Planning for Urban Health: Evaluating Urban Planning Strategies to Improve Public Health and Wellbeing Outcomes through Cycling

A Latitudinal European Section Analysis

by Folouli Stefania & Savvides Andreas
University of Cyprus

Keywords: active transportation, urban policies, cycling infrastructure, public health, physical activity.
Conference topic: Theory 1: emergence, relational theories, the social sciences and urban morphology.

Abstract: In the late decades public health and urban planning, towards a sustainable future, have emerged with the common goal of increasing public health, and researchers have been initiating a research agenda on the built environment and public health suggesting that there is an obvious overlap between the two fields today. In an effort to review and highlight the major connection between these two fields, this paper tries to evaluate specific urban strategies, forms and infrastructure, specifically those promoting cycling, and their impact on urban population health. More specific, the current research will try to prove that urban strategies and infrastructures, who promote physical activity through cycling, have major impact on improving public health. Sedentary lifestyles have emerged as a pressing public health challenge because some of the consequences – overweight, type 2 diabetes, cardiovascular diseases, and other conditions, – and have reached epidemic proportions. Urban planners have the power on mobilizing population by designing cities that promote physical activity through policies that encourage cycling. An increasing body of evidence suggests that moderate forms of physical activity such as walking and bicycling, when engaged in regularly, can have important beneficial effects on public health. Although, the demand for clear scientific evidence to inform and support the health policy-making process is greater than ever. The current researche's results indicated that urban characteristics and infrastructures such as high densities, polycentrism, long and cohesive cycling network, existence and availability of bike schemes and distributed bike parking have a positive impact on public health.

1. Introduction

EU member states in recent years have placed different emphasis on active transport and the use of urban design to facilitate cycling and walking. Many countries have a strong culture of cycling, long standing cycling strategies and extensive cycle networks. EU transport strategies also

DOI 10.36158/978889295328445
www.tabedizioni.it

now include a focus on active travel including tax breaks for work cycle schemes, cycle training for children and even the development of cycling cities and towns. More recent, population level cycling interventions have included the public bike hire schemes in Paris and London, Barcelona and other metropolises. Furthermore, active transport is a high priority in the European Union's (EU) sustainable development and public health strategies. Reducing the use of vehicles and increasing distances walked and cycled, could have important health co-benefits reducing the prevalence of physical inactivity and associated burden of chronic non communicable diseases, contributing to achieve the so-called "healthy cities".

The understanding of how urban environments affect health outcomes and can produce health benefits is an urgent priority, as recognized by WHO in their declaration of 2010 as the Year of Urban Health. From this perspective, there are reasons to be optimistic. The Healthy Cities movement has appreciated the fact that cycling promotes public health and generated much action. (The Lancet, 2012). An active lifestyle is associated with lower mortality and improved quality of life. It is recommended by the WHO (World Health Organization) that adults should undertake at least 150 minutes of moderate intensity physical activity or 75 minutes of vigorous physical activity a week. Most adults in Europe do not currently achieve this target. Cycling is one way that can promote populations physical activity, so shifting people's approach to alternative ways of transport is now a common objective of urban policies, the overall aims of which may include improving public health.

Cycling has been shown to meet metabolic criteria for achieving health benefits from exercise. The health benefits of regular sustained physical activity include on general:

- a 50% reduction in the risk of developing coronary heart disease (a similar effect to not smoking);
- a 50% reduction in the risk of developing adult diabetes;
- a 50% reduction in the risk of becoming obese;
- a 30% reduction in the risk of developing hypertension;
- a 10/8-mmHg decline in blood pressure in people with hypertension (a similar effect to drugs);
- reduced osteoporosis;
- relief of symptoms of depression and anxiety and
- prevention of falls in the elderly

On the other hand there are also health risks that are associated with cycling and walking, too, the most serious of which are accidents involving cars. Nevertheless, preliminary analysis shows that on balance the benefits to life expectancy of choosing to cycle are about 20 times the injury risks incurred by that choice, so in this thesis cycling will be considered only on its positive aspects. (Carlos Dora, Margaret A. Phillips, Margaret Phillips, 2000)

