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Is cancer increasing in young adults in Spain? Incidence trends from the Spanish Network of Cancer Registries (REDECAN)

Daniel Redondo-Sánchez [a,b,c], Dafina Petrova [a,b,c,d,*], Jàmnica Bigorra [e,f], Alberto Ameijide [e,f], Blanca Madrid Pérez-Esparza [b], María-Isabel Palacios-Castaño [g], Marta Muncunill Farreny [h], María Dolores Chirlaque López [a,i], Marcela Guevara [a,j,k], Marià Carulla [e,f], Pilar Gutiérrez Meléndez [l], Susana Merino Perera [m], Montserrat Cristina Garrido Martín [n], Xitama Nayra Álvarez Díaz [n], Ana Vizcaíno Batllés [o], Isabel Martin Muñoz [p], Nere Mendizabal [p], Amaia Onaindia [p], Jan Trallero [q,r], Encarnación González-Flores [b,d], Jaume Galceran [e,f], María-José Sánchez [a,b,c]

[a] CIBER de Epidemiología y Salud Pública (CIBERESP), Madrid, Spain
[b] Instituto de Investigación Biosanitaria de Granada ibs.GRANADA, Granada, Spain
[c] Escuela Andaluza de Salud Pública, Granada, Spain
[d] Medical Oncology, Hospital Universitario Virgen de las Nieves, Granada, Spain
[e] Tarragona Cancer Registry, Hospital Universitari Sant Joan de Reus, Reus, Spain
[f] Institut d'Investigació Sanitària Pere Virgili, Reus, Spain
[g] Responsable del Registro de cáncer, Servicio de Epidemiología y Prevención Sanitaria, Dirección General de Salud Pública, Consumo y Cuidados, Logroño, La Rioja, Spain
[h] Registro de Cáncer de Mallorca, Spain
[i] Department of Epidemiology, Regional Health Council, IMIB-Arrixaca, Murcia University, Murcia, Spain
[j] Instituto de Salud Pública y Laboral de Navarra, Pamplona 31003, Spain
[k] Navarra Institute for Health Research (IdiSNA), Pamplona 31008, Spain
[l] Registro poblacional de Cáncer de Castilla y León, Spain
[m] Registro de Cáncer de Asturias, Spain
[n] Registro Poblacional de Cáncer de Canarias, Spain
[o] Registro de tumores de Castellón (Castellón Cancer Registry), Spain
[p] Registro de Cáncer de Euskadi, Spain
[q] Directorate Plan of Oncology, Epidemiology Unit and Girona Cancer Registry, Girona Biomedical Research Institute Dr. Josep Trueta (IDIBGI-CERCA), Catalan Institute of Oncology, Carrer del Sol n°15, Girona 17003, Spain
[r] Josep Carreras Leukaemia Research Institute, Badalona, Spain

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ABSTRACT

Introduction: There is growing concern about rising cancer incidence among adults younger than 50 years. This collaborative study within the Spanish Network of Cancer Registries (REDECAN) aimed to examine cancer incidence trends in young adults in Spain.

Material and methods: This population-based observational study used data from 15 cancer registries. All newly diagnosed cancer cases in individuals aged 20–49 years between 1993 and 2018 were included. For each sex and cancer site, truncated age-standardized incidence rates per 100,000 person-years were calculated using the European standard population (TASR-E). Temporal trends were assessed using Joinpoint regression analysis to estimate the annual percent change (APC).

Results: A total of 153,599 new cancer cases (58% in women) were diagnosed during the study period. Trends were heterogeneous, with more increases observed in women. Incidence rose for kidney (APC=2.5%), thyroid (4.0%), and Hodgkin lymphoma (1.1%) in men and for pancreas (2.0%), Hodgkin (2.1%) and non-Hodgkin (1.7%) lymphoma in women. Several digestive system (stomach, colon, rectum), breast and cervical cancers increased significantly among the youngest adults (<40 years old). In contrast, incidence declined for larynx,

* Correspondence to: Cuesta del Observatorio 4, Granada 18071, Spain.
E-mail address: dafina.petrova.easp@juntadeandalucia.es (D. Petrova).

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lung, urinary bladder, and liver cancers in both sexes (APCs ranging between −3.1% to −8.7%), and for lip, oral cavity, and pharynx cancers in men.
Discussion: In young adults, incidence of smoking-associated cancers has decreased substantially, whereas some obesity-associated cancers have increased among adults 20–39 years old. These findings underscore the need for stronger cancer prevention measures and a better understanding of the rising incidence of some cancers in young adults.

1. Introduction

Cancer diagnosed in adults younger than 50 years represented an estimated 15.4% of cases worldwide in 2022 [1]. This proportion is relatively small because cancer incidence increases exponentially with age, as most cancers occur in older adults. Nonetheless, data from multiple countries revealed substantial rises in cancer incidence among adults aged 20–49, with incidence increasing by 79% between 1990 and 2019 [2].

Cancers that have traditionally shown a peak in early-to-middle adulthood include thyroid and testicular cancers, sarcomas, skin melanoma, central nervous system (CNS) tumors, and cervical and ovarian cancers. Beyond these long-recognized patterns, recent increases in several cancer types—typically diagnosed later in life—among individuals under 50 are particularly concerning [2–6]. This phenomenon, termed *early-onset cancer*, has even been described as an emerging pandemic [3]. Early-onset cancers that are increasing in multiple countries among adults aged 20–49 include breast, colorectal, pancreatic, liver, stomach, head and neck, kidney, and thyroid cancers, multiple myeloma, and some cancers of the reproductive system [3,4].

Diagnosing cancers that typically occur in older adults in young adults presents several unique challenges [7,8]. First, early-onset cancers appear to have different biological behavior, tending to be more aggressive than those occurring in older adults [7,9,10]. Second, these cancers may frequently be diagnosed at more advanced stages, partly because their occurrence is unexpected in younger individuals, and clinicians may fail to suspect that a malignancy may be responsible for the symptoms experienced [11]. Third, these cancers may carry distinct personal, social, and economic consequences for patients and their families, because they arise during key life stages—often disrupting education, career development, family planning, caregiving responsibilities, and long-term financial stability—leading to a broader and more sustained impact than diagnoses occurring later in life [12].

Although a proportion of young-onset cancers is attributable to hereditary cancer syndromes, most cases are considered sporadic and potentially influenced by early-life exposome factors during pregnancy, infancy, adolescence, and early adulthood [13,14]. Hypothesized contributors include obesity, accelerated biological aging, diet, lifestyle, antibiotic exposure, environmental factors, infections, and the associated changes in the microbiome [3,13,14]. The growing use of screening and early detection before age 50 has likely contributed to rising incidence for certain cancers such as breast, prostate, and thyroid tumors. However, screening alone cannot fully explain the observed trends [3,9].

It is also important to note that, while several cancer types have shown increasing incidence among young adults, declines have been documented for others such as cervical, lung, laryngeal, and ovarian cancers [4], most likely due to effective prevention and early detection strategies. This demonstrates that it may be possible to design appropriate interventions and potentially reverse the concerning trends.

