



Onco-Epidemiological Analysis of a Research Hospital in Campania, conducted for the Years 2022-2023-2024: Carcinomas with the Highest Incidence by Age and District, Mobility and Interventions Performed

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Abstract

Background/objectives: Cancer is the cause of death for 6% of Italian citizens. The analysis aims to raise awareness by monitoring the incidence of the most common carcinomas through prescriptions in a research institute, comparing the years of interest.

Methods: The data was extracted using the company's computer database: Patient and doctor details, local health authority, cycles, department, therapeutic indication, dose and procedures performed.

Results: A total of 11,062 patients were treated, 55% of whom were women. The highest number of patients assessed by the local health authority were from Naples, followed by Caserta, Salerno, Benevento and Avellino. Of the total, 742 were from outside the region. The age groups with the highest incidence are 58-78 years for 2022, 54-74 for 2023 and 53-73 for 2024. The most common diagnosis in 2022 is breast cancer with 720 patients, followed by 676 in 2023 and 721 in 2024. This is followed by melanoma, with 535 cases in 2022, 376 in 2023 and 643 in 2024. Finally, colorectal adenocarcinoma with 497 in 2022, 544 in 2023 and 630 in 2024. The age incidence report shows that: Under 25, the most frequent diagnosis is Hodgkin's lymphoma; from 30/60, it is breast cancer; from 60 to 80, it is malignant melanoma and colorectal adenocarcinoma; over 80, it is squamous cell carcinoma of the skin.

Conclusion: The analysis shows that the number of tumours is increasing. Breast cancer remains the most common type of cancer, especially among women aged 30/60, followed by melanoma and colorectal adenocarcinoma. Screening is key to survival.

Abbreviations: EV Intravenous: Endovenosa; FR Out-Of-Region: Fuori regione

Keywords: Oncoepidemiology; Oncology; Cancer; Incidence; Mobility

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Introduction

In Italy, neoplastic diseases account for 6% of deaths. The study aims to monitor the frequency of the most common cancers by analyzing intravenous treatments at a research institute over the three-year period 2022-2024, the local health authority of origin and the average age. According to the AIOM, approximately 390,100 new cases were diagnosed in Italy in 2024. Of these, 214,500 were men and 175,600 were women [1]. The study aims to analyze the number of patients treated with Intravenous (IV) therapy at a cancer research institute in Campania. The focus was on patients undergoing IV therapy, as the work was carried out at a cancer research institute with a 'U.M.A.C.A.'

This facility is none other than the anti-cancer drug manipulation unit, where preparations are made for the parenteral administration of drugs for in-label, off-label, innovative, experimental and personalized therapy for patients.

The number of intravenous therapies far exceeds the number of oral therapies by about 70%. Specifically, it has been determined that the number of patients undergoing treatment in the years of interest to us is 11,062, broken down as follows: 3,727, 328 and 4,050 for the years under review, namely 2022, 2023 and 2024. Of these, evaluating the local health authorities to which they belong, we know that: 247 patients for the first year, 214 for the second and 281 for the third are patients who do not reside in Campania, defined as Outside Of Region (fr).

We focused on the mobility. The mobility refers to the phenomenon whereby patients travel to facilities outside their region of residence to receive healthcare services and treatment: The OECD1 defines healthcare mobility as medical tourism, which is based on two fundamental aspects: Movement from one jurisdiction to another and the healthcare service that is the reason for the travel. It is divided into active mobility and passive mobility. As stated by AGENAS in Italy, healthcare mobility is a key phenomenon for understanding the organizational structure and critical issues of the National Health Service (SSN). It is mainly divided into two macro-dimensions: Hospital mobility and outpatient mobility, which together accounted for approximately 85% of total healthcare mobility expenditure in 2023. This incidence highlights the crucial role of these flows in understanding the dynamics of healthcare service use and the territorial organization of supply. In-depth analysis of mobility is therefore essential for healthcare planning, the efficient distribution of resources and ensuring equitable and timely access to the services provided by the National Health Service [2].

This phenomenon was evident in the data examined, evaluating the regions with the highest attendance. Lazio was observed to be the predominant reaction. Overall, we then observed the average age, which is 65 and the

incidence of the most recurrent carcinomas. Finally, by structuring the extracted data in-to tables with 10-year age intervals starting from under 25 and ending with over 80, we analyzed the incidence in relation to age. We observed a predominance of breast cancer in the middle age groups. The study concludes with a brief focus on the surgical procedures performed over the years, as first-line treatment, neoadjuvant treatment or adjuvant therapy following IV therapy.

