Regional Disparities in health care opportunities in Italy

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I SERVIZI PUBBLICI LOCALI TRA DISPARITÀ ECONOMICHE E SFIDE DEMOGRAFICHE

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Motivation

Public expenditure on healthcare in Italy: 6.2% of GDP in 2023

- $<$ OECD average (6.9%), EU average (6.8%)
- Is Italian per capita expenditure on healthcare high or low?

The question is misplaced: a better approach would be to ask why we should allocate public resources to healthcare and what the limits of this process are

- Narrow perspective: economic efficiency
- Broader perspective: balancing opportunities

The broader perspective

- In a broader perspective, balancing opportunities for care is a precondition for balancing opportunities more generally
- The idea that health care is essential to ensuring individuals' fair shares of opportunity is central to key egalitarian perspectives (Daniels, 1981, 2001, 2013). It underpins both Rawls' (1971, 2001) principle of *fair equality of opportunity* and Sen's (1980, 1992) work on *capabilities* (e.g., Abatemarco, Beraldo, Stroffolini, 2020)
- As a society we have to determine the criteria that health needs have to satisfy to be considered *special*, i.e. relevant from the society's perspective

The broader perspective

The identification of needs might be highly controversial, for it is the outcome of complex social processes determining what is morally relevant at the societal level and what is not – Overall: what is our goal: flourishing (Nicomachean Ethics)?

- technological constraints
- **resource constraints**

LEA

1. The Essential Levels of Care (LEA) are the services and benefits that the National Health Service (SSN) is required to provide to all citizens, either free of charge or upon payment of a co-payment (ticket), using public resources collected through general taxation (taxes).
2. Italian Regions can provide additional services and benefits **beyond** those included in the LEA, using their own resources.

LEA - Shortcomings

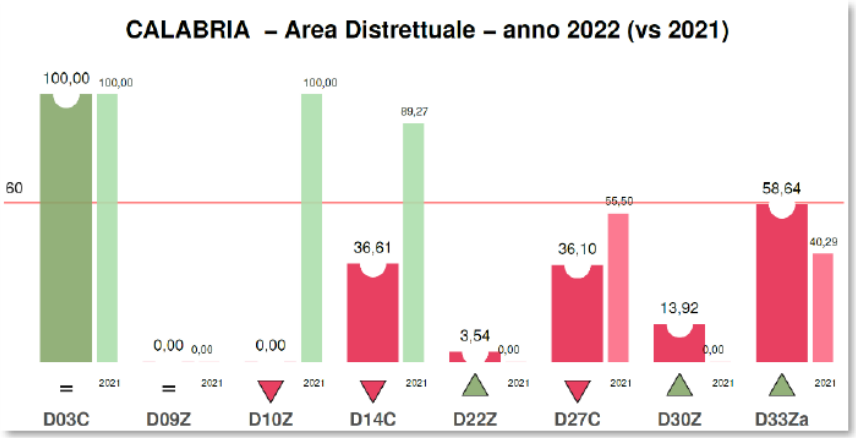
1. LEA scores are computed as composite indices taking into account a variety of heterogeneous dimensions (e.g. controls on animals' health)
2. Some of the LEA dimensions do not pertain to the quality of supply but to preferences and beliefs (e.g., % of the target population getting the flu vaccine, %Organ donors in brain death) - It is considered utilization instead of opportunities
3. Weights are not appropriately determined

LEA - Shortcomings - Example

"Analizzando gli indicatori CORE dell'area prevenzione, si evidenziano le criticità del punteggio dell'indicatore...

