

Fondazione Sanità Futura

REPORT ON THE QUALITY OF CLINICAL OUTCOMES IN HOSPITALS

comparison between the Region of Lombardy and other Regions

NATIONAL OUTCOMES PROGRAMME (PNE) - 2023

COLLANA



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The Fourth Report on the Quality of Clinical Outcomes in Italian Hospitals was prepared by Fondazione Sanità Futura in collaboration with Innogea srl. The report was published just a few days after the death of Carlo Lucchina, a distinguished member of our Scientific Committee as well as a prominent figure and academic within the Italian National Health Service. He was a highly regarded senior manager in the Lombardy Regional Health Service for many years, playing a pivotal role there.

He was an active and valuable member of our Scientific Committee, and this report is dedicated to his memory.

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Introductory note

The Fourth Report on the Quality of Clinical Outcomes in Italian Hospitals maintains complete methodological continuity with the previous three reports, providing a comprehensive and detailed analysis from 2018 to 2022.

In a context in which an increasing number of studies and evaluative research on the quality of Italian healthcare are emerging, we believe that our report is characterised by at least two fundamental features.

Firstly, the report exclusively uses a public and institutional database produced by the government agency Agenas. Secondly, it is characterised by the universality of the survey activities. This feature is particularly valuable and unique in reducing the effect of errors and distortions in the collected data, which can be insidious when dealing with such a large number of sources.

Even though the quality of the data remains uncertain, and there are reasonable doubts about the constant variation in documented clinical outcomes, the Italian PNE [National Outcome Programme] remains the best tool available for evaluating the quality of hospital care in the European Union, which is a source for satisfaction in the Italian National Health Service.

The epidemiological context of the 2022 Report is the confirmed conclusion of the major epidemic of 2020/2021. As the tables in the first part demonstrate, activity levels throughout the Italian hospital network have essentially returned to pre-Covid levels, with a volume in 2022 that is only 7.4% lower than in 2019. The same applies to the Lombardy hospital network, where the volume in 2022 was only 6.9% lower than in 2019.

However, these decreasing variations are to be expected to some extent when considered alongside the decades-long trend of de-hospitalisation.

In the Lombardy region, the private healthcare sector returned more quickly to 2019 hospitalisation volumes (–2.0% deviation for the 22/18 period) than the public sector (–10.1% deviation for the same period). This is consistent with the private healthcare sector being more reactive than the public sector. This was also evident in the initial post-Covid phase (see our third report, published last year).

The assessment of the quality of care remains essentially stable. The comparison between Lombardy and Italy (see table 7.3) continues to demonstrate that the Lombardy hospital network has the highest number of best indicators when all 48 indicators are considered, as well as those for which statistical significance can be calculated. We consider these to be the most reliable.

The public/private comparison also confirms higher quality values in the private hospital network. In the different regions, the significance of this data increases with the size of the hospital network observed and the number of indicators that can be assessed.

This report once again confirms the significant qualitative variability of the Italian hospital network as a whole. It also reiterates our previous concerns regarding the minimum thresholds indicated in Ministerial Decree 70/2015, as well as the doubts about the scientific validity of the quality/volume relationship. In many cases, this relationship should undergo an in-depth meta-analysis and be adequately documented.

The data contained in this report confirms the positive overall opinion on the National Health System with regard to the quantity and quality of hospital care provided, even when compared to previous reports. It also confirms the effectiveness of combining public and private healthcare in Lombardy, which undoubtedly helps to maintain the highest quality standards.

Gabriele Pelissero

The authors

The collection, processing and analysis of the data contained in this report were carried out by a working group specially set up by the Fondazione Sanità Futura. The group includes:

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1. Foreword

This is the fourth report produced by the working group of the Fondazione Sanità Futura, in collaboration with Innogea srl. It is part of the clinical outcomes quality monitoring programme launched in 2019. The programme aims to compare the quality of healthcare services provided by public and private hospitals in the Lombardy Region with those in other Italian regions.

The Fondazione Sanità Futura is committed to ensuring continuity in the analysis and evaluation of trends in the main volume and clinical outcome indicators, while taking into account factors that may affect data homogeneity from year to year (which is crucial for correctly evaluating trends).

The specific objective of the studies is to provide public institutions and public and private hospitals with useful evaluation criteria to help them design and implement improvement strategies based on critical issues and opportunities identified by comparing different territories and health service providers.

This edition presents and analyses data from 2019 to 2022, enabling trends to be identified. Specifically, the data allowed us to assess the impact of factors related to the Covid-19 pandemic on hospital admissions and clinical outcomes as comprehensively as possible.

The first part of the study examined the trend in hospital admission volumes, highlighting the significant reduction in 2020 compared to pre-pandemic trends, followed by an increase in numbers in subsequent years. Variations were observed among clinical areas as well as among indicators within each area.

Clinical outcomes recorded between 2019 and 2022 were then compared to determine the extent to which the pandemic affected not only the number of hospital admissions, but also the quality of care provided.

Previous studies have clearly shown that, despite the severity of the Covid-19 pandemic, the Italian National Health System continued to function effectively, experiencing fairly limited deterioration in 2020 and beginning to recover significantly from 2021 onwards. This process is ongoing.

In this context, Lombardy, with the decisive contribution of private hospitals, was again confirmed in 2022 to be the top-ranked region in the list that includes the percentage of clinical outcomes better than the national average (see table 7.3 of this report for details).

However, Lombardy and other regions did not make significant progress on critical issues already identified in previous studies. These issues are the excessive fragmentation of cases and the marked variability in clinical outcomes in both public and private hospitals.

With regard to volumes, the survey of hospital facilities recording values below the minimum thresholds set out in Ministerial Decree No. 70 of 2015, as amended, was repeated. In 2022, there was no significant improvement in the situation compared to previous years (see table 6.1).

The correlation between the volume of cases treated and the quality of clinical outcomes was investigated again, but the results were similar to those of previous years.

The data is largely conflicting. For many of the indicators, there is no definitive evidence of a correlation, and the value of the clinical outcome is almost always highly variable for the same number of cases treated.

Lastly, critical issues remain regarding the appropriateness of services and the correct coding of Diagnosis Related Groups. This is evidenced by clinical outcomes that are highly dispersed in relation to the expected quality levels based on scientific evidence as well as the same average values recorded at a territorial level.

2. Terms, definitions and acronyms

- *Cohort*: set of data on hospital admissions that meets the inclusion/exclusion criteria
- *Dispersion or dispersion index*: measures how far the values in the table deviate from the mean
- *Raw outcome*: percentage value of the clinical outcome calculated based on the total number of cases considered
- *“ADJ” (ADJusted) outcome*: clinical outcome value recalculated according to correction factors
- *Box plot*: graphical representation used to describe the distribution of a sample via dispersion indices
- *Clinical outcome*: effect obtained from treatment in terms of improvement or worsening of the patient’s clinical condition
- *P value*: statistical significance index
- *Risk ADJustment*: procedure for correcting raw data according to pre-defined criteria
- *Treemap*: tree map used to assess the quality of hospital facilities
- *COPD*: Chronic Obstructive Pulmonary Disease
- *DRG - Diagnosis Related Group*: Homogeneous grouping of clinical diagnoses
- *AMI*: Acute Myocardial Infarction
- *STEMI*: ST-Elevation Myocardial Infarction
- *IRCCS*: Scientific Research and Treatment Institute
- *GL*: Guidelines
- *PDTA*: Diagnostic Therapeutic Care Pathway
- *PO*: Hospital
- *PNE*: (Italian) National Outcomes Programme
- *PTCA*: Percutaneous Transluminal Coronary Angioplasty

- *SDO*: Hospital Discharge Form
- *SSN*: National Health Service
- *SSR*: Regional Health Service
- *MT*: Malignant Tumour
- *A.O.*: Hospital
- *ASL*: Local Health Authority
- *ATS*: Territorial Health Agency

3. Research methodology

This year's study analysed data from 2019 and compared it with data from the subsequent three-year period (2020-2022). The analysis of hospital admission volumes and clinical outcome quality were both conducted using the same methodology as in previous years. This approach provided a comprehensive overview of the impact that the Covid-19 pandemic had on the delivery of care.

The analysed volume indicators are the 52 listed in the PNE 2023 edition. Compared to the 2022 edition, 7 indicators have been added (2 for the paediatric area and 5 for the organ transplant area).

Of the 66 outcome indicators listed in the 2022 PNE edition, 48 were analysed. No outcome indicators are available for transplants and the two paediatric appendectomy indicators were only considered in the volume survey as they have little impact on the quality of clinical outcome. The cases treated are very scattered and no "ADJ" data is available for any region. In Lombardy, a total of 91 cases were treated across 26 different hospitals.

The analysed volume and outcome indicators are broken down by clinical area as follows:

Volume indicators			Outcome / process indicators	
Clinical area	Cardiovascular	10	Cardiovascular	14
	Cerebrovascular	3	Cerebrovascular	2
	Digestive	2	Digestive	3
	Musculoskeletal	6	Musculoskeletal	10
	Oncology	18	Oncology	11
	Paediatrics	2	Paediatrics	2
	Perinatal	2	Perinatal	5
	Respiratory	1	Respiratory	2
	Urogenital	3	Urogenital	1
	Transplants	5		
		TOTAL 52	TOTAL 48	

To ensure consistency when making comparisons between regions and between service providers, “ADJ”(*) data is used for all outcome indicators. “ADJ” data is generated by the “raw” data adjustment procedure adopted by Agenas. Therefore, the tables relating to comparisons between regions do not include regions for which “ADJ” data is unavailable for the private sector due to the limited number of cases treated.

When interpreting the data, bear in mind that the number of cases treated, listed for each outcome indicator *does not coincide with the volume of admissions* because:

- the treated cases (or cohort) are extracted from the total number of admissions according to the eligibility/exclusion criteria established in the protocol for each indicator;
- the volumes refer to SDOs [hospital discharge forms] from the previous year, while the treated cases (or cohort) for many indicators refer to SDOs from two or more years.

To distinguish between public and private hospitals, the classification follows the PNE criteria:

- Public hospitals* - comprise: Hospital Authorities – Directly managed hospitals – Hospitals integrated with the National Health Service – Hospitals integrated with Universities – Public Scientific Research Hospitals – Public Foundations –Public Research Organisations.
- Private hospitals* - comprise: Nursing homes (accredited and non-accredited) – Private university polyclinic hospitals – Classified hospitals – Qualified institutes managed by USLs – Private Scientific Research Hospitals – Private foundations – Religious bodies.

1. The “Risk ADJustment” procedure uses raw data correction coefficients, taking into account confounding factors such as gender, age and the number of comorbidities present in the hospital admission under review as well as hospital admissions in the previous two years.

4. Report structure

4.1. Volume analysis

Five tables were produced:

- Change in the volume of hospital admissions in 2022/2021 - Italy / Lombardy comparison
- Changes in the volume of hospital admissions from 2019 to 2022 in Italy
- Changes in the volume of hospital admissions from 2019 to 2022 in Lombardy
- Changes in the volume of admissions from 2019 to 2022 - Lombardy public hospitals
- Changes in the volume of admissions from 2019 to 2022 - Lombardy private hospitals

4.2. Analysis of clinical outcomes

Three summary tables were produced:

- Number of cases treated and “ADJ” clinical outcomes in 2021 and 2022 - Italy / Lombardy comparison
- Clinical outcome trends in Lombardy from 2019 to 2022 - Comparison between the public and private sector
- Ranking of regions by number of indicators present and quality of clinical outcome compared to the national average

A table was produced for each of the 48 outcome indicators considered. This includes:

- Indicator name
- Year the SDOs refer to

- Total number of cases treated at national level
- National average of the “raw” outcome
- The region to which the indicators refer
- Total number of cases treated per region (broken down by public and private hospitals)
- Number of “ADJ” cases
- Regional average of the “raw” outcome
- Regional average of the adjusted “ADJ” outcome

4.3. Analysis of variability of outcomes between regions

In order to assess the extent of the dispersion of the values for individual clinical outcomes, a *box plot* was produced for each indicator showing the variability of the clinical outcomes recorded in each region and the comparison between public and private hospitals.

4.4. Analysis of correlations between volumes and outcomes

To verify whether there is a definite correlation between the volume of cases treated and the quality of the clinical outcome, a graph was produced for each indicator. This shows the number of cases treated by all public and private hospitals (the cohort) on the x-axis, with the “ADJ” clinical outcome shown on the y-axis. The linear regression line, which indicates the correlation, is shown within the graph.

5. Volume analysis

5.1. Change in the volume of hospital admissions in Italy / Lombardy Comparison between 2022 and 2021

ref.	INDICATOR	ITALY			LOMBARDY		
		2021	2022	var. for 22/21	2021	2022	var. for 22/21
1	Stage II and IV lower limb Peripheral Arterial Disease (PAD)	33,992	34,890	2.6%	4,897	5,293	8.1%
2	Coronary artery bypass graft surgery	11,953	12,400	3.7%	1,737	1,829	5.3%
3	Pulmonary embolism	45,949	41,798	-9.0%	9,293	8,250	-11.2%
4	Acute Myocardial Infarction	106,673	107,856	1.1%	17,707	17,472	-1.3%
5	Repair of abdominal aortic aneurysm	8,075	8,370	3.7%	1,595	1,768	10.8%
6	Carotid revascularisation	20,010	21,331	6.6%	3,566	3,797	6.5%
7	Congestive heart failure	120,111	123,552	2.9%	21,075	21,838	3.6%
8	Vein stripping	12,132	13,746	13.3%	456	518	13.6%
9	Deep Vein Thrombosis	5,626	5,279	-6.2%	925	834	-9.8%
10	Valvuloplasty or heart valve repl.	33,919	37,360	10.1%	7,745	9,298	20.1%
CARDIOVASCULAR AREA		398,440	406,582	2.0%	68,996	70,897	2.8%
11	Ruptured and unruptured brain aneurysm	3,234	3,340	3.3%	620	727	17.3%
12	Subarachnoid haemorrhage	7,732	8,074	4.4%	1,083	1,119	3.3%
13	Ischaemic stroke	73,276	74,611	1.8%	11,495	11,702	1.8%
CEREBROVASCULAR AREA		84,242	86,025	2.1%	13,198	13,548	2.7%
14	Laparoscopic cholecystectomy	83,268	92,558	11.2%	13,078	15,971	22.1%
15	Laparotomy cholecystectomy	9,647	8,947	-7.3%	1,741	1,686	-3.2%
DIGESTIVE AREA		92,915	101,505	9.2%	14,819	17,657	19.2%
16	Knee arthroscopy	43,204	47,711	10.4%	6,401	8,123	26.9%
17	Femoral neck fracture	97,329	101,271	4.1%	14,089	14,799	5.0%
18	Fracture of tibia and fibula	15,408	16,701	8.4%	2,467	2,686	8.9%
19	Hip replacement	115,097	125,079	8.7%	22,912	26,004	13.5%
20	Knee prosthesis	80,465	97,409	21.1%	16,332	21,336	30.6%
21	Shoulder prosthesis	11,620	13,046	12.3%	1,596	2,037	27.6%
MUSCULOSKELETAL AREA		363,123	401,217	10.5%	63,797	74,985	17.5%
22	Surgery for MT of the brain: craniotomies	13,136	13,369	1.8%	3,085	3,223	4.5%
23	Surgery for MT of the colon	24,796	25,545	3.0%	4,064	4,380	7.8%
24	Surgery for MT of the liver	5,961	6,125	2.8%	1,284	1,409	9.7%
25	Surgery for MT of the breast	62,764	63,986	1.9%	13,829	14,225	2.9%
26	Surgery for MT of the pancreas	2,766	2,938	6.2%	579	629	8.6%
27	Surgery for MT of the lung	11,532	12,808	11.1%	2,674	3,031	13.4%
28	Surgery for MT of the prostate	18,645	21,324	14.4%	3,689	4,298	16.5%
29	Surgery for MT of the kidney	11,676	12,481	6.9%	2,058	2,418	17.5%
30	Surgery for MT of the rectum	5,615	5,685	1.2%	913	980	7.3%
31	Surgery for MT of the stomach	5,075	4,890	-3.6%	1,068	1,028	-3.7%
32	Surgery for MT of the oral cavity	2,521	2,548	1.1%	549	551	0.4%
33	Surgery for MT of the gallbladder	731	736	0.7%	137	124	-9.5%
34	Surgery for MT of the oesophagus	869	883	1.6%	304	343	12.8%
35	Surgery for MT of the larynx	4,846	4,512	-6.9%	785	781	-0.5%
36	Surgery for MT of the ovary	3,909	4,100	4.9%	853	935	9.6%
37	Surgery for MT of the thyroid	10,346	11,626	12.4%	1,655	1,849	11.7%
38	Surgery for MT of the uterus	12,103	12,106	0.0%	2,254	2,431	7.9%
39	Surgery for MT of the bladder	5,101	5,037	-1.3%	804	892	10.9%
ONCOLOGY AREA		202,392	210,699	4.1%	40,584	43,527	7.3%
40	Laparotomy appendectomy in paediatric patients	2,195	1,885	-14.1%	319	284	-11.0%
41	Laparoscopic appendectomy in paediatric patients	7,125	7,431	4.3%	1,393	1,466	5.3%

ref.	INDICATOR	ITALY			LOMBARDY		
		2021	2022	var. for 22/21	2021	2022	var. for 22/21
	PAEDIATRIC AREA	9,320	9,316	-0.04%	1,712	1,750	2.2%
42	Caesarean sections	129,369	127,410	-1.5%	17,903	17,909	0.0%
43	Vaginal deliveries	269,137	266,089	-1.1%	50,767	50,051	-1.4%
	PERINATAL AREA	398,506	393,499	-1.3%	68,670	67,960	-1.0%
44	COPD relapse - ordinary admissions	56,317	69,481	23.4%	9,324	12,193	30.8%
	RESPIRATORY AREA	56,317	69,481	23.4%	9,324	12,193	30.8%
45	Chronic renal failure	101,473	105,044	3.5%	10,215	10,929	7.0%
46	Hysterectomy	51,067	55,542	8.8%	9,112	10,810	18.6%
47	Prostatectomy	32,975	40,016	21.4%	5,153	6,377	23.8%
	UROGENITAL AREA	185,515	200,602	8.1%	24,480	28,116	14.9%
48	Cornea transplant	3,685	3,770	2.3%	658	786	19.5%
49	Heart or lung transplant	380	413	8.7%	86	91	5.8%
50	Liver transplant	1,287	1,410	9.6%	236	271	14.8%
51	Bone marrow transplant	5,789	6,005	3.7%	1,372	1,305	-4.9%
52	Kidney transplant	2,019	2,024	0.2%	309	364	17.8%
	TRANSPLANT AREA	13,160	13,622	3.5%	2,661	2,817	5.9%
	TOTAL ADMISSIONS		1,892,548	4.9%	308,241	333,450	8.2%

AGENAS PNE data - 2023 edition processed by Innogea

The data shows that the volume of hospital admissions increased in 2022 compared to 2021, continuing the upward trend that began in 2020 compared to the pre-Covid 19 pandemic trend.

However, a few indicators (such as pulmonary embolism, deep vein thrombosis, laparotomy cholecystectomy and appendectomy and some malignant tumour operations) have been declining for some time, regardless of the Covid pandemic. The trend is still towards lower numbers. The decrease in the number of childbirths follows an established long-term trend.

The percentage increase in hospital admissions in Lombardy compared to 2021 (+8.2%) is higher than the national percentage increase in Italy (+4.9%) when broken down by clinical area.

As can be seen in the table below, normal levels have not yet been fully restored, except for a few indicators for which volumes in 2022 exceeded those in 2019, the year before the pandemic.

5.2. Change in the volume of hospital admissions between 2019 and 2022 / Italy

ref.	INDICATOR	TOTAL ITALY						
		2019	2020	dev. for 20/19	2021	dev. for 21/19	2022	dev. for 22/19
1	Stage II and IV lower limb Peripheral Arterial Disease (PAD)	39,627	30,536	-22.9%	33,992	-14.2%	34,890	-12.0%
2	Coronary artery bypass graft surgery	14,185	10,681	-24.7%	11,953	-15.7%	12,400	-12.6%
3	Pulmonary embolism	35,287	38,393	8.8%	45,949	30.2%	41,798	18.5%
4	Acute Myocardial Infarction	123,336	105,742	-14.3%	106,673	-13.5%	107,856	-12.6%
5	Repair of abdominal aortic aneurysm	9,060	7,096	-21.7%	8,075	-10.9%	8,370	-7.6%
6	Carotid revascularisation	22,134	17,611	-20.4%	20,010	-9.6%	21,331	-3.6%
7	Congestive heart failure	156,493	116,807	-25.4%	120,111	-23.2%	123,552	-21.0%
8	Vein stripping	20,096	10,141	-49.5%	12,132	-39.6%	13,746	-31.6%
9	Deep Vein Thrombosis	7,264	5,640	-22.4%	5,626	-22.5%	5,279	-27.3%
10	Valvuloplasty or heart valve repl.	35,609	29,238	-17.9%	33,919	-4.7%	37,360	4.9%
CARDIOVASCULAR AREA		463,091	371,885	-19.7%	398,440	-14.0%	406,582	-12.2%
11	Ruptured and unruptured brain aneurysm	3,392	3,022	-10.9%	3,234	-4.7%	3,340	-1.5%
12	Subarachnoid haemorrhage	8,063	7,471	-7.3%	7,732	-4.1%	8,074	0.1%
13	Ischaemic stroke	83,834	73,494	-12.3%	73,276	-12.6%	74,611	-11.0%
CEREBROVASCULAR AREA		95,289	83,987	-11.9%	84,242	-11.6%	86,025	-9.7%
14	Laparoscopic cholecystectomy	98,779	69,890	-29.2%	83,268	-15.7%	92,558	-6.3%
15	Laparotomy cholecystectomy	12,183	9,890	-18.8%	9,647	-20.8%	8,947	-26.6%
DIGESTIVE AREA		110,962	79,780	-28.1%	92,915	-16.3%	101,505	-8.5%
16	Knee arthroscopy	54,920	39,100	-28.8%	43,204	-21.3%	47,711	-13.1%
17	Femoral neck fracture	102,839	95,456	-7.2%	97,329	-5.4%	101,271	-1.5%
18	Fracture of tibia and fibula	15,818	14,276	-9.7%	15,408	-2.6%	16,701	5.6%
19	Hip replacement	115,989	96,822	-16.5%	115,097	-0.8%	125,079	7.8%
20	Knee prosthesis	87,922	66,691	-24.1%	80,465	-8.5%	97,409	10.8%
21	Shoulder prosthesis	11,219	9,405	-16.2%	11,620	3.6%	13,046	16.3%
MUSCULOSKELETAL AREA		388,707	321,750	-17.2%	363,123	-6.6%	401,217	3.2%
22	Surgery for MT of the brain: craniotomies	13,237	12,447	-6.0%	13,136	-0.8%	13,369	1.0%
23	Surgery for MT of the colon	26,233	23,078	-12.0%	24,796	-5.5%	25,545	-2.6%
24	Surgery for MT of the liver	6,610	6,195	-6.3%	5,961	-9.8%	6,125	-7.3%
25	Surgery for MT of the breast	62,343	56,057	-10.1%	62,764	0.7%	63,986	2.6%
26	Surgery for MT of the pancreas	2,710	2,778	2.5%	2,766	2.1%	2,938	8.4%
27	Surgery for MT of the lung	12,116	11,078	-8.6%	11,532	-4.8%	12,808	5.7%
28	Surgery for MT of the prostate	20,688	17,115	-17.3%	18,645	-9.9%	21,324	3.1%
29	Surgery for MT of the kidney	11,907	10,665	-10.4%	11,676	-1.9%	12,481	4.8%
30	Surgery for MT of the rectum	6,051	5,627	-7.0%	5,615	-7.2%	5,685	-6.0%
31	Surgery for MT of the stomach	5,824	5,088	-12.6%	5,075	-12.9%	4,890	-16.0%
32	Surgery for MT of the oral cavity	2,701	2,502	-7.4%	2,521	-6.7%	2,548	-5.7%
33	Surgery for MT of the gallbladder	771	713	-7.5%	731	-5.2%	736	-4.5%
34	Surgery for MT of the oesophagus	856	827	-3.4%	869	1.5%	883	3.2%
35	Surgery for MT of the larynx	5,030	4,603	-8.5%	4,846	-3.7%	4,512	-10.3%
36	Surgery for MT of the ovary	4,058	3,953	-2.6%	3,909	-3.7%	4,100	1.0%
37	Surgery for MT of the thyroid	10,237	9,014	-11.9%	10,346	1.1%	11,626	13.6%
38	Surgery for MT of the uterus	12,349	11,643	-5.7%	12,103	-2.0%	12,106	-2.0%
39	Surgery for MT of the bladder	5,211	5,241	0.6%	5,101	-2.1%	5,037	-3.3%
ONCOLOGY AREA		208,932	188,624	-9.7%	202,392	3.1%	210,699	0.8%
40	Laparotomy appendectomy in paediatric patients	3,934	2,711	-31.1%	2,195	-44.2%	1,885	-52.1%

ref.	INDICATOR	TOTAL ITALY						
		2019	2020	dev. for 20/19	2021	dev. for 21/19	2022	dev. for 22/19
41	Laparoscopic appendectomy in paediatric patients	7,885	6,812	-13.6%	7,125	-9.6%	7,431	-5.8%
	PAEDIATRIC AREA	11,819	9,523	-19.4%	9,320	-21.1%	9,316	-21.2%
42	Caesarean sections	137,189	131,390	-4.2%	129,369	-5.7%	127,410	-7.1%
43	Vaginal deliveries	279,955	272,745	-2.6%	269,137	-3.9%	266,089	-5.0%
	PERINATAL AREA	417,144	404,135	-3.1%	398,506	-4.5%	393,499	-5.7%
44	COPD relapse - ordinary admissions	102,475	60,640	-40.8%	56,317	-45.0%	69,481	-32.2%
	RESPIRATORY AREA	102,475	60,640	-40.8%	56,317	-45.0%	69,481	-32.2%
45	Chronic renal failure	134,902	104,645	-22.4%	101,473	-24.8%	105,044	-22.1%
46	Hysterectomy	56,702	44,114	-22.2%	51,067	-9.9%	55,542	-2.0%
47	Prostatectomy	38,574	27,350	-29.1%	32,975	-14.5%	40,016	3.7%
	UROGENITAL AREA	230,178	176,109	-23.5%	185,515	-19.4%	200,602	-12.8%
48	Cornea transplant	4,547	3,285	-27.8%	3,685	-19.0%	3,770	-17.1%
49	Heart or lung transplant	424	380	-10.4%	380	-10.4%	413	-2.6%
50	Liver transplant	1,241	1,173	-5.5%	1,287	3.7%	1,410	13.6%
51	Bone marrow transplant	5,827	5,683	-2.5%	5,789	-0.7%	6,005	3.1%
52	Kidney transplant	2,153	1,929	-10.4%	2,019	-6.2%	2,024	-6.0%
	TRANSPLANT AREA	14,192	12,450	-12.3%	13,160	-7.3%	13,622	-4.0%
	TOTAL ADMISSIONS	2,042,789	1,708,883	-16.3%	1,803,930	-11.7%	1,892,548	-7.4%

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Hospital admissions in Italy are realigning to pre-Covid levels in all clinical areas. Overall, there has been a significant recovery, the decrease of 16.3% recorded in 2020 compared to 2019 changed to 11.7% in 2021 and 7.4% in 2022.

For some indicators (see the outcomes marked in green), the 2022 volumes exceeded those of 2019.

The following indicators remain negative (by over -10%), but are rising:

- Laparotomy appendectomy: -52.1%
- Stage II-IV lower limb Peripheral Arterial Disease (PAD): -12%
- Knee arthroscopy: -13.1%
- COPD relapse: -32.2%
- Isolated coronary artery bypass graft surgery: -12.6%
- Laparotomy cholecystectomy: -26.6%
- Ischaemic stroke: -11%
- Acute Myocardial Infarction: -12.6%
- Chronic renal failure: -22.1%
- Surgery for MT of the larynx: -10.3%
- Surgery for MT of the stomach: -16.0%
- Congestive heart failure: -21.0%
- Vein stripping: -31.6%
- Cornea transplant: -17.1%
- Deep vein thrombosis: -27.3%

Conversely, the following indicators increased (by more than 5%) compared to 2019:

- Surgery for MT of the lung: +5.75%
- Shoulder prosthesis: +16.3%
- Surgery for MT of the pancreas: +8.4%
- Pulmonary embolism: +18.5%
- Fracture of tibia and fibula: +5.6%
- Surgery for MT of the thyroid: +13.6%
- Liver transplant: +13.6
- Hip replacement: +7.8%
- Knee prosthesis: +10.8%

The interpretation of the data, at both national and regional levels, must also be correlated with the evolution of pathologies and intervention techniques.

5.3. Change in the volume of hospital admissions between 2019 and 2022 Lombardy region

ref.	INDICATOR	LOMBARDY TOTAL (Public+Private)						
		2019	2020	dev. for 20/19	2021	dev. for 21/19	2022	dev. for 21/19
1	Stage II and IV lower limb Peripheral Arterial Disease (PAD)	6,402	4,502	-29.7%	4,897	-23.5%	5,293	-17.3%
2	Coronary artery bypass graft surgery	2,308	1,641	-28.9%	1,737	-24.7%	1,829	-20.8%
3	Pulmonary embolism	6,746	8,493	25.9%	9,293	37.8%	8,250	22.3%
4	Acute Myocardial Infarction	20,841	17,372	-16.6%	17,707	-15.0%	17,472	-16.2%
5	Repair of abdominal aortic aneurysm	1,996	1,287	-35.5%	1,595	-20.1%	1,768	-11.4%
6	Carotid revascularisation	4,147	2,892	-30.3%	3,566	-14.0%	3,797	-8.4%
7	Congestive heart failure	26,614	19,723	-25.9%	21,075	-20.8%	21,838	-17.9%
8	Vein stripping	478	294	-38.5%	456	-4.6%	518	8.4%
9	Deep Vein Thrombosis	1,129	984	-12.8%	925	-18.1%	834	-26.1%
10	Valvuloplasty or heart valve repl.	8,685	6,307	-27.4%	7,745	-10.8%	9,298	7.1%
CARDIOVASCULAR AREA		79,346	63,495	-20.0%	68,996	-13.0%	70,897	-10.6%
11	Ruptured and unruptured brain aneurysm	774	647	-16.4%	620	-19.9%	727	-6.1%
12	Subarachnoid haemorrhage	1,141	1,122	-1.7%	1,083	-5.1%	1,119	-1.9%
13	Ischaemic stroke	12,641	11,067	-12.5%	11,495	-9.1%	11,702	-7.4%
CEREBROVASCULAR AREA		14,556	12,836	-11.8%	13,198	-9.3%	13,548	-6.9%
14	Laparoscopic cholecystectomy	16,501	10,252	-37.9%	13,078	-20.7%	15,971	-3.2%
15	Laparotomy cholecystectomy	2,358	1,737	-26.3%	1,741	-26.2%	1,686	-28.5%
DIGESTIVE AREA		18,859	11,989	-36.4%	14,819	-21.4%	17,657	-6.4%
16	Knee arthroscopy	9,046	5,534	-38.8%	6,401	-29.2%	8,123	-10.2%
17	Femoral neck fracture	15,336	14,226	-7.2%	14,089	-8.1%	14,799	-3.5%
18	Fracture of tibia and fibula	2,536	2,219	-12.5%	2,467	-2.7%	2,686	5.9%
19	Hip replacement	24,454	17,508	-28.4%	22,912	-6.3%	26,004	6.3%
20	Knee prosthesis	19,183	11,462	-40.2%	16,332	-14.9%	21,336	11.2%
21	Shoulder prosthesis	1,763	1,225	-30.5%	1,596	-9.5%	2,037	15.5%
MUSCULOSKELETAL AREA		72,318	52,174	-27.9%	63,797	-11.8%	74,985	3.7%
22	Surgery for MT of the brain: craniotomies	3,300	2,842	-13.9%	3,085	-6.5%	3,223	-2.3%
23	Surgery for MT of the colon	4,607	3,680	-20.1%	4,064	-11.8%	4,380	-4.9%
24	Surgery for MT of the liver	1,557	1,275	-18.1%	1,284	-17.5%	1,409	-9.5%
25	Surgery for MT of the breast	14,667	11,811	-19.5%	13,829	-5.7%	14,225	-3.0%
26	Surgery for MT of the pancreas	649	564	-13.1%	579	-10.8%	629	-3.1%
27	Surgery for MT of the lung	3,044	2,466	-19.0%	2,674	-12.2%	3,031	-0.4%
28	Surgery for MT of the prostate	4,601	3,103	-32.6%	3,689	-19.8%	4,298	-6.6%
29	Surgery for MT of the kidney	2,362	1,872	-20.7%	2,058	-12.9%	2,418	2.4%
30	Surgery for MT of the rectum	1,091	914	-16.2%	913	-16.3%	980	-10.2%
31	Surgery for MT of the stomach	1,243	964	-22.4%	1,068	-14.1%	1,028	-17.3%
32	Surgery for MT of the oral cavity	560	520	-7.1%	549	-2.0%	551	-1.6%
33	Surgery for MT of the gallbladder	96	125	30.2%	137	42.7%	124	29.2%
34	Surgery for MT of the oesophagus	300	266	-11.3%	304	1.3%	343	14.3%
35	Surgery for MT of the larynx	892	674	-24.4%	785	-12.0%	781	-12.4%
36	Surgery for MT of the ovary	970	828	-14.6%	853	-12.1%	935	-3.6%
37	Surgery for MT of the thyroid	1,668	1,286	-22.9%	1,655	-0.8%	1,849	10.9%
38	Surgery for MT of the uterus	2,447	2,127	-13.1%	2,254	-7.9%	2,431	-0.7%
39	Surgery for MT of the bladder	987	835	-15.4%	804	-18.5%	892	-9.6%
ONCOLOGY AREA		45,041	36,152	-19.7%	40,584	-9.9%	43,527	-3.4%
40	Laparotomy appendectomy in paediatric patients	512	369	-27.9%	310	-39.5%	284	-44.5%
41	Laparoscopic appendectomy in paediatric patients	1,360	1,278	-6.0%	1,432	5.3%	1,466	7.8%

ref.	INDICATOR	LOMBARDY TOTAL (Public+Private)						
		2019	2020	dev. for 20/19	2021	dev. for 21/19	2022	dev. for 21/19
	PAEDIATRIC AREA	1,872	1,647	-12.0%	1,742	-6.9%	1,750	-6.5%
42	Caesarean sections	19,073	17,922	-6.0%	17,903	-6.1%	17,909	-6.1%
43	Vaginal deliveries	53,808	51,412	-4.5%	50,767	-5.7%	50,051	-7.0%
	PERINATAL AREA	72,881	69,334	-4.9%	68,670	-5.8%	67,960	-6.8%
44	COPD relapse - ordinary admissions	17,013	9,685	-43.1%	9,324	-45.2%	12,193	-28.3%
	RESPIRATORY AREA	17,013	9,685	-43.1%	9,324	-45.2%	12,193	-28.3%
45	Chronic renal failure	14,613	10,752	-26.4%	10,215	-30.1%	10,929	-25.2%
46	Hysterectomy	11,671	7,468	-36.0%	9,112	-21.9%	10,810	-7.4%
47	Prostatectomy	6,867	3,894	-43.3%	5,153	-25.0%	6,377	-7.1%
	UROGENITAL AREA	33,151	22,114	-33.3%	24,480	-26.2%	28,116	-15.2%
48	Cornea transplant	761	542	-28.8%	658	-13.5%	786	3.3%
49	Heart or lung transplant	118	88	-25.4%	86	-27.1%	91	-22.9%
50	Liver transplant	291	246	-15.5%	236	-18.9%	271	-6.9%
51	Bone marrow transplant	1,433	1,412	-1.5%	1,372	-4.3%	1,305	-8.9%
52	Kidney transplant	354	285	-19.5%	309	-12.7%	364	2.8%
	TRANSPLANT AREA	2,957	2,573	-13.0%	2,661	-10.0%	2,817	-4.7%
	TOTAL ADMISSIONS	357,994	281,999	-21.2%	308,271	-13.9%	333,450	-6.9%

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In Lombardy, the recovery is roughly the same in percentage terms as the national level (the difference compared to 2019 is -6.9% as opposed to -7.4%), but the situation differs when clinical areas and individual indicators are considered. The following indicators are still negative:

- Laparotomy appendectomy in paediatric patients: -44.5%
- Stage II-IV lower limb Peripheral Arterial Disease (PAD): -17.3%
- Knee arthroscopy: -10.2%
- Isolated coronary artery bypass graft surgery: -20.8%
- Laparotomy cholecystectomy: -28.5%
- Acute Myocardial Infarction: -16.2%
- Surgery for MT of the larynx: -12.4%
- Surgery for MT of the rectum: -10.2%
- Surgery for MT of the stomach: -17.3%
- Repair of non-ruptured abdominal aortic aneurysm: -11.4%
- Congestive heart failure: -17.9%
- Deep Vein Thrombosis: -26.1%
- COPD relapse: -28.3%
- Chronic renal failure: -25.2%
- Heart or lung transplant: -22.9%
- The following indicators are positive:
- Laparoscopic appendectomy in paediatric patients: +7.8%
- Pulmonary embolism: +22.3%
- Fracture of tibia and fibula: +5.9%

- TM thyroid surgery: +10.9%
- Surgery for MT of the gallbladder: +29.2%
- Surgery for MT of the oesophagus: +14.3%
- Hip replacement: +6.3%
- Knee prosthesis: +11.2%
- Shoulder prosthesis: +15.5%
- Vein stripping: +8.4%
- Valvuloplasty: +7.1%