Most recent studies documenting increases in early-onset cancers come from English-speaking countries, and considerable variability has been observed in both the significance and magnitude of the incidence trends [3,4,6,15]. These differences may reflect variations in exposure to etiological factors and healthcare system characteristics. Emerging studies from the Mediterranean region indicate more heterogeneous patterns and do not confirm the alarming trends in early-onset breast and digestive tumors documented in other parts of the world [16–18]. For example, unlike the marked increases in colorectal cancer reported in countries such as the United States, the United Kingdom, Australia, Germany, Sweden, Finland, Denmark, and the Netherlands [6,15,19,20], studies from Spain and Italy indicate declining or stable trends among the broader young adult population aged 20–49 [16–18]. However, more detailed analyses from Spain have revealed rising colorectal cancer rates among the youngest adults under 30 [21], suggesting that Mediterranean countries may be experiencing similar patterns, albeit with some delay.

In Spain, these observations have raised concerns among scientists, clinicians, patients, and policymakers about whether the country may soon face the alarming trends documented elsewhere. Previous studies, however, have been limited to regional analyses [16], specific cancer sites [21], or non–population-based data [22], offering only partial insights. To address the need for nationwide, population-based evidence, respond to growing concerns about early-onset cancer, and offer relevant information for health authorities and policymakers, we initiated a collaborative study within the Spanish Network of Cancer Registries (REDECAN). The objective of the study was to analyze cancer incidence trends among young adults in Spain.

2. Material and methods

This study was designed as a nationwide, population-based retrospective observational study. Incidence data (new cancer cases among adults aged 20–49 years) were obtained from the REDECAN database, 6th edition. The dataset included the total number of cases for each combination of sex, age group at diagnosis, year of diagnosis, and cancer type.

The study period started in 1993 and ended in 2018, the latest year for which updated REDECAN data were available, with some variation between registries depending on the availability of data as follows: Basque Country (1993–2018), Mallorca (1993–2013), Castellón (2004–2018), Girona (1993–2018), Granada (1993–2018), La Rioja (1993–2018), Murcia (1993–2018), Navarra (1993–2017), Asturias (1993–2017), Tenerife (1993–2018), Salamanca (2011–2018), Gran Canaria (1993–2018), and Tarragona (1993–2018).

For each sex, cancer type, 10-year age group, and calendar year of diagnosis, age-specific rates and age-standardized truncated rates per 100,000 persons were calculated using the 2013 European standard population from EUROSTAT (TASR-E). Truncated rates were computed by applying the relative weights of the 2013 European standard population between ages 20–49 to the age-specific rates.

Joinpoint regression was used to estimate the annual percent change (APC) in TASR-E. This method applies a log-linear model to estimate incidence rates over time, allowing the identification of potential trend changes and the determination of joinpoints, if present. Given the long period and relatively low incidence of some cancer types overall or in subgroups, we restricted the analysis so that each trend segment covered a minimum of five years. The maximum number of joinpoints was restricted to 2 for reasons of both statistical power and epidemiological plausibility. The trends presented correspond to those selected by the Joinpoint model as the best-fitting solution according to its statistical criteria.

APCs represent the annual percentage change (increase or decrease) during periods without significant shifts in trend. Additionally, the

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average annual percentage change (AAPC) was calculated for selected cancer sites over the most recent decade to characterise the most recent trends. 95% confidence intervals (CI) were also computed to assess the statistical significance of the observed trends.

Analyses were conducted for all cancers combined (excluding non-melanoma skin cancer (NMSC)) as well as for each cancer type separately (see Table S1 for cancer site classification). Results are presented for all ages combined and stratified by sex and by 10-year age groups (20–29, 30–39, and 40–49 years old) to explore age-specific patterns.

Trend analyses of TASR-E were performed using Joinpoint software, version 5.4.0.0, calculating the APCs and their associated p-values. All other statistical analyses and figure generation were conducted using R software, version 4.5.0.

3. Results

There were 153,599 new cancer cases in young adults during the study period, accounting for 12.1% of cancer cases in all ages (Table 1). This percentage was twice as high in women (17.6%) than in men (8.5%).

In young women (Table 2), the most frequent cancer sites were breast with 37,820 new cases (42.3% of the total), thyroid (7.9%), cervix (6.1%), skin melanoma (5.7%) and ovary (4.1%). In young men (Table 2), the most common cancer sites were lung (11.6% of the total), testis (8.3%), non-Hodgkin's lymphoma (7.7%), lip, oral cavity and pharynx (7.7%) and urinary bladder (6.6%).

3.1. Overall incidence trends in young adults

For all cancers except NMSC, incidence decreased in men between 1998 and 2018 (APC=−1.6%, 95%CI: (−2.2, −1.4)) and increased slightly in women from 2000 to 2018 (APC=0.4%, 95%CI: (0.1, 0.6)). In Figure 1, the APC in incidence by anatomical site and sex is shown. Considering the last period of the joinpoint regression, statistically significant increases were found in men for kidney cancer (APC=2.5% in the period 2006–2018), thyroid cancer (APC=4.0% in the period 1993–2018) and Hodgkin's lymphoma (APC=1.1% in the period 1993–2018). In women, significant increases were found in pancreatic cancer (APC=2.0% in 1993–2018), Hodgkin's lymphoma (APC=2.1% in 1993–2018), and non-Hodgkin's lymphoma (APC=1.7% in 2005–2018). Incidence decreased for several types of cancer in both men (lip, oral cavity and pharynx, colon, liver, larynx, lung, urinary bladder, and brain and CNS) and women (stomach, larynx, lung, urinary bladder, and brain and CNS). Figure 2 shows cancer incidence trends of the five most frequent cancer sites by sex.

Supplementary Figure 1 compares the truncated age-standardized rates (TASR-E) per 100,000 young adults by sex and cancer site in two periods, taking into account the first and last three years of the period: 1993–1995 and 2016–2018. Supplementary Figure 2 shows the AAPC in cancer incidence in the last decade, by sex and cancer site. The biggest decreases were found for esophagus (AAPC=−19.5%), larynx (AAPC=−7.0%) and lung (AAPC=−5.6%) in women, and liver (AAPC=−11.7%), larynx (AAPC=−8.7%) and lung (AAPC=−6.9%) in men. In the last decade, AAPCs were below 5% for all cancer sites.

Table 1
Number of new cancer cases (N) in young adults (20–49 years old) and all ages. REDECAN, Spain, 1993–2018.

	Young adults (N)	All ages (N)	% of cancer in young adults relative to the total
Females	89,420	508,387	17.6%
Males	64,179	757,243	8.5%
Both sexes	153,599	1,265,630	12.1%

Table 2
Number of new cancer cases (N) in young adults, age-specific rate, and truncated age-standardized rate (TASR-E) per 100,000 young adults by sex, and cancer site. REDECAN, Spain, 1993–2018.

