Real and Perceived Travel Time: The contribution of GIS

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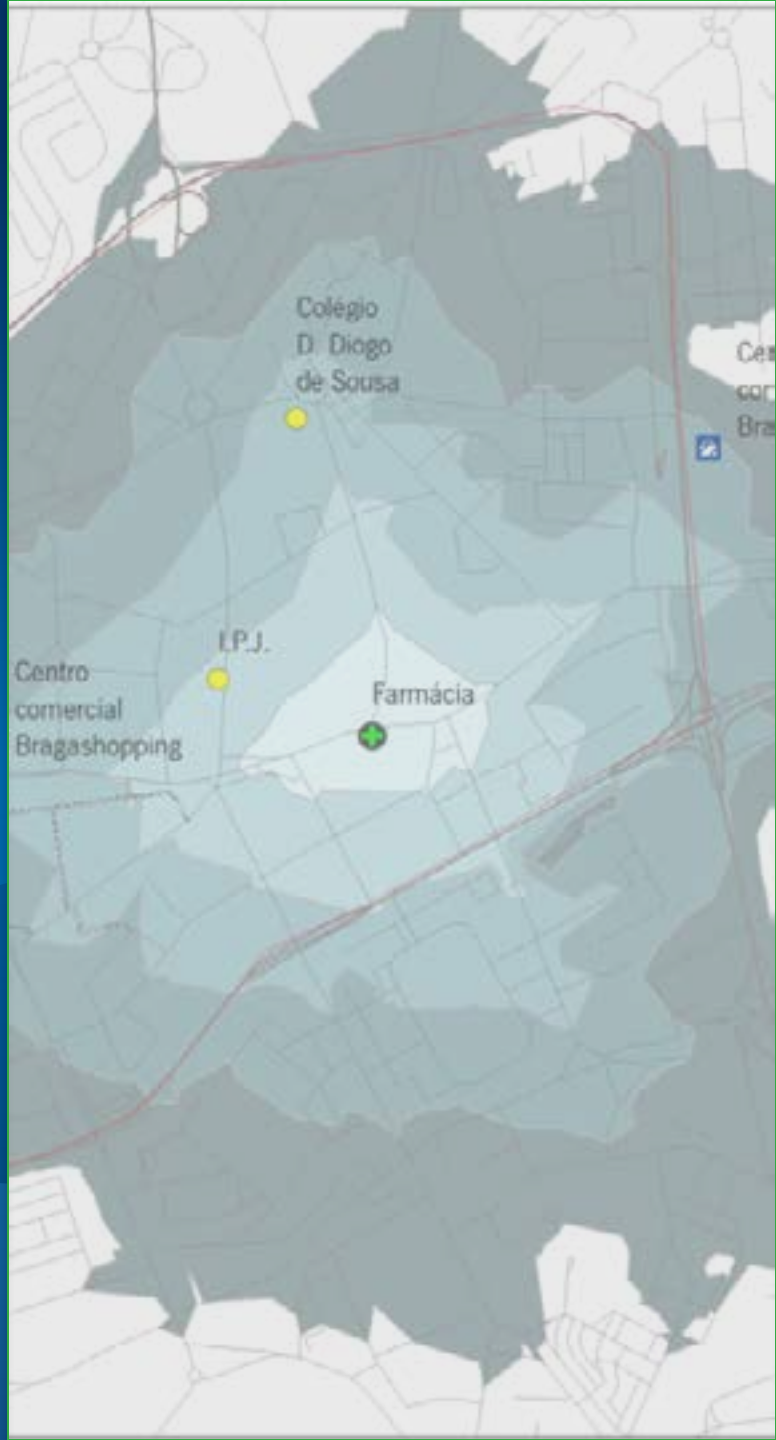


Outline

Methodology and case study frame

Walking access to health services (chemists/pharmacies) inequalities

- Methodology and case study frame
- Real and Perceived walking travel time
  - Mapping walking travel time – GIS environment
- Conclusions and further work

“Consumers often rely on their estimates of duration in making a wide range of purchase-related decisions”

Priya Raghubir (2011)

“In order to navigate within any environment, individuals must amalgamate characteristics of their surroundings and route into a single “representation” that minimizes the gaps in their perception and allows them to make decisions”

Jessica Horning (2007)

“Most travel is induced. To alleviate the need for driving – both perceived and real- urban planners… suggest relying on land-use planning to bring origins and destinations closer.“

Karst T. Geurs (2012)

Methodology

A survey was implemented to understand pharmacies users characteristics, type of mobility and walking time perception

Survey of 12 pharmacies (of 38 existing in Braga)

Basic services for all the population

Good (walking) accessibility should be provided

(pharmacies and local health centers)

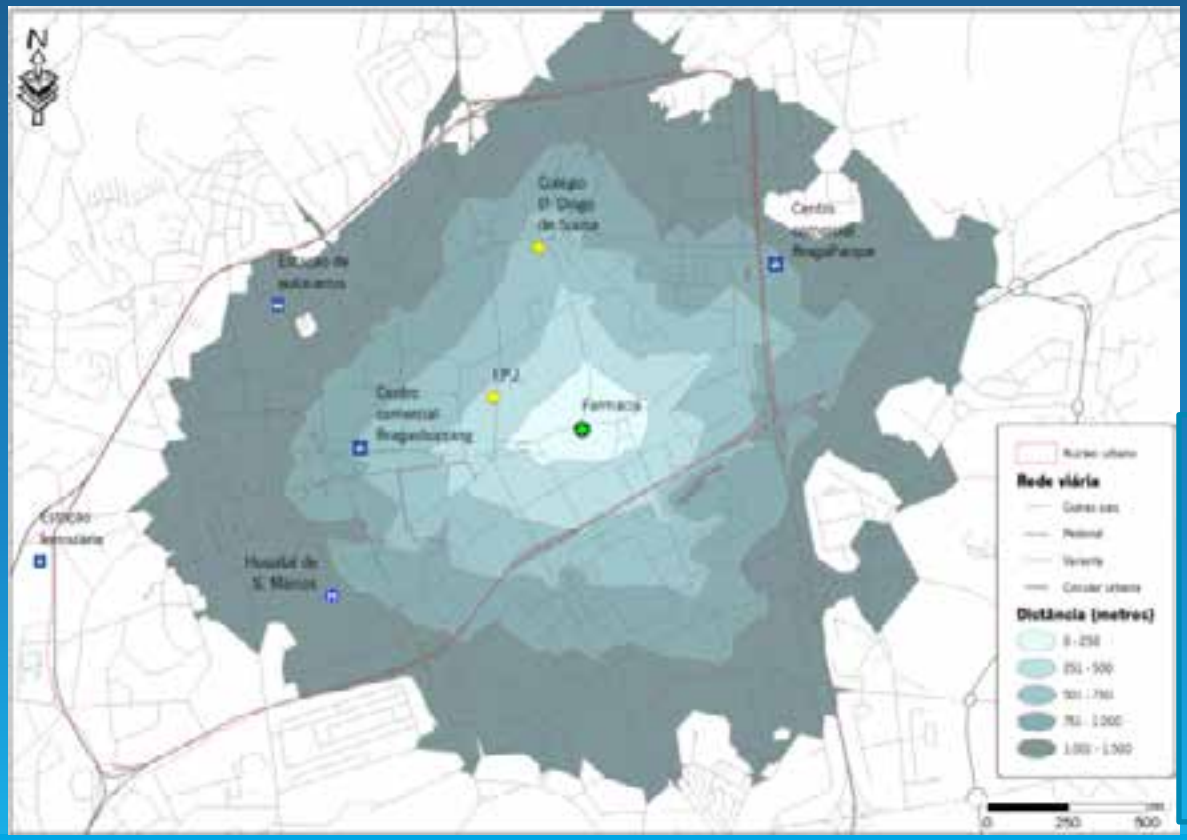
The elderly are local the more frequent users of these services

Facilities are spread all over the municipality

Health services are perceived, by Braga inhabitants, as the major problem (Urban Audit, 2009)

Methodology

In each pharmacies, participants were given 5 different destinations, they were asked to give an estimated walking time to + from the destination in relation to the pharmacies



92% of participants mentioned the time travel

(most of the other 8%, did not answer, was due to destination unknown)

