Complete cancer prevalence in Europe in 2020 by disease duration and country: results from the EUROCARE-6 population-based study

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Summary

Background
Cancer survivors – people living with and beyond cancer- are a growing population with different health needs depending on prognosis and time since diagnosis. Despite being increasingly necessary, complete information on cancer prevalence is not systematically available in all European countries. We aimed to fill this gap by analysing population-based cancer registry (CR) data from the EUROCARE-6 study.

Methods
In this population-based study, using incidence and follow-up data up to Jan 1, 2013, from 61 CRs, complete and limited duration prevalence by cancer type, sex and age were estimated for 29 European countries and the 27 countries in the EU (EU27; represented by 22 member states that contributed registry data) using the completeness index method. We focused on 32 malignant cancers defined according to the third edition of the International Classification of Diseases for Oncology, and only the first primary tumour was considered when estimating the prevalence. Prevalence measures are expressed in terms of absolute number of prevalent cases, crude prevalence proportion (reported as percentages or cases per 100000 resident people) and age-standardised prevalence proportion based on the European Standard Population 2013. We made projections of cancer prevalence proportions to Jan1, 2020 using linear regression.

Findings
In 2020, 23711 thousand (95% CI 23565-23857) people (5.0% of the population) were estimated to be alive after a cancer diagnosis in Europe, and 22347 thousand (95% CI 22210-22483) in EU-27. Cancer survivors were more frequently female (12818 thousand [95% CI 12720-12917]) than male (10892 thousand [10785-11000]). The five leading tumours in female survivors were breast cancer, colorectal cancer, endometrial cancer, skin melanoma, and thyroid cancer (crude prevalence proportions from 2270 [95% CI 2248-2292] per 100000 to 301 [297-305] per 100000). Prostate cancer, colorectal cancer, urinary bladder cancer, skin melanoma, and kidney cancer were the most common tumours in male survivors (from 1714 [95% CI 1686-1741] per 100000 to 255 [249-260] per 100000). The differences in prevalence between countries were large (from 2 to 10 times depending on cancer type), in line with the demographic structure, incidence and survival patterns.
Between 2010 and 2020, the number of prevalent cases increased by 3.5% per year (41% overall), partly due to an ageing population. In 2020, 14850 thousand [95% CI 14681-15018] were estimated to be alive more than 5 years after diagnosis and 9099 thousand [8909-9288] were estimated to be alive more than 10 years after diagnosis, representing an increasing proportion of the cancer survivor population.

Interpretation
Our findings are useful at the country level in Europe to support evidence-based policies aimed at improving the quality of life, care, and rehabilitation of patients with cancer throughout the disease pathway. Future work includes estimating time to cure by stage at diagnosis in prevalent cases.

Research in context

Evidence before this study
We searched the MEDLINE database between April 18, 2023 and May 9, 2023 focusing on documents published in English since 2002, when the EUROPREVAL project pivoted the first complete cancer prevalence estimation in Europe using population-based cancer registry data. We combined search terms relevant to cancer ("cancer", "neoplasms") and to registries ("population-based", "registries") with terms restricting the focus to prevalence ("prevalence", "survivors") and European area ("Europe"). We discarded irrelevant reports (prevalence of cancer as comorbid condition, prevalence of risk factors and other conditions). We prioritised evidence from population-based studies. There is a growing body of evidence on the health care needs of cancer survivors in Europe, but information on their actual number and characterization is scattered and not comprehensive. Systematic cancer prevalence estimates by country are provided by IARC only for short-term follow-up (within 5 years from diagnosis). By contrast, complete prevalence, including all people living longer than 5 years after cancer diagnosis, is not routinely available in Europe. A main reason is that, unlike incidence or survival, it cannot be measured from cancer registry data, but it must be estimated using specific methods to compensate for limited follow-up. As a result, the existing estimates of complete cancer prevalence in Europe are not up to date and are limited to specific cancer entities or to specific countries.

Added value of this study
The study quantifies and characterises the total cancer prevalence by country in Europe in 2020 using the largest available population-based dataset (EUROCARE-6). The number and proportion of cancer survivors are estimated for 32 cancer entities by sex, age, disease duration (2, 5, 10, 15, 20, 25+ years since diagnosis), time period (2010 vs 2020) in 29 European countries, including the UK and EFTA countries.
The size of the population covered (61 cancer registries, 23 of which are national) strengthens the representativeness of the study. A unique data collection protocol and central quality control, according to best international standards, maximise the standardisation of individual data. The completeness index method was used to optimise the accuracy and international comparability of the estimates. The same method is employed in the USA, where complete prevalence is an integral part of the cancer statistics published annually. The study identifies the most common cancers among prevalent cases. The demographic and case-mix characteristics of cancer survivors differ from those of incident and deceased cancer cases. The differences between countries are also remarkably greater than for cancer incidence or mortality. Cancer survivors beyond 5 years are found to be a dominant and ever-increasing component. Prevalence time trends differ by cancer with a varying impact of demographic ageing compared with changes in incidence risk and survival.

Implications of all the available evidence
The impact of cancer on the population is very significant when considering patients and long-term survivors, and even more so when considering families and caregivers. Increased efforts are needed on primary prevention and early diagnosis, to reduce the burden of cancer and improve the chances of recovery and good quality of life after cancer.
Long-term cancer survivorship implies emerging health and social needs that require an integrated approach throughout the life course. Oncological rehabilitation should address all the needs of survivors, including psychological, cognitive, social, sexual, and nutritional symptoms. Our results allow to identify specific high-risk populations and are helpful in defining priorities for intervention and in the Health Technology Assessment (HTA) domain. Our results can usefully complement studies on cancer recovery (time to cure) and quality of life conducted in representative patient cohorts. Prevalence estimates at the threshold of the Covid era provide a baseline to compare with the evidence that will emerge from population data after 2020, which is currently limited in Europe. There is an increasing need for comprehensive cancer prevalence estimates with continuity, detail and systematicity in Europe. The joint analysis of data from European cancer registries provides immense added value to what individual countries can do and should be sustained over time.

Introduction

Cancer survivors – people living with and beyond cancer – are a relatively understudied population with diverse care needs depending on prognostic factors and the phase of care (first line, surveillance, or terminal care). Representative and reliable indicators quantifying cancer prevalence by disease duration over time are essential to develop follow-up guidelines, prevent late health effects, better tackle the causes of inequalities, and improve patients' quality of life.

The rapid increase in the number of cancer survivors in all ageing societies, combined with the cost of innovative therapies, poses a major challenge to the sustainability of public health systems. Detailed and comparable prevalence indicators are therefore increasingly needed also for cancer control planning and Health Technology Assessment.

Cancer prevalence in a population indicates the number (or proportion) of people living after a cancer diagnosis at a given time (*index date*). It includes all people who have ever been diagnosed, regardless of the distance since diagnosis, whether they are still under treatment or cured. Cancer prevalence can be measured from incidence and survival data collected by population-based cancer registries (CRs) by counting incident cases alive at the index date. However, observed prevalence, unlike other registry statistics, is intrinsically *incomplete* because it cannot include living people diagnosed before the start of registration. A virtually complete observed prevalence is only released by registries operating for five or more decades. Commonly, registration periods are shorter and the number of cancer survivors, at any time after diagnosis, can only be estimated using statistical models. Worldwide comparable estimates of cancer prevalence limited to 5 years after diagnosis and based on projections of cancer incidence and mortality, are provided by IARC for all European countries.[1,2] Conversely, despite its informative potential, complete cancer prevalence is not systematically estimated in all European countries with active population-based registries.

To fill this information gap, the European iPAAC (Innovative Partnership for Action Against Cancer) Joint Action, has promoted the estimation and dissemination of complete cancer prevalence indicators at country level in Europe .[3]

The main results of this joint effort are reported here. The estimation of complete cancer prevalence in 2020 by country in Europe was based on the EUROCARE-6 study dataset. Particular attention has been paid to analyse he impact of long-term survivors. We also assessed how much of the increase in prevalence between 2010 and 2020 can be explained by demographic ageing or changes in incidence and survival.

Methods

Study design and data collection

Standardised information on patients' diagnosis and life status, and on life expectancy in the general population, was collected from the European CRs using a unique study protocol.[4] The data were quality assured according to ENCR-JRC[5] and EUROCARE criteria.[6] The validity of individual records was checked to identify errors and anomalies in single variables (semantic checks) or between multiple variables (internal consistency). Missing or invalid values in compulsory variables were classified as major errors and excluded from the analyses.

The final EUROCARE-6 database contains information on over 26 million patients diagnosed with cancer between 1978 and 2015 and followed up until December 31, 2016 at

the latest. Overall, 109 CRs from 29 countries contributed data. Population coverage is national in 23 countries and partial in six countries (France, Germany, Italy, Portugal, Spain, and Switzerland). As a result, the EUROCARE-6 dataset covers 64% of the population of the 29 participating countries (478 million inhabitants) and 52% of the EU-27 population represented by 22 Member States (Greece, Sweden, Hungary, Romania, and Luxembourg did not contribute).