1. ...sulla copertura delle principali **attività di controllo degli alimenti** (28 nel 2022, mentre nell'anno 2021 era pari a 97,6)
2. ...del punteggio relativo all'**indicatore composito sugli stili di vita** (48,6)
3. ...e del punteggio relativo alla proporzione di persone che hanno effettuato **test di screening** di primo livello, in un programma organizzato per mammella, cervice uterina e colon-retto"

Weights - An example



D10Z = % di prestazioni garantite entro i tempi della classe di priorità B (alta) in rapporto al totale di prestazioni di classe B

"La quota di prestazioni ambulatoriali garantite entro i tempi previsti dal Piano Nazionale Governo Liste di attesa (PNGLA) 2019-2021 per la classe di priorità B, si riduce in 11 Regioni"
(Monitoraggio dei LEA, NSG 2022)

Discussion on LEA Indicators

The discussion on LEA highlights that these indicators:

1. Confusingly combine information related to the supply of healthcare services with information related to the demand for such services
2. Are not designed to verify the opportunities citizens benefit from. Rather, they seem to be motivated by the - otherwise very justifiable - need to monitor appropriateness and, consequently, costs
    - As a consequence: assign equal weight to activities that have significantly different impacts on the opportunities available to citizens

It is necessary to distinguish between objectives, so that it becomes more clear what we are actually measuring when using these indices.

Measuring disparities in health care opportunities

- The idea that health care is essential to ensuring individuals' fair shares of opportunity is central to key egalitarian perspectives.
- All available notions of equity in healthcare fail to disentangle opportunities from utilization. However, utilization does not provide information about opportunities, as it depends on individual preferences.
- I have proposed (with my co-authors) a notion of Equity in Health care which disentangles opportunities from utilization (e.g., Abatemarco, Beraldo, Stroffolini, 2020; Abatemarco, Aria, Collaro, Beraldo 2024).

ex-ante potential access

- The proposal resembles the Rawlsian principle of *fair equality of opportunity*, by which the equalizandum is to be determined in terms of access to health care independently from both health needs and individuals' preferences.
- In the *ex-ante* perspective we propose, what is salient is how the size of access barriers—defined as the monetary cost of a bundle of health services of a given quality—is distributed across different groups, where each group is defined by characteristics relevant to determining barriers (such as age, geographic location, or presence of a disability).

Making the notion operative

- To apply our notion, so to measure disparities in opportunities of access to health care, three ingredients are necessary:
  1. a list of individual characteristics potentially affecting access costs;
  2. a bundle of health treatments of appropriate quality;
  3. a group-specific distribution of resources that can be employed to get the treatment(s) under consideration.
- With these ingredients it is possible to compute the access cost for any possible realization of characteristics, i.e. the cost the individual belonging to a given group will incur in to gain access to the appropriate treatment, once a need for that treatment emerges.

The Access Gap Index, 2024

- *The Access Gap Index measures financial resources needed to grant access to treatment.*
- $\overline{A}_i$: monetary measure of non-access for group i.
- Computed as:
  - Proportion of individuals denied access.
  - Average per capita transfer required for access.
- Inequality across groups $(\overline{A}_1, \ldots, \overline{A}_n)$ assessed using standard metrics (e.g., Gini coefficient).

$$\overline{A}_i = \frac{1}{n_i} \sum_{j=1}^{n_i} \max(c_i - y_{ij}, 0) =$$

$$\left(\frac{q_i}{n_i}\right) \left(\frac{1}{q_i} \sum_{j=1}^{q_i} (c_i - y_{ij})\right)$$

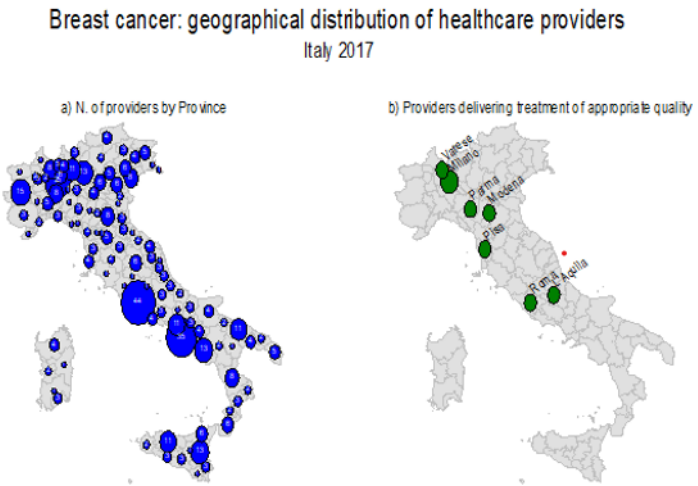
- c_i: cost of access.
- y_{ij}: available resources.