5.4. Change in the volume of admissions between 2019 and 2022 Lombardy public hospitals

ref.	INDICATOR	PUBLIC HOSPITALS						
		2019	2020	dev. for 20/19	2021	dev. for 20/19	2022	dev. for 20/19
1	Stage II and IV lower limb Peripheral Arterial Disease (PAD)	3,317	2,292	-30.9%	2,458	-25.9%	2,669	-19.5%
2	Coronary artery bypass graft surgery	1,383	920	-33.5%	964	-30.3%	1,148	-17.0%
3	Pulmonary embolism	5,031	6,407	27.4%	7,234	43.8%	6,332	25.9%
4	Acute Myocardial Infarction	14,234	11,951	-16.0%	12,076	-15.2%	12,139	-14.7%
5	Repair of abdominal aortic aneurysm	1,089	641	-41.1%	843	-22.6%	1,010	-7.3%
6	Carotid revascularisation	2,133	1,421	-33.4%	1,820	-14.7%	2,002	-6.1%
7	Congestive heart failure	19,129	13,860	-27.5%	14,600	-23.7%	15,517	-18.9%
8	Vein stripping	48	40	-16.7%	33	-31.3%	52	8.3%
9	Deep Vein Thrombosis	815	649	-20.4%	621	-23.8%	519	-36.3%
10	Valvuloplasty or heart valve repl.	3,194	2,202	-31.1%	2,256	-29.4%	3,176	-0.6%
CARDIOVASCULAR AREA		50,373	40,383	-19.8%	42,905	-14.8%	44,564	-11.5%
11	Cerebral aneurysm	638	560	-12.2%	516	-19.1%	602	-5.6%
12	Subarachnoid haemorrhage	911	893	-2.0%	849	-6.8%	876	-3.8%
13	Ischaemic stroke	9,590	8,387	-12.5%	8,844	-7.8%	9,141	-4.7%
CEREBROVASCULAR AREA		11,139	9,840	-11.7%	10,209	-8.3%	10,619	-4.7%
14	Laparoscopic cholecystectomy	11,041	6,159	-44.2%	7,937	-28.1%	10,290	-6.8%
15	Laparotomy cholecystectomy	1,783	1,271	-28.7%	1,261	-29.3%	1,198	-32.8%
DIGESTIVE AREA		12,824	7,430	-42.1%	9,198	-28.3%	11,488	-10.4%
16	Knee arthroscopy	2,252	1,158	-48.6%	1,335	-40.7%	1,720	-23.6%
17	Femoral neck fracture	11,724	10,399	-11.3%	10,113	-13.7%	10,511	-10.3%
18	Fracture of tibia and fibula	1,923	1,622	-15.7%	1,814	-5.7%	1,990	3.5%
19	Hip replacement	9,391	6,686	-28.8%	7,897	-15.9%	8,472	-9.8%
20	Knee prosthesis	4,193	1,793	-57.2%	2,355	-43.8%	3,559	-15.1%
21	Shoulder prosthesis	763	552	-27.7%	693	-9.2%	860	12.7%
MUSCULOSKELETAL AREA		30,246	22,210	-26.6%	24,207	-20.0%	27,112	-10.4%
22	Surgery for MT of the brain	2,239	2,014	-10.0%	2,015	-10.0%	2,126	-5.0%
23	Surgery for MT of the colon	3,108	2,442	-21.4%	2,703	-13.0%	2,962	-4.7%
24	Surgery for MT of the liver	952	809	-15.0%	834	-12.4%	905	-4.9%
25	Surgery for MT of the breast	7,456	5,934	-20.4%	7,189	-3.6%	7,588	1.8%
26	Surgery for MT of the pancreas	278	249	-10.4%	247	-11.2%	280	0.7%
27	Surgery for MT of the lung	1,585	1,309	-17.4%	1,417	-10.6%	1,595	0.6%
28	Surgery for MT of the prostate	1,821	1,018	-44.1%	1,335	-26.7%	1,778	-2.4%
29	Surgery for MT of the kidney	1,373	988	-28.0%	1,157	-15.7%	1,550	12.9%
30	Surgery for MT of the rectum	602	515	-14.5%	485	-19.4%	544	-9.6%
31	Surgery for MT of the stomach	794	596	-24.9%	651	-18.0%	631	-20.5%
32	Surgery for MT of the oral cavity	426	389	-8.7%	393	-7.7%	420	-1.4%
33	Surgery for MT of the gallbladder	68	90	32.4%	81	19.1%	77	13.2%
34	Surgery for MT of the oesophagus	54	50	-7.4%	49	-9.3%	63	16.7%
35	Surgery for MT of the larynx	621	445	-28.3%	540	-13.0%	582	-6.3%
36	Surgery for MT of the ovary	617	521	-15.6%	512	-17.0%	575	-6.8%
37	Surgery for MT of the thyroid	988	690	-30.2%	928	-6.1%	1,070	8.3%
38	Surgery for MT of the uterus	1,658	1,385	-16.5%	1,473	-11.2%	1,597	-3.7%
39	Surgery for MT of the bladder	564	463	-17.9%	428	-24.1%	525	-6.9%
ONCOLOGY AREA		25,204	19,907	-21.0%	22,437	-11.0%	24,868	-1.3%
40	Laparotomy appendectomy in paediatric patients	491	359	-26.9%	296	-39.7%	274	-44.2%
41	Laparoscopic appendectomy in paediatric patients	1,212	1,163	-4.0%	1,320	8.9%	1,366	12.7%

ref.	INDICATOR	PUBLIC HOSPITALS						
		2019	2020	dev. for 20/19	2021	dev. for 20/19	2022	dev. for 20/19
	PAEDIATRIC AREA	1,703	1,522	-10.6%	1,616	-5.1%	1,640	-3.7%
42	Caesarean sections	15,306	14,362	-6.2%	14,281	-6.7%	14,375	-6.1%
43	Vaginal deliveries	43,963	42,056	-4.3%	41,244	-6.2%	40,911	-6.9%
	PERINATAL AREA	59,269	56,418	-4.8%	55,525	-6.3%	55,286	-6.7%
44	COPD relapse - ordinary admissions	11,228	6,360	-43.4%	6,056	-46.1%	8,262	-26.4%
	RESPIRATORY AREA	11,228	6,360	-43.4%	6,056	-46.1%	8,262	-26.4%
45	Chronic renal failure	11,037	7,934	-28.1%	7,438	-32.6%	8,080	-26.8%
46	Hysterectomy	8,540	5,130	-39.9%	6,246	-26.9%	7,635	-10.6%
47	Prostatectomy	3,161	1,247	-60.6%	1,572	-50.3%	2,471	-21.8%
	UROGENITAL AREA	22,738	14,311	-37.1%	15,256	-32.9%	18,186	-20.0%
48	Cornea transplant	318	206	-35.2%	269	-15.4%	317	-0.3%
49	Heart or lung transplant	118	88	-25.4%	86	-27.1%	90	-23.7%
50	Liver transplant	291	246	-15.5%	236	-18.9%	271	-6.9%
51	Bone marrow transplant	1,020	1,007	-1.3%	996	-2.4%	910	-10.8%
52	Kidney transplant	354	285	-19.5%	309	-12.7%	364	2.8%
	TRANSPLANT AREA	2,101	1,832	-12.8%	1,896	-9.8%	1,952	-7.1%
	TOTAL ADMISSIONS	226,825	180,213	-20.5%	189,305	-16.5%	203,977	-10.1%

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5.5. Change in the volume of admissions between 2019 and 2022 Lombardy private hospitals

ref.	INDICATOR	PRIVATE HOSPITALS						
		2019	2020	dev. for 20/19	2021	dev. for 20/19	2022	dev. for 20/19
1	Stage II and IV lower limb Peripheral Arterial Disease (PAD)	3,085	2,210	-28.4%	2,439	-20.9%	2,624	-14.9%
2	Coronary artery bypass graft surgery	925	721	-22.1%	773	-16.4%	681	-26.4%
3	Pulmonary embolism	1,715	2,086	21.6%	2,059	20.1%	1,918	11.8%
4	Acute Myocardial Infarction	6,607	5,421	-18.0%	5,631	-14.8%	5,333	-19.3%
5	Repair of abdominal aortic aneurysm	907	646	-28.8%	752	-17.1%	758	-16.4%
6	Carotid revascularisation	2,014	1,471	-27.0%	1,746	-13.3%	1,795	-10.9%
7	Congestive heart failure	7,485	5,863	-21.7%	6,475	-13.5%	6,321	-15.6%
8	Vein stripping	430	254	-40.9%	423	-1.6%	466	8.4%
9	Deep Vein Thrombosis	314	335	6.7%	304	-3.2%	315	0.3%
10	Valvuloplasty or heart valve repl.	5,491	4,105	-25.2%	5,489	0.0%	6,122	11.5%
CARDIOVASCULAR AREA		28,973	23,112	-20.2%	26,091	-9.9%	26,333	-9.1%
11	Cerebral aneurysm	136	87	-36.0%	104	-23.5%	125	-8.1%
12	Subarachnoid haemorrhage	230	229	-0.4%	234	1.7%	243	5.7%
13	Ischaemic stroke	3,051	2,680	-12.2%	2,651	-13.1%	2,561	-16.1%
CEREBROVASCULAR AREA		3,417	2,996	-12.3%	2,989	-12.5%	2,929	-14.3%
14	Laparoscopic cholecystectomy	5,460	4,093	-25.0%	5,141	-5.8%	5,681	4.0%
15	Laparotomy cholecystectomy	575	466	-19.0%	480	-16.5%	488	-15.1%
DIGESTIVE AREA		6,035	4,559	-24.5%	5,621	-6.9%	6,169	2.2%
16	Knee arthroscopy	6,794	4,376	-35.6%	5,066	-25.4%	6,403	-5.8%
17	Femoral neck fracture	3,612	3,827	6.0%	3,976	10.1%	4,288	18.7%
20	Fracture of tibia and fibula	613	597	-2.6%	653	6.5%	696	13.5%
18	Hip replacement	15,063	10,822	-28.2%	15,015	-0.3%	17,532	16.4%
19	Knee prosthesis	14,990	9,669	-35.5%	13,977	-6.8%	17,777	18.6%
21	Shoulder prosthesis	1,000	673	-32.7%	903	-9.7%	1,177	17.7%
MUSCULOSKELETAL AREA		42,072	29,964	-28.8%	39,590	-5.9%	47,873	13.8%
22	Surgery for MT of the brain	1,061	828	-22.0%	1,070	0.8%	1,097	3.4%
23	Surgery for MT of the colon	1,499	1,238	-17.4%	1,361	-9.2%	1,418	-5.4%
24	Surgery for MT of the liver	605	466	-23.0%	450	-25.6%	504	-16.7%
25	Surgery for MT of the breast	7,211	5,877	-18.5%	6,640	-7.9%	6,637	-8.0%
26	Surgery for MT of the pancreas	371	315	-15.1%	332	-10.5%	349	-5.9%
27	Surgery for MT of the lung	1,459	1,157	-20.7%	1,257	-13.8%	1,436	-1.6%
28	Surgery for MT of the prostate	2,780	2,085	-25.0%	2,354	-15.3%	2,520	-9.4%
29	Surgery for MT of the kidney	989	884	-10.6%	901	-8.9%	868	-12.2%
30	Surgery for MT of the rectum	489	399	-18.4%	428	-12.5%	436	-10.8%
31	Surgery for MT of the stomach	449	368	-18.0%	417	-7.1%	397	-11.6%
32	Surgery for MT of the oral cavity	134	131	-2.2%	156	16.4%	131	-2.2%
33	Surgery for MT of the gallbladder	28	35	25.0%	56	100.0%	47	67.9%
34	Surgery for MT of the oesophagus	246	216	-12.2%	255	3.7%	280	13.8%
35	Surgery for MT of the larynx	271	229	-15.5%	245	-9.6%	199	-26.6%
36	Surgery for MT of the ovary	353	307	-13.0%	341	-3.4%	360	2.0%
37	Surgery for MT of the thyroid	680	596	-12.4%	727	6.9%	779	14.6%
38	Surgery for MT of the uterus	789	742	-6.0%	781	-1.0%	834	5.7%
39	Surgery for MT of the bladder	423	372	-12.1%	376	-11.1%	367	-13.2%
ONCOLOGY AREA		19,837	16,245	-18.1%	18,147	-8.5%	18,659	-5.9%
40	Laparotomy appendectomy in paediatric patients	23	22	-4.3%	18	-21.7%	10	-56.5%
41	Laparoscopic appendectomy in paediatric patients	148	115	-22.3%	112	-24.3%	105	-29.1%

ref.	INDICATOR	PRIVATE HOSPITALS						
		2019	2020	dev. for 20/19	2021	dev. for 20/19	2022	dev. for 20/19
	PAEDIATRIC AREA	171	137	-19.9%	130	-24.0%	115	-32.7%
42	Caesarean sections	3,767	3,560	-5.5%	3,622	-3.8%	3,534	-6.2%
43	Vaginal deliveries	9,845	9,356	-5.0%	9,523	-3.3%	9,140	-7.2%
	PERINATAL AREA	13,612	12,916	-5.1%	13,145	-3.4%	12,674	-6.9%
44	COPD relapse - ordinary admissions	5,785	3,325	-42.5%	3,268	-43.5%	3,931	-32.0%
	RESPIRATORY AREA	5,785	3,325	-42.5%	3,268	-43.5%	3,931	-32.0%
45	Chronic renal failure	3,576	2,818	-21.2%	2,777	-22.3%	2,849	-20.3%
46	Hysterectomy	3,131	2,338	-25.3%	2,866	-8.5%	3,175	1.4%
47	Prostatectomy	3,706	2,647	-28.6%	3,581	-3.4%	3,906	5.4%
	UROGENITAL AREA	10,413	7,803	-25.1%	9,224	-11.4%	9,930	-4.6%
48	Cornea transplant	443	336	-24.2%	377	-14.9%	469	5.9%
49	Heart or lung transplant	0	0	=	0	=	1	=
50	Liver transplant	0	0	=	0	=	0	=
51	Bone marrow transplant	423	405	-4.3%	376	-11.1%	395	-6.6%
52	Kidney transplant	0	0	=	0	=	0	=
	TRANSPLANT AREA	866	741	-14.4%	753	-13.0%	865	-0.1%
	TOTALS	131,181	100,920	-23.1%	118,075	-10.0%	128,498	-2.0%

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A comparison of the number of admissions to public and private hospitals shows that private hospitals play an effective complementary role within Lombardy's Regional Health System.

Overall, private hospitals recorded the greatest percentage increase in admissions. Of the 52 indicators analysed, hospital admissions decreased by 2% in the private sector and by 10.1% in the public sector between 2019 and 2022.

The following tables show the indicators that decreased (by at least 10%) and those that increased (by at least 5%) in 2022 compared to 2019.

INDICATORS DECREASING IN 2022 COMPARED TO 2019		
Indicator	Public Hospitals	Private Hospitals
Paediatric laparotomy appendectomy	-44.2%	-56.5%
COPD relapse - ordinary admissions	-26.4%	-32.0%
Paediatric laparoscopic appendectomy	12.7%	-29.1%
Surgery for MT of the larynx	-6.3%	-26.6%
Chronic renal failure	-26.8%	-20.3%
Acute Myocardial Infarction	-14.7%	-19.3%
Surgery for MT of the liver	-4.9%	-16.7%
Repair of abdominal aorta aneurysm	-7.3%	-16.4%
Ischaemic Stroke	-4.7%	-16.1%
Congestive heart failure	-18.9%	-15.6%
Laparotomy cholecystectomy	-32.8%	-15.1%
Stage II and IV lower limb PAD	-19.5%	-14.9%
Surgery for MT of the bladder	-6.9%	-13.2%
Surgery for MT of the kidney	12.9%	-12.2%
Surgery for MT of the stomach	-20.5%	-11.6%
Carotid revascularisation	-6.1%	-10.9%
Surgery for MT of the rectum	-9.6%	-10.8%
Coronary artery bypass graft surgery	-17.0%	-6.4%

NOTE - The indicators marked in green show a decrease in the private sector and an increase in the public sector.

INDICATORS INCREASING IN 2022 COMPARED TO 2019		
Indicator	Public Hospitals	Private Hospitals
Surgery for MT of the gallbladder	13.2%	67.9%
Femoral neck fracture	-10.3%	18.7%
Knee prosthesis	-15.1%	18.6%
Shoulder prosthesis	12.7%	17.7%
Hip replacement	-9.8%	16.4%
Surgery for MT of the thyroid	8.3%	14.6%
Surgery for MT of the oesophagus	16.7%	13.8%
Fracture of tibia and fibula	3.5%	13.5%
Pulmonary embolism	25.9%	11.8%
Valvuloplasty or heart valve repl.	-0.6%	11.5%
Vein stripping	8.3%	8.4%
Subarachnoid haemorrhage	-3.8%	5.7%
Surgery for MT of the uterus	-3.7%	5.7%
Prostatectomy	-21.8%	5.4%

NOTE - The indicators marked in red show an increase in the private sector and a decrease in the public sector.

6. Volume of admissions - Case fragmentation and thresholds, purs. to min. Dec. 70/2015

As there has been no significant change in the general context compared to previous years, last year's evaluations regarding the interpretation of the limits of the indicators used to verify the correlation between activity volume and the quality of clinical outcomes can be applied again. These limits are determined by the elements used to calculate each indicator individually.

The first limitation relates to the fact that the number of cases treated (cohort) is aggregated by healthcare facility. However, for surgical procedures in particular, it would be more meaningful to refer to the number of cases treated by individual teams. In this regard, the PNE has recently started a survey of cases handled by individual operators, but this is currently only available for certain indicators. Therefore, it may be useful to conduct more in-depth analyses and assessments once a more extensive and complete database is available.

The second limitation relates to the failure to update protocols, or to do so in a timely manner. This may cause protocols to become misaligned with clinical-scientific and regulatory developments, thereby altering the meaning attributed to the indicator. For example, if evidence-based scientific research indicates that a different clinical or surgical treatment is more appropriate, maintaining high volumes of the previous treatment would result in a negative evaluation. Conversely, hospitals that have reduced these volumes would be evaluated positively.

With reference to the contents of Ministerial Decree 70/2015, the general situation regarding the first limitation remains substantially unchanged from previous years: the majority of public and private hospitals throughout Italy do not reach the minimum thresholds for many indicators making it difficult to envisage these thresholds being applied in their current form. It may therefore be appropriate initially to set the minimum volume thresh-

olds lower and then increase them according to the results achieved in order to allow regions and hospitals time to adjust their planning.

Regarding the second limitation, reviewing scientific studies and updating legislation must become systematic and timely.

The following table shows the number of hospitals not within the threshold, based on 2022 volumes, and the percentage of hospitals that performed the reference procedure.

Table 6.1

INDICATOR / PROCEDURE	THRESHOLD	BELOW-THRESHOLD HOSPITALS IN LOMBARDY			
		PUBLIC		PRIVATE	
		no.	%	no.	%
Angioplasty	250	15/46	33%	7/21	33%
Isolated coronary artery bypass graft surgery	200	10/11	91%	11/11	100%
Laparoscopic cholecystectomy	100	22/68	32%	22/47	47%
Femoral neck fracture	75	13/68	19%	22/42	52%
Acute Myocardial Infarction	100	43/79	54%	34/58	59%
Knee prosthesis	100	5/60	8%	10/51	20%
Repair of non-ruptured abdominal aortic aneurysm	60	13/15	87%	4/4	100%
MT of the colon	50	37/60	62%	33/40	82%
MT of the liver	70	34/37	92%	19/21	90%
MT of the pancreas	50	27/27	100%	14/16	87%
MT of the lung	80	17/24	71%	11/15	73%
MT of the prostate	50	23/38	60%	24/36	67%
MT of the kidney	50	34/45	76%	26/29	90%
MT of the stomach	40	55/58	95%	27/30	90%
MT of the breast	150	25/48	52%	8/19	42%

7. Analysis of clinical outcomes

7.1. No. of treated cases (cohorts) and “ADJ” clinical outcomes for 2021-2022 - Italy / Lombardy comparison

ref.	INDICATORS	ITALY				LOMBARDY				p value
		number of adj cases		adj outcome		number of adj. cases		adj outcome		
		2021	2022	2021	2022	2021	2022	2021	2022	
1	Stage III and IV lower limb PAD - mortality at 6 months	6,333	6,768	13.74	13.26	843	904	11.32	12.20	0.3734
2	Stage III and IV lower limb PAD - amputations at 6 months	5,086	5,436	3.97	4.47	712	821	6.69	7.65	0.0000
3	Stage III and IV lower limb PAD - revascularisation at 6 months	5,086	5,518	17.61	15.97	712	821	14.87	18.80	0.0414
4	Coronary artery bypass graft surgery: 30-day mortality with clinical variables	21,199	22,697	2.37	2.15	3,165	3,278	2.18	2.34	0.4840
5	Pulmonary embolism: readmissions 30 days after hospitalisation	9,987	9,138	8.22	8.50	2,429	2,529	6.02	7.60	0.1470
6	Pulmonary embolism: 30-day mortality after hospitalisation	11,288	10,786	9.16	10.45	2,692	2,817	8.95	9.01	0.0244
7	Acute myocardial infarction: 30-day mortality with clinical variables	73,188	73,605	7.61	7.64	12,408	12,250	7.47	7.85	0.4180
8	Acute myocardial infarction: 1-year mortality	72,492	66,832	9.37	8.94	11,953	12,665	9.64	8.70	0.3844
9	STEMI: 30-day mortality	31,820	28,470	9.19	9.03	5,559	4,999	9.76	10.85	0.0016
10	STEMI: % patients treated with PTCA within 90 minutes	28,587	31,799	53.91	54.66	4,958	5,600	51.12	52.63	0.0050
11	Non-ruptured abdominal aortic aneurysm repair: 30-day mortality	11,303	11,842	1.72	1.61	2,045	2,403	1.35	1.43	0.5156
12	Congestive heart failure: 30-day mortality	86,219	88,242	11.25	10.74	15,299	16,088	10.62	10.49	0.3472
13	Congestive heart failure: 30-day readmissions	64,575	67,020	13.53	13.03	11,716	12,166	11.90	12.59	0.1836
14	Heart valve repl. or valvuloplasty: 30-day mortality	40,014	46,084	2.52	2.42	9,873	12,193	1.83	1.72	0.0000
15	Ischaemic stroke: 30-day readmissions	41,416	42,087	6.99	7.06	7,270	7,363	5.78	5.54	0.0000
16	Ischaemic stroke: 30-day mortality	44,990	45,735	10.52	10.28	7,884	7,944	9.19	9.23	0.0042
17	Laparoscopic cholecystectomy: post-operative stay <3 days	48,153	55,240	81.31	83.25	8,911	11,042	80.18	80.94	0.0000
18	Cholecystectomy, ordinary adm.: complications at 30 days	76,914	93,993	2.13	2.04	13,583	18,128	2.16	2.01	0.7948
19	Cholecystectomy, ordinary adm.: another surgery at 30 days	77,167	94,305	1.22	1.20	13,501	18,112	1.21	1.10	0.2542
20	Knee prosthesis: 30-day readmissions	52,813	65,594	1.41	1.31	10,614	14,749	1.30	1.10	0.0394
21	Knee prosthesis: revision surgery at 2 years	62,272	44,433	2.34	2.91	13,932	7,815	2.20	3.17	0.2112
22	Knee arthroscopy: new surgery within 6 months	55,023	61,272	1.04	1.02	8,096	8,786	0.70	0.70	0.0046
23	Hip replacements: 30-day readmissions	74,352	82,624	3.55	3.51	15,348	17,875	3.10	3.07	0.0034
24	Hip replacement: revision surgery at 2 years	81,416	66,468	1.81	1.98	18,242	12,595	1.81	1.90	0.5552
25	Shoulder prostheses: 30-day readmissions	12,238	14,953	1.66	1.70	1,328	2,082	2.16	2.32	0.0444
26	Femoral neck fracture: 30-day mortality	66,766	69,885	6.33	6.26	9,934	10,366	6.27	5.51	0.0030
27	Femoral neck fracture surgery within 48 hours of admission to the hospital	74,010	77,080	48.37	49.98	11,020	11,602	51.62	52.56	0.0000

ref.	INDICATORS	ITALY				LOMBARDY				p value
		number of adj. cases		adj outcome		number of adj. cases		adj outcome		
		2021	2022	2021	2022	2021	2022	2021	2022	
28	Femoral neck fracture in the over 65s: surgery within 2 days	73,505	76,802	64.24	65.54	10,947	11,568	66.50	65.84	0.5286
29	Fracture of tibia and fibula: waiting times for surgery	10,940	11,811	4.0	4.0	875	1,895	3.0	3.0	0.0358
30	Surgery for MT of the brain: 30-day mortality	29,334	29,645	2.92	3.09	6,913	6,915	2.64	2.63	0.0434
31	Surgery for MT of the colon: 30-day mortality	35,131	38,032	4.48	4.07	5,721	6,381	3.68	3.06	0.0000
32	Surgery for MT of the liver: 30-day mortality	8,676	7,753	2.05	2.16	2,117	1,972	1.41	1.88	0.4412
33	Surgery for MT of the pancreas: 30-day mortality	4,494	4,478	3.83	3.89	944	792	1.91	1.73	0.0026
34	Surgery for MT of the lung: 30-day mortality	25,198	25,065	1.03	0.97	5,909	5,879	0.82	0.80	0.2224
35	Surgery for MT of the prostate: 30-day readmission, with new variables	10,109	12,989	3.66	3.85	1,851	2,659	2.93	4.28	0.2984
36	Surgery for MT of the kidney: 30-day mortality	25,716	26,471	0.75	0.74	4,821	4,859	0.48	0.45	0.0250
37	Surgery for MT of the rectum: 30-day mortality	11,288	11,236	1.52	1.58	1,901	1,841	0.62	0.88	0.0214
38	Surgery for MT of the stomach: 30-day mortality	7,363	6,748	5.04	4.88	1,534	1,388	3.15	3.40	0.0168
39	Resection surgery at 120 days after conservative surgery for breast MT	34,274	37,645	5.93	5.57	7,455	8,626	4.70	4.93	0.0182
40	Resection surgery at 90 days after conservative surgery for breast MT, with variables	34,911	37,676	5.57	5.10	7,641	8,609	4.58	4.78	0.2224
41	Proportion of deliveries by primary caesarean section	298,463	327,063	22.34	23.03	53,672	58,713	17.04	18.16	0.0000
42	Caesarean sections: % subsequent admissions during puerperium	231,717	356,643	0.78	0.82	31,594	49,196	1.08	1.11	0.0000
43	Vaginal deliveries: % subsequent admissions during puerperium	476,691	470,270	0.48	0.51	89,814	88,747	0.67	0.72	0.0000
44	Vaginal deliveries in women with previous caesarean section	45,285	44,688	10.69	11.05	6,286	6,048	17.05	17.23	0.0000
45	Vaginal deliveries: proportion of episiotomies	243,310	239,475	12.27	11.40	45,538	44,672	12.23	11.88	0.0036
46	COPD relapse: 30-day mortality	28,200	37,919	13.57	11.42	4,169	6,462	9.66	8.12	0.0000
47	COPD relapse: 30-day hospital readmissions	24,525	33,774	12.06	12.71	3,891	5,916	11.25	10.82	0.0000
48	Chronic renal failure: 30-day mortality after hospitalisation	93,357	97,346	14.12	13.04	8,623	9,335	10.83	9.24	0.0000

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The clinical outcomes that are better in the comparison between the Italian average and the Lombardy average are highlighted in green in the table.

In 2021, Lombardy had 40 better clinical outcomes out of a total of 48 indicators (83%). In 2022, Lombardy had 35 better clinical outcomes out of 48 indicators (73%).

Of the indicators that passed the statistical significance test in 2022 (see *p value column*), Lombardy had 22 out of 31 (71%) better indicators compared to 22 out of 25 (88%) in the previous year.

7.2. “ADJ” clinical outcome trend in Lombardy from 2019 to 2022 - Public/private comparison

ref.	INDICATORS	PUBLIC HOSPITALS				PRIVATE HOSPITALS			
		2019	2020	2021	2022	2019	2020	2021	2022
1	Stage III and IV lower limb PAD - mortality at 6 months	14.98	17.35	11.91	13.17	9.64	17.20	10.73	11.55
2	Stage III and IV lower limb PAD - amputations at 6 months	7.64	8.68	9.16	8.38	2.70	4.11	4.42	7.05
3	Stage III and IV lower limb PAD - revascularisation at 6 months	17.54	16.64	14.80	19.75	18.98	18.40	14.92	18.01
4	Coronary artery bypass graft surgery: 30-day mortality with clinical variables	N.D.	3.06	2.55	2.19	N.D.	1.05	1.72	2.55
5	Pulmonary embolism: readmissions at 30 days after hospitalisation	8.73	7.12	5.97	7.40	6.92	9.25	6.45	8.79
6	Pulmonary embolism: mortality at 30 days after admission	7.56	9.17	9.15	9.24	8.93	11.05	7.40	7.52
7	IMA: 30-day mortality with clinical variables	N.D.	7.94	7.73	8.00	N.D.	8.25	6.78	7.76
8	Acute myocardial infarction: 1-year mortality	8.03	9.60	9.89	8.73	7.53	8.16	8.99	8.64
9	STEMI: 30-day mortality	10.87	11.20	11.25	11.11	9.73	10.02	9.85	9.62
10	STEMI: % patients treated with PTCA within 90 minutes	N.D.	49.00	51.17	51.52	N.D.	53.26	50.95	55.40
11	Repair of non-ruptured abdominal aortic aneurysm: 30-day mortality	1.46	1.38	1.63	1.56	0.75	0.69	1.04	1.29
12	Congestive heart failure: 30-day mortality	10.06	11.85	11.01	10.59	8.36	10.41	9.58	10.20
13	Congestive heart failure: 30-day readmissions	14.29	13.64	11.42	12.76	13.86	11.90	13.82	12.07
14	Valvuloplasty or heart valve replacement: 30-day mortality	2.58	2.56	2.26	2.33	1.29	1.25	1.62	1.45
15	Ischaemic stroke: 30-day readmissions	6.27	5.98	5.44	5.33	7.00	6.24	7.21	6.46
16	Ischaemic stroke: 30-day mortality	9.44	11.04	9.28	9.40	7.50	8.43	8.48	8.47
17	Laparoscopic cholecystectomy: post-operative stay < 3 days	74.32	70.38	75.37	76.80	86.74	84.57	87.15	88.38
18	Cholecystectomy, ordinary adm.: complications at 30 days	2.41	2.64	2.66	2.39	1.51	1.36	1.43	1.45
19	Cholecystectomy, ordinary adm.: another surgery at 30 days	2.04	1.95	2.01	1.18	1.05	1.01	0.99	0.97
20	Knee prosthesis: 30-day readmissions	1.31	2.11	1.02	0.89	1.16	1.97	1.15	1.12
21	Knee prosthesis: revision surgery at 2 years	2.77	2.09	2.01	2.78	2.99	2.78	2.24	3.19
22	Knee arthroscopy: new surgery within 6 months	0.79	0.92	1.03	0.99	0.53	0.52	0.65	0.66
23	Hip replacements: 30-day readmissions	3.70	4.57	3.49	3.57	2.75	3.63	2.92	2.83
24	Hip replacement: revision surgery at 2 years	1.63	1.87	1.73	1.91	1.91	1.71	1.86	2.02
25	Shoulder prostheses: 30-day readmissions	1.61	1.50	2.51	2.93	1.57	2.11	1.99	1.98
26	Femoral neck fracture: 30-day mortality	4.37	6.98	6.05	5.42	4.39	6.86	6.82	5.77
27	Femoral neck fracture: surgery within 48 hours of admission to the hospital	N.D.	N.D.	47.81	49.57	N.D.	N.D.	61.15	61.76
28	Femoral neck fracture in the over 65s: surgery within 2 days	67.60	63.72	61.00	61.84	79.95	78.80	80.57	76.54

rif.	INDICATORI	OSPEDALI PUBBLICI				OSPEDALI PRIVATI			
		2019	2020	2021	2022	2019	2020	2021	2022
29	Fracture of tibia and fibula: waiting times for surgery	4	4	4	5	3	3	3	3
30	Surgery for MT of the brain: 30-day mortality	2.32	2.34	2.59	2.82	1.39	1.66	2.77	2.23
31	Surgery for MT of the colon: 30-day mortality	3.58	3.90	3.86	3.34	3.02	3.67	2.99	2.44
32	Surgery for MT of the liver: 30-day mortality	2.18	1.95	1.50	2.15	1.71	1.60	1.30	1.37
33	Surgery for MT of the pancreas: 30-day mortality	4.04	4.46	3.07	2.18	3.21	3.12	1.38	1.36
34	Surgery for MT of the lung: 30-day mortality	0.80	0.88	0.72	0.69	1.04	0.95	0.93	0.93
35	Surgery for MT of the prostate: 30-day readmission, with variables	N.D.	N.D	3.00	5.62	N.D.	2.76	2.91	3.41
36	Surgery for MT of the kidney: 30-day mortality	0.94	0.85	0.58	0.49	0.27	3.06	0.36	0.39
37	Surgery for MT of the rectum: 30-day mortality	0.76	1.01	1.19	1.64	0.36	0.45	0.00	0.00
38	Surgery for MT of the stomach: 30-day mortality	3.05	4.01	4.10	3.80	2.71	2.85	1.79	2.87
39	Resection surgery within 120 days of conservative surgery for MT of the breast	6.58	6.37	6.05	6.37	4.24	3.96	3.31	3.43
40	Resection surgery within 90 days of conservative surgery, with new variables	N.D.	N.D	5.78	5.78	N.D.	N.D.	3.33	3.50
41	Proportion of deliveries by primary caesarean section	16.91	16.58	16.46	17.64	19.33	20.08	19.48	20.46
42	Caesarean sections: % subsequent admissions during puerperium	1.29	1.39	1.14	1.16	1.14	0.87	0.85	0.82
43	Vaginal deliveries: % subsequent admissions during puerperium	0.95	0.83	0.70	0.73	0.80	0.80	0.52	0.66
44	Vaginal deliveries in women with previous caesarean section	16.52	16.90	17.15	17.84	15.64	16.26	15.47	14.53
45	Vaginal deliveries: proportion of episiotomies	N.D.	13.93	12.07	11.74	N.D.	13.50	12.91	12.50
46	COPD relapse: 30-day mortality	6.59	11.21	11.20	9.39	4.58	6.49	6.05	4.69
47	COPD relapse: 30-day readmissions	13.05	11.57	12.43	11.98	8.57	8.37	8.65	7.85
48	Chronic renal failure: 30-day mortality after hospitalisation	9.01	13.16	11.15	9.58	6.73	11.80	8.84	8.18

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Clinical outcomes that are better in 2022 when comparing public and private hospitals are highlighted in green. Of the 48 indicators, 37 (77%) show better results in the private sector, confirming the trend already seen in previous years.

However, there is no evidence of a steady improvement trend for most indicators, which show fluctuating values over a four-year period with increases and decreases from one year to the next. A steady improvement can only be seen for a few indicators, such as:

- AMI-STEMI - patients treated with PTCA within 48 hours
- Laparoscopic cholecystectomy – post-operative stay < 3 days
- Femoral neck fracture – 30-day mortality

In the private sector, 18 out of 48 indicators (37%) improved in 2022 compared to 2021.

7.3. Ranking of regions by number of indicators and quality of outcomes vs the italian national average

Region	Total Region		
	number of indicators	number of better ind.	% better ind.
LOMBARDY	48	35	73%
VENETO	48	33	69%
PIEDMONT	48	29	60%
TUSCANY	48	29	60%
EMILIA ROMAGNA	48	27	56%
APULIA	48	22	46%
FRIULI VENEZIA GIULIA	48	21	44%
LAZIO	48	20	42%
SICILY	48	20	42%
CAMPANIA	48	19	40%
MARCHE	47	36	77%
AUTON. PROV. OF TRENTO	47	30	64%
LIGURIA	47	19	40%
SARDINIA	47	17	36%
UMBRIA	46	26	57%
AUTON. PROV. OF BOLZANO	45	23	51%
ABRUZZO	45	18	40%
CALABRIA	45	17	38%
MOLISE	37	16	43%
BASILICATA	37	13	35%
VALLE D'AOSTA	31	19	61%

Region	Private hospitals		
	number of indicators	number of better ind.	% better ind.
LOMBARDY	48	37	77%
LAZIO	48	23	48%
SICILY	45	29	64%
APULIA	44	21	48%
VENETO	43	27	63%
CAMPANIA	37	20	54%
LIGURIA	36	22	61%
PIEDMONT	28	23	82%
CALABRIA	28	20	71%
EMILIA ROMAGNA	25	16	64%
MOLISE	22	14	64%
FRIULI VENEZIA GIULIA	21	12	57%
ABRUZZO	21	17	81%
SARDINIA	14	7	50%
MARCHE	13	7	54%
TUSCANY	12	7	58%
UMBRIA	9	7	78%
AUTON. PROV. OF BOLZANO	6	3	50%
AUTON. PROV. OF TRENTO	5	4	80%
VALLE D'AOSTA	5	2	40%
BASILICATA	0	0	0%

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The table is sorted by the number of indicators with the “ADJ” outcome present for the reference region.

Once again, Lombardy achieved “ADJ” outcomes for all 48 indicators in 2022, which are associated with the highest percentage of outcomes better than the national average compared to all other regions.

In 2021, the percentage of improved outcomes was 83% (40 out of 48 indicators), for the region as a whole and the private sector. Although Lombardy fell slightly in 2022, the private sector maintained its position with 79%.