Description

Cancer is responsible for about 6% of all deaths in Italy. This study looked at data from a research institute to better understand which types of cancer are most common and how their numbers have changed over three years: 2022, 2023 and 2024.

Over 11,000 patients were treated during this period, with women making up 55% of the total. Most patients came from the province of Naples, followed by Caserta, Salerno, Benevento and Avellino. A smaller number of patients came from outside the region.

The three most common types of cancer were:

- Breast cancer, especially among women aged 30 to 60
- Melanoma, a serious form of skin cancer, more common in people aged 60 and above
- Colorectal cancer, also frequent in older adults.

Among people under 25, Hodgkin's lymphoma was the most frequent cancer. In patients over 80, squamous cell skin cancer was the most common.

The overall number of cancer cases increased from 2022 to 2024. Breast cancer remained the most diagnosed type each year. The findings from this study show how important it is to focus on prevention and regular screening, as early diagnosis can greatly improve the chances of successful treatment and survival.

Key Points:

Study objective

The analysis aims to monitor the frequency of the most common cancers through Intravenous (IV) therapies administered at a cancer research institute in Campania over the three-year period 2022-2024, also assessing patients' regional origins and average age.

General patient data

During the study period, a total of 11,062 patients were treated:

- 3,727 in 2022
- 3,285 in 2023



➤ 4,050 in 2024.

Among these, 247, 214 and 281 patients respectively came from outside the Campania region (healthcare mobility).

Role of intravenous therapy

Intravenous therapies exceed oral therapies by about 70%, as the institute hosts the U.M.A.C.A. unit (Anti-Cancer Drug Manipulation Unit), where personalized, off-label, innovative and experimental drugs are prepared for parenteral administration.

Healthcare mobility

The phenomenon of healthcare mobility, meaning patients traveling outside their home region to receive treatment, was clearly observed. A significant number of patients came from Lazio. Mobility is a key indicator for understanding the organization and challenges of the Italian National Health Service (SSN).

Average age and cancer incidence

The average age of the patients is 65 years. When analyzing age groups in 10-year intervals, a predominance of breast cancer was observed among middle-aged patients. The study concludes with a focus on the associated surgical procedures, performed as first-line treatment, neoadjuvant therapy or adjuvant therapy following IV treatment.

Inter and extra-regional mobility

Patient mobility was also analyzed, distinguishing between those residing in Campania and those from other Italian regions. For Campania, patients were first divided by ASL and then grouped by province. For other regions, since the numbers were lower, patients were grouped only by ASL, with results reported in descending order for each year.

🚦 **2022:** ASL Napoli 1 Centro (1,016), ASL Napoli 2 Nord (729), ASL Napoli 3 Sud (728), ASL Caserta (550), ASL Salerno (299), ASL Avellino (103), ASL Benevento (54).

🚦 **2023:** ASL Napoli 1 Centro (1,031), ASL Napoli 2 Nord (581), ASL Napoli 3 Sud (575), ASL Caserta (503), ASL Salerno (225), ASL Avellino (99), ASL Benevento (58).

🚦 **2024:** ASL Napoli 1 Centro (1,122), ASL Napoli 2 Nord (795), ASL Napoli 3 Sud (783), ASL Caserta (571), ASL Salerno (305), ASL Avellino (115), ASL Benevento (78).

As for patients from outside Campania, a summary table was compiled to show regional distribution for 2022–2024. Lazio emerged as the region with the highest inflow of patients, followed by Puglia, Calabria, Sicily and Abruzzo. A smaller, though not negligible, number of

patients also came from northern Italy (**Figures 1, 2, 3, 4 and Table 1**).

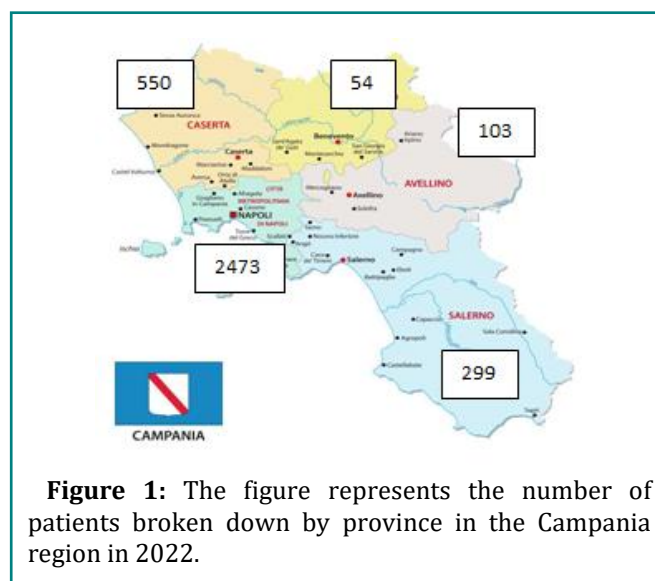


Figure 1: The figure represents the number of patients broken down by province in the Campania region in 2022.

