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Managing waiting times and avoidable variations in elective surgery: the case of Tuscany Region

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Waiting time for elective surgery



Demand

Waiting time

Supply

Dissatisfaction

Potential worsening of health status

Postponed health benefits

Equity of access





Waiting time for elective surgery



Excess due to the absence of price rationing

Act as a non-price rationing mechanism that brings together the demand and the supply of health care





Geographic variation in the use rates of ES services:

- Evidence-based
- Preference sensitive
- Supply sensitive

- Appropriateness → Benchmarking

- Equity

References:

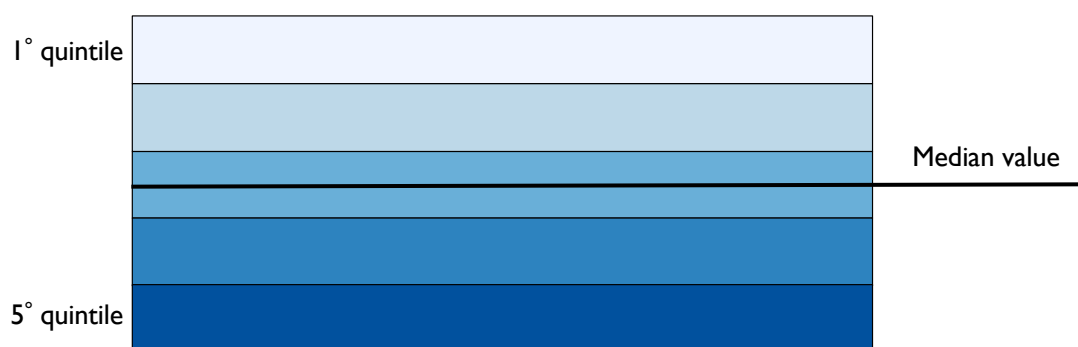
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- Weeks, William B., Marie Jardin, Jean-Charles Dufour, Alain Paraponaris, and Bruno Ventelou. 2017. "Geographic variation in admissions for knee replacement, hip replacement, and hip fracture in France: evidence on supplier-induced demand in for-profit and not-for-profit hospitals: Medical Care." *LWW*. Accessed July 11. doi:10.1097/MLR.0000000000000211.





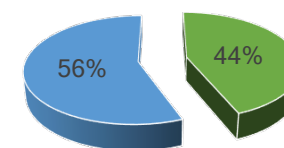
Methodology

- **Use rate** = $\frac{\text{Number of procedures for the inhabitants of a district}}{\text{Number of inhabitants}} \times 100.000$
 - Standardised by gender and age
 - Takes into account extra-regional mobility
- **Waiting time** = Date of access – Date of booking
- Assessed geographical variation in use rates



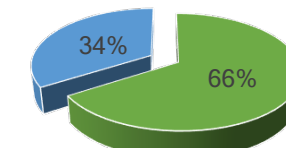
- 2016 data
- 34 Tuscan districts
- 9 procedures:
 - Percutaneous coronary angioplasty*
 - Laparoscopic cholecystectomy*
 - Transurethral prostatectomy*
 - Knee replacement*
 - Cholecystectomy*
 - Knee arthroscopy*
 - Hip replacement*
 - Hysterectomy*
 - Colectomy*

Hospital admissions



■ Surgery ■ Medicine

Surgery



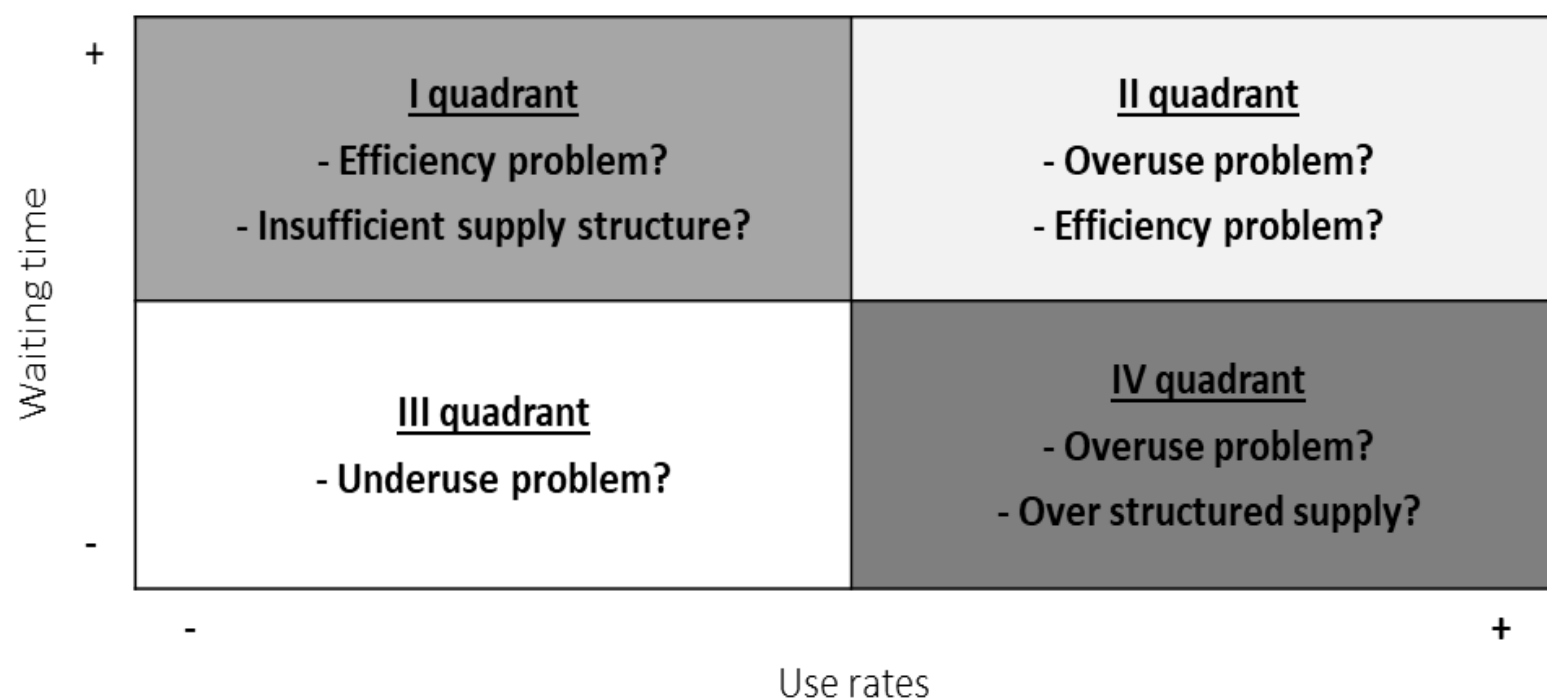
■ Elective ■ Other





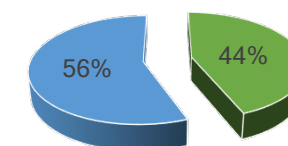
Methodology

- Pearson correlation analysis
- Used the theoretical framework by Nuti and Vainieri (2012)



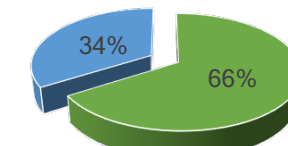
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 - Hysterectomy*
 - Colectomy*

Hospital admissions



■ Surgery ■ Medicine

Surgery



■ Elective ■ Other

References:

- Nuti, Sabina, and Milena Vainieri. 2012. "Managing Waiting Times in Diagnostic Medical Imaging." *BMJ Open* 2 (6): e001255





Italian context

- Italian NHS follows a Beveridge model
- Regions are responsible for the organisation of healthcare
- 3.7 million inhabitants in Tuscany



Elective surgery in Tuscany (2016) [the 9 procedures under examination]