Consequently, the aim of this research was to document urban planning strategies and infrastructure that promote cycling, and prove that these can contribute to higher levels concerning public health. The goal is to assess the current situation on bike use, focusing on six different cities across Europe, by evaluating planned improvements to the network from the cyclist's perspective, in order to observe if there are any variations on public health levels concerning cardiovascular and circulatory diseases, life expectancy, physical activity and other determinants. Between these six case studies, where different strategies are applied. Moreover the aim also includes an evaluation of the existing cycling infrastructure's impact to public health for

the different case studies, in terms of parking, accessibility, route quantity and quality in order to observe through statistical modelling how much they do affect public health.

Literature review indicates that many valuation studies concerning the health benefits of active travel policies have been published over the recent years. Building upon the literature review of Genter, Donovan, and Petrenas (2008), one can see that different approaches had been used to value the health benefits of active transport modes such us cycling and walking, which accounted for different diseases costs, mortality and morbidity outcomes, using different monetary values (e.g. social costs for a set of diseases, value of a statistical life) and thresholds. Most recent studies use the World Health Organization's appraisal tool HEAT (Health Economic Assessment Tool) or its parameter values to estimate the health benefits of urban forms and policies. This tool is designed to help conduct an economic assessment of the health benefits of walking or cycling, by estimating the value of reduced mortality, that results from specified amounts of walking or cycling. Apart from HEAT, another widely used tool is HIA (Health Impact Assessment) tool, which is presented on the table below.

Following the theoretical methodology proposed by the UCL & Lancet Commission in 2011, which suggested that a) urban planning and managements b) the features of the built environment c) the aspects of the built environment that affect health d) the society and governance, all affect both directly and in combination and interaction, public health, a new table was produced, based on UCL's flow charts, in order to organize this research and create a conceptual framework to prove that appropriate urban planning and infrastructure that promote cycling do increase public health levels.

According to the WHO regional office for Europe, some factors that have been proved to influence people's choices and habits are the following:

- availability of public transport
- high housing density
- street connectivity
- land-use mix

The above have all been shown to be associated with higher levels of physical activity, especially when these interventions apply to cycling.

The main limitation of available studies of the association between physical activity and the environment is the absence of prospective data. Most studies so far are cross-sectional, and little is known about the effectiveness of interventions in the urban environment on levels of physical activity. Although the evidence is patchy and cannot be generalized, urban planners could probably help to promote higher levels of physical activity, through policies that seek to increase population density, diversify land uses, and improve street connectivity, paying particular attention to the transport demands associated with heterogeneous populations in cities. (The UCL&Lancet Commission, 2012).

2. Data sources

Data collection on cycling and walking across Europe, paralleled with health facts, is not systematic or standardized. Reporting is irregular, with different definitions and range of values. Every country has its own local data basis, and as a result, many times data is not comparable. The monitoring of physically active modes of transport should be improved.

Many of the data were collected by the European Health Survey 2014 and secondary data were also collected from national travel and crash surveys that were used to compute fatality trends in general and fatality and injury rates for cyclists. Literature review and its findings shaped the current thesis theoretical axes and oriented the author to look on the appropriate data sources.

3. Methodology

The research follows three main axes of work: the conceptual framework, the qualitative research and the quantitative research.

3.1. *The conceptual framework*

As already mentioned an overview of scholarly work related to the central theme of this thesis was given. The conceptual framework of the author has already been presented and was based on UCL& Lancet Commission's research, and indicated that public health has a strong relation with the size of the population of one city, the morphology and the land use of the city, the spatial location, the means, mode and distance of transport and the consumption of energy. These parameters will be the main domains that the current dissertation will examine, in order to prove the strong relationship between public health and cycling urban infrastructure.

3.2. *Qualitative research*

The multiple case study analysis was found to be the most appropriate research strategy for this research. Latitudinal sections across Europe were made, comparing cities with many similar characteristics regarding to their climatological conditions and population size, resulting to city-couples that can be comparable. Believing temperature may be reason why people cycle or not, as long as extremely cold or extremely hot temperatures may be think to discourage cycling, comparisons will be made on cities that have similar latitude which means climatological factor will be omitted and not affecting the research, at this qualitative level.