For prevalence estimation we selected 61 general CRs with prevalence data available up to Jan 1, 2013, the most recent common index date for most CRs, and a registration period at the index date of at least 10 years (9 years just for the national registries of Cyprus and Belgium). The index date was Jan 1, 2013 for all registries except Slovakia (Jan 1, 2011), Croatia, Saarland, Ferrara, Sassari, Varese, Canary Islands, and Tarragona (Jan 1, 2012). These exceptions allowed to increase the population coverage in Europe (four more countries) and in Germany, Italy, Spain, where many registries didn't meet the selection requirements. Countries were grouped into five macro-areas: Northern Europe, UK and Ireland, Central, Eastern and Southern Europe (**appendix p 12**).

We focused on a list of 32 malignant cancers defined according to the Third Revision of the International Classification of Diseases for Oncology (ICD-O-3). Given the heterogeneous classification of behaviour, for brain and urinary bladder, benign, uncertain and in situ cancers were also included to improve comparability between countries (**appendix p 15**). For each entity, the first primary tumour was considered (person-based prevalence). People with multiple primary cancers contribute to the prevalence counts of different entities. Instead, only the first primary tumour was considered when estimating the prevalence of all cancers combined. Therefore, the cancer-specific prevalence counts do not sum to the counts for all cancers combined.

Statistical analysis

Prevalence measures are expressed in terms of absolute number of prevalent cases, crude prevalence proportions (percent or per 100,000 resident people) and age-standardised prevalence proportions according to EUROSTAT official standard (European Standard Population 2013).

Registry-specific observed limited-duration prevalence was calculated by cancer, sex and 5-year age group) with the counting method using the SEER*Stat software.[7] Observed limited-duration prevalence corresponds to the number of alive cases diagnosed within the previous 1,2,3,…L years from the index date, where L is the maximum length of registration period. Lost to follow-up cases estimated alive are counted using registry-specific life-tables stratified by cancer, sex, age group and 10-year period of diagnosis.

Registry-specific complete prevalence was estimated from observed prevalence by the completeness index method[8,9] using the COMPREV software.[10] This method consists in adjusting the registry-specific observed prevalence by a correction factor, the completeness index, which quantifies the theoretical completeness of observed prevalence as a function of the registration time length. This allows to supplement the prevalence observable at the maximum duration with the unobservable part, i.e. that due to cases diagnosed before the start of registration.

European completeness indexes (or R-indexes) were estimated by modelling cancer specific trends of incidence and relative survival observed by the registries with at least 30 years of observation.[11]

Country-specific complete prevalence estimates for countries with local registration systems were obtained by pooling registry-specific estimates and applying age-specific pooled

estimates to the national resident population stratified by age group (0-54, 55-64, 65-74, 75+). Country-specific complete prevalence estimates were derived for the latest index date and in the previous five years, so as to extrapolate projections based on the latest prevalence observations.

Country-specific prevalence proportions were projected to Jan 1, 2020 with linear regression by extrapolating the prevalence time trend over the last three available index dates. A sensitivity analysis was conducted using linear and logistic regression and alternative basis for projections (prevalence in the last 3,4 or 5 index dates). For each sensitivity scenario, the regression was applied to prevalence proportions smoothed with three-year moving averages and stratified by sex and age at prevalence (0-54, 55-64, 65-74, 75+). Validation against published observed prevalence 2014-2016 in the Nordic registries[12] allowed to choose the linear model with 3-year basis for projections (data not shown). Complete (and limited duration) prevalence was then projected annually from Jan 1, 2014 to Jan 1, 2020 through the final estimated model parameters. Projected vs observed prevalence proportions in the Nordic registries 2014-2020[12] are shown in **appendix p 28-29**.

Estimates at the European level are provided for the 29 participating countries (European Pool) and for the EU-27, assuming prevalence proportions equal to the respective macro area for the five EU-27 countries not participating in EUROCARE-6.

Complete prevalence difference between Jan 1, 2010 and Jan 1, 2020 was decomposed by determinant, to quantify the impact of incidence and survival changes compared to demographic changes. The prevalence change due to ageing is the difference in population between 2020 and 2010 applied to prevalence proportion in 2010. The prevalence change due incidence and survival dynamics is the difference in prevalence proportion between 2020 and 2010 applied to population in 2020.

For all indicators, 95% confidence intervals were estimated assuming a normal distribution. The delta method was used to compute the standard error of prevalence estimates up to 2013 (from the known variance of the observed prevalence and completeness indices) and the standard error of prevalence projections (from the variance of the linear slope parameter).

Statistical analyses were performed with SAS statistical software Release 9.4.

Further methodological details are provided in the appendix.

Role of the funding source

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

A total of 19,538,317 cases were confirmed eligible and included in the analysis. Length of observation at the index date ranged from 9 to 35 years (median length 20 years). Proportion of records excluded due to major errors was 0.9% overall and never exceeded 3%. Proportion of cases censored alive before the index date (lost to follow-up) was below 3% for most registries. Recording of non-malignant cases of bladder and brain cancer was not consistent across Europe and was missing in some registries or countries (appendix p 12). Overall, in the 29 European countries covered by the study (478 million inhabitants) 23·7 million (95% CI 23·6-23·9) people are estimated to live in early 2020 after a cancer

diagnosis, irrespective of how far back in time. They represent 5% of the resident population (4,961 per 100,000 [95% CI 4,931-4,992]) (**Table 1**). The same proportion and a slightly lower number (22·3 million [95% CI 22·2-22·5]) are estimated for the EU-27 area (447·3 million inhabitants).

Cancer survivors are more frequently women (12·8 million [95% CI 12·7-12·9]) than men (10·9 million [10·8-11·0]), 5·25% [5·21%-5·30%] vs 4·66% [4·61%-4·70%] in terms of crude proportions, although women to men ratio varies between countries from 1·0 to 1·7 because of differences in cancer case-mix and demographic structure. Crude proportion of cancer prevalence is higher in Central (5·6% [95% CI 5·5%-5·7%]), Southern (5·2% [5·1%-5·3%]) and Northern Europe (5·08% [5·03%-5·13%]), intermediate in the UK and Ireland (4·16% [4·08%-4·23%]) and lowest in Eastern Europe (3·48% [3·45%-3·50%]). Between country differences are even wider, ranging from 3,562 per 100,000 (95% CI 3,499-3,626) in Poland to 6,338 (6,177-6,498) in Italy for women, and from 2,372 (2,321-2,422) in Bulgaria to 5,692 (5,512-5,873) in Germany for men. When comparing age-standardised prevalence proportions the heterogeneity is reduced and countries may rank differently, as in the case of Italy and Germany, both with a high proportion of elderly people.

Leading cancer types among survivors differ remarkably by sex reflecting different incidence and survival profiles (**Table 2**). Breast and prostate cancers account for about 40% of all cancer survivors, 43% in women (5·54 million [5·49-5·59]) and 37% in men (4·00 million [3·94-4·07]), respectively. Colorectal cancer is the second most common tumour in both sexes, with a higher prevalence proportion in men (691 per 100,000 [95% CI 682-699]) than in women (564 [557-572]). Uterine and ovarian cancers (1·95 million [95% CI 1·92-1·99]), skin melanoma (779 thousands [770-788]), thyroid cancer (734 thousands [724-744]) and non-Hodgkin lymphomas (434 thousands [426-442]) account for a further third of survivors in women. In men, a third of prevalent cases were diagnosed with urinary bladder (1·03 million [95% CI 1·01-1·04]) and kidney cancers (595 thousands [583-608]), skin melanoma (612 thousands [602-621]), lung (519 thousands [507-531]) and testicular cancers (493 thousands [485-500]).

Most cancer survivors in Europe are over 65 years old: 62% of women (7·96 million out of 12·8) and 70% of men (7·6 million out of 10·9) (**Table 2**). People over 75 years of age represent a relevant proportion (48-55%) of those living after a diagnosis of colorectal, prostate, urinary bladder, stomach cancer and CLL/SLL in women. Younger cancer survivors, under the age of 55, are 3·74 million [95% CI 3·70-3·78] and represent 16% of all prevalent cases, 18% in women (2·3 million out of 12·8) and 13% in men (1·4 million out of 10·9). They are the majority of prevalent cases (about 60%) for early-onset cancers with a good prognosis, such as Hodgkin's lymphoma or testicular cancer. The distribution by age and sex for cancer entities with lower prevalence is shown in **appendix p 24**.

The complete cancer prevalence proportions differ remarkably between countries. In women, the range of variation is more than two-times for all the top eight cancer, e.g. breast (crude proportions ranging from 1,268 per 100,000 [95% CI 1,246-1,289] in Poland to 2,924 [2,846-3,002] in Belgium), colorectal (339 [325-353] in Poland vs 744 [722-766] in Italy) and endometrial cancers (249 [232-266] in Ireland vs 609 [591-626] in Lithuania) (**Figure 1, appendix p 16, 18**). The differences between countries are even greater for tumours with marked incidence dynamics and geographical variability, such as thyroid cancer (less than 130 in the UK, Ireland, Netherlands and Denmark and more than 700 in Italy and Cyprus),

skin melanoma (83 [95% CI 81-84] in Bulgaria and 700 [685-715] in Denmark) and cervical cancer (from less than 100 in Malta and Finland to 553 [536-569] in Bulgaria and 606 [573-640] in Lithuania).

