbourhood [Mehdipanah et al, 2019]. Even with the difficulty of measuring these intangible variables, in this section we attempt to discuss some of them.

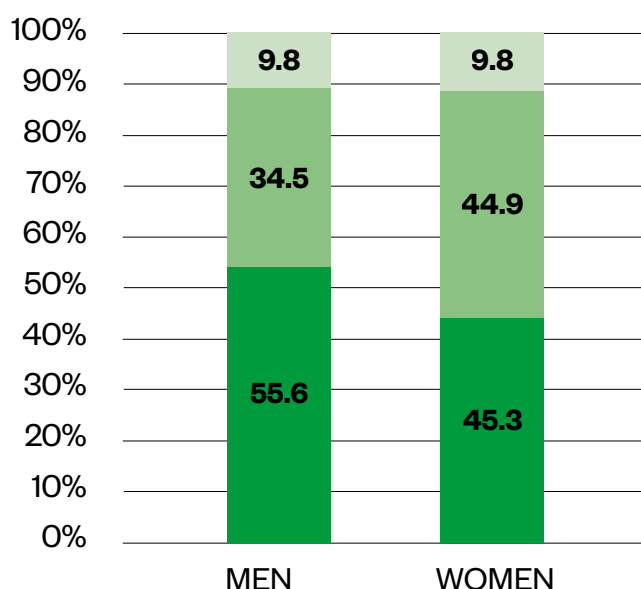
HORTA

As we have mentioned in previous sections, in the Superblock of Horta a survey was carried out of which 835 people responded before and after the intervention. Of these, 55% of men and 45% of women thought that well-being on the streets had increased. More than 60% of men and women felt that walking comfort had increased, about 75% of men and 70% of women that accessibility for strollers had increased (Figure 7.1).

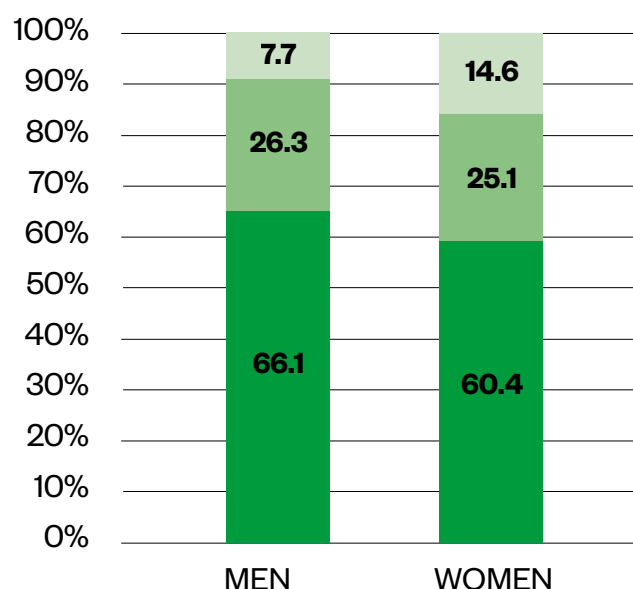
Ethnographic guerrillas were also carried out in Horta's superblock. As has also been mentioned, as for the superblock of Horta, it presents a differentiated assessment between the intervention of Fulton/Horta and that of Feliu Codina/Chapí. A positive assessment is made of the pacification of the streets Feliu Codina/Chapí: there are fewer vehicles, at reduced speed, more space has been achieved for passers-by who use the entire width of the street to walk and better accessibility for people with reduced mobility. You can appreciate walking in a quieter and more pleasant way. However, as mentioned above, the Fulton/Horta intervention is considered not to have met the objectives of the superilla as the use has not changed: it is mainly for passing and shopping and the circulation is still on the sides of the street. In addition, the circulation on the street as a pedestrian is less safe and more stressful than before by having to dodge stopped vehicles and enter the old roadway, horn of drivers who are considered with priority, absence of pedestrian crossing as there was before and in general feeling of insecurity and vulnerability and stress with children.

Figure 7.1. Percentage of people who think that certain characteristics in the intervened area of Horta have increased or decreased, Salut Als Carrers Survey 2020.