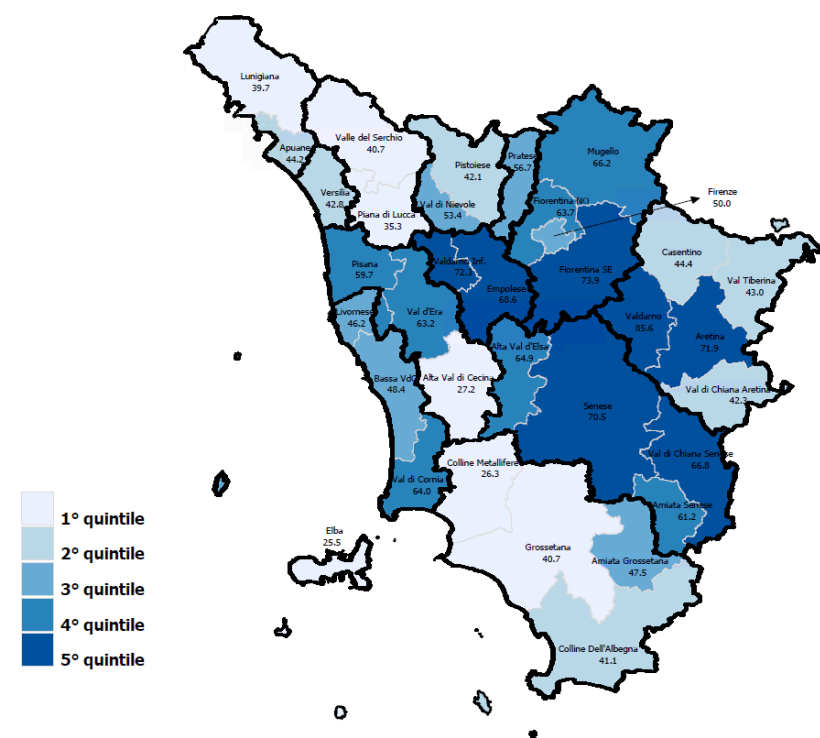
- 30.000+ procedures delivered
- 66 days average waiting time
- Up to 287 days in some districts



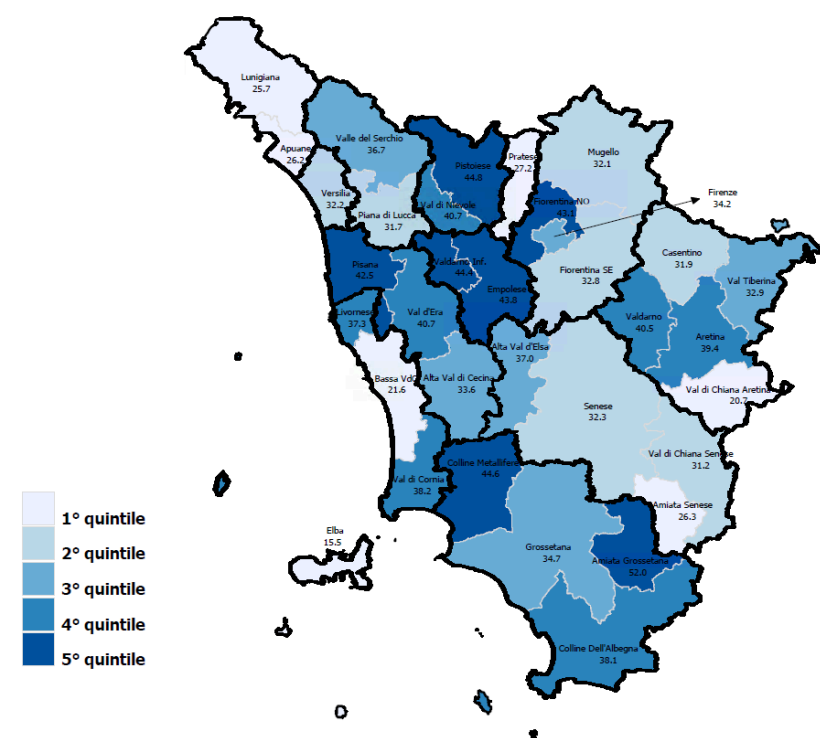


Geographic variation in use rates

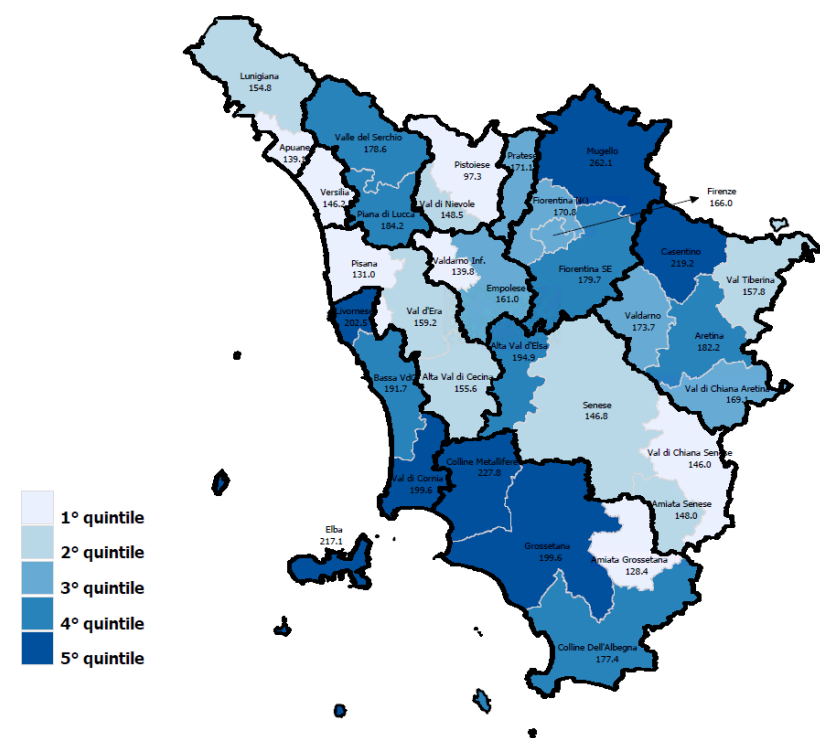
Percutaneous coronary angioplasty
Use rates for 100.000 inhabitants



Colectomy
Use rates for 100.000 inhabitants



Cholecystectomy
Use rates for 100.000 inhabitants



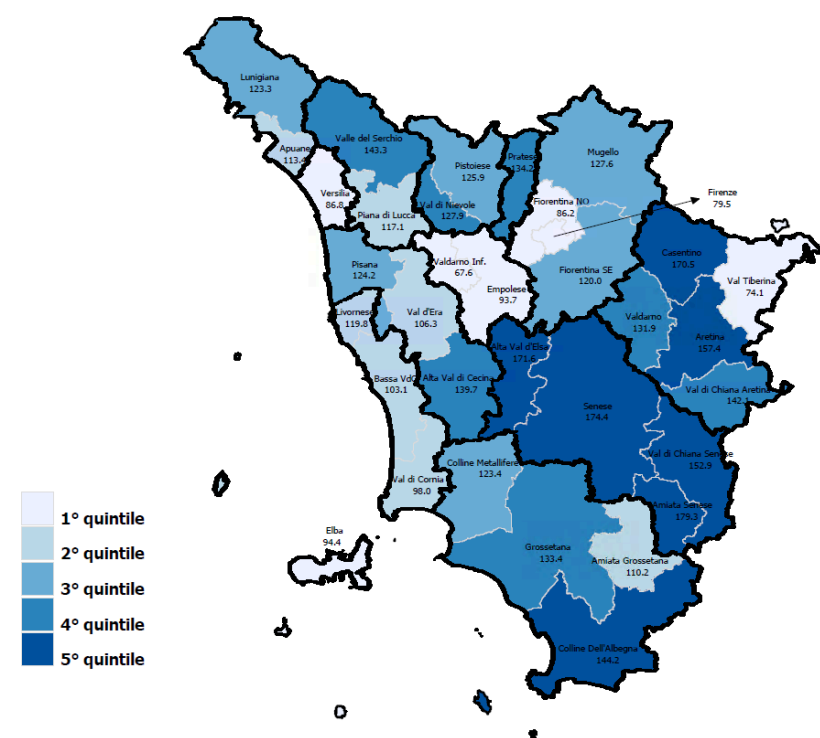
* Data processed by the MeS Lab, Scuola Superiore Sant'Anna - 2016