These couplings were extensively analyzed in order to examine, on the one hand the cycling attitude/cycling trends of their citizens, and on the other hand some main differences on the urban form and infrastructure of every city and the urban policies which are followed in order to make cycling feasible. Different mapping were compared to analyze, in terms of urban context, the differences between every two cities and compare urban forms, infrastructures & policies to underline the main divergences.

The selected cases are the cities of: Manchester, Copenhagen, Paris, Bucharest, Barcelona, Athens which where categorized by their climate zones in pairs as following:

- SECTION A in red colour: Mediterranean cities- Mediterranean climate zone
- SECTION B in green colour: Central Europe cities- Central European Continental climate zone
- SECTION C in blue colour: Northern Europe cities-Temperate Oceanic climate zone

The selected cases were picked by means of purposeful sampling. As opposed to quantitative studies, where cases are often randomly selected, purposeful sampling is a widely used case se-

lection method in qualitative research. Based on the information gained from the desk research, the following criteria were then used to select the cases:

- a. difference in modal share of cycling and the cycling history of the cases
- b. difference in strategy regarding cycling policy between the cases
- c. difference on health data(mainly mortality rates) between the cases
- d. comparable population size between the city-couples
- e. available statistical data on all cases

3.3. *Quantitative research*

Data were collected for all 6 cities and were inputted into IBM SPSS Statistics 21 software. SPSS Statistics is a software package used for interactive, or batched, statistical analysis. All the data used for this research derive from:

- World Health Organisation available statistics
- European Health Survey 2014
- National Statistics Organisations for each city
- Regional surveys concerning mobility for each city

After collecting the data, R-squared regression was calculated through the software, in order to observe if there is any correlation between possible couples of variables.

For each city the following data were collected:

- Km of overall cycling routes (numerical)
- Modal share of cycling (%)
- Modal share of trips by car (%)
- Life expectancy (years)
- Modal share of circulatory system deaths (% of all deaths)
- Obesity percentage (%)
- Bikes available on the bike scheme (numerical)
- Physical Activity percentage (%)
- Number of bike parking (numerical)

Table 1 demonstrates the values for the variables above.

3.4. *Value Range of R-squared*

As already noticed, this study contains both values taken from European Surveys and National statistics departments of each country and/or city, and values to be predicted that are behavior-related. For example, the expected modal share of cycling as a hypothesis (dependent variable) modeled together with the km of overall cycling routes (independent variable) is a totally behavioral-related model, because the modal share of cycling will always be affected by people's willing to cycle which is a human parameter-hard to be predicted. In addition to this, the sample of this study N=6 is quite small for statistics modeling, a fact that generally minimizes the R-squared levels.

Table 1. *Collected Data.*

N=CITIES	modal share of cycling	modal share of trips by car**	km of overall cycling routes	share of circulatory system deaths*	obesity percentage	life expectancy	bikes available on bike scheme	physical activity percentage	number of bike parking
Copenhag.	35.00	24.00	526.00	24.30	16.20	80.50	2500.00	82.00	54000.0
Manchest.	2.10	36.00	410.00	27.80	28.00	80.00	1000.00	51.60	3055.0
Barcelona	2.50	15.00	190.00	30.00	24.00	83.00	6300.00	34.00	21387.0
Athens	2.00	35.00	73.00	39.70	17.00	81.00	260.00	16.70	900.00
Paris	7.50	12.80	692.00	24.50	23.90	81.50	14500.00	25.00	25900.0
Bucharest	2.00	48.00	58.00	59.50	17.50	75.00	210.00	8.60	500.00

*among all deaths
** car means any privately owned vehicle (does not include public transportations by any kind of car)

Having taken into account all the special parameters of this particular study and its purpose, the R-squared values that will be set for this study follow below:

- R-squared values lower than 0.4 was referred as "weak", "low" or "indicative" because they cannot be considered as statistically significant.
- R-squared values of 0.4 up to 0.6 was considered as "moderate", statistically significant.
- R-squared values higher than 0.6 was referred as "high" or "substantial", being considered as statistically significant indicators that confirm the hypothesis.

