SEPTEMBER 2019

National estimates of cancer incidence and mortality in metropolitan France between 1990 and 2018

Study based on the French network of cancer registries, Francim

Overview

Authors
Gautier Defossez
Sandra Le Guyader-Peyrou
Zoé Uhry
Pascale Grosclaude
Marc Colonna
Emmanuelle Dantony
Patricia Delafosse
Florence Molinié
Anne-Sophie Woronoff
Anne-Marie Bouvier
Laurent Remontet
Nadine Bossard
Alain Monnereau

Santé publique France
Registres des cancers FRANCIM
HCL HOSPICES CIVILS DE LYON
INSTITUT NATIONAL DU CANCER

INTRODUCTION

The analysis of developments in the incidence (new cases), combined with mortality (death), is an essential part of the processes of surveillance and observation of the epidemiology of cancers.

National estimates of cancer incidence and mortality in metropolitan France between 1990 and 2018 fall within the framework of the 2014-2019 Cancer Plan, and contribute to the assessment of the preventive and curative actions carried out for several years, informed by changes in risk factors, and in diagnostic and screening practices. These estimates constitute an updated version to the most recent study of trends, which was published in 2013, and covered the period 1980–2012 [1, 2]. This edition helps to strengthen the value of projections of the incidence and mortality of cancer, uncertain by nature, produced every two years for the current year [3].

This new edition is also notable for a major revision of the methodology used. Firstly, the incidence in metropolitan France is now estimated from data appearing in the registries only, without using mortality as a correlate of incidence. Secondly, the method relies on more efficient statistical models. This **new methodology** makes it possible for the first time in France to enrich the publication of **trends with sub-types** (topographical and histological) and to accurately reproduce **age-specific trends** which make it possible to considerably refine our knowledge of these diseases, which often have very different therapeutic solutions and prognoses.

In addition to the advances in methodology, this document also presents the main results of national trends in cancer incidence and mortality between 1990 and 2018 in metropolitan France for the entity "all cancers", including solid tumours and haematological malignancies. It goes along with the publication of the detailed results published in two volumes: the first on solid tumours (27 types of solid tumour and 22 sub-types) and the entity "all cancers" [4], and the second on haematological malignancies (24 types of haematological malignancies) [5], gathering a total of 74 cancer types or sub-types.

METHODOLOGY

This study presents the detailed analysis of cancer incidence and mortality in metropolitan France from 1990 to 2018, based on data observed up to 2015. Estimates for the years 2016 to 2018 are therefore based on projections.

The incidence data (new cases of cancer) come from metropolitan cancer registries, which cover between 19 and 22 *départements* (county-sized administrative divisions), the number depending on the cancer in question, and which, according to the registries, began collecting data between 1975 and 2008. Cancer cases are coded according to the International Classification of Diseases for Oncology, 3rd Edition (ICD-O3). The mortality data come from the Centre for Epidemiology on Medical Causes of Death (*Centre d'épidémiologie sur les causes médicales de Décès* - CépiDc-Inserm) and have been available since 1975. Causes of death are coded according to the International Classification of Diseases (8th to 10th revision, depending on the year). Population data from 1975 to 2018 are provided by the National institute of statistics and economic studies (*Institut national de la statistique et des études économiques* - Insee).

National incidence estimates were performed using a new methodology based on modelling incidence data only, mortality not being used as a correlate of incidence as it was in previous studies[1]. The statistical model used has allowed to estimate national incidence using data from all registries since 1985, taking into account differences between registries in term of starting time for data collection and in term if incidence levels. This methodology relies on the assumption that the registry area is representative of metropolitan France in terms of cancer incidence. It was possible to validate this hypothesis by comparing national estimates with those obtained from another methodology using health care data as a correlate. In addition, this new methodology uses flexible models for both analyses (incidence and mortality),

1. In previous studies (Binder *et al.* 2013), mortality was used to correct a possible difference in incidence between the area covered by the registries and the country as a whole, assuming that the difference in incidence and mortality was the same.

which makes it possible to reveal complex trends that may differ according to age.

For solid tumours, the analysis of incidence was carried out for 27 cancers, including 8 new sites in comparison to the previous edition with, for the first time, analyses by topographical sub-sites for cancers of the lip, oral cavity and pharynx, colorectal cancer, kidney cancer, sarcomas, and by histological sub-types for cancers of the oesophagus, lung, testis, ovary, thyroid and central nervous system. These analyses by histological sub-types were made possible by the new methodology adopted. Mortality was analysed for the 19 major solid cancers. For haematological malignancies, the analysis of incidence was carried out for 17 entities and 6 sub-entities defined according to their morphology. Non-Hodgkin lymphomas (NHL) were also analysed as a whole. Due to changes in the classification and the ability of pathologists to identify newly defined entities, some haematological diseases can be analysed only from 1995 or 2003. This is specified in the table of results (Table 4). Since the studied entities are not identifiable in the mortality data for haematological malignancies, only the incidence is presented, with the exception of non-Hodgkin lymphomas as a whole, for which it was possible to associate mortality data. Finally, estimates for "all cancers" were provided.

In total, the study examined 74 types or sub-types of cancer[2]. Only invasive tumours are counted in this study, and skin cancers other than melanomas, are excluded. For prostate cancer, the incidence is given for the year 2015 (last year of observation) and not 2018, due to the high level of uncertainty regarding the short-term incidence trends for this cancer.

Sub-sites analyses were conducted separately, and estimates presents some variability. The consequences of this are: 1) in the case of a partition, the sum of sub-sites estimates differs slightly from the whole site estimate; 2) when the sub-sites do not cover the whole site, their sum may sometimes exceed that of the site for certain age groups and years [4, 5].

In order to allow temporal and/or international comparisons, incidence and mortality rates are standardised according to the age structure of the world population (Doll *et al.* 1966). Incidence or mortality rates are expressed as the number of cases or deaths per 100,000 person-years. Unless otherwise stated, changes in incidence or mortality thereafter refer to changes in standardised incidence or mortality rates, and not to the changes in the number of cases or deaths.

2. Mesothelioma was not estimated in this study, as it falls within the scope of the National Mesothelioma Surveillance Program (*Programme national de surveillance du mésothéliome* - PNSM), which makes estimates of incidence from its own data (https://www.santepubliquefrance.fr/maladies-et-traumatismes/cancers/mesotheliomes)

MAIN RESULTS

Part I: All cancers

Incidence and mortality in 2018

In 2018, the number of **new cancer cases** for all cancer sites combined in metropolitan France is estimated at **382,000** (204,600 in men and 177,400 in women, Tables 1 and 2). Age-standardized incidence rates using the world standard population (Age-Standardised Incidence Rate - ASIR) are 330.2 cases per 100,000 person-years in men and 274.0 in women (male/female ratio of incidence rate equal to 1.2). The number of **cancer deaths** is estimated at **157,400**, of which 89,600 were men and 67,800 women, an age-standardised mortality rate (ASMR) of 123.8 and 72.2 per 100,000 person-years respectively (male/female ratio of mortality rate 1.7).

Prostate cancer remains by far the most common cancer in men (50,430 new cases estimated in 2015 - see methodology), ahead of lung cancer and colorectal cancer (31,231 and 23,216 cases estimated respectively in 2018). In women, breast cancer tops of the list (58,459 cases estimated in 2018), ahead of colorectal cancer (20,120 cases) and lung cancer (15,132 cases, Tables 1 and 2).

In terms of mortality, lung cancer ranks highest among men (22,761 deaths in 2018), then colorectal cancer (9,209 deaths) and prostate cancer (8,115 deaths). In women, breast cancer is the leading cause of cancer death (12,146 deaths), then lung cancer (10,356 deaths) and colorectal cancer (7,908 deaths).

Trends between 1990 and 2018

The number of new cases increased by 65% in men between 1990 and 2018 (estimated 124,000 to 204,600 cases), and by 93% in women (91,800 to 177,400). The increase in the number of cases in men is primarily related to the increase in the population (20%) and its ageing (39%) between 1990 and 2018, while the attributable portion to an increased risk of the cancer itself is 6% over the same period. The situation is different in women, for whom the increase of 93% in the number of cases breaks down into 45% related to an increased risk of cancer, with 25% and 23% respectively being due to the increase in, and ageing of, the population. Regarding mortality, the increase in the number of deaths is 6% in men over the period 1990–2018 (84,400 to 89,600) and 26% in women (54,000 to 67,800). This increase is explained by the increase in, and ageing of, the population for 12% and 48% respectively in men and 17% and 34% in women, while the proportion of deaths attributable to the cancer itself is lower by -54% in men and -25% in women.

Trend analysis between 1990 and 2018 show a **relatively stable incidence rate (ASIR) for men**, with a mean annual variation of +0.1% (Table 1). This apparent stability in the incidence rate actually

results from an increase until 2005 (from 320.7 cases per 100,000 in 1990 to 402.1 in 2005), followed by a reversal of the trend (330.2 per 100,000 in 2018), with a mean decrease in the incidence rate of -1.4% per year over the recent period, 2010–2018. This trend is related, in particular, to the pronounced change in the incidence of prostate cancer (25% of male cancers), which increased sharply until 2005, and then declined rapidly in response to changes in screening practices using PSA (Prostate Specific Antigen). An estimation covering "all cancers other than prostate cancer" confirms a stable and linear incidence in men over the entire period from 1990 to 2018, with a mean annual variation in the incidence rate (ASIR) of -0.1% per year.

In women, the finding is different, with an **increase in the incidence rate** (ASIR) during the period between 1990 and 2018 of +1.1% per year, with a slowdown in the increase over the more recent period (mean +0.7% per year between 2010 and 2018, Table 2). This trend is primarily a reflection of the increased incidence of lung cancer (9% of female cancers: mean +5.3% per year between 1990 and 2018), and to a lesser extent, of the continuation of that of breast cancer in women (33% of female cancers: mean +1.1% per year between 1990 and 2018).

Mortality rates (Age-Standardised Mortality Rate - ASMR) due to cancer **decreased** more significantly in men between 1990 and 2018 (mean -1.8% per year in men and -0.8% per year in women, Tables 1 and 2).

It is important to note that cancers in all loci combined form a highly heterogeneous group with regard to natural history, risk factors, diagnostic and therapeutic conditions, and prognosis. The estimates of the "all cancers" entity may thus mask the variation of changes in the incidence and mortality in the various loci studied.

Part II: Solid tumours

Conventionally, an increase in the incidence rate reflects a real change in the risk of contracting cancer, it also may result from better detection of these cancers, explained by improvements in diagnostic techniques and progress in medical practices. This phenomenon leads to an increase in the number of diagnosed cases, while the actual risk of cancer may have changed much more modestly or even decreased. An increase in the incidence rate combined with an increase in the mortality rate is generally due to limited therapeutic progress and/or the proportion of cases diagnosed at an advanced stage that remains stable. Conversely, an increase in the incidence rate may be accompanied by a decrease in the mortality rate if therapeutic progress is made and/or the proportion of cases diagnosed at an advanced stage decreases.
On the contrary, a decrease in the incidence rate classically reflects a real decrease in the risk of contracting cancer, and will be accompanied by a decrease in the mortality rate.

A strong increase in incidence and mortality for lung cancer in women

The most unfavourable developments are those associating an increase in the incidence rate with a concomitant increase in the mortality rate. The most worrying development in this regard, given its frequency and poor prognosis, is that of **lung cancer in women**. Incidence and mortality rates (ASIR, ASMR) increase in women, while incidence is stable in men and mortality decreases (Tables 1 and 2). The difference in incidence rates between the two sexes decreased significantly, reflecting the increase in smoking among women [6]. Although the incidence of lung cancer remains twice as high in men, the ratio of men to women decreased from 9.6 in 1990 to 2.2 in 2018. Trends by histological type provide particularly interesting information for a more precise interpretation of temporal changes in this locus. Indeed, the apparent stability of the incidence of lung cancer in men results from different developments according to the histological type (Tables 1 and 2, Figure 1). Figure 1 shows very clearly that the incidence rate of lung adenocarcinoma increased in men between 1990 and 2018 (mean annual variation +3.9%) while squamous cell carcinoma and small cell cancer decreased (-2.9% and -0.9% per year respectively). In women, however, incidence rates of these three main histological types increased, dominated by the increase in pulmonary adenocarcinoma (mean annual variation +7.7% between 1990 and 2018) followed by that of small cell cancers (+4.4% per year) and squamous cell carcinoma (+2.1%). Although all histological types of lung cancer are associated with tobacco, the different trends may be explained by a change in the structure and composition of cigarettes [7, 8]. The introduction of cigarette filters, on one hand, may have been responsible for a deeper inhalation of small carcinogenic particles into the respiratory tract, resulting in adenocarcinomas. The change in the composition of cigarettes, on the other hand, with the increase in concentrations of nitrosamines, a family of extremely dangerous and carcinogenic chemical compounds, may also have contributed to this development.