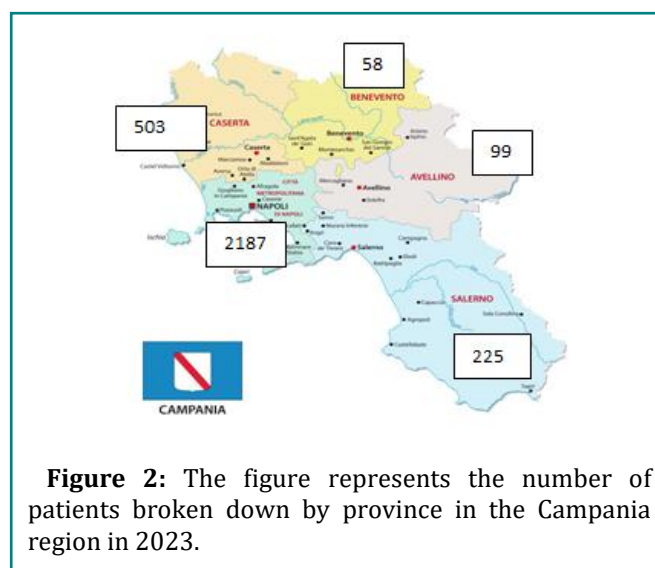


Figure 2: The figure represents the number of patients broken down by province in the Campania region in 2023.

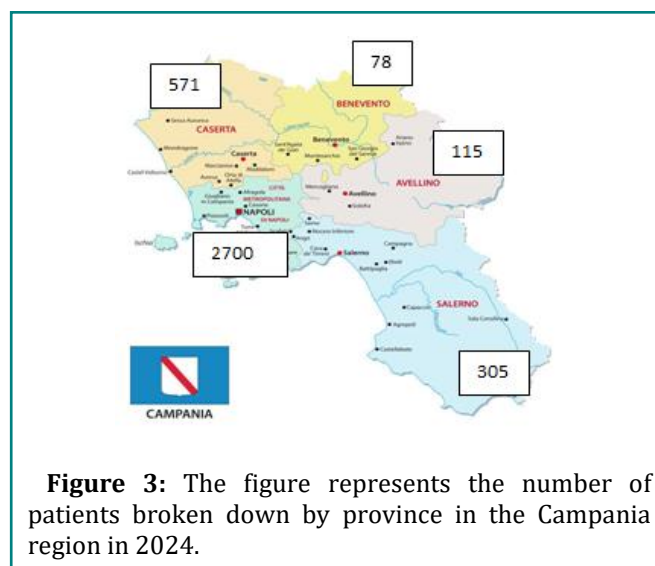


Figure 3: The figure represents the number of patients broken down by province in the Campania region in 2024.

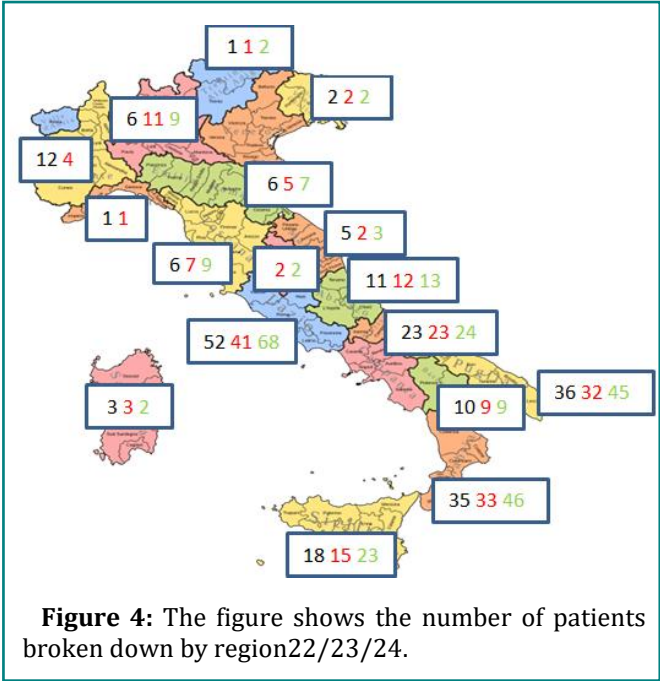


Figure 4: The figure shows the number of patients broken down by region22/23/24.

Table 1: This table highlights FR patients, showing their regions of origin.