4. Analysis/Results

4.1. *Case studies analysis*

Section A: Barcelona-Athens (Mediteranean cities)
A. Barcelona
Population: 1.62 million
Total Area: 101,9 km2
Density: 16.000 residents/km

Over the past decade, the city of Barcelona has slowly been building up cycling infrastructure by the implementation of new policies and infrastructure such as adding bike lanes and reducing speed limits, in order to promote cycling in the city.Barcelona's high population and urban density are an advantage to spatial development and transport planning.Barcelona's 2013-2018 Urban Mobility Plan (UMP) defined the lines of action that will govern urban mobility in the coming years. Concrete lines of the UMP contain the following: (1) implementation of su-

perblocks and other traffic calming measures(2) implementation of the orthogonal bus network (to improve connectivity); (3) further development of the cycling network; (4) maintenance of current level of traffic services; (5) compliance with regulatory parameters of environmental quality; (6) positive discrimination measures of high occupancy vehicles; (7) review of the regulation of parking (on and off-road); and (8) improving the efficiency of loading and unloading.

What SUMP aspired, concerning Superblocks, was taking a square of nine blocks, allowing the roads on the perimeter to retain their original function, but changing what the interior streets allow. Those streets trisecting the 3x3 superblock have their directions of travel altered. Barcelona's superblocks are found in five pilot neighborhoods, the city has lassoed units of nine square blocks of mixed-use buildings into designated superblock zones with new rules for transportation, environmental health, and governance. In contrast to the single mega-block structure used in typical cities, Barcelona's superblock is criss-crossed with small streets.

The Superblocks project is being applied today in Barcelona and its effect on the neighborhoods is substantial. This translates well to greater bicycle use, according to previous data, and therefore, it translates to improvement on public health, according to Spanish researchers Rojas-Nueada & de Nazelle. (2011).

Barcelona also features a city sponsored rent a bicycle easily program called *Bicing*. The small-wheeled red bicycles can be remarked easily, being ridden by mostly Barcelona citizens. Started in March 2007, the Bicing program is thought to be only for the Barcelona residents, these bicycles can only be rented out by the locals.Bicing was introduced in 2007 to improve the use of different types of transport, promote sustainable transport, create a new individual public transport system, promote the bicycle as a common means of transport, improve air quality, and reduce noise pollution, and has been extremely popular. By August 2009, 182,062 people had subscribed to Bicing (11% of the population in Barcelona municipality), with 68% of trips being used for commuting to work or school and 37% combined with another mode of travel.

On June 2011, researchers David RojasRueda, Audrey de Nazelle, Marko Tainio, Mark J Nieuwenhuijsen completed a Health Impact Assessment study on Bicing bike hire scheme, in