Sex	Cancer site	N	Age-specific rate	TASR-E
Females	Total except non-melanoma skin	89,420	153.5	158.8
	Lip, oral cavity and pharynx	1340	2.3	2.4
	Esophagus	154	0.3	0.3
	Stomach	1419	2.4	2.5
	Colon	3248	5.6	5.8
	Rectum	1824	3.1	3.3
	Liver	336	0.6	0.6
	Gallbladder	232	0.4	0.4
	Pancreas	796	1.4	1.4
	Larynx	238	0.4	0.4
	Lung	3181	5.5	5.8
	Skin melanoma	5120	8.8	8.9
	Breast	37,820	64.9	67.7
	Cervix uteri	5448	9.4	9.5
	Corpus uteri	2643	4.5	4.8
	Ovary	3665	6.3	6.5
	Kidney	1124	1.9	2.0
	Urinary bladder	1053	1.8	1.9
	Brain and CNS	1770	3.0	3.1
	Thyroid	7022	12.1	12.2
	Hodgkin's lymphoma	1881	3.2	3.2
	NHL	2960	5.1	5.2
	Multiple myeloma	339	0.6	0.6
	Leukemias	1800	3.1	3.2
	Others	3981	6.8	7.0
Males	Total except non-melanoma skin	64,179	105.9	110.7
	Lip, oral cavity and pharynx	4932	8.1	8.7
	Esophagus	1086	1.8	1.9
	Stomach	2092	3.5	3.7
	Colon	3299	5.4	5.8
	Rectum	2361	3.9	4.2
	Liver	1514	2.5	2.7
	Gallbladder	257	0.4	0.5
	Pancreas	1217	2.0	2.1
	Larynx	2326	3.8	4.2
	Lung	7425	12.3	13.2
	Skin melanoma	3409	5.6	5.7
	Prostate	1256	2.1	2.3
	Testis	5306	8.8	8.5
	Kidney	2587	4.3	4.5
	Urinary bladder	4258	7.0	7.5
	Brain and CNS	2605	4.3	4.4
	Thyroid	1813	3.0	3.0
	Hodgkin's lymphoma	2449	4.0	4.0
	NHL	4934	8.1	8.3
	Multiple myeloma	508	0.8	0.9
	Leukemias	2488	4.1	4.2
	Others	6057	10.0	10.3

CNS: Central Nervous System; NHL: Non-Hodgkin's lymphoma.

3.2. Incidence trends in young adults by age group

Supplementary Tables S2 to S7 show the incidence trends by sex, cancer site and 10-year age group. In Figures 3–4 we show trends for cancer sites of special interest (stomach, colon, rectum, pancreas for both sexes, and breast and cervix uteri for women).

3.2.1. Young adults aged 20–29 years

In women, there were significant increases in cancers of the lip, oral cavity, and pharynx (APC=3.7%); colon (APC=21.1%); breast (APC=2.3%); cervix (APC=4.2%) and thyroid cancer (APC=2.3%). In contrast, skin melanoma (APC=−2.2%) and ovarian cancer (APC=−2.2%) decreased significantly.

In men, there were significant increases in colon cancer (APC=5.5%), thyroid cancer (APC=3.5%), and Hodgkin lymphoma (APC=2.0%), with no significant decreases observed.

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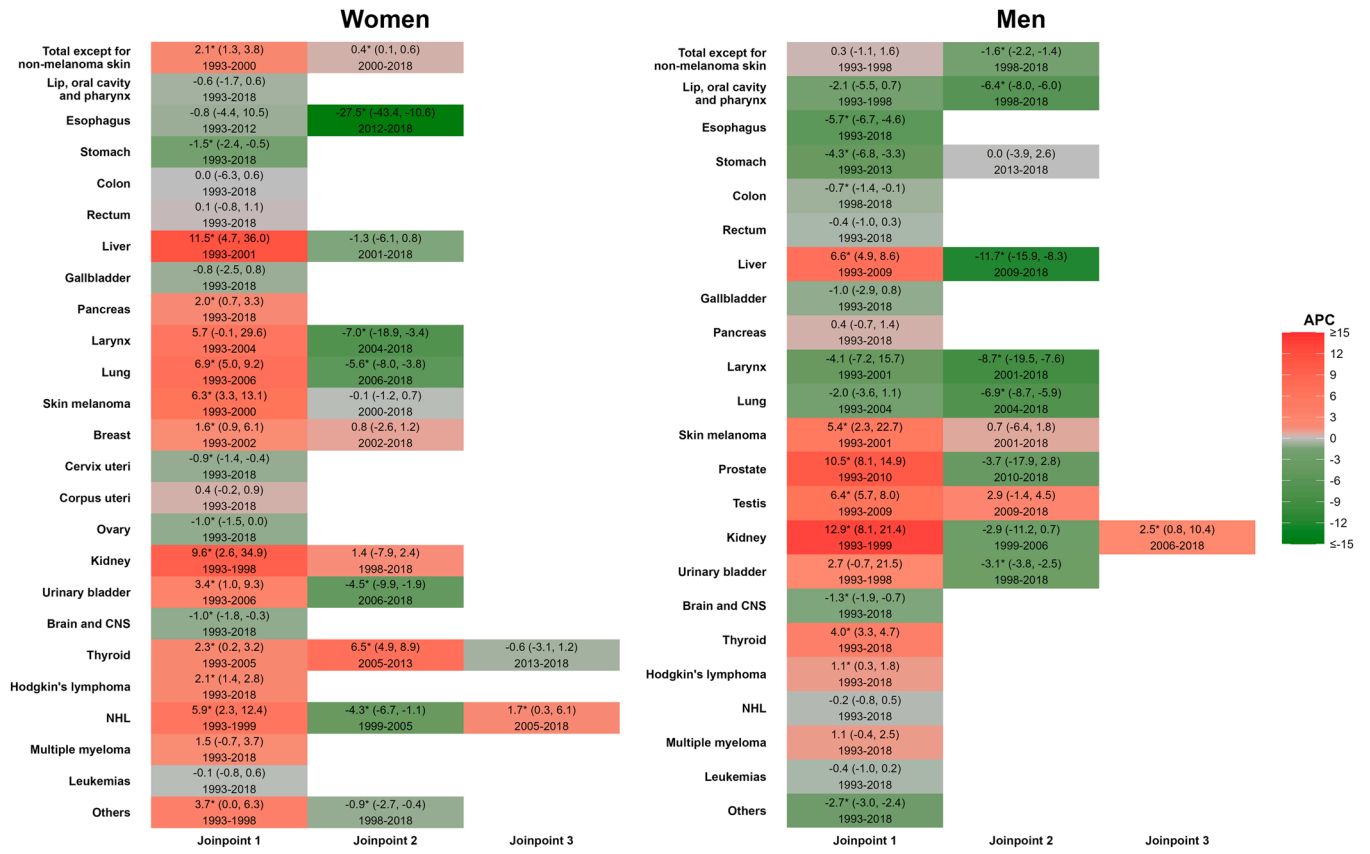


Fig. 1. Annual percent change (APC) and 95% confidence interval in incidence by anatomical location for each sex during the study period. REDECAN, Spain, 1993–2018. * p-value < 0.05; CNS: Central Nervous System; NHL: Non-Hodgkin's lymphoma.



Fig. 2. Cancer incidence trends in young adults by sex and cancer site, for the five most frequent cancer sites in young adults. REDECAN, Spain, 1993–2018. LOP: Lip, oral cavity and pharynx; NHL: Non-Hodgkin's lymphoma.