Region	2022	2023	2024
Abruzzo	11	12	13
Basilicata	10	9	9
Calabria	35	33	46
Emilia Romagna	6	5	7
Friuli Venezia Giulia	2	2	2
Lazio	52	41	68
Liguria	1	1	
Lombardia	6	11	9
Marche	5	2	3
Molise	23	23	24
Piemonte	12	4	
Puglia	36	32	45
Sardegna	3	3	2
Sicilia	18	15	23
Toscana	6	7	9
Trentino Alto Adige	1	1	2
Umbria	-	2	2

Patients by age (examples from 2022-2024)

For each year, patients were grouped by age and categorized as follows (Figures 5, 6 and 7):

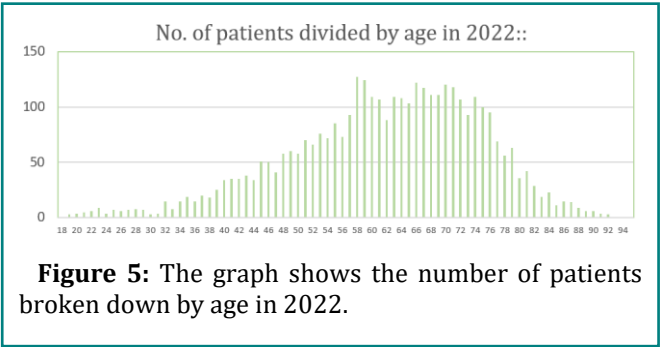


Figure 5: The graph shows the number of patients broken down by age in 2022.

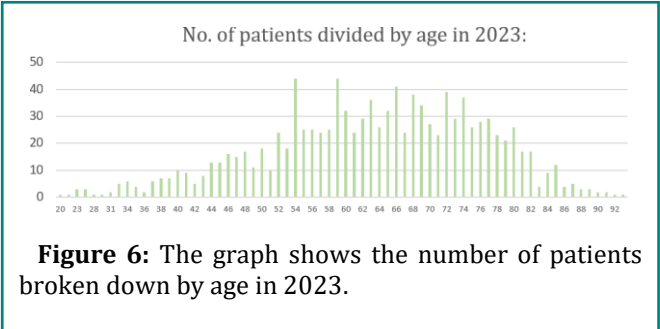


Figure 6: The graph shows the number of patients broken down by age in 2023.

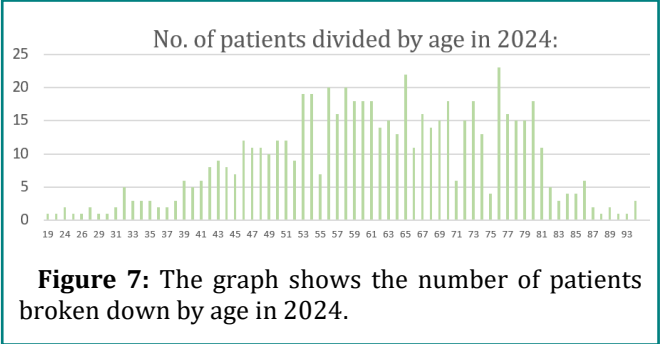


Figure 7: The graph shows the number of patients broken down by age in 2024.

- 2022: In patients under 25, the most frequent diagnosis was classical Hodgkin lymphoma. Between ages 26-65, breast carcinoma was predominant. Between 66-85, advanced malignant melanoma was most common, while in patients over 85, cutaneous squamous cell carcinoma was the leading diagnosis.
- 2023: Patients under 25 and 26-35 were most often diagnosed with classical Hodgkin lymphoma. From 36-65 years, breast carcinoma predominated; from 66-75, meta-static colorectal adenocarcinoma; from 76-85, malignant melanoma; and above 85 years, cutaneous squamous cell carcinoma.
- 2024: In patients under 25, classical Hodgkin lymphoma remained the most frequent diagnosis. Between 26-65, breast carcinoma was predominant; between 66-75, metastatic colorectal adenocarcinoma; from 76-85, melanoma; and above 85, cutaneous squamous cell carcinoma.

Patients divided by department:

For each year, treated patients were grouped and divided by department (Figures 8, 9 and 10):



Patients divided by department 2022

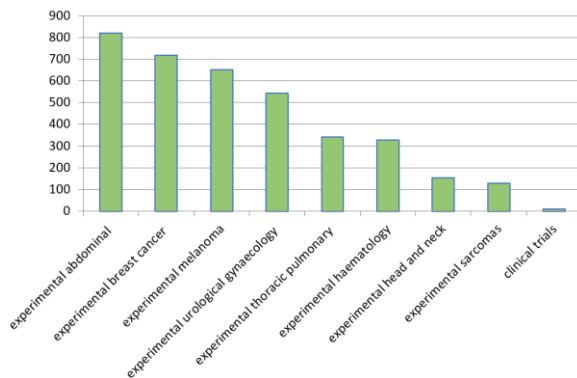


Figure 8: The graph shows the number of patients broken down by department in 2022.