The indicators in Lombardy (public + private sectors combined) that are worse than the national average are as follows:

Indicator	% Lombardy	% Italy
Stage III and IV lower limb PAD - amputations at 6 months	7.65	4.55
Stage III and IV lower limb PAD - revascularisation at 6 months	18.80	16.04
Coronary artery bypass graft surgery: 30-day mortality	2.34	2.16
Acute myocardial infarction: 30-day mortality	7.87	7.62
STEMI: 30-day mortality	10.84	9.19
STEMI: % patients treated with PTCA within 90 minutes	52.63	54.66
Laparoscopic cholecystectomy: post-operative stay < 3 days	80.94	83.08
Knee replacement: revision surgery at 2 years	3.15	2.84
Shoulder prostheses: 30-day readmissions	2.31	1.64
Surgery for MT of the prostate: 30-day readmissions	4.23	3.87
Caesarean sections: % subsequent admissions during puerperium	1.10	0.82
Vaginal deliveries: % subsequent admissions during puerperium	0.72	0.50
Vaginal deliveries: proportion of episiotomies	11.88	11.40

In the private sector, the indicators for post-cholecystectomy hospitalisation, 30-day mortality for STEMI and readmissions for prostate MT are better than the national average.

8. Analysis of clinical outcomes by indicator - Comparison between regions

8.1. Cardiovascular clinical area

Outcome Indicator	Stage III and IV lower limb PAD - 6-month mortality							
SDO: 2022								
Total cases at national level	8,708							
National average raw outcome	13.91							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	580	559	14.66	12.27	116	0	9.48	//
LOMBARDY	743	457	14.54	13.17	588	447	11.79	11.20
VENETO	620	514	17.1	13.41	89	64	12.36	8.19
LAZIO	404	228	13.12	12.33	139	109	20.86	25.72
ABRUZZO	164	117	17.68	19.10	36	36	2.78	2.13
MOLISE	23	0	43.48	//	97	96	15.46	11.33
CAMPANIA	329	282	13.68	25.20	1,045	912	5.36	7.25
APULIA	126	57	16.67	13.52	268	192	10.08	13.11
SICILY	454	326	14.54	20.71	175	146	10.28	13.09
TOTALS	3,443	2,540	14.58	15.53	2,553	2,002	9.35	12.77
% of national total	39.54	29.17			29.32	22.99		

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In 6 out of 7 regions, private hospitals have a better “ADJ” outcome than public hospitals. In one region (Lazio), however, public hospitals have a better outcome. In one region (Molise), it is not possible to make a comparison, as no “ADJ” data is available for public hospitals. Similarly,

it is not possible to make a comparison for Piedmont, as no “ADJ” data is available for private hospitals.

The national average is significantly better in the private sector.

Compared to last year, national averages have worsened slightly in both the public (+0.17) and private (+1.26) sectors.

Outcomes vary most widely between regions in the private sector, ranging from 2.13 to 25.72 compared to 12.27-25.20 in the public sector.

Outcome Indicator	Stage III and IV lower limb PAD - revascularisation at 6 months							
SDO: 2022								
Total cases at national level	7,497							
National average raw outcome	16.55							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	total	adj	raw	adj	total	adj	raw	adj
LOMBARDY	635	372	17.95	19.75	569	449	19.68	18.01
VENETO	514	401	18.68	17.11	78	58	29.49	32.77
LAZIO	259	107	13.9	17.76	202	141	14.85	17.02
ABRUZZO	135	53	17.78	15.53	35	35	20.00	20.99
MOLISE	13	0	7.69	//	82	64	4.88	3.05
CAMPANIA	305	223	13.44	11.96	968	869	11.16	10.72
APULIA	112	28	13.39	17.54	241	172	17.84	13.00
SICILY	388	258	11.86	11.61	157	107	21.65	18.00
TOTALS	2,361	1,442	15.25	15.06	2,332	1,895	15.58	14.14
% of national total	31.49	19.23			31.11	25.28		

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Private hospitals perform better than public hospitals in 4 out of 8 regions, while public hospitals perform better in 3 regions. In one region (Molise), it is not possible to make a comparison due to a lack of “ADJ” data from the public sector.

The national “ADJ” average is higher in the private sector. In both sectors, the average has improved since last year (-1.06% in the public sector and -1.09% in the private sector).

As with the previous indicator, there is considerable variation between regions, particularly in the private sector. Notably, the figure for Veneto is high at 32.77%, despite the limited number of cases treated, compared to the national average of 14.14%.

Outcome Indicator	Stage III and IV lower limb PAD - amputations at 6 months							
SDO: 2022								
Total cases at national level	7,497							
National average raw outcome	4.51				TABLE 3			
REGIONS	Public hospitals				Public hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	499	484	6.01	5.80	101	0	2.97	//
LOMBARDY	635	372	5.83	8.38	569	449	8.08	7.05
VENETO	514	401	6.61	5.50	78	58	3.85	3.81
LAZIO	259	107	2.32	1.12	202	141	4.95	7.33
ABRUZZO	135	53	1.48	1.82	35	35	8.57	10.04
MOLISE	13	0	0	//	82	64	4.88	4.66
CAMPANIA	305	233	4.59	3.07	968	869	2.17	1.93
APULIA	112	28	8.03	6.37	241	172	4.98	4.07
SICILY	388	217	5.92	5.16	157	82	1.27	0.00
TOTALS	2,860	1,895	5.42	5.47	2,433	1,870	4.27	3.98
% of national total	38.15	25.28			32.45	24.94		

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As with the previous indicators, amputation outcomes in the private sector are better than the national average: outcomes are better in 5 of the 8 regions in the private sector and 2 in the public sector. No “ADJ” data is available from the public sector in Molise or the private sector in Piedmont.

To accurately assess the effectiveness of treatment for stage III and IV peripheral arterial disease (PAD), all 3 indicators must be considered together.

Outcome Indicator	Coronary artery bypass graft surgery: 30-day mortality with new clinical variables							
SDO: 2021-2022								
Total cases at national level	22,952							
National average raw outcome	2.17							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	713	695	1.54	1.58	428	428	2.57	3.89
LOMBARDY	1,984	1,924	2.37	2.19	1,381	1,354	2.50	2.55
LIGURIA	131	129	1.53	1.21	268	268	2.14	2.41
EMILIA R.	641	641	0.78	0.76	1,203	1,203	2.16	2.84
LAZIO	938	938	2.88	2.67	1,673	1,616	1.44	2.17
MOLISE	0	0		//	202	202	1.49	2.80
CAMPANIA	1,618	1,614	2.96	2.25	1,138	990	2.72	2.34
APULIA	384	365	3.39	2.75	1,531	1,531	3.00	3.10
CALABRIA	569	569	2.11	1.93	63	63	3.18	1.86
SICILY	963	963	5.92	1.94	833	833	1.56	1.47
TOTALS	7,941	7,838	2.85	2.06	8,720	8,488	2.24	2.56
% of national total	34.60	34.15			37.99	36.98		

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“ADJ” data for the private sector is available for 10 regions. In all other regions, no isolated coronary artery bypass graft surgeries were performed.

The number of cases treated by the private sector in the regions surveyed is higher than in the public sector, representing a significant percentage of all cases treated nationwide.

However, the private sector’s performance has worsened compared to last year; in only 3 out of 9 regions is the average performance of private hospitals better than that of public hospitals. A comparison for Molise is not possible due to a lack of “ADJ” data from the public sector.

The national average in the private sector increased from 2.02% to 2.55%, whereas in the public sector it improved from 2.84% to 2.05%.

The dispersion of the value of the outcomes in the two sectors has different minimum and maximum values, with varying degrees of deviation. In the public sector, it ranges from a minimum of 0.76 to a maximum of 2.75, with a spread of just under 2 points. In the private sector, it ranges from 1.47 to 3.89, with a spread of 2.42 points.

Outcome Indicator	Pulmonary embolism: readmissions at 30 days after hospitalisation							
SDO: 2022								
Total cases at national level	18,377							
National average raw outcome	8.73							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	3,161	2,164	6.89	7.40	898	365	8.57	8.79
VENETO	1,791	1,132	7.15	8.21	189	68	7.40	10.11
LIGURIA	508	242	10.04	9.04	79	68	5.06	5.63
LAZIO	1,132	586	10.44	9.93	645	193	12.21	10.39
TOTALS	6,592	4,124	7.81	8.08	1,811	694	9.59	9.05
% of national total	35.87	22.44			9.85	3.78		

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Only 4 regions have ADJ outcomes related to the private sector.

The percentage of cases treated by the private sector, both nationally and in Lombardy, is very small. Even when cases treated in the 13 regions that do not have “ADJ” data are included, the overall percentage is just over 10%.

Only in Liguria is the average better in the private sector. The ADJ outcomes in Liguria and Veneto in the private sector refer to a very limited number of cases in just one hospital.

In Lombardy, the outcome worsened from 6.45% the previous year to 8.79% despite a similar number of cases being treated (from 293 to 365).

Outcome Indicator	Pulmonary embolism: 30-day mortality							
SDO: 2022								
Total cases at national level	19,777							
National average raw outcome	10.59							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	3,347	2,434	9.26	9.24	965	383	10.26	7.52
VENETO	1,925	1,419	8.42	8.40	200	149	11.50	12.17
LIGURIA	564	321	11.35	10.15	72	86	5.56	8.14
LAZIO	1,266	764	15.93	16.13	721	265	12.84	17.14
TOTALS	7,102	4,938	10.39	10.12	1,958	883	11.15	11.25
% of national total	35.91	24.97			9.90	4.46		

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As with the previous indicator, only 4 regions presented “ADJ” data for the private sector, accounting for a very small proportion of the national total. In the private sector, in addition to the 1,958 cases shown in the table, a total of 484 cases with widely varying clinical outcomes were treated in 14 other regions.

The averages are better in the public sector in 2 regions and in the private sector in 2 regions. The national average is better in the public sector. The result in the private sector is influenced by data from Veneto and Lazio, which show much more scattered values compared to Lombardy and Liguria.

Outcome Indicator	Acute Myocardial Infarction: 1-year mortality							
SDO: 2021								
Total cases at national level	77,175							
National average raw outcome	9.14							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	9,395	9,108	8.64	8.73	3,593	3,547	7.90	8.64
VENETO	5,208	5,113	9.62	8.76	150	304	9.33	6.35
LIGURIA	2,442	2,344	9.46	7.98	169	139	7.69	10.94
EMILIA R.	6,073	5,955	9.76	7.92	237	207	8.36	7.23
LAZIO	4,747	4,562	9.90	10.99	1,537	1,472	10.54	10.73
CAMPANIA	5,871	5,669	7.94	9.26	1,339	1,291	5.60	7.18
APULIA	3,505	3,281	10.04	9.82	1,149	1,138	9.31	11.10
CALABRIA	2,537	2,524	8.24	9.15	144	143	7.64	9.50
SICILY	6,049	5,871	9.70	11.46	319	206	10.66	12.86
TOTALS	45,827	44,427	9.21	9.35	8,637	8,447	8.33	9.15
% of national total	59.38	57.57			11.19	10.95		

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Of the 9 regions for which private sector “ADJ” data is available the average “ADJ” outcome is better in private hospitals in 5 regions and in public hospitals in 4 regions; the national averages are very close.

The regional averages for the public and private sectors are also fairly similar, including Sicily, where high values are recorded in both sectors compared to all other regions.

Outcome Indicator	Acute myocardial infarction: 30-day mortality with new clinical variables							
SDO: 2022								
Total cases at national level	76,366							
National average raw outcome	7.69							
REGIONS	Public hospitals				Public hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	9,079	8,807	7.97	8.00	3,692	3,613	7.10	7.76
VENETO	5,334	5,086	8.85	7.22	363	87	7.16	7.32
LIGURIA	2,354	2,332	8.20	7.01	169	159	7.69	3.82
EMILIA R.	5,998	5,762	7.40	6.21	235	202	10.21	7.32
LAZIO	4,856	4,710	7.31	7.76	1,512	1,476	7.47	7.21
CAMPANIA	5,685	5,464	7.74	10.41	1,335	1,287	4.50	5.27
APULIA	3,705	3,454	7.24	7.25	1,083	1,079	8.22	8.03
CALABRIA	2,353	2,271	8.03	9.72	152	147	5.26	9.31
SICILY	5,989	5,864	7.85	9.64	301	178	7.31	9.81
TOTALS	45,353	43,750	7.79	8.10	8,842	8,228	6.94	7.48
% of national total	59.39	57.29			11.58	10.77		

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The number of cases treated is almost the same as last year, in both the public and private sectors.

National averages for clinical outcomes have remained stable in the public sector and worsened slightly in the private sector (from 7.11% to 7.48%). In Lombardy, outcomes have also worsened from 6.78% to 7.56%, though this remains better than the regional average for the public sector.

The number of regions with better clinical outcomes in the private sector than the public sector has fallen from 8 last year to 5.

Outcome Indicator	STEMI: mortality 30 days from admission							
SDO: 2022								
Total cases at national level	31,820							
National average raw outcome	9.19							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	3,900	3,540	10.31	11.11	1,659	1,459	9.28	10.20
VENETO	2,183	1,982	9.07	8.72	150	125	8.67	7.40
LIGURIA	1,045	982	9.38	7.67	99	95	8.08	5.95
EMILIA R.	2,345	2,140	8.96	7.50	89	73	11.24	8.51
LAZIO	2,169	2,013	8.76	9.27	539	458	11.13	8.76
CAMPANIA	2,458	2,269	8.54	9.57	563	452	6.04	7.39
APULIA	1,168	1,054	9.25	9.56	660	608	8.64	7.45
TOTALS	15,268	13,980	9.28	9.35	3,759	3,270	10.27	8.83
% of national total	47.98	43.93			11.81	10.28		

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The regional average of the clinical outcome is better in the private sector in 6 out of the 7 regions for which “ADJ” data is available.

Compared to other regions, Lombardy has the worst data, both in the public and private sector.

Outcome Indicator	IMA-STEMI: % patients treated with PTCA within 90 minutes from access to the hospital							
SDO: 2022								
Total cases at national level	35,042							
National average raw outcome	51.29							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	4,297	4,001	50.15	51.52	1,818	1,599	55.94	55.40
VENETO	2,413	2,189	53.42	56.09	166	137	52.41	62.91
LIGURIA	1,095	1,017	35.98	39.13	161	154	62.64	63.48
EMILIA R.	2,360	2,163	60.89	66.35	343	288	47.81	55.96
LAZIO	2,319	2,159	63.00	66.43	643	534	43.23	46.84
CAMPANIA	2,902	2,674	46.35	47.87	438	339	37.90	44.52
APULIA	1,048	939	49.72	54.66	973	945	53.03	55.27
SICILY	2,653	2,464	43.08	44.93	245	108	40.00	64.20
TOTALS	19,087	17,606	51.05	53.71	4,787	4,104	50.69	54.18
% of national total	54.47	50.24			13.66	11.71		

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Of the 8 regions for which ADJ data is available for the private sector, the average clinical outcome is better in 5 of them (compared to 3 regions last year). The national average has also improved, rising from 53.63% to 54.18%.

Lombardy saw a significant improvement in the private sector, with an increase from 50.95% to 55.40%, while the public sector remained stable with an increase from 51.17% to 51.52%.

The dispersion of outcome values is fairly contained, except for the figures for Liguria in the public sector and for Lazio and Campania in the private sector.

Outcome Indicator	Repair of non-ruptured abdominal aortic aneurysm:							
SDO: 2021-2022	30-day mortality							
Total cases at national level	15,406							
National average raw outcome	1.64							
TABLE 11								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	1,647	1,264	1.82	1.56	1,503	1,139	1.20	1.29
VENETO	1,041	930	0.86	0.63	127	74	0.78	1.39
LIGURIA	396	339	1.26	1.42	67	67	1.49	1.29
LAZIO	1,336	1,244	1.80	1.45	491	363	1.63	1.38
MOLISE	27	0	11.11	//	99	68	1.01	0.00
CAMPANIA	749	598	2.54	2.47	467	306	1.07	0.90
APULIA	280	154	2.50	2.17	422	274	1.90	1.32
SICILY	882	703	1.13	0.98	139	66	2.16	0.00
TOTALS	6,358	5,232	1.68	1.40	3,315	2,357	1.36	1.19
% of national total	41.27	33.96			21.52	15.30		

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“ADJ” data for private hospitals is available for 8 regions, compared to 9 last year. Emilia-Romagna is missing (it recorded 53 “ADJ” cases in 2021 and none in 2022).

The outcome is better in the private sector in 6 out of 7 regions (no comparison is possible for Molise as there is no “ADJ” data).

Nationally, the averages of the two sectors are similar; however, the national average for the private sector is only slightly better than that for the public sector.

Outcome Indicator	Congestive Heart Failure: 30-day mortality							
SDO: 2022								
Total cases at national level	94,627							
National average raw outcome	10.73							
TABLE 12								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	4,177	3,985	11.01	11.01	258	179	6.59	4.00
LOMBARDY	12,102	11,875	11.14	10.59	4,580	4,213	10.20	10.20
VENETO	7,255	7,078	10.70	9.46	982	810	9.98	9.23
FRIULI V.G.	1,728	1,680	12.73	11.35	169	104	11.83	9.93
LIGURIA	2,224	2,157	12.72	11.71	246	173	8.54	8.85
EMILIA R.	7,881	7,575	10.85	9.18	1,053	633	17.00	14.88
LAZIO	5,480	5,429	12.50	13.18	4,790	4,424	11.75	11.24
ABRUZZO	1,890	1,693	11.16	11.79	629	596	10.01	9.97
MOLISE	315	311	13.65	15.18	105	77	6.67	5.09
CAMPANIA	4,085	3,765	10.31	12.93	2,268	1,706	5.89	6.48
APULIA	3,746	3,646	10.33	12.18	1,763	1,290	7.77	8.80
CALABRIA	1,961	1,824	11.42	13.47	316	275	8.23	8.38
SICILY	5,590	5,004	10.54	12.30	3,296	3,040	6.25	7.24
TOTALS	58,434	56,022	11.05	11.17	20,455	17,520	9.48	9.47
% of national total	61.75	59.20			21.62	18.51		

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“ADJ” data for the private sector is available for 13 regions, compared to 14 last year. The Marche region, which is missing from the data, recorded 75 cases with a clinical outcome of 13.36% in 2021.

The outcome is better in the private sector in 12 regions, compared to 9 last year. There is a significant gap between the public and private sectors in many regions (see Piedmont, Sicily and Campania), but in Lombardy, the two averages are very similar.

The mortality rate in the private sector was 1.70 points lower than in the public sector, improving from 10.15% to 9.47% compared to the previous year. The public sector’s rate improved by 0.66%.

Outcome Indicator	Congestive heart failure: 30-day readmissions							
SDO: 2022								
Total cases at national level	74,019							
National average raw outcome	13.01							
TABLE 13								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	3,439	3,048	12.77	11.48	215	151	8.84	9.92
LOMBARDY	9,375	9,064	12.69	12.76	3,475	3,102	11.88	12.07
VENETO	5,670	5,438	13.39	13.25	773	554	13.06	13.22
FRIULI V.G.	1,337	1,298	14.66	14.63	131	83	11.45	4.88
LIGURIA	1,744	1,660	13.43	13.14	208	152	16.83	16.18
EMILIA R.	6,019	5,664	14.50	14.65	846	442	16.90	17.65
LAZIO	4,018	3,903	12.96	12.54	3,757	3,170	14.40	14.20
ABRUZZO	1,460	1,260	12.33	11.71	458	406	10.04	10.23
MOLISE	242	194	17.77	19.16	96	70	9.37	9.20
CAMPANIA	3,329	3,034	12.56	12.30	1,908	1,651	10.69	11.41
APULIA	2,832	2,682	12.92	12.68	1,427	1,071	10.93	11.23
CALABRIA	1,526	1,446	11.60	11.13	291	216	8.25	9.07
SICILY	4,315	3,821	12.12	11.91	2,601	2,264	10.69	11.13
TOTALS	45,306	42,512	12.86	13.31	16,186	13,332	12.26	12.36
% of national total	61.21	57.43			21.87	18.01		

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As with the mortality index, the 30-day readmission index also improved in the private sector compared to the previous year (−0.72), whereas no change was recorded in the public sector.

The national averages have a spread of about 1 percentage point; in the private sector it is better in 10 out of 13 regions.

Outcome Indicator	Valvuloplasty or heart valve repl.: 30-day mortality							
SDO: 2021-2022								
Total cases at national level	46,395							
National average raw outcomes	2.42							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	3,199	3,206	3.30	3.62	962	962	2.80	2.60
LOMBARDY	3,772	3,769	2.47	2.33	8,441	8,424	1.34	1.45
LIGURIA	499	499	3.01	2.32	734	731	1.50	1.25
EMILIA R.	1,780	1,719	2.42	2.11	1,814	1,814	1.71	1.75
LAZIO	1,196	1,151	4.02	3.73	2,110	2,024	2.13	2.13
MOLISE	0	0		//	253	253	2.77	2.67
CAMPANIA	1,690	1,664	4.26	4.07	2,154	2,154	2.65	3.12
APULIA	380	380	2.90	2.90	2,514	2,514	3.03	3.14
CALABRIA	447	447	3.58	3.28	55	55	1.82	1.31
SICILY	1,195	1,173	5.27	5.39	1,834	1,834	2.62	3.05
TOTALS	14,158	14,008	3.30	3.22	20,871	20,765	1.99	2.12
% of national total	30.52	30.19			44.99	44.76		

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“ADJ” data for the private sector is available for 10 regions; no valvuloplasty or heart valve replacement operations were performed in private hospitals in the other regions.

In 8 out of 9 regions, private hospitals have better average “ADJ” outcomes than public hospitals. No comparison is possible for Molise, as no “raw” or “ADJ” public sector data is available.

The private sector treats a far greater percentage of cases than the public sector, particularly in Lombardy, where it remains at around 70% of total cases treated in the region.

Both in Lombardy and nationally, outcomes improved slightly compared to last year.

8.2. Cerebrovascular clinical area

Outcome Indicator	Ischaemic Stroke: 30-day readmissions							
SDO: 2022								
Total cases at national level	47,616							
National average raw outcomes	7.24							
TABLE 15								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	6,217	5,971	5.20	5.33	1,656	1,392	6.58	6.46
VENETO	4,081	3,825	6.30	6.42	212	189	7.55	6.48
LIGURIA	1,699	1,661	8.01	7.74	84	82	3.57	3.69
LAZIO	2,470	2,236	8.14	8.21	1,414	990	7.99	6.95
APULIA	1,970	1,884	7.36	7.19	448	408	7.52	9.65
SICILY	3,127	2,589	8.03	7.87	517	350	8.90	9.02
TOTALS	19,564	18,166	6.71	6.69	4,331	3,411	7.40	7.18
% of national total	41.09	38.15			9.10	7.16		

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In the private sector, “ADJ” outcomes are available for only 6 regions; the cases treated are less than 10% of those treated nationally.

The average national outcome in the private sector is worse than in the public sector, with only 2 regions recording better outcomes.

In Lombardy, where the number of cases is almost identical, the average has improved compared to the previous year (decreasing from 7.21% to 6.46%), but it is still worse than in the public sector within the same region.

Outcome Indicator	Ischaemic Stroke: 30-day mortality							
SDO: 2022								
Total cases at national level	51,458							
National average raw outcomes	10.54							
TABLE 16								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	6,688	6,412	9.36	9.40	1,765	1,532	8.95	8.47
VENETO	4,480	4,165	10.42	9.29	231	197	9.09	4.11
LIGURIA	1,872	1,823	11.43	10.55	90	88	8.88	7.81
LAZIO	2,686	2,418	10.98	10.40	1,500	1,036	9.87	8.00
APULIA	2,114	2,013	10.60	11.78	480	444	9.17	8.97
SICILY	3,388	2,809	11.95	13.54	532	363	9.96	9.54
TOTALS	21,228	19,640	10.50	10.44	4,598	3,660	9.36	8.25
% of national total	41.25	38.17			8.94	7.11		

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The number of regions for which “ADJ” data is available has fallen from 9 to 6 (Piedmont, Abruzzo and Campania are missing; these regions had recorded a limited number of cases in the previous PNE). In all cases treated in 2022, the clinical outcome was better in the private sector.

Unlike 30-day hospital readmissions, the mortality index is much better. However, the gap between the averages of the two sectors at national level remains significant (at 2.19 percentage points), though this is an improvement on last year’s figure of 3.35 points.

8.3. Digestive clinical area

Outcome Indicator	Laparoscopic cholecystectomy: post-operative stay <3 days							
SDO: 2022								
Total cases at national level	62,446							
National average raw outcomes	82.81							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totali	adj	grezzo	adj
PIEDMONT	3,717	3,640	80.20	81.24	946	823	96.41	95.28
LOMBARDY	7,406	7,094	77.17	76.80	4,394	3,948	88.85	88.38
VENETO	3,361	3,121	91.25	90.03	1,181	1,093	93.14	91.57
FRIULI	945	817	69.10	72.74	197	133	92.39	89.30
LIGURIA	756	640	78.84	83.28	229	211	91.27	91.09
EMILIA R.	3,674	3,539	83.97	85.08	364	118	86.81	86.92
TUSCANY	4,950	4,868	86.42	85.39	238	71	87.32	69.26
UMBRIA	767	621	80.18	82.40	126	85	94.44	92.19
MARCHE	979	864	80.60	83.56	273	257	86.45	80.00
LAZIO	3,091	2,849	80.23	83.10	3,826	3,443	88.55	88.20
ABRUZZO	775	499	64.25	72.99	902	902	89.13	86.33
MOLISE	107	54	43.92	58.70	230	230	92.61	92.38
CAMPANIA	2,526	1,921	69.96	74.64	3,485	2,883	85.48	84.40
APULIA	2,201	1,873	71.97	75.27	1,790	1,622	88.60	87.46
CALABRIA	678	403	62.03	68.40	773	738	59.00	62.83
SICILY	2,447	1,729	88.88	90.18	2,187	1,830	90.99	89.36
SARDINIA	896	724	74.10	74.03	648	617	79.78	81.53
TOTALS	39,276	35,256	80.07	81.54	21,789	19,004	87.65	86.73
% of national total	62.90	56.46			34.89	34.89		

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Of the 17 regions for which private sector “ADJ” data is available, the average outcome in the private sector is better than in the public sector in 13 of these regions.

There are significant deviations in the national averages, with better results in the private sector, where only 2 regional averages are below 80%.

Compared to the previous year, national averages improved in both sectors, especially in the public sector (by 4.5 percentage points compared to about 1 point in the private sector).

A large proportion of cases, around 35% of the total national cases in the 17 regions were treated in private hospitals.

In both sectors, dispersion is fairly low.

Outcome Indicator	Cholecystectomy, ordinary admission: complications at 30 days							
SDO: 2021-2022								
Total cases at national level	111,704							
National average raw outcomes	2.00							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	6,517	6,124	2.15	2.10	1,795	1,350	1.34	1.51
LOMBARDY	11,977	11,357	2.39	2.39	7,785	6,771	1.35	1.45
VENETO	5,904	5,013	2.86	3.13	2,218	2,049	1.67	2.06
FRIULI V.G.	1,767	1,540	1.41	1.15	378	146	2.38	4.26
LIGURIA	1,569	1,258	1.55	1.85	427	391	2.11	2.25
EMILIA R.	6,368	5,739	2.81	2.59	694	126	1.30	1.73
TUSCANY	8,417	7,949	2.06	2.07	446	240	1.35	1.19
UMBRIA	1,348	1,014	2.22	2.36	241	158	1.66	2.81
MARCHE	1,801	1,426	2.67	1.86	579	534	1.21	1.35
LAZIO	5,201	4,792	1.75	1.60	7,310	6,272	1.49	1.50
ABRUZZO	1,474	978	2.58	2.90	1,537	1,477	1.30	1.49
MOLISE	177	0	0.57	//	435	435	0.16	0.57
CAMPANIA	4,613	3,300	2.02	1.85	6,752	5,559	1.11	1.11
APULIA	4,056	3,334	2.49	2.04	3,493	3,038	1.49	1.61
CALABRIA	1,165	722	8.76	11.06	1,374	1,047	0.65	0.95
SICILY	4,462	3,192	1.68	1.96	4,226	3,223	1.25	1.30
SARDINIA	1,721	1,320	3.02	2.61	1,231	1,169	0.73	0.96
TOTALS	68,537	59,058	2.37	2.33	40,921	33,985	1.30	1.41
% of national total	61.36	52.87			36.63	30.42		

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The outcome for this indicator is better in the private sector in 13 out of 16 regions. It is not possible to make a comparison for one region (Molise) due to a lack of public sector “ADJ” data.

The average of the outcomes at national level is much better in the private sector. The public sector values for Calabria are highlighted in yellow because they are much more dispersed compared to all the averages; this is due to one hospital (out of 5) recording an index of 40.94% for the 181 cases it treated.

In any case, the index at national level improved compared to last year, even in the public sector.

Outcome Indicator	Cholecystectomy, ordinary admission: another operation at 30 days							
SDO: 2021-2022								
Total cases at national level	111,553							
National average raw outcomes	1.18							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	6,515	6,107	1.92	1.86	1,779	1,349	1.07	1.14
LOMBARDY	12,057	11,345	1.17	1.18	7,688	6,767	0.87	0.97
VENETO	5,901	5,010	1.02	1.11	2,217	2,049	1.35	1.61
FRIULI V.G.	1,764	1,541	1.25	1.12	378	146	1.32	2.22
LIGURIA	1,567	1,256	1.34	1.61	427	391	0.94	1.06
EMILIA R.	6,361	5,733	1.59	1.44	694	126	0.57	0.00
TUSCANY	8,406	7,938	1.38	1.38	445	239	0.90	0.61
UMBRIA	1,345	1,012	1.71	2.07	241	158	0.42	0.00
MARCHE	1,797	1,423	1.11	1.16	579	534	1.21	1.41
LAZIO	5,260	4,785	1.23	1.10	7,226	6,256	1.19	1.27
ABRUZZO	1,471	1,100	1.36	1.49	1,536	1,476	0.26	0.37
MOLISE	177	0	0.00	//	434	434	0.23	0.22
CAMPANIA	4,602	3,292	1.30	1.09	6,750	5,558	0.73	0.85
APULIA	4,045	3,324	1.04	0.88	3,492	3,037	0.83	0.90
CALABRIA	1,163	721	1.12	0.92	1,374	1,047	0.36	0.58
SICILY	4,456	3,187	1.26	1.17	4,219	3,217	0.71	0.70
SARDINIA	1,715	1,316	1.54	1.98	1,230	1,168	1.14	1.48
TOTALS	68,602	59,090	1.34	1.32	40,709	33,952	0.87	0.99
% of national total	61.50	52.97			36.49	30.44		

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For this indicator as well, results are better in the private sector; out of 16 regions, clinical outcomes are better in 11, leading to a better average at national level. It is not possible to make the comparison for one region (Molise) due to a lack of public sector “ADJ” data.

The averages for the public sector in Calabria have realigned, compared to the previous indicator.

8.4. Musculoskeletal clinical area

Outcome Indicator	Knee prosthesis: 30-day readmissions							
SDO: 2022								
Total cases at national level	68,423							
National average raw outcomes	1.33							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	1,792	1,639	1.62	1.67	4,429	4,426	1.15	1.13
VALLE D'AOSTA	22	0	0.00	//	128	128	2.17	2.20
LOMBARDY	2,354	2,044	1.14	0.89	12,746	12,705	1.08	1.12
AUTON. PROV. OF BOLZANO	565	542	1.77	1.71	249	226	2.41	1.82
AUTON. PROV. OF TRENTO	422	410	1.66	1.69	336	336	1.19	1.21
VENETO	1,402	1,304	1.43	1.45	4,931	4,909	1.58	1.63
FRIULI V.G.	360	337	2.78	2.25	1,249	1,249	1.28	1.27
LIGURIA	333	284	3.60	3.08	342	317	1.46	1.47
EMILIA R.	1,762	1,570	2.04	2.02	6,182	6,178	1.36	1.40
TUSCANY	1,680	1,489	1.73	1.48	3,893	3,866	1.11	1.09
UMBRIA	294	267	2.38	2.17	674	674	0.89	0.93
MARCHE	462	441	1.95	1.70	1,031	1,023	0.68	0.70
LAZIO	663	480	2.41	2.18	4,844	4,637	1.34	1.33
ABRUZZO	325	201	2.46	1.20	1,324	1,324	1.51	1.55
MOLISE	24	0	0.00	//	162	160	0.62	0.44
CAMPANIA	555	375	1.62	1.04	3,210	3,157	1.06	1.15
APULIA	634	407	1.58	1.39	2,184	2,184	1.37	1.33
CALABRIA	120	78	1.67	2.10	1,223	1,223	1.06	1.06
SICILY	815	627	1.72	1.76	3,152	3,146	0.86	0.90
SARDINIA	101	44	2.97	1.79	1,275	1,259	1.49	1.53
TOTALS	14,685	12,539	1.76	1.62	53,564	53,127	1.21	1.23
% of national total	21.46	18.33			78.28	77.64		

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The private sector continues to treat the largest number of cases nation-wide (over 78%). In Lombardy, private hospitals treated 85% of cases in the region.

“ADJ” data is available for 20 regions (Basilicata is the only region missing). Of these regions, the outcome is better in the private sector in 13 of them. For 2 regions (Valle d’Aosta and Molise), a comparison is not possible due to a lack of public sector “ADJ” data.

At a national level, the averages have remained stable compared to the previous year.

Outcome Indicator	Knee prosthesis: revision surgery at 2 years							
SDO: 2020								
Total cases at national level		49,327						
National average outcomes		2.86						
		TABLE 21						
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	715	471	2.38	3.22	3,342	3,338	3.56	3.61
VALLE D'AOSTA	24	0	0.00	//	64	64	4.69	4.85
LOMBARDY	1,318	744	2.96	2.78	7,152	7,097	3.27	3.19
AUTON. PROV. OF BOLZANO	371	349	2.69	2.51	77	32	1.30	0.00
AUTON. PROV. OF TRENTO	252	249	1.59	1.70	184	184	1.17	1.28
VENETO	1,416	1,330	2.33	2.48	4,262	4,239	2.30	2.31
FRIULI V.G.	412	379	0.73	0.80	828	828	1.45	1.46
LIGURIA	230	182	2.61	2.84	182	161	5.49	5.30
EMILIA R.	1,132	948	3.09	2.69	4,282	4,281	2.94	2.91
TUSCANY	1,444	1,223	2.42	2.41	3,285	3,265	3.01	3.09
UMBRIA	289	274	2.77	2.98	625	625	2.72	2.55
MARCHE	321	258	0.62	0.40	959	959	1.56	1.52
LAZIO	422	242	3.08	3.82	4,021	3,833	3.22	3.24
ABRUZZO	288	183	3.12	1.07	1,037	1,037	2.02	1.98
MOLISE	16	0	0.00	//	104	115	0.99	0.87
CAMPANIA	280	0	4.29	//	2,264	2,234	4.37	4.26
APULIA	431	146	0.70	0.68	1,893	1,893	2.32	2.31
CALABRIA	43	0	0.00	//	946	946	2.75	2.71
SICILY	624	389	2.08	1.50	2,572	2,514	3.11	3.06
SARDINIA	125	40	1.60	2.31	978	964	2.07	3.03
TOTALS	10,153	7,407	2.41	2.37	39,057	38,609	2.96	2.85
% of national total	20.58	15.02			79.18	78.27		

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As in previous years, average outcomes are better in the public sector (in 11 out of 16 regions). However, national averages are slightly worse in both sectors.

The average for Lombardy also worsened. It should be noted that the data in this edition of the PNE refers to surgical operations carried out in 2020, during the acute phase of the Covid-19 pandemic.

The values of the different regions are, in general, distributed around the national averages.

Outcome Indicator	Knee arthroscopy: new surgery within 6 months							
SDO: 2021-2022								
Total cases at national level	75,255							
National average outcomes	0.96							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	1,950	989	1.38	1.46	5,380	5,201	0.67	0.66
VALLE D'AOSTA	8	0	0.00	//	207	207	0.97	0.95
LOMBARDY	2,226	1,064	0.85	0.99	8,674	7,762	0.70	0.66
AUTON. PROV. OF BOLZANO	1,412	1,219	1.56	1.75	517	402	2.12	2.46
AUTON. PROV. OF TRENTO	1,138	833	2.37	1.13	470	470	0.43	0.44
VENETO	2,350	1,379	0.90	0.78	1,484	1,298	0.66	0.64
FRIULI V.G.	1,269	836	0.63	0.74	4,669	4,669	1.31	1.35
LIGURIA	472	361	0.21	0.00	1,803	1,782	1.89	1.90
EMILIA R.	587	124	1.02	0.80	1,680	1,549	0.95	0.85
TUSCANY	2,150	1,370	0.42	0.44	5,781	5,748	1.00	1.02
UMBRIA	797	535	1.25	1.02	1,753	1,644	1.37	1.34
MARCHE	1,227	700	0.41	0.42	1,806	1,766	0.89	0.93
LAZIO	1,310	611	0.69	0.50	11,702	10,869	1.24	1.27
ABRUZZO	933	413	0.96	1.71	441	402	0.23	0.23
MOLISE	48	0	2.08	//	161	161	2.48	2.43
CAMPANIA	688	160	0.29	0.64	1,295	446	0.54	0.68
APULIA	342	0	0.29	//	1,588	1,337	0.82	0.64
CALABRIA	120	0	0.00	//	445	270	0.45	0.34
SICILY	585	253	0.68	1.46	1,456	704	0.34	0.26
SARDINIA	372	0	1.07	//	3,650	3,554	1.76	1.31
TOTALS	19,984	10,847	0.93	0.95	54,962	50,241	1.04	1.03
% of national total	26.56	14.41			73.03	66.76		

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The private sector accounts for over 73% of the total national cases treated, rising to 80% in Lombardy.

For 5 regions, no public sector “ADJ” data is available. In the remaining regions, the regional averages in the two sectors are very similar and have improved moderately since last year (falling from 1.24% to 1.03% in the private sector and from 1.09% to 0.95% in the public sector).