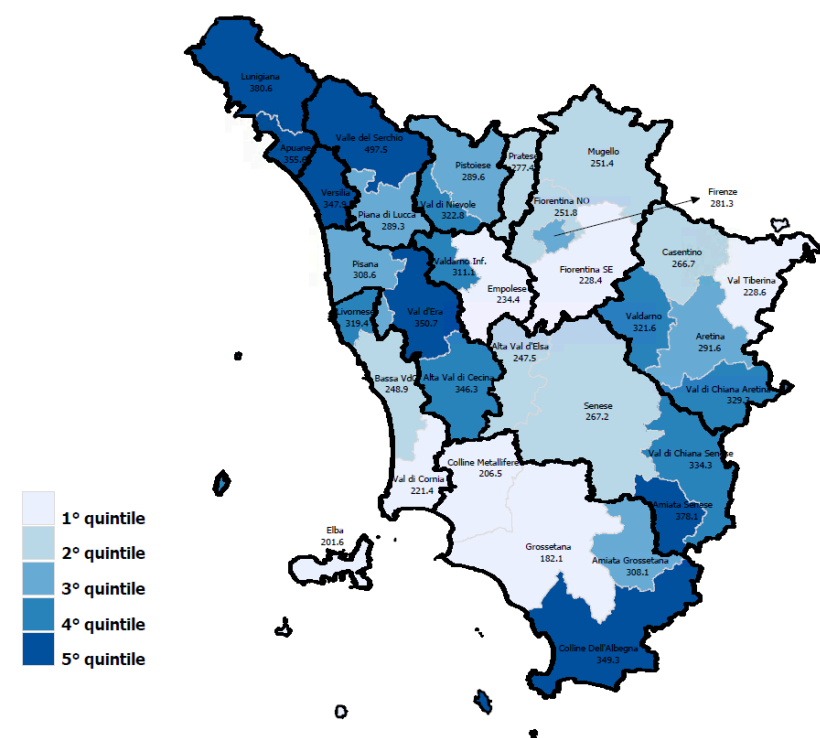


Geographic variation in use rates

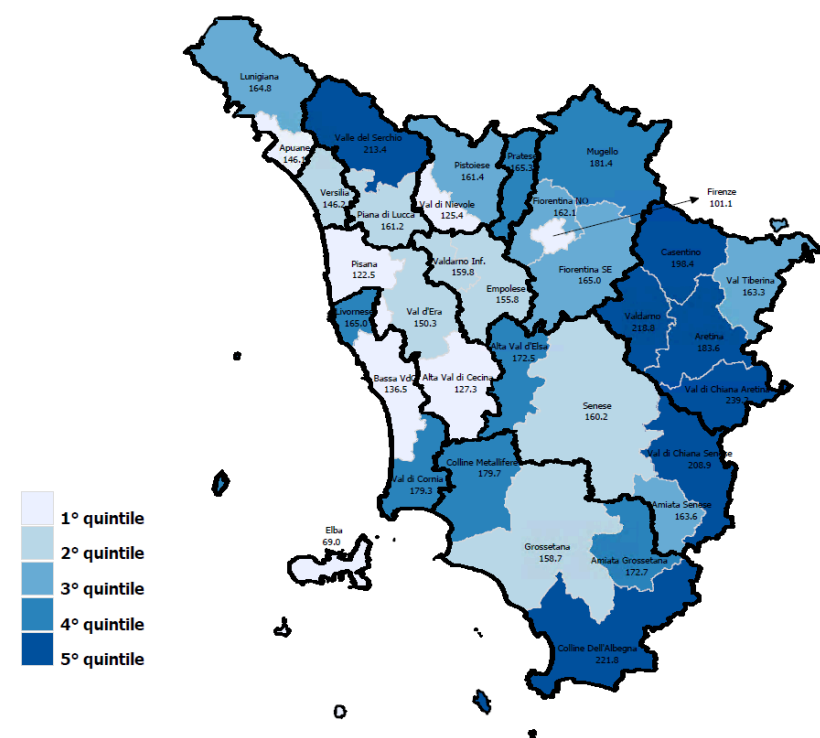
Hysterectomy
Use rates for 100.000 inhabitants



Hip replacement
Use rates for 100.000 inhabitants



Knee replacement
Use rates for 100.000 inhabitants



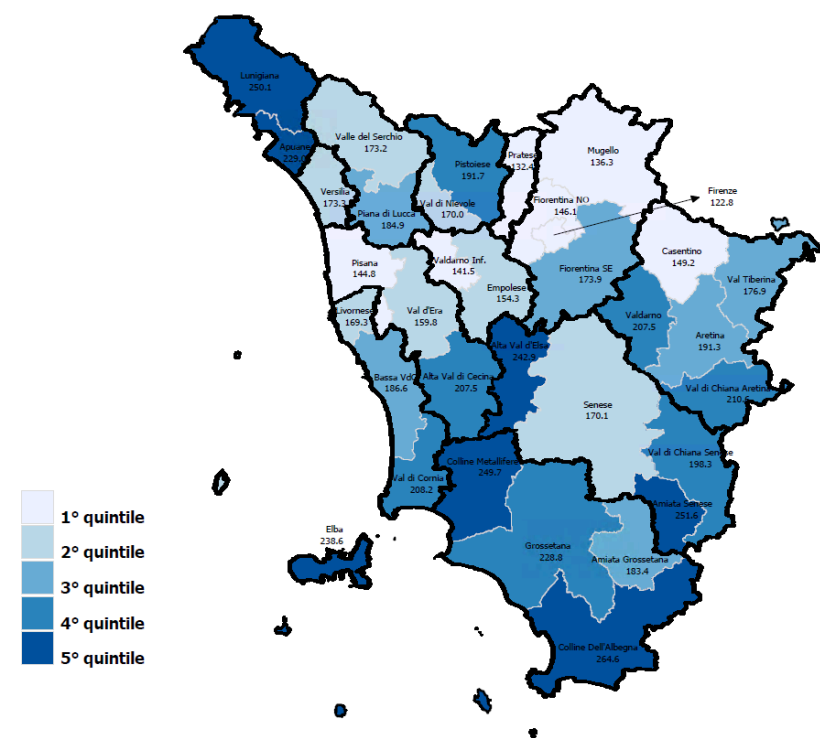
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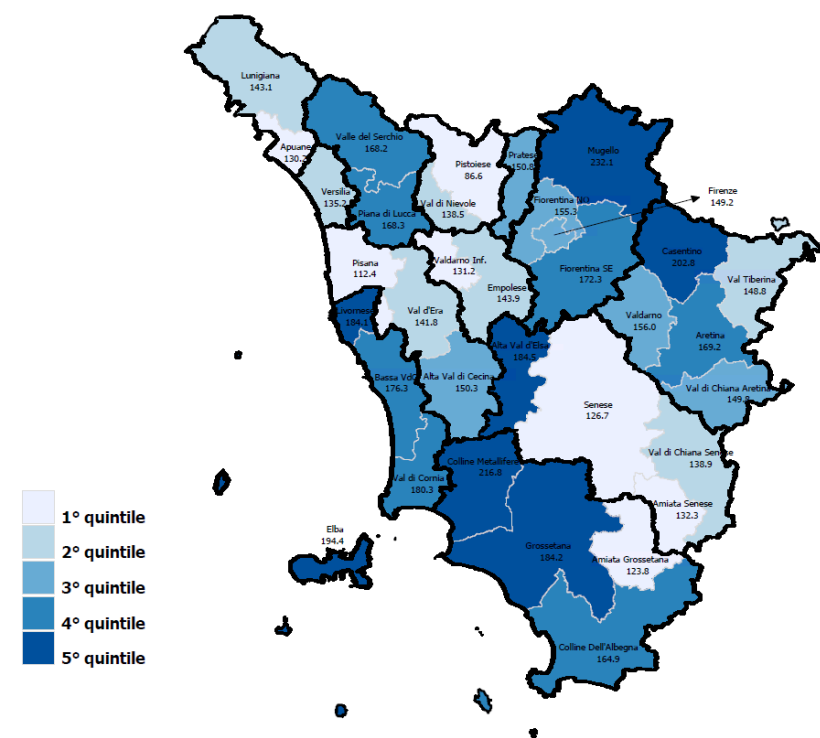


