

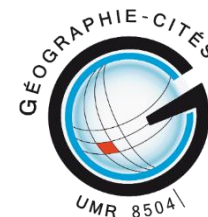


AMERICAN ASSOCIATION *of* GEOGRAPHERS

ANNUAL MEETING • Feb. 25-March 1, 2022 • NEW YORK CITY

Evolution of spatial access to hospital surgery in France between 2000 and 2018: analysis of socio-spatial inequalities

Benoit Conti, Sophie Baudet-Michel, Ronan Ysebaert, Timothée Giraud, Hugues Pecout



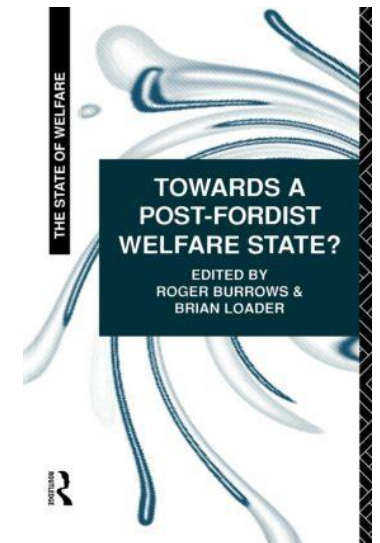
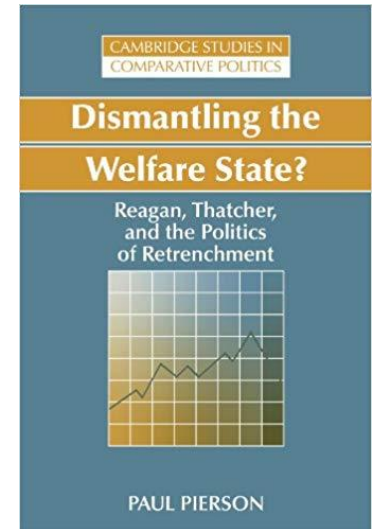
Transformations in hospital

Organisational transformations

- New Public Management in OECD countries
- Looking for productivity (Bezes, 2009)
- Quantitative evaluation of hospitals and clinics
- Enhanced competition between clinics and hospitals (Delas, 2011)
- Change in the financing mode: looking for more surgical operation
- Hospital and clinics closures

Technological transformations

- Anaesthesia and surgery techniques (Holcman, 2015)
- Ambulatory care (Bert *et al.*, 2014): shorter stay, beds to places



Consequences for spatial access to hospital

Spatial access to hospitals: elements of the international literature

- Spatial differences between urban and rural areas
- Distinction according to the level of deprivation: question of the choice of hospital

Comber *et al.*, 2011 (UK); Song *et al.*, 2018 (Australia); Barbieri & Jorm, 2019 (Australia); Jia, 2019 (Floride, USA); Bauer *et al.*, 2020 (Germany)

Spatial access to hospitals: empirical studies in France

- Differences in spatial access by specialties (orthopaedic \neq cardiac)
- Managers have better access but lower use of the nearest one
- "The type of space has a major effect weighing on the additional distances travelled"

Evain *et al.*, 2012 (surgery); Charreire & Combier, 2011 (maternity); Coldefy *et al.*, 2011 (short stay); Lucas-Gabrielli *et al.*, 2016 (ambulatory care); Bonastre *et al.*, 2017; Fayet *et al.*, 2020 (cancer surgery); Lefebvre-Hoang & Yilmaz, 2019

Question

In France, between 2000 and 2018, the number of municipalities equipped with hospital surgical care fell from 659 to 529 (loss for 130 municipalities)
About sixty functional urban areas lost their surgical service

**How the closures of surgical services over the last 20 years
have changed people's spatial access to hospitals?**

Question

In France, between 2000 and 2018, the number of municipalities equipped with hospital surgical care fell from 659 to 529 (loss for 130 municipalities)
About sixty functional urban areas lost their surgical service

How the closures of surgical services over the last 20 years have changed people's spatial access to hospitals?

Hypothesis :

- Decrease in spatial access over the French territory
- Decrease in spatial access according to the size of the city. Smaller cities are more affected
- Decrease in spatial access enlarge inequalities between white and blue collar
- A general impact on the choice of hospital is observed, especially for cities with no or only one hospital

Method

Location (geo-referenced points)