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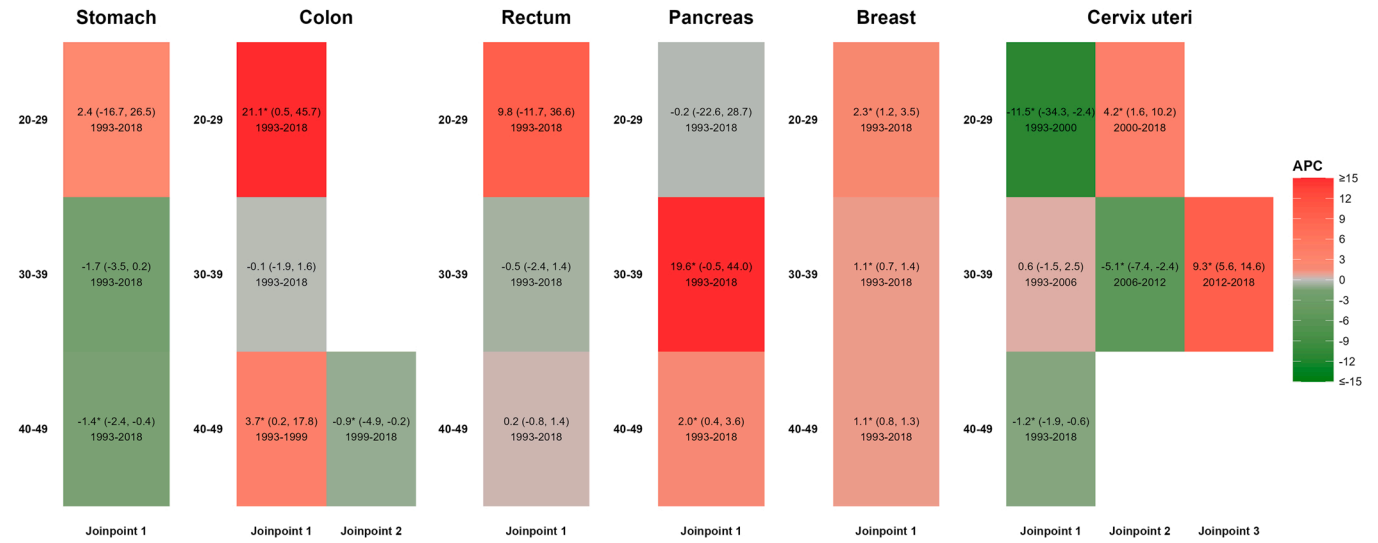


Fig. 3. Annual percent change (APC) and 95% confidence interval in incidence by anatomical site and 10-year age group for women. REDECAN, Spain, 1993–2018. * p-value < 0.05.

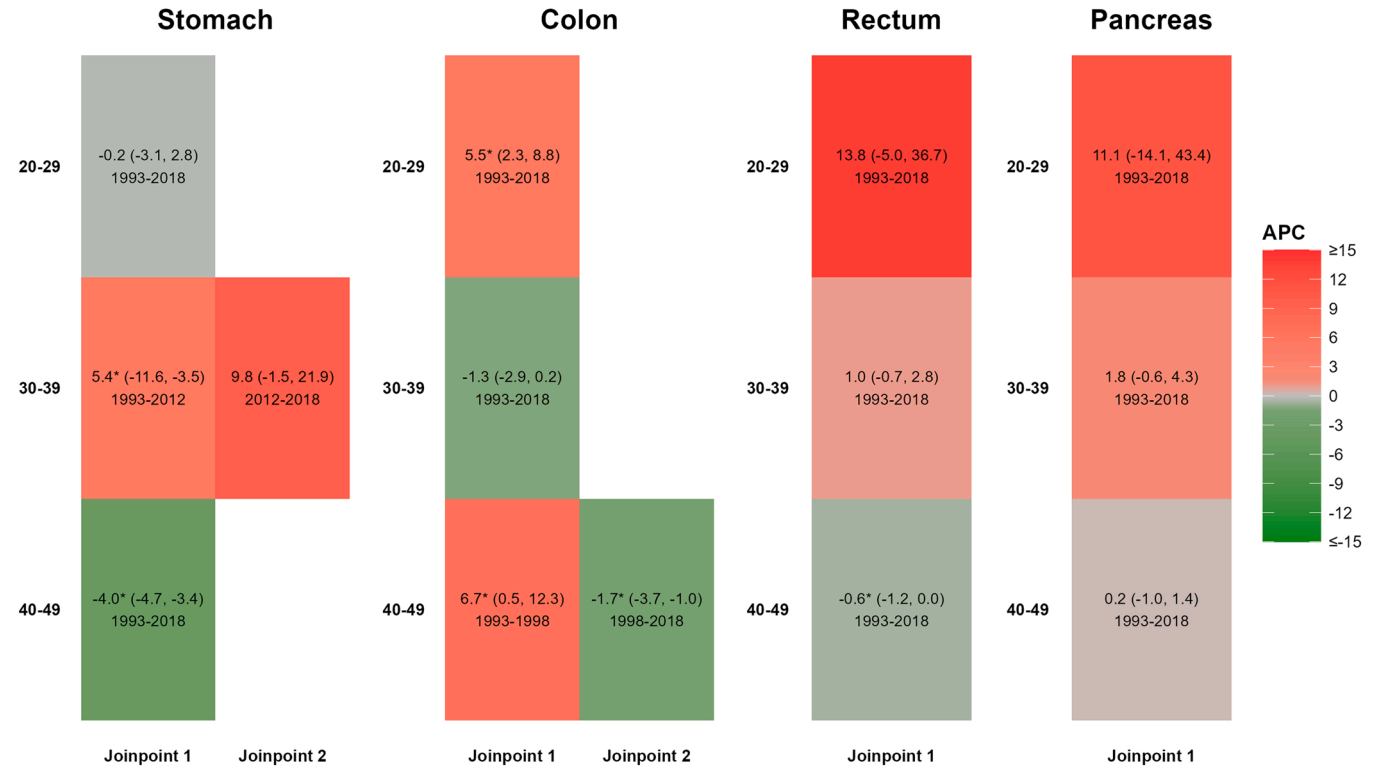


Fig. 4. Annual percent change (APC) and 95% confidence interval in incidence by anatomical site and 10-year age group for men. REDECAN, Spain, 1993–2018. * p-value < 0.05.

3.2.2. *Young adults aged 30–39 years*

In women, cancers of the breast (APC=1.1%), cervix uteri (APC=9.3%), kidney (APC=2.9%), and thyroid (APC=3.6%), and non-Hodgkin lymphoma (APC=4.3%) increased significantly. In contrast, there were significant decreases in laryngeal (APC=−25.3%), lung (APC=−2.6%), ovarian (APC=−1.1%), and brain and CNS tumors (APC=−1.7%).

In men, there was only one increasing trend observed in thyroid cancer (APC=3.2%). In contrast, there were several decreasing trends, including lung cancer (APC=−6.1%), bladder cancer (APC=−2.4%); non-Hodgkin lymphoma (APC=−1.5%); and multiple myeloma (APC=−65.0%).