Geographic variation in use rates

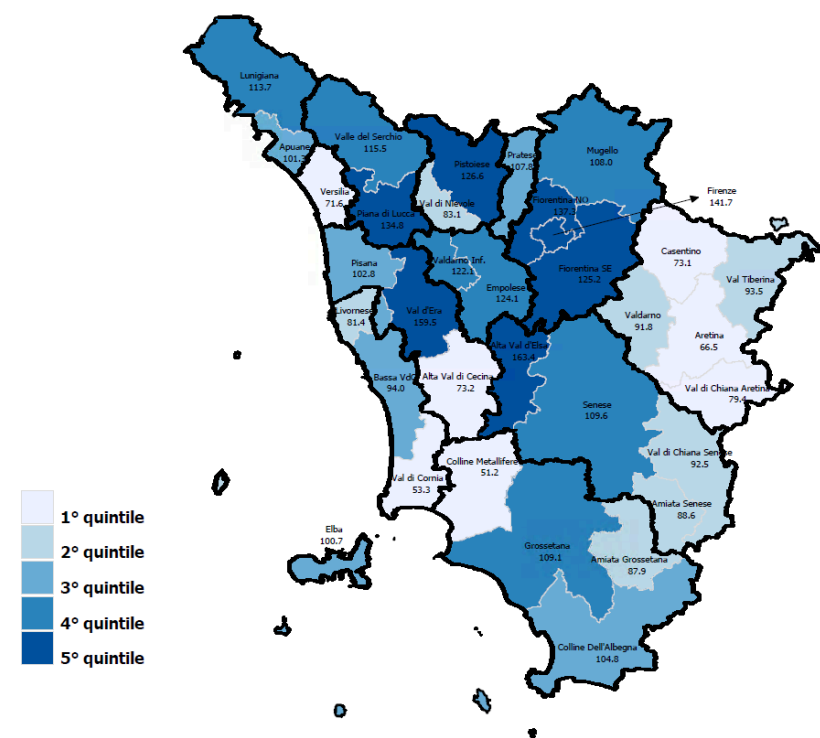
Knee arthroscopy
Use rates for 100.000 inhabitants



Laparoscopic cholecystectomy
Use rates for 100.000 inhabitants



Transurethral prostatectomy
Use rates for 100.000 inhabitants



REGIONE TOSCANA



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Pearson correlation analysis

- There appears to be no correlation between the waiting times and the use rates of elective surgical procedures for the 34 Tuscan districts

Procedure	Pearson coefficient	p-value
Knee arthroscopy	0.0119	0.9467
Cholecystectomy	-0.1222	0.4911
Colectomy	0.0406	0.8198
Hip replacement	0.2815	0.1068
Hysterectomy	-0.3037	0.0808
Knee replacement	-0.0043	0.9809
Laparoscopic cholecystectomy	-0.1986	0.2601
Percutaneous coronary angioplasty	-0.2073	0.2395
Transurethral Prostatectomy	0.0287	0.8721

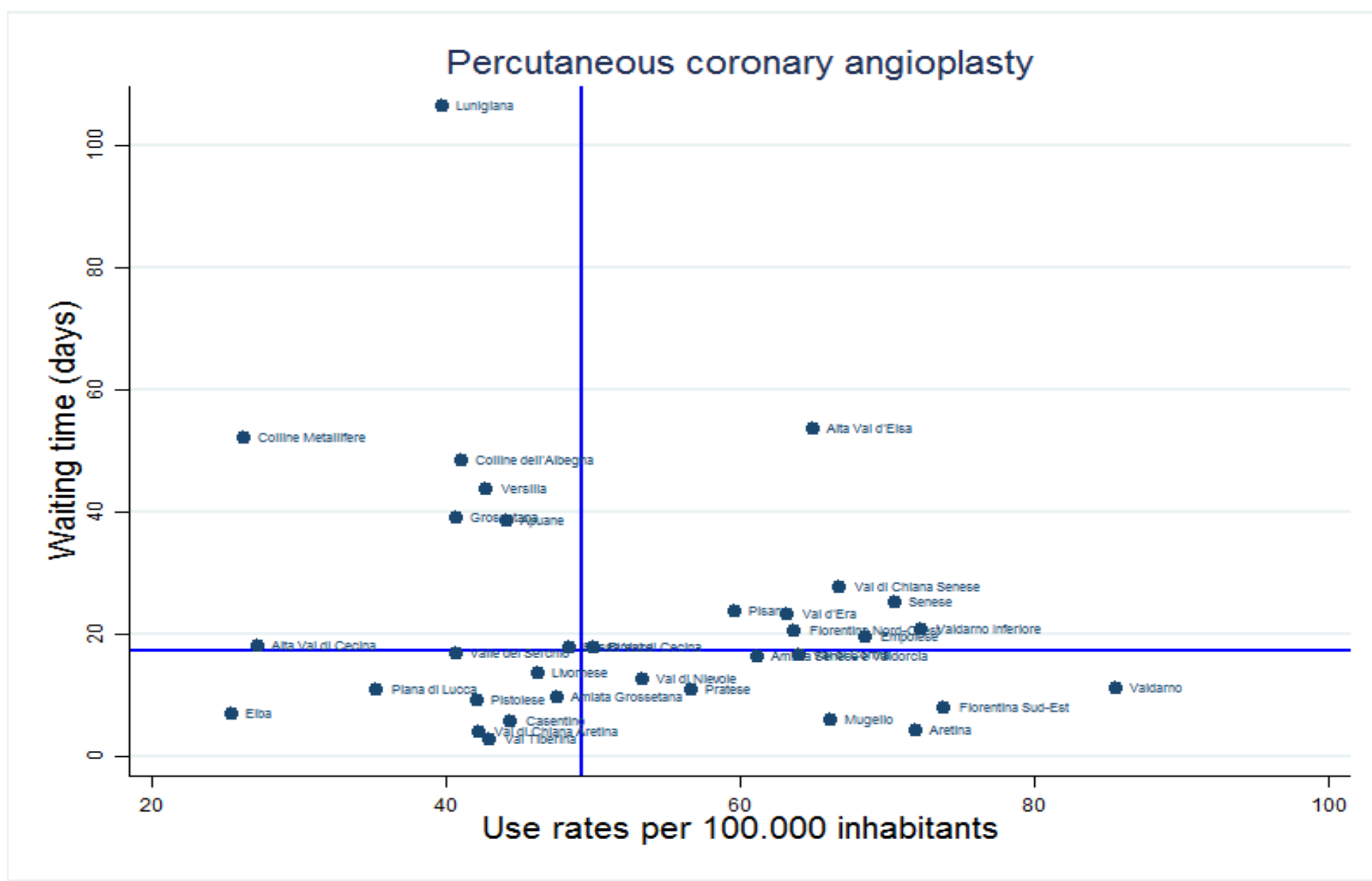
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- Riganti A, Siciliani L, Fiorio CV. The effect of waiting times on demand and supply for elective surgery: Evidence from Italy. *Health Economics*. 2017;1-14. <https://doi.org/10.1002/hec.3545>
- Martin, Stephen, Nigel Rice, Rowena Jacobs, and Peter Smith. 2007. "The Market for Elective Surgery: Joint Estimation of Supply and Demand." *Journal of Health Economics* 26 (2): 263–85. doi:10.1016/j.jhealeco.2006.08.006.