Inequality decomposition:

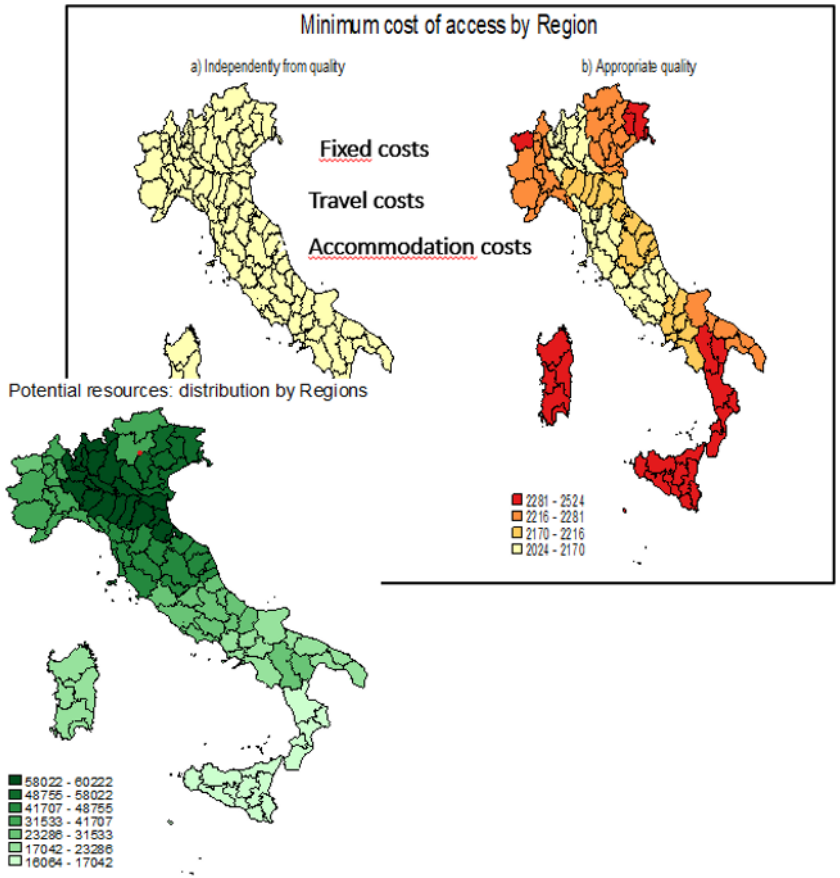
$$\overline{A}_i = \overline{A}_i^1 + \overline{A}_i^2 + \overline{A}_i^3 + \overline{A}_i^4$$

- $\overline{A}_i^1$: Productive inefficiencies.
- $\overline{A}_i^2$: Shortfall of providers.
- $\overline{A}_i^3$: Income inequalities.
- $\overline{A}_i^4$: Socio-economic conditions.

