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Cancers attributable to tobacco smoking in France in 2015

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Background: The evidence on the carcinogenicity of tobacco smoking has been well established. An assessment of the population-attributable fraction (PAF) of cancer due to smoking is needed for France, given its high smoking prevalence. **Methods:** We extracted age- and sex-specific national estimates of population and cancer incidence for France, and incidence rates of lung cancer among never smokers and relative risk (RR) estimates of smoking for various cancers from the American Cancer Prevention Study (CPS II). For active smoking, we applied a modified indirect method to estimate the PAF for lung and other tobacco smoking-related cancer sites. Using the RR estimates for second-hand smoking, the proportion of never smokers living with an ever-smoking partner derived from survey, and marital status data, we then estimated the PAF for lung cancer attributable to domestic passive smoking. **Results:** Overall in France in 2015, 54 142 and 12 008 cancer cases in males and females, respectively, were attributable to active smoking, accounting for 28 and 8% of all cancer cases observed among adult (30+ years) males and females. Additionally, 36 and 142 lung cancer cases, respectively among male and female never smokers, were attributable to second-hand smoke resulting from their partner's active smoking, corresponding to 4.2 and 6.7% of lung cancer cases which occurred in never smoker males and females, respectively. **Conclusions:** Tobacco smoking is responsible for a significant number of potentially avoidable cancer cases in France in 2015. More effective tobacco control programmes are critical to reduce this cancer burden.

Table 1 Estimated relative risks (RRs)[a] of dying from cancers for current smokers compared to never smokers by cancer sites

Cancer site	ICD10	Relative risk (95% CI)				Reference
		Males		Females		
Oral cavity & pharynx	C01–14	10.9		5.1		US Surgeon General's report 2004[3]
Oesophagus	C15	6.8		7.8		US Surgeon General's report 2004[3]
Stomach	C16	2.2	(1.8–2.7)	1.5	(1.2–1.9)	Ezzati et al. 2005[14]
Colon-rectum	C18–20	1.2	(1.0–1.6)	1.3	(1.0–1.7)	Hannan et al. 2009[16]
Liver	C22	2.3	(1.5–3.8)	1.5	(0.8–2.7)	Ezzati et al. 2005[14]
Pancreas	C25	2.2	(1.7–2.8)	2.2	(1.8–2.8)	Ezzati et al. 2005[14]
Larynx	C32	14.6		13.0		US Surgeon General's report 2004[3]
Lung	C33–34	21.3	(17.7–25.6)	12.5	(10.9–14.3)	Ezzati et al. 2005[14]
Cervix	C53			1.5	(0.9–2.6)	Ezzati et al. 2005[14]
Ovary (mucinous)	C56.9			2.1	(1.7–2.7)	Jordan et al. 2006[15]
Kidney	C64–66, C68	2.5	(1.8–3.6)	1.5	(1.0–2.1)	Ezzati et al. 2005[14]
Urinary bladder	C67	3.0	(2.1–4.3)	2.4	(1.5–4.1)	Ezzati et al. 2005[14]
Acute myelogenous leukaemia	C92.0	1.9	(1.3–2.9)	1.2	(0.8–1.8)	Ezzati et al. 2005[14]

a: RRs used for the main analysis.

Introduction

The evidence on the carcinogenicity of tobacco smoking has grown vastly since the reports of an association between cigarette smoking and carcinoma of the lung in 1950.[1–3] The International Agency for Research on Cancer (IARC) has included cancers of the lung, larynx, oral cavity, pharynx, nasal cavity and paranasal sinuses, oesophagus, stomach, pancreas, liver, kidney, ureter, bladder, uterine cervix, colon and rectum, acute myeloid leukaemia and the mucinous tumours of the ovary in the list of cancers caused by tobacco smoking.[4,5] Exposure to second-hand smoke has also been found to increase the risk of lung cancer in never smokers and has been classified as carcinogenic.[4]

France is one of the high-income European countries with the highest daily smoking prevalence: in 2014, 28% (32% in men and 24% in women) of the French population were daily tobacco smokers.[6,7] In order to reduce the smoking prevalence in France, the public health authority has launched a national programme of tobacco control (*Programme national de réduction du tabagisme*), aiming to reduce the number of daily smokers by 10% in 2019.[8] It is therefore of great public health interest to provide the up-to-date estimates of the proportion and number of cancers attributable to active and passive smoking.

This article provides, for 2015, estimates of the number and proportion of cancer cases attributable to active smoking in France for all cancers identified by IARC to be caused by smoking. It also estimates the number and proportion of lung cancer cases among never smokers due to exposure to passive smoking in their home.