Significant differences (four to five times) are also estimated for male prevalence of prostate cancer (from 487 [95% CI 396-577] in Bulgaria to 2,424 [2,291-2,556] in France and 2,393 [2,234-2,551] in Lithuania) and urinary bladder cancer (from 156 [145-168] in England to 783 [751-815] in Italy) (**Figure 1, appendix p 20, 22**). As for women, striking differences are estimated for skin melanoma (from 60 [95% CI 57-62] in Bulgaria to 505 [500-511] in Denmark). These large differences imply that top prevalent cancers may be ranked differently in the different European countries. Differences of cancer prevalence between countries largely reflect differences in incidence risk, as shown by the high goodness of fit of the linear correlation between country-specific prevalence profiles in 2020 and crude incidence rates in previous years (**appendix p 30-31**).

Cancer prognosis, median age at onset and previous incidence time trends (decreasing vs increasing) are the main factors influencing prevalence patterns by disease duration. Overall, in early 2020, the number of women in Europe diagnosed with cancer within 2 years or in the previous 2-5 years is estimated at 2·04 (95% CI 1·97-2·10) and 2·4 (2·3-2·5) million, respectively (**Figure 2**). Long-term survivors (diagnosed for more than 5 years) account for 65% of the total prevalent female cases (8·4 million out of 12·8) and are estimated to be 2·76 million (95% CI 2·68-2·83), 3·2 (3·1-3·3) and 2·4 (2·2-2·5) for durations of 5-10 years, 10-20 years and more than 20 years, respectively. Similar distributions are estimated for women diagnosed with cancer of breast, colon rectum, endometrium, thyroid, kidney, urinary bladder, non-Hodgkin lymphomas or skin melanoma. The share of very long-term survivors (diagnosed since more than 10 years) is 44% overall (5·6 million out of 12·8), highest for cervical cancer (72%, 447,345 out of 625,179) and Hodgkin's lymphoma (64%, 97,166 out of 151,166), and lowest for lung cancer (18%, 60,188 out of 324,729).

Overall, in Europe the number of men living within 2 years or 2-5 years after a cancer diagnosis is 2·07 (95% CI 2·01-2·13) and 2·34 (2·25-2·43) million, respectively (**Figure 2**). Those surviving more than 5 years represent 59% of all prevalent cases (6·5 million [95% CI 6·4-6·6), and similar proportions are estimated for the tumours with the highest prevalence in men (prostate, colorectal, bladder, skin melanoma, kidney, and non-Hodgkin lymphomas). The share of men surviving more than 10 years is 32% overall (3·50 million [95% CI 3·34-3·64), much lower than in women. For those diagnosed with Hodgkin's lymphoma and testicular cancer, it is over 60%, whereas for lung and prostate cancer survivors it is less than 25%.

The estimated total number of cancer survivors in Europe has increased on average by 3·5% per year over the last decade, from 16·805 million (95% CI 16·798-16·813) million on Jan 1, 2010 to 23·7 million (23·6-23·9) million on Jan 1, 2020, a relative change of 41% (**Figure 3**). A similar increase (+37%) is estimated for the crude prevalence proportion (from 3,615 per 100,000 [95% CI 3,613-3,617] to 4,961 [4,931-4,992]). The age-adjusted prevalence proportion increased less steeply (+24%, from 3,864 per 100,000 [95% CI 3,862-3,866] to 4,783 [4,754-4,813]), because it is not affected by demographic changes.

The prevalence of cases diagnosed within 5 years increased by 28% between 2010 (6·932 million [95% CI 6·927-6·937]) and 2020 (8·86 million [95% CI 8·78-8·94). Conversely, the number of people living more than 10 years after diagnosis is estimated to increase by 50%

over the same period (from 6·05 million [95% CI 6·04-6·06] to 9·1 [8·9-9·3]) and is expected to become an increasingly important proportion of all cancer survivors in the near future.

The impact of demographic ageing on the changes of cancer prevalence 2010-2020, compared with the dynamics of incidence and survival, is shown in **Figure 4** (details in **appendix p 25**). The number of survivors from all cancers is predicted to increase by 46% in men, of which 27% is attributable to incidence and survival changes and 19% to ageing. The relative percentage increase was lower in women (+37%), with a smaller effect of ageing (12%), because of the different case mix and lower average age at onset.

The cancers with increasing incidence and survival showed the steepest relative percentage increase in the number of prevalent cases: skin melanoma (+78% in men and +55% in women), female lung (+84%), thyroid (+77% in men and +64% in women) and prostate cancer (+71%). For these tumours incidence and survival changes have had a much greater impact (two to seven times) than the ageing of the population between 2010 and 2020. For smoking-related cancers (lung, head and neck, larynx) the increase in prevalence was estimated to be more marked in women, in line with less favourable incidence trends in women compared to men.

Prevalence was estimated to decrease for cervix uteri cancer only (-0·3%) but the increase was also limited for other tumours with declining incidence, such as stomach (about +10%) and male laryngeal cancers (+3%). In the absence of demographic ageing, the prevalence of these cancers would decrease. Demographic changes have a minimal effect on the prevalence increase for juvenile cancers, such as testis, brain, or Hodgkin's disease (1%-4%).

Discussion

The study documents that in early 2020, an average of 5% of the European population has had a recent or distant history of cancer. Most were women, over 65 years old and living more than five years after cancer (63%). Overall, 38% of all prevalent cases in Europe were living more than 10 years after cancer (44% in women and 32% in men). These proportions are comparable to and lower than those estimated in the USA in Jan 1,2020 (47% overall, 50% in women and 44% in men)[13] using the same methodology and similar population-based data sources. A lower long term cancer prevalence in European populations is consistent with the higher prognosis generally reported for US compared to European cancer patients.[14]

Female breast, prostate, and colorectal cancers alone account for 53% of all cancer survivors. Less common tumours that occur at younger ages (skin melanoma, thyroid, testicular and cervical cancers) are more frequent in cancer survivors than common fatal tumours diagnosed in older people (pancreatic, oesophageal, liver), which do not reach crude prevalence proportions of 0·05%.

The study also highlights the large differences between countries in cancer prevalence, which are much greater than those in cancer incidence or mortality. Incidence is by far the most important determinant of geographical variation, followed by differences in survival and demography, the latter partly inflating the crude proportions in countries with an older age structure.[15] Variations between countries reflect both real differences in incidence risk (as in the case of cutaneous melanoma or lung cancer) and different levels of diagnostic intensity, screening and overdiagnosis, as in the case of thyroid[16] or prostate cancer.[17]

Country-specific estimates of complete prevalence are consistent with limited duration prevalence figures available in some countries (same order of magnitude and higher values). Estimates for urinary bladder and brain cancers are not fully comparable across Europe, because of missing non-malignant cases for some registries . This explains, for instance, the particularly low estimates for male urinary bladder cancer in France and UK-England. The selected population coverage in countries with regional registration (from 10% in France to maximum 20% in Switzerland) may limit the representativeness of our estimates at country level. To contain this limitation in Italy, where within-country heterogeneity is particularly relevant, the national estimate was obtained by combining separate estimates for registries in centre-north and south.

Projections to 2020 by country relied on prevalence time trends over the latest 3-year period available (2011-2013). Validation against NORDCAN observations[12] guided the choice of time base for projections and confirmed the validity of assuming linear trends. Trends in cancer prevalence are, indeed, rather smooth over time, as the number of alive incident cases is cumulated year after year. However, deviations from linearity can occur when incidence changes sharply, as was the case with prostate cancer[17], which peaked in some European countries around 2013 and then levelled off.

We have estimated a remarkable increase in the number of cancer survivors in the decade 2010-2020, reflecting an increase for all cancer entities except those with a more frequent declining incidence risk (stomach, cervix uteri, male larynx). This is not due to an increase in the general population, which grew by only 3% over the same period, but is partly due to the ageing of the population, with the number of people aged over 65 in Europe increasing by 20% between 2010 and 2020. However, we found that trends in incidence and survival had a greater or equal impact on prevalence growth than demographic changes. The number of cancer survivors increased faster in men than in women, largely due to the increase in incidence of prostate cancer – which was observed at different rates in all countries.

Survivorship care services are increasingly being advocated to improve cancer care throughout the life course. We have extended the estimation of cancer prevalence beyond the traditional 5-year prevalence and found that long-term survivors are an increasing population to focus on. They include those who are cured and those who will die from the disease. Among those who are cured some will have no further sequelae, while others will still need to be monitored for late sequelae due to toxicity and long-term complications of cancer therapy or to increased risk of secondary malignancies.
Whenever a cure with no further sequelae is possible, the time to cure – after which the risk of death of patients reaches that of the general population without cancer – can be estimated according to key prognostic factors to complement and better qualify complete cancer prevalence statistics.[18]

Estimates on complete cancer prevalence tell us how prevalent cases are distributed by disease duration and what their demographic characteristics are. They are useful for quantifying the target population for interventions aimed at specific sub-populations of survivors, but not for deriving information on their actual health status as a function of the distance from diagnosis.