3.2.3. *Young adults aged 40–49 years*

In women, increasing trends were observed for pancreatic cancer (APC=+2.0%), breast cancer (APC=1.1%), thyroid cancer (APC=4.3%), and Hodgkin lymphoma (APC=2.7%). However, there were significant decreases in esophageal (APC=−70.9%), stomach (APC=−1.4%), colon (APC=−0.9%), laryngeal (APC=−4.0%), lung (APC=−5.5%), cervical (APC=−1.2%), and urinary bladder cancers (APC=−4.0%).

In men, the cancers with significant increasing trends included skin

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melanoma (APC=2.0%); testicular (APC=+7.6%), kidney (APC=3.2%), thyroid cancer (APC=5.1%), and multiple myeloma (APC=1.7%). There were also many significant decreasing trends, including cancers of the lip, oral cavity, and pharynx (APC=−6.9%); esophagus (APC=−5.8%); stomach (APC=−4.0%); colon (APC=−1.7%); rectum (APC=−0.6%); liver (APC=−12.4%); larynx (APC=−9.1%); lung (APC=−6.9%); urinary bladder (APC=−3.8%); and brain and CNS (APC=−1.5%); and in leukemia (APC=−2.1%).

4. Discussion

Population-based data from the Spanish Network of Cancer Registries up to 2018 show that the overall incidence of cancer (excluding NMSC) decreased by 1.6% annually among young men, while it increased slightly by 0.4% annually among young women. The incidence rose significantly for kidney cancer, thyroid cancer, and Hodgkin lymphoma in men and for pancreatic cancer, Hodgkin lymphoma, and non-Hodgkin lymphoma in women. Several cancers of the digestive system (stomach, colon, rectum) and breast and cervical cancers increased significantly among the youngest adults but decreased in young adults> 40 (stomach, colon, and cervix). Conversely, incidence declined notably for cancers of the larynx, lung, urinary bladder, and liver in both sexes, and for cancers of the lip, oral cavity, and pharynx in men.

These trends in cancer incidence may reflect changes in the prevalence of key risk factors in Spain. To illustrate, strong decreases were observed in some cancers predominantly associated with smoking such as lung, laryngeal, bladder and lip, oral cavity, and pharynx [23], especially among men. Nationally representative data from Spain have shown consistent and sizeable declines in smoking prevalence since 1987 among men, with smaller and more variable decreases among women [24,25]. This gradual decrease in smoking rates provides one plausible explanation for the declining trends observed in some smoking-associated cancers.

By contrast, some of the cancers where increases were observed, such as kidney and some digestive system cancers, have been associated to lifestyle factors including obesity [26]. The prevalence of obesity among young Spanish adults increased among men until 2009 and among women until 2014 [27]. Thus, the observed rise in some obesity-related cancers in our study is consistent with this concurrent increase in obesity prevalence in Spain before and during the study period. However, the causes of cancer are multifactorial and there could be other diverse factors at play.

Heterogenous, and sometimes contradictory epidemiological patterns were also observed by age group, demonstrating the importance of analyzing subgroups of young adults in more detail. For example, while the overall cancer incidence decreased in men aged 40 and older, it increased significantly among men under 30 and women under 40 years old.

A higher number of increasing trends were observed in women, a finding that aligns with emerging evidence indicating a widening gap between women and men in early-onset cancer [28]. To illustrate, in the United States during 2000–2020, young women experienced substantially sharper increases in the incidence of cancers such as pancreas, stomach, multiple myeloma, and colorectal [28].

In the case of breast cancer, an overall upward trend in incidence was observed across the entire studied population, which was significantly more pronounced among women under 30, with an APC of 2.3% since 1993. Recent data from France are in line with our findings, showing faster increases among younger adults under 30, suggesting that younger females may be increasingly exposed to risk factors for premenopausal breast cancer [29]. Similar increasing trends in breast cancer incidence have been observed in many countries with different healthcare systems [4] and a recent study from the United States found a cohort effect twice as strong as the period effect in the incidence of early-onset breast cancer [30].

A relevant question is whether screening has contributed to this increase. In Spain, most breast cancer screening programs target women aged 50–69 years since the 1990s. However, four provinces included in our study (Granada, Castellón, Navarra, and La Rioja) included women aged 45–49 years old [31]. To evaluate the potential impact of screening on trend estimates, we conducted a sensitivity analysis for breast cancer trends restricted to women aged 45–49 years, stratified by province. As shown in Supplementary Figure 3, provinces with screening from age 45 did not show markedly different trends from those starting at 50, suggesting that differential screening policies are unlikely to have substantially influenced the results. Furthermore, the steepest increases in breast cancer incidence were observed in the youngest age groups—particularly women aged 20–29 years (APC = +2.3%*)—who fall well outside the scope of any organized screening program. Overall, although opportunistic screening may contribute to the observed increases, it is unlikely to be fully responsible for the rising trends.

The incidence of corpus uteri cancer remained relatively stable, whereas that of ovarian cancer decreased by 1% annually, consistent with broader international evidence [4,32]. This is in line with the increasing use of oral contraceptive pills and some reproductive trends in developed countries, which can have a protective effect on ovarian cancer risk [32].

In the case of cervical cancer, a particularly surprising trend was observed – despite previous decreases in incidence consistent with preventive and early detection efforts and a significant decrease among women over 40, we document an increase in the incidence of cervical cancer among young women, of 4.2% annually since 2000 among women aged 20–29 and 9.3% annually since 2012 among women aged 30–39. Similar trends have been observed in Japan, Sweden, Norway, China, Ireland, the UK, and the Netherlands, among others [33]. Potential contributors include suboptimal participation in screening, increasing prevalence of HPV infections, changes in screening programs, and increased immigration from countries with high cervical cancer incidence and limited prevention policies [33]. Spain introduced HPV vaccination for adolescent girls in 2007–2008 and is currently transitioning to HPV-based screening. It is expected that over time, as vaccinated cohorts reach eligible age for screening, the combined effect of vaccination and screening will lead to substantial reductions in cervical cancer incidence.

The overall stable or decreasing trends in digestive system cancers masked highly heterogenous patterns among age groups. Whereas stomach cancer decreased in adults over 40 for both sexes, non-significant increases were observed in younger groups, in line with recent data [34]. Similarly, whereas colon and rectum cancers mostly decreased in adults aged > 30 years, incidence increased among both men and women under 30. This increase was particularly significant for colon cancer, by 5.5% and 21.1% annually, respectively. Many countries, including the United States, the United Kingdom, New Zealand, Australia, Canada, Denmark, and the Netherlands, have experienced sharp increases in the incidence of colorectal cancer in young adults [19,35]. The rise in incidence has been primarily due to increases in rectal cancer and, more specifically, neuroendocrine tumors [36]. A multi-country study found strong cohort effects, with individuals born in the 1990s having at least five-fold higher the risk of those born in the 1960s [37]. A recent study conducted in France which analyzed the histopathological type and tumor extension at the time of diagnosis, revealed that changes to the classification of neuroendocrine neoplasms (NENs) during the period 2010–2013 may explain part of the increase of early-onset colorectal cancer incidence [38]. This demonstrates the unique value of population-based cancer registry data, helping to detect such effects [38,39].

In the case of pancreatic cancer, incidence increased significantly among women overall, particularly among those aged 30–49, with an upward trend also observed in men under 30. This is consistent with global trends [14], particularly with data from the United States, where women experienced a significantly greater increase in age-adjusted

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incidence rates compared to men, with an annual increase of + 2.36% versus + 0.62% for men [40].