An increase in incidence associated with a mortality rate which remains stable or increases little for several cancers

Of these, four are common cancers: cutaneous melanoma, pancreatic cancer, liver cancer and kidney cancer.

Cutaneous melanoma shows the greatest increases incidence among solid tumours in men over the more recent period, 2010–2018 (mean +3.4% per year), despite a slight slowdown compared to the whole 1990–2018 period (+4.0%, Table 1). Although less marked in women, the increase in incidence is nonetheless greater than 2% per year (Table 2). This increase, which is higher for men than for women, for the first time leads to identical incidence rates in 2018. These development are primarily the result of an increase in exposure to natural

and artificial ultraviolet (UV) radiation that has continued over successive generations.

It is more difficult to explain the increase in the incidence rate of **pancreatic cancer**, which is more pronounced in women, and has continued since 1990 (+2.7% per year in men and +3.8% in women between 1990 and 2018, Tables 1 and 2) since the incidence rate does not increase in a similar way in other industrialised countries. Excessive consumption of alcohol and tobacco, or a change in dietary behaviours associated with an increasing prevalence of obesity, may help partly explain these trends. The increase in the incidence of **liver cancer**, which is also more pronounced in women, tends to slow down in the recent period (+1.6% per year in men and +3.5% in women between 1990 and 2018, Tables 1 and 2). This is due, on the one hand, to the increased incidence of chronic liver diseases related to alcohol, the hepatitis B and C viruses, steatohepatitis metabolic diseases and, on the other hand, to improvements in the management of cirrhosis. These advances, by extending the life expectancy of patients with cirrhosis (reducing deaths from liver failure), actually increases the probability of developing liver cancer later in life. Despite advances in medical imaging and therapeutics, the prognosis for these two cancers remains bleak, explaining the lack of any favourable progress in terms of mortality.

Concerning **kidney cancer** (+1.7% per year in men and +1.4% in women between 1990 and 2018, Tables 1 and 2), the main factors incriminated in the increase in incidence are tobacco, the increasing prevalence of obesity and a lack of significant improvements in the control of arterial hypertension [9]. The improved performance of abdominal imaging techniques certainly plays a significant role in promoting early and fortuitous diagnoses of asymptomatic forms or small localised tumours, which has resulted in earlier treatment and better survival. This hypothesis is nonetheless called into doubt by the mild increase in mortality seen in men over the more recent period, which will have to be confirmed.

An increase in incidence associated with a decrease in mortality for other cancers

Such developments are observed for breast cancer in women (the most common cancer and the most common cause of death due to cancer), testicular cancer, and thyroid cancer in both sexes.

Regarding **breast cancer in women**, despite a stabilisation between 2003 and 2010, the incidence has again been increasing over the more recent period, 2010–2018 (mean +0.6% per year), although at a slower pace than in the 1990s (Table 2). An analysis of age trends reveals that the increase in incidence in recent years concerns women of all age groups except 60 year-olds (Figure 2a). The decline in incidence observed in the mid-2000s for these women, more broadly in those 55–64 years of age, was partly attributed to a rapid decline in menopausal hormone treatment prescriptions after 2003, as well as to a saturation effect of screening (decrease/stabilisation of incidence after the temporary rise due to the introduction of general screening) [10]. The hypothesis of a contingent phenomenon in this context is likely, and developments in the incidence rate in the 60 year-old age group in the coming years will confirm or refute this hypothesis. In contrast, the decrease in mortality between 1990 and 2018 (-1.3% per year) is constant over the entire study period. It is linked to major therapeutic advances and earlier diagnosis (better awareness among women and professionals, improvements in diagnostic imaging techniques and screening practices). Breast cancer is a multifactorial disease. Among the known risk factors, certain hormonal and reproductive factors as well as the prevalence of obesity have developed unfavourably over recent generations. Other suspected factors, such as night work, endocrine disruptors or certain kinds of occupational exposure, may also partly explain the continued increase in incidence. Finally, alcohol was implicated in 15% of breast cancers in 2015, which argues for similar policies as proved successful with smoking to fight against alcohol consumption in women [11].

Regarding **testicular cancer**, mortality remains very low in France and continues to decrease (-2.2% per year between 1990 and 2018, Table 1), concomitant with the arrival of treatments that cure the vast majority of patients. In contrast, the increased incidence of this cancer (+2.6% per year between 1990 and 2018) cannot be explained by improved diagnostic procedures or by the ageing of the population. Few risk factors have been identified, apart from a history of cryptorchidism and a personal or family history of testicular cancer, but several environmental and occupational risk factors are suspected and are now preferred avenues for research, such as pesticide exposure and endocrine disruptors, in particular.

For **thyroid cancer**, mortality, already very low for this cancer, is in constant decline (-1.9% per year in men and -3.4% among women between 1990 and 2018, Tables 1 and 2). The increase in the incidence rate (+4.4% per year in men and women between 1990 and 2018) is mainly explained by developments in medical practice and improvements in diagnostic techniques, which tend to induce an over diagnosis of these cancers, evaluated at between 70 and 80% in France during the 2003–2007 period [12]. This increase in incidence is related to that of papillary cancers, a histological type with very good prognosis, and which contribute to this difference between the changes in incidence and changes in mortality [13]. The role of clearly identified risk factors, such as exposure to ionizing radiation and iodine deficiency, is more difficult to quantify.

Favourable developments with a decline in both incidence and mortality for several cancers

In men, these developments primarily concern prostate cancer, colorectal cancer, lip, oral cavity and pharyngeal cancers, laryngeal

cancer and oesophageal cancer; in women, cancer of the cervix and ovary; in both sexes stomach cancer.

For **prostate cancer**, which remains the most common locus in men, the incidence has been declining over the recent period (mean -3.5% per year between 2010 and 2015, Table 1). This change must be interpreted in the light of the sharp increase in the incidence observed until 2005, an episode followed by a rapid decline related to changes in the practice of individual screening using the PSA assay [14]. The persistent decline in mortality between 1990 and 2018 (-2.8% per year) is a favourable factor in this context, attributable to improvements in treatments and the role of screening, which makes it possible to diagnose certain cancers at early stages, rendering them curable.

This is also the case for **colorectal cancer in men** (Table 1), the third most common cancer and the second most common cause of death due to cancer. Already observed in the United States since 1985 [15], the decline in the incidence of colorectal cancer is observed in France with a delay of some ten years, appearing first for rectal cancer from 1995 onwards, then for colon cancer from 2005. This change is perceptible through the analysis of trends by topographical sub-sites and mean annual variations of standardised incidence rates (ASIR) reported in Table 1. The introduction of organised screening with the resection of precancerous lesions and the detection of early cancers may go some way towards explaining this decrease, along with that of mortality. The absence of a decrease in the incidence of colorectal cancer in women is, however, difficult to explain. By contrast, the analysis of age trends reveals no increase in incidence among young adults in France as has been observed in the recent period in the United States, Canada, Australia and parts of Asia [16-19]. The decline in incidence observed is nevertheless smaller among young men than among other age groups, and rates have been slowly increasing among young women as of 2005. Changes in dietary behaviours among children and young adults, the increasing prevalence of obesity, insufficient physical activity, and changes in screening and surveillance strategies for high-risk individuals may explain this trend in part.

A combined decrease in both incidence and mortality is also observed **in men** for **lip, oral cavity and pharyngeal cancers, laryngeal cancer** and **oesophageal cancer** (Table 1), for which alcohol and tobacco use are the primary risk factors. Concerning oesophageal cancer, analysis of trends by histological sub-type shows an increase in the incidence rate of adenocarcinoma, which may be a consequence of the increasing prevalence of obesity, favouring a recrudescence of gastroesophageal reflux [20].

These favourable developments are also observed in women for two gynaecological cancers, cancer of the cervix and cancer of the ovary. The decline in the incidence and mortality of **cervical cancer**, which was already very strong in France in the 1980s and 1990s [1], is largely attributed to the introduction of cytological smear screening. The analysis of age trends reveals a slowing of the decline in incidence from the 2000s onwards for women 50 to 60 years of age, with a slight increase at the end of the period (Figure 2b). This may be related to a change in risk behaviours among women born after 1950, with the use of contraception, a younger age when first having intercourse, an increase in the number of partners, and changes in sexual practices which may contribute to an increase in the prevalence of persistent infection by *human papillomavirus* (HPV) in these women [21]. The topping-out of screening coverage rates and the limits of individual screening may also have contributed to this effect. This same increase in the risk of exposure to HPV could also explain the increase in the incidence of one rare cancer, **anal cancer**, for which age trends also show an increase, principally in women in the 50 and 60 years age groups (Figure 2c, Tables 1 and 2).

For **ovarian cancer**, the primary risk factors are hormonal and reproductive. The increased and earlier use of oral contraceptives may explain the observed decline in incidence. On the other hand, the decline in mortality cannot be attributed to changes in survival, which improves little over time and rather reflects the decline in incidence.

Finally, this favourable situation is observed in both sexes for **stomach cancer**, the change in which can be explained by the decrease in the prevalence and the treatment of the main risk factor for this cancer, infection by the *Helicobacter pylori* bacteria.

Incidence stable for some cancers

Over the period 1990–2018, no significant changes in incidence were observed for sarcomas, bladder cancer, uveal melanoma, nasal cavity cancers or central nervous system tumours in either sex, or in sex-specific cancers of the penis, the vulva and the body of the uterus (endometrium) (Tables 1 and 2).

Part III: Haematological malignancies

Incidence in 2018

For 2018, the number of **new cases of haematological malignancies**[3] in metropolitan France is estimated at **45,000** (25,000 in men and 20,000 in women), representing nearly 12% of all new cases of cancer.

Some two-thirds of the cases reported are lymphoid haematological diseases (Hodgkin lymphoma and non-Hodgkin lymphoma). Age-standardized incidence rates using the world standard

3. The entity "all haematological malignancies" was analysed using the methodology used for other cancers and the figures given here are from this analysis. The results of this entity, however, are not presented in detail due to their limited epidemiological interest.

population (ASIR) vary by type of haematological malignancy and by sex (Table 3). Haematological malignancies are more common in men, with the exception of essential thrombocythaemia. The ratio of incidence rates (ASIR) between males and females ranged from 0.9 for essential thrombocythaemia to 5.0 for mantle cell lymphoma and hairy cell leukaemia.

The five entities most frequently reported are multiple myeloma/plasmacytoma (5,442 new cases), diffuse large B-cell lymphoma (5,071), myelodysplastic syndromes (4,735), chronic lymphocytic leukaemia (CLL)/small lymphocytic lymphoma (4,674) and acute myeloid leukaemia (3,428) (Table 3). These five diseases account for 53% of all new cases of haematological malignancies in 2018.

Between 1995 and 2015, 95% of new cases of non-Hodgkin lymphoma received specific coding, allowing this breakdown by histological sub-type to be carried out. The proportion of new cases coded as "non-Hodgkin lymphoma Not Otherwise Specified" (NHL NOS) over the study period was 5%, which remained stable over time.

Trends between 1990 and 2018

One of the major interests of this study is the analysis of temporal trends in incidence for each type and sub-type of haematological malignancy, which globally differ widely (Table 4).