European prevalence completeness indexes were computed using incidence and relative survival observations from a pool of selected long-standing registries. This ensured robust estimates over the long term. A larger pool would have increased the population coverage at the cost of reduced follow-up. All European areas are represented in the selected pool used to derive European R-indexes, and their performance has been positively validated against registry-specific observed prevalence in Europe and against alternative indexes (US R-indexes).[11]

Projections to 2020 assume a constant linear trend in prevalence proportions from 2013 onwards. This assumption cannot capture deviations from linearity occurring after 2013 due to epidemiological trends or to changes in cancer control strategies. Validation in the Nordic countries showed these limits for cancers with declining prevalence (cervix and stomach) and, to a lesser extent, for lung and colon cancers.

Our projections are limited to Jan 1, 2020 and represent a pre-Covid baseline. Changes in cancer incidence (reduced diagnostic capacity), outcome (delayed referral) and population age structure (high mortality among the elderly) that occurred during the pandemic emergency do not allow a priori assumptions of a stable prevalence trend after 2020. More recent data and new assessments will be needed to draw more firm conclusions.

The broad population coverage, including the EU-27, the UK and the EFTA countries, and the projections to early 2020 are major strengths. Complete cancer prevalence is indeed not routinely calculated in all countries, and the available estimates in Europe are not up to date,[19] or are limited to certain countries. [20–22]

To optimise the accuracy and comparability of our estimates, we used the completeness index method [8,9], one of the most validated methods for calculating complete and limited duration prevalence using maximum available information observed by CRs. The method is systematically applied in the USA, where complete prevalence statistics are published annually[13] and a specific software for implementing the method is distributed.[10] Compared with international cancer prevalence estimates [1,2,23], the completeness index method is more firmly based on observations. Estimates are registry-specific and derived from observed prevalence at the maximum available duration. For example, 5-year prevalence estimates are fully observed until 2013 and then projected. In addition, the completeness correction decreases with increasing registration length. This feature ensures the highest possible adherence of estimates to observations.

The distribution by short, long, and very long disease duration is an additional strength. Although there is a growing body of evidence on the problems and unmet needs of cancer survivors, [24] little is known about their actual numbers and characterisation, especially in the long term. Research on the quality of life of long-term survivors after cancer, often based on representative samples from CRs data,[25–26] does indeed highlight a wide range of issues that point to integrated models of care, with an increasing role for patient-centred care and community medicine.[27] Information on cancer prevalence by disease duration is critical not only at the health care level to plan patient care and rehabilitation, but also at the societal level, to assess the impact of policies to mitigate the socioeconomic consequences of the disease, such as employment discrimination or financial toxicity.[28,29]

The large and growing burden of cancer on the European population confirms the need to strengthen cancer prevention measures, as envisaged in the Europe's Beating Cancer Plan and related action plans. Primary prevention and early diagnosis are the most effective tools to reduce in the coming years the burden of cancer and improve the quality of life of patients. People living after a juvenile cancer have been shown to be an important component of long-term cancer survivors. Addressing the health and socio-economic impact of cancer on this vulnerable subpopulation is particularly valuable. Initiatives such as the survivorship passport or the legislation on the right to be forgotten[28] should be pursued in all countries. Complete information on cancer prevalence at country level is needed in Europe to develop evidence-based policies on cancer survivorship. This information should be systematically integrated into the European Cancer Information System (ECIS)[30]. The study shows that an effective way to ensure accurate and comparable estimates of complete cancer prevalence at national level is to jointly analyse data from European registries. Continuity in these collaborative studies with high European added value is essential to make prevalence estimates available on a regular and systematic basis. Future developments in this area should incorporate the analysis of cured cancer survivors and time to cure, to provide robust epidemiological evidence useful for responsibly optimising follow-up care guidelines and recommendations.

Authorship contributions

RDA drafted the article, designed and coordinated the study. ED carried out the study and analysed the prevalence data. SR coordinated the data quality checks and the preparation of the study database. PB, SR and MS prepared the registry-specific lifetables. SR and MS implemented the procedures to check the raw data and to generate the SEER*Stat study database. ED, SR and LV estimated and validated the European prevalence completeness indexes. LDM, SG, AK, MG, KP and KI contributed to validate country-specific prevalence estimates. XT, AK, MDCL, KI, MB, KP, RG, MG, GR, MBe, LB, LDM, SG and SL provided advice and revised the results.

The EUROCARE-6 Working Group collected, prepared, and transmitted raw data for the study database, corrected data after quality controls, checked the results of the analyses and revised the final draft of the article.

All authors interpreted results, contributed to writing the paper, reviewed and approved the final version.

Conflict of interest statement
The authors have declared no conflicts of interest

Data sharing statement

The detailed results on cancer prevalence by cancer site, country, age and disease duration will be available on the ECIS website (https://ecis.jrc.ec.europa.eu) with publication. The European completeness indexes of cancer prevalence estimated for this article can be shared upon reasonable request. Requests should be directed to ED, elena.demuru@iss.it.