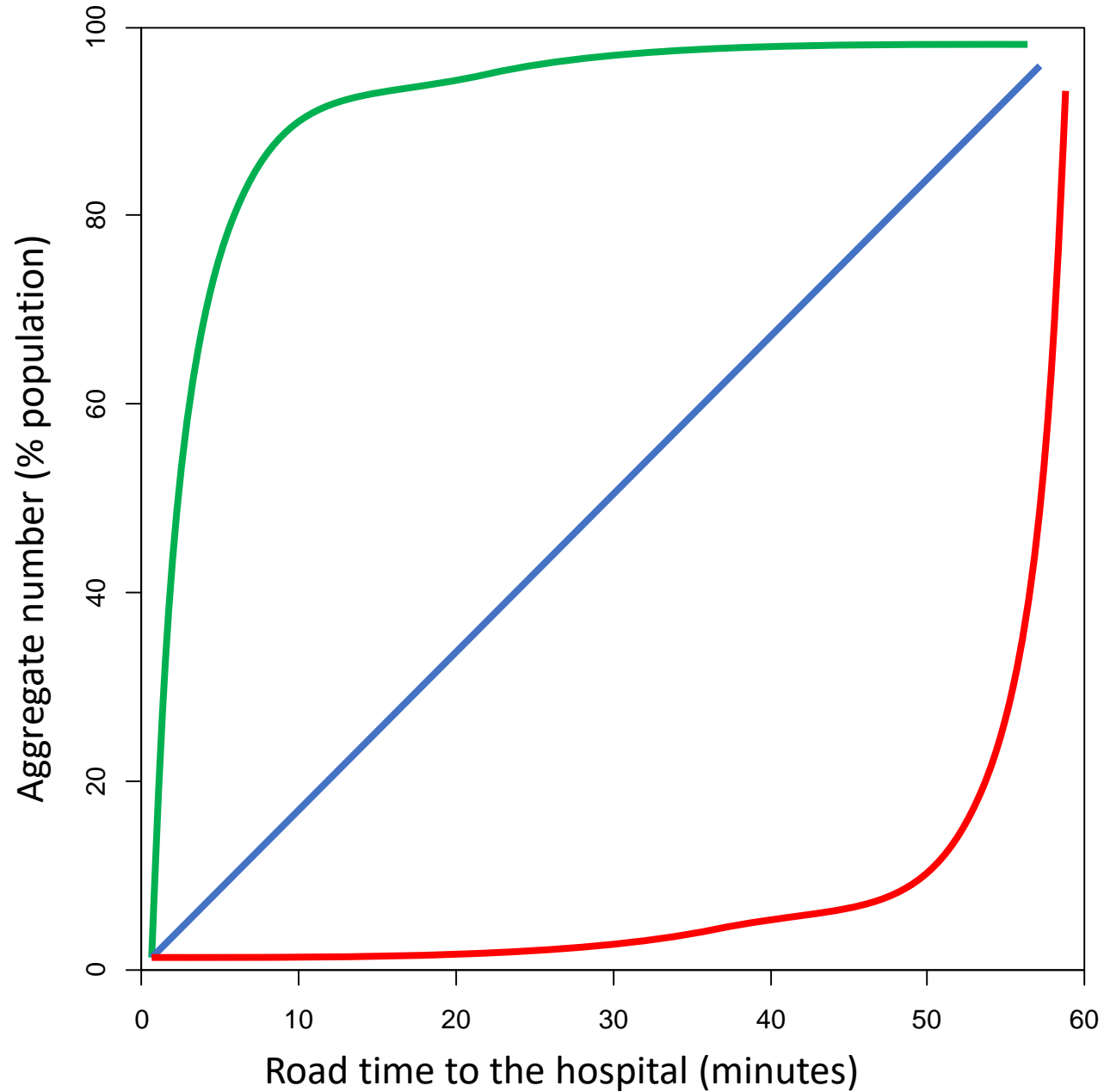
- Origins: Town halls of municipalities (town halls)
- Destinations: hospitals (public and private practice) with surgical beds in 2000 and 2018 (georeferenced in the banR library) (Annual Statistics on Establishments [SAE]: beds & places)
- Municipality according to their city size (<20k; 20-50k; 50-200k; >200k)
- Populations at the municipality's centroid: total and by social category (INSEE-population census)

Calculation of distances by road to the fastest (towns halls -> hospitals)

- Open Street Map network: consideration of speed limits and signage (not congestion)
- Travel time by road (2021 network): R OSRM package
- Study area: continental France
- Distance-time indicators estimated at the municipal level, to the nearest and the second nearest hospital for 2000 and 2018 (at constant road network, 2021)