Overall, data from Spain confirm the increase in early-onset digestive system cancers, reported in other developed countries, albeit restricted to certain age groups. These trends may reflect generational shifts in diet, obesity, environmental exposures, and lifestyle habits and their causes are currently one of the leading research priorities in oncology.

The incidence of thyroid cancer increased in both males and females across all age groups, with a trend towards stabilization or overall decrease in women since 2013. Previous studies conducted in Spain have suggested that increased detection of very small tumors (papillary microcarcinomas, <1 cm)—likely driven by shifts in the clinical management of thyroid nodules and the wider use of neck ultrasound—may have contributed to the overall rise in incidence [16,41].

Other increases observed in line with international trends include rising rates of testicular cancer in men over 40 [42], Hodgkin lymphoma in both sexes (and non-Hodgkin lymphoma among women) [43], and kidney cancer in both sexes, with a significantly steeper increase among men, possibly related to obesity [44]. The types of cancer that showed more stable trends included gallbladder cancer, cutaneous melanoma (which increased until 2000 followed by subsequent relative stability), multiple myeloma, and leukemias.

It is worth to note that significant and pronounced decreases in the incidence of many smoking-associated cancers were observed in both sexes, including cancers of the lip, oral cavity, and pharynx, larynx, lung, and urinary bladder [45]. These results are in line with the introduction of policies aimed at reducing tobacco consumption. The APCs were heterogenous and ranged between 3.1% and 8.7% of annual decrease, with the exception of lip, oral cavity and pharynx cancers among women, where an increasing trend was observed in women under 30 years of age. This exception could be due to HPV-related infections, which can increase the risk of certain types of cancers in this group.

Other notable decreasing trends were seen in liver cancer, with an APC of −11.7% among men since 2009 and −1.3% among women since 2001, possibly attributable to hepatitis C infection control. A recent study conducted in Spain reported a changing landscape of liver cancer, with a decrease in hepatitis C-related cancers and an increase in tumors associated to alcohol and metabolic syndrome [46]. Following a significant increase in the period 1993–2010, prostate cancer incidence has also decreased and stabilized, most likely due to changing patterns in opportunistic PSA screening. Finally, brain and CNS tumors have also decreased approximately 1% per year for both sexes, in line with trends observed in the United States [47].

This was the first nationwide study on cancer incidence trends in young adults in Spain using population-based data. A key limitation is the lack of updated incidence information from cancer registries beyond 2018, which limits our ability to detect more recent changes. Therefore, improving data timeliness is a priority for the cancer registration community in Spain, which is actively participating in the CancerWatch Joint Action to address this issue. Another limitation is that, despite their geographical diversity, Spanish cancer registries cover less than one third of the national population. In addition to true underlying changes in incidence, modifications in cancer coding practices, introduced nationally and following European guidelines, could also affect incidence trends [38,39]. Finally, to provide an overall picture, we adopted a broad approach and described incidence trends across all cancer sites. This limits our capacity to report on patterns in greater detail, such as by tumor subtype, histological type, or province. A recent international study compared incidence trends in young and older adults and found that, with the exception of colorectal cancer, cancers that were increasing in younger populations were also increasing among older adults [48]. This illustrates the importance of studying incidence trends in a broader context, taking into account possible changes in coding and diagnostic practices [39,49]. Within REDECAN, ongoing work on age–period–cohort models will offer a more detailed view of trends for some cancer sites.

The findings of this study have potential implications for clinical practice and cancer prevention policies. On the one hand, the documented decrease in the incidence of many tobacco-related cancers supports the public health benefits of smoking cessation and broader tobacco control policies. However, given the observed increase in certain tumors, clinical guidelines for investigation and detection may need to be reconsidered. Raising awareness among primary care physicians and specialists [11] and lowering the threshold for clinical suspicion and diagnostic evaluation among younger adults could help reduce late-stage diagnoses for some tumors.

Despite the relative increases observed, cancer remains a rare disease in young adults, which poses challenges to epidemiological research. Investment in infrastructures to enable robust research into early-onset cancers is essential to advance this agenda. There is an urgent need to determine whether there are specific environmental and molecular drivers to early-onset cancer, and to what extent overdiagnosis and changing in coding practices contribute to the observed trends. In any case, the findings reinforce the importance of expanding cancer prevention efforts to the general population, as most cancers with increased incidence are strongly influenced by modifiable lifestyle factors included in major cancer prevention guidelines.

CRediT authorship contribution statement

Isabel Martin Muñoz: Writing – review & editing, Writing – original draft. **Blanca Madrid Pérez-Esparza:** Writing – review & editing, Formal analysis, Data curation. **Ana Vizcaíno Batllés:** Writing – review & editing, Writing – original draft. **Amaia Onaindia:** Writing – review & editing, Writing – original draft. **Marta Muncunill Farreny:** Writing – review & editing, Writing – original draft. **Nere Mendizabal:** Writing – review & editing, Writing – original draft. **María-Isabel Palacios-Castaño:** Writing – review & editing, Writing – original draft. **Encarnación González-Flores:** Writing – review & editing, Writing – original draft. **Marcela Guevara:** Writing – review & editing, Writing – original draft. **Jan Trallero:** Writing – review & editing, Writing – original draft. **María Dolores Chirlaque López:** Writing – review & editing, Writing – original draft. **María-José Sánchez:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization. **Pilar Gutiérrez Meléndez:** Writing – review & editing, Writing – original draft. **Jaume Galceran:** Writing – review & editing, Writing – original draft. **Marià Carulla:** Writing – review & editing, Writing – original draft. **Montserrat Cristina Garrido Martín:** Writing – review & editing, Writing – original draft. **Dafina Petrova:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Daniel Redondo-Sánchez:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Susana Merino Perera:** Writing – review & editing, Writing – original draft. **Alberto Ameijide:** Writing – review & editing, Writing – original draft. **Xitama Nayra Álvarez Díaz:** Writing – review & editing, Writing – original draft. **Jàmnica Bigorra:** Writing – review & editing, Writing – original draft.

Ethical approval and informed consent

The study was approved by the Provincial Research Ethics Committee of Granada, Ref. CANJOVEN SICEIA−2024–002081 and by the Ethics Committee for Drug Research of the Pere Virgili Health Research Institute, Ref. 114/2024 with record number 004/2024. Spanish population-based cancer registries collect personal data for surveillance and control purposes that do not require the collection of explicit

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individual consent, without any direct or indirect intervention on patients.

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Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Dafina Petrova reports financial support was provided by Health Institute Carlos III. This research was partially supported by the subprogram VICA (Epidemiological Cancer Surveillance) of the CIBER of Epidemiology and Public Health (CIBERESP) and the intramural project for young investigators A_PI01_2024 of the Oncology Area of ibs.GRANADA (2024) “Is cancer increasing in young adults? Incidence trends in young adults (20–49 years old) in Spain” (PI: Daniel Redondo-Sánchez). DP is supported by a Miguel Servet Fellowship from the Health Institute Carlos III (CP23/00024). The funding sources had no involvement in the study design, in the collection, analysis, and interpretation of data, in the writing of the report, and in the decision to submit the article for publication. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ejca.2026.116883.