Methods

Estimation of population-attributable fractions

Active smoking

We estimated the population-attributable fractions (PAFs) and numbers of cancer cases attributable to cigarette smoking using an indirect method of Peto and Lopez (1992),[9] modified by Parkin (2011) and used in similar projects for the UK and Australia.[10,11] This method relies on two main assumptions for high-income populations: (i) active tobacco smoking is the most important risk factor for lung cancer; (ii) lung cancer incidence among never smokers is fairly small and roughly constant across populations of a given sex and age. The number of lung cancers due to active smoking can be calculated as the difference between the observed number of lung cancers and the expected number if the population had the incidence rate of never smokers.

Data

The data required for the analysis include, from the same population, the sex and age-specific incidence rates of lung cancer among never smokers and relative risks (RRs) for individual cancers in smokers in comparison to never smokers.[12–14] We used the lung cancer incidence rates in never smokers reported in Parkin (2011), which are estimated from lung cancer death rates in the second Cancer Prevention Study (CPS II study) for the period 1982–02.[10,13] The CPS II is an American prospective cohort study, involving roughly 1.2 million participants, over 30 years old at the baseline survey in 1982 with a 20-year follow-up.[12,13]

Similar to previous studies, we used for most cancer sites the RRs of death from cancer among current smokers as compared to never smokers from analyses based on the CPS II study. We chose to use the RRs of cancer death instead of incidence, because they are estimated from cohort studies with long duration of follow-up and sample-size large enough to produce accurate risk estimates even for less common cancers. However, for mucinous ovarian cancer, the RR estimate for cancer incidence from a meta-analysis by Jordan et al. (2006) was used, as no RR for mortality or incidence have been estimated for the CPS II cohort.[15] And for colorectal cancer, we used the RR for cancer incidence estimated by Hannan et al. (2009) from the follow-up of the CPS II Nutrition Cohort.[16] Most other RRs are derived from the CPS II study re-analysis conducted by Ezzati et al. (2005) adjusted for important covariates (including age, race, marital status, education, employment, food and alcohol consumption).[14] The RRs used are listed in table 1 with their sources.

The size of the French population in 2015 by sex and age group was obtained from the French National Institute for Statistics and Economic Studies datasets (INSEE).[17] The number of cancer cases in France in 2015 by age, sex and site was estimated by applying the observed incidence rates for 2013 reported by the national network of cancer registries (FRANCIM) to the 2015 population.[18] To estimate the number of mucinous ovarian cancers, we applied the age-specific proportions of mucinous ovarian cancers reported by the FRANCIM for 2009–13 (shown in Supplementary table S1) to the age-specific numbers of ovarian cancer cases estimated for 2015.

Analysis

The statistical analysis was performed in two steps. First, we calculated the expected number of lung cancer cases in France if smoking was absent for a given sex s and age a, by multiplying the sex- and age-specific lung cancer rate among never smokers $I_L(s, a)$ from the CPS II study by the corresponding population size $N(s, a)$ in France in 2015. The number of lung cancer cases attributable to smoking was estimated as the difference between the observed number of lung cancer cases $O_L(s, a)$ and the expected number in the absence of smoking in 2015. The PAF for lung cancer due to tobacco smoking is then estimated as

$$PAF_L(s, a) = \frac{O_L(s, a) - I_L(s, a)N(s, a)}{O_L(s, a)} \quad (1)$$

For all the other cancer sites i, we used the conventional PAF formula,[19] for each sex and age category:

$$PAF_i(s, a) = \frac{P_e(s, a)(rr_i(s) - 1)}{1 + P_e(s, a)(rr_i(s) - 1)} \quad (2)$$

where $P_e(s, a)$ is the pseudo smoking prevalence in the population, and $rr_i(s)$ the RR for cancer site i in smokers as compared to never smokers.

$P_e(s, a)$ was calculated as the expected proportion of tobacco smokers in the French population which explains the estimated smoking-attributable fraction of lung cancers using the RR of lung cancer $rr_L(s)$ provided by the CPS II study.[10] It summarizes the cumulative effect of the smoking history among former and current smokers in the population with a single indicator.

$$P_e(s, a) = \frac{PAF_L(s, a)}{(1 - PAF_L(s, a))(rr_L(s) - 1)} \quad (3)$$

Having calibrated the prevalence of smoking on the risk in the CPS II population, one can use Equation (2) to estimate the corresponding PAFs. The numbers of cancer cases attributable to smoking for each site are the products of the PAFs and the total incidence for each site.