Descriptive statistics at aggregate commune level

Method



Graphical reading of spatial access of the population

— Equality situation

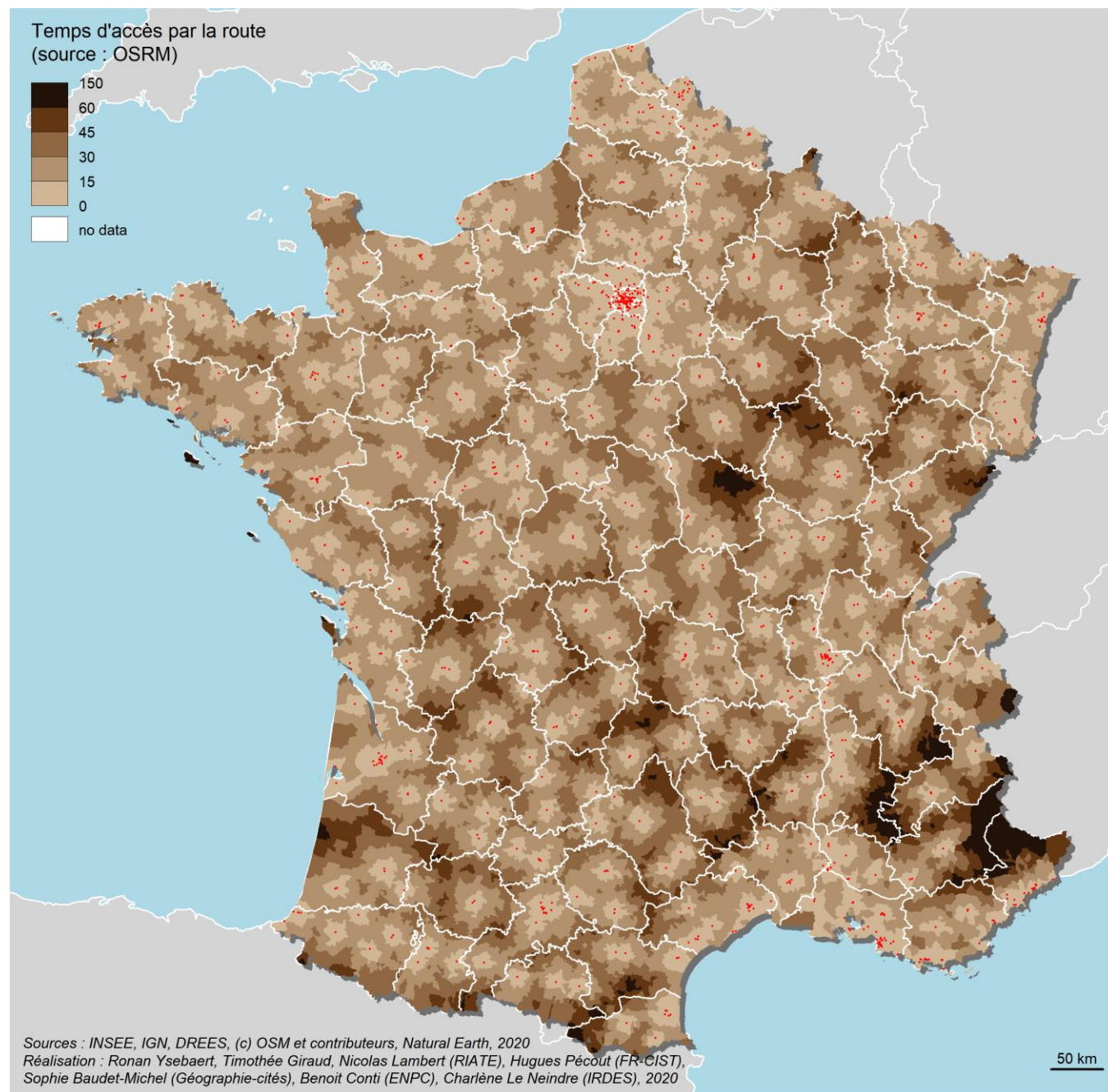
— Intermediate situation

— Inequality situation

Result 1 - The broad picture:

Distance to surgery has slightly increased between 2000 and 2018

Road time (minutes) to the nearest hospital, 2018



Since 2000, 78 closures in 71 cities:

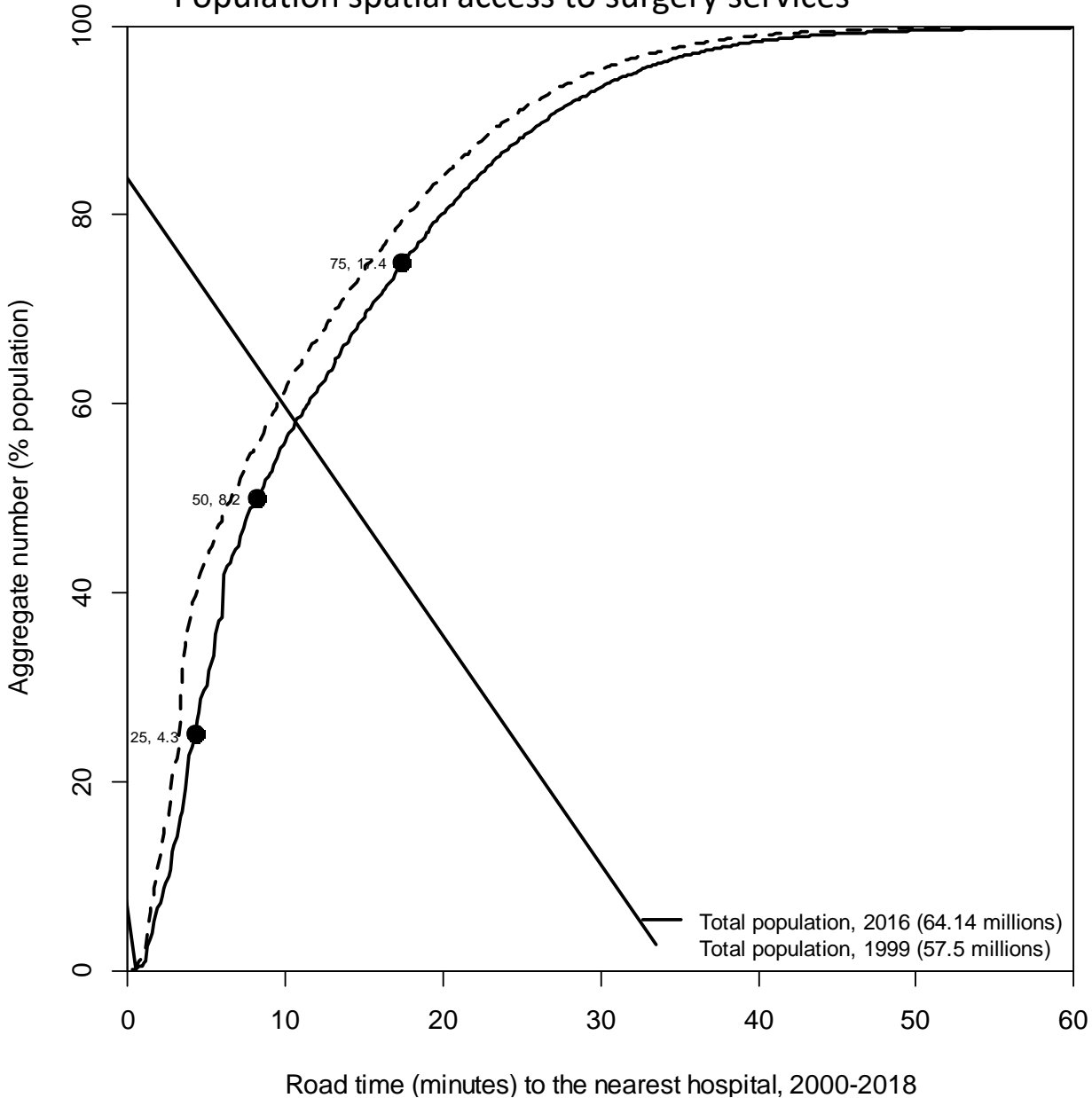
- 58 very small cities (<20k)
- 11 small cities (20k – 50k)
- 2 medium size cities (50k-200k)