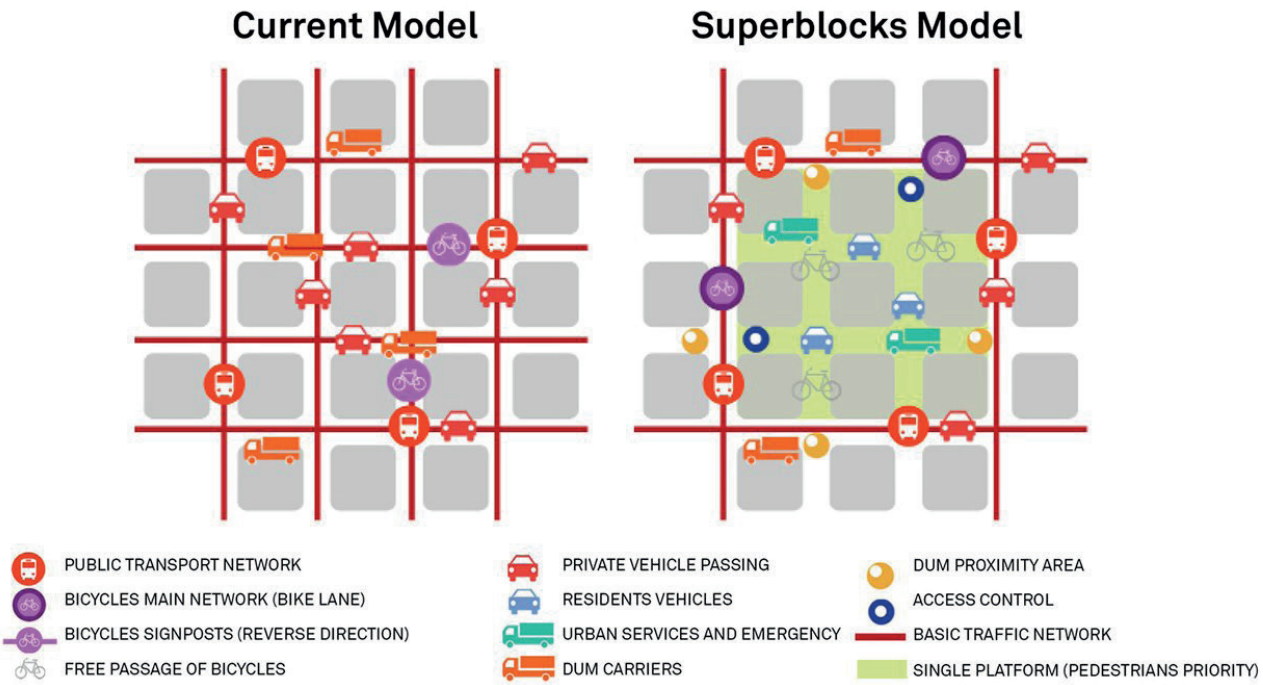

Figure 1.

order to estimate the risks and benefits to health, of travelling by bicycle using a bicycle sharing scheme, compared with travelling by car in an urban environment. They found out that 52.15 deaths would have been expected each year, but because cycling was used as a typical means of transport, the number of annual deaths was reduced by 12.28 to 39.87. A previous study of the same researchers, showed that such interventions generally lead to an average 3% increase in the prevalence of cycling in the population. Bicing, has so far increased the number of cycling trips by 30%. In addition, 11% of the population in Barcelona subscribed to Bicing, although based on their estimates only 1.7% of the population are regular users. Their work has shown that, low cost public bicycle sharing systems aimed at encouraging commuters to cycle, are worth implementing in other cities, not only for the health benefits but also for potential co-benefits such as a reduction in air pollution and greenhouse gases.

B. Athens

Population: 1.9 million*

*Including: 1. Central precinct of Athens 750.982 residents, area 87,4 km2

2. South precinct of Athens 394.191 residents, area 69,4 km2

3. North precint of Athens 446.721 residents, area 140,7 km2

4. West precint of Athens 386.953 residents, area 66,7 km2

*Pireaus is not taken in account

Total Area: 364,2 km^2

Density: 5219 residents/km^2

Although Athens already possess the critical features of compact development, such as high densities and diversity of land uses (see Milakis, Vlastos, and Barbopoulos 2008), travel choices are still primarily oriented toward cars and motorcycles. Car-restriction policies few, but also the infrastructure for alternative means of transport is limited, resulting in low usage levels with cycling trips only in 1%. Cycling in Athens was very common until the 1970's. Nowadays problems of safety force more and more people to use the car. Greece often ranks last among European countries when it comes to driving culture. Every day, two people perish, four become quadriplegic, eight are left paraplegic, and 50 are wounded, according to European Commission Data, as presented by the Special Committee on Road Safety. Over the last years there has been an effort to reintroduce cycling into everyday life, but little progress has been done. There are many problems involving cost, mentality, very poor and narrow road networks and congestion both in traffic and parking. .Unfortunately, Athens does not have an official Sustainable Urban Mobility Plan yet.

Although Athens is a city of almost 2 million citizens, its form is typically monocentric. Approximately 25% of the population lives, and 30% works, in the centre, and sometimes working places (mainly of the tertiary sector) have been concentrated across radial arteries leading to the city centre. This monocentric form of Athens, is accompanied by high residential densities, particularly in central areas .In Athens, a high percentage of the population still lives in the centre, and as a consequence there is a low rate of suburbanisation compared with other polycentric European cities. Low suburbanisation could also be attributed to the topography of the city. Although high densities around the centre could enhance the bike prevalence, today car still remains the prevalent means of transport of the Athenians, even in the historical centre. In addition, monocentric urban form is a parameter that make travel distances longer, from the suburbs to the centre, and therefore commuting to cycling is made much difficult.