Domestic passive smoking

Because never smokers exposed to second-hand smoke are at increased risk of lung cancer, we estimate the PAF and the number of lung cancer cases attributable to passive smoking. Due to lack of exposure data for passive smoking in workplaces and other public areas, we restrict the analysis to domestic passive smoking.

Data

The RR estimates of passive smoking on lung cancer are most robust for never smokers who have lived with a partner who smokes. Because data on exposure to passive smoking at work and other public places in France are not readily available, we restrict the analysis to never smokers who were living in the same household as a smoking partner.

Relative risks

The RRs for lung cancer incidence in never smokers who were exposed to tobacco smoke from a smoking partner were obtained from the meta-analysis published in the IARC Monograph volume 83 (2004).[4] The RRs for males and females never smokers were 1.37 (95% CI 1.02–1.82) and 1.24 (95% CI 1.14–1.34), respectively.

Exposure

Because there is no data available in France on the proportion of never smokers living with a smoker, it was estimated following the methods described by Parkin (2011).[10] Briefly, we used the marital status data in 2005 published by INSEE and the tobacco smoking prevalence (categorized in never, former and current smoker) from a 2005 national health survey (Baromètre Santé, 2005),[20] allowing a 10-year latency time for the occurrence of lung cancer. Both data are available by sex and five-year age groups in 2005. Recognizing that couples tend to be concordant for smoking status and as proposed by Wald et al. (1986)[21] and used by Parkin (2011),[10] we assumed that ever smokers and never smokers were three times more likely to live with a partner with the same smoking status than with one having different smoking status. We also assumed that couples were in the same five-year age-group. The estimation is detailed in Supplementary table S3.

Analysis

The corresponding PAFs are estimated using the conventional equation

$$PAF(s, a) = \frac{P_{NwT}(s, a)(RR(s) - 1)}{P_{NwT}(s, a)(RR(s) - 1) + 1} \quad (4)$$

where $P_{NwT}(s, a)$ denotes the proportion of never smokers who were living with partners who had ever smoked.

The number of lung cancer cases is the product of the estimated PAF and the total number of lung cancer cases estimated among never smokers. The latter is obtained by multiplying the proportion of never smokers by the number of lung cancer cases not attributed to active smoking.

Sensitivity analysis for active smoking

We additionally performed sensitivity analysis to test different assumptions for active smoking, by applying alternative smoking prevalence and alternative RR estimates, and by including female breast cancer for which there is limited evidence of tobacco carcinogenicity. Detailed descriptions of methods and corresponding results are provided in the Supplementary methods and Supplementary tables S5 and S6.

Results

Active smoking

Overall, 66 150 cancer cases (54 142 in men and 12 008 in women) were attributable to active smoking, accounting for 28 and 8% of all cancer cases diagnosed in 2015 among French men and women over 30 years old (table 2).

In 2015, 32 686 (25 494 in men and 7192 in women) of the 40 450 lung cancer cases (29 097 in men and 11 353 in women) diagnosed in the French population aged 30 years and above were attributable to active smoking, corresponding to PAFs of 88% for men and 63% for women (table 3). Table 2 shows, in men and women respectively, the estimated numbers and proportions of cancer cases attributable to active smoking, by cancer sites. Detailed estimates by age are provided in Supplementary tables S2a and b. Besides lung, cancer sites that have the highest PAFs include larynx (84% in men and 68% in women), oral cavity and pharynx (80% in men and 42% in women) and oesophagus (69% in men and 45% in women). Cancer sites (besides lung) that account for the largest number of cases due to smoking include oral cavity and pharynx (8177 in men and 1281 in women), bladder (4046 in men and 287 in women) and oesophagus (3101 in men and 497 in women).

Domestic passive smoking

Table 4 shows, by age and sex, the proportion and number of lung cancer cases attributable to domestic passive smoking in 2015. Detailed estimates, including the estimated prevalence of never smokers living with an ever smoker in 2005 and the number of lung cancer cases among never smokers in 2015, are provided in Supplementary tables S4a and b. In sum, 36 and 142 lung cancer cases among male and female never smokers were attributable to exposure of smoking from a partner, corresponding to 4.2 and 6.7% of lung cancer occurring in male and female never smoker respectively.