Methodology

652 Surveys

6.052 Perceived time travel

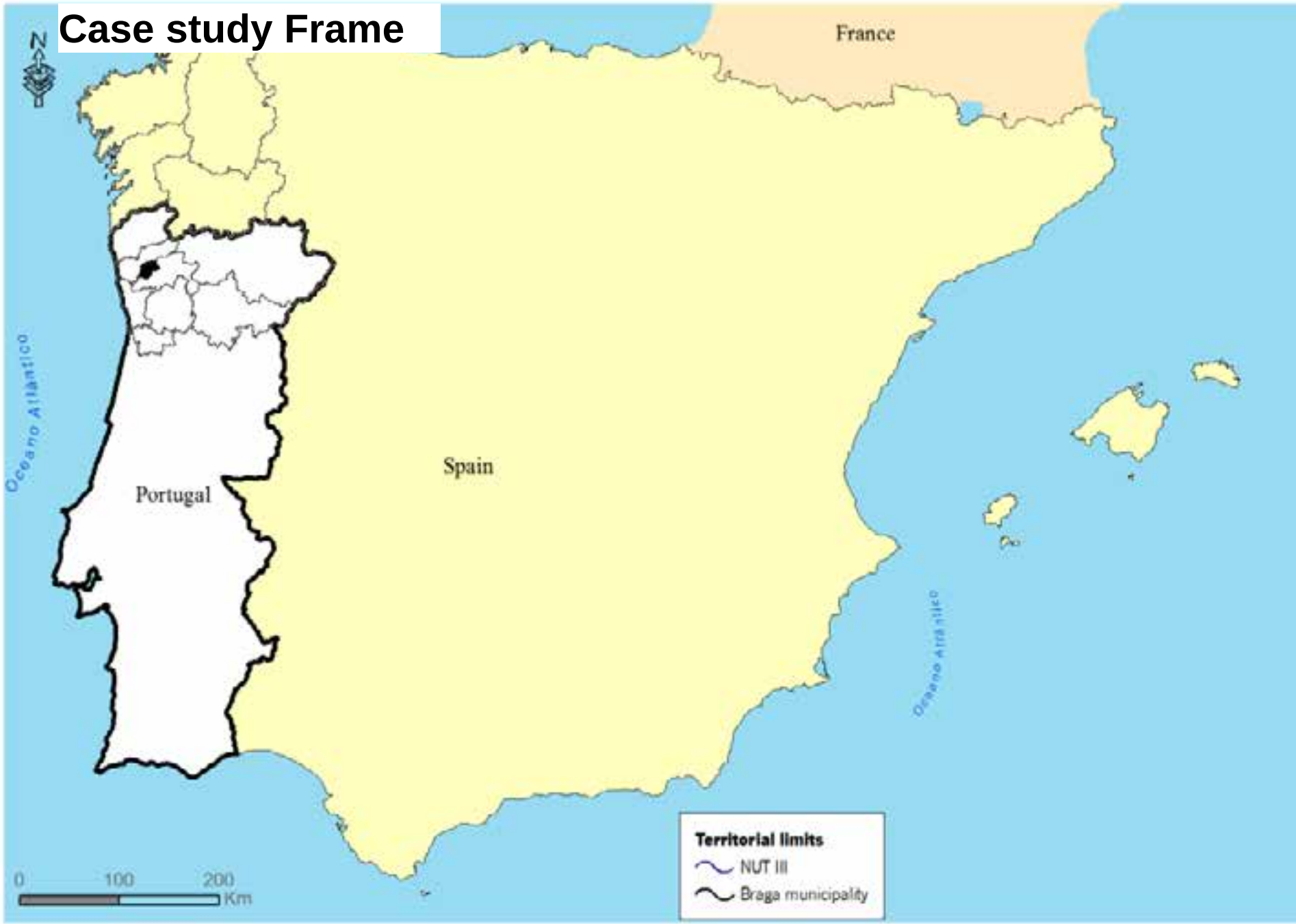
Pharmacies walking time travel was modeled through a G.I.S

Network analyst

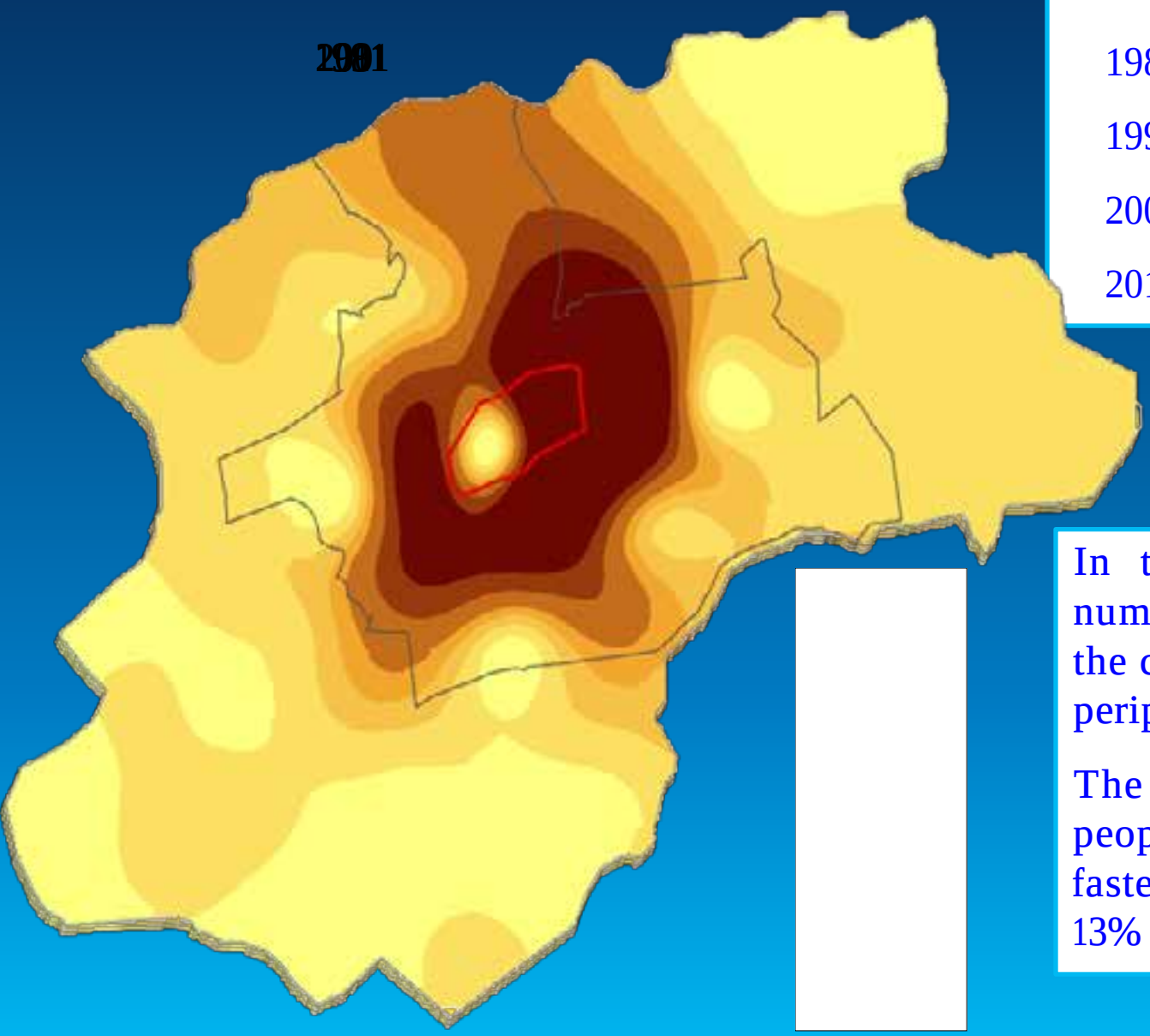
Real/perceived time travel

Real time: different walking speed according to age and street slope

Case study Frame



Case study Frame



Demographic growth

1981: 125.454 inhabitants

1991: 141.256 inhabitants

2001: 164.192 inhabitants

2011: 181.819 inhabitants

In the last decade the number of inhabitants in the city grew while in the periphery it decreased

The proportion of older people is increasing at a faster rate (9% in 1981 to 13% in 2009)