Waiting time-Use rates matrix



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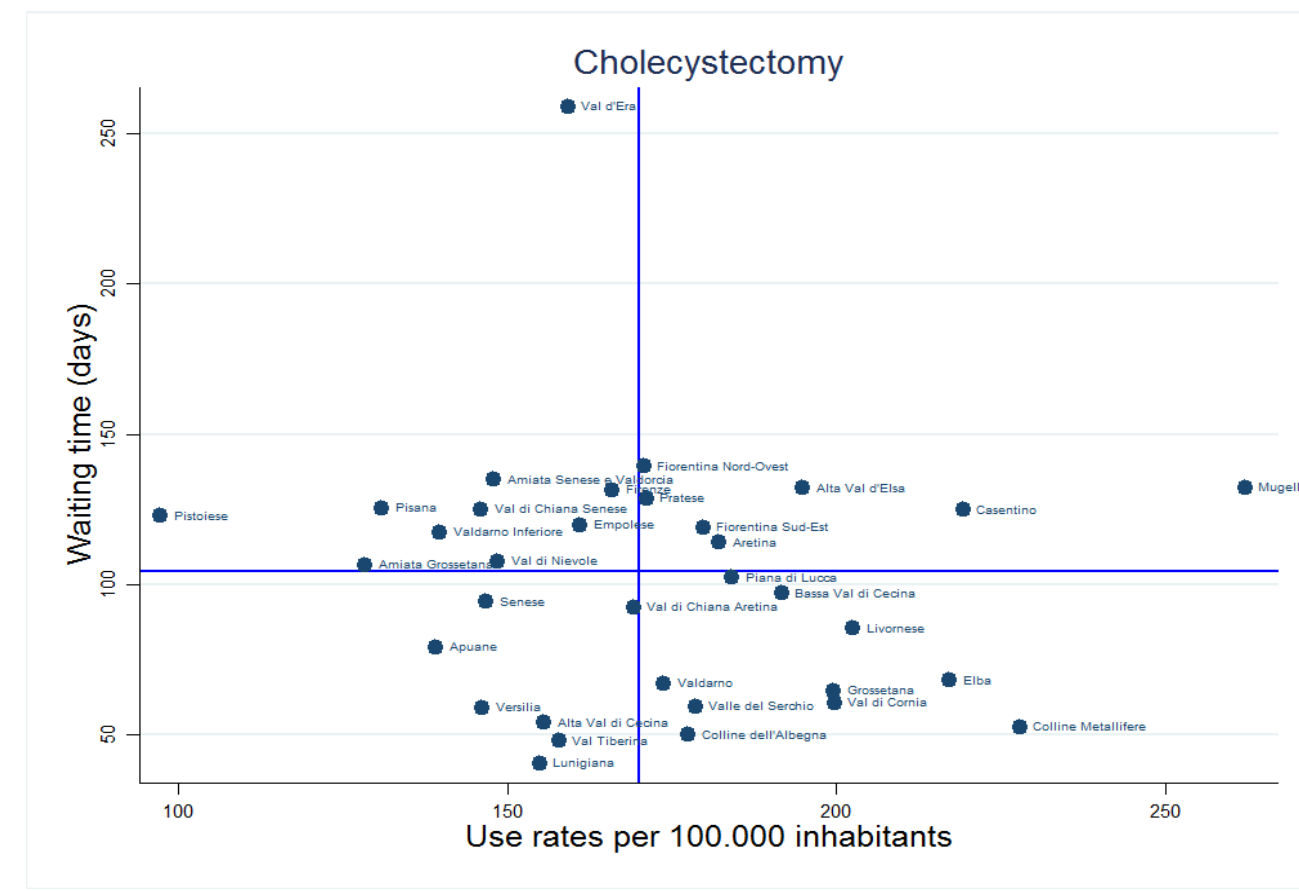
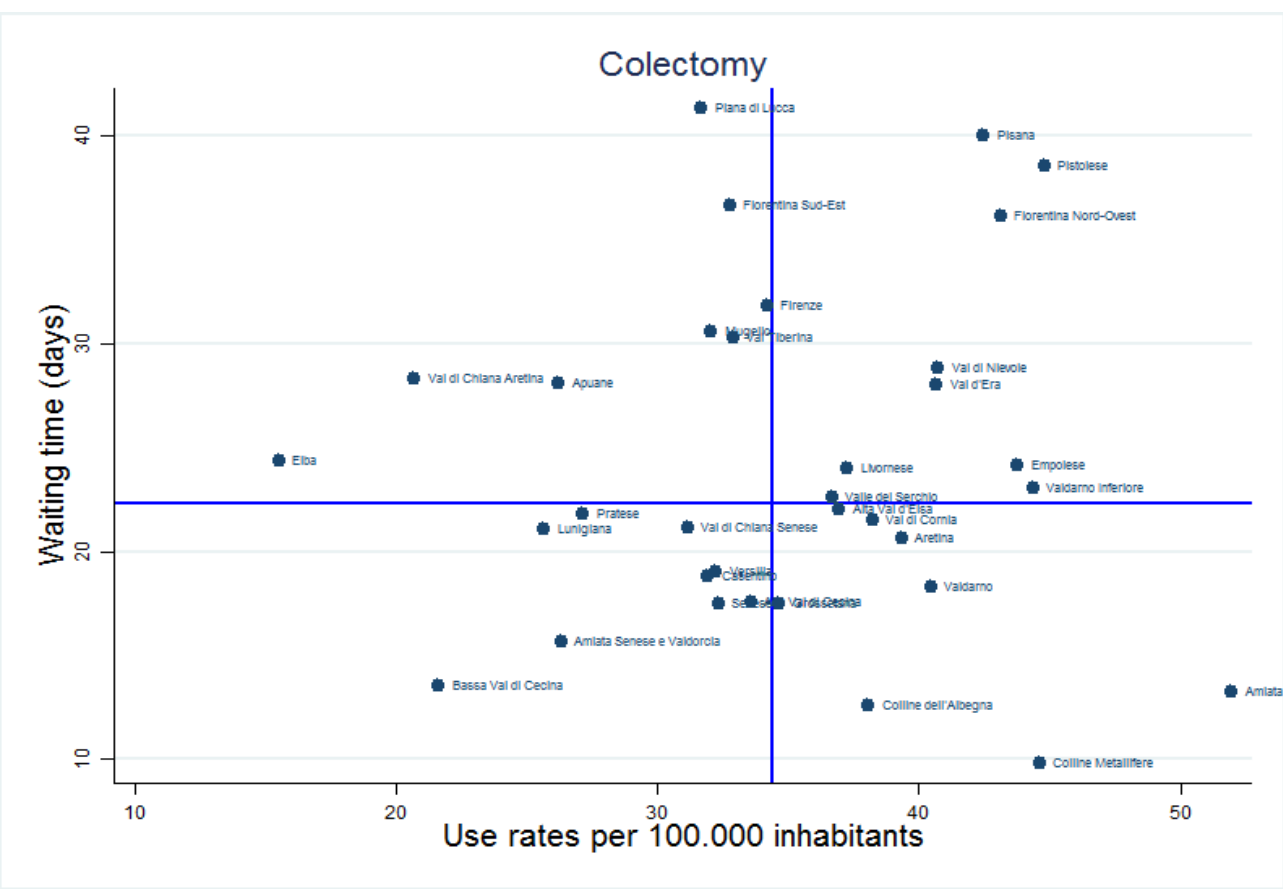


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Waiting time-Use rates matrix