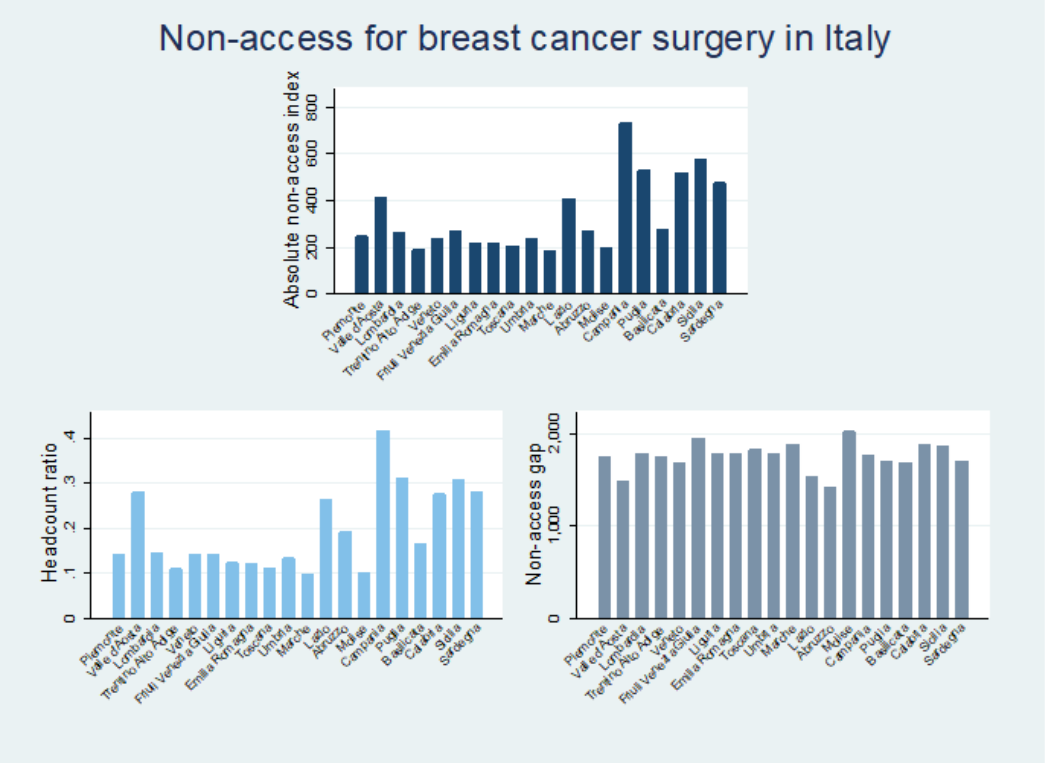
Decomposing the Access Gap Index

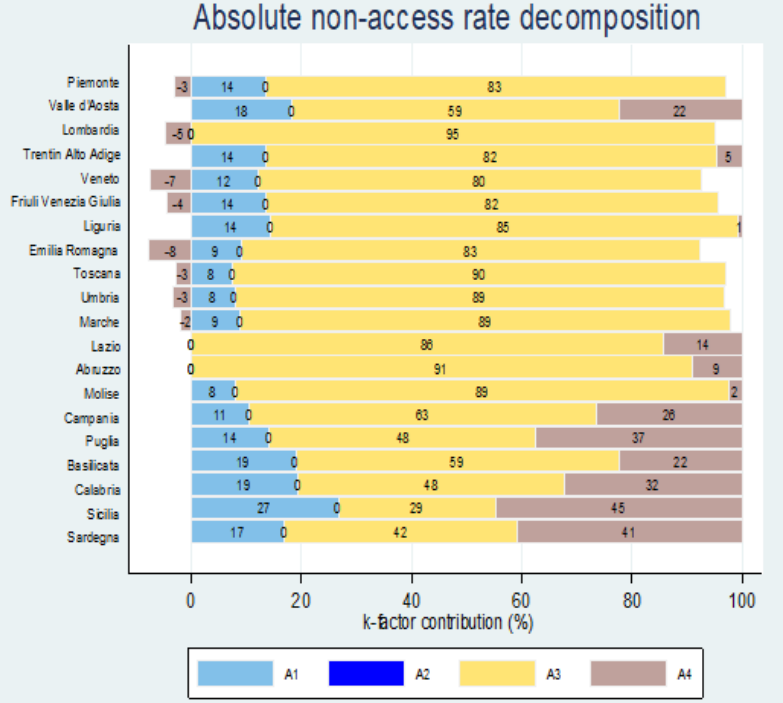


N. of per-year surgical treatments: **≥150**
Share of patients readmitted within 120 days: **≤8%**
Reconstruction with prosthesis during mastectomy: **≥70%**



Decomposing the Access Gap Index





Patient mobility

- There is another way to study regional imbalances in access opportunities: patient migration
- a reliable indicator of perceived poor quality of healthcare services - an example of Tiebout's (1956) voting with one's feet model
- Patient migration is particularly alarming when focusing on cancer: 11.39% (10%) of all hospital admissions in 2021 (2018) occurred outside the region of residence.