Spatial access evolution to the nearest hospital (min)

	10 %	Mean	Median	90 %
2000	8.5	21.2	19.9	35.4
2018	9.4	23.5	22.1	39.1
Evolution	+0.9	+2.3	+2.2	+3.7

Decline in geographic access since 2000

Population spatial access to surgery services



Both curves are very similar!

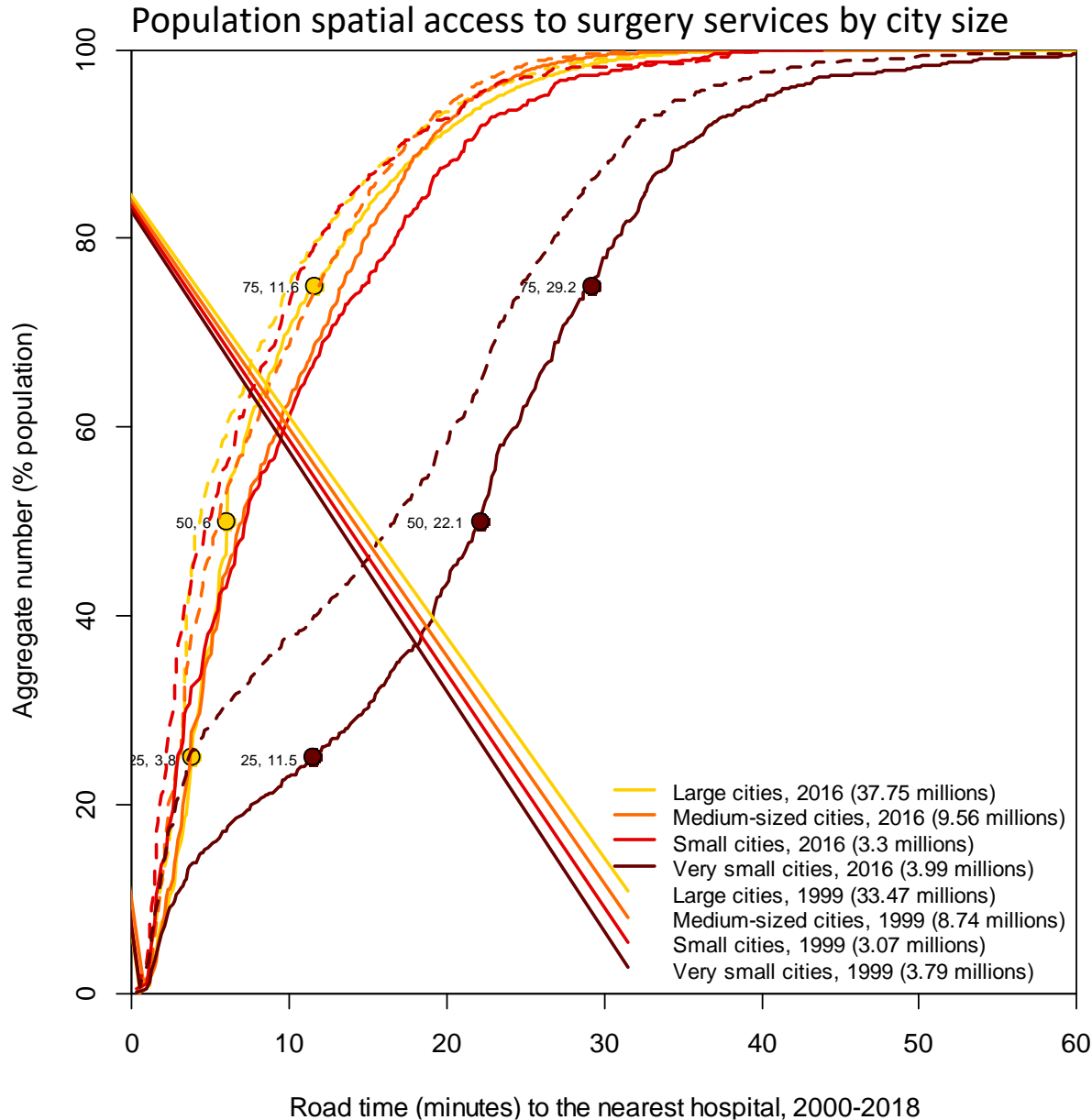
- 2018 curve shows a lower global accessibility for all
 - 75% of population have access in less than 20 mn (18 mn in 2000)
 - 15% of population have access in more than 30 mn (13% in 2000)
- Great difference between the 10th closest and 10th remote: at least 20 mn