Fonte: INE, Censos 81, 91, 2001, 2011

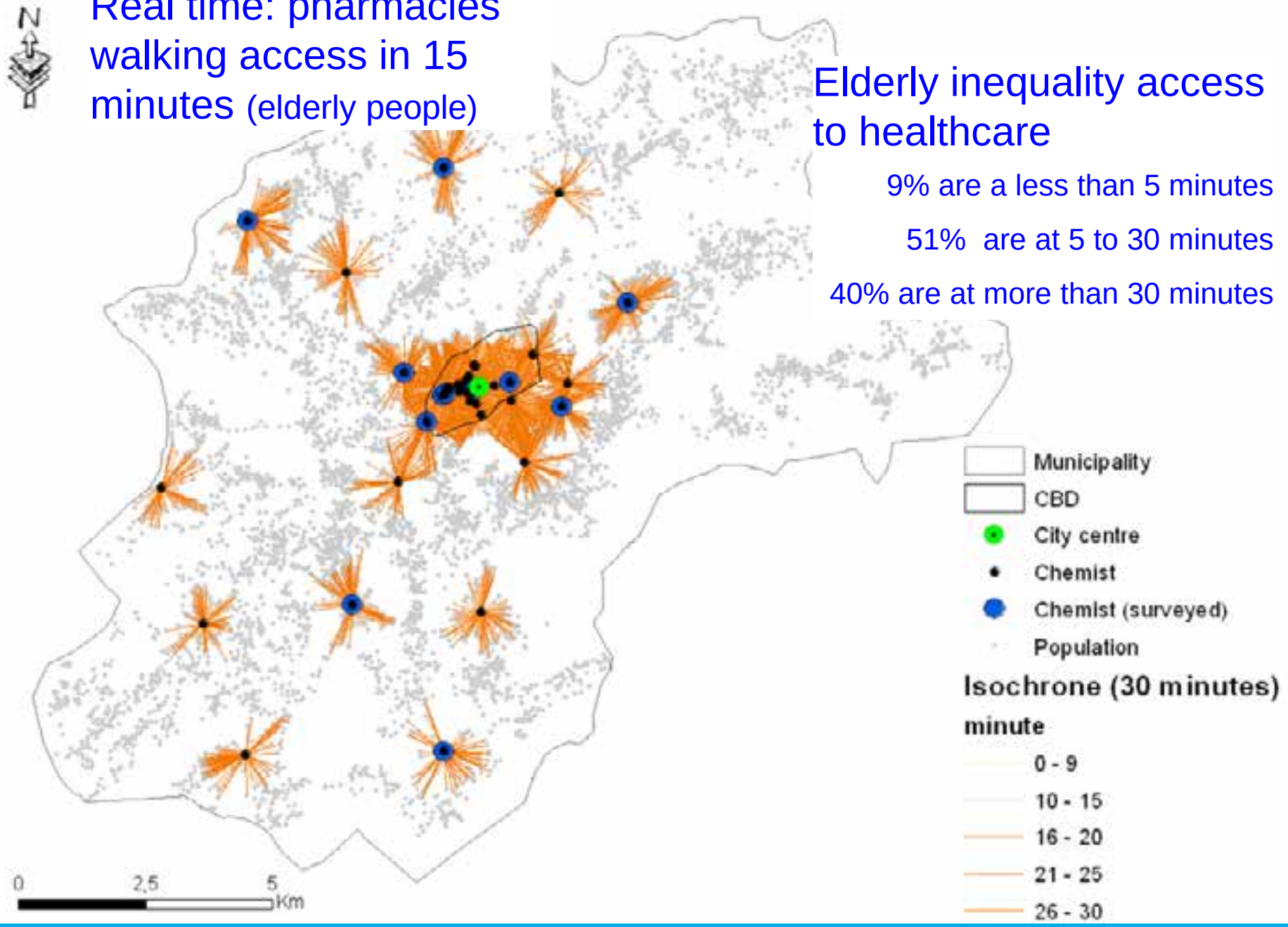
Real time: pharmacies walking access in 15 minutes (elderly people)