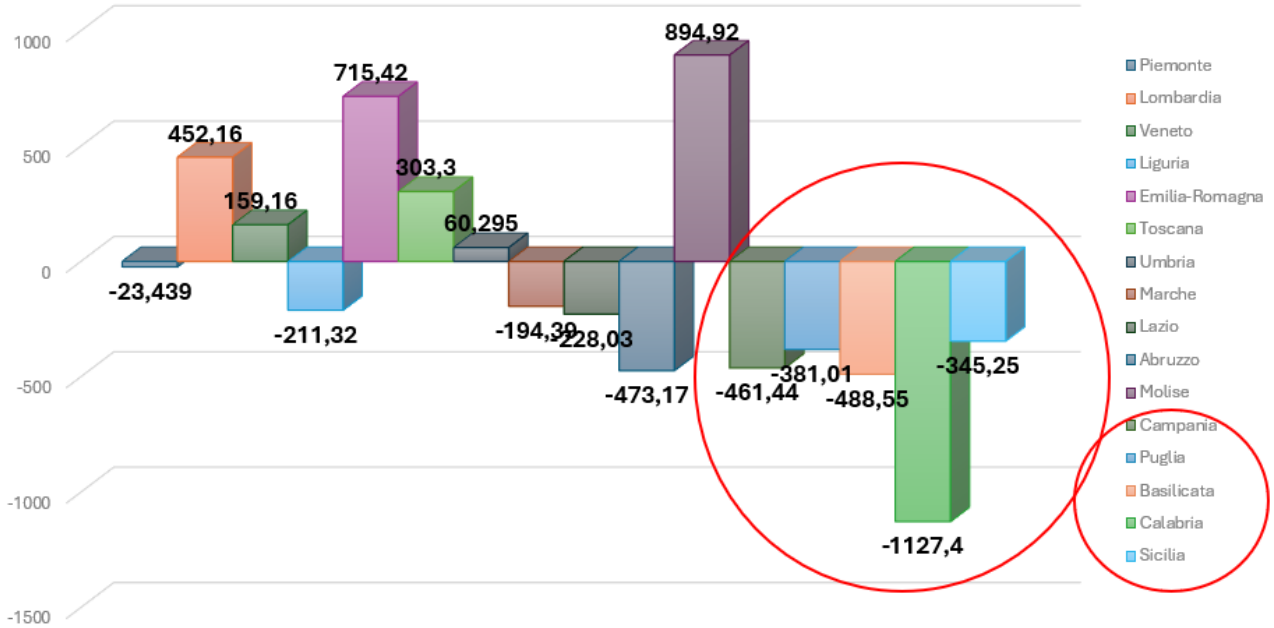
Financial Consequences of Mobility

Inter-regional Transfers (Million Euros, 2018)