Barbieri & Jorn (2019): Australia, 70% of the population has access in less than 10 mn to hospital for 5 States. Access is poorer in Tasmania, North Territory and Canberra

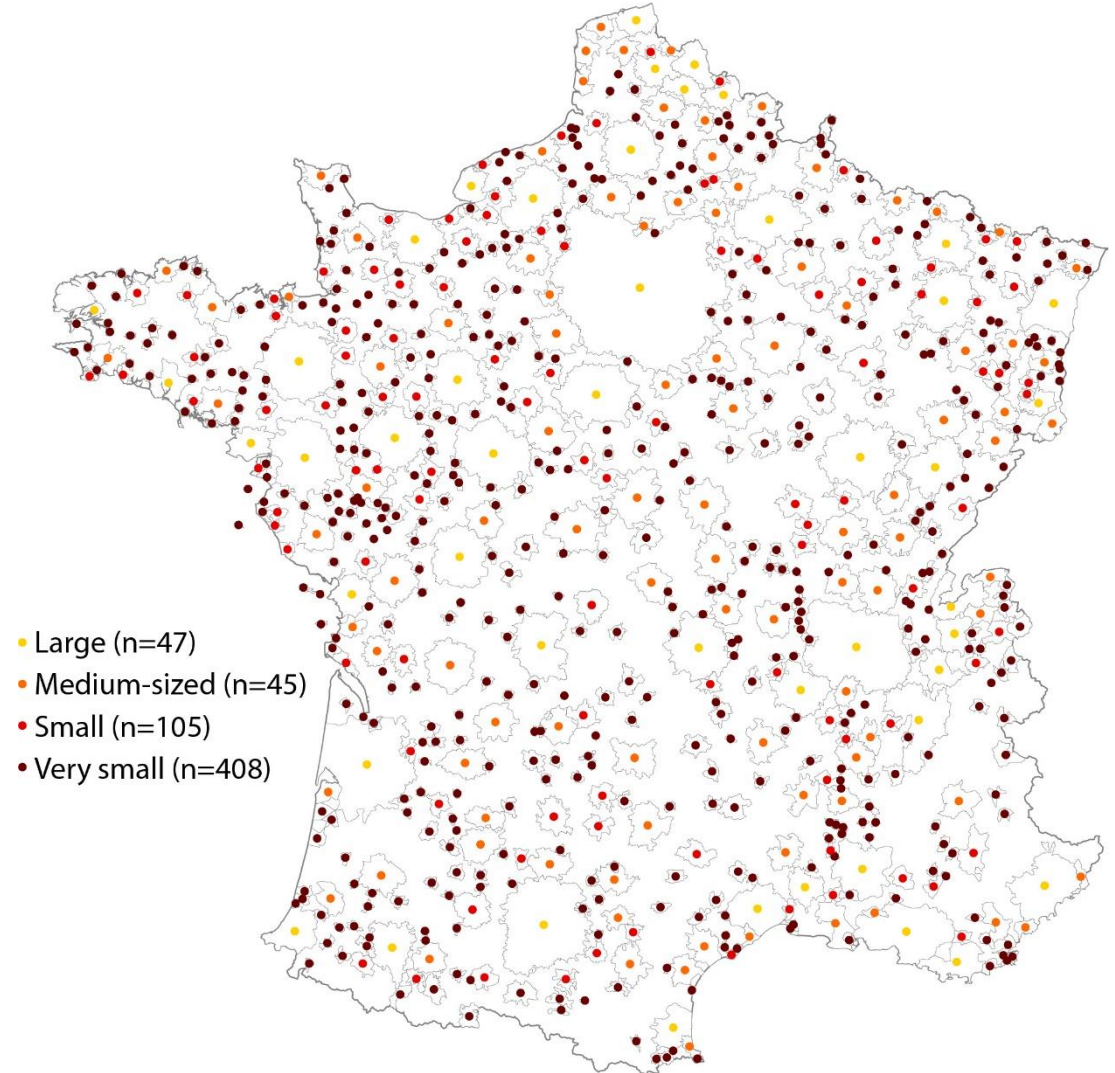
Result 2 – City size matters:

Smallest cities (< 20 k) are the most distant and the most unequal in access

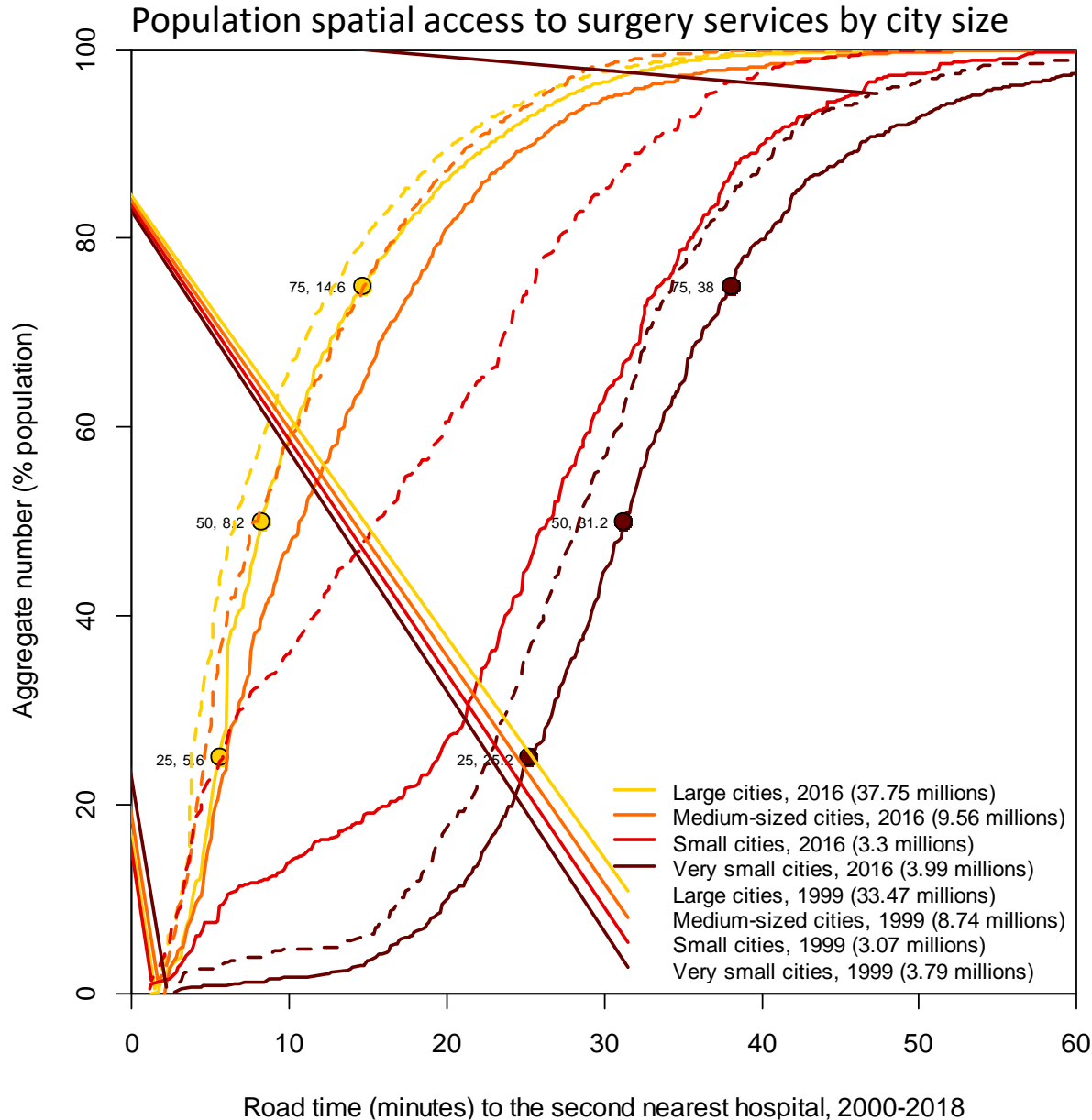
Lowering access for very small cities between 2000 and 2018 (< 20 k)



Very small cities are very different from the others
Australia: Song *et al.* (2018): difference in Surgery Access between categories of space: 12 mn for large cities, 23 mn in centers, 27 mn in suburban spaces