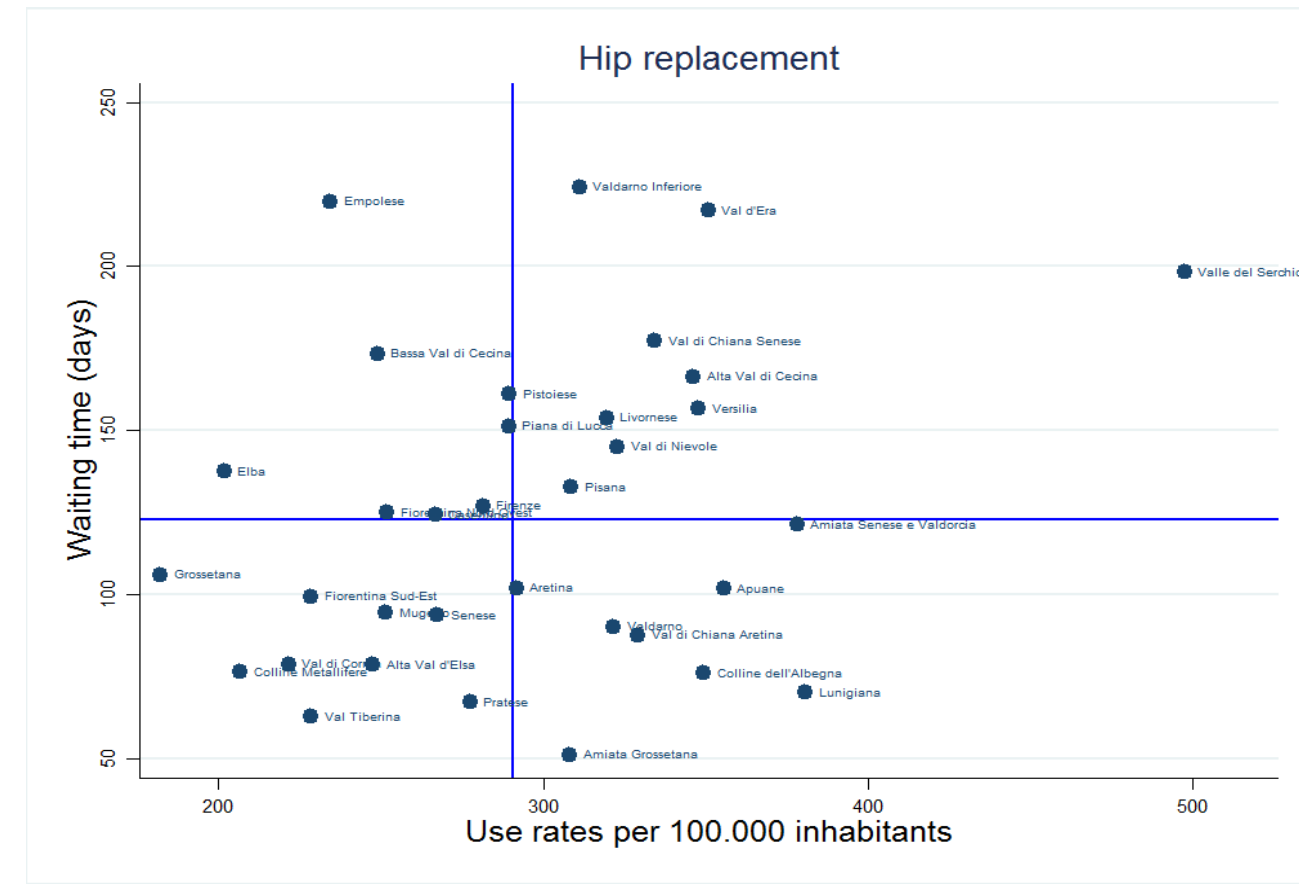
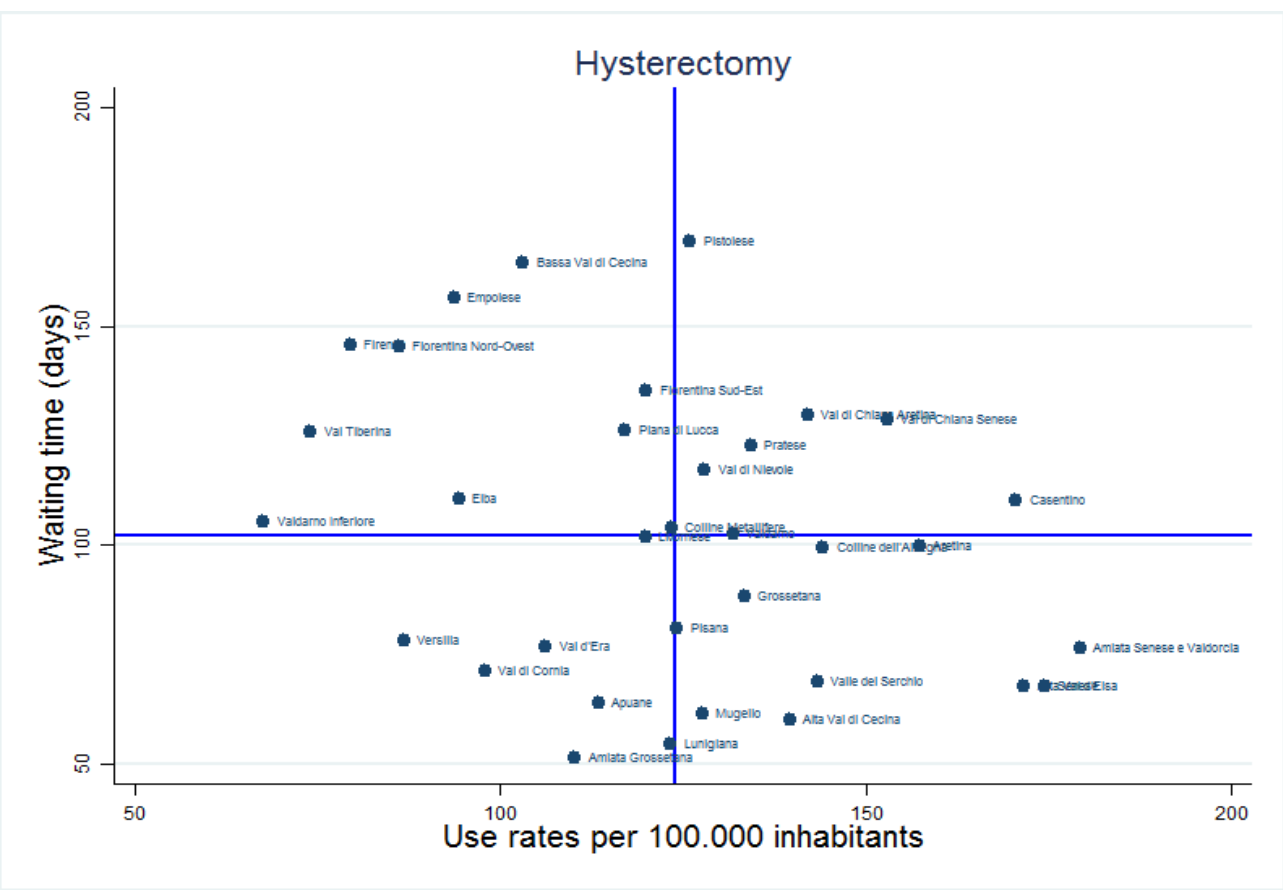


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Waiting time-Use rates matrix