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Table 1 - Population (thousands) and estimated complete cancer prevalence in Europe (EUROPEAN Pool of 29 countries in EUROCARE-6 and EU-27) by country and sex as of Jan 1, 2020. Number of prevalent cases (thousands), crude and age-standardised (European Standard Population, EUROSTAT 2013) prevalence proportions per 100,000 inhabitants with 95% confidence intervals in parentheses.
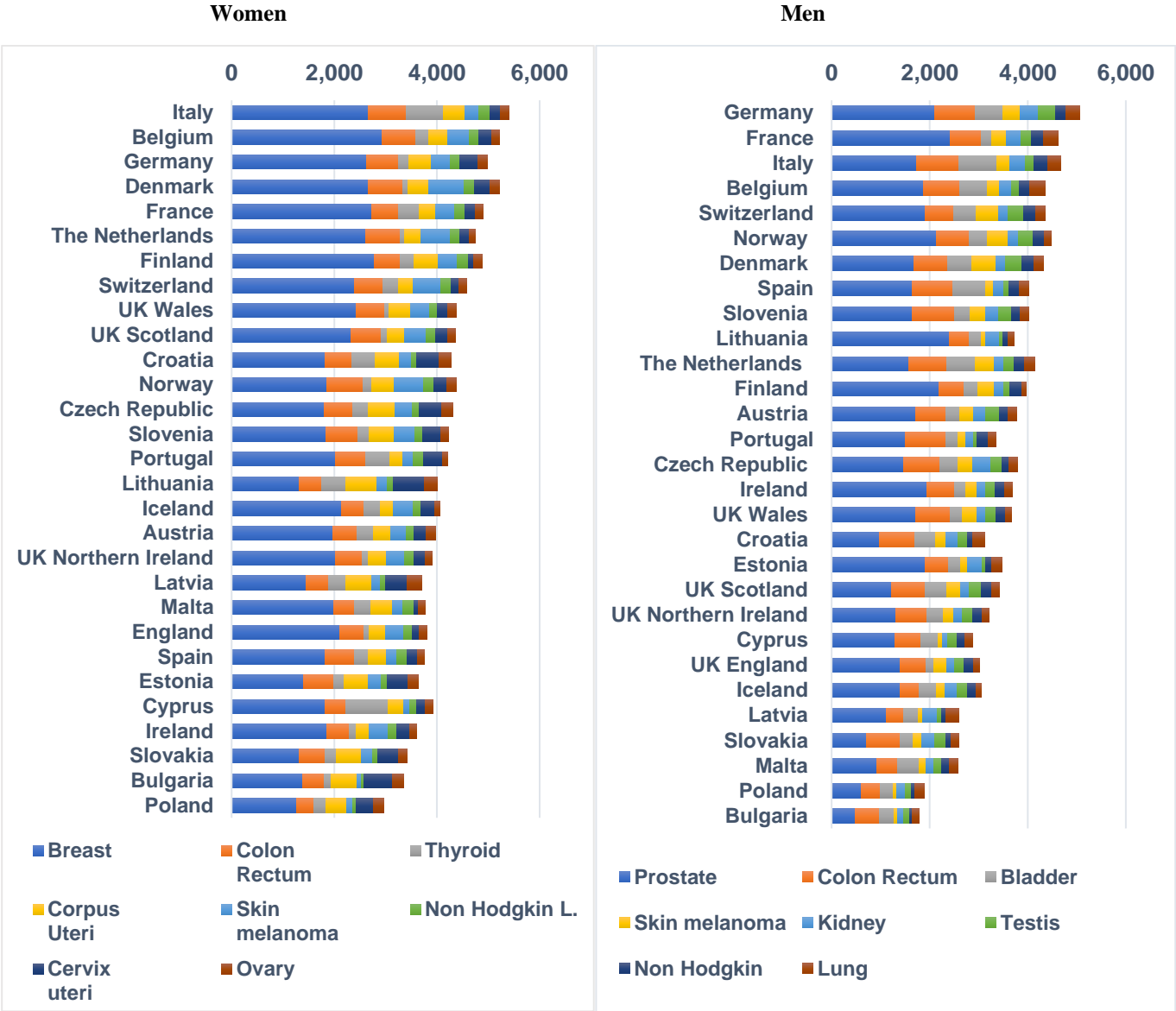
Country/Area	Population (thousands)				Number of prevalent cases (thousands)				Women to Men ratio	Crude Prevalence proportion per 100,000			Age-standardised Prevalence proportion per 100,000		
	Both sexes	%	Women	Men	Both sexes	%	Women	Men		Both sexes	Women	Men	Both sexes	Women	Men
Austria	8,901	1·9	4,522	4,379	408 (402-414)	1·7	214 (211-217)	194 (189-199)	1·1	4,583 (4,521-4,646)	4,732 (4,671-4,793)	4,429 (4,319-4,540)	4,531 (4,466-4,596)	4,397 (4,335-4,459)	4,810 (4,689-4,931)
Belgium	11,522	2·4	5,841	5,681	657 (650-664)	2·8	368 (365-372)	289 (283-294)	1·3	5,701 (5,641-5,761)	6,305 (6,242-6,369)	5,080 (4,977-5,183)	5,705 (5,644-5,766)	5,954 (5,896-6,013)	5,574 (5,466-5,682)
Bulgaria	6,951	1·5	3,582	3,370	215 (212-219)	0·9	135 (132-139)	80 (78-82)	1·7	3,099 (3,043-3,154)	3,783 (3,685-3,880)	2,372 (2,321-2,422)	2,905 (2,850-2,960)	3,295 (3,209-3,381)	2,526 (2,470-2,583)
Croatia	4,058	0·8	2,087	1,972	186 (182-191)	0·8	105 (102-109)	81 (79-83)	1·3	4,593 (4,482-4,704)	5,050 (4,865-5,236)	4,108 (3,992-4,225)	4,298 (4,193-4,403)	4,365 (4,223-4,508)	4,369 (4,236-4,502)
Cyprus	888	0·2	454	434	36 (35-37)	0·2	20 (19-20)	16 (16-17)	1·3	4,067 (3,981-4,154)	4,386 (4,258-4,514)	3,735 (3,619-3,850)	4,608 (4,511-4,705)	4,733 (4,593-4,872)	4,559 (4,424-4,695)
Czechia	10,694	2·2	5,422	5,272	498 (495-500)	2·1	270 (268-272)	228 (227-229)	1·2	4,656 (4,632-4,680)	4,977 (4,934-5,020)	4,326 (4,306-4,347)	4,683 (4,659-4,707)	4,584 (4,541-4,627)	4,957 (4,933-4,981)
Denmark	5,823	1·2	2,926	2,897	312 (306-318)	1·3	175 (169-180)	137 (134-140)	1·3	5,354 (5,250-5,459)	5,975 (5,791-6,159)	4,727 (4,628-4,826)	5,312 (5,209-5,415)	5,669 (5,491-5,847)	4,985 (4,886-5,084)
Estonia	1,329	0·3	700	629	56 (55-57)	0·2	31 (30-32)	25 (24-26)	1·2	4,214 (4,129-4,300)	4,433 (4,299-4,566)	3,971 (3,868-4,075)	4,109 (4,027-4,192)	3,823 (3,724-3,922)	4,912 (4,788-5,035)
Finland	5,525	1·2	2,797	2,728	277 (272-281)	1·2	155 (153-158)	121 (118-125)	1·3	5,004 (4,928-5,081)	5,548 (5,458-5,638)	4,447 (4,324-4,570)	4,598 (4,529-4,668)	4,779 (4,701-4,857)	4,540 (4,425-4,655)
France	67,320	14·1	34,788	32,533	3,772 (3,716-3,828)	15·9	1,998 (1,974-2,022)	1,774 (1,723-1,825)	1·1	5,603 (5,519-5,686)	5,744 (5,676-5,812)	5,452 (5,296-5,609)	5,439 (5,358-5,519)	5,266 (5,204-5,327)	5,822 (5,657-5,987)
Germany	83,167	17·4	42,129	41,038	4,874 (4,771-4,978)	20·6	2,538 (2,466-2,611)	2,336 (2,262-2,410)	1·1	5,861 (5,736-5,986)	6,025 (5,853-6,197)	5,692 (5,512-5,873)	5,290 (5,171-5,409)	5,180 (5,013-5,348)	5,554 (5,387-5,720)
Iceland	364	0·1	177	187	15 (15-16)	0·1	8 (8-9)	7 (6-7)	1·1	4,164 (3,996-4,333)	4,760 (4,440-5,079)	3,600 (3,475-3,725)	5,108 (4,903-5,313)	5,463 (5,086-5,840)	4,840 (4,698-4,981)
Ireland	4,964	1·0	2,507	2,458	215 (213-217)	0·9	109 (108-110)	106 (104-108)	1·0	4,333 (4,289-4,392)	4,343 (4,294-4,392)	4,322 (4,250-4,394)	5,343 (5,285-5,400)	5,090 (5,025-5,154)	5,676 (5,581-5,770)
Italy	59,641	12·5	30,591	29,050	3,514 (3,453-3,574)	14·8	1,939 (1,890-1,988)	1,575 (1,540-1,610)	1·2	5,891 (5,790-5,993)	6,338 (6,177-6,498)	5,421 (5,301-5,542)	5,184 (5,095-5,273)	5,375 (5,239-5,511)	5,102 (4,990-5,214)
Latvia	1,908	0·4	1,027	881	78 (77-79)	0·3	48 (47-49)	30 (30-31)	1·6	4,097 (4,033-4,160)	4,652 (4,554-4,750)	3,449 (3,374-3,524)	3,884 (3,826-3,942)	3,925 (3,853-3,996)	4,145 (4,065-4,225)
Lithuania	2,794	0·6	1,490	1,304	130 (128-133)	0·5	72 (70-73)	58 (56-61)	1·2	4,659 (4,567-4,751)	4,821 (4,729-4,913)	4,475 (4,309-4,641)	4,462 (4,377-4,547)	4,176 (4,094-4,258)	5,342 (5,175-5,509)
Malta	515	0·1	249	266	19 (19-20)	0·1	11 (11-12)	8 (8-8)	1·4	3,789 (3,639-3,938)	4,564 (4,287-4,841)	3,063 (2,934-3,192)	3,998 (3,849-4,147)	4,458 (4,191-4,724)	3,613 (3,475-3,750)