Outcome Indicator	Hip replacements: 30-day readmissions							
SDO: 2022								
Total cases at national level	87,162							
National average raw outcomes	3.55							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	4,518	4,383	4.18	4.04	3,569	3,512	2.10	2.56
VALLE D'AOSTA	115	115	3.48	2.23	118	118	3.39	4.31
LOMBARDY	5,963	5,829	4.08	3.57	12,201	12,046	2.33	2.83
AUTON. PROV. OF BOLZANO	773	732	5.69	5.77	309	256	3.24	4.55
AUTON. PROV. OF TRENTO	647	632	4.48	4.42	655	655	2.90	3.87
VENETO	4,250	4,171	4.40	3.87	3,400	3,400	1.71	2.15
FRIULI	1,214	1,214	4.94	4.14	870	870	1.32	1.26
LIGURIA	1,079	1,054	6.39	5.20	346	321	5.20	4.85
EMILIA R.	4,885	4,697	4.97	4.59	4,835	4,807	2.13	2.96
TUSCANY	4,072	3,905	4.64	4.20	2,582	2,552	1.97	2.61
UMBRIA	701	642	4.57	3.72	391	341	1.28	1.59
MARCHE	1,204	1,204	4.57	3.62	759	759	1.85	2.46
LAZIO	2,559	2,249	7.78	6.60	4,919	4,548	2.93	3.28
ABRUZZO	1,054	985	6.55	5.46	892	892	1.24	1.55
MOLISE	159	69	5.03	3.17	121	118	0.00	0.00
CAMPANIA	1,919	1,347	4.33	3.64	3,474	3,120	2.36	2.78
APULIA	1,969	1,925	6.20	5.02	2,090	2,090	3.25	3.89
CALABRIA	934	726	4.28	3.49	694	633	1.73	1.86
SICILY	2,295	1,556	4.36	4.24	2,715	2,532	2.84	3.08
SARDINIA	693	531	5.34	3.44	833	758	2.88	3.39
TOTALS	41,003	37,966	4.86	4.30	45,773	44,328	2.33	2.81
% of national total	47.04	43.56			52.51	50.86		

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Compared to knee replacements, the percentage of cases treated by the private sector is lower, though still significant; in Lombardy, it accounts for 67% of the region's total.

The percentage of cases treated by the private sector fell in 20 regions from 56.4% last year to 52.5% of the national total, while remaining stable in the public sector.

The average outcome is better in the private sector in all regions except Valle d'Aosta.

Outcome Indicator	Hip replacements: revision surgery at 2 years							
SDO: 2020								
Total cases at national level	72,704							
National average raw outcomes	1.92							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	3,751	3,592	2.48	2.53	2,660	2,616	1.96	1.95
VALLE D'AOSTA	95	95	2.11	2.18	66	66	0.00	0.00
LOMBARDY	4,967	4,499	1.87	1.91	8,287	8,096	2.04	2.02
AUTON. PROV. OF BOLZANO	654	618	3.36	3.27	112	51	0.00	0.00
AUTON. PROV. OF TRENTO	496	447	2.01	1.82	350	350	0.57	0.57
VENETO	4,291	4,163	1.21	1.25	3,065	3,036	1.47	1.44
FRIULI V.G.	1,305	1,305	1.46	1.43	655	655	1.68	1.70
LIGURIA	1,106	1,035	1.90	1.78	253	180	1.98	1.71
EMILIA R.	4,496	4,272	2.25	2.25	3,423	3,301	1.98	2.03
TUSCANY	3,795	3,626	1.98	1.99	2,444	2,377	2.00	2.00
UMBRIA	737	657	2.17	2.51	381	312	2.10	1.92
MARCHE	1,159	1,058	1.30	1.42	611	545	1.96	1.80
LAZIO	2,357	2,044	4.07	3.85	3,916	3,473	1.66	1.56
ABRUZZO	942	837	1.91	1.80	735	713	2.04	1.91
MOLISE	144	56	2.08	0.00	85	80	0.00	0.00
CAMPANIA	1,826	1,174	1.97	1.69	2,732	2,288	2.89	2.55
APULIA	1,686	1,454	1.66	1.84	1,809	1,781	1.44	1.44
CALABRIA	543	490	1.66	1.55	761	628	1.84	1.66
SICILY	2,184	1,566	1.83	2.13	2,095	1,759	2.00	1.69
SARDINIA	789	613	0.89	1.15	494	346	2.63	3.18
TOTALS	37,323	33,601	2.02	2.03	34,934	32,653	1.93	1.86
% of national total	51.34	46.22			48.05	44.91		

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In contrast to the findings for knee replacements, the average national outcome for 2-year hip replacement revision surgery is better in the private sector due to deterioration in the public sector, where the outcome changed from 1.0% to 2.03%.

Eleven out of 20 regions achieved better average outcomes in the private sector than in the public sector, compared to 4 in the previous year.

The regional averages are distributed around the values of the national averages, without significant dispersion.

Outcome Indicator	Shoulder prostheses: 30-day readmissions							
SDO: 2021-2022								
Total cases at national level	19,732							
National average raw outcome	1.73							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	690	452	2.30	2.34	1,240	1,187	0.57	0.59
LOMBARDY	1,244	733	2.49	2.93	1,614	1,349	1.92	1.98
VENETO	1,014	799	0.69	2.34	1,144	1,142	0.61	0.66
FRIULI V. G.	209	129	3.25	3.88	60	30	1.66	3.01
EMILIA R.	935	673	2.03	2.02	1,229	1,158	1.46	1.49
TUSCANY	569	391	1.58	1.50	1,029	991	1.17	1.24
UMBRIA	112	71	6.25	7.31	311	306	0.96	1.14
MARCHE	188	55	1.06	3.89	303	288	1.98	2.26
LAZIO	544	363	2.94	2.96	1,764	1,530	1.70	1.92
ABRUZZO	184	64	5.06	6.61	323	323	1.24	1.33
CAMPANIA	311	159	1.60	2.70	1,564	1,418	0.58	0.61
APULIA	365	137	3.56	4.84	587	525	1.19	1.08
CALABRIA	116	56	4.31	2.77	214	154	0.47	0.68
SICILY	472	254	2.97	2.28	809	618	1.48	1.16
SARDINIA	101	40	1.98	0	92	61	0.00	0.00
TOTALS	7,054	4,376	2.30	2.66	12,283	11,080	1.20	1.24
% of national total	35.75	22.18			62.25	56.15		

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The number of shoulder prosthesis cases treated by private hospitals is also substantial, at over 62%, which is slightly higher than last year (61%).

The outcome is better in the private sector in all regions, except Sardinia, where the outcome is 0, given the small number of cases in both sectors.

The national average for the private sector is over 1 point higher than that for the public sector.

Outcome Indicator	Femoral neck fracture: 30-day mortality							
SDO: 2022								
Total cases at national level	72,062							
National average raw outcomes	6.26							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	5,654	5,640	6.00	6.12	126	95	0.79	1.00
LOMBARDY	7,789	7,641	5.16	5.42	2,780	2,725	5.25	5.77
VENETO	4,993	4,892	5.65	5.71	407	395	3.93	3.90
LIGURIA	1,926	1,891	6.85	6.66	497	453	5.43	3.97
LAZIO	4,657	4,600	7.75	7.48	1,917	1,651	7.15	7.62
CAMPANIA	4,610	4,535	8.57	8.80	1,208	897	5.80	7.23
APULIA	3,548	3,508	7.64	7.38	809	744	7.54	8.58
CALABRIA	1,838	1,829	8.18	8.15	306	229	5.56	5.67
SICILY	4,243	4,053	7.40	7.46	1,548	1,380	5.69	6.80
TOTALS	39,258	38,589	6.74	6.78	9,598	8,569	5.86	6.45
% of national total	54.48	53.55			13.32	11.89		

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The percentage of cases treated by private hospitals is significantly lower than the other indicators in the musculoskeletal area; the number and percentage are also slightly down on last year. The 9 regions with available private sector “ADJ” outcomes treated just over 13% of the total national cases.

Outcomes are better in the private sector in 6 out of 9 regions. Nationally, the average is better in the private sector and has improved since last year (falling from 7.06% to 6.45%).

At a national level, the values recorded in the two sectors are very similar.

Outcome Indicator	Femoral neck fracture: surgery within 48 h of access							
SDO: 2022								
Total cases at national level	79,575							
National average raw outcomes	50.16							

TABLE 27

REGIONS	Ospedali di diritto pubblico				Ospedali di diritto privato			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	6,267	6,250	57.12	57.16	144	111	72.22	73.52
LOMBARDY	8,598	8,529	50.20	49.57	3,128	3,073	60.86	61.76
VENETO	5,522	5,410	63.64	63.54	455	439	55.16	54.78
LIGURIA	2,212	2,072	28.60	28.64	550	504	28.91	29.83
LAZIO	5,397	5,332	58.12	58.59	1,827	1,528	62.40	64.47
CAMPANIA	5,062	4,980	39.99	40.44	1,339	998	48.10	39.02
APULIA	3,963	3,914	54.50	57.13	891	816	49.16	47.11
CALABRIA	2,009	2,020	37.02	25.89	329	248	54.71	56.76
SICILY	4,678	4,472	48.68	50.10	1,738	1,539	63.12	61.86
TOTALS	43,708	42,979	51.21	51.11	10,401	9,256	56.89	56.42
% of national total	54.93	54.01			13.07	11.63		

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In 6 out of 9 regions, the outcome is better in private hospitals.

In both sectors, the national averages improved, but while the public sector average improved by more than 3 percentage points, the private sector average improved only by a few decimal points.

In the private sector, the values for three regions (Liguria, Campania and Apulia) differ significantly from the average, as do those for three regions in the public sector (Liguria, Campania and Calabria).

The deviation in favour of the private sector between the averages of the two sectors remains significant, at both the national level and in some regions (e.g. Piedmont, Lombardy and Calabria).

Outcome Indicator	Femoral neck fracture >65: surgery within 2 days							
SDO: 2021								
Total cases at national level	79,122							
National average raw outcomes	65.55							
TABLE 28								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	6,267	6,250	77.84	72.92	144	111	85.42	88.91
LOMBARDY	8,598	8,529	62.60	61.84	3,128	3,073	73.24	76.54
VENETO	5,522	5,410	78.30	78.27	455	439	74.29	74.51
LIGURIA	2,112	2,072	42.95	43.34	550	504	43.27	46.30
LAZIO	5,397	5,332	69.95	70.49	1,827	1,528	77.50	79.75
CAMPANIA	5,062	4,980	58.83	59.76	1,339	998	60.72	52.59
APULIA	3,963	3,914	72.92	73.38	891	816	60.94	58.59
CALABRIA	2,029	2,018	35.60	36.06	329	248	67.48	71.02
SICILY	4,678	4,472	69.69	71.06	1,738	1,539	73.59	72.70
TOTALS	43,628	42,977	66.74	66.26	10,401	9,256	69.83	70.52
% of national total	55.14	54.32			13.15	11.70		

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The results differ from those of the previous indicator. At a national level, the private sector average remains better, but has worsened by more than 2 points compared to the previous year, while the public sector average has improved by more than 2 points.

Nevertheless, the private sector's results remain better in 6 out of 9 regions.

Outcome Indicator	Fracture of tibia and fibula: waiting times for surgery (days)					
SDO: 2022						
Total cases at national level	11,811					
National Median	4					
REGIONS	Public hospitals			Private hospitals		
	number of total cases	number of ADJ cases	day median	number of ADJ cases	number of ADJ cases	day median
LOMBARDY	1,397	672	4	498	254	3
VENETO	857	510	5	98	33	1
LIGURIA	318	217	3	73	35	5
LAZIO	797	493	5	386	173	3
APULIA	594	360	5	95	40	4
SICILY	869	324	5	212	82	4
TOTALS	4,832	2,576	5	1,362	617	3

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As can be seen, private sector “ADJ” data is only available for 6 regions.

The treated cases are very dispersed across both the public and the private sectors.

The average for the public sector deteriorated from 4 to 5, while the private sector average was stable.

8.5. Oncology clinical area

Outcome Indicator	Surgery for MT of the brain: 30-day mortality from craniotomy surgery							
SDO: 2020-2022								
Total cases at national level	30,485							
National average raw outcomes	3.11							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	4,828	4,738	2.28	2.82	2,222	2,177	1.66	2.23
EMILIA R.	2,594	2,559	1.97	2.10	165	231	0.37	0.85
TUSCANY	1,957	1,938	3.48	3.36	86	68	1.16	2.60
LAZIO	1,947	1,944	3.68	3.68	1,446	1,313	2.09	1.98
MOLISE	0	0	//	//	746	746	2.68	4.06
APULIA	955	1,110	5.82	3.89	487	451	4.11	3.54
SICILY	1,435	1,360	4.81	4.32	225	223	3.11	4.15
TOTALS	13,716	13,649	2.87	3.10	5,377	5,209	2.20	2.76
% of total cases	44.99	44.77			17.64	17.09		

AGENAS PNE data - 2023 edition processed by Innogea

The best outcomes are found in the private sector across all regions. In the public sector, there were no cases in Molise.

Compared to last year, average outcomes improved in the private sector in Lombardy and worsened slightly in the public sector.

It should be noted that private hospitals in Lombardy treated over 41% of all cases nationally and 31% of cases within the region.

Outcome Indicator	Surgery for MT of the colon: 30-day mortality							
SDO: 2021-2022								
Total cases at national level	44,991							
National average raw outcomes	4.14							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	3,304	3,009	5.21	4.66	476	360	1.47	2.29
LOMBARDY	5,076	4,392	3.23	3.34	2,523	1,989	1.90	2.44
VENETO	3,363	3,197	3.12	3.79	452	347	1.77	3.35
FRIULI V.G.	900	804	3.00	2.72	66	51	0.00	0.00
LIGURIA	1,057	1,035	5.11	4.53	206	200	4.86	3.66
MARCHE	1,234	1,122	3.00	3.43	135	51	5.18	6.24
LAZIO	2,371	2,077	5.36	4.51	2,224	1,951	2.70	2.98
ABRUZZO	685	571	5.69	4.12	323	270	2.17	3.79
MOLISE	101	0	12.87	//	116	110	4.31	7.43
CAMPANIA	2,568	1,900	6.00	5.43	921	547	5.86	5.06
APULIA	2,141	1,768	4.67	3.57	1,019	856	3.53	4.48
CALABRIA	755	603	6.36	4.68	220	57	6.37	10.23
SICILY	2,309	1,715	6.02	4.99	890	704	2.69	4.62
TOTALS	25,864	22,193	4.59	4.15	9,571	7,493	2.94	3.41
% of national total	57.49	49.33			21.27	16.65		

AGENAS PNE data - 2023 edition processed by Innogea

In 9 of the 12 regions with “ADJ” outcomes, the private sector has better outcomes than the public sector. It is not possible to make a comparison for one region (Molise) due to a lack of public sector “ADJ” data.

Last year, 10 regions reached the threshold set by Agenas for calculating the “ADJ” outcome. This year, this figure increased to 13 regions, with a slight improvement in average outcomes.

The percentage of cases treated by the private sector in these 13 regions slightly exceeds 21% of the national total.

The national averages differ by less than 1 percentage point.

Outcome Indicator	Surgery for MT of the liver: 30-day mortality							
SDO: 2020-2022								
Total cases at national level	11,756							
National average raw outcomes	2.21							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	696	473	1.87	2.58	124	93	0.00	0.00
LOMBARDY	1,646	1,205	1.82	2.15	970	819	0.93	1.37
LAZIO	712	553	2.25	2.02	569	403	1.93	0.00
APULIA	424	331	3.36	3.10	347	292	2.59	2.22
SICILY	275	72	6.91	8.75	357	266	1.40	1.85
TOTALS	3,753	2,634	2.64	2.50	2,367	1,873	1.69	1.20
% of national total	31.92	22.41			20.13	15.93		

AGENAS PNE data - 2023 edition processed by Innogea

Only 5 regions have private hospitals that have treated at least 50 cases over a three-year period (compared to 6 last year) and the clinical outcome is better for all of them than for the public sector.

The public sector figure for Sicily is highlighted in yellow because it significantly deviates from all the averages; the 72 “ADJ” cases to which the outcome relates involve only one hospital.

The average national outcome is stable in the private sector, whereas it has worsened slightly in the public sector.

Lombardy treated over 48% of cases nationally in the private sector and 40% within the region (public + private combined).

The national averages differ by more than 1 percentage point.

Outcome Indicator	Surgery for MT of the pancreas: 30-day mortality							
SDO: 2020-2022								
Total cases at national level	7,033							
National average raw outcomes	5.42							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	709	250	4.09	2.18	728	608	1.93	1.36
VENETO	1,071	871	1.40	1.50	273	248	3.29	4.79
LAZIO	299	110	10.37	6.86	414	342	4.59	4.08
APULIA	192	104	10.94	7.76	150	121	6.00	4.91
SICILY	191	74	15.71	20.44	127	66	4.73	1.80
TOTALS	2,462	1,409	5.11	3.50	1,692	1,385	3.37	2.98
% of national total	35.01	20.03			24.06	19.69		

TABLE 33

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Only in 5 regions did private hospitals treat a number of cases above the threshold of 50 cases required to calculate the “ADJ” outcome. In 4 regions, the average outcome is better in the private sector.

As with the other indicators, the value for the public sector in Sicily is highly dispersed: the 74 ADJ cases are related to a single hospital that recorded an outcome of 18.92% at the raw data level. This has a significant impact on the regional average.

In the private sector, Lombardy treats 43% of the national total and 51% of the regional total (public + private combined).

Outcome Indicator	Surgery for MT of the lung: 30-day mortality							
SDO: 2020-2022								
Total cases at national level	26,737							
National average raw outcomes	0.95							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	1,360	1,360	1.25	1.14	181	178	0.55	0.96
LOMBARDY	3,260	3,109	0.58	0.69	2,870	2,770	0.80	0.93
VENETO	1,667	1,567	0.30	0.38	349	349	0.57	0.52
LAZIO	2,909	2,902	1.37	1.59	1,352	1,260	1.03	0.83
ABRUZZO	432	432	0.93	0.66	163	163	0.00	0.00
CAMPANIA	1,418	1,375	0.71	0.76	212	179	0.94	0.62
APULIA	1,153	1,153	1.56	1.39	404	361	3.22	2.68
SICILY	909	676	1.54	1.29	604	526	0.99	1.23
TOTALS	13,108	12,574	1.08	1.13	6,135	5,786	1.02	1.01
% of national total	49.03	47.03			22.95	21.64		

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In 5 out of 8 regions, the average outcome is better in the private sector.

The 8 regions in the private sector handled an appreciable percentage of the total number of cases nationwide.

Lombardy's private sector treated over 48% of the national total and 47% of the regional total (public + private combined).

Outcome Indicator	Surgery for MT of the prostate: 30-day readmissions (with new variables)							
SDO: 2022								
Total cases at national level	17,863							
National average raw outcomes	3.68							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	1,306	875	4.59	4.52	387	226	1.71	1.29
LOMBARDY	1,458	974	4.80	5.65	2,040	1,685	3.28	3.41
VENETO	1,610	1,226	3.85	4.23	914	865	4.38	4.34
FRIULI V.G.	261	195	3.06	3.67	77	72	1.30	1.43
LIGURIA	264	113	6.06	7.75	88	61	6.82	7.84
EMILIA R.	1,082	740	4.35	4.36	172	90	4.07	2.27
MARCHE	440	282	2.27	2.94	109	102	3.67	4.00
LAZIO	790	622	2.61	3.03	1,135	710	3.26	3.18
ABRUZZO	302	302	0.66	0.85	84	56	1.19	0.00
APULIA	654	471	2.60	2.58	500	492	4.20	4.25
CALABRIA	142	86	1.41	1.24	108	90	13.89	13.31
SICILY	659	405	3.34	3.89	239	64	1.67	0.00
TOTALS	8,968	6,291	3.56	4.06	5,853	4,513	3.60	3.69
% of national total	50.20	35.22			32.77	25.26		

AGENAS PNE data - 2023 edition processed by Innogea

There are now 12 regions with private sector “ADJ” data, compared to 10 last year.

The average clinical outcome is better in the private sector in 6 regions and in the public sector in 6 regions. Although the result for Calabria is highlighted in yellow because it is widely dispersed in relation to all averages, the national average is better for the private sector. The 90 ADJ cases referring to Calabria were treated by only one hospital.

In Lombardy, the number of cases treated in the private sector remains at 35% of the national total. At regional level, this figure is 58% of the total (public + private).

Outcome Indicator	Surgery for MT of the kidney: 30-day mortality							
SDO: 2020-2022								
Total cases at national level	31,430							
National average raw outcomes	0.78							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	1,997	1,622	0.80	0.89	283	130	0.35	0.00
LOMBARDY	3,227	2,711	0.71	0.48	2,564	2,148	0.35	0.39
VENETO	2,830	2,669	0.18	0.18	851	841	0.71	0.96
LIGURIA	557	424	3.60	0.30	176	137	2.84	4.01
EMILIA R.	2,842	2,734	0.74	0.80	254	164	0.79	0.94
LAZIO	1,714	1,565	1.05	0.74	1,390	972	1.08	1.48
APULIA	916	816	0.66	0.67	808	703	1.48	1.74
SICILY	1,205	909	1.74	1.48	317	211	0.63	0.66
TOTALS	15,288	13,450	0.85	0.64	6,643	5,306	0.79	0.78
% of national total	48.64	42.79			21.14	16.88		

AGENAS PNE data - 2023 edition processed by Innogea

Of the 8 regions in which private hospitals have treated a number of cases falling within the “ADJ” outcome threshold of 50, only 3 have better outcomes than those in the public sector.

Consequently, the national average is better, albeit slightly, in the public sector.

Cases treated in the private sector in Lombardy account for 39% of the national total and 44% of the total across the public and private sectors at regional level.

Outcome Indicator	Surgery for MT of the rectum: 30-day mortality							
SDO: 2020-2022								
Total cases at national level	14,559							
National average raw outcomes	1.75							
TABLE 37								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	965	671	1.97	2.77	285	245	1.75	3.32
LOMBARDY	1,346	919	1.78	1.64	1,108	760	0.18	0.00
VENETO	957	761	1.36	2.15	153	87	1.96	3.06
MARCHE	344	216	1.16	0.62	45	26	0.00	0.00
LAZIO	699	600	2.72	1.51	1,003	883	1.20	1.25
ABRUZZO	175	63	4.00	3.39	146	121	1.37	1.44
MOLISE	15	0	0.00	//	51	44	0.00	0.00
CAMPANIA	943	774	2.23	1.89	249	100	4.42	3.00
APULIA	717	607	2.23	0.54	354	294	0.85	0.85
SICILY	558	350	3.58	2.93	438	365	1.83	1.57
SARDINIA	402	279	2.24	1.40	86	63	2.33	3.43
TOTALS	6,156	4,569	2.50	2.14	3,918	2,988	1.19	1.14
% of national total	42.28	31.38			26.91	20.52		

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Currently there are 11 regions with private sector “ADJ” outcomes, compared to 12 last year (Liguria is missing).

The percentage of cases treated by the private sector of the national total has remained stable at around 27% compared to last year. In Lombardy, private hospitals treated 45% of the region’s total cases (public + private combined) and 28% of the total cases treated in the private sector nationwide.

Better results were seen in the private sector in 6 regions and in the public sector in 5 regions.

Outcome Indicator	Surgery for MT of the stomach: 30-day mortality							
SDO: 2020-2022								
Total cases at national level	13,947							
National average raw outcomes	5.64							
TABLE 38								
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	842	319	4.51	3.00	127	65	2.36	0.00
LOMBARDY	1,763	795	5.39	3.80	1,094	593	3.93	2.87
LAZIO	756	398	7.27	5.05	765	492	4.44	4.90
APULIA	560	406	7.68	4.96	242	142	4.54	5.94
SICILY	464	188	11.21	16.23	274	128	5.83	11.86
TOTALS	4,385	2,106	6.48	5.25	2,502	1,420	4.22	4.56
% of national total	31.44	15.10			17.94	10.18		

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Fragmentation in the treatment of cases is also evident for this indicator. Only 5 regions have private hospitals that reach the required threshold of 50 cases to calculate the “ADJ” outcome, and the average outcome is better for 4 of these regions.

Another 11 regions had 77 private hospitals that treated a total of 667 cases. When these figures are added to those in the table, the percentage of cases treated by the private sector increases to 23% of the national total.

In Lombardy, 55% of cases outside the “ADJ” threshold are in the public sector, while 46% are in the private sector.

The data for Sicily is highlighted in yellow because it is widely dispersed in relation to all averages, in both sectors. In the public sector, the regional average is influenced by 2 out of 3 hospitals with outcomes of 24.39% and 15.14% respectively based on 74 and 51 cases respectively. In the private sector, the average is influenced by 1 out of 2 hospitals with an outcome of 18.55%, based on 72 cases.

Outcome Indicator	New resection surgeries within 120 days after conservative surgery for breast MT (with new variables)							
SDO: 2022								
Total cases at national level	38,704							
National average raw outcomes	5,06							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	2,275	2,239	4.97	5.26	741	669	6.48	5.21
LOMBARDY	5,084	4,966	5.80	6.37	3,688	3,660	3.66	3.43
VENETO	3,026	2,995	7.07	7.43	613	583	8.81	7.81
FRIULI V.G.	929	912	8.83	8.81	47	45	12.76	10.78
EMILIA R.	3,215	3,209	4.23	4.04	132	107	2.27	1.60
LAZIO	2,594	2,571	5.59	5.72	1,550	1,384	2.84	2.99
MOLISE	84	83	9.52	10.90	27	25	14.81	18.11
CAMPANIA	1,718	1,681	6.58	6.03	823	654	6.44	6.84
APULIA	1,222	1,203	3.68	3.31	710	706	4.79	4.70
SICILY	1,541	1,516	4.41	3.82	815	799	5.89	5.35
SARDINIA	595	589	11.26	9.75	225	223	0.89	0.89
TOTALS	22,283	21,964	5.78	5.84	9,371	8,855	4.39	4.22
% of national total	57.57	56.75			24.21	22.88		

AGENAS PNE data - 2023 edition processed by Innogea

Private sector “ADJ” data is available for 11 regions, compared to 12 last year (Liguria is missing). In 3 other regions, only a few cases have been treated overall.

In terms of results, 6 regions have better results in the public sector and 5 in the private sector.

In the private sector, data from Friuli Venezia Giulia and Molise are highlighted in yellow as they differ significantly from all averages, despite referring to a very limited number of cases.

The national averages have improved moderately compared to last year.

Outcome Indicator	New resection surgeries within 90 days of conservative surgery for breast MT (with new clinical variables)							
SDO: 2019-2020								
Total cases at national level	38,734							
National average raw outcomes	5.11							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	2,273	2,254	5.72	6.48	745	714	1.47	1.51
LOMBARDY	4,965	4,848	5.34	5.78	3,787	3,761	3.70	3.50
VENETO	3,030	3,003	6.24	6.39	622	595	9.32	8.35
FRIULI V.G.	906	889	7.27	7.62	54	49	9.26	8.21
EMILIA R.	3,199	3,193	3.63	3.43	117	98	2.56	1.78
LAZIO	2,624	2,600	5.10	5.20	1,554	1,373	2.58	2.69
MOLISE	84	83	9.52	10.61	32	29	21.88	27.91
CAMPANIA	1,659	1,627	5.49	5.07	887	702	6.09	6.30
APULIA	1,228	1,210	3.18	2.85	718	626	4.73	4.23
SICILY	1,558	1,537	3.59	3.14	810	798	5.30	4.86
SARDINIA	586	537	9.38	8.42	223	221	0.90	0.86
TOTALS	22,112	21,781	5.20	5.28	9,549	8,966	4.30	4.54
% of national total	57.09	56.23			24.65	23.15		

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There is little difference in outcome values between the 120-day and 90-day periods in terms of national and regional averages.
The data for Molise remains very scattered.

8.6. Perinatal clinical area

Outcome Indicator	Proportion of deliveries by primary caesarean section							
SDO: 2022								
Total cases at national level	328,577							
National average outcomes	23.06							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	47,726	47,726	18.91	17.64	10,987	10,987	21.20	20.46
VENETO	25,065	24,984	17.58	18.17	2,318	2,313	21.40	25.51
FRIULI	6,295	6,294	17.28	17.27	559	559	16.46	19.91
LIGURIA	5,720	5,719	22.66	23.76	1,225	1,225	22.12	20.21
LAZIO	13,125	13,121	25.48	26.43	16,733	16,549	29.77	28.27
CAMPANIA	15,855	15,495	30.89	31.11	17,318	17,315	30.03	40.28
APULIA	16,398	16,395	27.80	26.57	4,946	4,946	26.00	24.34
CALABRIA	9,650	9,647	25.04	28.77	872	872	32.23	39.66
SICILY	24,379	24,221	27.44	27.73	4,925	4,925	35.37	39.94
TOTALS	164,213	163,602	22.97	22.95	59,883	59,691	27.85	30.77
% of national total	49.98	49.79			18.22	18.17		

AGENAS PNE data - 2023 edition processed by Innogea

The trend of the public sector performing better than the private sector was confirmed; private sector performance worsened by almost 2 points compared to last year, falling from 28.90% to 30.77%.

Only 2 out of 9 regions show better results in the private sector.

Lombardy is no longer the region with the best private sector results. Its score has increased from 19.48% last year to 20.46% this year. Friuli Venezia Giulia now has the best result (19.91%), followed by Liguria (20.21%).

Two important regions are completely missing in the private sector: Emilia-Romagna and Tuscany, neither of which has any accredited obstetric facilities.

Southern regions (with the exception of Apulia) consistently have the highest caesarean section rates, creating a significant disparity between the public and private sectors at a national level.

Outcome Indicator	Caesarean sections: subsequent admissions during the puerperium							
SDO: 2021-2022								
Total cases at national level	358,101							
National average raw outcomes	0.82							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	39,444	39,247	1.18	1.16	8,015	8,015	0.81	0.82
VENETO	19,354	19,258	1.24	1.23	2,179	2,179	1.47	1.52
FRIULI	4,146	4,146	1.11	1.08	362	362	0.83	0.84
LIGURIA	6,495	6,470	1.39	1.39	606	606	1.32	1.27
LAZIO	16,157	16,003	0.72	0.70	22,495	22,429	0.80	0.79
CAMPANIA	25,072	25,025	0.46	0.48	35,440	35,440	0.31	0.32
APULIA	22,056	21,971	0.69	0.71	6,183	6,183	0.87	0.89
CALABRIA	11,559	11,557	0.61	0.64	1,239	1,239	0.32	0.34
SICILY	32,894	32,804	0.87	0.88	8,937	8,936	0.66	0.70
TOTALS	177,177	176,481	0.88	0.88	85,456	85,389	0.60	0.61
% of national total	49.48	49.28			23.86	23.84		

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In 6 out of 9 regions, the private sector performs better than the public sector.

The average outcomes are stable compared to last year in both sectors.

Outcome Indicator	Vaginal deliveries: subsequent admissions during puerperium							
SDO: 2021-2022								
Total cases at national level	471,996							
National average raw outcomes	0.50							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	72,230	72,228	0.73	0.73	16,520	16,519	0.65	0.66
VENETO	38,748	38,665	0.50	0.50	3,859	3,854	0.67	0.70
FRIULI	9,755	9,754	0.68	0.65	929	929	0.65	0.66
LIGURIA	8,330	8,329	0.87	0.90	1,647	1,647	0.60	0.60
LAZIO	17,582	17,579	0.41	0.40	22,939	22,862	0.42	0.41
CAMPANIA	19,014	19,011	0.17	0.18	19,974	19,877	0.29	0.31
APULIA	21,619	21,609	0.35	0.36	6,879	6,782	0.47	0.48
CALABRIA	12,329	12,325	0.22	0.25	1,043	1,043	0.19	0.24
SICILY	32,434	32,350	0.37	0.38	5,927	5,926	0.35	0.37
TOTALS	232,041	231,850	0.51	0.52	79,717	79,439	0.45	0.46
% of national total	49.16	49.12			16.89	16.83		

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Nine regions are included in this indicator in the private sector.

In 4 out of 9 regions, the private sector achieves better results than in the public sector, with national averages being similar.

Outcome Indicator	Vaginal deliveries in women with previous caesarean section							
SDO: 2022								
Total cases at national level	52,779							
National average raw outcomes	10.58				TABLE 44			
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	5,763	4,861	17.30	17.54	1,319	1,108	14.40	14.53
VENETO	2,911	2,299	23.08	24.72	271	197	26.67	17.00
LIGURIA	799	644	11.64	13.70	180	113	12.22	18.30
LAZIO	2,406	2,298	3.24	3.50	2,731	2,692	8.82	8.95
CAMPANIA	4,173	3,882	2.38	2.60	5,668	5,669	2.66	2.67
APULIA	3,190	3,005	2.70	2.79	832	832	2.76	2.85
CALABRIA	2,269	2,269	2.95	3.03	209	209	0.00	0.00
SICILY	5,051	4,542	3.60	3.58	1,314	1,314	2.16	2.17
TOTALS	26,562	23,800	8.56	8.43	12,524	12,134	5.80	5.44
% of national total	50.33	45.09			23.73	22.99		

AGENAS PNE data - 2023 edition processed by Innogea

For this indicator, the overall performance of the private sector compared to the public sector is similar to the percentage of caesarean sections. However, some regions present appreciable data in line with those of the public sector in the same regions.

The average for this indicator is also negatively affected by the southern regions.

Outcome Indicator	Vaginal deliveries: proportion of episiotomies							
SDO: 2022								
Total cases at national level	240,061							
National average raw outcomes	11.42							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
LOMBARDY	36,676	36,676	11.65	11.74	7,998	7,996	12.12	12.50
VENETO	19,534	19,476	6.00	6.15	1,727	1,727	2.37	2.40
FRIULI	4,831	4,830	8.30	4.16	442	442	11.31	11.66
LIGURIA	4,102	4,101	4.07	5.06	882	882	6.46	6.58
LAZIO	9,353	9,351	14.05	14.12	10,591	10,494	11.57	11.80
CAMPANIA	10,997	10,847	15.73	15.33	9,813	9,810	30.83	31.12
APULIA	11,462	11,457	17.80	17.66	3,555	3,555	14.49	15.02
CALABRIA	6,883	6,880	20.35	20.27	582	582	20.45	21.39
SICILY	17,006	16,978	25.20	24.33	2,852	2,852	23.00	22.64
TOTALS	120,844	120,596	13.89	13.64	38,442	38,340	17.32	17.59
% of national total	50.34	50.24			16.01	15.97		

AGENAS PNE data - 2023 edition processed by Innogea

This indicator was first included in the 2021 edition of the PNE and has steadily improved since then. In the public sector, the figure changed from 16.07% in 2020 to 14.48% in 2021 and 13.64% in 2022. In the private sector, it changed from 20.86% in 2020 to 18.80% in 2021 and 17.59% in 2022.

At a national level, the gap between the public and private sectors remains at around 4 percentage points in favour of the public sector.

8.7. Respiratory clinical area

Outcome Indicator	COPD relapse: 30-day mortality							
SDO: 2022								
Total cases at national level	47,808							
National average outcomes	11.61							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	3,292	2,836	13.43	13.97	151	87	6.63	9.08
LOMBARDY	5,588	4,708	8.93	9.39	2,417	1,754	5.42	4.69
VENETO	2,628	2,101	10.46	10.02	260	122	9.62	10.68
LIGURIA	1,446	1,368	13.07	12.04	217	170	11.98	10.62
EMILIA R.	5,377	5,023	10.62	9.23	604	370	9.27	6.00
TUSCANY	3,975	3,436	11.17	9.94	111	68	7.21	0.85
LAZIO	1,797	1,095	14.25	13.08	1,425	865	9.47	8.85
ABRUZZO	1,060	857	14.72	13.73	136	69	2.94	1.36
CAMPANIA	2,564	1,784	21.18	26.59	960	503	5.73	6.94
APULIA	2,844	2,588	17.37	16.96	1,312	1,052	4.27	4.78
CALABRIA	910	562	12.86	12.37	149	149	2.01	2.30
SICILY	1,841	863	16.95	18.21	603	388	3.98	5.45
TOTALS	33,322	27,221	14.31	14.02	8,345	5,597	6.50	6.01
% of national total	69.70	56.94			17.46	11.71		

AGENAS PNE data - 2023 edition processed by Innogea

As in previous years, the averages for the two sectors differ significantly in all regions. To correctly assess the trend of this indicator, audits on the correct classification of cases would be necessary in all regions.

Outcome Indicator	COPD relapse: 30-day readmissions							
SDO: 2022								
Total cases at national level	43,860							
National average outcomes	12.72							
REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	2,948	2,447	11.16	11.16	144	82	11.11	10.30
LOMBARDY	5,257	4,358	11.49	11.89	2,295	1,558	9.02	7.85
VENETO	2,410	1,878	13.32	13.70	241	111	16.18	12.65
LIGURIA	1,295	1,224	16.06	15.45	200	155	11.00	10.45
EMILIA R.	4,962	4,648	16.06	15.36	594	356	13.13	12.96
TUSCANY	3,612	3,154	14.31	13.06	108	68	17.60	16.41
LAZIO	1,542	909	12.58	11.04	1,407	892	14.64	15.27
ABRUZZO	945	667	14.50	13.38	134	69	7.46	9.85
CAMPANIA	2,187	1,480	12.71	12.92	919	496	7.62	10.90
APULIA	2,506	2,196	11.85	11.63	1,248	1,049	8.82	9.27
CALABRIA	824	505	13.11	13.41	148	148	5.41	5.76
SICILY	1,634	731	12.73	13.75	592	379	15.02	18.32
TOTALS	30,122	24,197	14.72	14.59	8,030	5,363	11.08	11.18
% of national total	68.68	55.17			18.31	12.23		

AGENAS PNE data - 2023 edition processed by Innogea

Unlike the previous indicator, the gap between the public and private sectors is smaller.

The considerations set out for the previous indicator also apply here.