Patients divided by department 2023

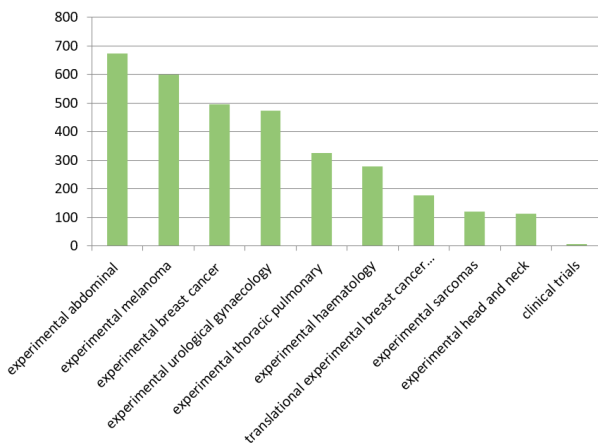


Figure 9: The graph shows the number of patients broken down by department in 2023.

Patients divided by department 2024

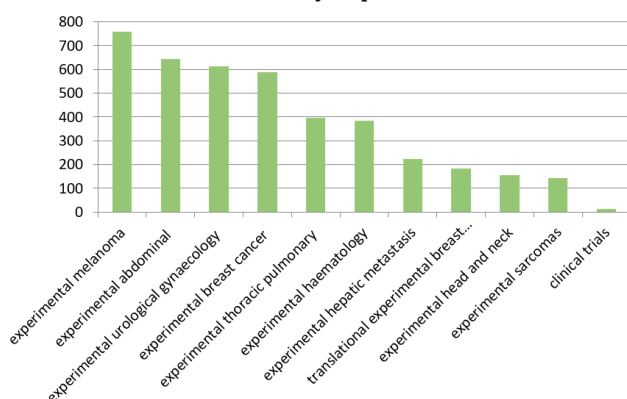


Figure 10: The graph shows the number of patients broken down by department in 2024.

department, 718 for breast cancer, 652 for melanoma, 543 for urogynecology, 342 for thoracic-pulmonary, 329 for hematology, 154 for head and neck, 129 for sarcomas and rare tumours and 10 for clinical trials.

✚ **In 2023:** 673 patients for the experimental abdominal department, 674 for senology, 600 for melanoma, 474 for urogynecology, 325 for thoracic-pulmonary, 297 for hematology, 121 for sarcomas, 113 for head and neck, 8 for trials.

✚ **In 2024:** 869 patients for the experimental abdominal department, 769 patients for the breast cancer department, 758 for melanoma, 613 for urogynecology, 396 for thoracic-pulmonary, 384 for hematological oncology, 157 for head and neck, 142 for sarcomas and 12 for clinical trials.

Diagnosis 2022/2023/2024

Patients divided by diagnosis 2022

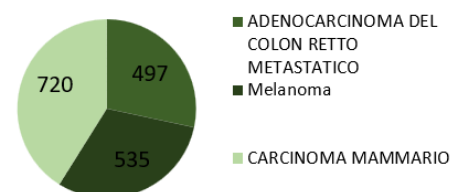


Figure 11: The graph shows the number of patients broken down by diagnosis in 2022.

Patients divided by diagnosis 2023

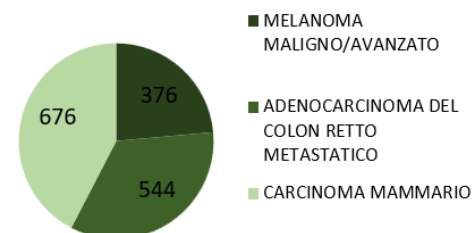


Figure 12: The graph shows the number of patients broken down by diagnosis in 2023.

Patients divided by diagnosis 2024

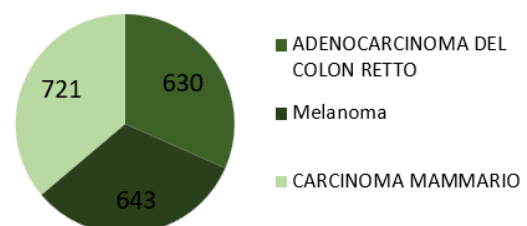


Figure 13: The graph shows the number of patients broken down by diagnosis in 2024.