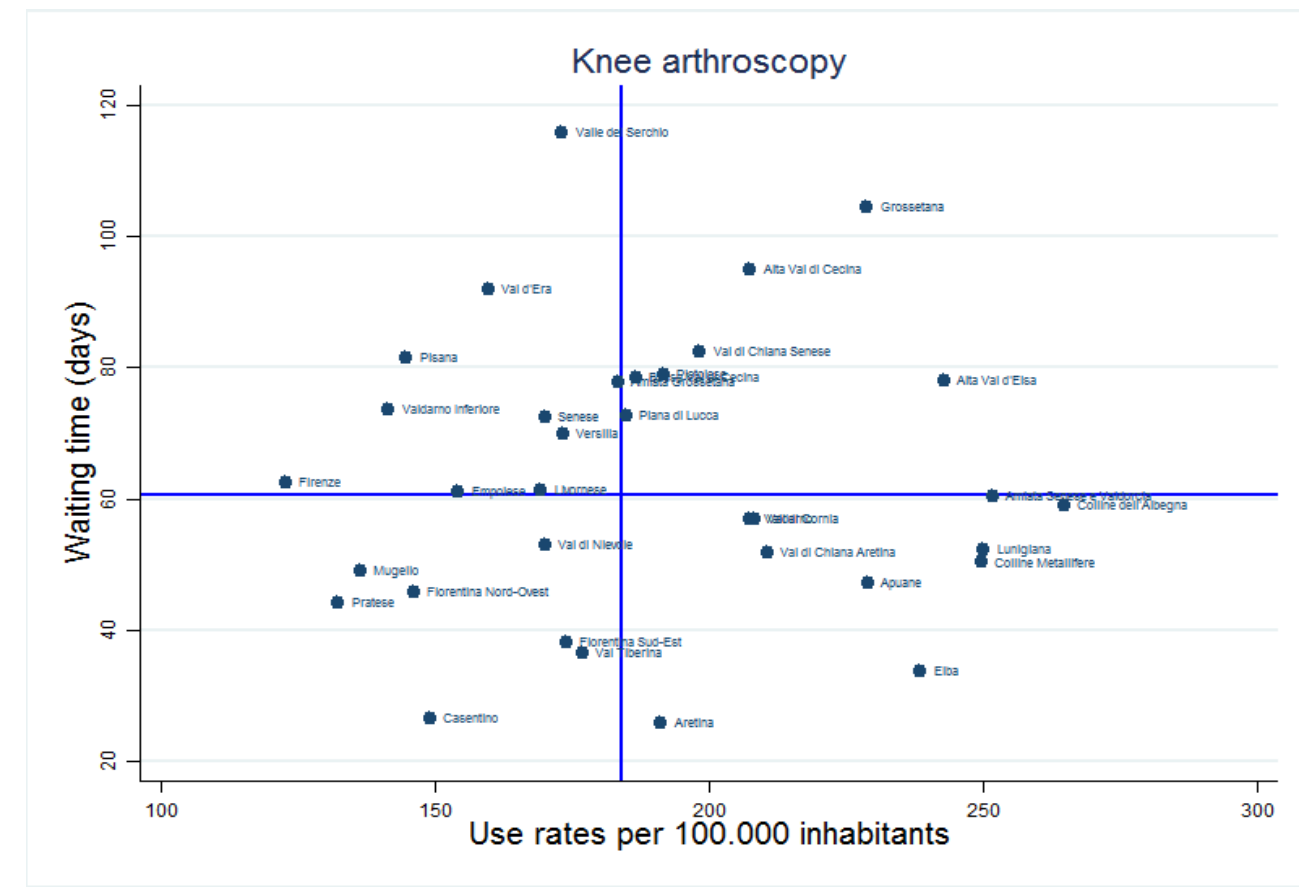
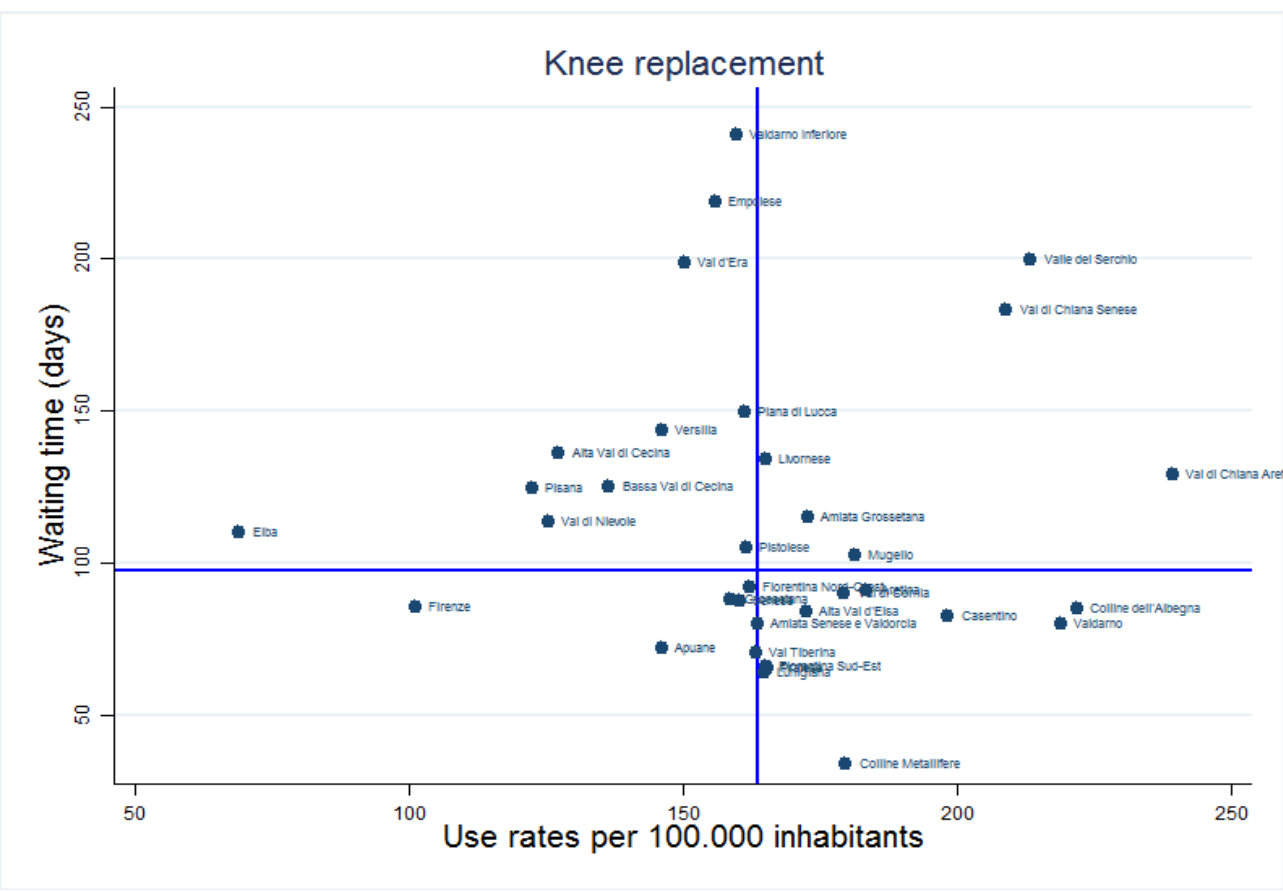


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Waiting time-Use rates matrix