8.8. Urogenital clinical area

Outcome Indicator	Chronic renal failure: 30-day mortality							
SDO: 2022								
Total cases at national level	105,044							
National average raw outcomes	13.04							

TABLE 48

REGIONS	Public hospitals				Private hospitals			
	number of cases		clinical outcome		number of cases		clinical outcome	
	totals	adj	raw	adj	totals	adj	raw	adj
PIEDMONT	5,859	5,473	13.07	12.57	985	710	8.22	7.86
LOMBARDY	8,033	7,110	10.10	9.58	2,896	2,225	9.01	8.18
AUTON. PROV. OF BOLZANO	606	430	9.15	10.14	96	63	9.38	8.10
VENETO	5,004	4,764	12.93	11.29	700	593	12.28	11.84
FRIULI V.G.	1,805	1,731	11.47	10.78	134	75	8.95	12.81
LIGURIA	2,923	2,907	12.90	12.37	403	390	11.66	11.15
EMILIA R.	11,085	10,875	12.89	11.45	959	629	18.25	15.82
MARCHE	3,289	3,202	16.36	14.57	278	195	15.11	13.24
LAZIO	5,479	5,263	13.96	14.70	3,571	2,928	13.05	12.77
ABRUZZO	2,129	2,017	17.99	19.50	142	80	4.93	2.49
MOLISE	612	609	20.42	22.75	336	335	5.06	5.49
CAMPANIA	6,385	6,052	13.69	16.75	2,709	2,305	8.12	8.07
APULIA	6,706	6,499	15.61	16.05	3,380	3,145	9.73	11.50
CALABRIA	3,473	3,360	14.69	16.23	167	115	10.18	10.24
SICILY	7,125	6,734	13.08	15.04	2,662	2,332	7.06	7.87
SARDINIA	2,318	2,071	17.08	15.26	156	101	9.61	9.65
TOTALS	72,831	69,097	13.56	13.67	19,574	16,221	10.07	10.10
% of national total	69.33	65.78			18.63	15.44		

AGENAS PNE data - 2023 edition processed by Innogea

In the private sector, 16 regions have “ADJ” outcomes; of these, 13 have better regional outcome averages than the public sector.

The national averages improved over the previous year in both sectors: from 14.78% to 13.67% in the public sector and from 11.42% to 10.10% in the private sector.

9. *Variability of clinical outcomes in the Regions*

As mentioned in the introduction, the overall picture is positive, with an increase in hospital admissions and improved clinical outcomes compared to 2020. However, critical issues remain, such as fragmentation of the number of cases treated and the often significant variability in clinical outcome values between regions and between public and private hospitals within them.

The wide variability of outcomes does not seem to have diminished in 2022, despite the fact that, in recent years, there have been multiple occasions (and multiple parties) calling for the need to put more effort into the definition and implementation of diagnostic and therapeutic care pathways (consistent with the recommendations and the context of reference).

An in-depth reflection on the data in this report should encourage the development of actions to raise awareness among decision-makers and providers, with the aim of implementing these vital clinical governance tools as widely and as quickly as possible.

To facilitate appropriate evaluation, the study group prepared box plots for each analysed indicator (excluding waiting times for tibial and fibular fracture surgery), showing comparisons between public and private hospitals.

To interpret these graphs correctly, it should be remembered that:

- the box represents the outcomes of hospitals in the 2nd and 3rd quartiles;
- the lower and upper parts of the box show the 1st and 4th quartiles;
- the line across the box of each region represents the median of the data;
- the lines extending from the bottom and top of the box (called “whiskers”) represent the variation of the data extended up to 1.5 times;
- the isolated points (called “outliers”) represent data that fall outside this range.

9.1. Cardiovascular clinical area

Chart no. 1

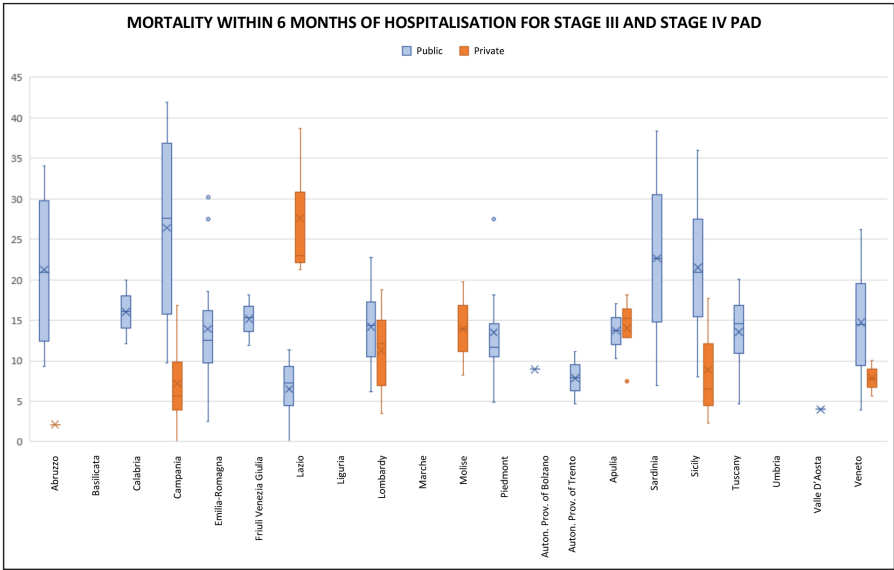


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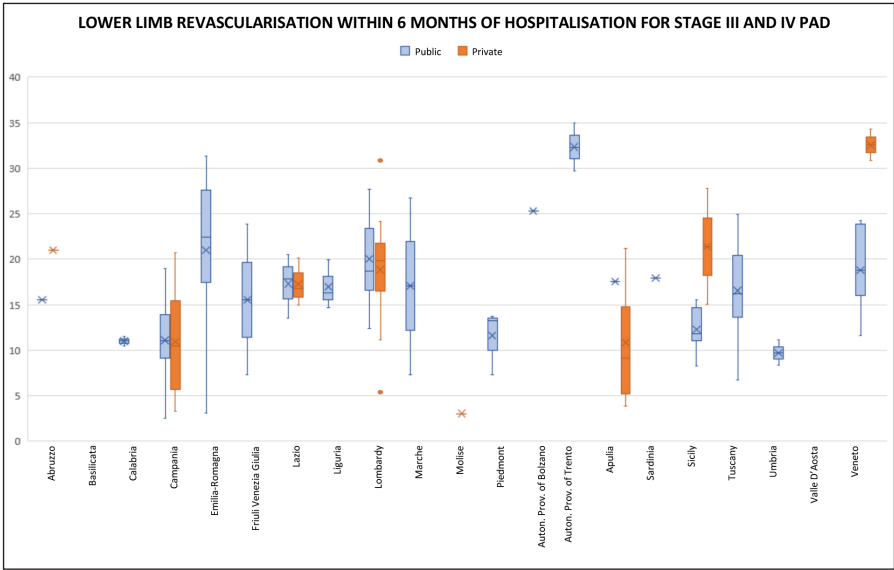


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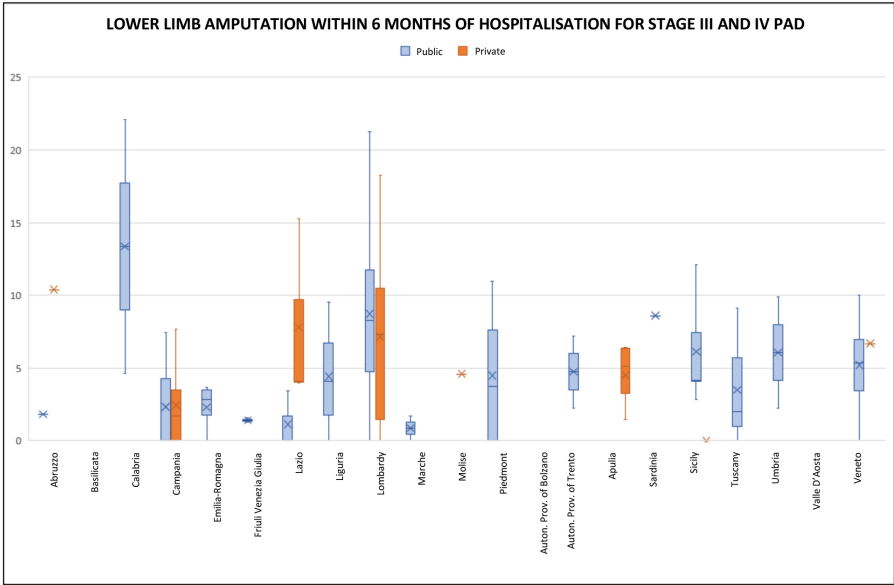


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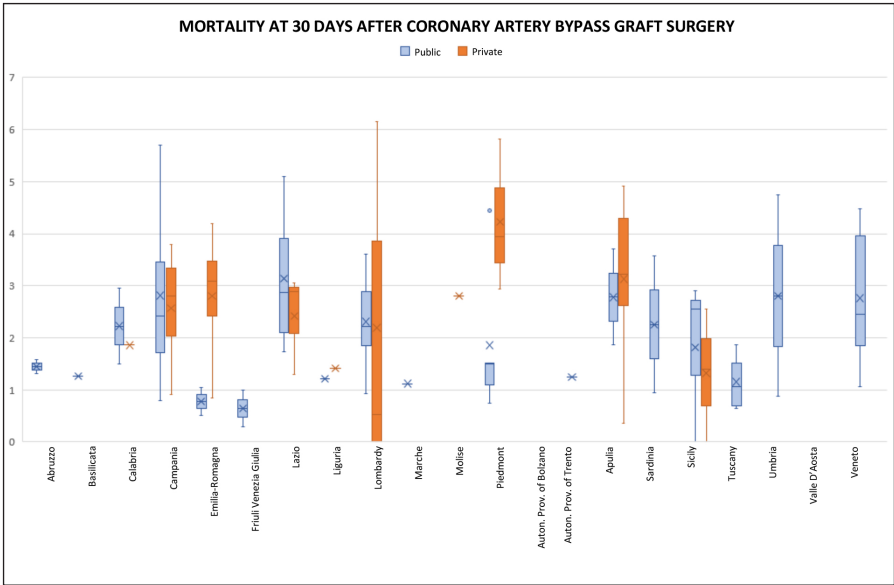


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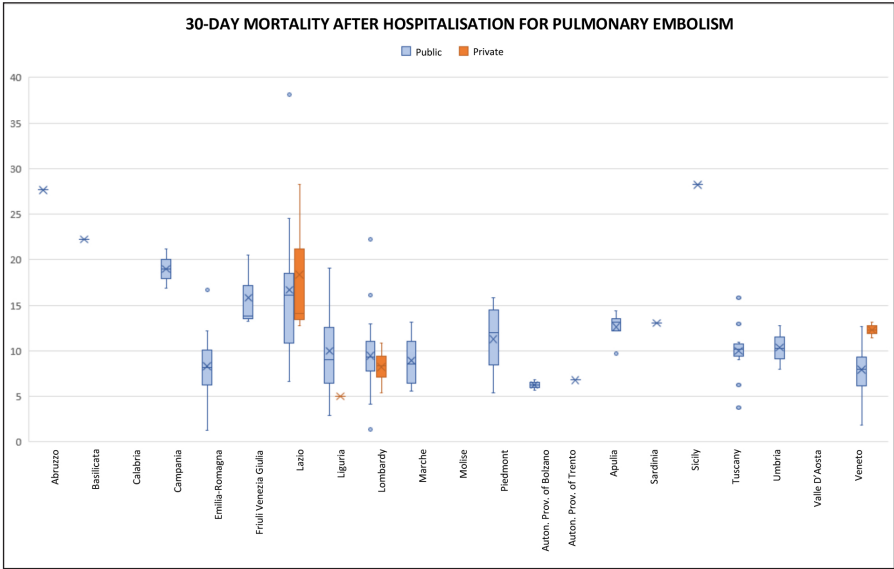


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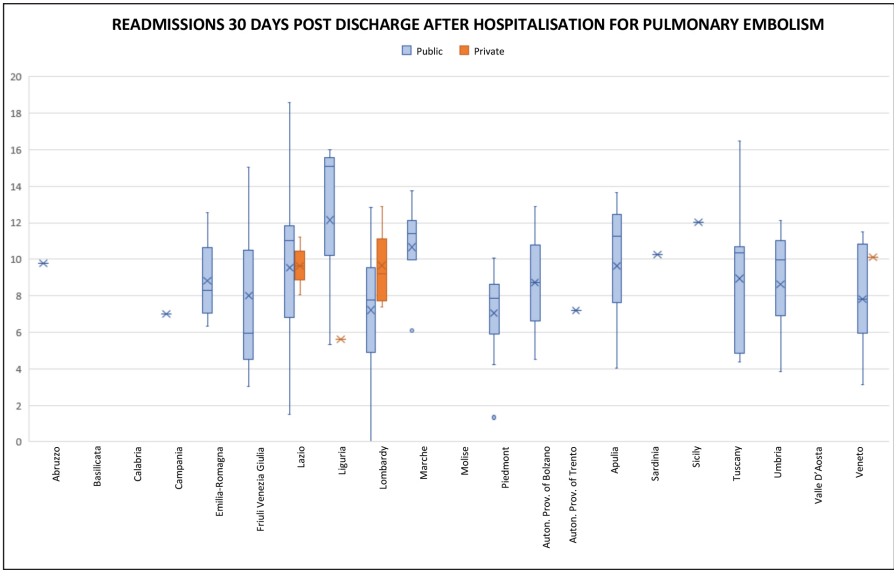


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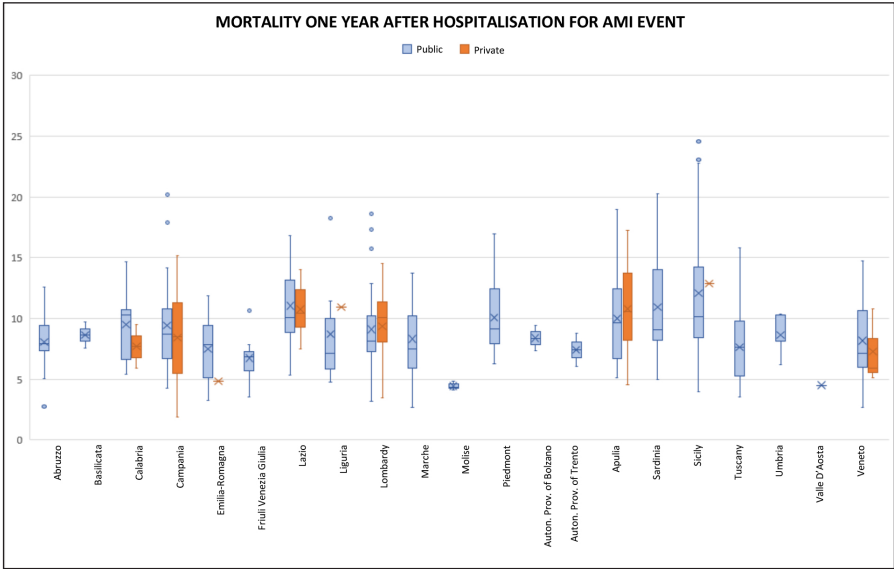


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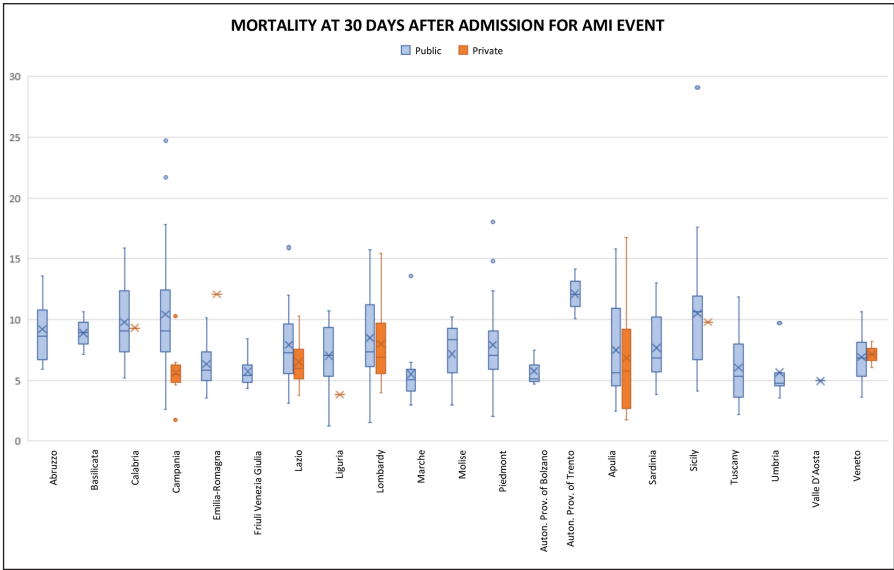


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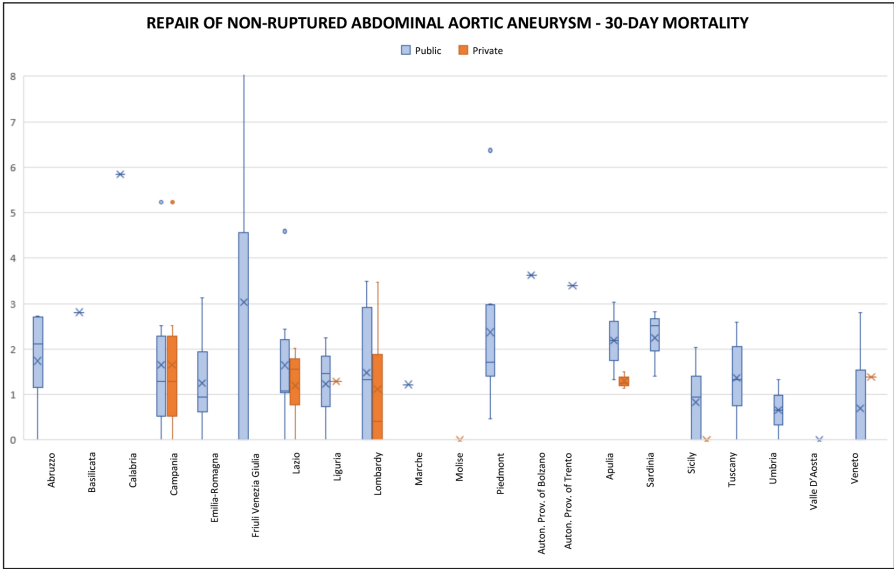


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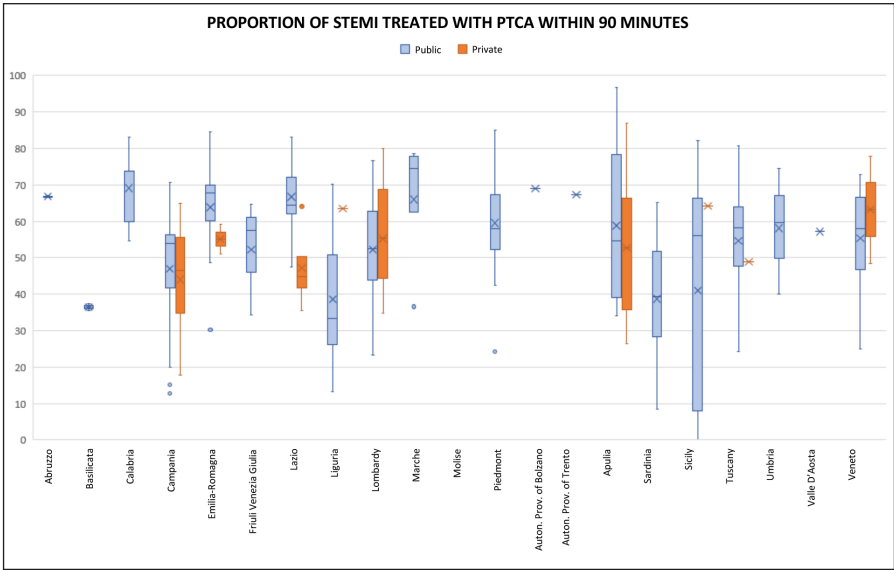


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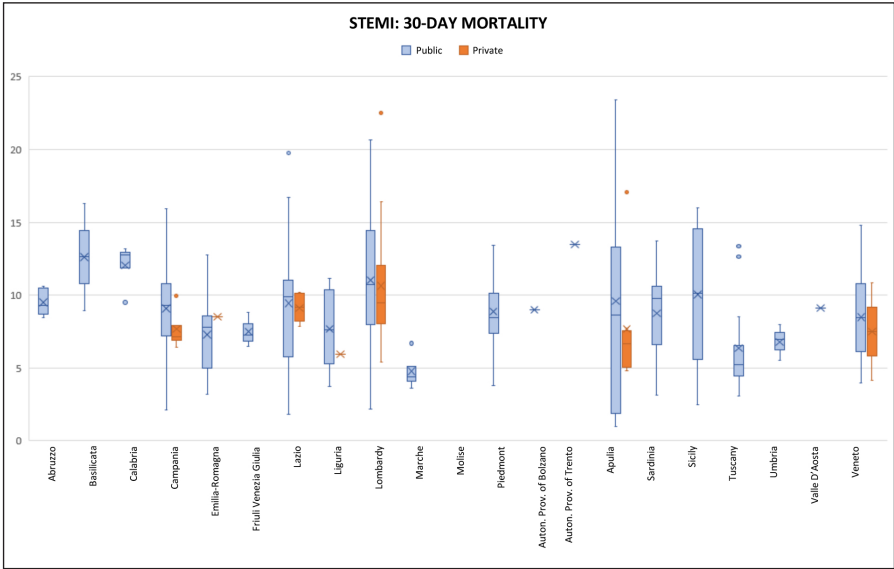


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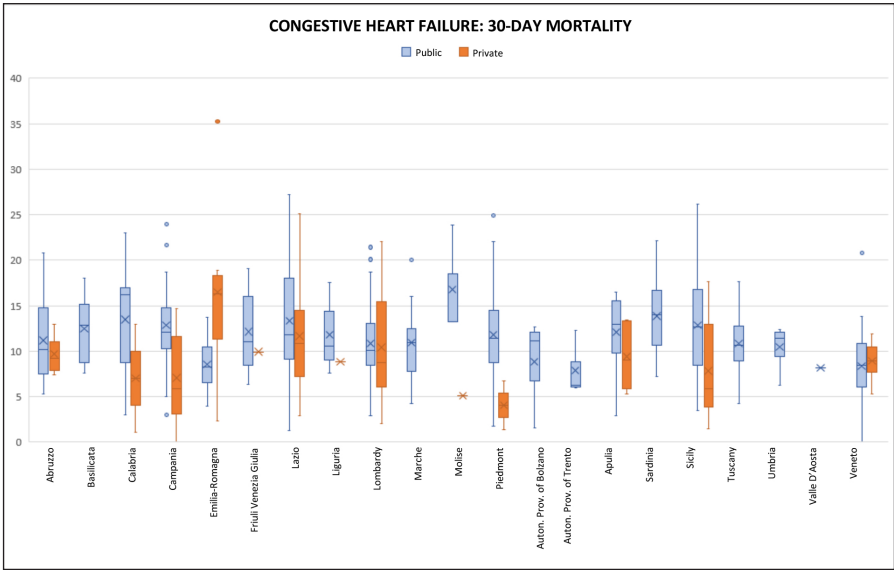


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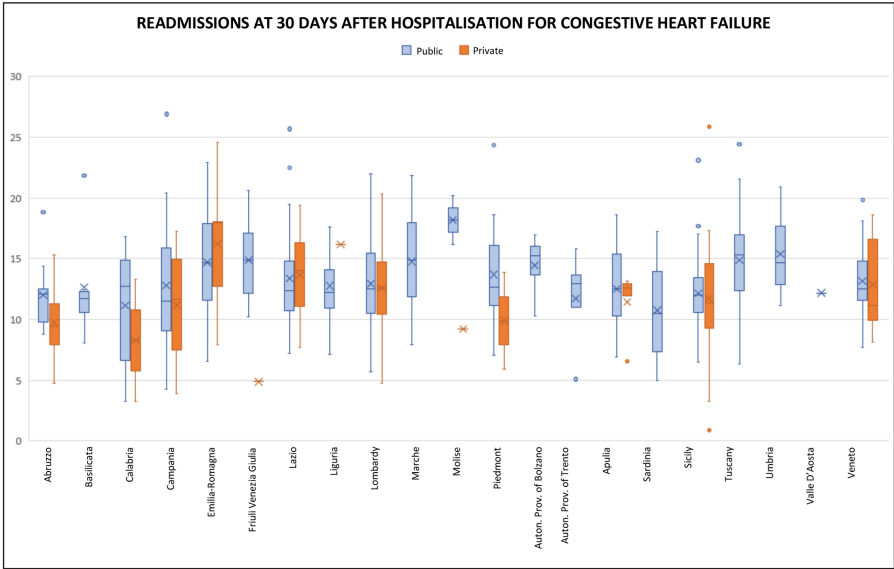
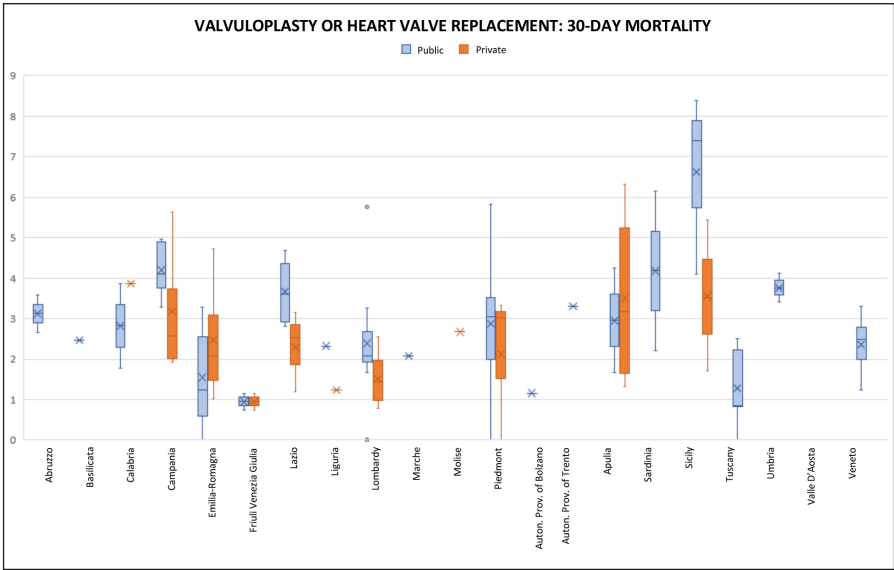


Chart no. 14



9.2. Cerebrovascular clinical area

Chart no. 15

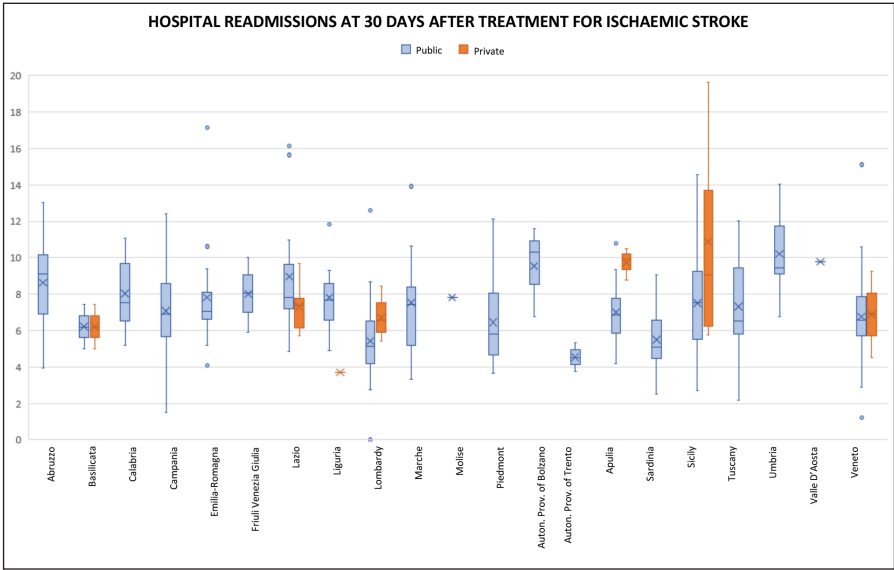
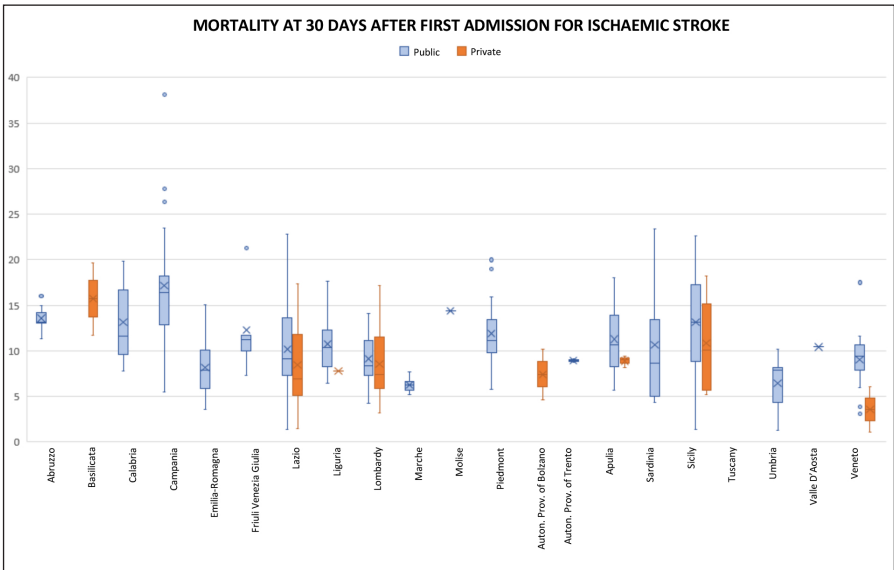


Chart no. 16



9.3. Digestive clinical area

Chart no. 17

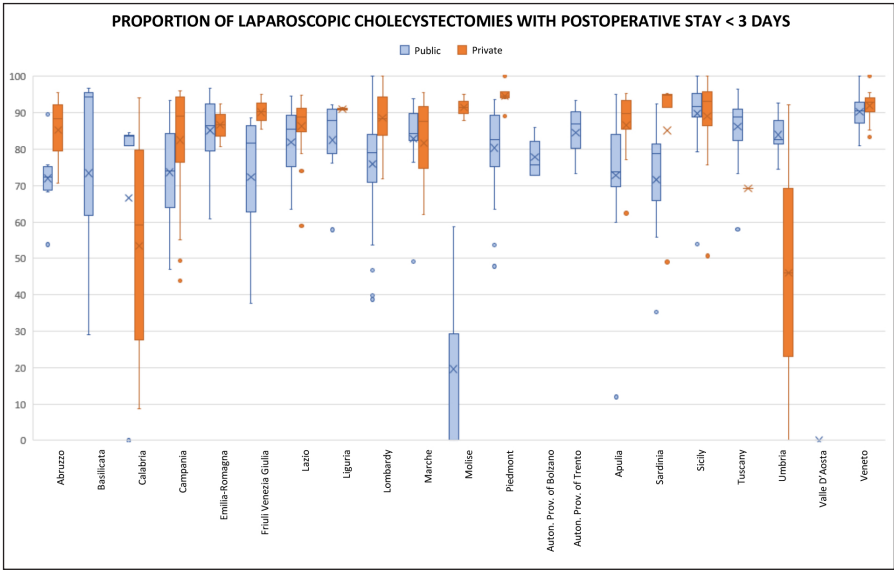


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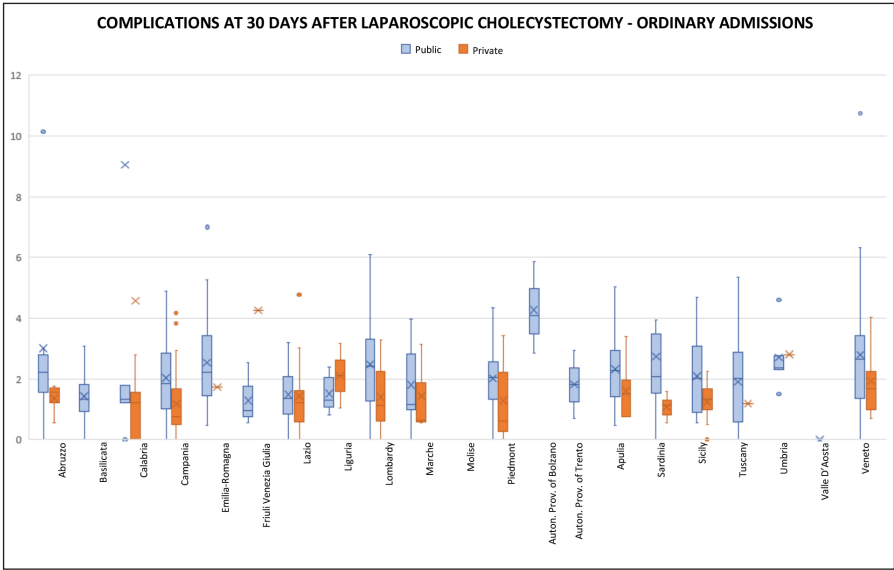
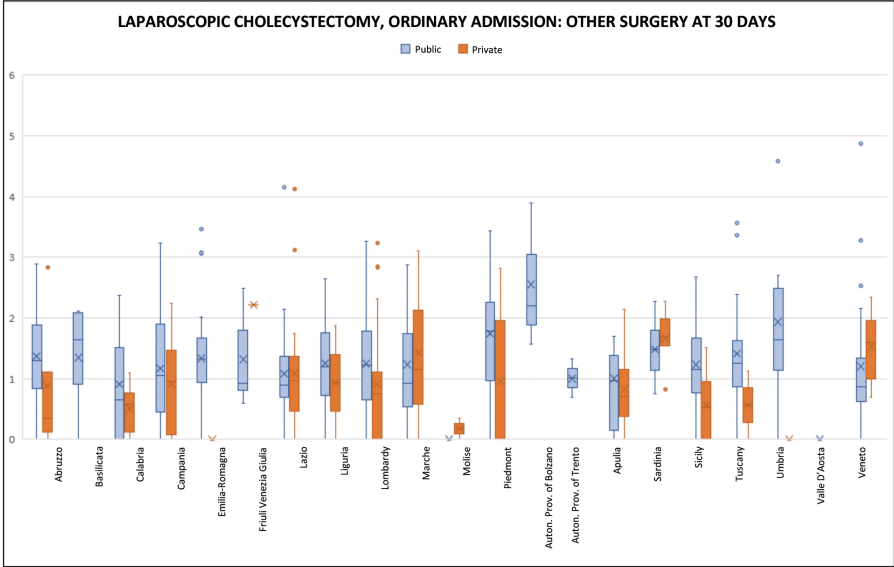


Chart no. 19



9.4. Musculoskeletal clinical area

Chart no. 20

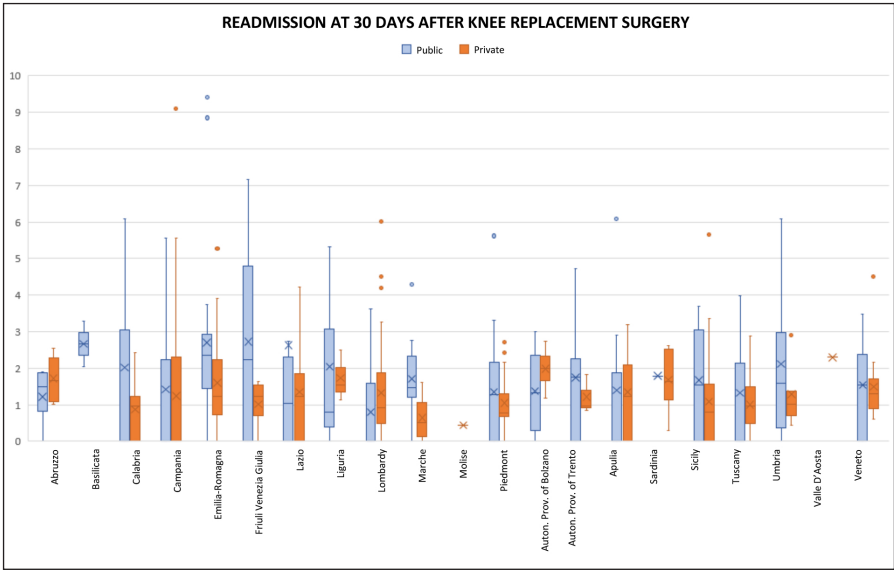


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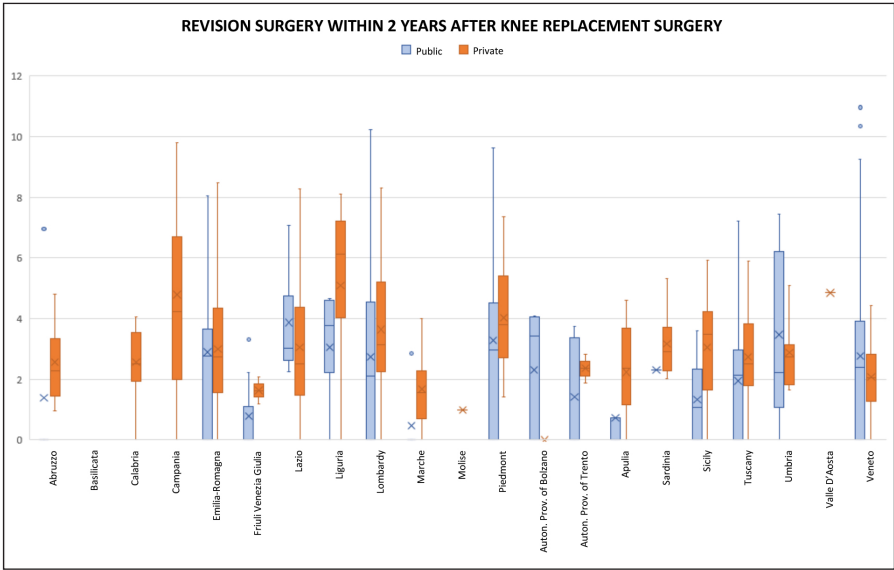