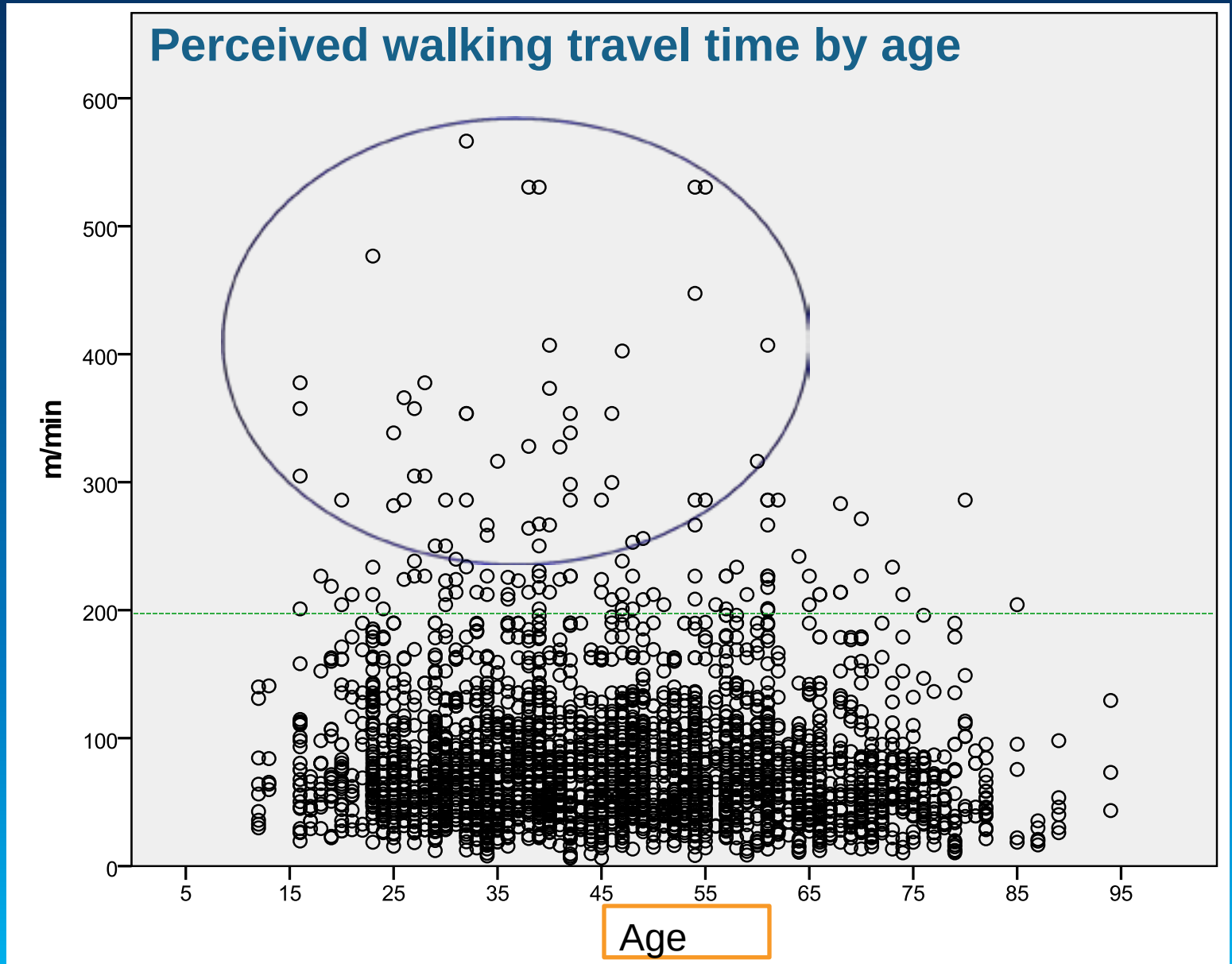
Elderly inequality access to healthcare

9% are a less than 5 minutes

51% are at 5 to 30 minutes

40% are at more than 30 minutes



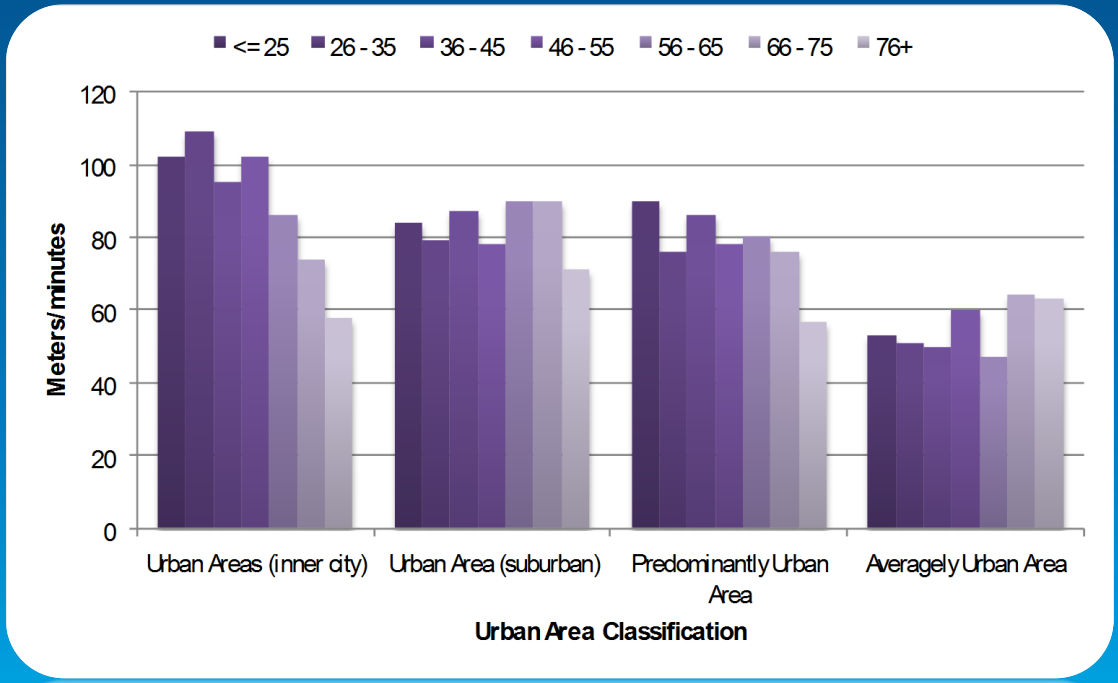

Perceived walking travel time by age
m/min
600
500
400
300
200
100
0
5
15
25
35
45
55
65
75
85
95
Age

Perceived walking travel time and urban environment

91 meters (inner city) to 53 meters (peripheral areas)

The average of the elderly perceived velocity are 66 meters / minute

The average of the youth / adult perceived velocity are 83 meters / minute



Elderly maintain the same velocity throughout all areas

Youth revealed to walk faster in the city center than in the other areas

Perceived walking time travel

Perceived time travel *from –to* and *to-from* was similar

Elderly people have a time travel perception above the youth/adult

Youth/Adult walking time perception was nearest the real time

Diferences in walking time perception were found according the demographic groups and transport mode used

Elderly perception range from 1 to 90 minutes while youth/adult ranged between 1 and 120 minutes

Majority of people perceived a walking velocity lesser than 100 m/min

Walking velocity growth as education level growth

People with no level of education have the lower velocity perception

Retired people also have the lower velocity perception

Perceived time travel and street slope

4% of answers differentiated in estimated walking time travel to/from the chemist

90% were surveyed in the city center

All of the answers were related to streets with + than 5% slope

Half of them were elderly and usually accessed the chemist

on foot (49%) or by public transit (23%)

Car drivers were not sensible to the influence of street slope on time travel. They also expressed more difficulty in answering, than the other groups

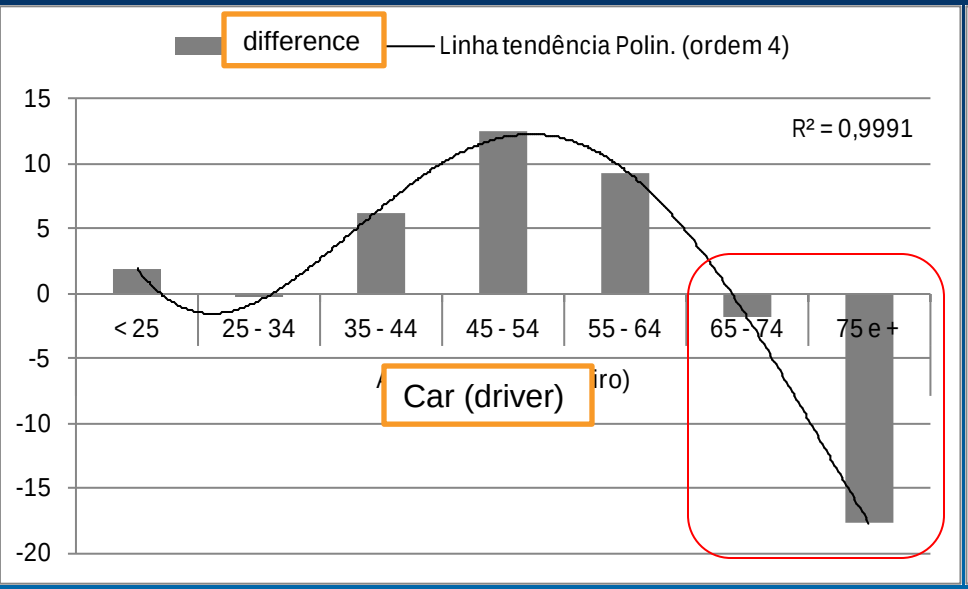
Household income:

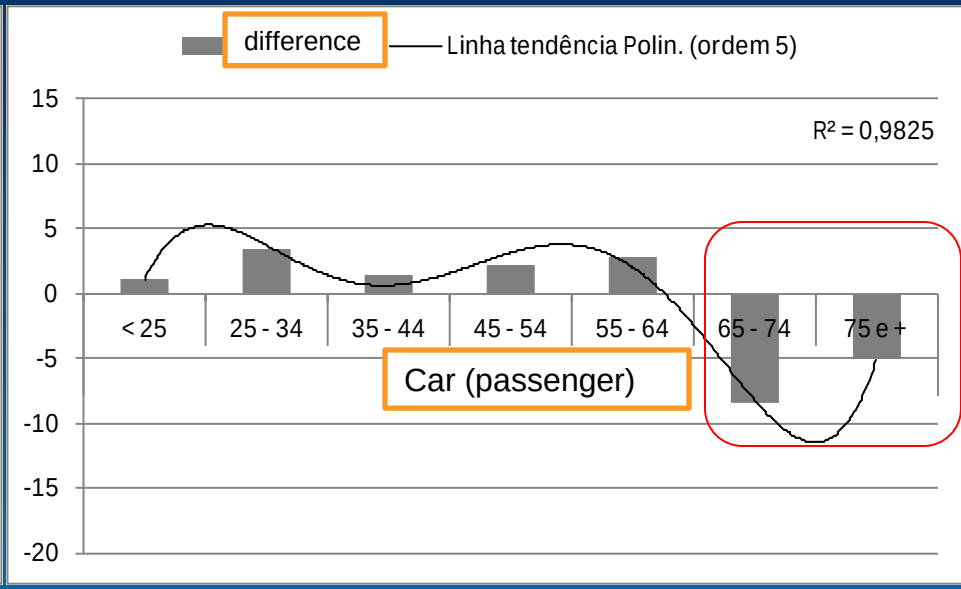
500 to 1.000 euros (42%)

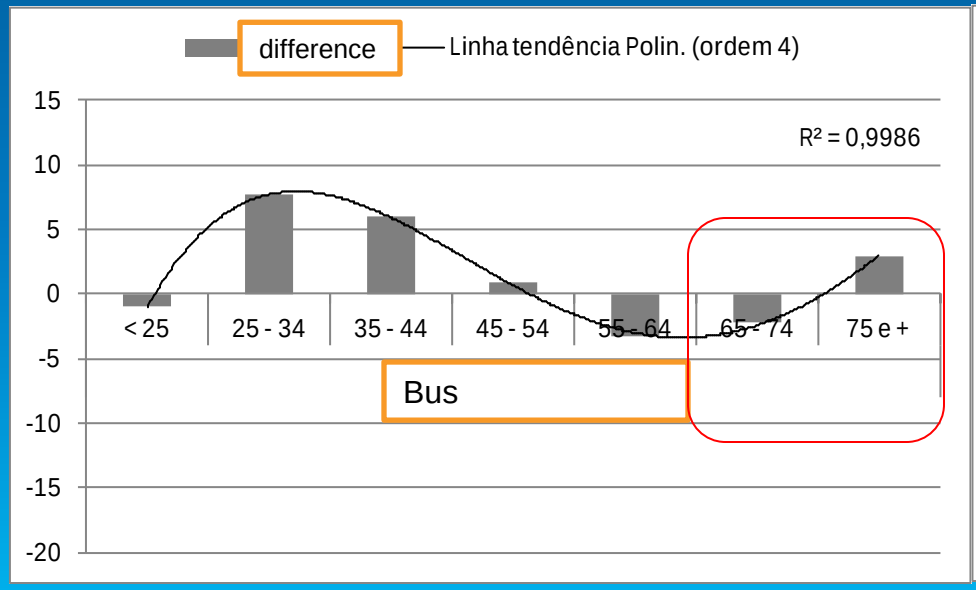
1.000 to 2.500 euros (28%)