Firstly, it is possible to distinguish a group of haematological malignancies for which the mean annual variation (MAV) in the **incidence rate (ASIR) increases** by 1% or more in men and/or women. In this group, we find Hodgkin lymphoma and acute myeloid leukaemias (studied over the period 1990–2018), but also follicular lymphoma, diffuse large B-cell lymphoma and multiple myeloma/plasmacytoma (studied over the 1995–2018 period). For these five loci, the number of new cases increased over the 1990–2018 period in men and women by +50% and +64% respectively for Hodgkin lymphoma, by +114% and +115% for acute myeloid leukaemias, and over the 1995–2018 period by +181% and +122% for follicular lymphoma, +86% and +82% for diffuse large B-cell lymphoma and +96% and +74% for multiple myeloma/plasmacytoma. For these five haematological loci, 30% to 60% of the observed increase is due to the increase in population numbers and its ageing, while 40% to 70% is due to an increased risk of these diseases, the cause of which remain to be studied.

There is also **a marked increase in the incidence rate** in men and women for haematological loci studied over a shorter observation period (**the last 15 years**: 2003–2018): for marginal zone lymphoma (MAV of the ASIR > +4% per year in both men and women, which corresponds to an increase in the number of cases of +157% and +168% respectively), mantle cell lymphoma in men (+2.2% per year), non-cutaneous mature T/NK-cell lymphoma (respectively +1.8% and +4.3% in men and women), myeloproliferative syndromes excluding chronic myeloid leukaemia (CML) in women (+1.2% per year) and chronic myelomonocytic leukaemia (respectively +3.2% and +5.0% per year in men and women).

To facilitate the understanding of changes in these incidence rates, Figure 3 describes the mean annual variations for each age group along with the change in incidence rates according to the year of diagnosis for the principal haematological malignancies. This analysis reveals that the increase in the incidence of Hodgkin lymphoma is particularly relevant to young adults aged 20 to 40 years at diagnosis, indicating a higher risk for more recent cohorts, while for follicular lymphoma the increase is greatest in the over-70 age group.

In men, the increase in the incidence rate affects all ages equally for diffuse large B-cell lymphoma, marginal zone lymphoma, multiple myeloma/plasmacytoma and acute myeloid leukaemias (AML). The increase is constant throughout the study period for diffuse large B-cell lymphoma and marginal zone lymphoma, but appears to slow-down in 2000 for AML and in 2005 for multiple myeloma/plasmacytoma. In women, the changes in incidence rates by age are globally similar, although more heterogeneous than in men, with the exception of AML.

In addition, certain haematological malignancies such as Burkitt lymphoma (1995–2018), mature T/NK-cell lymphoma and myelodysplastic syndromes (2003–2018) show near **stable incidence rates** over the observation period.

The **incidence rates decrease** for four haematological malignancies: lymphoplasmocytic lymphoma/Waldenström macroglobulinemia in both sexes (mean -1.7% per year between 1995 and 2018), CML in men (-0.7% per year between 1990 and 2018), and but only in the more recent period (2010-2018), CLL/lymphocytic lymphoma in both sexes (-2.2% per year) and myelodysplastic syndromes in women (-3.0% per year).

Finally, the trends of certain rare haematological malignancies could not be estimated due to limited numbers.

Interpretation of results

The interpretation of incidence data for haematological malignancies in 2018 and their changes with time should proceed entity-by-entity, taking into account information concerning age-specific incidence rates, provided for the first time.

For example, diffuse large B-cell lymphoma (DLBCL), the most common histological sub-type of non-Hodgkin lymphoma and the second most common haematological malignancy in metropolitan France (with nearly 5,100 new cases in 2018) has an incidence very similar to that published by registries of the SEER program in the United States [22]. However, data from the SEER program show a slight increase in the incidence in

men, significant only in subjects aged 65 or over, while in France there is an increase in the incidence affecting all age groups in men and women during the study period, including over the most recent period (2010–2018), although slowing somewhat from 2005 onwards in women.

This incidence trend is not associated with a decrease in other sub-types, in particular the follicular lymphoma sub-type, which would have argued in favour of a code transfer between the two histological sub-types. Neither trend is associated with a decrease in non-specific codes (improvements in diagnosis by pathologists). The share attributable to demographic changes (increased population and ageing) accounts for just over half of the upward trend observed in this study (some 1,200 new cases of additional DLBCL diagnosed between 1995 and 2018), with increased risk explaining the other half of this increase in the number of new cases (more than 1,000 additional cases diagnosed between 1995 and 2018). There are two possible explanations for this increased risk: 1) it may originate in improved access to diagnosis. The impact of this hypothesis, if accurate and preponderant, would not affect the different age groups but equally, but would have a preferential impact on the oldest subjects. It is therefore not retained as an explanation for our observation. 2) The other hypothesis is based on an increase in the prevalence of certain risk factors during the study period.

A major initiative of the international InterLymph consortium (http://epi.grants.cancer.gov/InterLymph) has allowed a detailed examination of the specific risk factors for the different sub-types of non-Hodgkin lymphoma (NHL) including DLBCL [23]. An increased risk of DLBCL is associated with a history of cell-activated autoimmune disease, hepatitis C virus (HCV) sero-positivity, a first-degree family history of NHL, and a high body mass index (BMI). Some occupations are associated with an increased risk of DLBCL, among them farmers/market gardeners, hairdressers and operators of handling equipment. Few studies exist on specific associations between pesticides and sub-types of NHL. DLBCL is positively associated with exposure to phenoxy herbicides [24]. It should be recalled here that NHL linked to occupational exposure to pesticides in an agricultural setting can be recognised as occupational diseases. The data are presented in a corresponding table [25]. Other studies from the InterLymph consortium provide substantial evidence for a genetic predisposition to DLBCL and indicate pathways involved in immune recognition and function in the pathogenesis of DLBCL [26, 27]. This work proves the aetiological heterogeneity among sub-types of lymphoma but also shows that they share a common aetiological background [28].

CONCLUSION

These updated estimates of cancer incidence and mortality for the period 1990–2018 benefit from a major methodological revision, which makes it possible to publish, for the first time, incidence data for metropolitan France by sub-type, whether histological or topographical. Estimates have been made using the same methodology for a total of 74 cancer types or sub-types.

These results describe a rather encouraging situation in men, for which there is a decrease in incidence and mortality for two of the three most common cancers (prostate cancer and colorectal cancer), and a decrease in incidence and mortality of several cancers related to alcohol and tobacco use (cancers of the lip, oral cavity, pharynx, larynx and oesophagus). The results, however, show that while the incidence of lung cancer is stable in men, it shows a worrying progression in women. Gaps in incidence rates between men and women have decreased considerably since 1990, related to the increase in tobacco use among women. Trend analysis by histological type shows an increase in the incidence of lung adenocarcinoma in both sexes, probably related to changes in the composition and structure of cigarettes made by the tobacco industry over several decades.

This study, unlike the last, which showed a decrease and then a stabilisation of the incidence of breast cancer between 2005 and 2010, shows a continuation of the increase in the incidence of this cancer in recent years. This increase, more moderate than that observed in the 1990s, is described for all age groups, except for women 60 years of age. Trend analyses by age also raise the hypothesis of a recent increase in cancers attributable to persistent infection with *human papillomavirus* (HPV) for cervical cancer and anal cancer in women.

This updating of the trends over the period 1990–2018 also makes it possible to highlight unfavourable trends in the incidence of certain cancers (cutaneous melanoma, pancreas, liver, and kidney) often with very different aetiologies, treatments and prognoses.

Preventive efforts need to be maintained and strengthened to reduce the number of preventable cancers (smoking for lung cancer, HPV infection for cervical and anal cancer, or natural or artificial ultraviolet exposures for cutaneous melanoma), as do those aimed at improving diagnosis and treatment.

Regarding haematological malignancies, distinguishing the incidence rates according to the main histological types

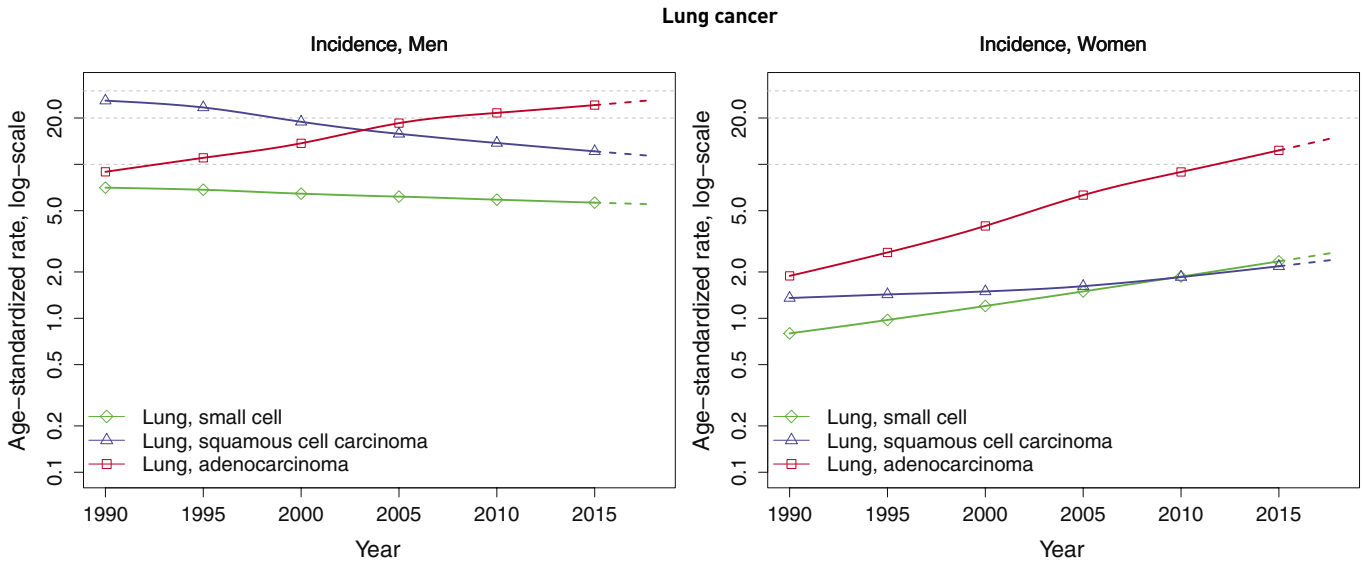
considerably improves knowledge of these diseases and makes it possible not only to follow the trends of each type of haematological malignancy over time but also to generate aetiological hypotheses and to provide diagnostic and therapeutic possibilities for comparison [29].

Some haematological malignancies show an increasing incidence, the origin of which does not appear to originate in registration artefacts or demographic changes. This is the case of several lymphoid malignancies for which recent work from the InterLymph consortium has shown a heterogeneity of risk factors according to histological sub-type, with a common aetiological background [28]. Certain lymphoma sub-types are associated with risk factors related to the immune system (history of autoimmune diseases, for example) of which diffuse large B cell lymphoma or MALT lymphoma (which is consistent with HIV/AIDS and organ transplant epidemiology data), while others have few associations with known risk factors, rather being of genetic origin, as shown by the results of recent genome-wide association studies in chronic lymphocytic leukaemia and follicular lymphoma [30, 31]. The existence of environmental and occupational risk factors is also proven [23]. Together these different elements show that significant scope remains for aetiological research on these diseases and the interactions between environmental and genetic factors.

As a result of the new breakdown of haematological malignancies for this incidence report, the corresponding data for mortality are not available. However, a recent publication of net survival in France over the same period and according to the same classification of haematological malignancies is available [32], and a new publication is planned for 2020.

This publication is the result of a partnership between *Francim* (the French network of cancer registries), the *Hospices civils de Lyon* (HCL, *Service de Biostatistique-Bioinformatique*), *Santé publique France* (the French national public health agency), and the *Institut national du cancer* (INCa, the French National Cancer Institute).

FIGURE 1 | Trends in incidence rates (ASIR[1]) of lung cancer by histological type and by sex between 1990 and 2018 in metropolitan France - Logarithmic scale



(1) ASIR: Age Standardised Incidence Rate, standardised according to the age structure of the world population, expressed as a number of cases per 100,000 person-years.
Source: Data from the cancer registries of the Francim network.