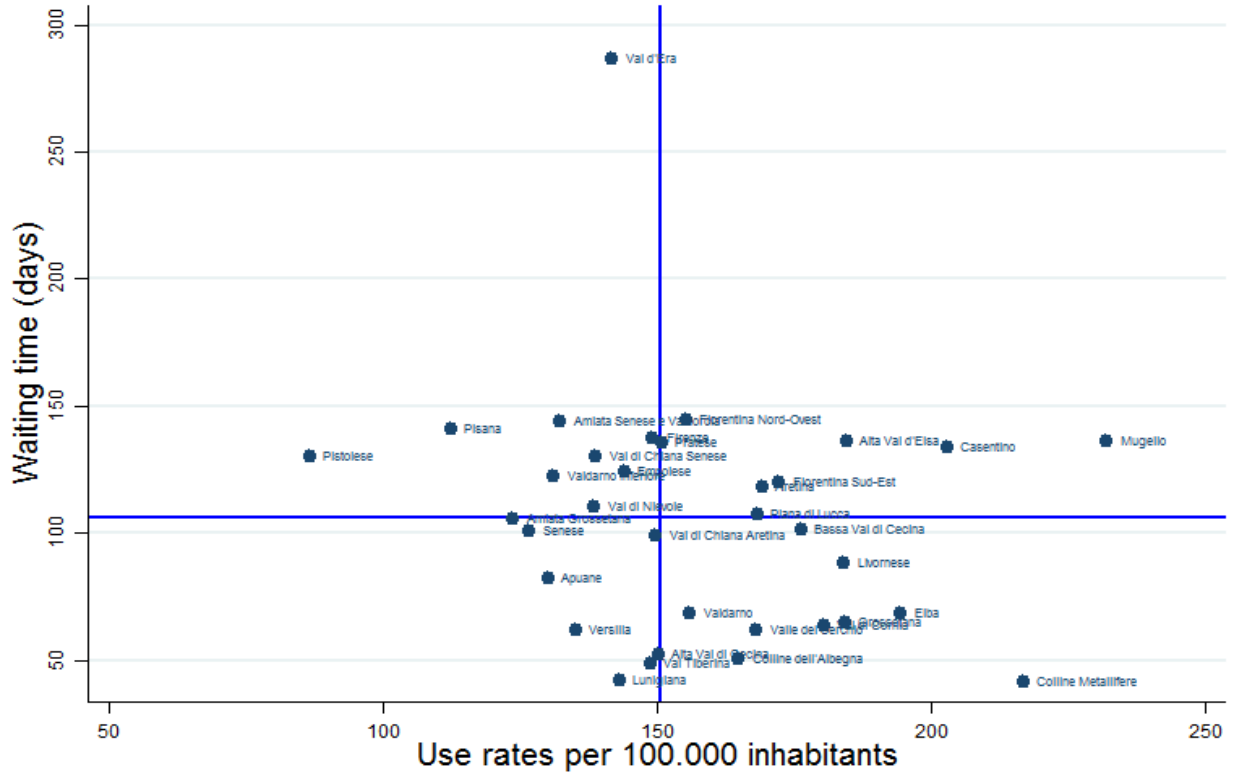
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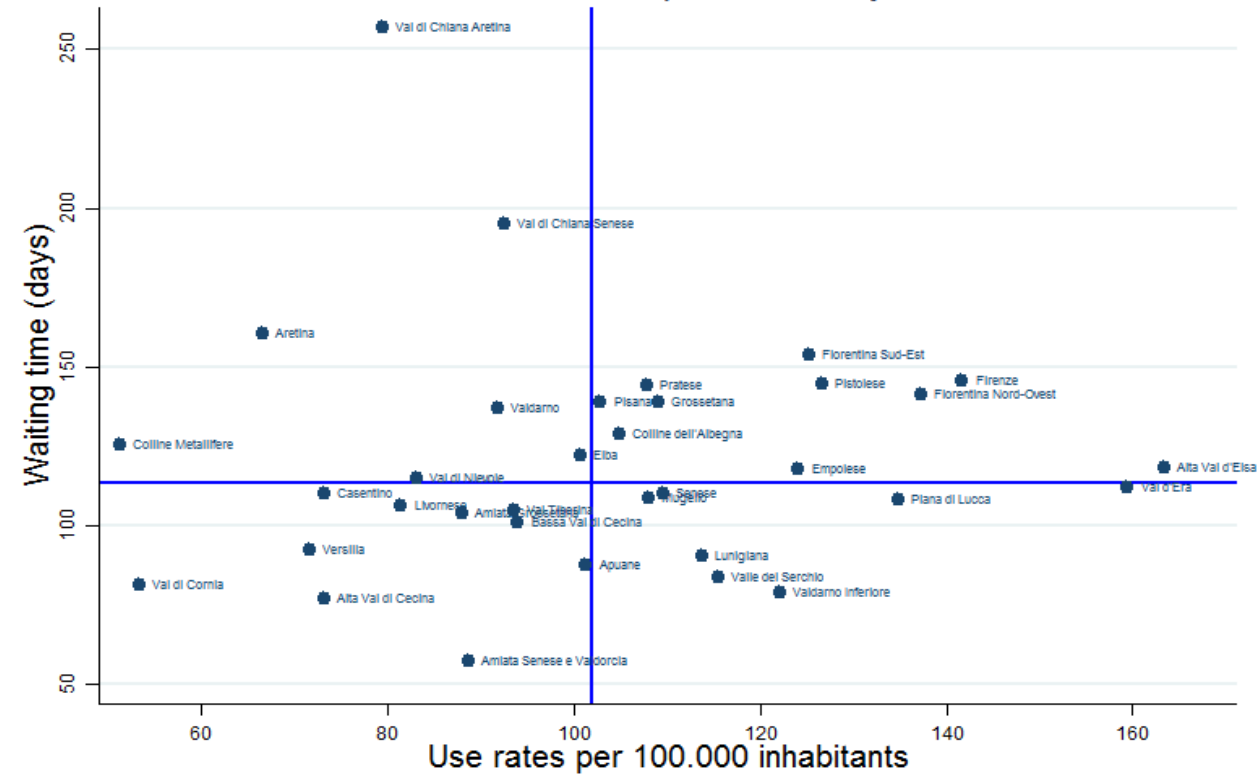


Waiting time-Use rates matrix

Laparoscopic cholecystectomy



Transurethral prostatectomy



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Summary – An example

	Knee arthroscopy	Laparoscopic chole.	Transurethral prost.	Colectomy	Cholecystectomy	Hysterectomy	PCA	Hip replacement	Knee replacement
Use rates (residency)	4	4	1	3	4	5	4	3	5
Waiting time (residency)	1	3	5	2	3	3	1	2	2
Use rates (provider)	5	4	2	4	4	4	4	4	5
Waiting time (provider)	1	2	5	3	2	3	1	2	1

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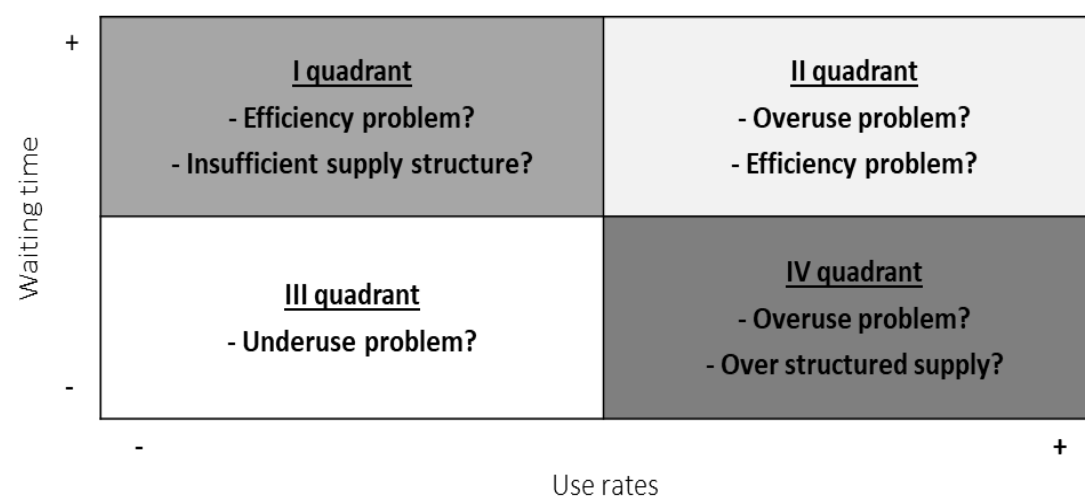
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Discussion

- Observed great geographical variation in the use rates, independently of the procedure;
- Geographical variation also for waiting times, but more procedure specific;
- No correlation between waiting times and use rates → supply-side interventions?
- The matrix can be a useful tool to cope with unwarranted variation for the policy makers



- The study is limited to Tuscany, it takes into account 9 procedures and one single year was under observation; it is highly replicable and additional experiments would increase the body of knowledge about geographical variation.





Thank you for your attention

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