The current bike lane network is far from what we see in bike-friendly cities around the world. Almost 50 kilometres of scattered, short paths, distributed all over Attica's Municipalities, perfectly describe the inadequate effectiveness with which authorities have responded to

the matter until now. More specifically, inadequate infrastructure, such as limited bike lanes and unprotected cycle paths in addition to traffic safety concerns, are significant factors that discourage Athenians to cycle. Furthermore, the bike lanes are found mostly around or inside parks, marinas or university campuses.

Athens has twobike schemes today. Athens Bikes is the first Athens bicycle rental system was launched in spring 2016, at Technopolis in Gazi, downtown Athens by the name Athens Bikes.For the time being, bikes must be returned to the starting point at Technopolis in Gazi, which is not quite convenient for users. The scheme does not pretend to solve all the city's traffic and pollution problems, but it was a step in the right direction. The second bike scheme is i-Bike, located at the coastal suburb of Glyfada, southern Athens, also launched in 2016. With i-Bike stations at two Glyfada locations — one near the beach and one at the old City Hall — 20 bicycles are available to cyclists for transportation purposes, strolling or just for leisure use.

4.2. *Case study comparison*

Comparing and analyzing different mapping , Barcelona and Athens comparison results summarize between four main domains:

- Urban Density
- Urban Form
- Cycling Routes
- Bike Schemes

4.3. *Comparison Synopsis*

In addition, numerical health determinants comparison is present on the following table.

Table 2. *Barcelona's and Athens' comparison.*

Urban Characteristics	Barcelona	Athens
Urban Density	Extremely dense, compact city	Dense city mainly in the historical centre
Urban Form	Coastal city, ortho-regular linear pattern, cohesive road network, flat topography	Coastal city, patchy organic planning, narrow incoherent road network, basin and hills
Cycling Network	Extensive, cohesive, prohibition of cars inside Superblocks	Inadequate, fragmental, cars allowed almost everywhere
Bike Scheme stations	Strong system well connected, spreaded equally throughout the city	Different schemes on different suburbs, discourage the user

4.4. *Health Determinants Comparison*

Table 3. *Barcelona's and Athens' health determinants comparison.*

	Barcelona	Athens
Cardiovascular diseases and circulatory system deaths share among all deaths (2013)	30%	39.7%
Life Expectancy	83 years	81 years
Physical Activity rate	34%	16.7%

Comparisons and health determinants observation shows that urban planning strategies such as, a)high urban densities, b)orthological gridded urban fabric, c)extensive and cohesive cycling network and d) developed bike-sharing system have a positive impact on public health.

5. Discussion/Conclusion

This study underlays the importance of urban planning strategies and cycling infrastructure concerning the public health levels of a city. Cycling infrastructure together with appropriate urban planning can be the motivation the population needs to commuting to cycling

According to the qualitative data analysis, quality factors such as urban sprawl, urban form, population density and road safety play a significant role to the implementation of good cycling infrastructure which motivates people to cycle more.

Based on the comparison between the three sections of coupled-cities, the cities who were more sprawled, having less people living in one km on a greater land area where those cities who had less cycling infrastructure while they presented higher percentages on circulatory system deaths. Therefore, parallel evaluation of both quantitative and qualitative data, lead to the conclusion that high density cities with concentrated nucleus urban form usually have higher scores on public health data because they consist a much easier ground for the local authorities to develop cycling infrastructure.

In parallel with high densities, transport-oriented polycentricism applied across the city, found to be an advantage in terms of public health levels. Cohesive and dense cycling network is obviously an advantage, because it encourages people to cycle more. Apart from these, bike sharing system station's number and distribution and the number and distribution of bike parking played an important role.