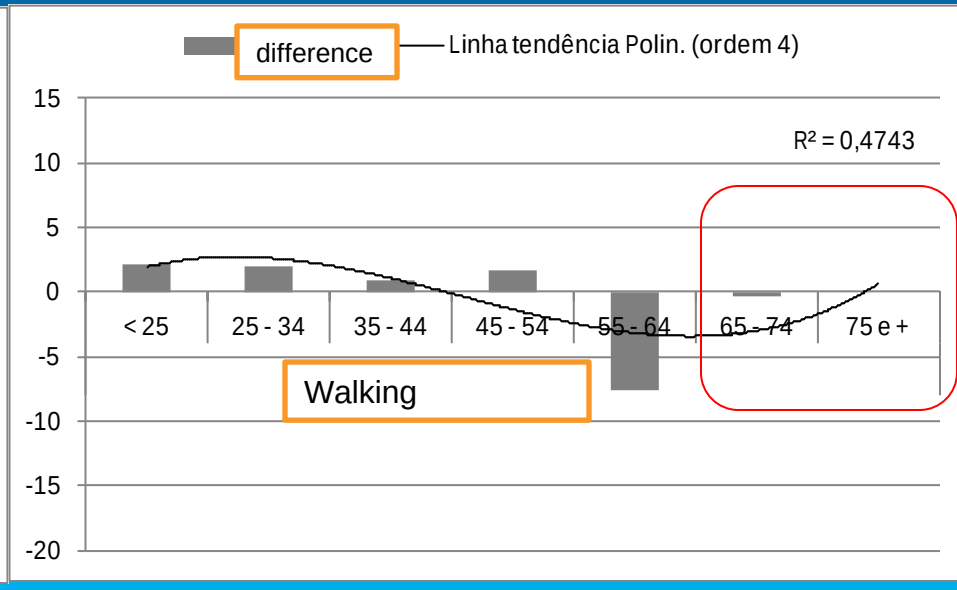
39% was due to destinations up to 500 meters away from the chemist

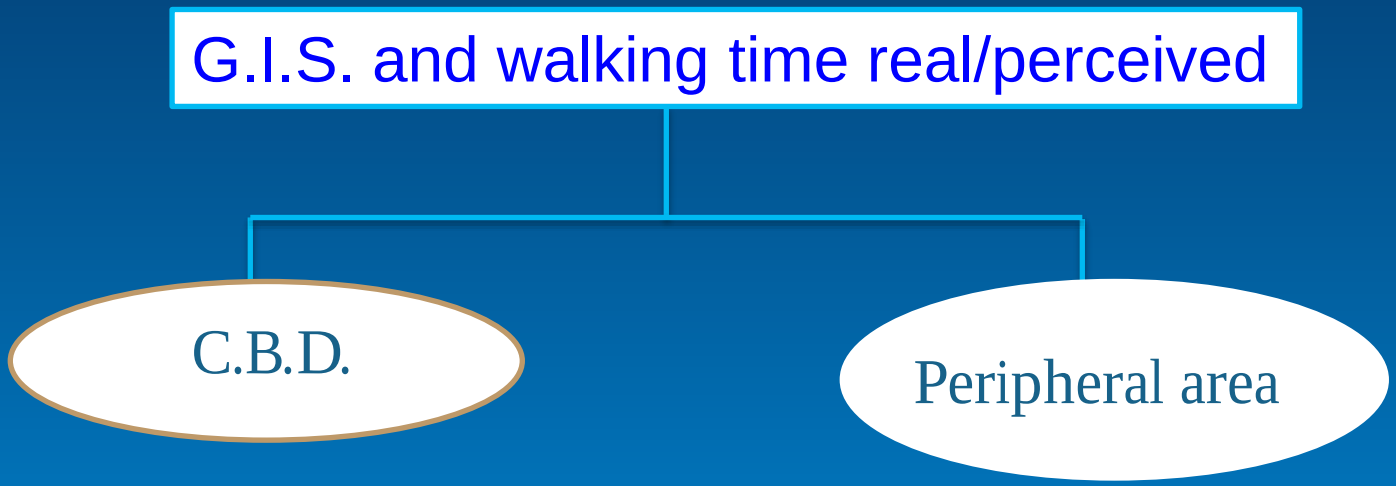
Difference between walking time perception and real time