Data Availability

Access to data can be requested from the Spanish Network of Cancer Registries at www.redecan.org.

References

[1] Ferlay J., Ervik M., Lam F., Laversanne M., Colombet M., Mery L., et al. Global Cancer Observatory: Cancer Today (version 1.1) 2025. ⟨https://gco.iarc.who.int/today⟩.
[2] Zhao J, Xu L, Sun J, Song M, Wang L, Yuan S, et al. Global trends in incidence, death, burden and risk factors of early-onset cancer from 1990 to 2019. BMJ Oncol 2023;2:e000049. https://doi.org/10.1136/bmjonc-2023-000049.
[3] Ugai T, Sasamoto N, Lee H-Y, Ando M, Song M, Tamimi RM, et al. Is early-onset cancer an emerging global epidemic? Current evidence and future implications. Nat Rev Clin Oncol 2022;19:656–73. https://doi.org/10.1038/s41571-022-00672-8.
[4] di Martino E, Smith L, Bradley SH, Hemphill S, Wright J, Renzi C, et al. Incidence trends for twelve cancers in younger adults—a rapid review. Br J Cancer 2022;126:1374–86. https://doi.org/10.1038/s41416-022-01704-x.
[5] Hamilton AC, Coleman HG. Shifting tides: the rising tide of early-onset cancers demands attention. BMJ Oncol 2023:2. https://doi.org/10.1136/bmjonc-2023-000106.
[6] Sung H, Jiang C, Bandi P, Minihan A, Fidler-Benaoudia M, Islami F, et al. Differences in cancer rates among adults born between 1920 and 1990 in the USA: an analysis of population-based cancer registry data. Lancet Public Health 2024;9:e583–93. https://doi.org/10.1016/S2468-2667(24)00156-7.
[7] Hamilton AC, Bannon FJ, Dunne PD, James J, McQuaid S, Gray RT, et al. Distinct molecular profiles of sporadic early-onset colorectal cancer: a population-based cohort and systematic review. Gastro Hep Adv 2023;2:347–59. https://doi.org/10.1016/j.gastha.2022.11.005.
[8] Jayakrishnan T, Ng K. Early-onset gastrointestinal cancers: a review. JAMA 2025;334:1373–85. https://doi.org/10.1001/jama.2025.10218.
[9] Mohammad Mirzaei N, Hur C, Terry MB, Dalerba P, Yang W. Modeling early-onset cancer kinetics reveals changes in underlying risk and the impact of population screening. Cancer Res 2025;85:4558–70. https://doi.org/10.1158/0008-5472.CAN-25-0186.
[10] Barreto SG, Ben-Aharon I, Eng C, Shrikhande SV, Sirohi B, Søreide K, et al. Definition of sporadic early-onset invasive solid organ cancers in adults. Oncol Ther 2025. https://doi.org/10.1007/s40487-025-00405-8.
[11] Jerjes W, Harding D. Breaking barriers: enhancing cancer detection in younger patients by overcoming diagnostic bias in primary care. Front Med 2024;11:1438402. https://doi.org/10.3389/fmed.2024.1438402.
[12] Hamilton AC, Donnelly DW, Fitzpatrick D, Coleman HG. Early-onset cancers in adults: a review of epidemiology, supportive care needs and future research priorities. Cancers 2022;14:4021. https://doi.org/10.3390/cancers14164021.
[13] Mauri G, Patelli G, Sartore-Bianchi A, Abrignani S, Bodega B, Marsoni S, et al. Early-onset cancers: Biological bases and clinical implications. Cell Rep Med 2024;5:101737. https://doi.org/10.1016/j.xcrm.2024.101737.
[14] Cai J, Lu B, Chen H, Lu M, Zhang Y, Luo C, et al. The impacts of exposure to risk factors during youth on the increasing global trend of early-onset pancreatic cancer. Public Health 2024;229:65–72. https://doi.org/10.1016/j.puhe.2023.11.006.
[15] Vuik FE, Nieuwenburg SA, Bardou M, Lansdorp-Vogelaar I, Dinis-Ribeiro M, Bento MJ, et al. Increasing incidence of colorectal cancer in young adults in Europe over the last 25 years. Gut 2019;68:1820–6. https://doi.org/10.1136/gutjnl-2018-317592.
[16] Petrova D, Sánchez-Martín A, Redondo-Sánchez D, Madrid Pérez-Esparza B, Suárez Betancourt L, González-Flores E, et al. What cancers are increasing in young adults: a population-based study of incidence trends in adults 20-49 years old in the South of Spain. BMC Public Health 2025. https://doi.org/10.1186/s12889-025-25707-4.
[17] AIRTUM Working Group1, Stracci F, Serraino D, Fusco M, Mazzucco W, Fabiano S, et al. Time trends of cancer incidence in young adults (20-49 years) in Italy. A population - based study, 2008-2017. Tumori 2025;111:55–70. https://doi.org/10.1177/03008916241297078.
[18] Buja A, Trevisiol C, Miatton A, Guzzinati S, Bovo E, Mocellin S, et al. Is the incidence of early-onset cancers increasing in the northeast of Italy? A 30-year analysis of the regional cancer registration data by age, 1987-2019. Int J Cancer 2026;158:532–45. https://doi.org/10.1002/ijc.70088.
[19] Siegel RL, Torre LA, Soerjomataram I, Hayes RB, Bray F, Weber TK, et al. Global patterns and trends in colorectal cancer incidence in young adults. Gut 2019;68:2179–85. https://doi.org/10.1136/gutjnl-2019-319511.
[20] Siegel RL, Fedewa SA, Anderson WF, Miller KD, Ma J, Rosenberg PS, et al. Colorectal cancer incidence patterns in the United States, 1974-2013. 109:djw322. J Natl Cancer Inst 2017. https://doi.org/10.1093/jnci/djw322.
[21] Galceran J. Incidence trends of colorectal cancer in young adults in Spain. Clin Transl Oncol 2025. https://doi.org/10.1007/s12094-025-04006-9.
[22] Ribelles N, Pascual J, Galvez-Carvajal L, Ruiz-Medina S, Garcia-Corbacho J, Benitez JC, et al. Increasing annual cancer incidence in patients age 20-49 years: a real-data study. JCO Glob Oncol 2024;10:e2300363. https://doi.org/10.1200/GO.23.00363.
[23] Feliu A, Anderson AS, Bauld L, Fernández E, Leitzmann M, Morris S, et al. European code against cancer, 5th edition - tobacco and nicotine containing products, second-hand smoke, alcohol and cancer. Mol Oncol 2026;20:6–27. https://doi.org/10.1002/1878-0261.70177.
[24] Rey-Brandariz J, Ruano-Ravina A, Santiago-Pérez MI, Varela-Lema L, Guerra-Tort C, Montes A, et al. Evolution of smoking prevalence in Spain and its 17 autonomous regions (1987-2020). Med Clin (Barc) 2024;162:417–24. https://doi.org/10.1016/j.medcli.2023.11.015.
[25] Montes Martínez A, Pérez-Ríos M, Ortiz C, Gtt-See, Galán Labaca I. Changes in smoking cessation in Spain, 1987-2020. Med Clin (Barc) 2023;160:237–44. https://doi.org/10.1016/j.medcli.2022.06.024.
[26] Leitzmann MF, Bakogianni I, Anderson AS, Bauld L, Fernandez E, Morris S, et al. European Code Against Cancer, 5th edition - diet, excess body weight, physical activity, sedentary behavior, breastfeeding, and cancer. Mol Oncol 2026;20:28–48. https://doi.org/10.1002/1878-0261.70201.
[27] Feijoo L, Rey-Brandariz J, Guerra-Tort C, Candal-Pedreira C, Santiago-Pérez MI, Ruano-Ravina A, et al. Prevalence of obesity in Spain and its autonomous communities, 1987-2020. Rev Esp Cardiol 2024;77:809–18. https://doi.org/10.1016/j.rec.2023.12.018.
[28] Cavazzani A, Angelini C, Gregori D, Cardone L. Cancer incidence (2000-2020) among individuals under 35: an emerging sex disparity in oncology. BMC Med 2024;22:363. https://doi.org/10.1186/s12916-024-03574-x.
[29] Pujol P, Remontet L, Lapôtre-Ledoux B, Rogel A, Lafay L, Molinié F. Increasing incidence of breast cancer in young women over time. Breast Edinb Scotl 2025;83:104555. https://doi.org/10.1016/j.breast.2025.104555.