✚ **In 2022:** 819 patients for the experimental abdominal



The breakdown by diagnosis is as follows: In 2022, the most common diagnosis is breast cancer with 720 patients, followed by melanoma with 535 patients and finally metastatic colorectal adenocarcinoma with 497 patients. In 2023, the most common diagnosis is breast cancer with 676 patients, followed by meta-static colorectal adenocarcinoma with 544 patients and finally advanced malignant melanoma with 376 patients. In 2024, the most common diagnosis is breast cancer with 721 patients, followed by melanoma with 643 patients and finally colorectal adenocarcinoma with 630 patients.

Therefore, over the three years, breast cancer will be the most common cancer, followed by alternating rates of colorectal adenocarcinoma and melanoma over the years.

Incidence/age ratio

Attached is an image showing patients divided by generation. They are divided into 10-year age groups in order to observe the most recurrent incidences (Figure 14, Table 2,3 and 4):

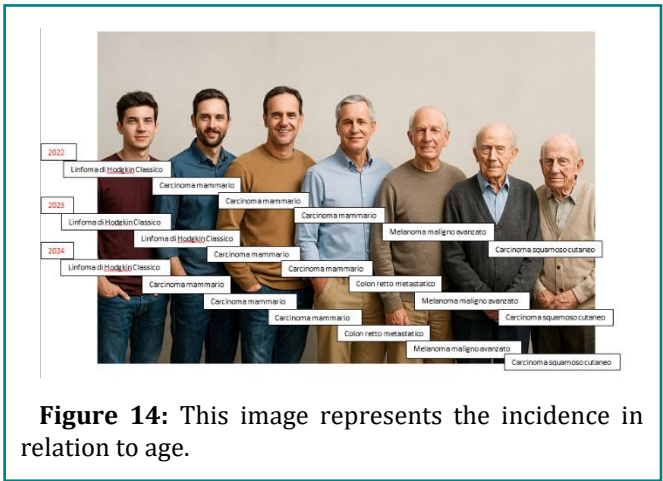


Figure 14: This image represents the incidence in relation to age.

Explanatory tables follow:

Table 2: The table shows the breakdown by age of carcinomas in 2022.

Age groups	Incidence of major pathology 2022
<25	Classic Hodgkin's lymphoma
26 e 35	Breast carcinoma
36 e 45	Breast carcinoma
46 e 55	Breast carcinoma
56 e 65	Breast carcinoma
66 e 75	Advanced malignant melanoma
76 e 85	Advanced malignant melanoma
>85	Squamous cell carcinoma of the skin

Table 3: The table shows the breakdown by age of carcinomas in 2023.

Age groups	Incidence of major pathology 2023
<25	Classic Hodgkin's lymphoma
26 e 35	Classic Hodgkin's lymphoma
36 e 45	HER2+ metastatic breast cancer
46 e 55	HER2+ metastatic breast cancer
56 e 65	HER2+ metastatic breast cancer
66 e 75	Metastatic rectal adenocarcinoma
76 e 85	Advanced malignant melanoma
>85	Squamous cell carcinoma of the skin

Table 4: The table shows the breakdown by age of carcinomas in 2024.

Age groups	Incidence of major pathology 2024
<25	Classic Hodgkin's lymphoma
26 e 35	Breast carcinoma
36 e 45	Breast carcinoma
46 e 55	Breast carcinoma
56 e 65	Breast carcinoma
66 e 75	Metastatic rectal adenocarcinoma
76 e 85	Melanoma
>85	Squamous cell carcinoma of the skin

In 2022: Patients under the age of 25 were most commonly diagnosed with classical Hodgkin's lymphoma, those between 26 and 65 were most commonly diagnosed with breast cancer, those between 66 and 85 with advanced malignant melanoma and those over 85 with squamous cell carcinoma of the skin.

In 2023: Patients under the age of 25 were most commonly diagnosed with classical Hodgkin's lymphoma, as were those aged 26 to 35. Among those aged 36 to 65, breast cancer was most commonly diagnosed, among those aged 66 to 75, metastatic colorectal adenocarcinoma, among those aged 76 to 85, malignant melanoma and among those over 85, squamous cell carcinoma.

In 2024: Patients under the age of 25 were most commonly diagnosed with classical Hodgkin's lymphoma, those aged 26 to 65 with breast cancer, those aged 66 to 75 with metastatic colorectal adenocarcinoma, those aged 76 to 85 with melanoma and those over 85 with squamous cell carcinoma.