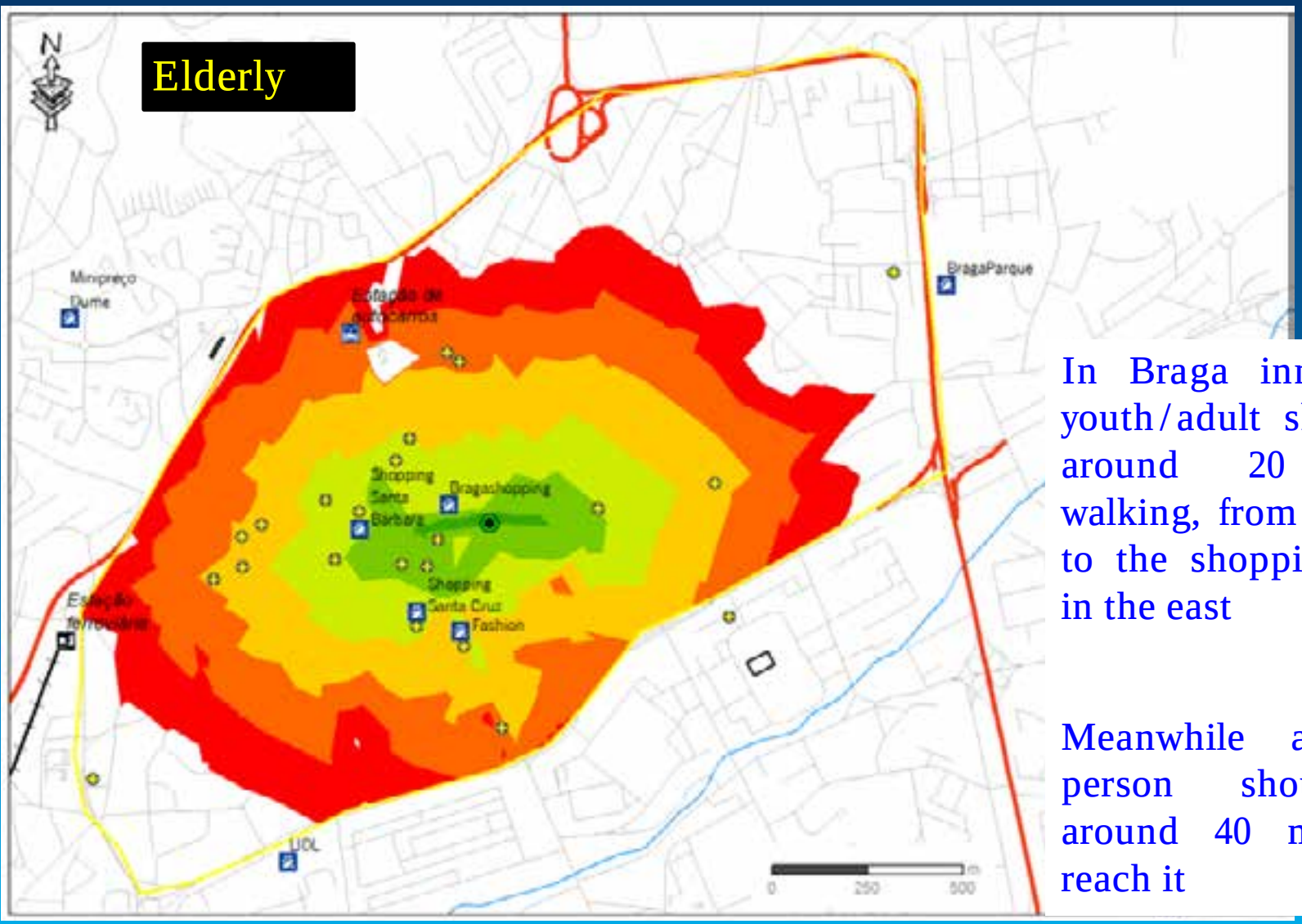




Real time vs. perceived time

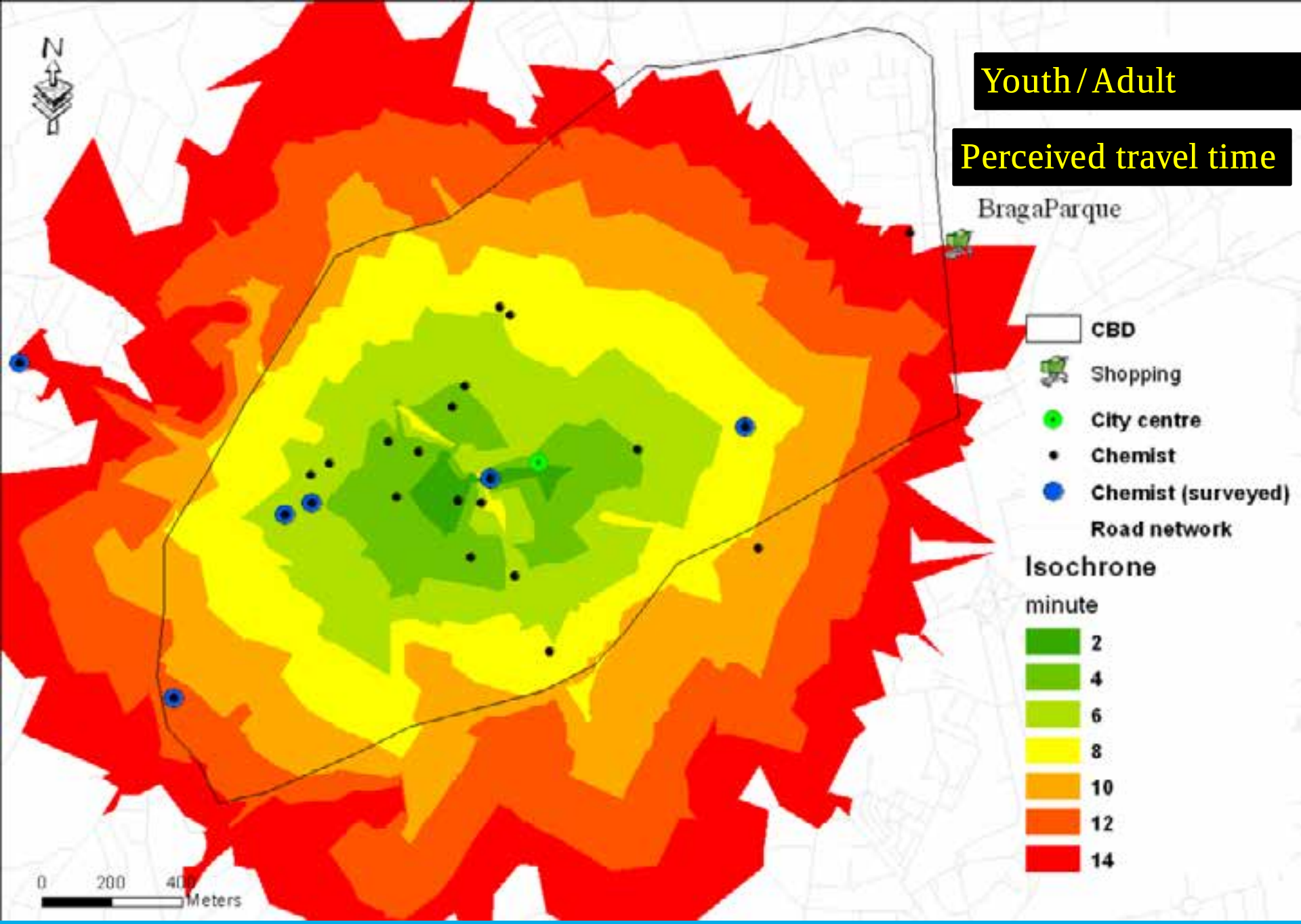
City Centre

Real time



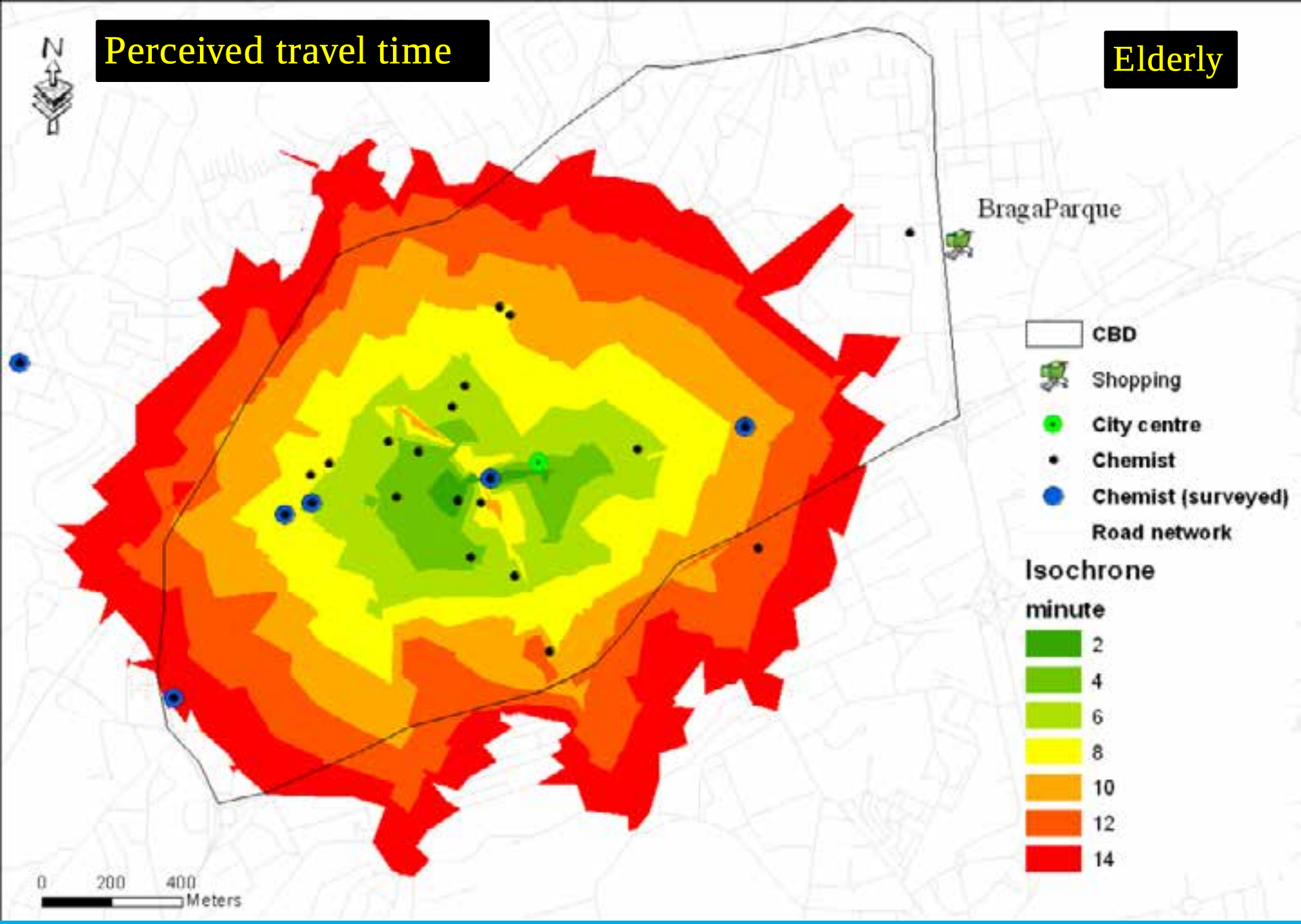
In Braga inner city a youth/adult should take around 20 minutes walking, from the center to the shopping located in the east