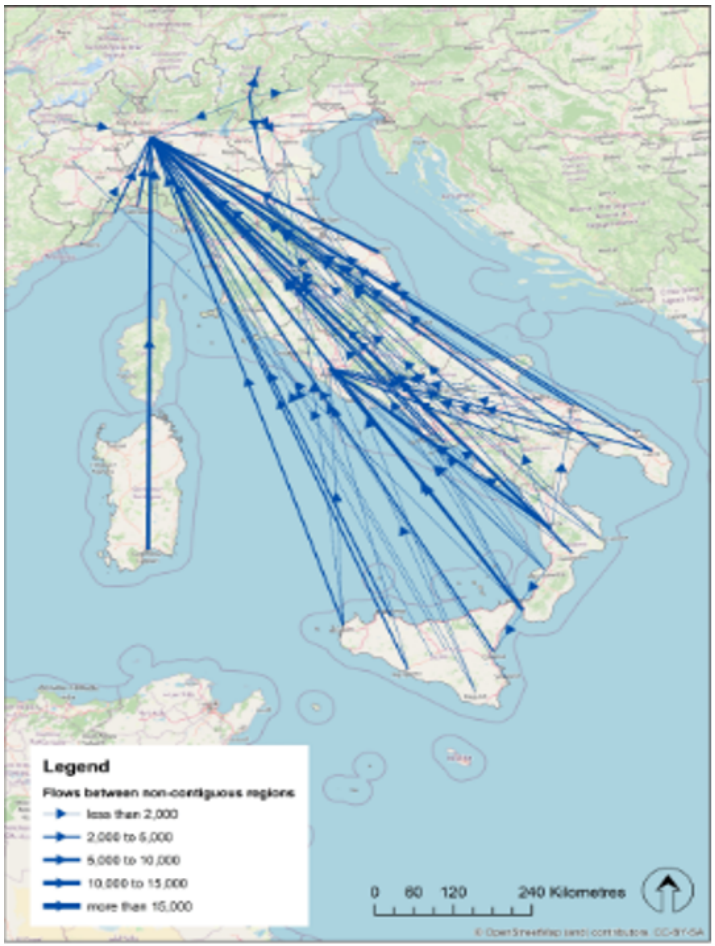
- It has several direct consequences

  → increase in out-of-pocket expenses borne by patients (greater inequality in the distribution of access opportunities to care)

  → significant financial flows between regions to reimburse health treatments delivered to non-resident



Financial Consequences of Mobility (Beraldo, Collaro, D'Ambrosio, Pratschke, 2021-2023



Inter-regional flows

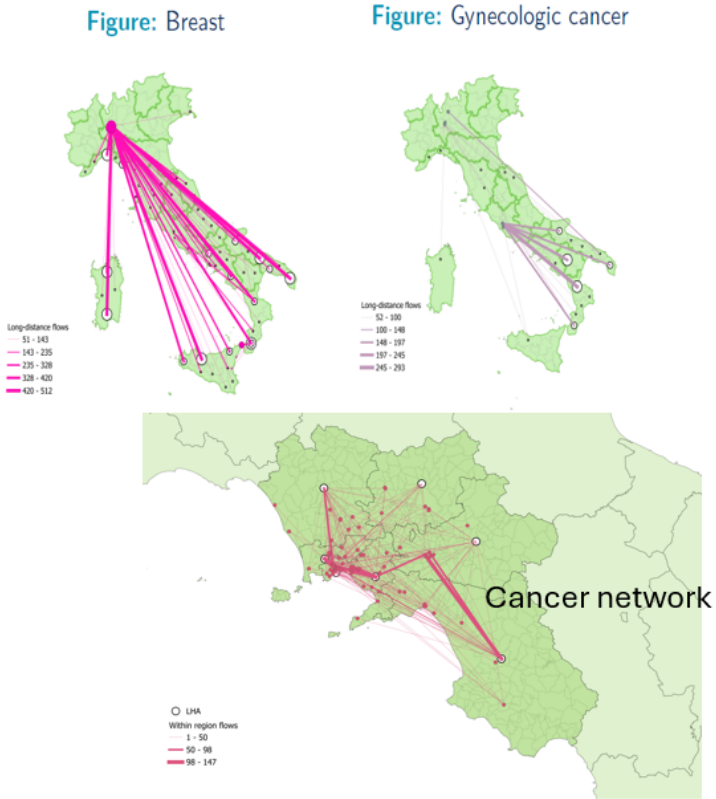
(Project Financed by Fed II, PI)

- Net flows – 9.510.716 obs
- We use Hospital Discharge Records data (2011-2019) to reconstruct the geography of cancer patient mobility within and between Regional Health Systems.
- We investigate the relationship between mobility flows and the characteristics of Regional Cancer Networks (RCNs) according to different types of Cancer

Types of mobility

Boundary Mobility

Long-distance mobility



Patient mobility signals imbalances in the opportunities available to individuals