TABLE 1 | Solid tumours: Estimated incident cases/deaths, incidence rate/mortality rate (ASIR/ASMR[1]) by site in 2018, and trends (1990–2018 and 2010–2018) in metropolitan France, in men

	Incidence						Mortality					
	Situation in 2018		Mean annual variation (%) and [CI 95%]				Situation in 2018		Mean annual variation (%) and [CI 95%]			
	Number of new cases	Incidence rate[1]	1990-2018		2010-2018		Number of deaths	Mortality rate[1]	1990-2018		2010-2018	
Lip-oral cavity-pharynx[2]	10,055	18.3	-2.6	[-2.8; -2.5]	-1.9	[-2.4; -1.4]	2,898	4.9	-3.5	[-3.7; -3.4]	-2.8	[-3.2; -2.5]
Oesophagus[2]	4,251	6.8	-2.7	[-3.0; -2.5]	-1.9	[-2.5; -1.2]	2,851	4.3	-3.4	[-3.5; -3.3]	-2.9	[-3.3; -2.5]
Stomach	4,264	6.3	-2.3	[-2.5; -2.1]	-2.3	[-2.7; -1.9]	2,794	3.9	-2.9	[-3.0; -2.8]	-2.3	[-2.6; -2.0]
Small intestine[3]	974	1.6	2.3	[1.8; 2.8]	2.2	[1.6; 2.8]	-	-	-	-	-	-
Colon-rectum[2]	23,216	34.0	-0.6	[-0.7; -0.5]	-1.4	[-1.7; -1.1]	9,209	11.5	-1.6	[-1.7; -1.6]	-1.8	[-2.1; -1.6]
Colon	14,597	20.7	-0.3	[-0.4; -0.2]	-1.1	[-1.5; -0.8]	-	-	-	-	-	-
Rectum	8,249	12.7	-1.0	[-1.2; -0.9]	-1.9	[-2.3; -1.5]	-	-	-	-	-	-
Anus	479	0.8	1.5	[0.7; 2.2]	3.3	[1.5; 5.1]	-	-	-	-	-	-
Liver	8,150	12.5	1.6	[1.4; 1.8]	0.4	[-0.1; 0.9]	6,303	9.0	-0.5	[-0.6; -0.4]	-0.7	[-1.0; -0.4]
Gallbladder and bile ducts[3]	1,533	2.1	1.1	[0.7; 1.5]	1.1	[0.7; 1.5]	-	-	-	-	-	-
Pancreas	7,301	11.0	2.7	[2.5; 2.9]	2.6	[2.0; 3.1]	5,790	8.2	0.3	[0.2; 0.4]	0.4	[0.2; 0.7]
Nasal cavity, sinuses and ears[3]	552	1.0	-0.7	[-1.4; -0.1]	-0.7	[-2.2; 0.9]	-	-	-	-	-	-
Larynx	2,753	4.8	-3.1	[-3.4; -2.8]	-2.8	[-3.5; 2.1]	819	1.2	-6.3	[-6.5; -6.1]	-5.5	[-6.0; -4.9]
Lung[2]	31,231	50.5	-0.1	[-0.2; 0.0]	-0.3	[-0.6; 0.0]	22,761	34.7	-1.2	[-1.2; -1.1]	-1.6	[-1.8; -1.5]
Adenocarcinomas	15,293	26.2	3.9	[3.7; 4.1]	2.4	[2.0; 2.9]	-	-	-	-	-	-
Squamous cell carcinomas	7,331	11.3	-2.9	[-3.1; -2.7]	-2.4	[-2.9; -1.9]	-	-	-	-	-	-
Small cell carcinomas	3,363	5.5	-0.9	[-1.2; -0.6]	-0.9	[-1.5; -0.2]	-	-	-	-	-	-
Melanoma of the skin	7,886	14.2	4.0	[3.7; 4.2]	3.4	[2.7; 4.0]	1,135	1.7	0.9	[0.7; 1.1]	0.1	[-0.4; 0.7]
Sarcoma[2, 3]	2,658	5.2	0.1	[-0.3; 0.4]	-1.2	[-2.1; -0.2]	-	-	-	-	-	-
Penis[3]	449	0.7	0.0	[NC]	0.0	[NC]	-	-	-	-	-	-
Prostate[4]	50,430[4]	81.5[4]	2.2[4]	[2.1; 1.3]	-3.5[4]	[-3.9; -3.1]	8,115	7.9	-2.8	[-2.8; -2.7]	-3.7	[-3.9; -3.5]
Testis[2]	2,769	8.7	2.6	[2.2; 2.9]	2.7	[1.8; 3.5]	86	0.2	-2.2	[-2.7; -1.6]	-1.1	[-2.4; 0.3]
Kidney[2]	10,254	17.1	1.7	[1.5; 1.9]	1.8	[1.4; 2.2]	3,818	5.0	0.3	[0.2; 0.4]	1.3	[0.9; 1.6]
Bladder	10,626	14.3	-0.7	[-0.8; -0.5]	-0.3	[-0.7; 0.1]	4,112	4.7	-1.4	[-1.5; -1.3]	-1.5	[-1.8; -1.2]
Uveal melanoma[3]	240	0.4	-0.1	[-1.0; -0.8]	-1.3	[-3.3; 0.7]	-	-	-	-	-	-
Central nervous system[2]	3,280	6.7	0.8	[0.6; 1.1]	0.6	[0.2; 1.1]	2,346	4.3	0.3	[0.2; 0.5]	0.9	[0.5; 1.3]
Thyroid[2]	2,600	5.6	4.4	[3.9; 4.8]	2.3	[1.3; 3.3]	159	0.2	-1.9	[-2.2; -1.5]	-1.6	[-2.4; -0.9]
All cancers	204,583	330.2	0.1	[0.1; 0.2]	-1.4	[-1.6; -1.3]	89,621	123.8	-1.8	[-1.8; -1.8]	-2.0	[-2.1; -2.0]

Sources: Incidence: Data from the cancer registries of the Francim network. Mortality: Data from CépiDc - Inserm. For each site, sub-site, and sub-type, the list of selected codes is presented in the materials and methods section of the report.

[1] ASIR/ASMR: Rates standardised according to the age structure of the world population expressed as the number of cases (Age Standardised Incidence Rate - ASIR) or deaths (Age Standardised Mortality Rate - ASMR) per 100,000 person-years.

[2] Site showing subdivisions by topographic sub-sites/histological sub-types (warning: the sum of sub-site/sub-type estimates may differ slightly from that of the site as a whole - see methods).

[3] "New" site with regard to the previous study 1980–2012 [1].

[4] The estimate for the incidence of prostate cancer is for the year 2015 and the mean annual variations cover the periods 1990–2015 or 2010–2015 (see methods).

CI 95: 95% confidence interval
NC: Not calculated

Legend: Mean annual variation 1990–2018 or 2010–2018

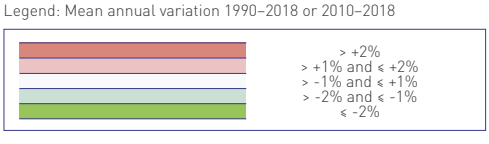


TABLE 2 | Solid tumours: Estimated incident cases/deaths, incidence rate/mortality rate (ASIR/ASMR[1]) by site in 2018, and trends (1990–2018 and 2010–2018) in metropolitan France, in women

	Incidence						Mortality					
	Situation in 2018		Mean annual variation (%) and [CI 95%]				Situation in 2018		Mean annual variation (%) and [CI 95%]			
	Number of new cases	Incidence rate[1]	1990-2018		2010-2018		Number of deaths	Mortality rate[1]	1990-2018		2010-2018	
Lip-oral cavity-pharynx[2]	3,637	5.8	1.8	[1.5; 2.1]	1.7	[0.9; 2.4]	924	1.2	-0.4	[-0.6; -0.2]	0.2	[-0.5; 0.8]
Oesophagus[2]	1,194	1.5	0.9	[0.5; 1.3]	0.9	[0.5; 1.3]	874	1.0	-0.3	[-0.5; -0.1]	0.2	[-0.5; 0.8]
Stomach	2,293	2.7	-1.9	[-2.2; -1.6]	-1.4	[-1.9; -0.8]	1,478	1.5	-3.0	[-3.2; -2.9]	-2.0	[-2.4; -1.6]
Small intestine[3]	772	1.0	2.2	[1.7; 2.7]	2.2	[1.7; 2.7]	-	-	-		-	
Colon-rectum[2]	20,120	23.9	0.0	[-0.1; 0.1]	0.0	[-0.3; 0.3]	7,908	6.9	-1.6	[-1.6; -1.5]	-1.6	[-1.8; -1.3]
Colon	13,217	14.8	-0.1	[-0.2; 0.1]	-0.1	[-0.5; 0.2]	-	-	-	-	-	-
Rectum	5,495	6.9	-0.5	[-0.7; -0.3]	-0.9	[-1.4; -0.4]	-	-	-	-	-	-
Anus	1,532	2.4	3.4	[2.9; 3.9]	5.7	[4.4; 7.1]	-	-	-	-	-	-
Liver	2,430	2.9	3.5	[3.1; 3.9]	2.7	[1.9; 3.5]	2,394	2.3	0.4	[0.3; 0.6]	0.3	[-0.1; 0.8]
Gallbladder and bile ducts[3]	1,432	1.4	-1.2	[-1.6; -0.8]	-1.0	[-1.7; -0.2]	-	-	-	-	-	-
Pancreas	6,883	7.7	3.8	[3.6; 4.1]	3.2	[2.6; 3.9]	5,666	5.5	1.2	[1.1; 1.3]	1.4	[1.2; 1.7]
Nasal cavity sinuses and ears[3]	254	0.4	1.0	[0.1; 1.9]	1.0	[0.1; 1.9]	-	-	-	-	-	-
Larynx	407	0.7	0.0	[NC]	0.0	[NC]	131	0.2	-2.4	[-2.8; -1.9]	-2.3	[-3.4; -1.1]
Lung[2]	15,132	23.2	5.3	[5.1; 5.5]	5.0	[4.4; 5.5]	10,356	14.0	3.5	[3.4; 3.6]	3.0	[2.7; 3.2]
Adenocarcinomas	9,498	15.1	7.7	[7.4; 8.1]	6.8	[6.1; 7.5]	-	-	-	-	-	-
Squamous cell carcinomas	1,648	2.4	2.1	[1.6; 2.6]	3.4	[2.2; 4.6]	-	-	-	-	-	-
Small cell carcinomas	1,644	2.7	4.4	[3.9; 5.0]	4.7	[3.9; 5.5]	-	-	-	-	-	-
Melanoma of the skin	7,627	14.2	2.7	[2.5; 3.0]	2.4	[1.9; 3.0]	840	1.0	0.2	[-0.1; 0.4]	-0.3	[-0.9; 0.3]
Sarcoma[2, 3]	2,636	4.9	0.7	[0.4; 1.1]	-0.1	[-0.8; 0.6]	-	-	-	-	-	-
Breast	58,459	99.9	1.1	[1.0; 1.2]	0.6	[0.3; 0.9]	12,146	14.0	-1.3	[-1.4; -1.2]	-1.6	[-1.8; -1.4]
Cervix uteri[4]	2,920	6.1	-1.8	[-2.1; -1.5]	-0.7	[-1.5; 0.0]	1,117	1.7	-2.1	[-2.3; -1.9]	-1.1	[-1.7; -0.6]
Corpus uteri[4]	8,224	11.0	0.1	[-0.1; 0.3]	0.0	[-0.5; 0.4]	2,415	2.3	-0.5	[-0.6; -0.3]	0.4	[0.0; 0.8]
Ovary[2]	5,193	7.5	-1.0	[-1.2; -0.8]	-1.1	[-1.5; -0.7]	3,479	3.9	-1.5	[-1.7; -1.4]	-1.7	[-2.1; -1.4]
Vulva[3]	838	0.9	-0.3	[-0.9; 0.2]	-0.2	[-1.6; 1.3]	-	-	-	-	-	-
Vagina[3]	162	0.2	-3.0	[-3.8; -2.2]	-3.0	[-3.8; -2.2]	-	-	-	-	-	-
Kidney[2]	5,069	7.1	1.4	[1.2; 1.7]	1.5	[1.0; 2.0]	1,771	1.5	-0.6	[-0.8; -0.4]	0.2	[-0.3; 0.6]
Bladder	2,448	2.4	-0.2	[-0.5; 0.1]	0.4	[-0.5; 1.3]	1,223	0.9	-1.2	[-1.4; -1.0]	-1.0	[-1.5; -0.5]
Uveal melanoma[3]	208	0.3	-0.1	[-1.1; 0.9]	-2.0	[-4.4; 0.4]	-	-	-	-	-	-
Central nervous system[2]	2,606	4.5	0.6	[0.3; 1.0]	0.5	[-0.1; 1.0]	1,782	2.7	0.3	[0.1; 0.5]	0.9	[0.4; 1.4]
Thyroid[2]	8,065	18.5	4.4	[4.1; 4.6]	2.5	[1.9; 3.1]	227	0.2	-3.4	[-3.7; -3.0]	-2.8	[-3.7; -1.9]
All cancers	177,433	274.0	1.1	[1.1; 1.2]	0.7	[0.5; 0.9]	67,817	72.2	-0.8	[-0.8; -0.8]	-0.7	[-0.8; -0.6]

Sources: Incidence: Data from the cancer registries of the Francim network. Mortality: Data from CépiDc - Inserm. For each site, sub-site, and sub-type, the list of selected codes is presented in the materials and methods section of the report.