Meanwhile an elderly person should take around 40 minutes to reach it

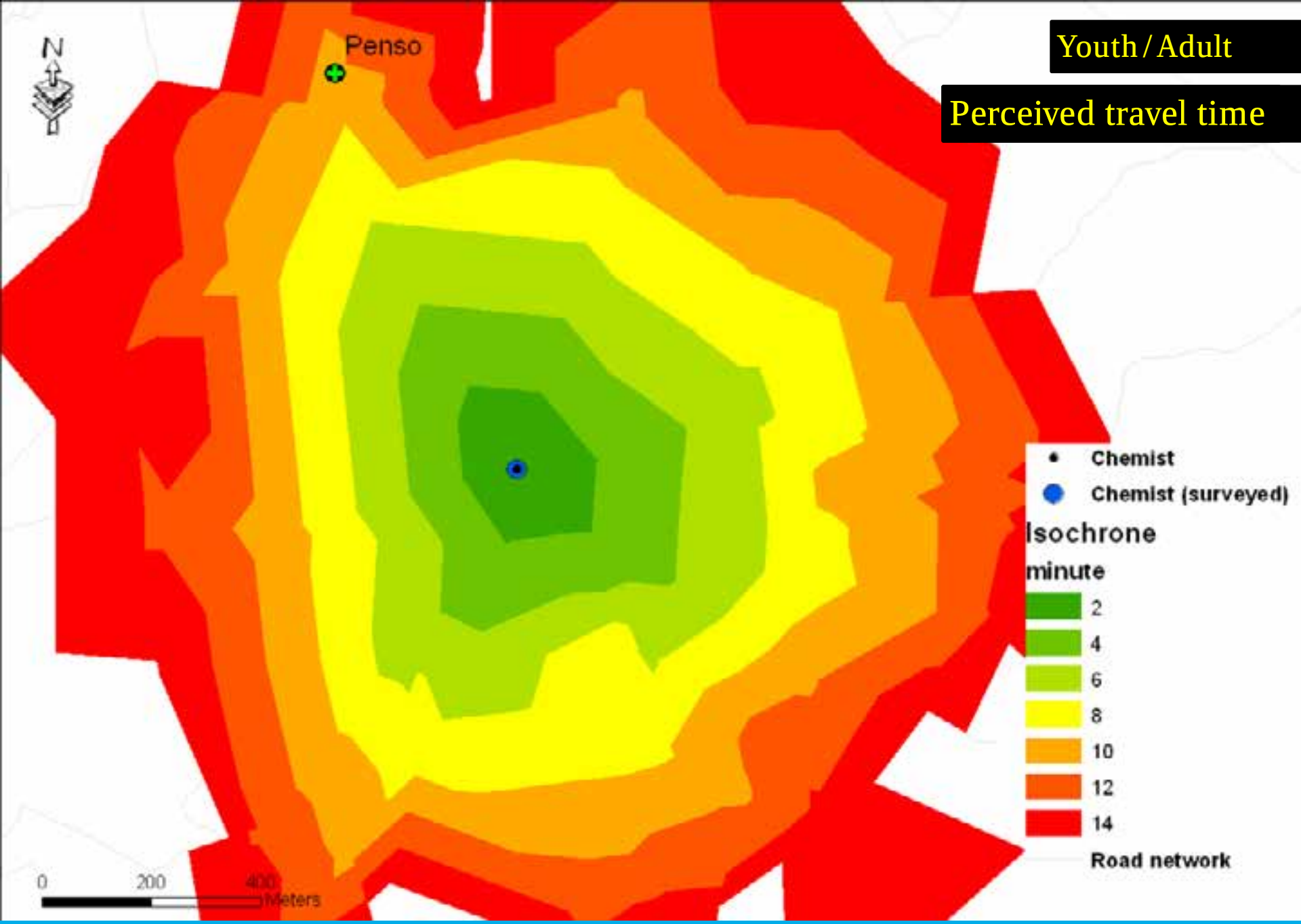

Youth / Adult
Perceived travel time
BragaParque
CBD
Shopping
City centre
Chemist
Chemist (surveyed)
Road network
Isochrone
minute
2
4
6
8
10
12
14
N
0
200
400
Meters