- Imbalances became more pronounced since 2004, the Italian Parliament passed new legislation, introducing financial recovery plans (FRPs) to control healthcare budget deficits
- Bordignon et al. (2020) suggest that FRPs have neither rationed the use of healthcare services nor implied significant deterioration in citizens' health:
  - Use data on the share of people declaring themselves *very satisfied* with the quality of care during their most recent hospital stay (Bordignon et al., 2020) $\rightarrow$ utilization – *what about denied access?*
  - LEA scores $\rightarrow$ composite indices taking into account a variety of heterogeneous dimensions

Input reductions and escape rates – Beraldo, Collaro, Marino, Regional Studies, 2023

Table 2. Presence of a commissioner and escape rates.

	(1) OLS	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
$EC_i \times Post_{it}$	2.407**	3.080***	2.782***	2.499***	2.763***	1.694*
	(1.074)	(0.721)	(0.807)	(0.745)	(0.717)	(0.907)
EC_i	3.114					
	(2.570)					
PopOver65				−0.235	−0.753	−0.452
				(0.409)	(0.760)	(0.446)
GDP p.c.				−0.000	−0.000	0.000
				(0.000)	(0.000)	(0.000)
Obesity rate				−0.029	0.024	0.113
				(0.123)	(0.134)	(0.102)
Education				0.151	0.081	0.090
				(0.202)	(0.191)	(0.438)
Cesarean rate				−0.065	−0.107	−0.080
				(0.075)	(0.084)	(0.074)
Observations	400	400	400	400	300	200
Region FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes
Mean $Y_{treat-pre}$	9.896	9.896	9.896	9.896	9.896	9.896
Effect of *EC* on treated (%)	24.32	31.12	28.11	25.25	27.93	17.12

Table 3. Inputs reduction and escape rates.

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE
EC × *Post*	1.41	1.04	1.51	2.45*	2.17**
	(1.217)	(1.211)	(1.257)	(1.342)	(0.937)
EC × *Post* × Δ*Beds*	−0.16*				
	(0.082)				
EC × *Post* × Δ*Beds public hospital*		−0.26***			
		(0.069)			
EC × *Post* × Δ*Employees*			−0.12*		
			(0.058)		
EC × *Post* × Δ*Doctors*				−0.30	
				(0.494)	
EC × *Post* × Δ*Nurses*					−0.36
					(0.242)
Observations	400	400	400	400	400
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

REGIONAL STUDIES

What we are actually doing: Reconstructing network from flows of patients

- We model patients flows in regional health systems as a network of health providers (**nodes**) and patient movements (**edges**)
  - We aim to uncover discrepancies in the distribution of cancer patients between observed and hypothetical random assignments, shedding light on access imbalances.