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[30] Xu S, Murtagh S, Han Y, Wan F, Toriola AT. Breast cancer incidence among US women aged 20 to 49 years by race, stage, and hormone receptor status. JAMA Netw Open 2024;7:e2353331. https://doi.org/10.1001/jamanetworkopen.2023.53331.
[31] Ascunce N, Salas D, Zubizarreta R, Almazán R, Ibáñez J, Ederra M, et al. Cancer screening in Spain. Ann Oncol Off J Eur Soc Med Oncol 2010;21(3:iii):43–51. https://doi.org/10.1093/annonc/mdq085.
[32] Cabasag CJ, Arnold M, Butler J, Inoue M, Trabert B, Webb PM, et al. The influence of birth cohort and calendar period on global trends in ovarian cancer incidence. Int J Cancer 2020;146:749–58. https://doi.org/10.1002/ijc.32322.
[33] Huang J, Deng Y, Boakye D, Tin MS, Lok V, Zhang L, et al. Global distribution, risk factors, and recent trends for cervical cancer: a worldwide country-level analysis. Gynecol Oncol 2022;164:85–92. https://doi.org/10.1016/j.ygyno.2021.11.005.
[34] Liu KS, Raza SA, El-Serag HB, Thrift AP. Recent trends in the incidence of gastric cancer in the United States. J Clin Gastroenterol 2024;58:39–45. https://doi.org/10.1097/MCG.0000000000001811.
[35] Sung H, Siegel RL, Laversanne M, Jiang C, Morgan E, Zahwe M, et al. Colorectal cancer incidence trends in younger versus older adults: an analysis of population-based cancer registry data. Lancet Oncol 2025;26:51–63. https://doi.org/10.1016/S1470-2045(24)00600-4.
[36] Abboud Y, Fraser M, Qureshi I, Hajifathalian K. Early-onset colorectal cancer: are neuroendocrine tumors or adenocarcinomas the culprit? analysis of the largest U.S. cancer incidence database, 2001-2020. J Clin Med 2024;13:1098. https://doi.org/10.3390/jcm13041098.
[37] Downham L, Laversanne M, Perdomo S, Filho AM, Bray F, Brennan P. Increase of early-onset colorectal cancer: a cohort effect. J Natl Cancer Inst 2025. https://doi.org/10.1093/jnci/djaf238. djaf238.
[38] Jooste V, Nousbaum J-B, Alves A, Woronoff A-S, Launoy G, Molinié F, et al. Epidemiological classification changes and incidence of early-onset colorectal cancer. JAMA Netw Open 2025;8:e2541732. https://doi.org/10.1001/jamanetworkopen.2025.41732.
[39] Trama A, Botta L. Early-onset colorectal cancer in transition-evolving international cancer classifications and incidence patterns. JAMA Netw Open 2025;8:e2541741. https://doi.org/10.1001/jamanetworkopen.2025.41741.
[40] Abboud Y, Samaan JS, Oh J, Jiang Y, Randhawa N, Lew D, et al. Increasing pancreatic cancer incidence in young women in the united states: a population-based time-trend analysis, 2001–2018. Gastroenterology 2023;164:978–89. https://doi.org/10.1053/j.gastro.2023.01.022. e6.
[41] Tofé S, Argüelles I, Forteza A, Álvarez C, Repetto A, Masmiquel L, et al. Age-standardized incidence, mortality rate, and trend changes of thyroid cancer in the Balearic Islands during the 2000-2020 period: a population-based study. Eur Thyroid J 2023;12:e220183. https://doi.org/10.1530/ETJ-22-0183.
[42] Huang J, Chan SC, Tin MS, Liu X, Lok VT-T, Ngai CH, et al. Worldwide distribution, risk factors, and temporal trends of testicular cancer incidence and mortality: a global analysis. Eur Urol Oncol 2022;5:566–76. https://doi.org/10.1016/j.euo.2022.06.009.
[43] Huang J, Pang WS, Lok V, Zhang L, Lucero-Prisno DE, Xu W, et al. Incidence, mortality, risk factors, and trends for Hodgkin lymphoma: a global data analysis. J Hematol OncolJ Hematol Oncol 2022;15:57. https://doi.org/10.1186/s13045-022-01281-9.
[44] Memon A, Salari Y, Bawa M, Zakikhani P. Increasing incidence of early-onset kidney cancer in young adults aged <50 years in England: an analysis of the national cancer registration data by age and gender, 1985-2020. BJC Rep 2025;3:32. https://doi.org/10.1038/s44276-025-00149-y.
[45] Gupta S, Harper A, Ruan Y, Barr R, Frazier AL, Ferlay J, et al. International Trends in the Incidence of Cancer Among Adolescents and Young Adults. J Natl Cancer Inst 2020;112:1105–17. https://doi.org/10.1093/jnci/djaa007.
[46] Sala M, Pascual S, Rota Roca MR, Matilla AM, Campos M, Delgado M, et al. Evolving epidemiology of HCC in Spain. JHEP Rep Innov Hepatol 2025;7:101336. https://doi.org/10.1016/j.jhepr.2025.101336.
[47] Koh B, Tan DJH, Ng CH, Fu CE, Lim WH, Zeng RW, et al. Patterns in Cancer Incidence Among People Younger Than 50 Years in the US, 2010 to 2019. JAMA Netw Open 2023;6:e2328171. https://doi.org/10.1001/jamanetworkopen.2023.28171.
[48] Berrington de Gonzalez A, Brayley M, Frost R, Freedman N, Gunter MJ, Jackson I, et al. Trends in cancer incidence in younger and older adults: an international comparative analysis. Ann Intern Med 2025. https://doi.org/10.7326/ANNALS-24-02718.
[49] Patel VR, Adamson AS, Welch HG. The rise in early-onset cancer in the us population-more apparent than real. JAMA Intern Med 2025;185:1370–4. https://doi.org/10.1001/jamainternmed.2025.4917.

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