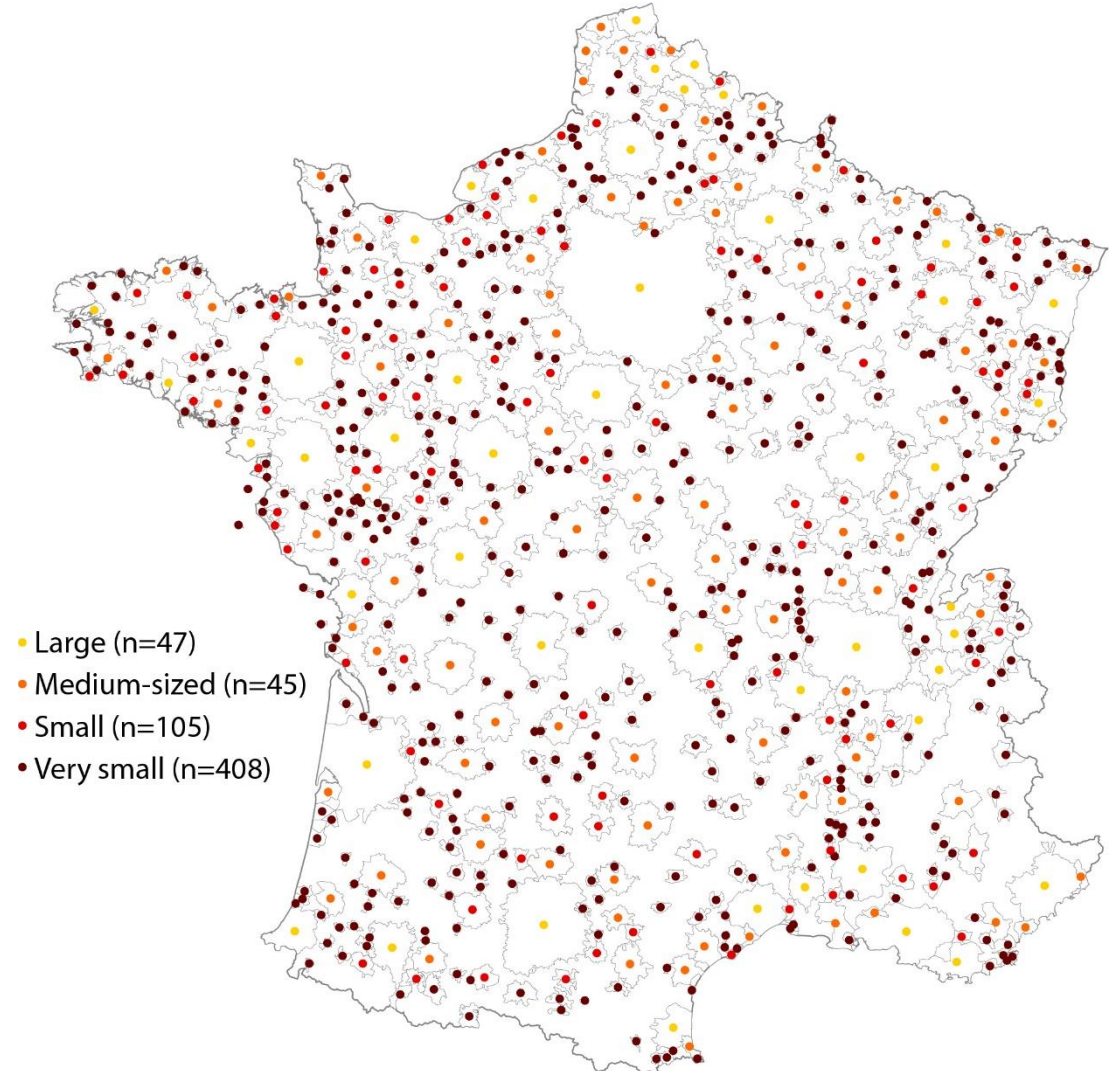


The 2nd nearest hospital: more and more distant for small & smallest cities



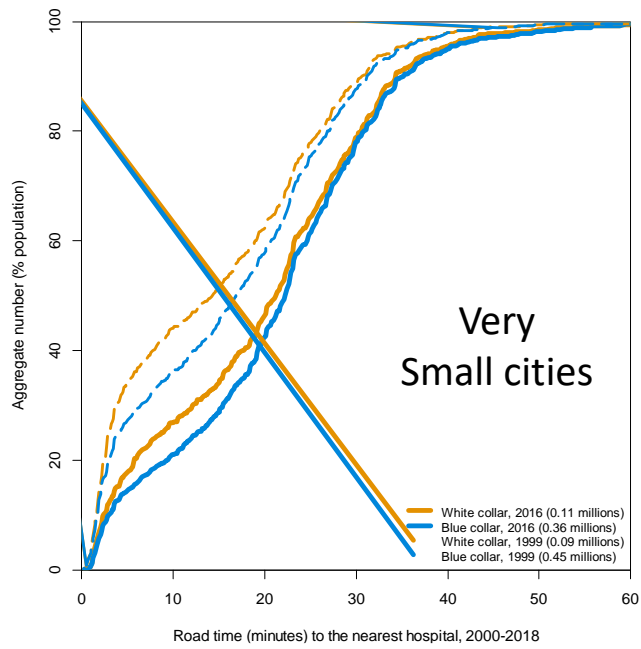
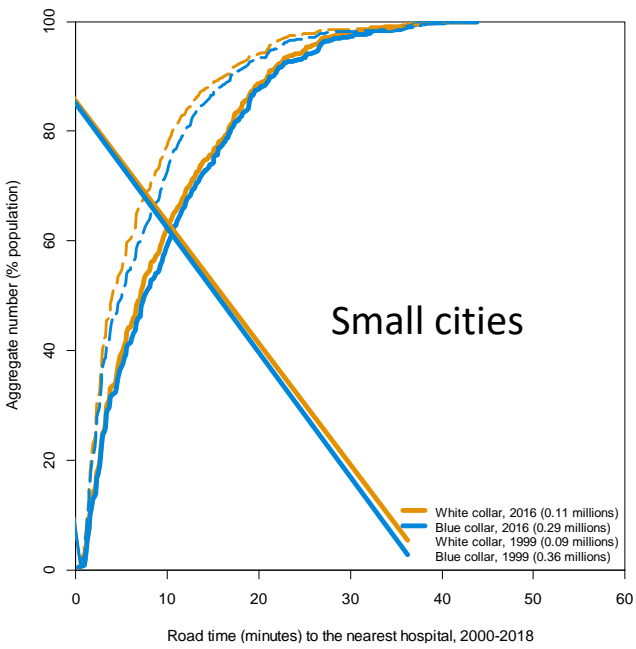
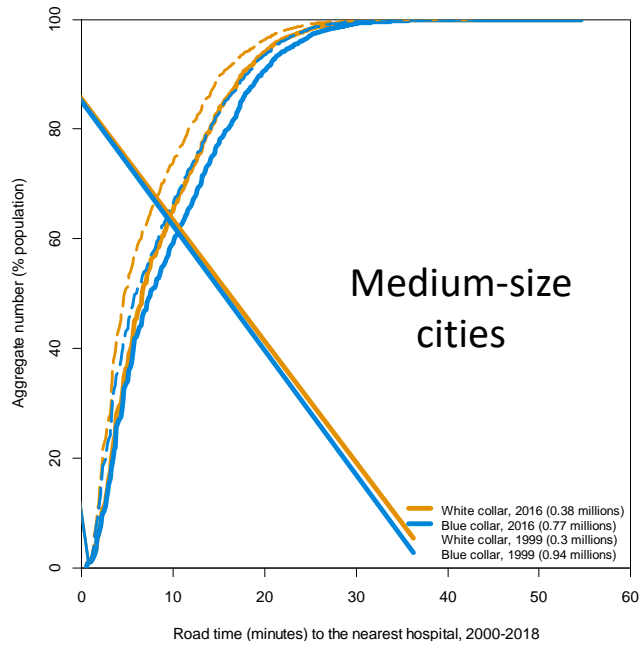
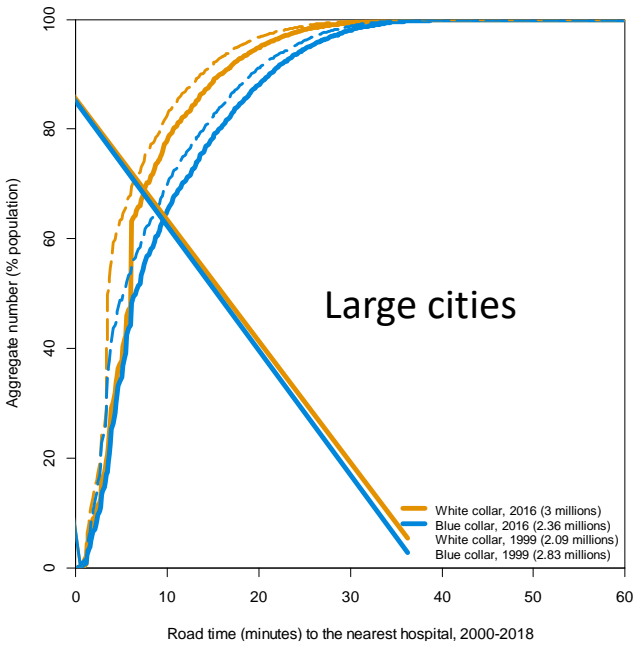
Small cities change categories: similar to large and medium in 2000 => similar to smaller cities in 2018