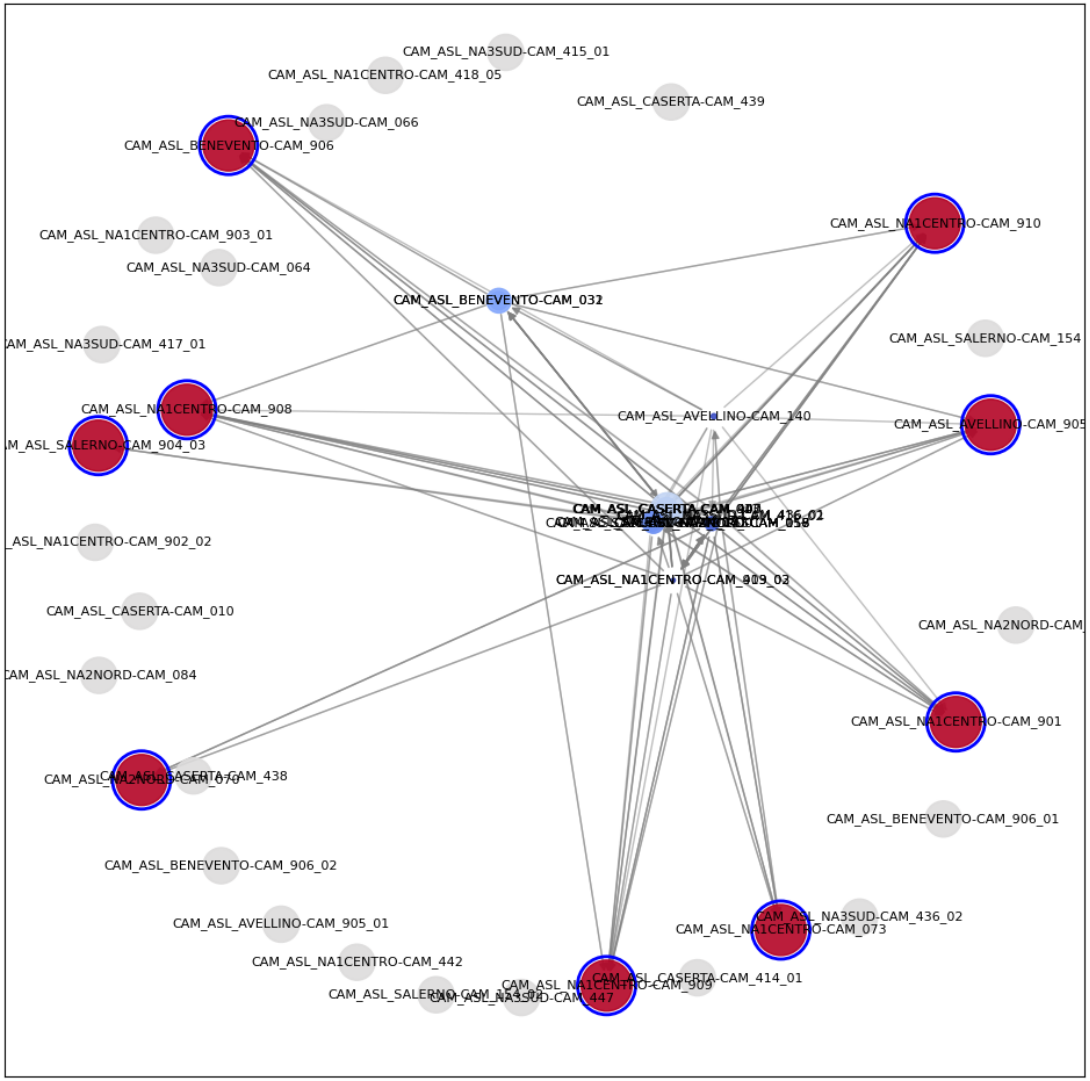
- The network model assumes nodes (**hospitals**) and edges (**patient flows**).
  - In the benchmark scenario, patients are randomly assigned to providers based on hospital bed capacity
  - The study compares these expectations with real-world data, identifying patterns of centralization and specialization.

What we are actually doing: Reconstructing network from flows of patients

- **Hypothesis:** The force of attraction of a single provider also depends on its role within the cancer care network.
  - → We propose a strategy to construct the regional network of patients.
  - → We identify and compute several **measures of centrality** for each **node** in the network.
  - → We provide a theoretical framework to analyze the network.

- **Data and Methods:**
  - → Use **Hospital Discharge Records** (2011–2019) to geolocate hospitals and reconstruct the geography of cancer patient mobility within and across **Regional Health Systems (RHSs)**.
  - → Investigate the relationship between **mobility flows** and **Regional Cancer Networks (RCNs)** by cancer type and centrality measures of nodes.

An example: Flows, Breast Cancer, Campania, 2012



- **Purpose of Centrality/Peripherality Measures**

1. **Explaining Long-Distance Attraction:**
   - To analyze whether the centrality of a hospital is a key factor in attracting patient flows over long distances
   - Focus on **inter-regional mobility**, where patients travel across regions to seek treatment
2. **Investigating Displacement Effects**
   - To examine if an increase in mobility from out-of-region patients toward central nodes results in displacement of regional residents.
   - Hypothesis: Higher inflows to central hospitals may force residents to seek care at peripheral nodes.

THE END (Grazie!!!)