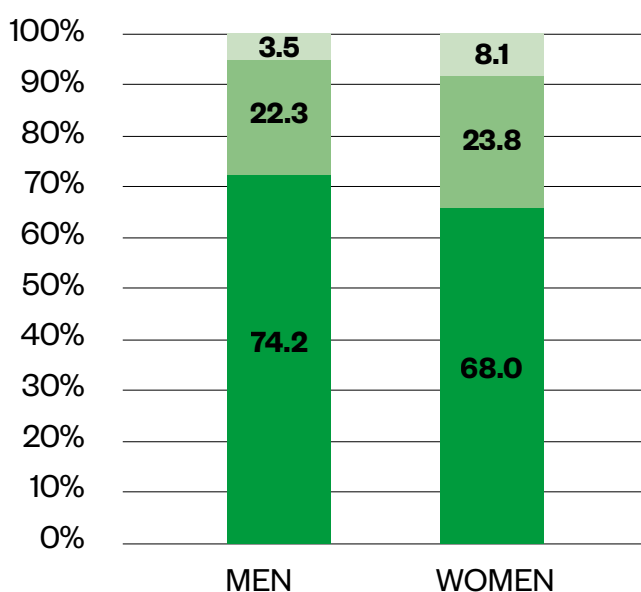
WELL-BEING



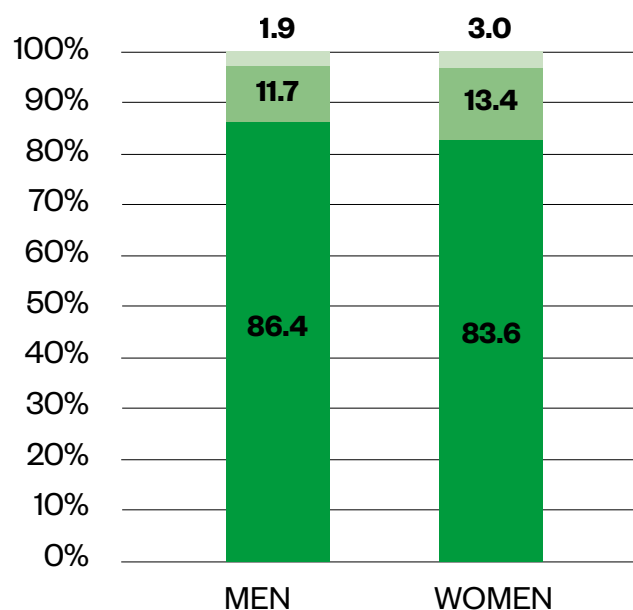
WALKING COMFORT



ACCESSIBILITY FOR STROLLERS



PARKING SPACES



■ Decreased
 ■ No change
 ■ Increased

SANT ANTONI

In this case, the guerrillas showed that currently, the area is valued as a great space for the neighbors, where to pass and be quietly, comfortably and safely. In this sense, the reduction of cars, as well as the presence of urban furniture, makes the public space happen with more pedestrians and is now considered more “full of life” and “more neighborhood”. It is a space that invites you to be. There are a variety of uses that give people a quiet, safe and comfortable experience. As we have mentioned previously, the reduction of the presence of cars provides a reduction in noise, and this means more tranquility and better rest. All of this has its repercussions on mental health, such as a perception of greater peace of mind and more security. Although people with minors in charge consider this to be a sense of false security, due to the even more or less elevated presence of vehicles. The fact that there is less pollution and more spaces to be outdoors and sunbathe, favors socialization. More specifically, it should also be noted that the presence of the market seems to establish a link with the neighborhood and especially with older women.

POBLENOU

As we have commented in several groups, the positive effects that a reduction in pollution and an improvement in air quality can have on health were highlighted. In adults without dependent children, there is specific talk of a more relaxed atmosphere and a reduction in stress. Among elderly people, however, there are no health effects derived from the superblock.