Summarizing, the specific urban characteristics of the cities, after the comparison, that showed a positive influence on public health are presented below:

- High urban density
- Transport-oriented polycentricism
- Long, dense and cohesive cycling network
- Number and dense distribution of bike-sharing system stations
- Number and equal distribution of bike parking throughout the city

Apart from the qualitative findings, the analysis of the collected quantitative data, indicated possible relativity between upgraded cycling infrastructure and public health. Statistical analysis implied that cities that have longer cycle paths, more bike parking spaces and well developed bike rental schemes, tend to have healthier citizens.

More specifically, it was proved statistically that the available kilometers of cycling routes in one city have a substantial impact on the reduction of cardiovascular system diseases (CVD's) related death rates among all deaths. Having in mind that CVDs are the leading cause of mortality and morbidity at a European level, this finding means that if a city invests on building more cycling routes, it is likely that there will be a significant improvement on annual death rates from CVD'S.

It must also be mentioned that the statistical analysis showed that the when the total kilometers of cycling routes are increased , the same do the bike parking spaces , which is quite logical as more people are likely to commute by bike so they need available parkings. This finding showed that cities usually, develop new different cycling infrastructures at the same time, in order to cover commuter's needs.

The statistical analysis also showed, that when the available bikes of a bike sharing scheme are increased, the modal share of trips by car tends to decrease. It also showed that, lower levels on modal share of trips by car, indicated lower CVD death rates among all deaths, and higher life expectancy.

In conclusion, the decisions of local authorities, concerning transportation, are mainly based on the potential of the project to contribute to public policy goals and one of the most important goals-apart from the economic side- must be public health. In the bike-friendly cities, the primary focus for the bike infrastructure projects is to provide good transportation facilities to non-car users, and especially in the later years, to motivate car users to cycle instead, changing the modal split from car to bike. According to the bicycle account 2016 in Copenhagen, the health benefits from switching from car to bicycle are 19 times higher than the drawbacks from accidents and air pollution. In addition 5-6 years longer life expectancy is a consequence of a physically active life style compared with physical inactivity, while 30 % reduced mortality rate as a consequence of cycling 30 minutes a day over a longer period.

The following table presents an overall synopsis of the findings of this research:

In conclusion, this research tried to make an overall evaluation of urban planning strategies and infrastructure which are bike-oriented, in order to show their major influence on public health levels. This research can also be used as a simple manual for designing more bike-friendly, sustainable, healthy cities.Public policy makers and local authorities should take more into

Table 5. *Public Health. Synopsis table of the findings of the research.*

Qualitative Research	Quantitative Research
urban density	kilometers of cycling routes
polycentrism	number of bike parking spaces
cycling network	number of bikes available on a bike scheme
bike-sharing systems facilities	
Bike parking facilities	

account policies that promote cycling, as they are a strong weapon on improving population public health.

References

UCL & the Lancet Comission, Rydin Y. *et al.* (2011), *Shaping cities for health: complexity and the planning of urban environments in the 21st century*, The Lancet Commission.

Pucher J., Dijkstra L. (2003), *Promoting Safe Walking and Cycling to Improve Public Health: Lessons From The Netherlands and Germany*, in *American Journal of Public Health*, vol. 93, N. 9.

de Nazelle A. *et al.* (2011), *Improving health through policies that promote active travel: A review of evidence to support integrated health impact assessment*, Elsevier.

Lawrence D. Frank, Engelke P., *How Land Use and Transportation Systems Impact Public Health: A Literature Review of the Relationship Between Physical Activity and Built Form*, City and Regional Planning Program, Georgia Institute of Technology, 2001.

Dora C., *A different route to health: implications of transport*, BMJ, 1999.

Policies, World Health Organisation, European Centre for Environment and Health, Rome Division, 00187 Rome, Italy.

Department of Health, Physical Activity, Health Improvement and Prevention, Chief Medical Officer Annual Report 2002, At least five a week, Evidence on the impact of physical activity and its relationship to health.

Sallis J., Haskell W., Fortmann M., Wood P., Vranizan K. (1986), *Moderate Intensity Physical Activity and Cardiovascular Risk Factors: The Stanford Five-City Project*, in *Preventative Medicine,* 15, pp. 561-8.