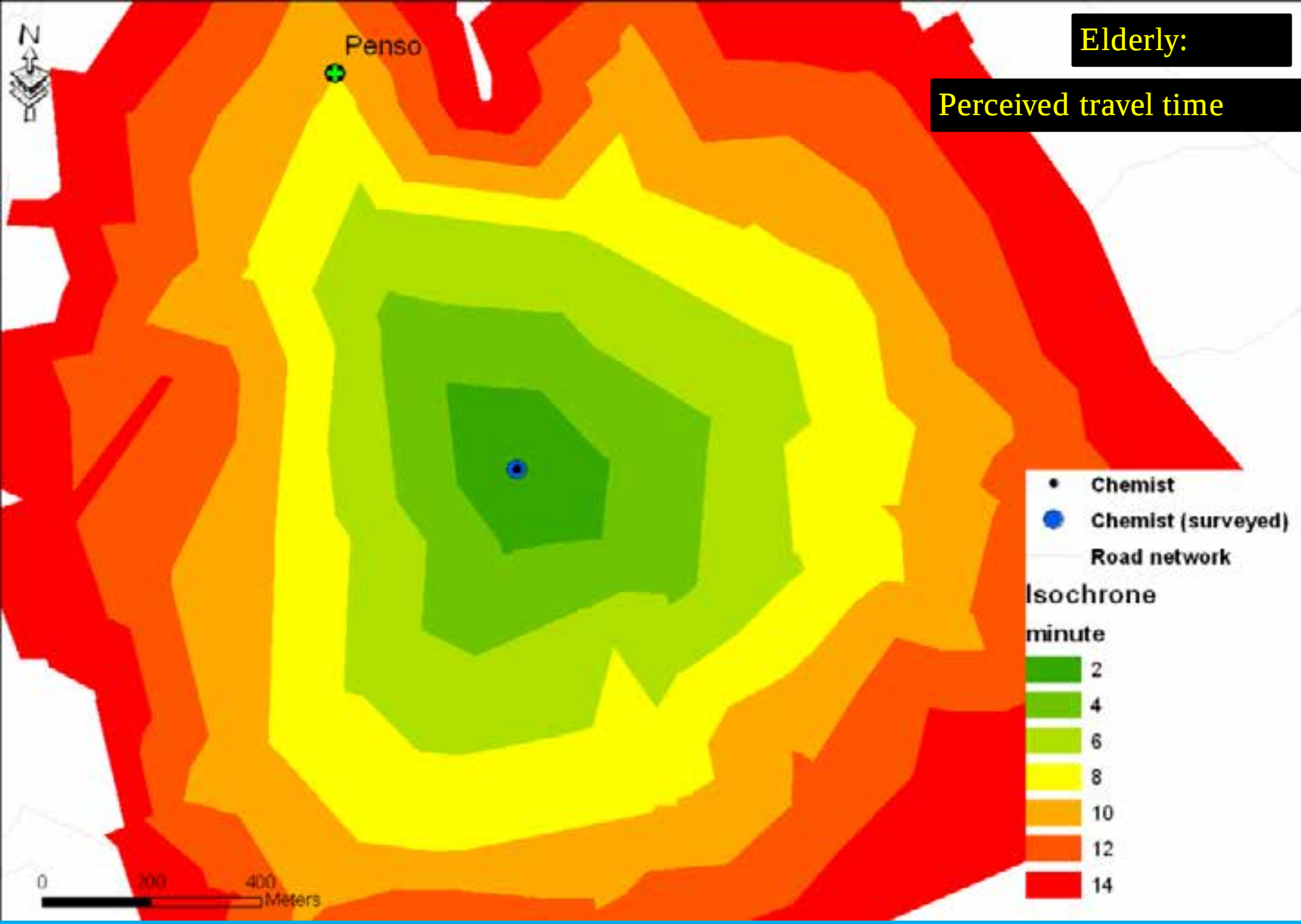
Perceived travel time

Elderly

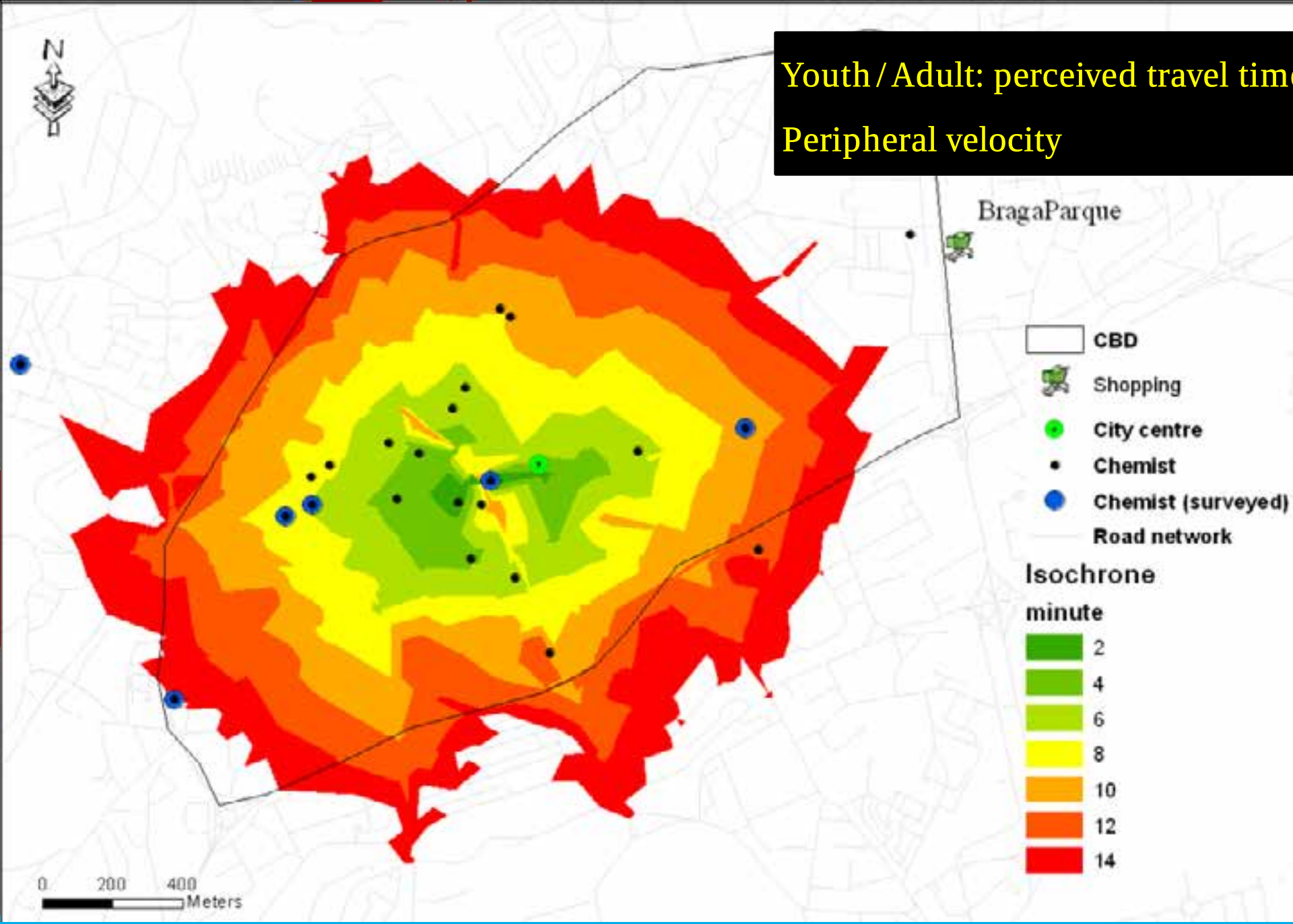


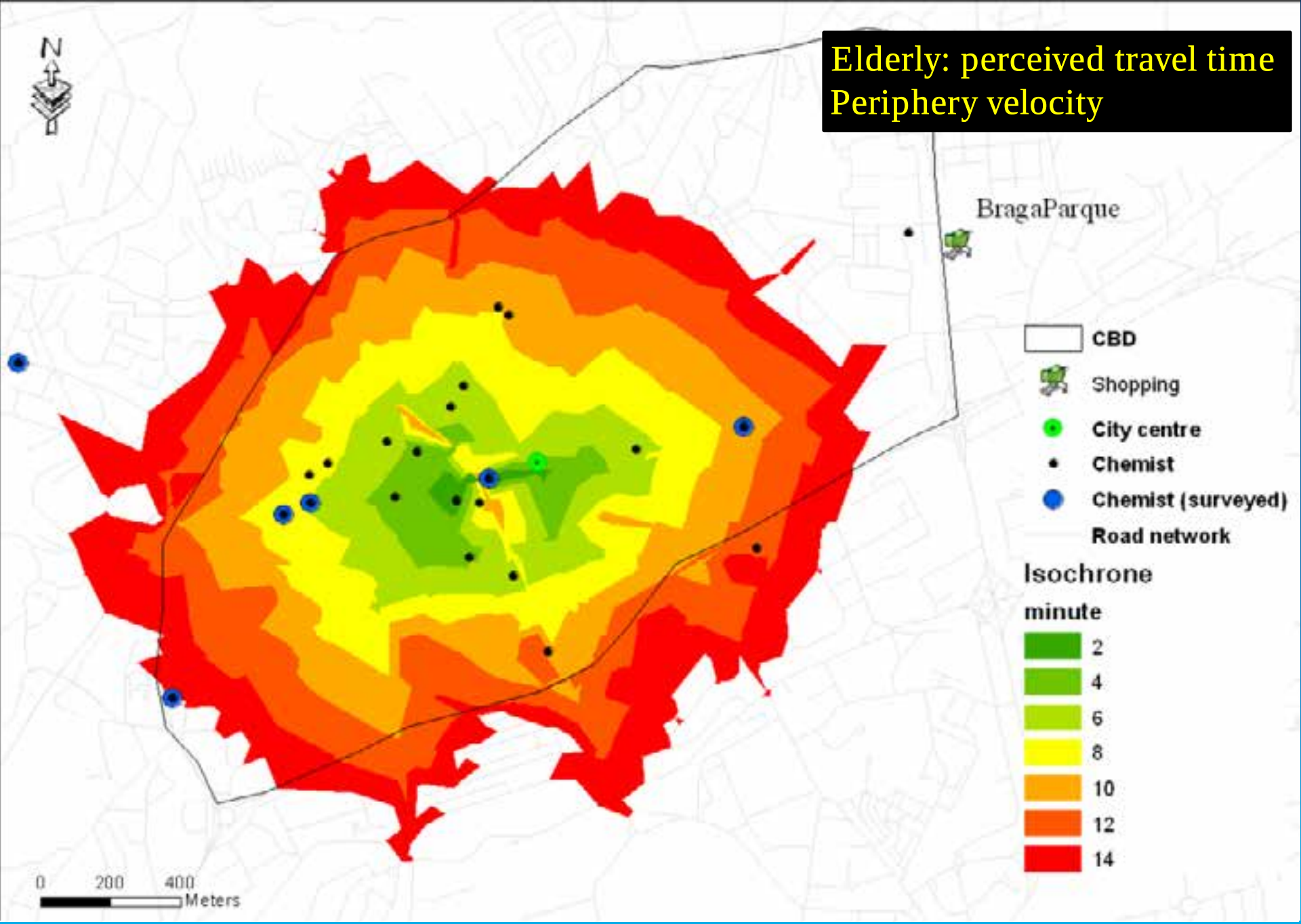
Peripheral area


Youth / Adult
Perceived travel time
N
Penso
Chemist
Chemist (surveyed)
Isochrone
minute
2
4
6
8
10
12
14
Road network
0
200
400
Meters


Elderly:
Perceived travel time
N
Penso
Chemist
Chemist (surveyed)
Road network
Isochrone
minute
2
4
6
8
10
12
14
0
200
400
Meters

What if the perceived velocity at the periferal area is modeled for the city centre


Youth / Adult: perceived travel tim
Peripheral velocity
BragaParque
CBD
Shopping
City centre
Chemist
Chemist (surveyed)
Road network
Isochrone
minute
2
4
6
8
10
12
14
N
0
200
400
Meters


Elderly: perceived travel time
Periphery velocity
BragaParque
CBD
Shopping
City centre
Chemist
Chemist (surveyed)
Road network
Isochrone
minute
2
4
6
8
10
12
14
N
0
200
400
Meters

Final remarks

- G.I.S. is a powerful tool to integrate socio-spatial analysis and to develop a Social Exclusion map based on walking accessibility
- Walking time perception vary strongly between age, sex, built environment, education level or street slope
- People which walk more have more sensibility to street slope and to travel time perception
- Age walking velocity affects the accessibility results
- Perceived time travel is important for urban planning and vary strongly between youth/adult people according to the urban area typology or mobility behavior

Thank you

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