In the case of the group of workers, there is also talk that picnic spaces could favor people to take food from home and therefore suppose an improvement in the diet. In addition, it is said that the space of the superblock facilitates walking and that it also provides tranquility, assuming therefore an improvement in mental health. In the case of women, the idea arises that the space facilitates interaction between neighbors, thus favoring relationships and social networks, and the theme of a potential negative effect on the streets around the superblocks appears again.

Among women, some mention this area as a deserted area and perceive a certain insecurity, while others perceive the opposite because it is an open space.

CONCLUSIONS

In general, in the two superblocks there are potential positive effects on health and wellbeing resulting from the implementation of the superblocks. In addition, more linked to the field of mental health, the idea of how superblocks would favor socialization, as well as a feeling of tranquility, also arises. In the case of Poblenou, other elements arise such as a possible improvement in physical activity related to the ease of walking, or improvements in eating habits due to the availability of picnic areas.

KEY POINTS

- The superblock of Horta in general is valued positively and an increase in the well-being of the neighbors is appreciated. However, there are two areas with distinct effects. The one on the entrance street to the neighborhood, where such positive effects are not appreciated so much. And that of the interior streets, where a reduction in traffic has been achieved, better accessibility and an increase in the use of space by pedestrians, with its consequent tranquility and well-being when walking.
- Among the main effects identified in the superblock of Sant Antoni would be the benefits in mental health (tranquility and safety), better rest (less noise) and more socialization.
- In the case of Poblenou, a more relaxed atmosphere and a decrease in stress are also perceived, and in the case of working people, a potential improvement in their diet.

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CHAPTER VIII

Conclusions and recommendations

CONCLUSIONS

The main findings of the studies are listed below:

- Although the interventions developed have been very small, overall the intervention in the superblocks is valued in a positive way.
- There is a perceived gain in well-being, tranquility, quality of sleep, reduction of noise, reduction of pollution and increase in social interaction.
- Air quality measures show improvements to the intervened areas where the streets are pacified and the number of cars is reduced. Air quality improvement is much more intense and effective in high traffic environments compared to urban background environments.
- Although the use of superblocks is high, the levels of vigorous physical activity performed in them is rather moderate.
- The population demands greater intensity of traffic pacification, since the passage of vehicles, despite being at low speed, continue to generate road insecurity, noise, pollution and occupation of public space.
- These measures have great potential to impact on the health of the population, but only if they are implemented extensively.

Specifically by superblock:

HORTA

- In Horta there are two distinct effects. The one on Fulton-Horta Street, with a high number of vehicles and at a speed above what is allowed, where pedestrians feel insecure. And that of Chapí-Feliu Codina streets, where pedestrians use the entire roadway to walk and where there has been a real improvement in accessibility for people with reduced mobility.
- There have been no significant changes in air quality.

SANT ANTONI

- The superblock of Sant Antoni is valued in a very positive way, an area that invites you to socialize and walk in a quiet, safe and comfortable way.
- You can feel more tranquility and better rest.
- The measures of the air quality in the superblock of Sant Antoni show a significant reduction of NO₂ in the pacified crossing.

POBLENOU

- It is used a lot by families with children and working people who receive its benefits.
- There is a noticeable decrease in pollution and noise due to the decrease in traffic. Still, there is concern that it may have moved to surrounding streets.

RECOMMENDATIONS

The following are the main recommendations derived from the studies carried out:

- Pacification actions in the areas of the superblock do not solve the problem of air pollution in the entire territorial area of superblock. More extensive pacification measures will have to be considered to improve air quality in a larger area.
- In general, residents are calling for the interventions to be complemented by other measures such as the reinforcement of public transport to reduce the use of private vehicles and more intense and extensive measures to improve air quality.
- In several of the superblocks, more street furniture and elements adapted for the different age groups are also requested.
- It is necessary to improve signage and the creation of mechanisms to further limit private car access in the superblock, reduce speed and emphasize pedestrian priority.
- The increase of the space of stay (especially in superblocks where little space has been created), as well as the increase of the green have also been recurring themes and that are considered important to increase the well-being of the neighbors.
- The Superblocks program is a good opportunity to increase the physical activity of the population by creating public, proximity and outdoor urban spaces. It would be advisable to create areas that target different age groups to maximize the effectiveness of promoting physical activity.

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