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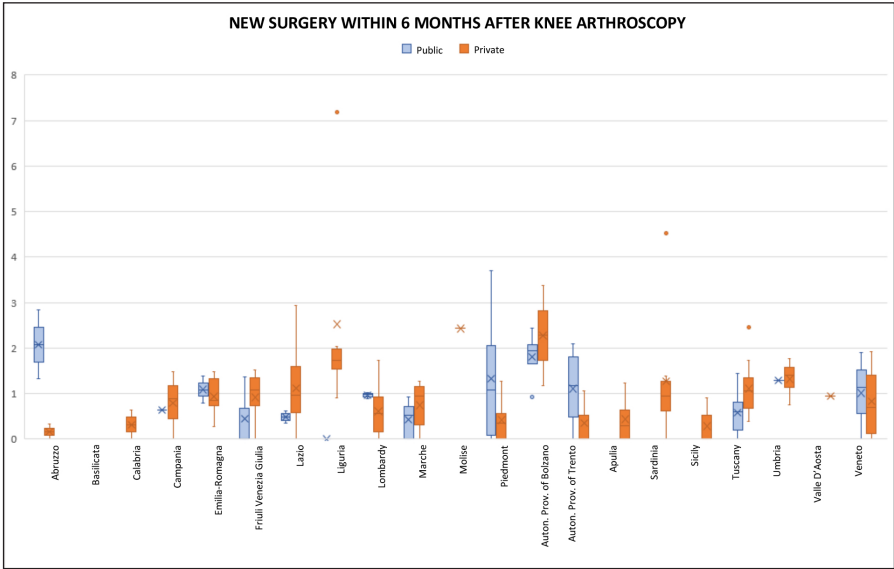


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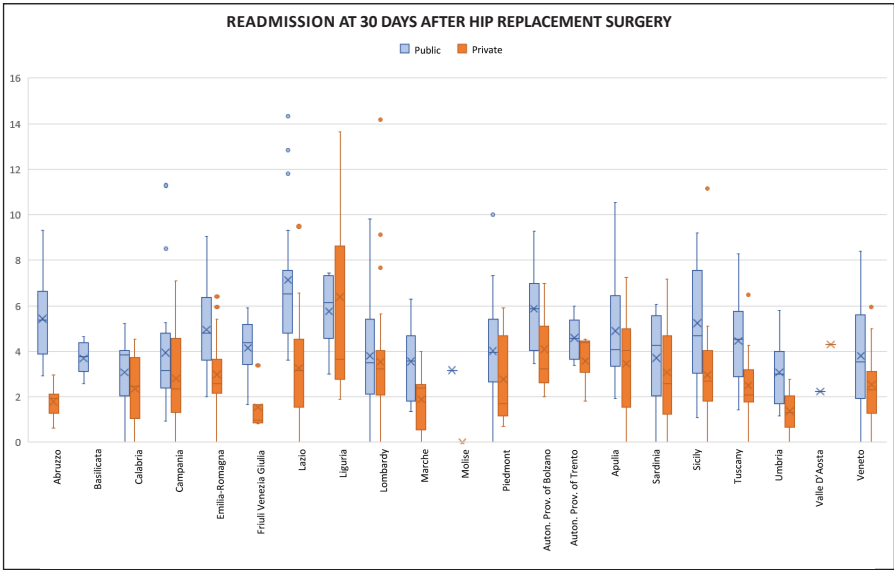


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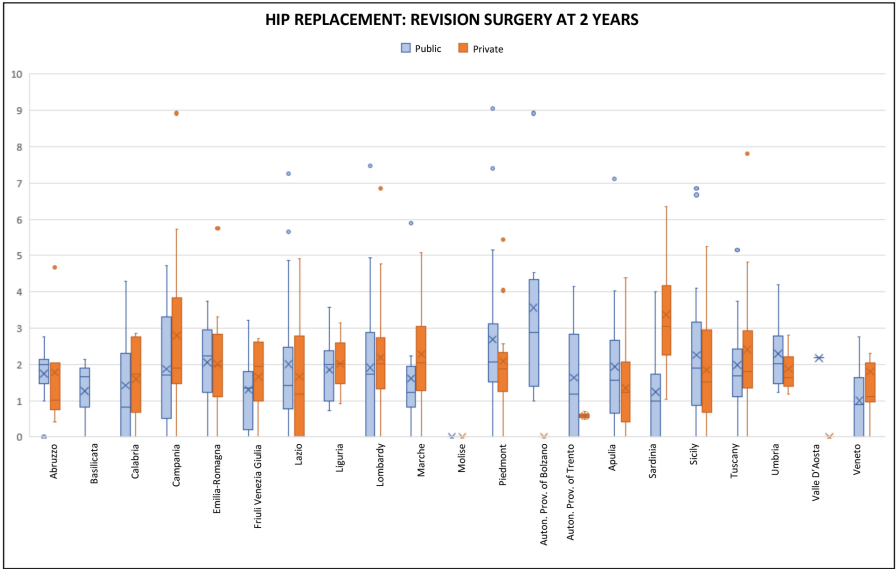


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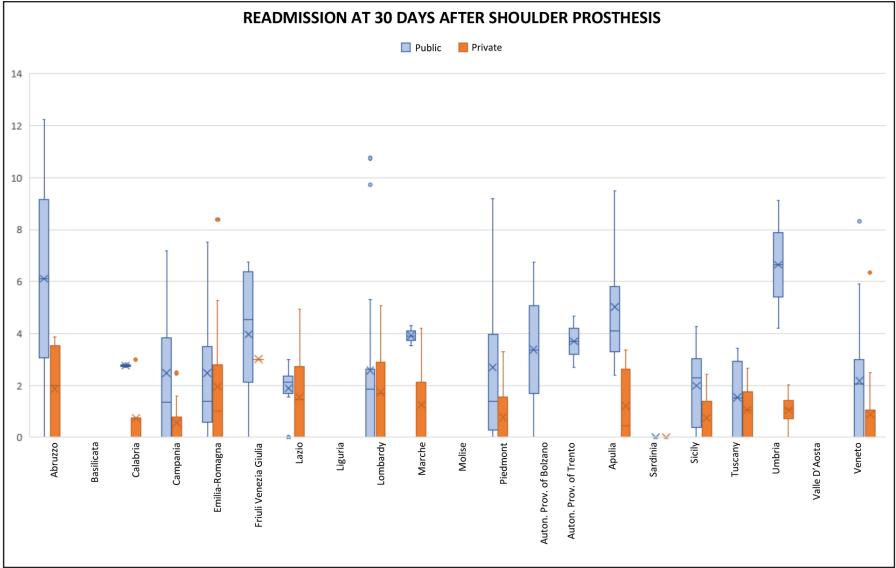


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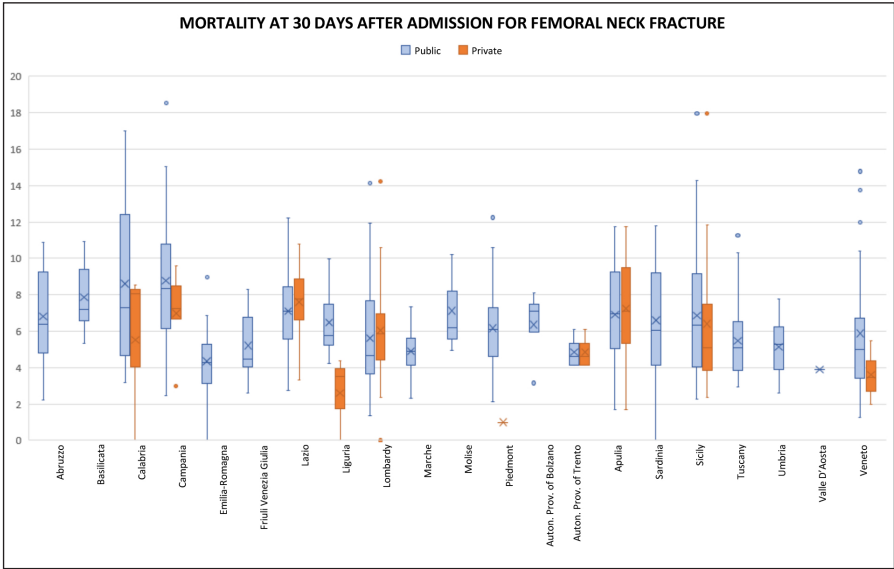


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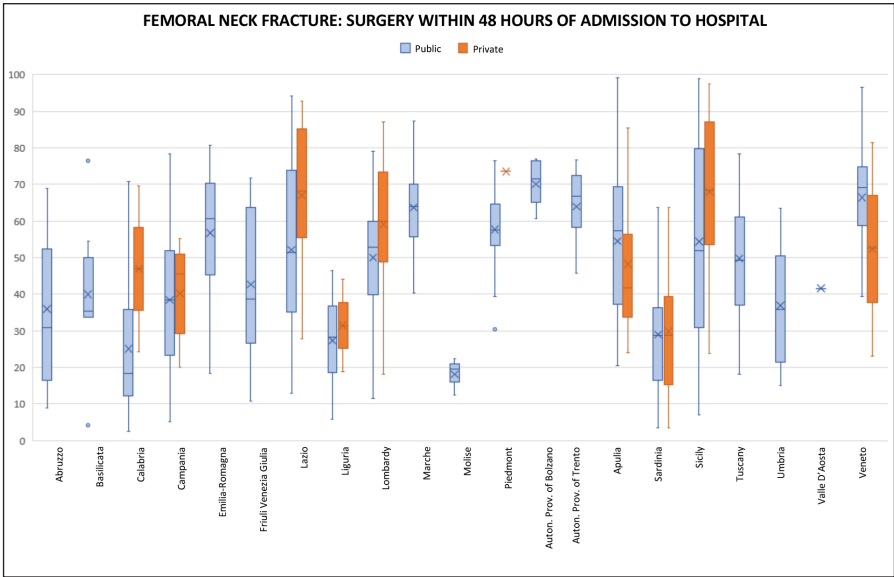
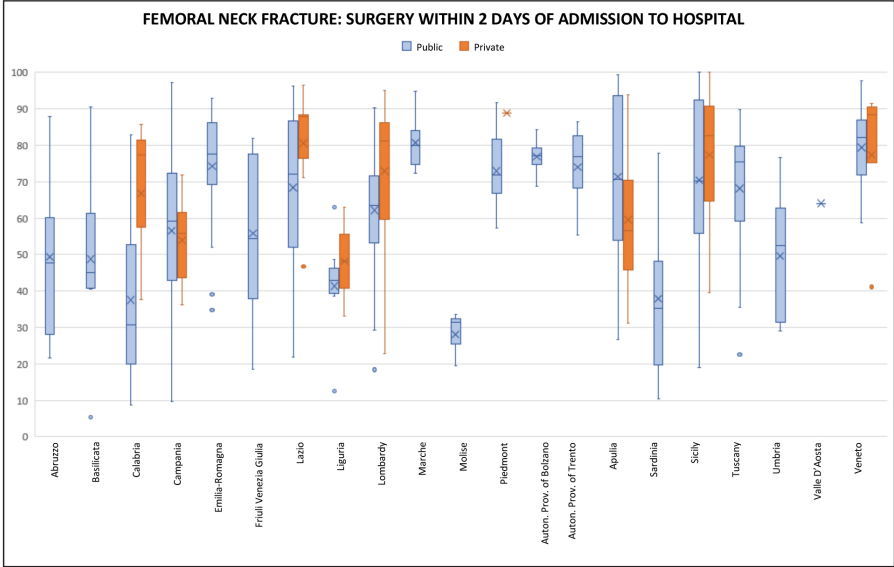


Chart no. 28



9.5. Oncology clinical area

Chart no. 29

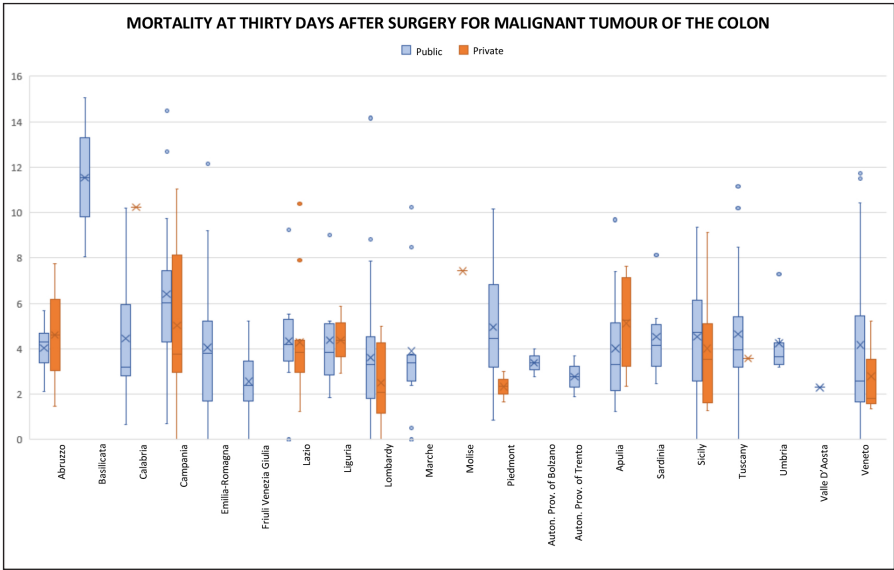


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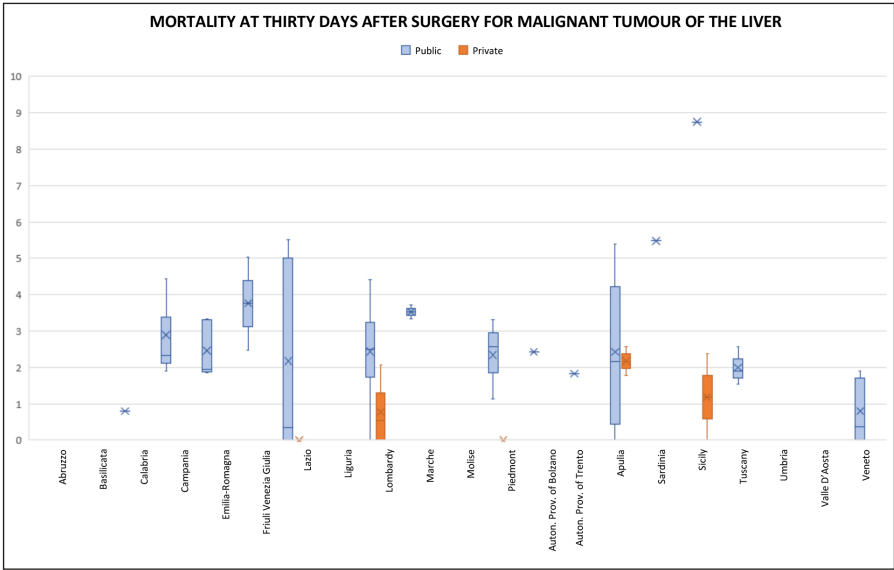


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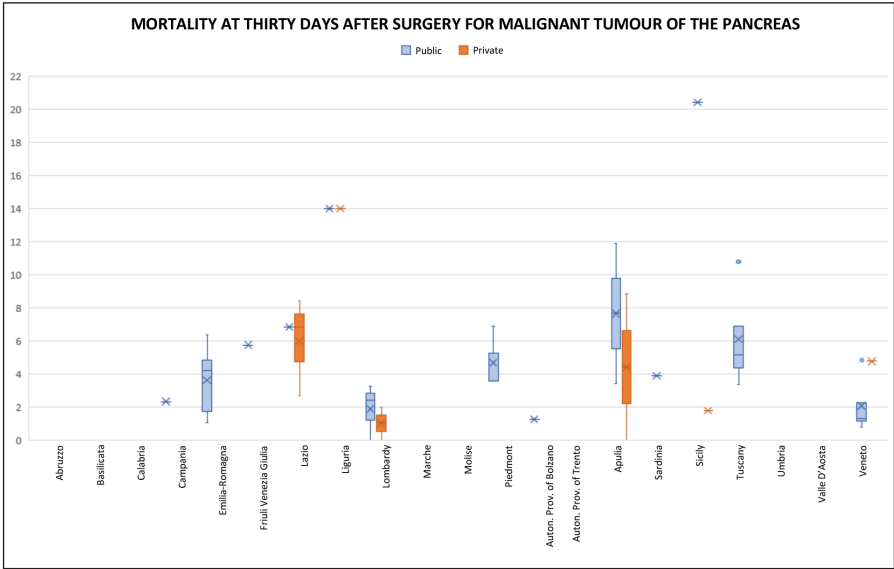


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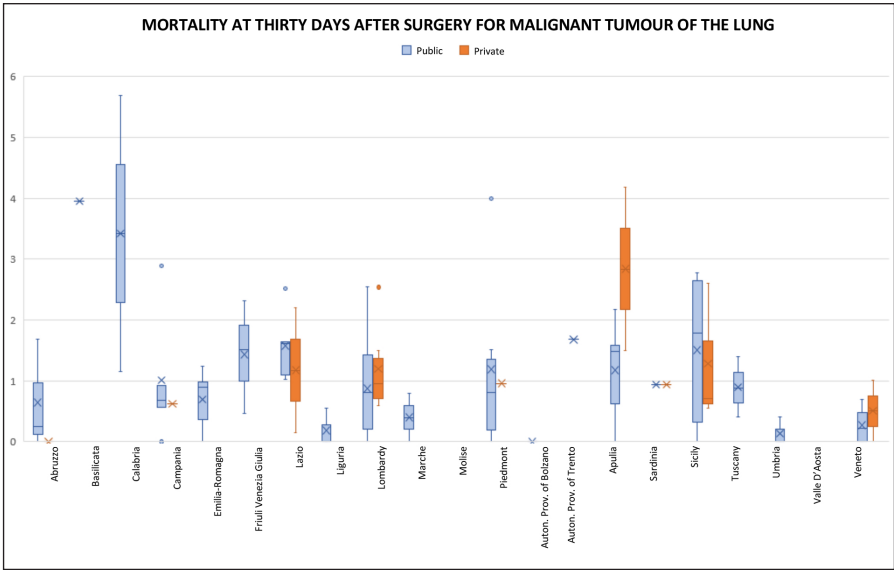


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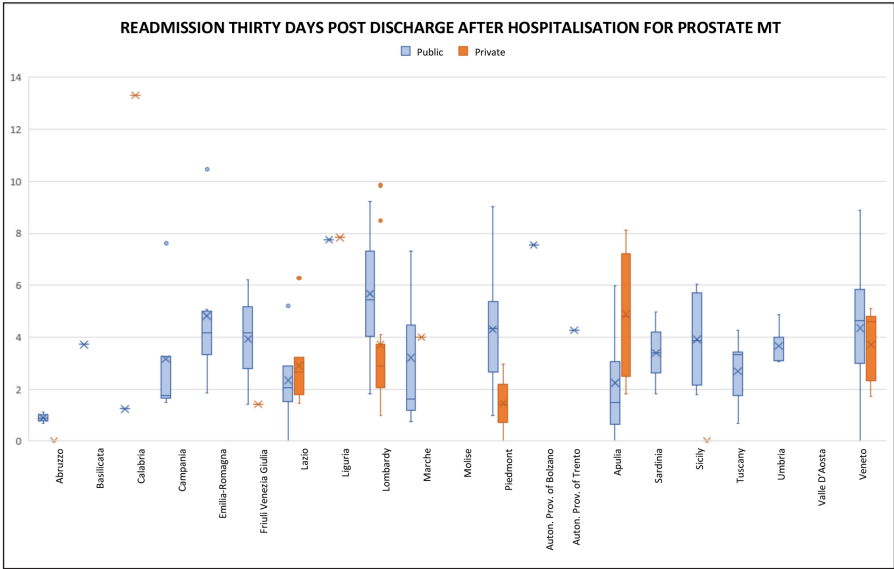


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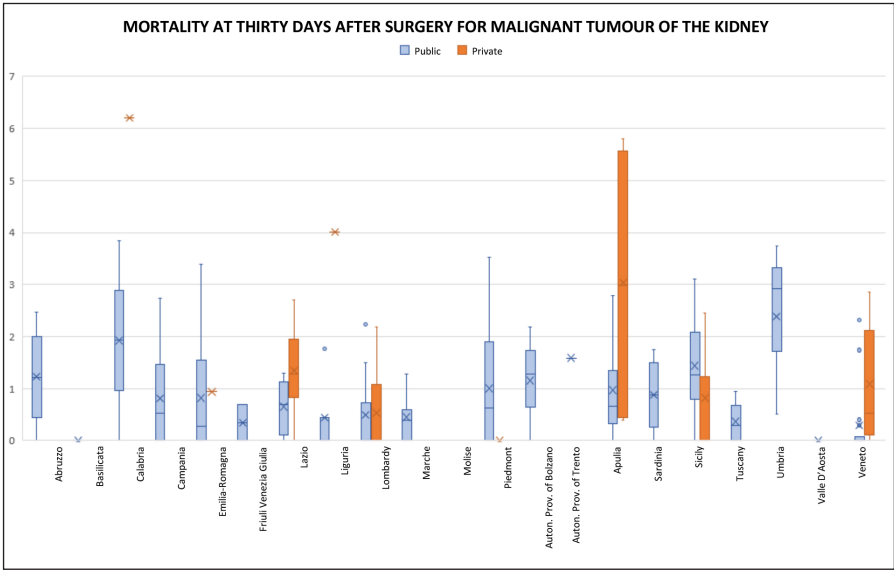


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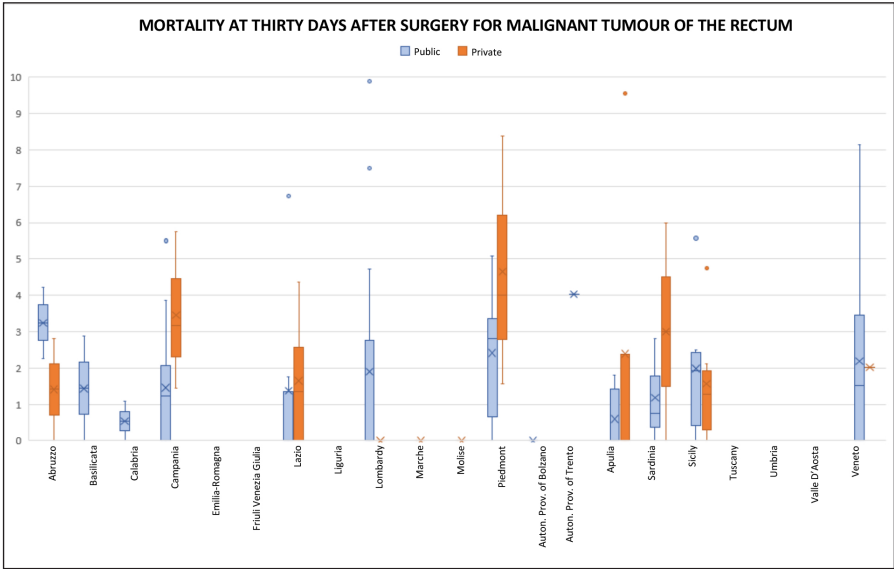
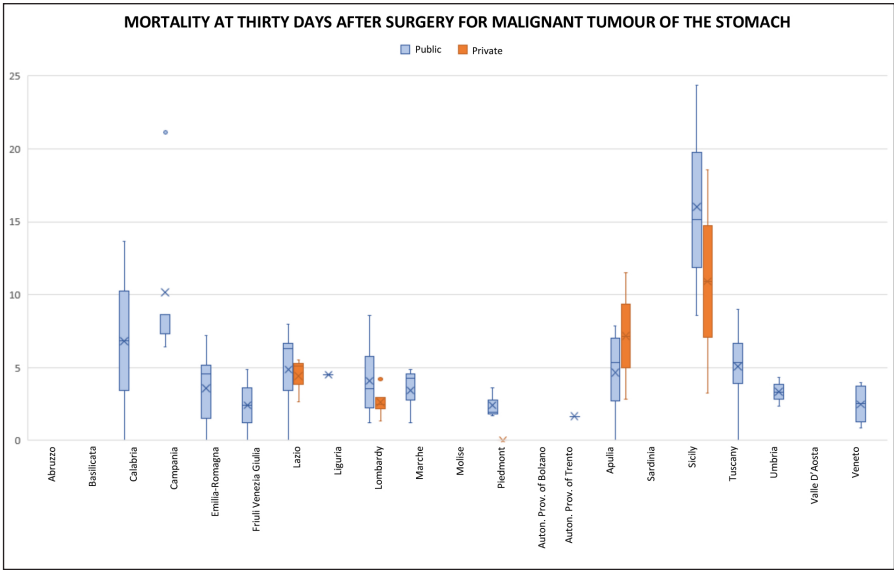


Chart no. 36



Graph no. 37

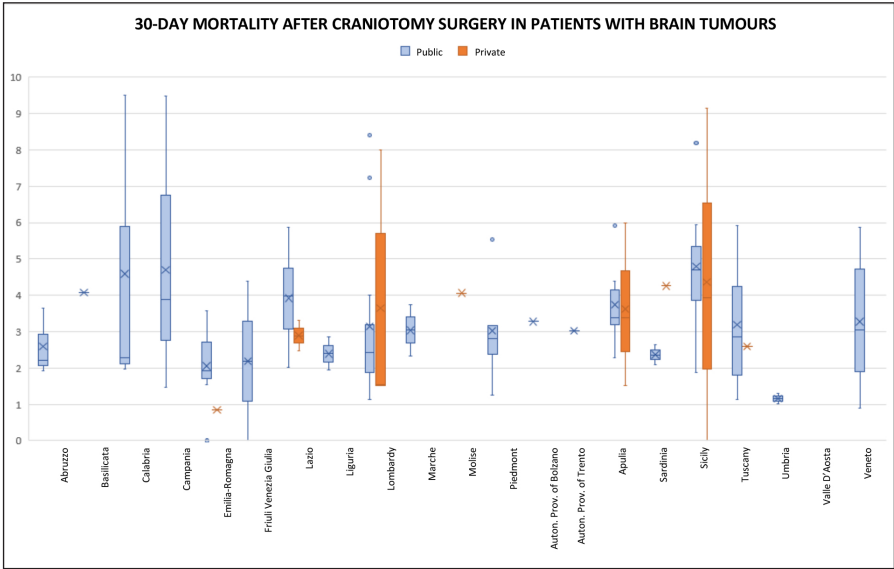


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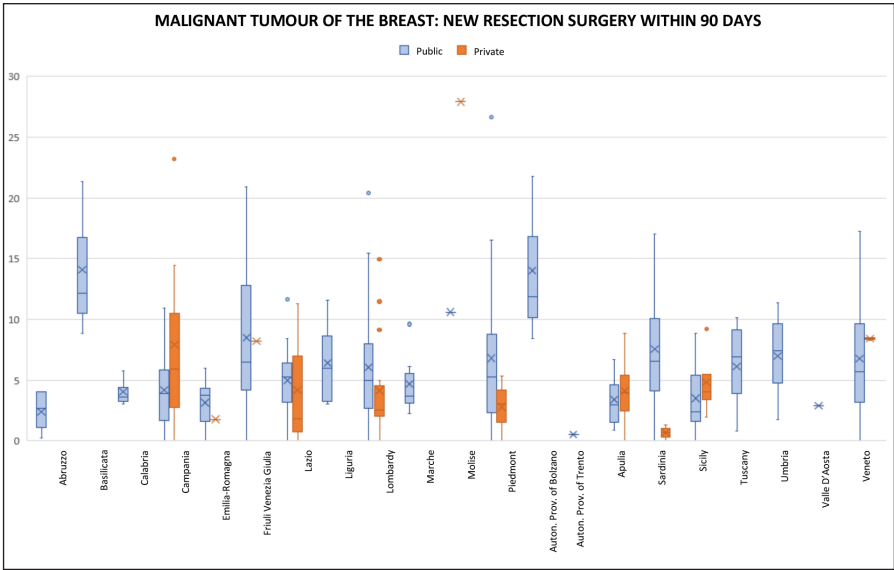
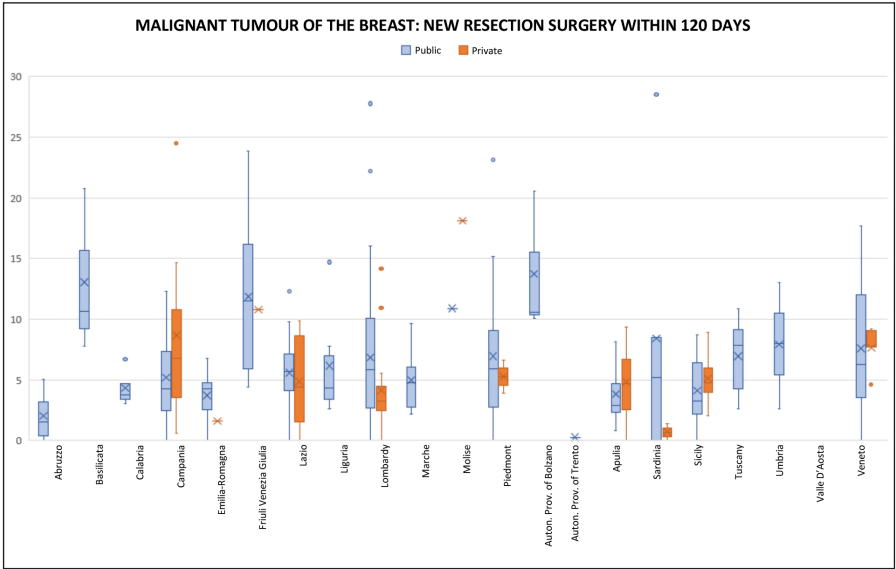


Chart no. 39



9.6. Perinatal clinical area

Chart no. 40

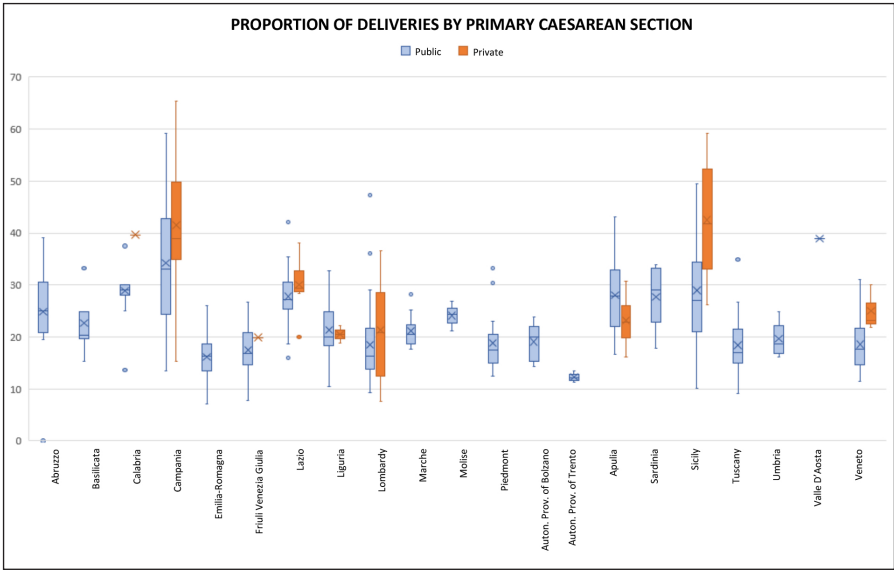


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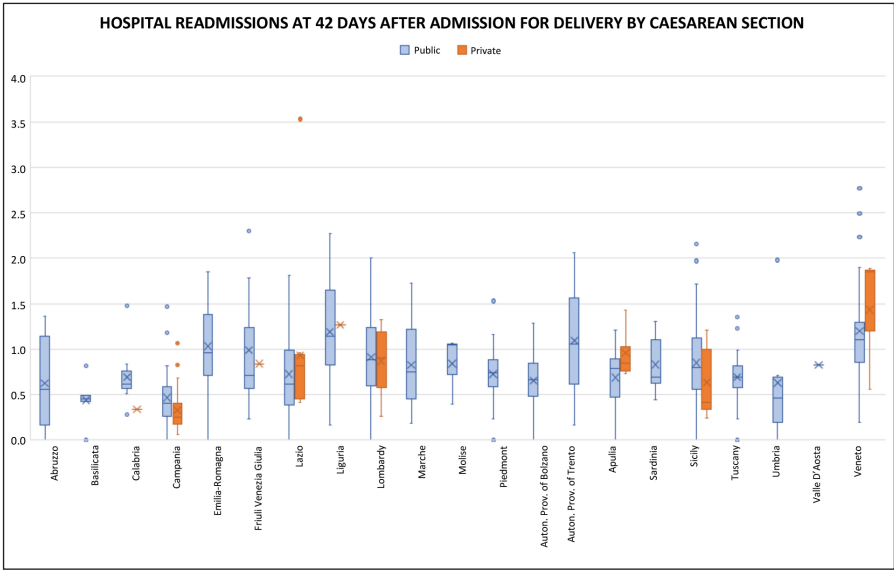


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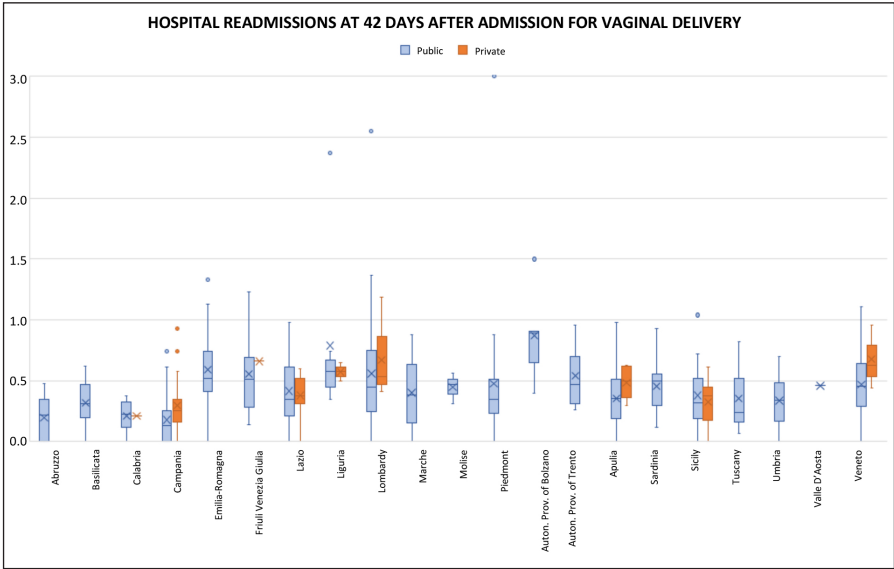


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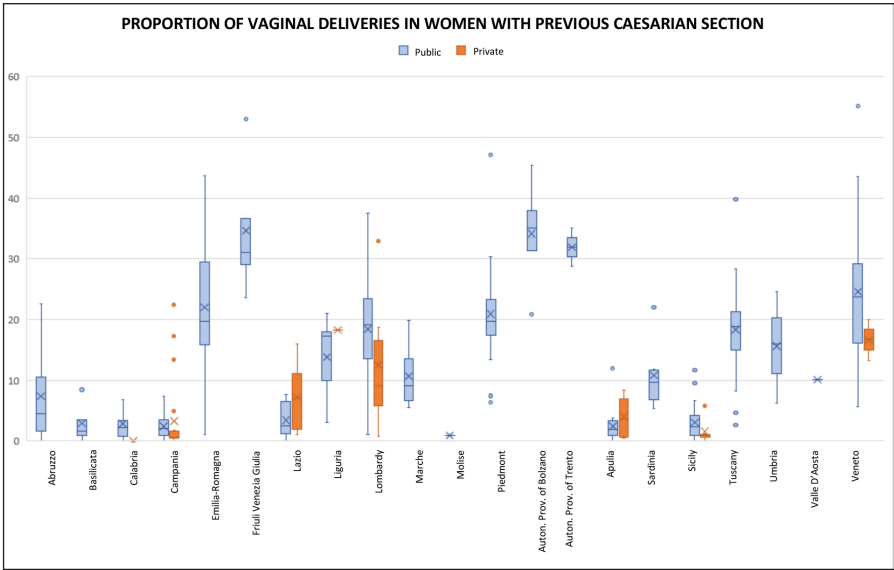
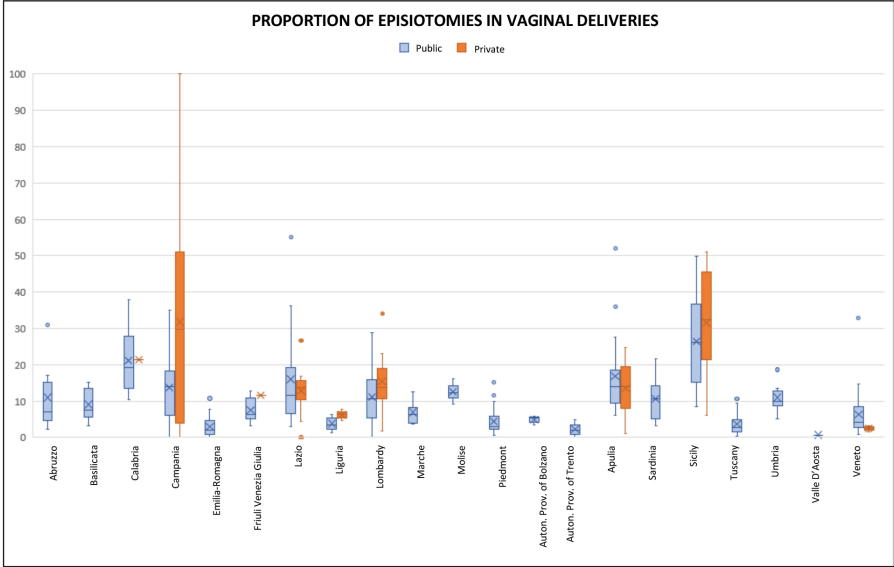


Chart no. 44



9.7. Respiratory clinical area

Chart no. 45

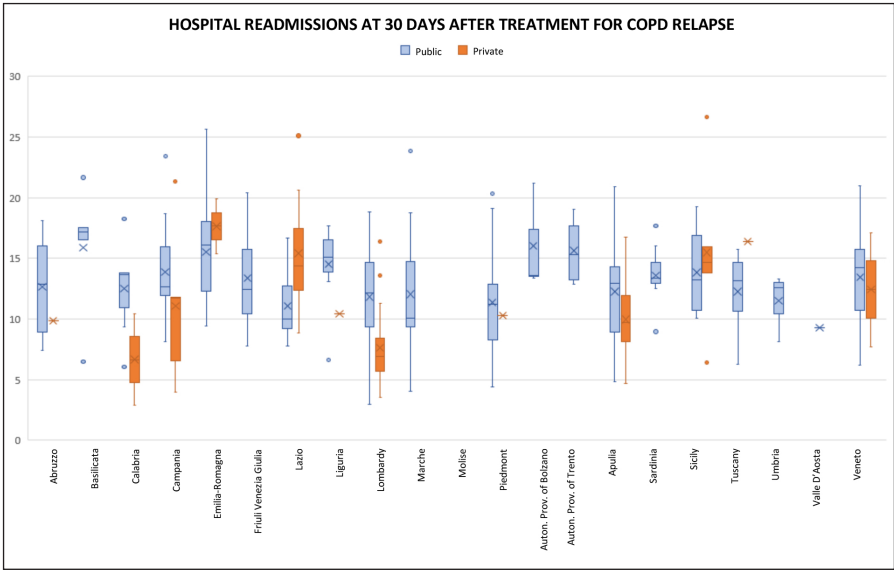
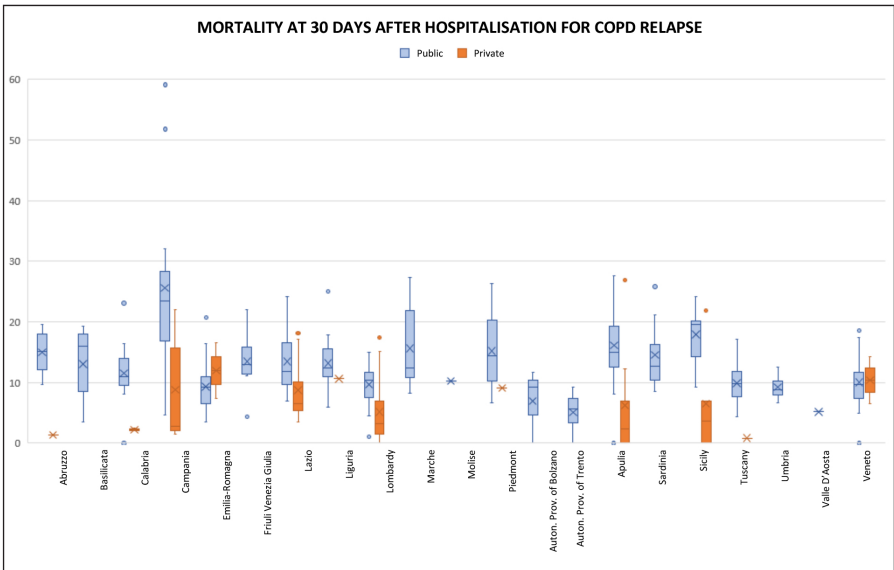
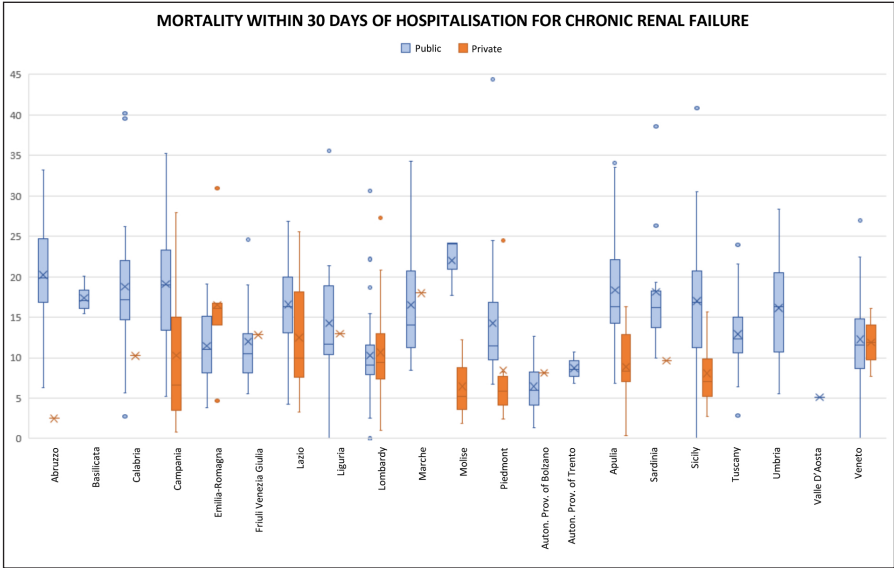


Chart no. 46



9.8. Urogenital clinical area

Chart no. 47



10. Correlation between volume of treated cases and quality of outcomes

When conducting the analyses for this report, we once again sought to confirm the existence of a definite correlation between the volume of cases treated and the quality of clinical outcomes, as claimed in many scientific publications.