Norway	5,368	1·1	2,661	2,707	264 (262-267)	1·1	134 (132-136)	130 (128-132)	1·0	4,922 (4,874-4,970)	5,041 (4,968-5,115)	4,804 (4,743-4,866)	5,348 (5,297-5,399)	5,176 (5,100-5,251)	5,640 (5,574-5,707)
Poland	37,958	7·9	19,585	18,373	1,149 (1,133-1,164)	4·8	698 (685-710)	451 (441-460)	1·5	3,026 (2,985-3,067)	3,562 (3,499-3,626)	2,454 (2,403-2,506)	3,138 (3,098-3,177)	3,341 (3,283-3,398)	3,032 (2,978-3,087)
Portugal	10,296	2·2	5,436	4,860	477 (472-483)	2·0	265 (261-269)	212 (208-216)	1·3	4,635 (4,582-4,687)	4,870 (4,803-4,937)	4,371 (4,289-4,454)	4,229 (4,182-4,277)	4,262 (4,198-4,325)	4,321 (4,236-4,405)
Slovakia	5,458	1·1	2,793	2,665	206 (203-210)	0·9	117 (115-120)	89 (86-91)	1·3	3,775 (3,710-3,840)	4,208 (4,117-4,298)	3,322 (3,229-3,414)	4,183 (4,111-4,256)	4,178 (4,086-4,270)	4,411 (4,300-4,521)
Slovenia	2,096	0·4	1,045	1,051	99 (98-100)	0·4	52 (51-53)	47 (46-48)	1·1	4,711 (4,654-4,768)	4,936 (4,844-5,028)	4,487 (4,419-4,555)	4,518 (4,464-4,572)	4,403 (4,322-4,484)	4,802 (4,734-4,869)
Spain	47,333	9·9	24,133	23,199	2,157 (2,135-2,180)	9·1	1,080 (1,063-1,097)	1,078 (1,062-1,093)	1·0	4,558 (4,510-4,606)	4,475 (4,404-4,546)	4,645 (4,579-4,710)	4,471 (4,421-4,520)	4,153 (4,083-4,224)	4,988 (4,915-5,060)
Switzerland	8,606	1·8	4,337	4,269	444 (437-450)	1·9	234 (229-239)	210 (205-214)	1·1	5,154 (5,077-5,231)	5,395 (5,287-5,503)	4,910 (4,801-5,018)	5,223 (5,147-5,300)	5,156 (5,061-5,251)	5,402 (5,281-5,522)
Netherlands	17,408	3·6	8,760	8,648	875 (865-884)	3·7	489 (483-494)	386 (378-394)	1·3	5,026 (4,970-5,081)	5,581 (5,519-5,642)	4,463 (4,372-4,555)	5,006 (4,951-5,061)	5,321 (5,261-5,382)	4,757 (4,660-4,855)
UK-England	56,481	11·8	28,560	27,921	2,296 (2,245-2,348)	9·7	1,280 (1,250-1,310)	1,017 (975-1,059)	1·3	4,066 (3,974-4,157)	4,481 (4,376-4,585)	3,641 (3,491-3,791)	4,262 (4,166-4,358)	4,480 (4,372-4,587)	4,085 (3,911-4,258)
UK-Northern Ireland	1,901	0·4	965	936	80 (79-82)	0·3	45 (44-46)	35 (34-37)	1·3	4,232 (4,142-4,323)	4,687 (4,598-4,776)	3,764 (3,605-3,923)	4,721 (4,614-4,827)	4,947 (4,852-5,042)	4,550 (4,326-4,773)
UK-Scotland	5,481	1·1	2,810	2,671	250 (247-254)	1·1	145 (143-147)	105 (103-108)	1·4	4,562 (4,498-4,625)	5,157 (5,074-5,240)	3,936 (3,840-4,032)	4,607 (4,544-4,670)	4,957 (4,877-5,038)	4,276 (4,178-4,374)
UK-Wales	3,163	0·7	1,603	1,559	150 (148-153)	0·6	83 (81-85)	67 (66-69)	1·2	4,756 (4,681-4,830)	5,178 (5,077-5,279)	4,322 (4,212-4,432)	4,546 (4,475-4,616)	4,752 (4,660-4,844)	4,380 (4,266-4,495)
Northern Europe	17,080	3·6	8,561	8,519	868 (860-875)	3·7	473 (466-479)	395 (390-400)	1·2	5,080 (5,034-5,126)	5,520 (5,447-5,594)	4,637 (4,582-4,693)	5,065 (5,020-5,110)	5,204 (5,133-5,274)	5,015 (4,960-5,070)
Central Europe	196,924	41·2	100,377	96,547	11,029 (10,911-11,148)	46·5	5,842 (5,765-5,918)	5,188 (5,097-5,279)	1·1	5,601 (5,541-5,661)	5,820 (5,743-5,896)	5,374 (5,280-5,467)	5,288 (5,230-5,346)	5,216 (5,143-5,290)	5,514 (5,423-5,605)
Eastern Europe	67,092	14·0	34,597	32,495	2,332 (2,315-2,349)	9·8	1,371 (1,358-1,385)	961 (951-971)	1·4	3,476 (3,451-3,502)	3,963 (3,924-4,002)	2,958 (2,927-2,990)	3,538 (3,513-3,562)	3,656 (3,620-3,691)	3,613 (3,526-3,593)
Southern Europe	124,827	26·1	63,994	60,832	6,489 (6,424-6,554)	27·4	3,472 (3,419-3,524)	3,017 (2,979-3,056)	1·2	5,198 (5,146-5,250)	5,425 (5,343-5,507)	4,960 (4,897-5,023)	4,795 (4,746-4,843)	4,778 (4,706-4,851)	4,955 (4,892-5,017)
UK and Ireland	71,990	15·1	36,444	35,546	2,992 (2,940-3,044)	12·6	1,662 (1,632-1,692)	1,331 (1,288-1,373)	1·2	4,156 (4,084-4,228)	4,559 (4,477-4,642)	3,743 (3,625-3,862)	4,377 (4,301-4,453)	4,578 (4,493-4,663)	4,218 (4,080-4,356)
European Pool	477,913	100	243,974	233,939	23,711 (23,565-23,857)	100	12,818 (12,720-12,917)	10,892 (10,785-11,000)	1·2	4,961 (4,931-4,992)	5,254 (5,213-5,295)	4,656 (4,610-4,702)	4,783 (4,754-4,813)	4,785 (4,747-4,823)	4,918 (4,872-4,965)
EU27	447,320	··	228,764	218,556	22,347 (22,210-22,483)	··	12,077 (11,982-12,171)	10,270 (10,171-10,369)	1·2	4,996 (4,965-5,026)	5,279 (5,238-5,320)	4,699 (4,654-4,744)	4,767 (4,737-4,796)	4,747 (4,708-4,784)	4,941 (4,896-4,986)