[1] ASIR/ASMR: Rates standardised according to the age structure of the world population expressed as the number of cases (Age Standardised Incidence Rate - ASIR) or deaths (Age Standardised Mortality Rate - ASMR) per 100,000 person-years.

[2] Site showing subdivisions by topographic sub-sites/histological sub-types (warning: the sum of sub-site/sub-type estimates may differ slightly from that of the site as a whole - see methods).

[3] "New" site with regard to the previous study 1980–2012 [1].

[4] Given the large number of deaths included under "uterus with no other indications" (NOI), deaths due to cancers of the cervix and body of the uterus are estimated from all deaths due to cancer of the uterus.

CI 95: 95% confidence interval
NC: Not calculated

Legend: Mean annual variation 1990–2018 or 2010–2018

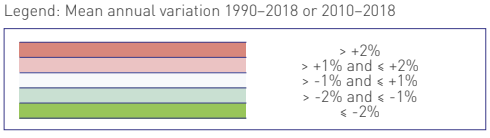
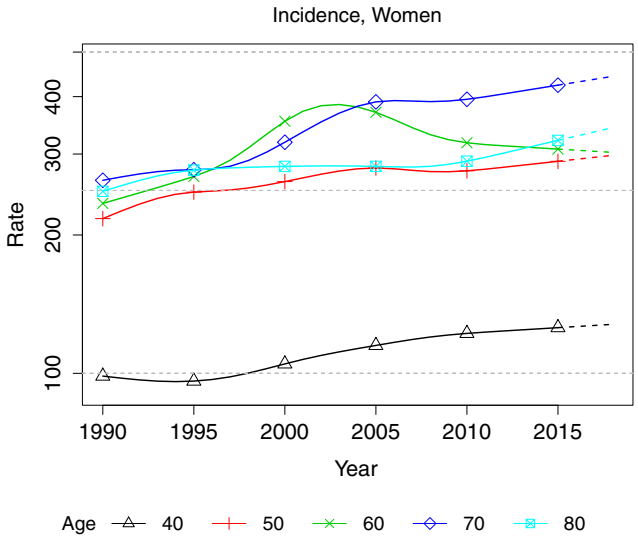


FIGURE 2 | Trends in incidence rate of breast, cervical and anal cancers by age for women, between 1990 and 2018 in metropolitan France - Logarithmic scale

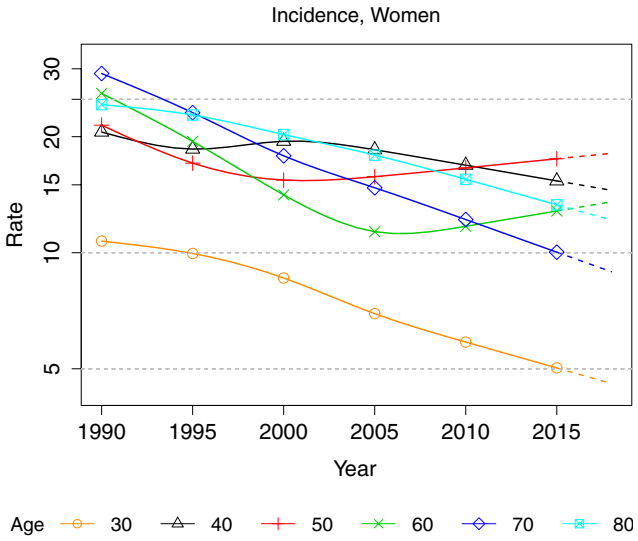
a- Breast cancer

	Women		
Age (years)	Rate[1] 1990	Rate[1] 2018	MAV[2] (%) and [CI 95%]
40	98.6	127.8	0.9 [0.5; 1.3]
50	217.1	298.1	1.1 [0.9; 1.4]
60	234.3	302.5	0.9 [0.7; 1.2]
70	263.0	442.7	1.9 [1.6; 2.2]
80	248.9	342.5	1.1 [0.8; 1.5]



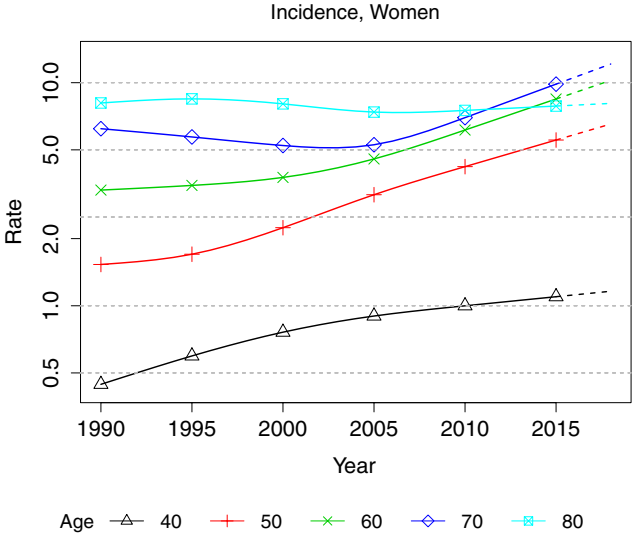
b- Cancer of the cervix

Age (years)	Rate[1] 1990	Rate[1] 2018	MAV[2] (%) and [CI 95%]
30	10.7	4.6	-3.0 [-3.8; -2.2]
40	20.6	14.5	-1.2 [-1.8; -0.7]
50	21.4	18.1	-0.6 [-1.2; 0.0]
60	25.9	13.6	-2.3 [-2.9; -1.7]
70	29.2	8.9	-4.1 [-4.8; -3.4]
80	24.2	12.2	-2.4 [-3.2; -1.7]



c- Cancer of the anus

	Women		
Age (years)	Rate[1] 1990	Rate[1] 2018	MAV[2] (%) and [CI 95%]
40	0.4	1.2	3.5 [1.5; 5.5]
50	1.5	6.5	5.3 [4.1; 6.6]
60	3.3	10.2	4.1 [3.1; 5.1]
70	6.2	12.1	2.4 [1.5; 3.4]
80	8.1	8.1	0.0 [-1.0; 1.0]



[1] Incidence rate expressed as a number of cases per 100,000 person-years
[2] MAV: mean annual variation and 95% confidence interval
Source: Data from the cancer registries of the Francim network

TABLE 3 | Haematological malignancies: Estimated incident cases, median age at diagnosis, raw incidence rate[1] and standardised incidence (ASIR[2]), sex ratio[3], by sex, in 2018, in metropolitan France

	Morphological codes ICD-03	Number of incident cases estimated			Median age at diagnosis (years)		Raw incidence rate[1]		Standardised incidence rate[2]		Sex ratio[3]
		Total	M	F	M	F	M	F	M	F	M/F
HODGKIN LYMPHOMA	***9650/3 to 9655/3, 9659/3, 9661/3 to 9667/3***	**2,127**	**1,240**	**887**	**38**	**33**	**3.9**	**2.6**	**3.7**	**2.7**	**1.4**
NON-HODGKIN LYMPHOMAS (NHL)											
CLL/Small lymphocytic lymphoma	*9670/3, 9823/3*	4,674	2,770	1,904	71	73	8.8	5.7	4.0	2.1	1.9
Follicular lymphoma	*(≥ 9690/3 & ≤ 9698/3), 9597/3*	3,066	1,658	1,408	65	68	5.3	4.2	2.9	2.0	1.5
Diffuse large B-cell lymphoma	*9678/3, 9679/3, 9680/3, 9684/3, 9688/3, 9712/3, 9735/3, 9737/3, 9738/3*	5,071	2,778	2,293	69	71	8.8	6.8	4.7	3.2	1.5
Mantle cell lymphoma	*9673/3*	887	673	214	70	73	2.1	0.6	1.0	0.2	5.0
Burkitt lymphoma	*9687/3, 9826/3*	220	149	71	40	57	0.5	0.2	0.5	0.2	2.5
Marginal zone lymphoma	*9689/3, 9699/3*	2,790	1,457	1,333	69	72	4.6	4.0	2.3	1.7	1.4
Multiple myeloma/plasmacytoma	*(≥ 9731/3 & ≤ 9734/3)*	5,442	2,822	2,620	70	74	9.0	7.8	4.2	2.9	1.4
LPL/Waldenström macroglobulinemia	*9761/3, 9671/3*	1,317	892	425	73	73	2.8	1.3	1.2	0.5	2.4
Hairy cell leukaemia	*9940/3*	304	243	61	63	59	0.8	0.2	0.5	0.1	5.0
T/NK-cell lymphoma (NHL T)	*(≥ 9700/3 & ≤ 9719/3), 9827/3, 9831/3, 9834/3, 9948/3, 9724/3, 9725/3, 9726/3*	1,777	997	780	66	67	3.2	2.3	1.8	1.3	1.4
Cutaneous T/NK lymphoma	*Same codes & topography = C44*	809	516	293	65	63	1.6	0.9	0.9	0.5	1.8
Non-cutaneous T/NK lymphoma	*Same codes & topography ≠ C44*	1,136	625	511	67	69	2.0	1.5	1.1	0.8	1.4
Precursor cell lymphoblastic leukaemia/lymphoma (B, T or NOS)	*9727/3, 9728/3, 9729/3, 9835/3, 9836/3, 9837/3, (≥ 9811/3 & ≤ 9818/3)*	900	517	383	17	18	1.6	1.1	2.0	1.5	1.3
ACUTE MYELOID LEUKAEMIAS	***9805/3, (≥ 9806/3 & ≤ 9809/3), 9840/3, (≥ 9860/3 & ≤ 9874/3), (≥ 9891/3 & ≤ 9931/3), 9984/3***	**3,428**	**1,787**	**1,641**	**69**	**72**	**5.7**	**4.9**	**3.1**	**2.3**	**1.3**
Acute promyelocytic leukaemia	*9866/3*	228	146	82	57	54	0.5	0.2	0.3	0.2	1.5
CHRONIC MYELOPROLIFERATIVE NEOPLASMS (MPN)											
Chronic myelogenous leukaemia (CML)	*9863/3, 9875/3*	872	480	392	61	62	1.5	1.2	1.0	0.7	1.4
MPN other than CML	*9950/3, 9960/3-9964/3*	3,762	1,824	1,938	69	72	5.8	5.8	2.9	2.5	1.2
Primary myelofibrosis	*9961/3*	520	273	247	71	72	0.9	0.7	0.4	0.3	1.3
Polycythemia vera	*9950/3*	1,129	603	526	68	72	1.9	1.6	1.0	0.6	1.7
Essential thrombocythaemia	*9962/3*	2,057	862	1,195	69	73	2.7	3.6	1.4	1.5	0.9
MYELODYSPLASTIC SYNDROMES	***9980/3, 9982/3, 9983/3, 9985/3, 9986/3, 9989/3, 9991/3, 9992/3***	**4,735**	**2,894**	**1,841**	**78**	**80**	**9.2**	**5.5**	**3.4**	**1.6**	**2.1**
CHRONIC MYELOMONOCYTIC LEUKAEMIA AND OTHER MDS-MPN	***9876/3, 9945/3, 9946/3, 9975/3***	**1,439**	**853**	**586**	**77**	**80**	**2.7**	**1.7**	**1.1**	**0.5**	**2.2**