As in previous studies, the results of our analyses are somewhat mixed; for many of the indicators, there is no definite evidence of correlation and for the same number of treated cases, the value of the clinical outcome is often highly dispersed.

The linear regression graphs show a straight line with a high gradient for some indicators, suggesting correlation. For other indicators, however, the straight line is horizontal or has a very slight gradient, which makes the existence of a correlation doubtful. Finally, for other indicators, the straight line has a negative gradient, which seems to rule out a correlation altogether.

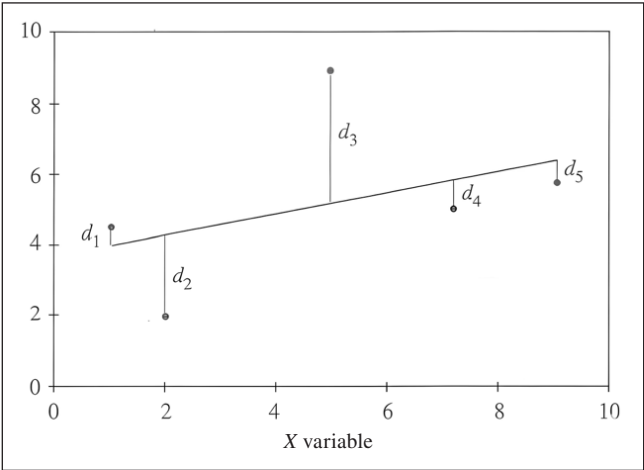
Methodological note

Linear regression analysis is used in statistics to predict the value of one variable based on the value of another variable. The variable to be predicted is called the dependent variable (in our case, the clinical outcome), while the variable used to predict the value of the other variable is called the independent variable (in our case, the volumes of services provided). Strictly speaking, this is significant when a causal relationship is assumed between the independent variable, on which one acts, and the dependent variable, on which one wants to produce an effect.

In the case of the relationship between volumes and outcomes, this is the basis for possible political/institutional decisions on setting minimum

volume thresholds, with the intention of producing effects on the dependent variable, the “outcome”. This form of analysis estimates the coefficients of the linear equation representing a straight line that minimises the discrepancies between the predicted (points on the straight line) and actual output values (scatter of points representative of the providers) using the least squares method. The best straight line, according to this criterion, is the one that minimises the sum of the squares of the differences between estimated values and observed values, also known as regression residuals (in Figure 1, the differences are represented by the segments marked d_1 to d_5).

Figure 1 - Differences between estimated and observed values



- For the interpretation of the results, the following considerations apply:
- a horizontal line or one characterised by a very slight slope (figure 2) is representative of a situation in which the expected outcome does not vary or varies very little, regardless of the volume of services provided. In such cases, setting thresholds would not lead to a significant improvement in average outcomes;
 - a straight line with a very steep slope (figure 3) is representative of a situation in which the expected outcome varies significantly towards better values as the volume of services provided increases. In this situation, setting a minimum volume threshold would improve the average outcome.

Figure 2 - Example of stable outcome as volumes change

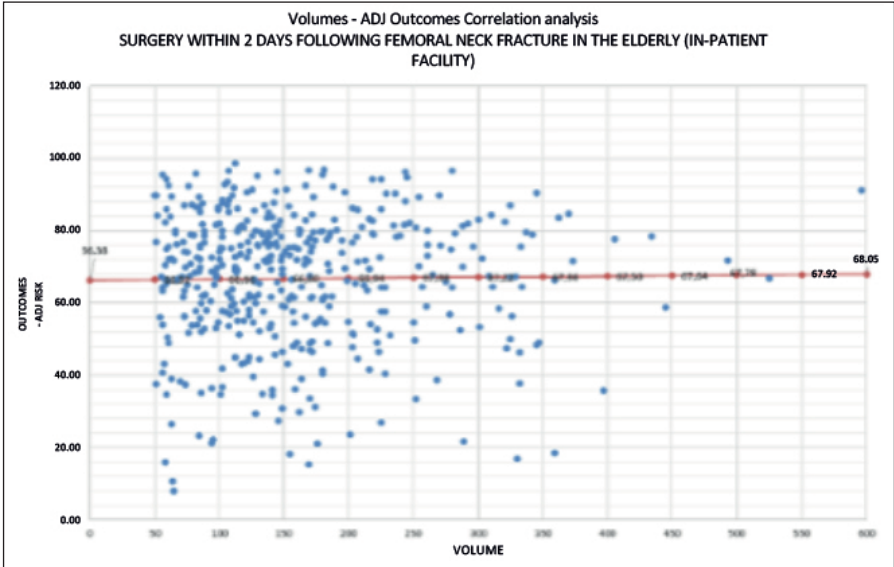
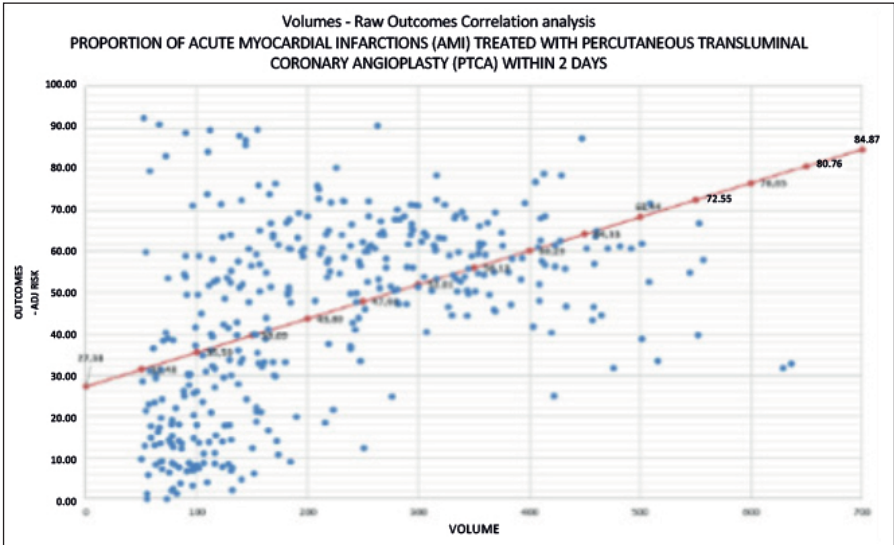


Figure 3 - Example of an outcome that improves with increasing volumes



10.1. Cardiovascular clinical area

Chart no. 48

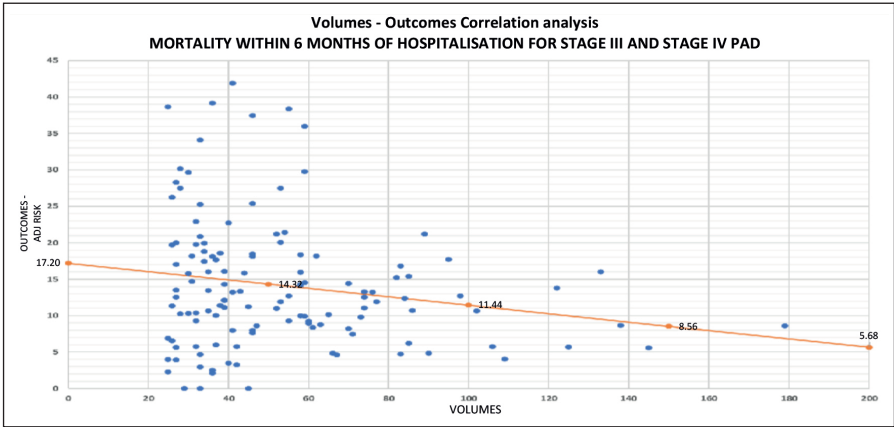


Chart no. 49

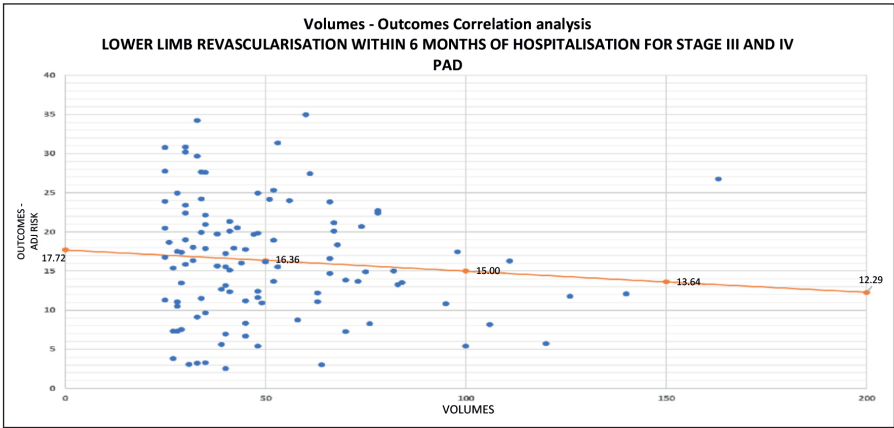


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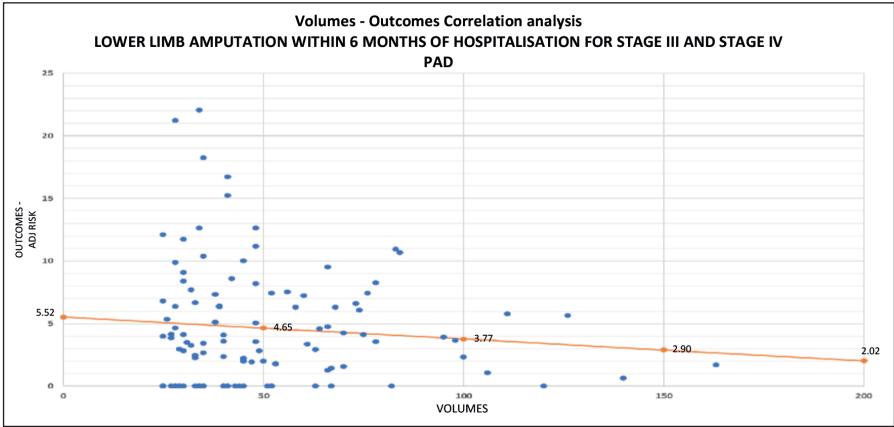


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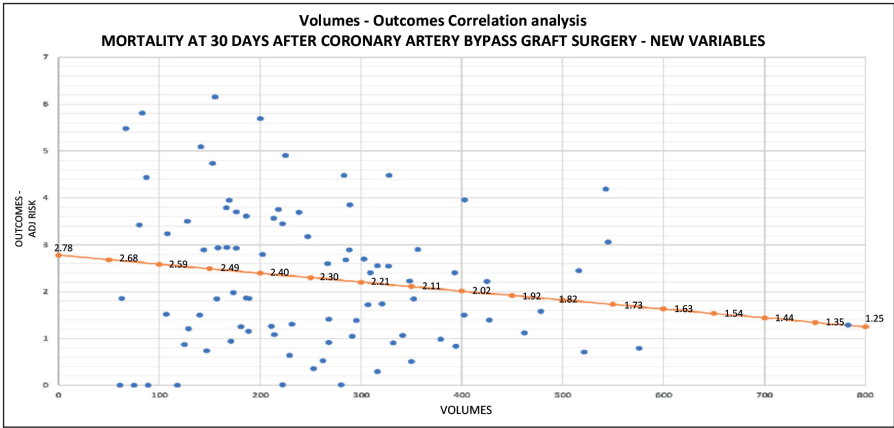


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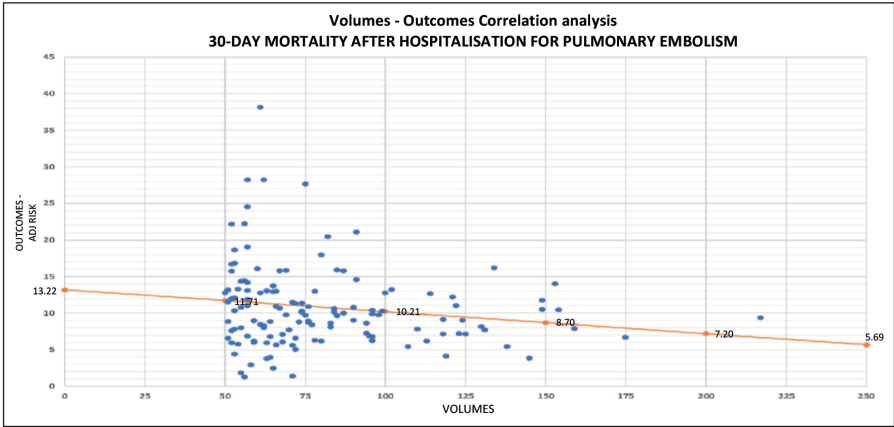


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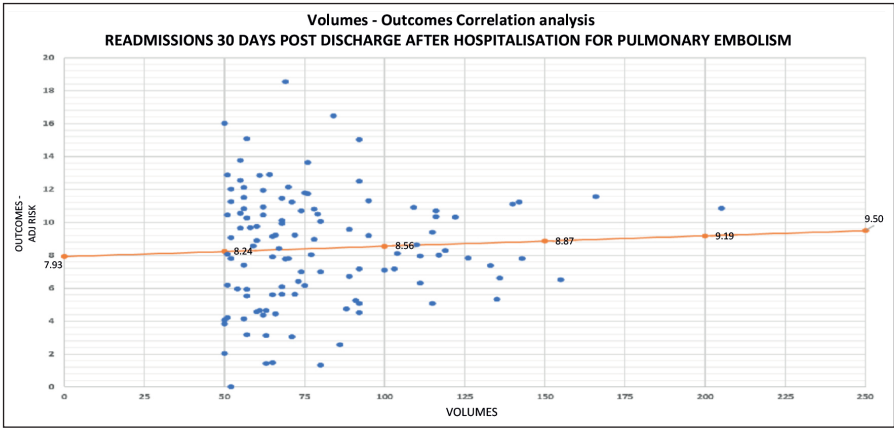


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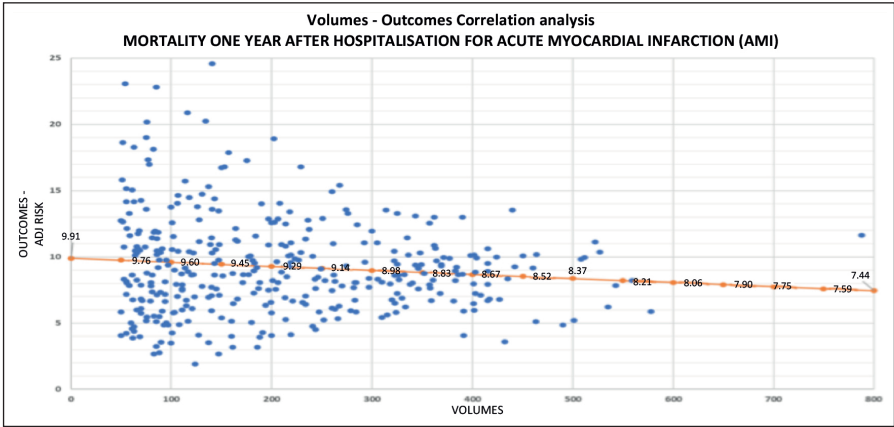


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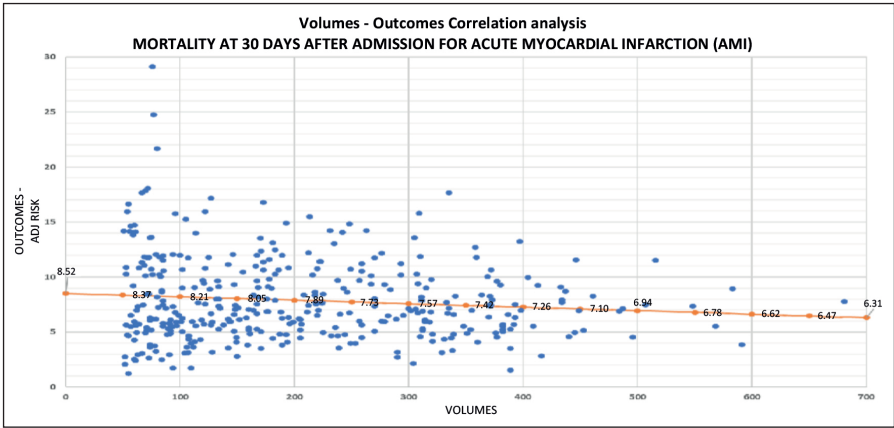


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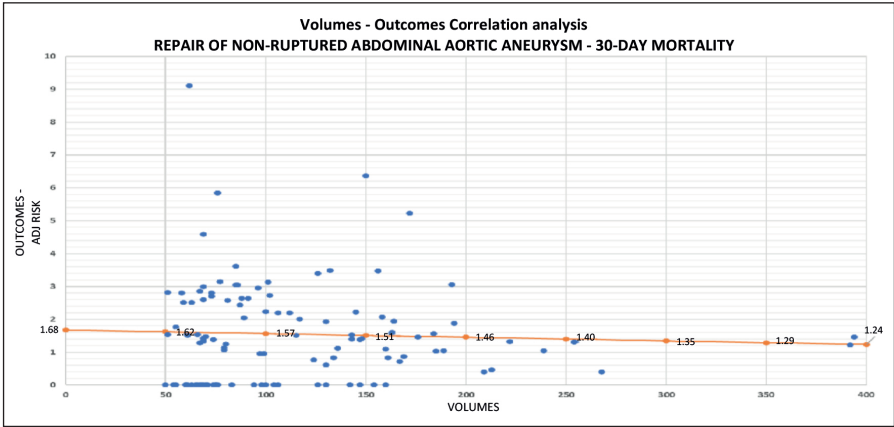


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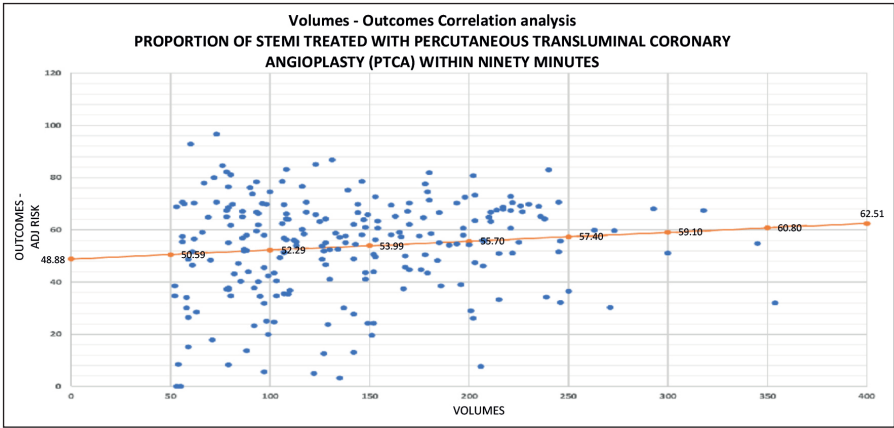


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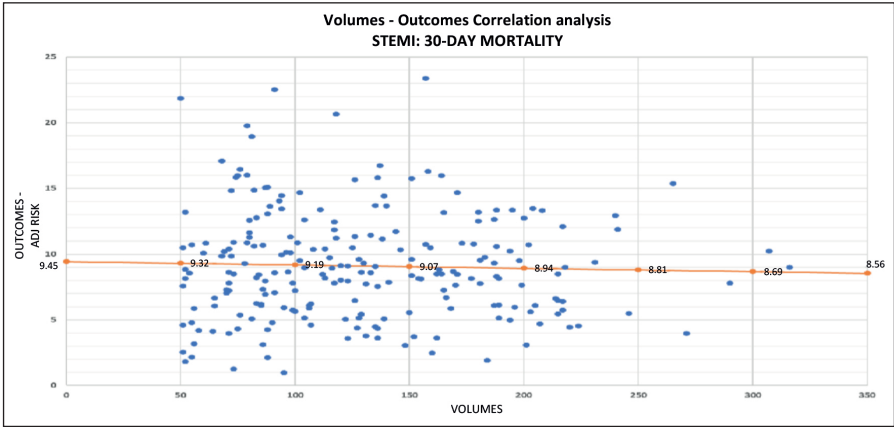


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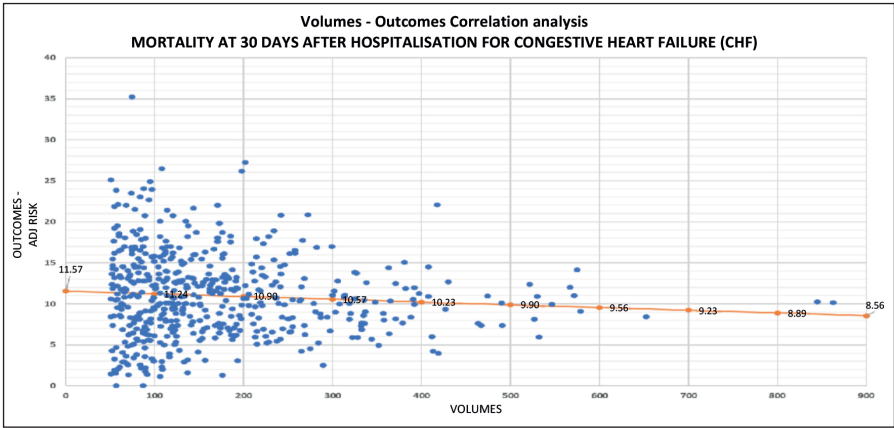


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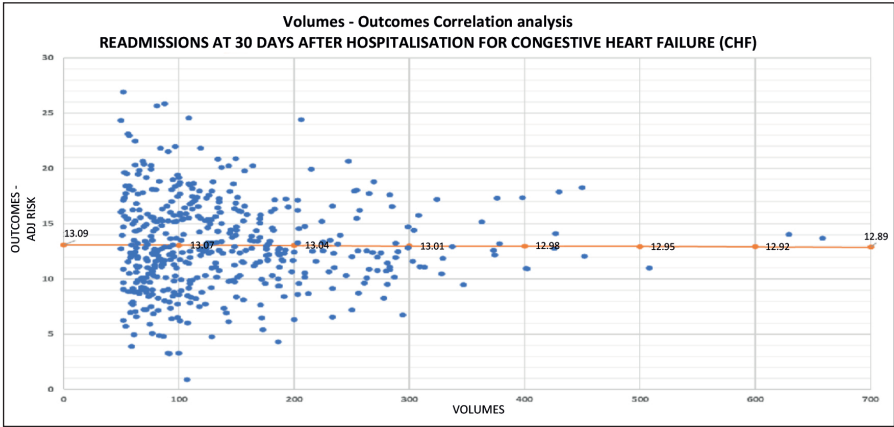
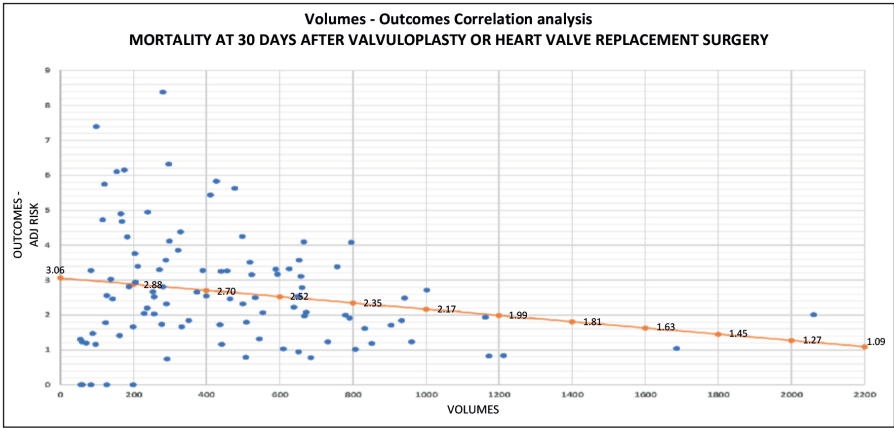


Chart no. 61



10.2. Cerebrovascular clinical area

Chart no. 62

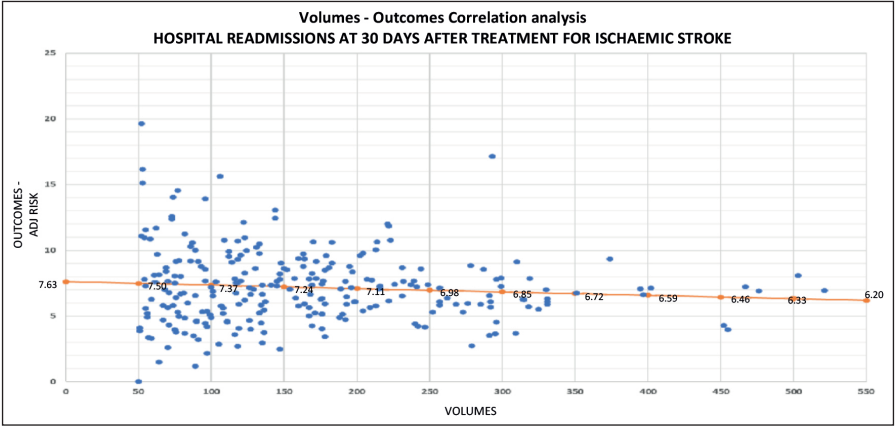
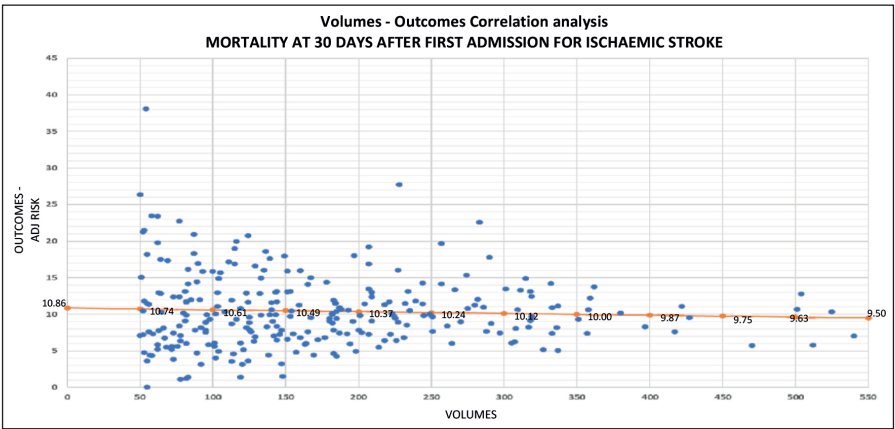


Chart no. 63



10.3. Digestive clinical area

Chart no. 64

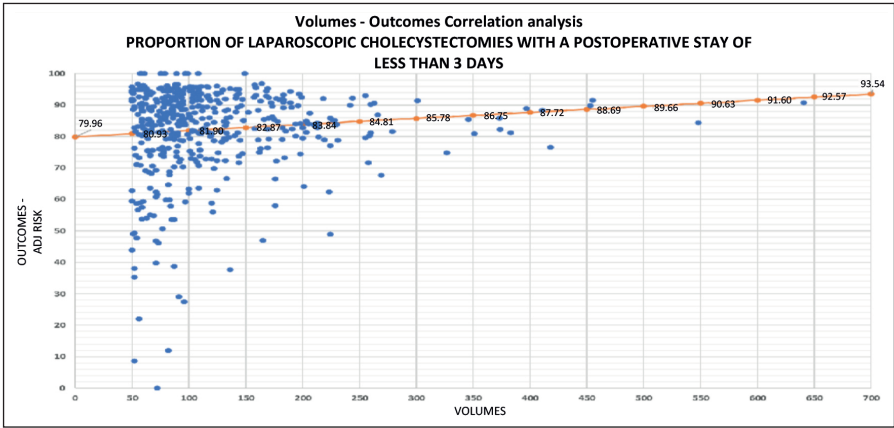


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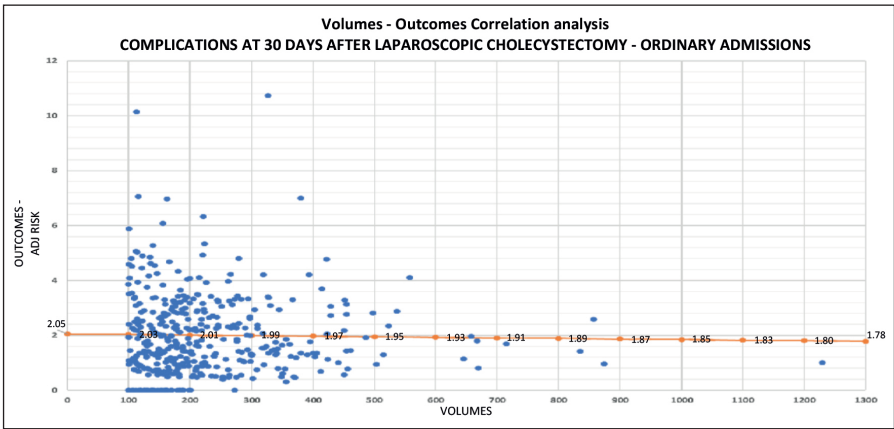
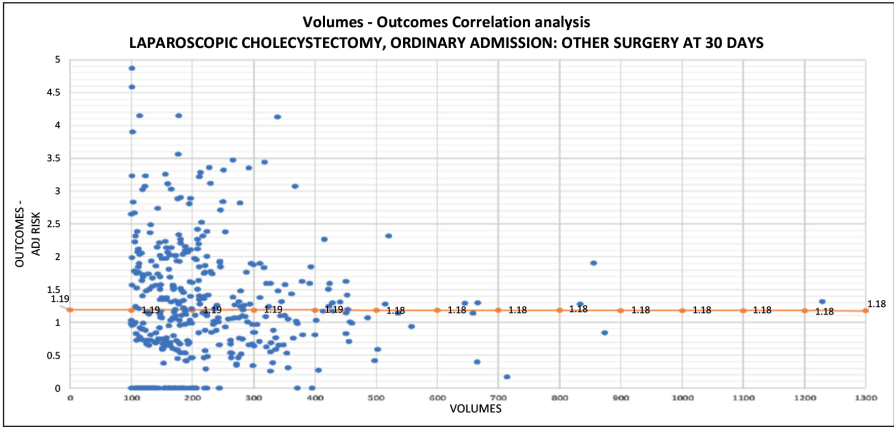


Chart no. 66



10.4. Musculoskeletal clinical area

Chart no. 67

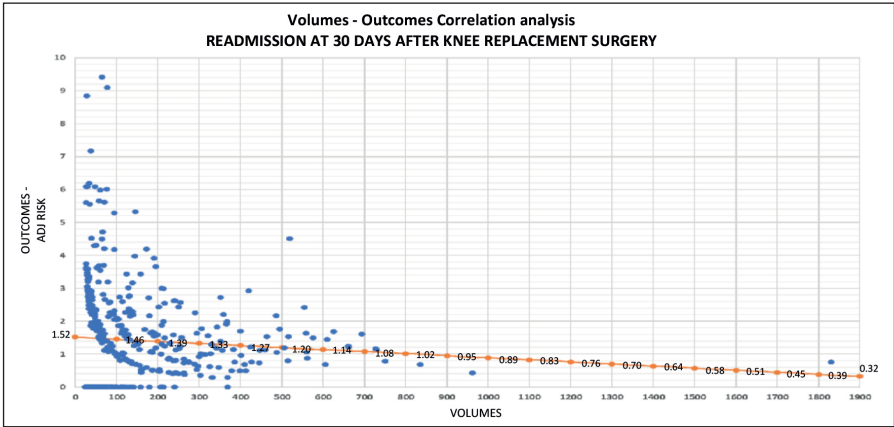


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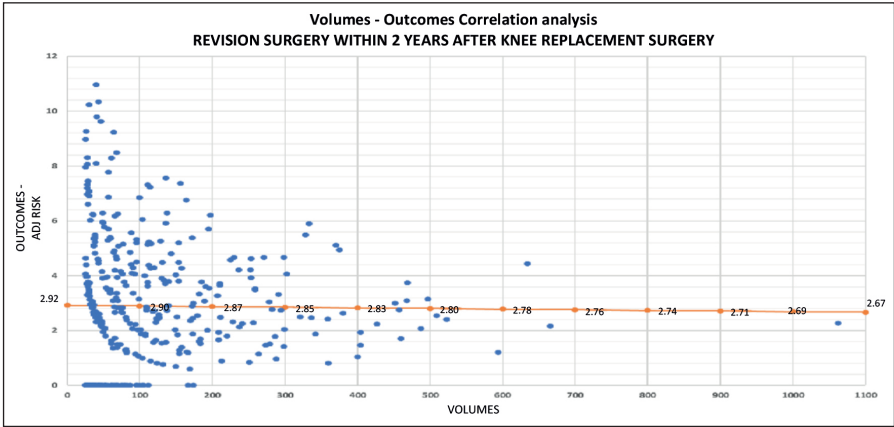