Surgical procedures

The surgical procedures performed at the institute were also analyzed. Based on data from the three years studied, the most frequently operated cancers were breast



cancer (with a peak of interventions in 2023), thyroid cancer, colorectal cancer and ovarian cancer (Figure 15 and Table 5).

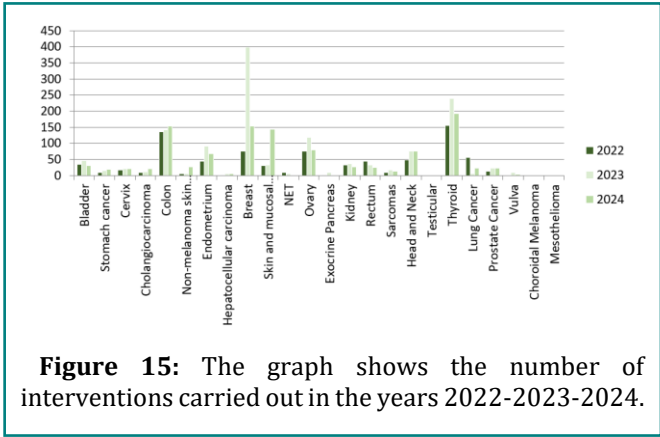


Figure 15: The graph shows the number of interventions carried out in the years 2022-2023-2024.

Table 5: The table shows the intervention data broken down by year.

Surgeries	2022	2023	2024
Bladder	34	46	30
Stomach cancer	10	15	18
Cervix	16	21	20
Cholangiocarcinoma	9	12	20
Colon	135	141	153
Non-melanoma skin cancer	5	5	26
Endometrium	45	91	68
Hepatocellular carcinoma	2	6	5
Breast	76	398	153
Skin and mucosal melanoma	30	33	143
NET	9	6	1
Ovary	76	119	80
Exocrine Pancreas	2	9	1
Kidney	33	37	26
Rectum	45	33	25
Sarcomas	9	16	13
Head and Neck	48	76	75
Testicular	1	1	1
Thyroid	156	239	193
Lung Cancer	55	6	22
Prostate Cancer	14	23	23
Vulva	0	9	3
Choroidal melanoma	1	-	-
Mesothelioma	1	-	-

Materials and Methods

Data were extracted from the research hospital’s electronic system, which records all IV therapies administered to patients. Patients were listed in Excel files, where for each case the following information was reported: Full name, tax code, date of birth, gender,

municipality of residence, therapy per-formed, number of cycles, prescribed dosage, active ingredient, commercial brand name, batch number, hospital department and clinic of origin. Physicians’ details were also recorded.

Data of interest were extracted every 3 months, then grouped into three 12-month blocks to cover the study years. Patients were stratified and analyzed to observe the most frequent diagnoses for 2022, 2023 and 2024.

Inter and extra-regional mobility was evaluated by recording each patient’s municipality of residence and region of origin. The analysis also included the average patient age, to assess whether the age of incidence for the most frequent pathologies was shifting upward or downward.

Finally, a second platform was used to extract data on surgical interventions carried out over the study years, with results summarized in tables.

Results

Intravenous (IV) treatments

The analysis showed that the number of patients treated at the oncology institute slightly increased over the years. In 2022, 3,727 patients were treated; in 2023, 3,285; and in 2024, the number rose again to 4,050 patients. Patients were then divided by gender. Over the three-year period, the proportion of female patients was about 5% higher compared to males. Specifically, in 2022 there were 1,629 men and 2,099 women; in 2023, 1,451 men and 1,834 women; and in 2024, 1,857 men and 2,193 women. Overall, women were slightly more represented.

Focus was then placed on the most frequent pathology, evaluated through the prescriptions received and the IV treatments administered at the institute. The data confirmed that in Campania the most commonly treated and diagnosed cancer was breast carcinoma: 720 cases in 2022, 676 in 2023 and 721 in 2024. This explains the higher proportion of female patients, given the greater incidence of breast carcinoma in women (Figures 16, 17, 18, 19 and 20).

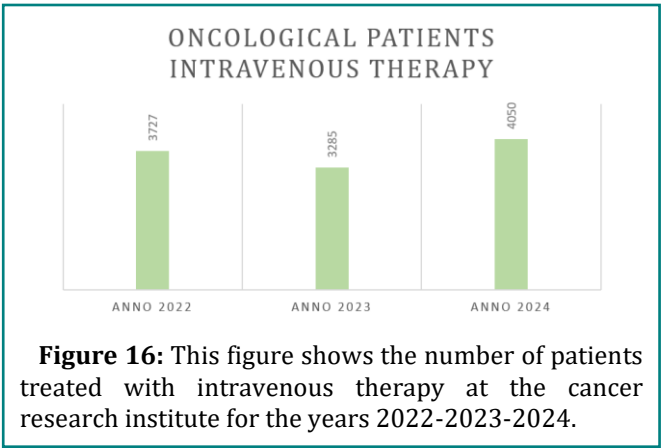


Figure 16: This figure shows the number of patients treated with intravenous therapy at the cancer research institute for the years 2022-2023-2024.