[1] Number of new cases per 100,000 person-years
[2] ASIR: Incidence rates standardised according to the age structure of the world population and expressed per 100,000 person-years
[3] Ratio of males to females for standardised incidence rates
M: Men, F: Women
CLL: Chronic lymphocytic leukaemia
LPL/Waldenström: Lymphoplasmocytic lymphoma/Waldenström macroglobulinemia
MDS-MPN: myelodysplastic syndromes - Myeloproliferative neoplams
Warning: The sum of estimates for sub-entities may differ from that of the site as a whole - see methods.
Source: Data from the cancer registries of the Francim network

TABLE 4 | Haematological malignancies: Trends in incidence (ASIR[1]) between the start of the study period and 2018, by sex, in metropolitan France

		Mean annual variation (%) and [CI 95%]							
		Start[2]-2018				2010-2018			
	Start of study period	Men		Women		Men		Women	
HODGKIN LYMPHOMA	1990	1.2	[0.7; 1.6]	1.7	[1.2; 2.2]	1.7	[0.5; 2.9]	0.6	[-0.7; 1.9]
NON-HODGKIN LYMPHOMAS (NHL)									
CLL/Small lymphocytic lymphoma	1990	0.0	[-0.3; 0.3]	-0.1	[-0.4; 0.3]	-2.2	[-3.0; -1.4]	-2.1	[-3.0; -1.3]
Follicular lymphoma	1995	2.8	[2.2; 3.4]	1.8	[1.1; 2.5]	3.0	[2.3; 3.6]	0.8	[-0.4; 2.0]
Diffuse large B-cell lymphoma	1995	1.1	[0.7; 1.5]	1.5	[0.9; 2.0]	0.9	[0.3; 1.5]	1.0	[0.1; 1.9]
Mantle cell lymphoma	2003	2.2	[0.7; 3.8]	0.0	[NC]	2.2	[0.7; 3.8]	0.0	[NC]
Burkitt lymphoma	1995	-0.2	[-1.6; 1.2]	0.0	[NC]	-2.6	[-5.3; 0.2]	0.0	[NC]
Marginal zone lymphoma	2003	4.7	[3.4; 5.9]	4.5	[3.0; 5.9]	4.7	[3.4; 5.9]	4.0	[2.0; 6.0]
Multiple myeloma/plasmacytoma	1995	1.1	[0.7; 1.5]	0.6	[0.1; 1.0]	0.1	[-0.7; 0.9]	0.4	[-0.2; 1.1]
LPL/Waldenström macroglobulinemia	1995	-1.7	[-2.4; -1.0]	-1.7	[-2.5; -0.8]	-1.5	[-2.2; -0.8]	-2.5	[-4.0; -1.0]
Hairy cell leukaemia	1990	1.2	[0.2; 2.3]	0.0	[NC]	0.1	[-2.4; 2.7]	0.0	[NC]
T/NK-cell lymphoma (NHL T)	2003	0.0	[NC]	2.0	[0.6; 3.4]	0.0	[NC]	2.0	[0.6; 3.4]
Cutaneous T/NK lymphoma	2003	0.0	[NC]	0.0	[NC]	0.0	[NC]	0.0	[NC]
Non-cutaneous T/NK lymphoma	2003	1.8	[0.2; 3.5]	4.3	[2.3; 6.2]	3.7	[0.7; 6.3]	4.3	[2.3; 6.2]
Precursor cell lymphoblastic leukaemia/lymphoma (B, T or NOS)	1995	0.0	[NC]	0.0	[NC]	0.0	[NC]	0.0	[NC]
ACUTE MYELOID LEUKAEMIAS	1990	1.2	[0.8; 1.6]	0.9	[0.5; 1.4]	0.8	[-0.2; 1.8]	0.7	[0.1; 1.4]
Acute promyelocytic leukaemia	2003	3.7	[0.2; 7.3]	0.0	[NC]	3.7	[0.2; 7.3]	0.0	[NC]
CHRONIC MYELOPROLIFERATIVE NEOPLASM (MPN)									
Chronic myelogenous leukaemia (CML)	1990	-0.7	[-1.3; -0.1]	0.0	[NC]	-0.4	[-1.5; 0.8]	0.0	[NC]
MPN other than CML	2003	0.0	[NC]	1.2	[0.3; 2.0]	0.0	[NC]	1.1	[0.3; 2.0]
Primary myelofibrosis	2003	0.0	[NC]	4.0	[0.8; 7.3]	0.0	[NC]	11.1	[4.5; 18]
Polycythemia vera	2003	0.0	[NC]	1.7	[0.0; 3.4]	0.0	[NC]	1.6	[0.0; 3.4]
Essential thrombocythaemia	2003	0.7	[-0.7; 2.1]	1.1	[-0.2; 2.5]	0.9	[-0.5; 2.3]	-0.3	[-2.5; 1.9]
MYELODYSPLASTIC SYNDROMES (MDS)	2003	0.7	[0.0; 1.5]	0.5	[-0.3; 1.4]	0.0	[-1.2; 1.3]	-3.0	[-4.6; -1.5]
CHRONIC MYELOMONOCYTIC LEUKAEMIA AND OTHER MDS-MPN	2003	3.2	[1.7; 4.8]	5.0	[3.0; 7.0]	3.2	[1.7; 4.7]	4.9	[3.0; 7.0]

[1] ASIR: Incidence rates standardised according to the age structure of the world population and expressed per 100,000 person-years
[2] The usable incidence period varies from 15 to 28 years depending on the data available for each type of haematological malignancy
CI95%: 95% confidence interval
CLL: Chronic lymphocytic leukaemia
LPL/Waldenström: Lymphoplasmocytic lymphoma/Waldenström macroglobulinemia
MDS-MPN: myelodysplastic syndromes - Myeloproliferative neoplams
NC: Not calculated
Source: Data from the cancer registries of the Francim network

Legend: Mean annual variation Start of period–2018 or 2010–2018

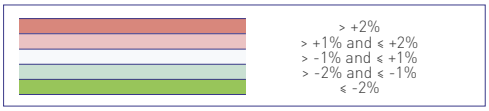
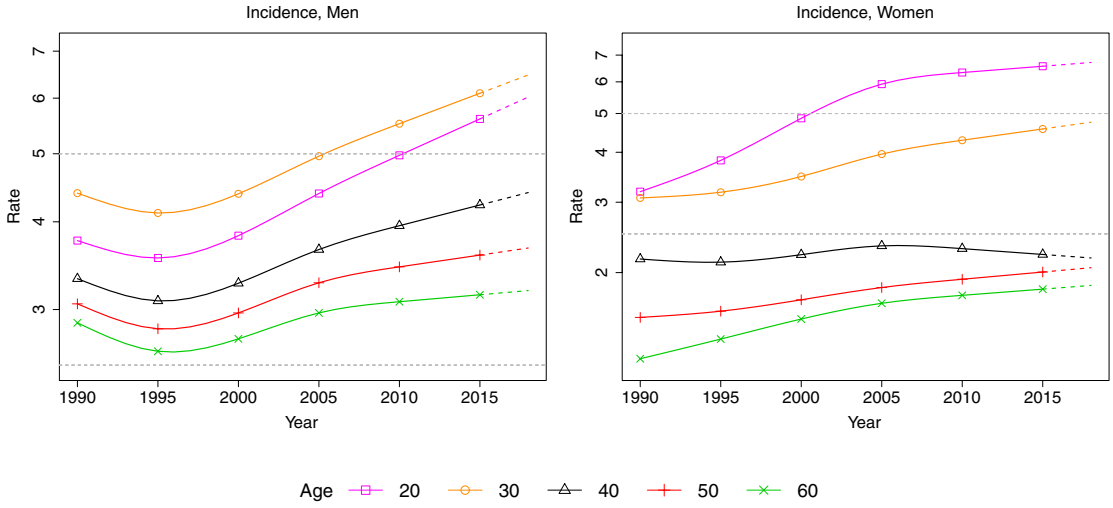


FIGURE 3 | Trends in incidence rates between the start of the study period and 2018, in metropolitan France by sex and age, for the main haematological malignancies for which incidence increases over the period of the study - Logarithmic scale

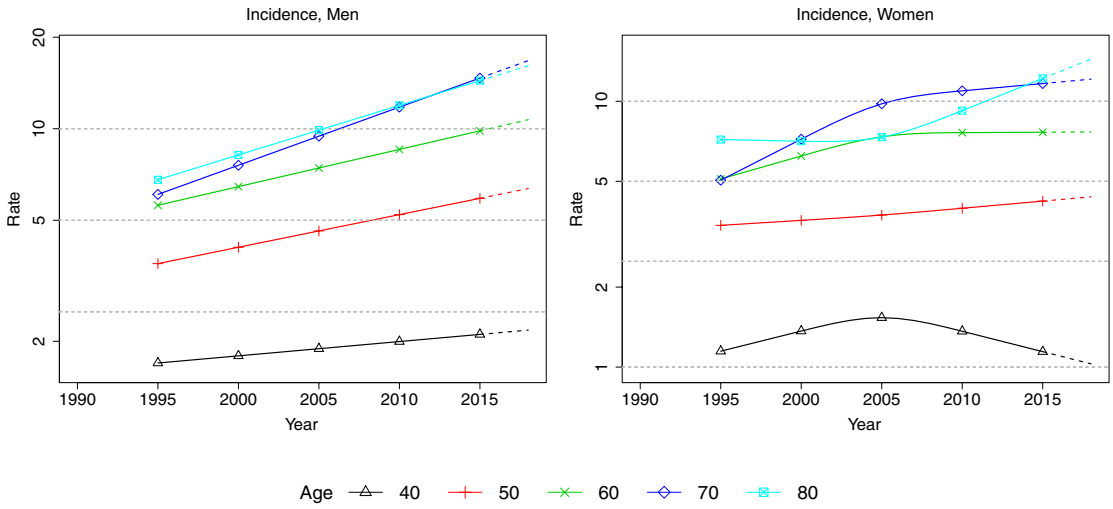
Hodgkin lymphoma

	Men			Women		
Age (years)	Rate[1] 1990	Rate[1] 2018	MAV[2] (%) and [CI 95%]	Rate[1] 1990	Rate[1] 2018	MAV[2] (%) and [CI 95%]
20	3.8	6.0	1.7 [1.1; 2.3]	3.2	6.7	2.7 [1.8; 3.6]
30	4.4	6.5	1.4 [0.9; 1.9]	3.1	4.8	1.6 [0.7; 2.5]
40	3.3	4.4	1.0 [0.5; 1.5]	2.2	2.2	0.0 [-1.0; 1.1]
50	3.1	3.7	0.7 [0.1; 1.2]	1.5	2.1	1.0 [-0.2; 2.2]
60	2.9	3.2	0.4 [-0.2; 1.0]	1.2	1.9	1.5 [0.2; 2.8]



Follicular lymphoma

	Men			Women		
Age (years)	Rate[1] 1995	Rate[1] 2018	MAV[2] (%) and [CI 95%]	Rate[1] 1995	Rate[1] 2018	MAV[2] (%) and [CI 95%]
40	1.7	2.2	1.1 [-0.8; 3.0]	1.1	1.0	-0.5 [-2.6; 1.7]
50	3.6	6.4	2.5 [1.2; 3.9]	3.4	4.4	1.1 [-0.4; 2.5]
60	5.6	10.7	2.9 [1.7; 4.1]	5.1	7.7	1.8 [0.6; 3.0]
70	6.1	16.7	4.5 [3.3; 5.8]	5.0	12.1	3.9 [2.7; 5.1]
80	6.8	16.1	3.8 [2.2; 5.5]	7.2	14.4	3.1 [1.7; 4.5]