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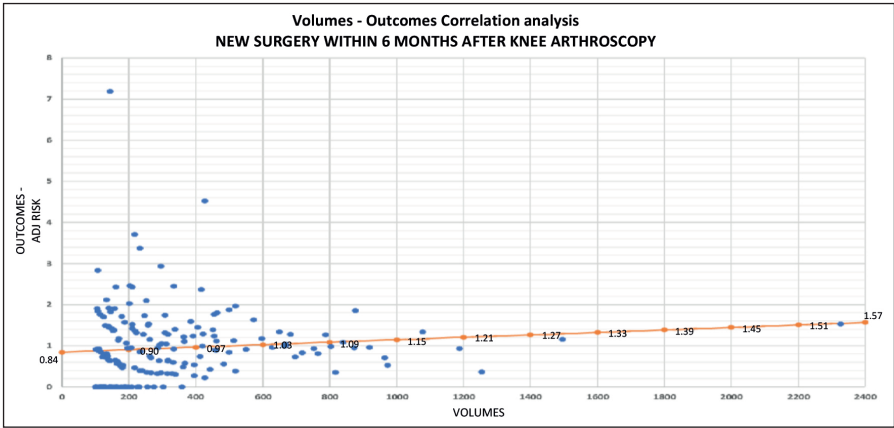


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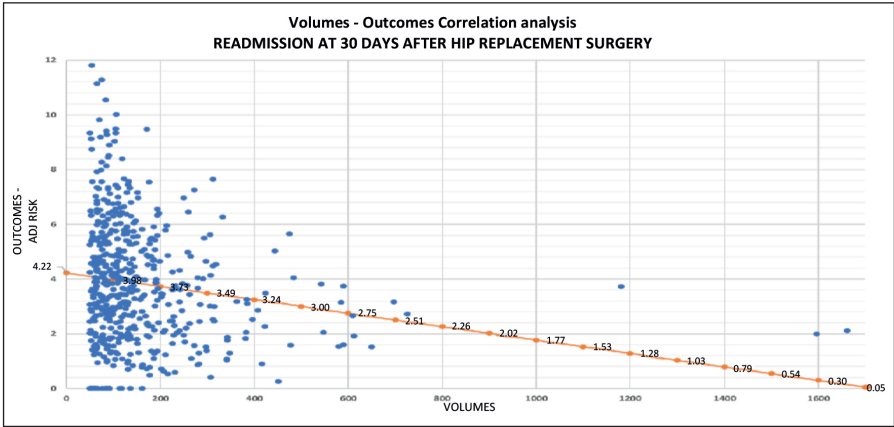


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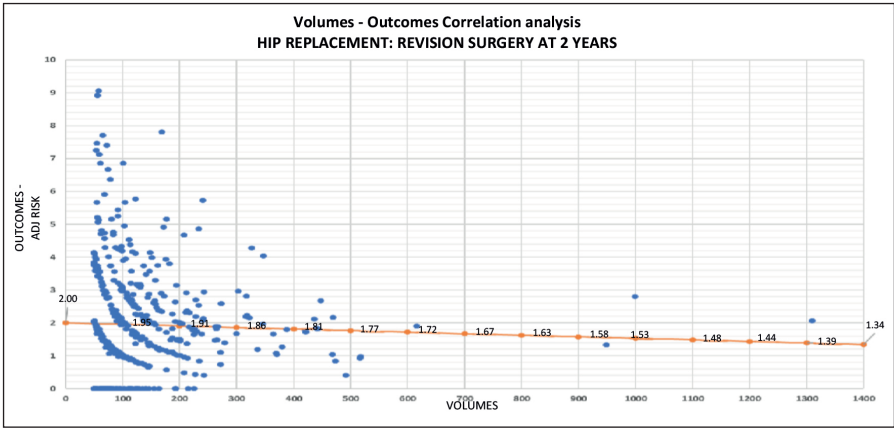


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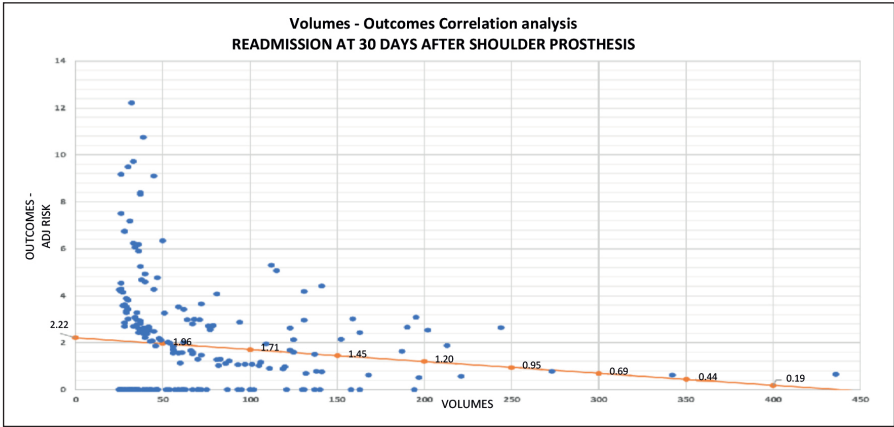


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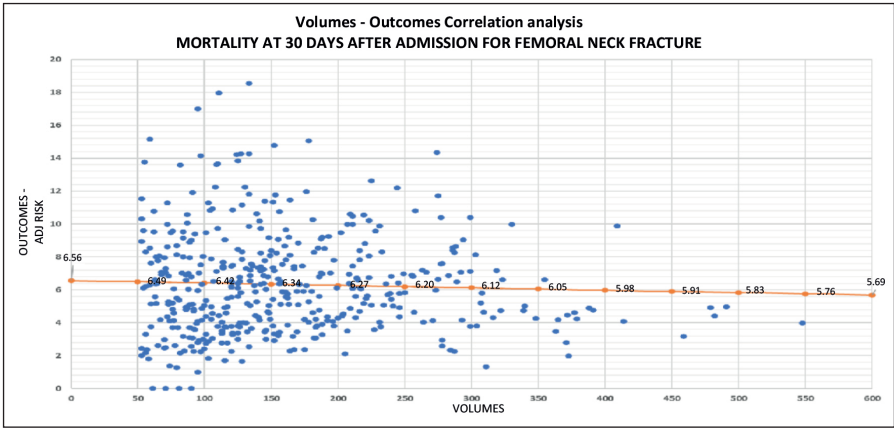


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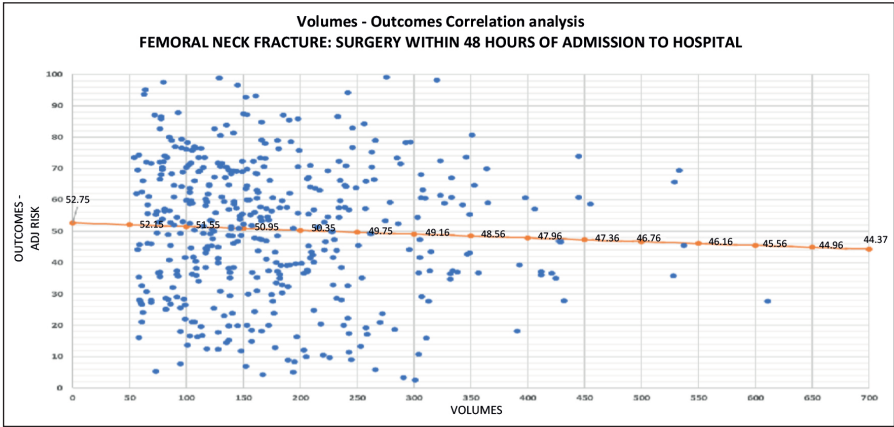
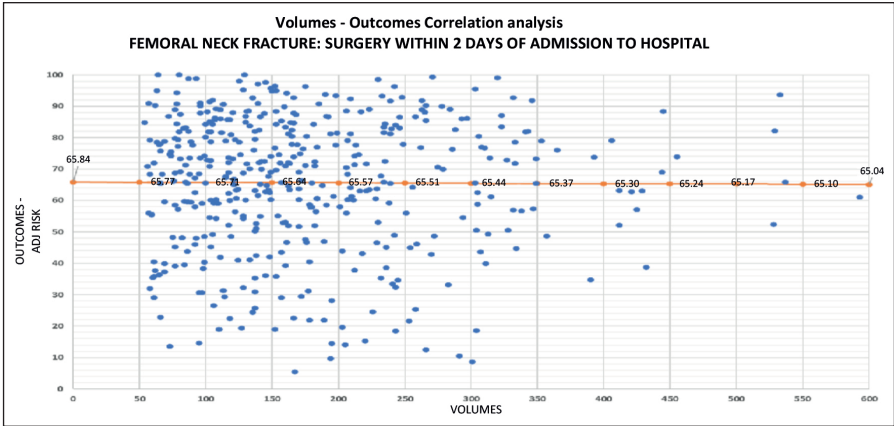


Chart no. 75



10.5. Oncology clinical area

Chart no. 76

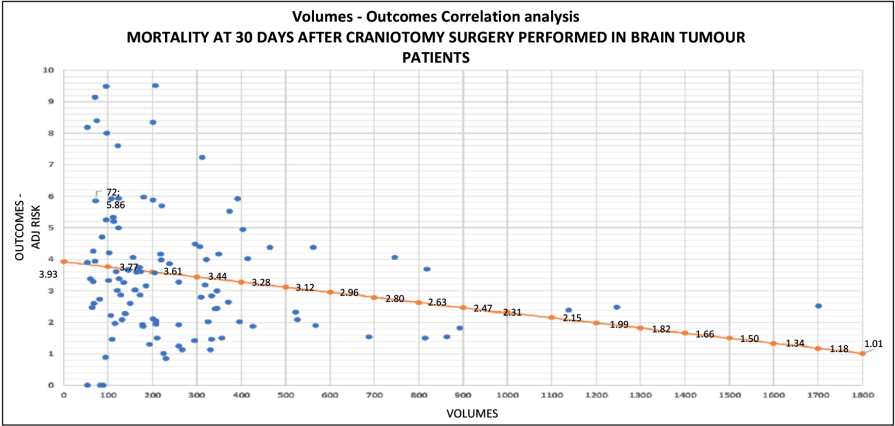


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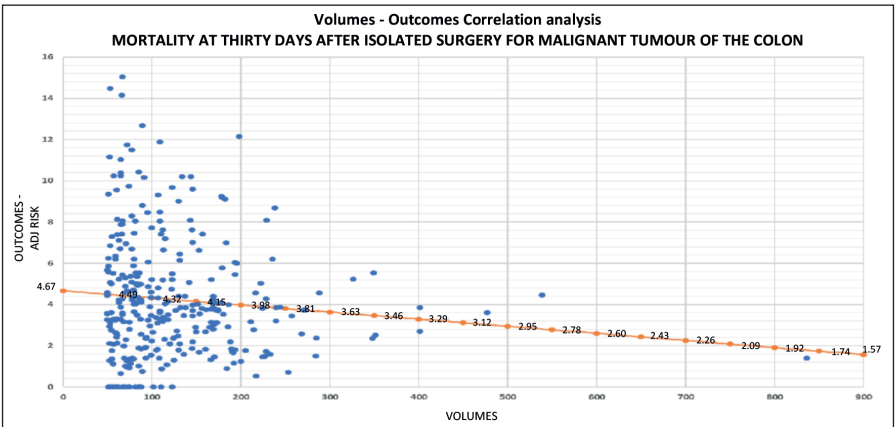


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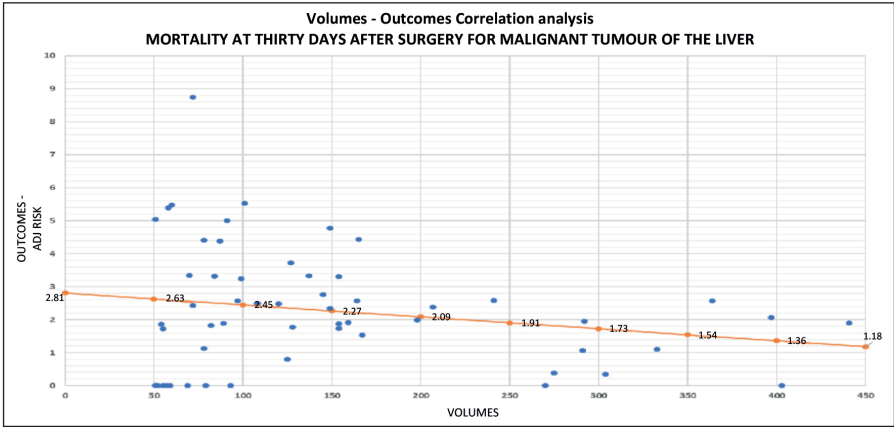


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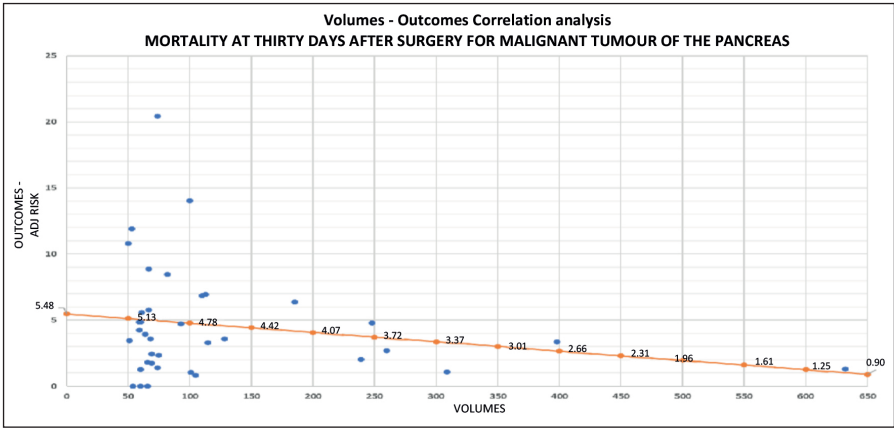


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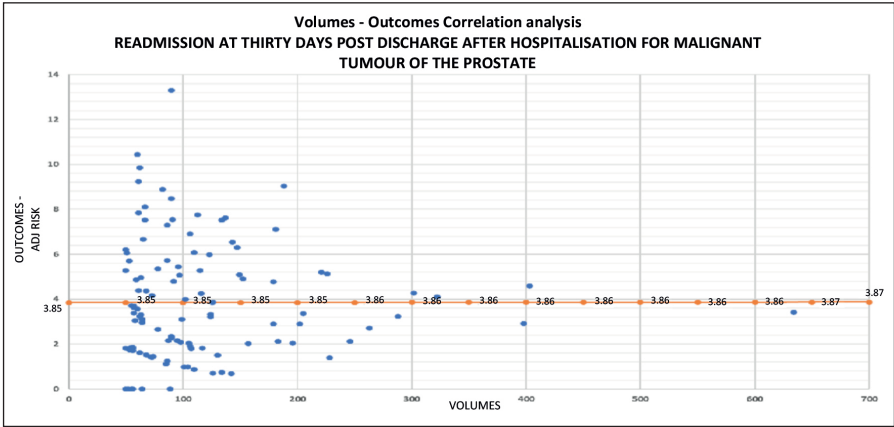


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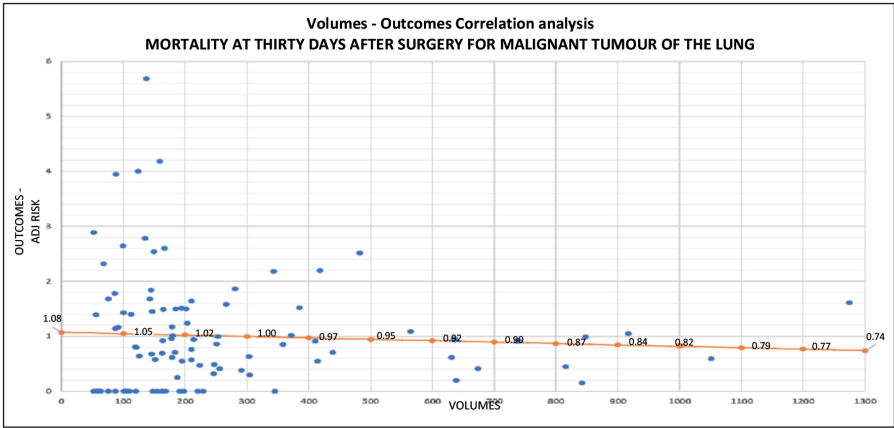


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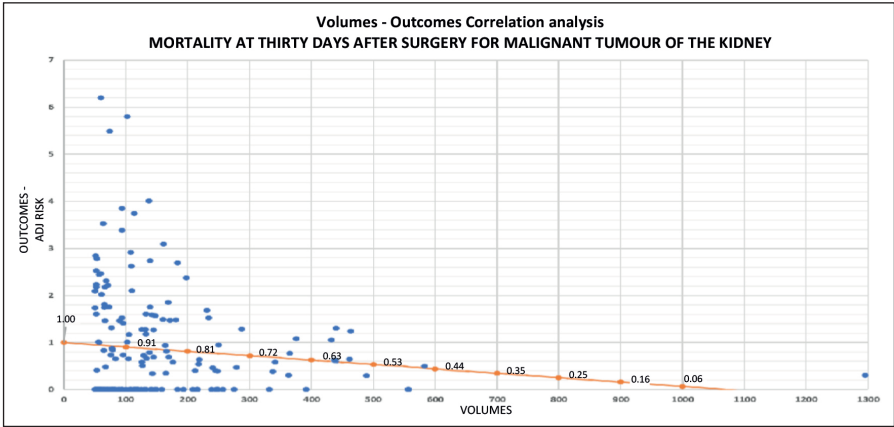


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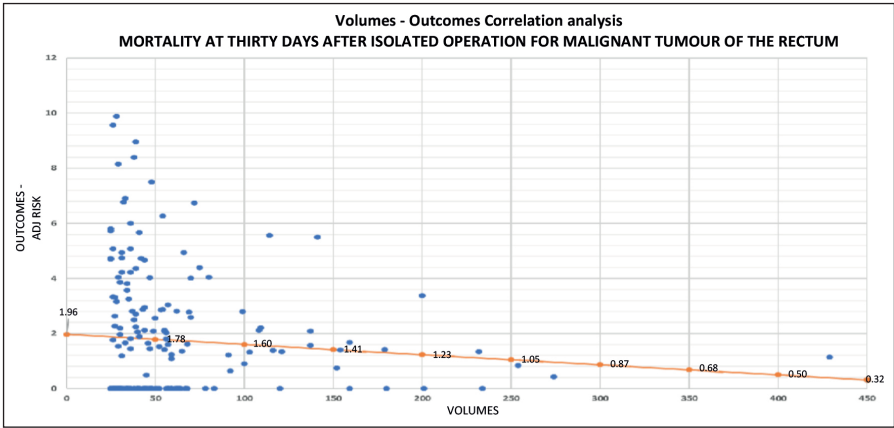


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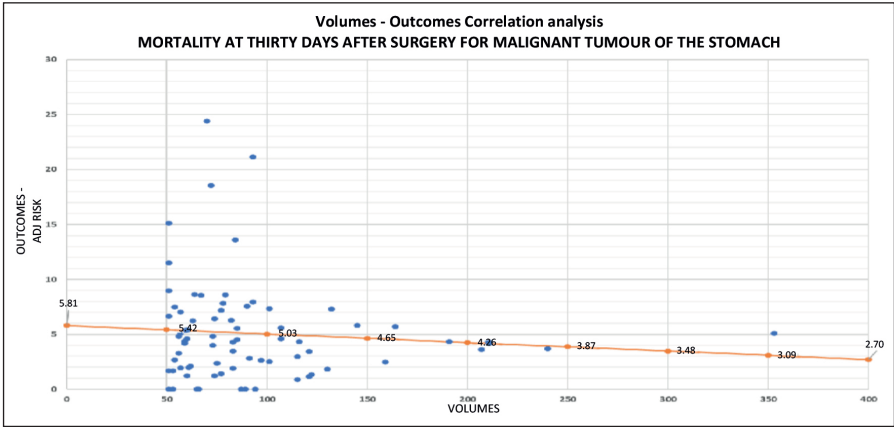


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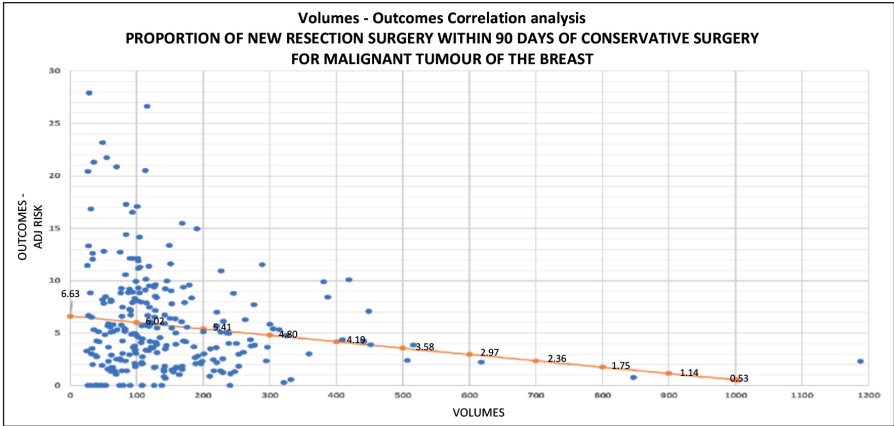
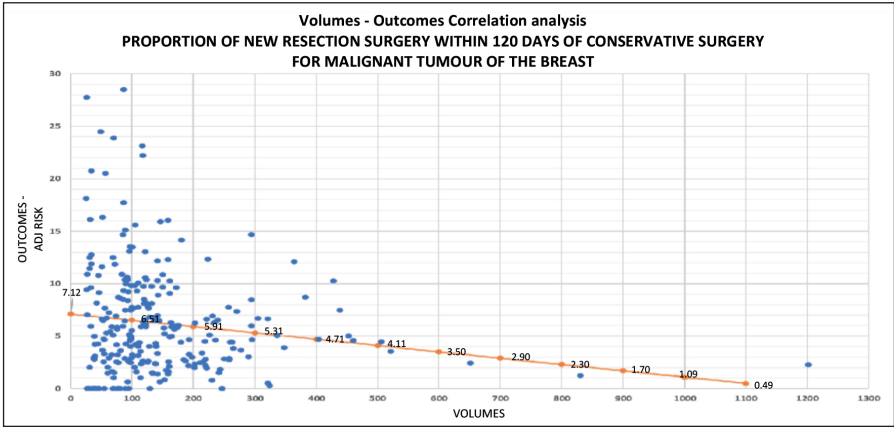


Chart no. 86



10.6. Perinatal clinical area

Chart no. 87

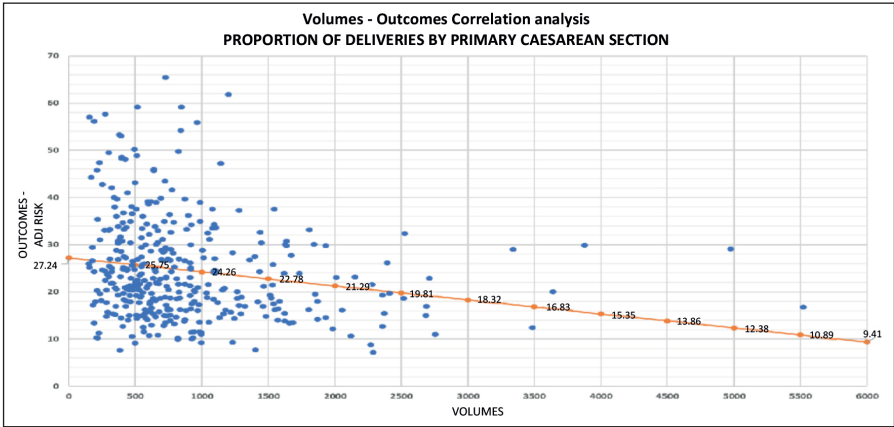


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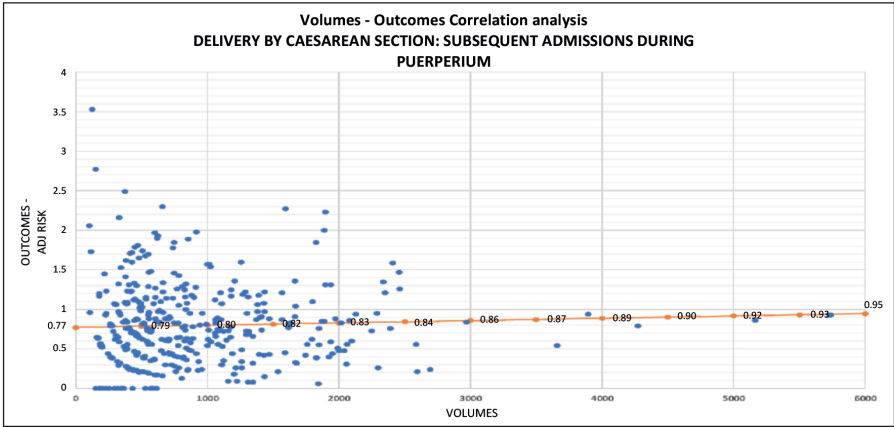


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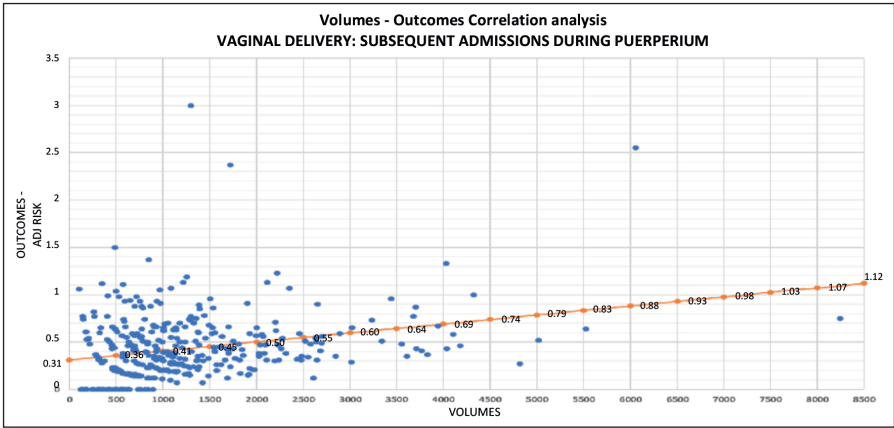


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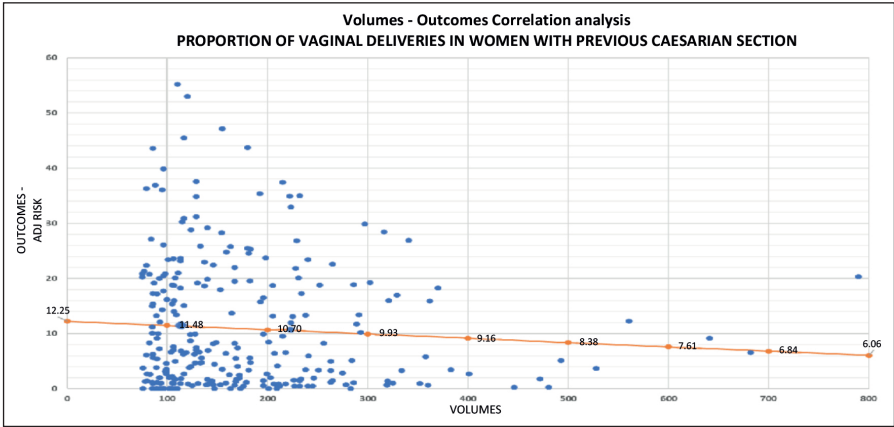
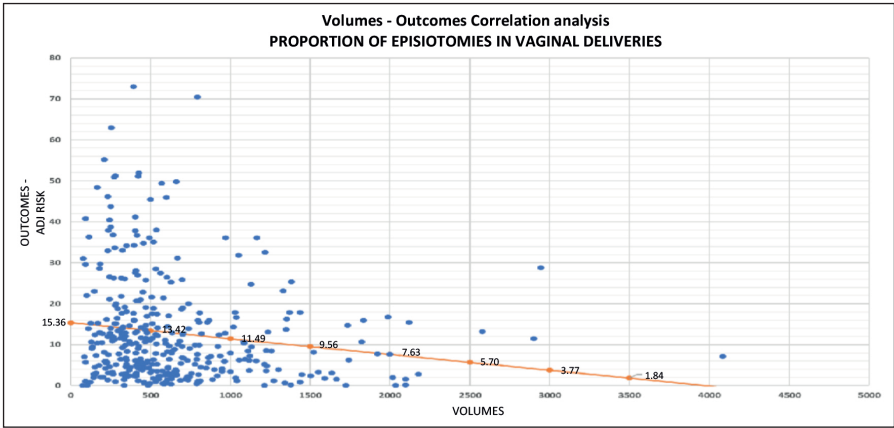


Chart no. 91



10.7. Respiratory clinical area

Chart no. 92

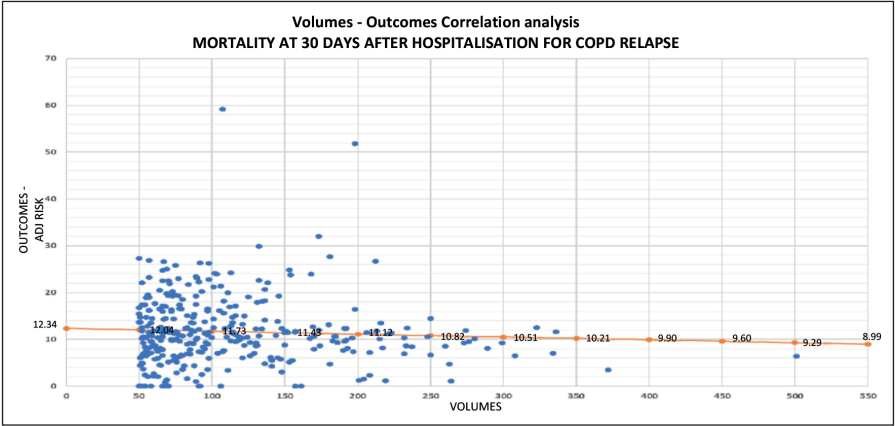
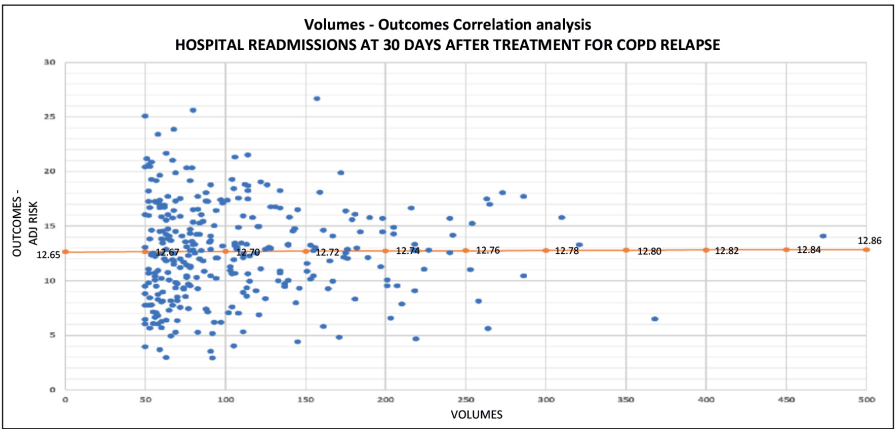
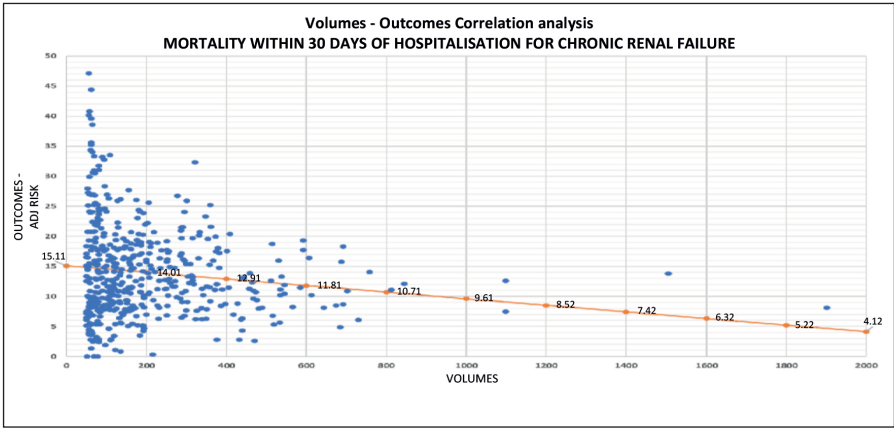


Chart no. 93



10.8. Urogenital clinical area

Chart no. 94



11. Final considerations

Analysing the trend in hospital admissions from 2019 to 2022 was essential in order to evaluate the Italian National Health System's capacity to resume providing the same standard of healthcare services at a regional level as before the disruption caused by the sudden onset of the serious phenomenon of the Covid-19 pandemic.

In this regard, a gradual increase in hospital admissions was confirmed. Recovery began in 2021, but it was uneven across clinical areas and territories. Nevertheless, there was a tendency for values to realign with those of the pre-pandemic years. This recovery was further consolidated in 2022, although it is not yet complete.

In Lombardy, the recovery has been more consistent than in the rest of Italy; in 2022, the gap in the total volume of hospital admissions for the 52 indicators analysed is -6.9% compared to -7.4% nationally, but Lombardy started from -21.2% in 2020 compared to -16.3% nationally.

In the region, the public sector went from -20.5% to -10.1% , while the private sector changed from -23.1% to -2.0% .

The size of the gap varies between clinical areas and between indicators within the same area. For some of these, the volume of admissions increased in 2022 compared to 2019, both nationally and in the Lombardy Region (see the Musculoskeletal and Oncology areas).

In Lombardy, the percentage of admissions to private hospitals out of the region's total for the 52 indicators analysed increased from 37% in 2019 to 39% in 2022. The highest percentages were recorded in the Musculoskeletal area (64%) and in Oncology (43%).

With regard to the quality of clinical outcomes, the comparison between the regions showed that Lombardy as a whole (public + private combined) recorded 35 outcomes as better than the national average (73%) out

of 48 indicators. In the private sector, 38 outcomes (79%) are better than the national average.

In Lombardy in 2022, 21 out of 46 private sector indicators (2 of which were identical) and 27 out of 48 public sector indicators showed improvement compared to the previous year.

These figures confirm the ability of private hospitals to operate within an integrated and complementary context, making an undeniably positive contribution to the overall performance of the Regional Health System, even during critical periods.

As in all other regions, critical issues in Lombardy are still the fragmentation of cases treated and the dispersion of clinical outcome values, which can sometimes be significant, between regions and between public and private hospitals within them.

These critical issues are also reflected in the difficulty of meeting the volume thresholds set out in Decree 70/2015 (as amended); according to data from the 2023 PNE edition, a very high percentage of hospitals (both private and public) fall below the established minimum thresholds for almost all indicators.

For more details, see the table on page 33 of this report.

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Methodology for assessing statistical significance

The comparison of the outcome indicators shown in Table 7.1 was subjected to significance testing in order to validate the recorded results.

For a given indicator, where p_1 defines the outcome calculated in public hospitals and where p_2 defines the outcome calculated in private hospitals, the test conducted verifies the null hypothesis $H_0: p_1 = p_2$ against the alternative hypothesis $H_1: p_1 \neq p_2$.

Moving to calculations, the estimated proportion of the population p^- is:

$$p^- = \left(\frac{N_1 p_1 + N_2 p_2}{N_1 + N_2} \right)$$

while $q^- = 1 - p^-$

The standard error of the difference $p_1 - p_2$ is equal to

$$S_{p_1 - p_2} = \sqrt{p^- q^- \left(\frac{N_1 + N_2}{N_1 N_2} \right)}$$

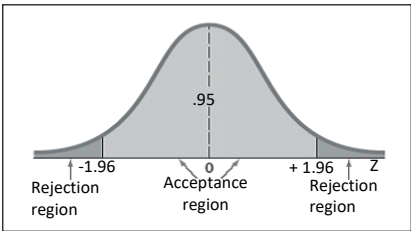
The test statistic Z is given by

$$Z = \frac{(p_1 - p_2)}{S_{p_1 - p_2}} \sim N(0,1)$$

In the normal distribution table, the critical values that divide the rejection region from the acceptance region of the H0 hypothesis are found to be -1.96 and $+1.96$ for $\alpha=0.05$.

Basically, having set the significance level of the statistical test at $\alpha=0.05$, the regions of acceptance and rejection are illustrated in the figure (from the normal distribution table, the critical value is $Z_{0.025}=1.96$). Therefore, for calculated values of the Z statistic greater than the critical value $+1.96$, the outcomes in the two structures differ significantly, implying the rejection of the null hypothesis.

Standard normal curve, with the Rejection region, with $\alpha=5\%$



Study limitations and possible bias

The study is based on complete public data from the PNE portal, which is already aggregated for each individual hospital. We then aggregated the data by group (Regions or Public/Private Hospitals), using the average of the adjusted rate as the aggregation criterion.

The analysis method has a limitation that can be overcome by starting with disaggregated data for each individual hospitalisation. This would provide a clearer picture of how the adjustment variables contribute to the calculation of the adjusted rate, enabling the adjusted rates for the groups (regions or public/private hospitals) to be recalculated.

However, the high number of group cases should not change either the content or the conclusions of this study.

As mentioned in the introduction, future studies could examine this issue in more detail by developing more sophisticated analytical models to explain how different regional organisational models, hospital size, and strategic and organisational management influence the quality of health-care services.

a strong international commitment

The **FrancoAngeli**, **FrancoAngeli Journals** and **FrancoAngeli Series** websites now offer a completely dual language interface, in Italian and English.

Ensuring international visibility and discoverability for our authors is of crucial importance to us.



The Fondazione Sanità Futura is committed to ensuring continuity in the analysis and evaluation of trends in the main volume and clinical outcome indicators, while taking into account factors that may affect data homogeneity from year to year (which is crucial for correctly evaluating trends).

The specific objective of the studies is to provide public institutions and public and private hospitals with useful evaluation criteria to help them design and implement improvement strategies based on critical issues and opportunities identified by comparing different territories and health service providers.



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