Percentage over 3 years

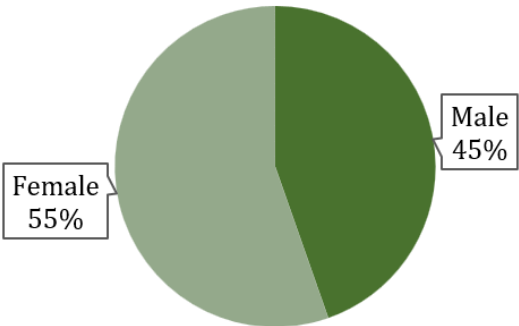


Figure 17: This figure shows the percentage of patients treated with EV therapy at the cancer research institute for the years 2022-2023-2024.

Patients 2022 broken down by gender

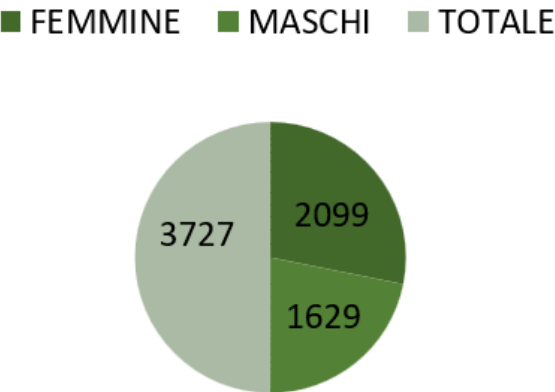


Figure 18: This figure shows patients treated with EV therapy, broken down by gender for the year 2022.

PATIENTS 2023 broken down by gender

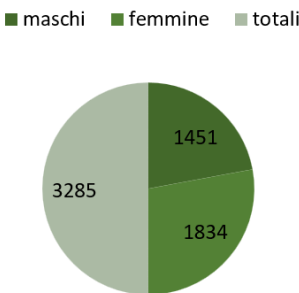


Figure 19: This figure shows patients treated with EV therapy, broken down by gender for the year 2023.

PATIENTS 2024 broken down by gender

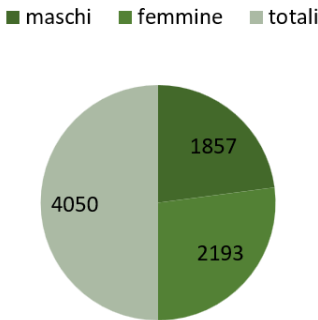


Figure 20: This figure shows patients treated with EV therapy, broken down by gender for the year 2024.

Discussion

The analysis highlighted a gradual increase in carcinoma diagnoses, even if by a relatively small number of cases. The main goal was to monitor IV therapies administered in past years and to continue doing so in future years, in order to evaluate incidence trends in Campania.

The most recurrent tumors were breast carcinoma, melanoma and colorectal adenocarcinoma, with breast carcinoma being the most frequent diagnosis. This disease primarily affects women from the age of 30 onward, but male patients are not completely excluded, though the incidence in men is much lower.

Attention was also given to surgical interventions, which again showed a pre-dominance of breast carcinoma. Future studies will focus more specifically on this tumor with the aim of raising awareness among both men and women about the importance of screening, in the hope of avoiding negative outcomes and the need for IV, adjuvant or neoadjuvant therapies.

Conclusion

Number of patients treated with intravenous therapy in the three years analyzed was over 3000 cases per year. The average age for the years 2022/2023/2024 was 65. 714 patients were treated who were not from the Campania region. The patients were mainly affected by three diagnoses: Breast cancer, colorectal adenocarcinoma and melanoma. Screening is recommended as a means of raising patient awareness. Precisely as stated by the source: Cancer screening programs are included in the Essential Levels of Care (Lea - Prime Ministerial Decree of January 12, 2017) and their activity is monitored through a series of analyses carried out by the National Statistics Institute (ONS) and the Passi surveillance system. In the case of the three established screening programs (mammography, cervical and colorectal), based on the new recommendations on cancer screening issued by the



European Council in December 2022, the overall objective is to ensure that screening is offered to at least 90% of eligible citizens in all member countries by 2025. It is clear that in order to align with European guidelines, our country needs to make significant changes and the digital transformation in healthcare must certainly also include cancer screening [3].

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