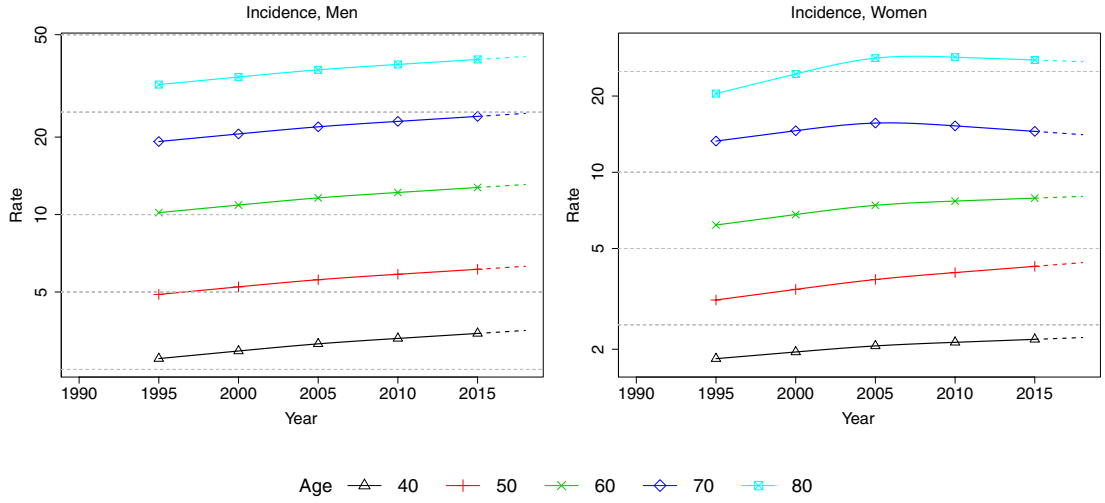


[1] Incidence rate expressed as a number of cases per 100,000 person-years
[2] MAV: mean annual variation and 95% confidence interval
Source: Data from the cancer registries of the Francim network

FIGURE 3 (CONT) | Trends in incidence rates between the start of the study period and 2018, in metropolitan France by sex and age, for the main haematological malignancies for which incidence increases over the period of the study - Logarithmic scale

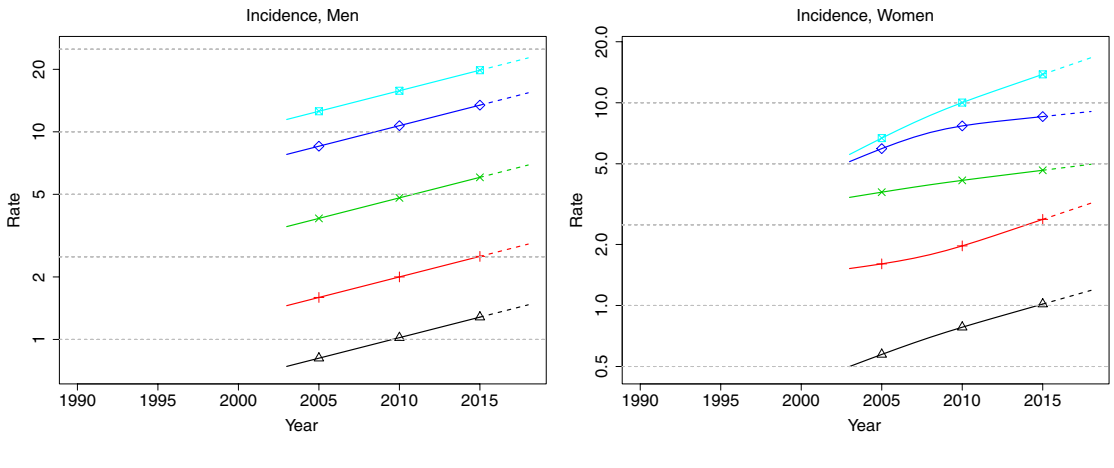
Diffuse large B-cell lymphoma

	Men			Women		
Age (years)	Rate[1] 1995	Rate[1] 2018	MAV[2] (%) and [CI 95%]	Rate[1] 1995	Rate[1] 2018	MAV[2] (%) and [CI 95%]
40	2.8	3.5	1.1 [0.7; 1.5]	1.8	2.2	0.8 [-1.0; 2.7]
50	4.9	6.3	1.1 [0.7; 1.5]	3.1	4.4	1.5 [0.0; 3.0]
60	10.2	13.1	1.1 [0.7; 1.5]	6.2	8.0	1.1 [0.0; 2.3]
70	19.2	24.7	1.1 [0.7; 1.5]	13.3	14.1	0.3 [-0.7; 1.2]
80	32.0	41.2	1.1 [0.7; 1.5]	20.5	27.3	1.3 [0.4; 2.2]



Marginal zone lymphoma

	Men			Women		
Age (years)	Rate[1] 2003	Rate[1] 2018	MAV[2] (%) and [CI 95%]	Rate[1] 2003	Rate[1] 2018	MAV[2] (%) and [CI 95%]
40	0.7	1.5	4.7 [3.4; 5.9]	0.5	1.2	5.9 [1.3; 10.8]
50	1.5	2.9	4.7 [3.4; 5.9]	1.5	3.2	5.1 [1.9; 8.3]
60	3.5	6.9	4.7 [3.4; 5.9]	3.4	5.0	2.5 [0.1; 5.1]
70	7.8	15.4	4.7 [3.4; 5.9]	5.1	9.1	3.9 [1.6; 6.1]
80	11.5	22.7	4.7 [3.4; 5.9]	5.6	16.7	7.6 [5.3; 10.0]

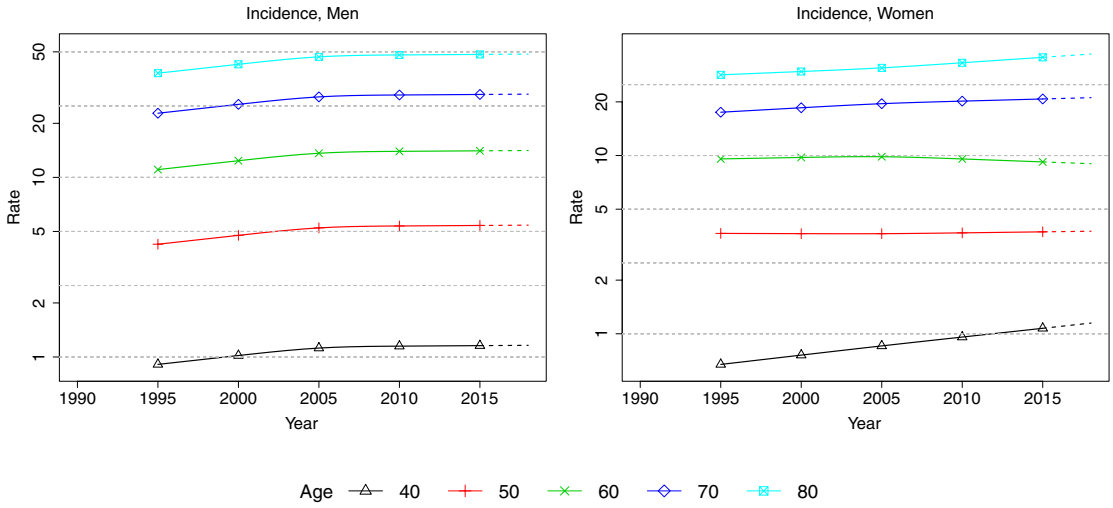


[1] Incidence rate expressed as a number of cases per 100,000 person-years
[2] MAV: mean annual variation and 95% confidence interval
Source: Data from the cancer registries of the Francim network

FIGURE 3 (CONT) | Trends in incidence rates between the start of the study period and 2018, in metropolitan France by sex and age, for the main haematological malignancies for which incidence increases over the period of the study - Logarithmic scale

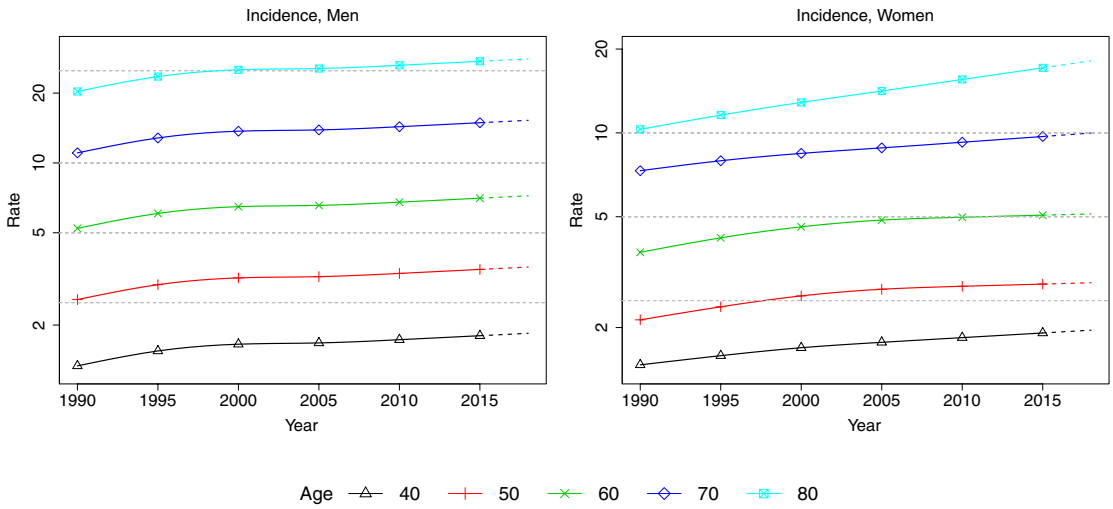
Multiple myeloma/plasmacytoma

	Men			Women		
Age (years)	Rate[1] 1995	Rate[1] 2018	MAV[2] (%) and [CI 95%]	Rate[1] 1995	Rate[1] 2018	MAV[2] (%) and [CI 95%]
40	0.9	1.2	1.1 [0.7; 1.5]	0.7	1.1	2.4 [-0.4; 5.2]
50	4.2	5.4	1.1 [0.7; 1.5]	3.7	3.8	0.1 [-1.4; 1.6]
60	11.1	14.1	1.1 [0.7; 1.5]	9.6	9.0	-0.3 [-1.3; 0.8]
70	22.8	29.1	1.1 [0.7; 1.5]	17.5	21.1	0.8 [0.0; 1.7]
80	38.0	48.6	1.1 [0.7; 1.5]	28.4	37.1	1.2 [0.4; 2.0]



Acute myeloid leukaemia

	Men			Women		
Age (years)	Rate[1] 1990	Rate[1] 2018	MAV[2] (%) and [CI 95%]	Rate[1] 1990	Rate[1] 2018	MAV[2] (%) and [CI 95%]
40	1.3	1.8	1.2 [0.8; 1.6]	1.5	2.0	1.0 [-0.2; 2.2]
50	2.6	3.6	1.2 [0.8; 1.6]	2.1	2.9	1.1 [0.0; 2.2]
60	5.2	7.2	1.2 [0.8; 1.6]	3.7	5.1	1.1 [0.3; 2.0]
70	11.1	15.3	1.2 [0.8; 1.6]	7.3	10.0	1.1 [0.3; 1.9]
80	20.3	28.1	1.2 [0.8; 1.6]	10.3	18.1	2.0 [1.3; 2.8]



[1] Incidence rate expressed as a number of cases per 100,000 person-years
[2] MAV: mean annual variation and 95% confidence interval
Source: Data from the cancer registries of the Francim network

REFERENCES

[1] Binder-Foucard F, Belot A, Delafosse P, Remontet L, Woronoff AS, Bossard N. [National estimate of the incidence and mortality from cancer in France between 1980 and 2012. Part 1 – Solid Tumors]. Saint-Maurice (Fra) : Institut de veille sanitaire, 2013. 122 p. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_recherche/INV11619

[2] Monnereau A, Remontet L, Maynadié M, Binder-Foucard F, Belot A, Troussard X, *et al.* [National estimate of the incidence of cancer in France between 1980 and 2012. Part 2 – Hematological Malignacies]. Saint-Maurice : Institut de veille sanitaire ; 2013. 88 p. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_recherche/INV11741

[3] Jéhannin-Ligier K, Dantony E, Bossard N, Molinié F, Defossez G, Daubisse-Marliac L, *et al.* [Cancer incidence and mortality projections in metropolitan France in 2017. Technical report]. Saint-Maurice : Santé publique France, 2017. 80 p. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_recherche/INV13638

[4] Defossez G, Le Guyader-Peyrou S, Uhry Z, Grosclaude P, Remontet L, Colonna M, *et al.* [National estimates of cancer incidence and mortality in metropolitan France between 1990 and 2018. Volume 1 – Solid Tumors]. Saint-Maurice : Santé publique France, 2019. 372 p. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_recherche/SPF00001170

[5] Le Guyader-Peyrou S, Defossez G, Uhry Z, Mounier M, Cornet E, Dantony E, *et al.* [National estimates of cancer incidence and mortality in metropolitan France between 1990 and 2018. Volume 2 – Hematological Malignancies]. Saint-Maurice (Fra) : Santé publique France, 2019. 169 p. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_recherche/SPF00001173

[6] Andler R, Guignard R, Spilka S, Le Nézet O, Pasquereau A, Richard J-B, *et al.* Consommation de tabac et usage de cigarette électronique en France. Rev Mal Respir. 2018 Jun;35(6):673–85.