In 2018, 2 groups of cities are observed !



Result 3 – Socio-professional status:

Globally not much difference, except in largest cities



Spatial impact > social impact:
more differences between city size than social categories

In all categories of cities, social categories have the same spatial access (excepted in Large cities)

Jia 2019 in Florida: richest population located in rural areas travel longer distance for hospital access. Explanation: they are choosing their hospital and it may not be the nearest one.

Spatial access to the 2nd nearest hospital: same observations

Summary of the results

Hypothesis	Result	Discussion
Increase in distance	Yes: + 2.3 mn for the mean distance but increase is +3.7 for the most remote => 39.1 mn	More distant than short-stay in France Distance measured in 2000 and 2018 are almost the same Are the closure the main reason? Need to compare cities with closure to the others
Smallest cities are more distant than larger one	Yes Inequalities are broader for smallest cities For access to 2 nd hospital, small and smallest cities register broader distance, enlargement of inequalities	Coherent with results in Florida / Australia / Germany where access is better in urban location than remote location for hospitals in general Size categories according to French literature on small and medium sized cities
White collar have better access than blue collar	Yes but the difference is mainly apparent in largest cities In others, the difference is very small	Differences in access to surgery seem more geographical than social Coherent with the results of Bert (2019) in France which underlines the difficulties of access for remote places
Public surgery is more accessible than private	Yes specially for small cities where a significant fall in access is registered: from 65% to 35% at less than 20 mn) Particularly for the 2 nd choice	To put in perspective with: - the fact that 58% of hospitalisation for surgery are due to private practice - public for complex surgery (usually in University Hospital) and private for more standardised surgery

Perspectives

- 1) At local level: identify the cities with important fall in access (i.e. access has fall more than 5 or 10 mn ?)
Look for explicative factors? Fall in the general number of medical care, of population, deprivation?
- 2) At local level: analyse more closely the social inequalities in access according to the local configurations of the cities:
What are the local inequalities related to socio-spatial segregation in large cities?
- 3) Carry on case analysis of small and very small cities in a more qualitative approach:
How has the fall in access has been cope with for local population?
Can it be put into perspective with the overall city situation?
How the fall in access has been managed by the health regional authority?
- 4) Compare access to ambulatory/complete surgery and private/public surgery for a set of specific surgery
- 5) Challenge of moving from spatial access to mobility practices (relevance of the nearest hospital)

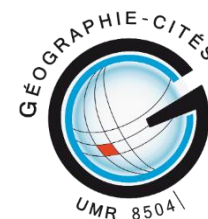


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Thank you!

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