Table 2 - Complete cancer prevalence in Europe (EUROPEAN Pool of 29 countries in EUROCARE-6) as of Jan 1, 2020 by cancer entity and age at prevalence date. Crude prevalence proportions per 100,000 inhabitants and number of prevalent cases (thousands) with 95% confidence intervals in parentheses. Percent proportion of young (0-54 years) and elderly (75 years or more) prevalent cases. Cancer entities with prevalence proportion higher than 50 per 100,000.
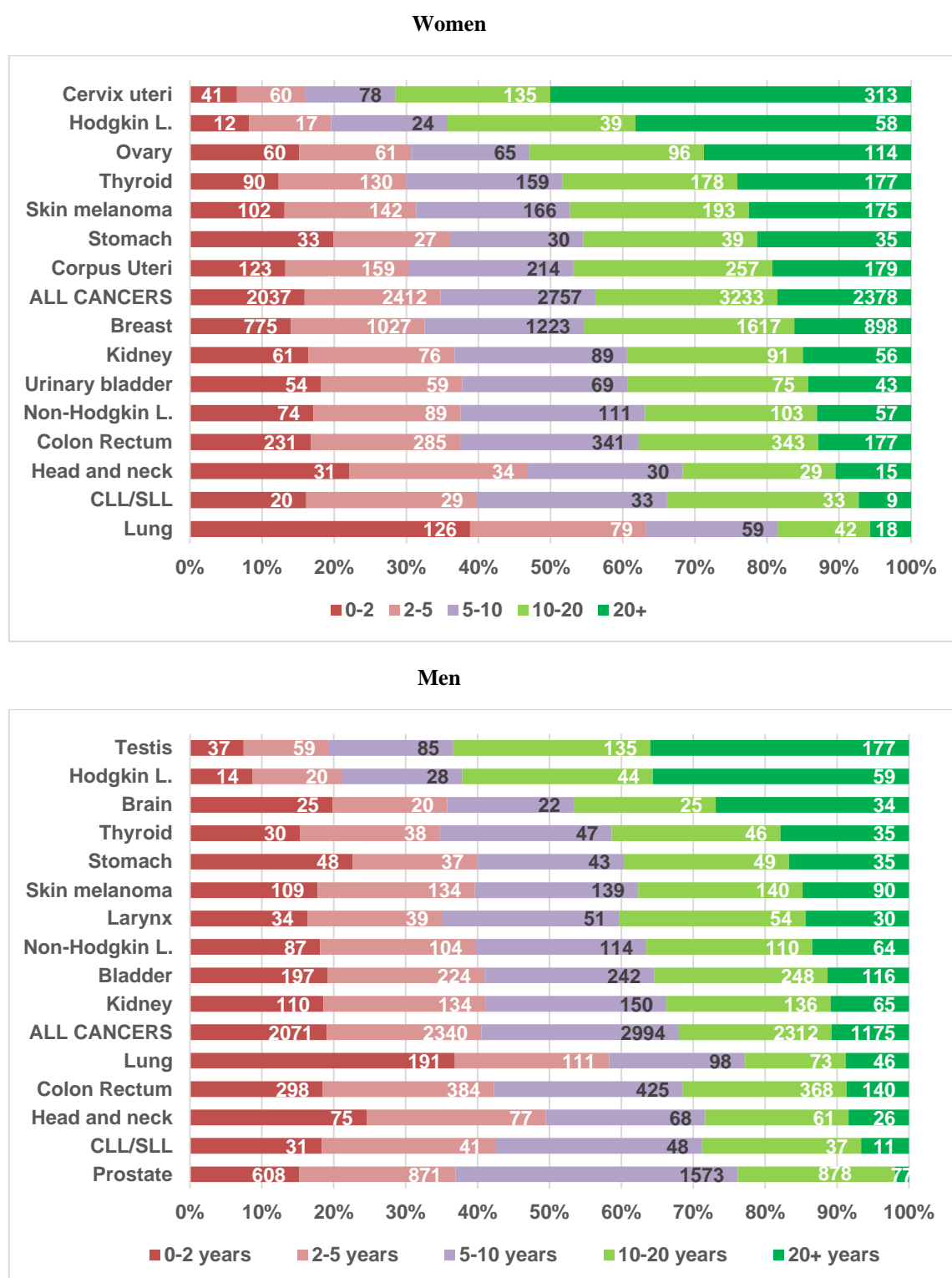
Cancer site	Crude Prevalence proportion per 100,000					Number of prevalent cases (thousands)					% Prevalent cases aged 0-54 and 75+	
	0-54	55-64	65-74	75+	All ages	0-54	55-64	65-74	75+	All ages	0-54	75+
WOMEN												
All cancers	1,480 (1,464-1,496)	7,773 (7,630-7,915)	12,892 (12,604-13,179)	16,144 (16,033-16,254)	5,254 (5,213-5,295)	2,316 (2,291-2,341)	2,548 (2,501-2,594)	3,482 (3,404-3,559)	4,473 (4,442-4,504)	12,818 (12,720-12,917)	18	35
Breast	560 (551-568)	3,638 (3,575-3,702)	6,163 (5,996-6,329)	6,518 (6,466-6,570)	2,270 (2,248-2,292)	876 (863-889)	1,193 (1,172-1,213)	1,664 (1,619-1,709)	1,806 (1,791-1,820)	5,539 (5,486-5,592)	16	33
Colon Rectum	59 (58-60)	586 (559-613)	1,290 (1,238-1,342)	2,685 (2,652-2,717)	564 (557-572)	92 (91-94)	192 (183-201)	348 (334-362)	744 (735-753)	1,377 (1,358-1,396)	7	54
Corpus Uteri	34 (33-35)	481 (454-508)	1,067 (1,039-1,094)	1,563 (1,533-1,593)	382 (376-388)	54 (52-55)	158 (149-167)	288 (281-295)	433 (425-441)	932 (918-947)	6	46
Skin melanoma	146 (144-149)	443 (430-456)	692 (669-715)	786 (774-799)	319 (315-323)	229 (225-233)	145 (141-149)	187 (181-193)	218 (214-221)	779 (770-788)	29	28
Thyroid	167 (164-170)	520 (499-541)	660 (642-678)	447 (430-464)	301 (297-305)	261 (257-266)	170 (164-177)	178 (173-183)	124 (119-128)	734 (724-744)	36	17
Cervix uteri	102 (100-104)	465 (439-491)	484 (458-510)	657 (620-695)	256 (250-263)	160 (157-163)	152 (144-161)	131 (124-138)	182 (172-192)	625 (610-641)	26	29
Non Hodgkin L.	50 (45-54)	250 (240-261)	436 (427-446)	564 (557-572)	178 (175-181)	78 (71-84)	82 (79-86)	118 (115-120)	156 (154-158)	434 (426-442)	18	36
Ovary	45 (43-46)	260 (250-271)	425 (408-442)	455 (443-468)	162 (160-165)	70 (68-72)	85 (82-89)	115 (110-119)	126 (123-130)	396 (389-403)	18	32
Kidney	30 (29-31)	190 (177-202)	348 (334-361)	615 (607-623)	153 (150-155)	46 (45-48)	62 (58-66)	94 (90-98)	170 (168-173)	373 (367-379)	12	46
Lung	21 (20-22)	250 (239-262)	403 (394-411)	364 (355-373)	133 (131-135)	33 (31-35)	82 (78-86)	109 (106-111)	101 (98-103)	325 (319-330)	10	31
Urinary bladder	12 (11-13)	124 (115-133)	274 (268-279)	601 (591-610)	123 (121-125)	19 (17-20)	41 (38-44)	74 (72-75)	166 (164-169)	300 (295-304)	6	55
Stomach	9 (8-9)	70 (65-75)	136 (128-144)	327 (297-357)	67 (64-71)	14 (13-15)	23 (21-25)	37 (34-39)	91 (82-99)	164 (155-173)	9	55
Hodgkin L.	58 (57-60)	79 (72-87)	72 (66-77)	52 (47-57)	62 (60-64)	91 (89-94)	26 (23-28)	19 (18-21)	14 (13-16)	151 (147-155)	60	9
Head and neck	14 (13-15)	115 (108-122)	150 (146-154)	138 (131-145)	57 (55-58)	22 (20-23)	38 (36-40)	41 (40-42)	38 (36-40)	138 (135-142)	16	28
CLL/SLL	4 (3-4)	54 (49-59)	134 (126-141)	230 (219-242)	51 (49-52)	6 (5-7)	18 (16-19)	36 (34-38)	64 (61-67)	124 (120-128)	5	52
MEN												
All cancers	887 (877-897)	5,999 (5,765-6,233)	14,150 (13,890-14,410)	23,103 (22,851-23,356)	4,656 (4,610-4,702)	1,425 (1,409-1,441)	1,877 (1,804-1,951)	3,358 (3,296-3,420)	4,232 (4,186-4,278)	10,892 (10,785-11,000)	13	39
Prostate	34 (32-36)	1,617 (1,498-1,735)	6,212 (6,046-6,379)	10,776 (10,591-10,961)	1,714 (1,686-1,741)	54 (51-58)	506 (469-543)	1,474 (1,435-1,514)	1,974 (1,940-2,008)	4,008 (3,944-4,072)	1	49
Colon Rectum	60 (59-62)	804 (764-844)	4,233 (2,024-2,117)	4,233 (4,169-4,297)	691 (682-699)	97 (94-100)	252 (239-264)	491 (480-502)	775 (764-787)	1,615 (1,595-1,636)	6	48
Urinary bladder	32 (30-34)	469 (445-493)	1,293 (1,251-1,335)	2,851 (2,822-2,880)	439 (433-445)	52 (48-55)	147 (139-154)	307 (297-317)	522 (517-528)	1,027 (1,013-1,042)	5	51
Skin melanoma	87 (86-89)	363 (349-376)	709 (675-744)	1,036 (1,026-1,046)	262 (257-266)	140 (138-142)	113 (109-118)	168 (160-176)	190 (188-192)	612 (602-621)	23	31
Kidney	45 (44-46)	372 (338-406)	763 (745-781)	1,232 (1,203-1,261)	255 (249-260)	72 (71-74)	116 (106-127)	181 (177-185)	226 (220-231)	595 (583-608)	12	38
Lung	19 (18-19)	342 (321-362)	781 (754-807)	1,075 (1,032-1,118)	222 (217-227)	30 (29-31)	107 (101-113)	185 (179-192)	197 (189-205)	519 (507-531)	6	38
Testis	193 (190-195)	336 (330-343)	210 (187-233)	153 (142-164)	211 (207-214)	310 (306-314)	105 (103-107)	50 (44-55)	28 (26-30)	493 (485-500)	63	6
Non Hodgkin L.	68 (67-70)	325 (321-328)	540 (533-547)	763 (736-789)	205 (202-207)	110 (107-112)	102 (100-103)	128 (126-130)	140 (135-145)	479 (473-485)	23	29
Head and neck	29 (26-32)	347 (332-362)	405 (391-420)	302 (290-314)	131 (128-135)	47 (43-51)	109 (104-113)	96 (93-100)	55 (53-58)	307 (300-315)	15	18
Stomach	10 (10-11)	112 (102-121)	252 (238-265)	552 (522-583)	91 (88-94)	16 (15-18)	35 (32-38)	60 (56-63)	101 (96-107)	212 (205-219)	8	48
Larynx	7 (6-8)	163 (155-171)	312 (295-329)	391 (369-412)	89 (86-91)	11 (9-13)	51 (48-53)	74 (70-78)	72 (68-76)	207 (201-214)	5	35
Thyroid	43 (42-44)	149 (142-156)	202 (195-208)	174 (167-181)	84 (82-85)	69 (67-71)	47 (45-49)	48 (46-49)	32 (31-33)	196 (192-199)	35	16
CLL/SLL	8 (7-8)	89 (86-92)	222 (209-235)	411 (374-448)	72 (69-75)	12 (11-13)	28 (27-29)	53 (50-56)	75 (68-82)	168 (161-176)	7	45
Hodgkin L.	61 (59-63)	108 (103-112)	93 (84-102)	63 (57-69)	71 (69-72)	98 (94-101)	34 (32-35)	22 (20-24)	12 (10-13)	165 (160-170)	59	7
Brain	45 (44-47)	78 (73-82)	78 (63-93)	64 (50-78)	54 (52-57)	73 (70-75)	24 (23-26)	18 (15-22)	12 (9-14)	127 (122-133)	57	9