[7] Khuder SA. Effect of cigarette smoking on major histological types of lung cancer: a metaanalysis. Lung cancer. 2001; 31(2–3):139–148.

[8] Burns DM, Anderson CM, Gray N. Do changes in cigarette design influence the rise in adenocarcinoma of the lung? Cancer Causes Control. 2011 Jan;22(1):13–22.

[9] Perrine A, Lecoffre C, Blacher J, Olié V. [Hypertension in France: prevalence, treatment and management in 2015 and temporal trends since 2006]. Bull Epidémiol Hebd. 2018;(10):170–9. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_revues/SPF00000016

[10] Zbuk K, Anand SS. Declining incidence of breast cancer after decreased use of hormone-replacement therapy: magnitude and time lags in different countries. J Epidemiol Community Health. 2012;66:1–7.

[11] International Agency for Research on Cancer. Les cancers attribuables au mode de vie et à l'environnement en France métropolitaine. Lyon; IARC 2018 p.271. Available at: http://gco.iarc.fr/resources/paf-france_fr.php. Accessed [26/10/2018].

[12] Vaccarella S, Dal Maso L, Laversanne M, Bray F, Plummer M, Franceschi S. The impact of diagnostic changes on the rise in thyroid cancer incidence: A population-based study in selected high-resource countries. Thyroid. 2015 Oct;25(10):1127–36.

[13] Colonna M, Bossard N, Guizard AV, Remontet L, Grosclaude P; le réseau FRANCIM. Descriptive epidemiology of thyroid cancer in France: incidence, mortality and survival. Ann Endocrinol (Paris). 2010 Mar;71(2):95-101.

[14] Tuppin P, Leboucher C, Dougé M, Peyre-Lanquar G, Gabach P, Descotes JL, *et al.* [Individual prostate cancer screening in men aged 40 and over, France, 2009-2015. Data from the national health insurance inter-schemes information system]. Bull Epidémiol Hebd. 2016;(39-40):700-6. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_revues/INV13175

[15] Siegel RL, Fedewa SA, Anderson WF, Miller KD, Ma J, Rosenberg PS, *et al.* Colorectal cancer incidence patterns in the United States, 1974-2013. J Natl Cancer Inst. 2017 01;109(8).

[16] Siegel RL, Jemal A, Ward EM. Increase in incidence of colorectal cancer among young men and women in the United States. Cancer Epidemiol Biomark Prev. 2009 Jun;18(6):1695–8.

[17] Patel P, De P. Trends in colorectal cancer incidence and related lifestyle risk factors in 15-49-year-olds in Canada, 1969-2010. Cancer Epidemiol. 2016;42:90–100.

[18] Haggar FA, Preen DB, Pereira G, Holman CDJ, Einarsdottir K. Cancer incidence and mortality trends in Australian adolescents and young adults, 1982-2007. BMC Cancer. 2012 Apr 20; 12:151

[19] Sung JJY, Lau JYW, Goh KL, Leung WK, Asia Pacific Working Group on Colorectal Cancer. Increasing incidence of colorectal cancer in Asia: implications for screening. Lancet Oncol. 2005 Nov;6(11):871–6.

[20] Chang P, Friedenberg F. Obesity and GERD. Gastroenterol Clin North Am. 2014; 43(1): 161-73.

[21] Beck F, Richard J-B. (dir.). Les comportements de santé des jeunes. Analyses du Baromètre santé 2010. Saint-Denis: INPES, coll. Baromètres santé, 2013: 344 p. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_recherche/DOC00000517

[22] Noone AM, Howlader N, Krapcho M, Miller D, Brest A, Yu M, *et al.* SEER Cancer Statistics Review, 1975-2015, National Cancer Institute. Bethesda, MD, https://seer.cancer.gov/csr/1975_2015/, based on November 2017 SEER data submission, posted to the SEER web site, April 2018.

[23] Cerhan JR, Kricker A, Paltiel OB, Flowers CR, Wang SS, Monnereau A, *et al.* Medical history, lifestyle, family history, and occupational risk factors for diffuse large B-cell lymphoma (DLBCL): The InterLymph NHL Subtypes Project. J Natl Cancer Inst Monogr. 2014: 15-25.

[24] Schinasi L, Leon ME. Non-Hodgkin lymphoma and occupational exposure to agricultural pesticide chemical groups and active ingredients: a systematic review and meta-analysis. Int J Environ Res Public Health. 2014 Apr 23;11(4):4449-527.

[25] Lasfargues G. Les lymphomes non hodgkiniens et les pesticides. Bull Acad Natle Méd. 2017, nos7-8-9, 1161-1173.

[26] Cerhan JR, Berndt SI, Vijai J, Ghesquières H, McKay J, Wang SS, *et al.* Genome-wide association study identifies multiple susceptibility loci for diffuse large B cell lymphoma. Nat Genet. 2014 Nov;46(11):1233-8.

[27] Cerhan JR, Slager SL. Familial predisposition and genetic risk factors for lymphoma. Blood. 2015 Nov 12;126(20):2265-73.

[28] Morton LM, Slager SL, Cerhan JR, Wang SS, Vajdic CM, Skibola CF, *et al.* Etiologic heterogeneity among non-Hodgkin lymphoma subtypes: the InterLymph Non-Hodgkin Lymphoma Subtypes Project. J Natl Cancer Inst Monogr. 2014 Aug;2014(48):130-44.

[29] Morton LM. Dissecting lymphoma incidence to inform epidemiologic and clinical research. Leuk Lymphoma. 2013 Aug; 54 (8):1575-1576.

[30] Berndt SI, Skibola CF, Joseph V, Camp NJ, Nieters A, *et al.* Genome-wide association study identifies multiple risk loci for chronic lymphocytic leukemia. Nat Genet. 2013:45(8):868-76.

[31] Skibola CF, Berndt SI, Vijai J, Conde L, Wang Z, Yeager M. Genome-wide association study identifies five susceptibility loci for follicular lymphoma outside the HLA region. Am J Hum Genet. 2014;95:462-471.

[32] Monnereau A, Uhry Z, Bossard N, Cowppli-Bony A, Voirin N, Delafosse P, Remontet L, Troussard X, Maynadié M. [Survival of cancer patients in metropolitan France 1989-2013. Part 2 – Hematological Malignancies]. Saint-Maurice (Fra): Institut de veille sanitaire; 2016. 144 p. Available at: http://portaildocumentaire.santepubliquefrance.fr/exl-php/vue-consult/spf___internet_recherche/INV12818

COLLABORATIVE STUDY

French network of cancer registries Francim, Service de Biostatistique-Bioinformatique des Hospices civils de Lyon (HCL), Santé publique France (the French national public health agency), Institut national du cancer (INCa, the French National Cancer Institute)

AUTHORS

Gautier Defossez (Registre général des cancers de Poitou-Charentes), Sandra Le Guyader-Peyrou (Registre des hémopathies malignes de la Gironde), Zoé Uhry (Santé publique France, Hospices civils de Lyon), Pascale Grosclaude (Registre des cancers du Tarn), Marc Colonna (Registre du cancer de l'Isère), Emmanuelle Dantony (Hospices civils de Lyon), Patricia Delafosse (Registre du cancer de l'Isère), Florence Molinié (Registre des tumeurs de Loire-Atlantique et de Vendée), Anne-Sophie Woronoff (Registre des tumeurs du Doubs et du Territoire de Belfort), Anne-Marie Bouvier (Registre bourguignon des cancers digestifs), Laurent Remontet (Hospices civils de Lyon), Nadine Bossard (Hospices civils de Lyon), Alain Monnereau (Registre des hémopathies malignes de la Gironde)

WORK FOR THE STUDY

Data collection, interpretation and comments: French network of cancer registries Francim
Statistical analysis: Service de Biostatistique-Bioinformatique des HCL, Santé publique France
Coordination of the report writing: Gautier Defossez (Solid tumors), Sandra Le Guyader-Peyrou (Haematological malignancies)

COORDINATION OF PUBLICATION

Santé publique France: Camille Lecoffre, Florence de Maria
Institut national du cancer: Lionel Lafay, Philippe-Jean Bousquet

THANKS

All data sources that contribute to cancer registration through registries — anatomical and cytological pathology laboratories, the medical information departments of public and private health institutions, local French national Health Insurance services, general practitioners and specialists.
The Centre for epidemiology on the medical causes of death (Centre d'épidémiologie sur les causes médicales de décès - CépiDc - Inserm).
The National institute of statistics and economic studies (Institut national de la statistique et des études économiques - Insee).

FUNDING

Santé publique France, Institut national du cancer

LIST OF REGISTRIES INCLUDED IN THIS STUDY

General Registries

Registre des cancers du Bas-Rhin
Registre général des tumeurs du Calvados
Registre des tumeurs du Doubs et du Territoire de Belfort
Registre général des cancers de la Gironde
Registre des cancers du Haut-Rhin
Registre des tumeurs de l'Hérault
Registre du cancer de l'Isère
Registre général des cancers de Lille et de sa Région
Registre général des cancers en Région Limousin
Registre des tumeurs de Loire-Atlantique et de Vendée
Registre des cancers de la Manche
Registre général des cancers de Poitou-Charentes
Registre du cancer de la Somme
Registre des cancers du Tarn

Specialised Registries

Registre bourguignon des cancers digestifs
Registre des tumeurs digestives du Calvados
Registre finistérien des tumeurs digestives
Registre des cancers du sein et des cancers gynécologiques de Côte-d'Or
Registre des tumeurs primitives du système nerveux central de la Gironde
Registre des cancers thyroïdiens Marne-Ardennes
Registre des hémopathies malignes de Basse-Normandie
Registre des hémopathies malignes de Côte-d'Or
Registre des hémopathies malignes de la Gironde

KEYWORDS:
INCIDENCE
MORTALITY
CANCER
FRANCE
POPULATION-BASED REGISTRIES
TRENDS

Suggested citation: Defossez G, Le Guyader-Peyrou S, Uhry Z, Grosclaude P, Colonna M, Dantony E, *et al. National estimates of cancer incidence and mortality in metropolitan France between 1990 and 2018. Overview*. Saint-Maurice: Santé publique France, 2019. 20 p. Available at: www.santepubliquefrance.fr; https://geodes.santepubliquefrance.fr; https://lesdonnees.e-cancer.fr/; https://www.e-cancer.fr/

ISBN-NET : 979-10-289-0585-9
CREATED BY JOUVE
SANTÉ PUBLIQUE FRANCE
LEGAL SUBMISSION: SEPTEMBER 2019