CLL/SLL: Chronic lymphocytic leukaemia/small lymphocytic lymphoma.

Figure 1 - Complete cancer prevalence as of Jan 1, 2020 by sex and country. First eight leading cancers. Countries in the EUROCARE-6 dataset ranked by complete cancer prevalence for all cancers. Crude proportions per 100,000.
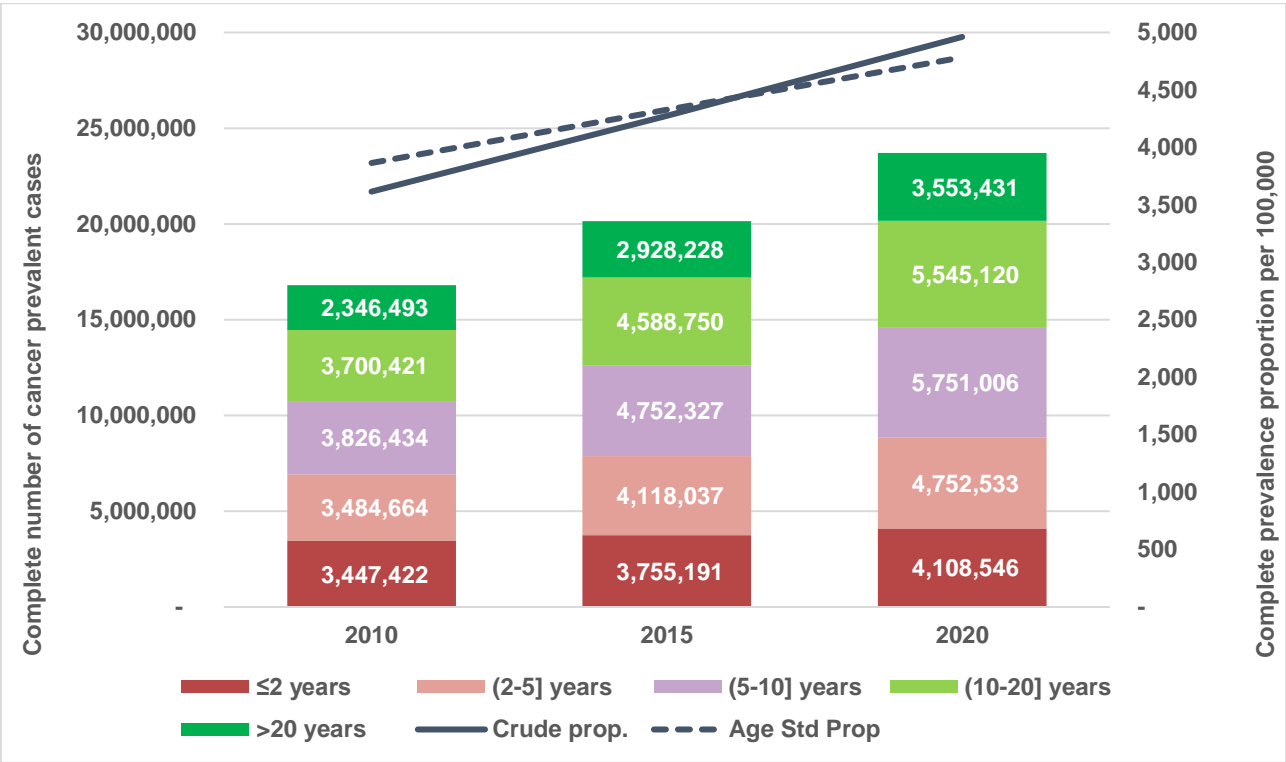
Figure 2 - Complete number of prevalent cancer cases (in thousands) by sex and disease duration in years (0-2, 2-5, 5-10, 10-20, 20+) in Europe (European Pool of 29 countries in EUROCARE-6) as of Jan 1, 2020. Cancer entities with crude prevalence proportion higher than 50 per 100,000. Values ordered by decreasing proportion of cases surviving 20 years or more after diagnosis.

Women

	0-2	2-5	5-10	10-20	20+
Cervix uteri	41	60	78	135	313
Hodgkin L.	12	17	24	39	58
Ovary	60	61	65	96	114
Thyroid	90	130	159	178	177
Skin melanoma	102	142	166	193	175
Stomach	33	27	30	39	35
Corpus Uteri	123	159	214	257	179
ALL CANCERS	2037	2412	2757	3233	2378
Breast	775	1027	1223	1617	898
Kidney	61	76	89	91	56
Urinary bladder	54	59	69	75	43
Non-Hodgkin L.	74	89	111	103	57
Colon Rectum	231	285	341	343	177
Head and neck	31	34	30	29	15
CLL/SLL	20	29	33	33	9
Lung	126	79	59	42	18

Men

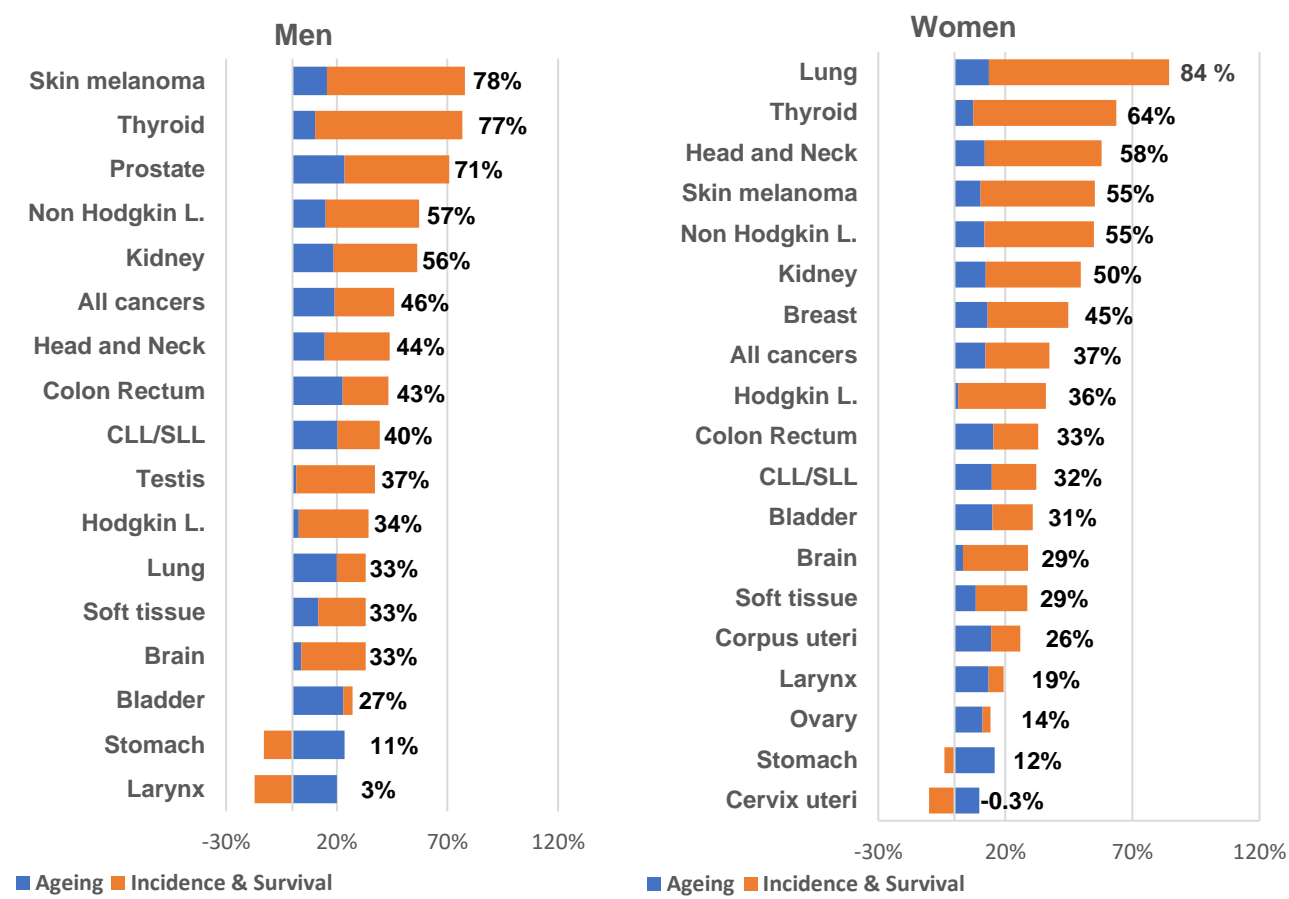|	0-2 years	2-5 years	5-10 years	10-20 years	20+ years
Testis	37	59	85	135	177
Hodgkin L.	14	20	28	44	59
Brain	25	20	22	25	34
Thyroid	30	38	47	46	35
Stomach	48	37	43	49	35
Skin melanoma	109	134	139	140	90
Larynx	34	39	51	54	30
Non-Hodgkin L.	87	104	114	110	64
Bladder	197	224	242	248	116
Kidney	110	134	150	136	65
ALL CANCERS	2071	2340	2994	2312	1175
Lung	191	111	98	73	46
Colon Rectum	298	384	425	368	140
Head and neck	75	77	68	61	26
CLL/SLL	31	41	48	37	11
Prostate	608	871	1573	878	77

CLL/SLL: Chronic lymphocytic leukaemia/small lymphocytic lymphoma.

Figure 3 - Trend between Jan 1, 2010 and Jan 1, 2020 of complete cancer prevalence in Europe (European Pool of 29 countries in EUROCARE-6). Overall number of prevalent cases by disease duration in years (0-2, 2-5, 5-10, 10-20, 20+) and complete crude and age-adjusted proportions per 100,000 (*European Standard Population, EUROSTAT 2013*). Women and Men.

Figure 4 – Estimated percent relative difference 2010-2020 in complete crude prevalence proportion by cancer and sex in Europe (European Pool of 29 countries in EUROCARE-6). Percent difference is decomposed by determinant: demographic ageing (blue bar) or incidence and survival dynamics (orange bar). Cancer entities with prevalence proportion higher than 50 per 100,000 in Men and Women, or in Men/Women for sex specific cancers

CLL/SLL: Chronic lymphocytic leukaemia/small lymphocytic lymphoma.