Discussion

Overall, 66 150 (or 19%) of all new cancer cases among adults in France in 2015 can be attributable to active smoking, representing 28 and 8% of all cancer cases diagnosed in men and women over 30 years of age. Almost half of those cases (32 686) were lung

Table 2 Estimated number (Tob. Attrib.) and proportion (PAF) of cancer cases attributable to active tobacco smoking by sex according to cancer site in France in 2015

Cancer site		Males	Females	Total
Lung	Observed	29 097	11 353	40 450
	Tob. Attrib.	25 494	7192	32 686
	PAF (%)	88	63	81
Oral cavity & pharynx	Observed	10 193	3060	13 253
	Tob. Attrib.	8177	1281	9458
	PAF (%)	80	42	71
Bladder	Observed	10 307	2237	12 544
	Tob. Attrib.	4046	287	4333
	PAF (%)	39	13	35
Oesophagus	Observed	4509	1108	5617
	Tob. Attrib.	3101	497	3598
	PAF (%)	69	45	64
Kidney	Observed	8020	4072	12 092
	Tob. Attrib.	2940	314	3254
	PAF (%)	37	8	27
Larynx	Observed	3025	415	3440
	Tob. Attrib.	2547	281	2828
	PAF (%)	84	68	82
Liver	Observed	7359	1713	9072
	Tob. Attrib.	2500	117	2617
	PAF (%)	34	7	29
Colon & rectum	Observed	21 824	17 822	39 646
	Tob. Attrib.	1838	771	2608
	PAF (%)	8	4	7
Pancreas	Observed	5748	5554	11 302
	Tob. Attrib.	1778	749	2527
	PAF (%)	31	13	22
Stomach	Observed	4745	2423	7168
	Tob. Attrib.	1388	145	1533
	PAF (%)	29	6	21
Acute myelogenous leukaemia	Observed	1527	1364	2891
	Tob. Attrib.	334	55	389
	PAF (%)	22	4	13
Cervix	Observed		2863	2863
	Tob. Attrib.		265	265
	PAF (%)		9	9
Mucinous ovary	Observed		306	306
	Tob. Attrib.		54	54
	PAF (%)		18	18
Total	Observed (All Sites)	190 254	155 919	346 173
	Tob. Attrib.	54 142	12 008	66 150
	PAF (%)	28	8	19

cancer. Among never smokers, past exposure to domestic passive smoking caused 178 cases of lung cancer.

Our results are consistent with previous studies. In 2000, 27% of the cancer cases in men and 6% in women in France were found to be attributable to active smoking[22] vs. 28 and 8% in 2015 in this study. While prevalence of current smoking in men has declined progressively from about 60% in early 1970s to around 40% in 2000 and remained relatively stable thereafter, it has increased progressively in women from about 25% to over 30% during the same period.[23] In 2014, the prevalence estimates in men and women were 38 and 30%, respectively.[7] This overall male-downward and female-upward trends in smoking prevalence have been reflected in smoking-attributable deaths. Deaths due to smoking in French men decreased from 66 000 in 1985 to 59 000 in 2010, corresponding to PAFs of 23 and 21%, respectively. In contrast, deaths in French women increased from 4700 in 1985 to 19 000 in 2010, corresponding to PAFs of 1 and 7%.[24] Consequently, smoking-related cancer burden is expected to increase among females in the foreseeable future, given the ascending trend in smoking observed in French women. Also worrisome is the high and rising prevalence of adolescent smoking, e.g. the prevalence of 16-year olds daily smokers increased from 17% in 2007–08 to 23% in 2011.[23]

Table 3 Estimated lung cancer cases and proportion (PAF) attributable to smoking according to sex in France in 2015

Age	Males						Females					
	Population size (INSEE)	Cases observed (FRANCIM)	Rates in never smokers per 100 000 (CPS II)	Cases in never smokers	PAF (%)	Cases attributable to smoking	Population size (INSEE)	Cases observed (FRANCIM)	Rates in never smokers per 100 000 (CPS II)	Cases in never smokers	PAF (%)	Cases attributable to smoking
	(1)	(2)	(3)	(4)=(1)*(3)	(5)=(6)/(2)	(6)= (2)−(4)	(1)	(2)	(3)	(4)=(1)*(3)	(5)=(6)/(2)	(6)= (2)−(4)
30–34	1 975 801	56	1.6	32	44	24	2 039 647	51	2.5	51	0	0
35–39	1 943 589	106	2.4	47	56	59	1 972 714	100	3.2	63	37	37
40–44	2 196 838	285	3.4	75	74	210	2 214 598	248	4.3	95	62	153
45–49	2 150 383	925	4.8	103	89	822	2 196 770	576	6.2	136	76	440
50–54	2 119 033	1940	7.3	155	92	1785	2 201 318	969	8.8	194	80	775
55–59	1 985 794	3647	11.1	220	94	3427	2 111 389	1818	12.5	264	85	1554
60–64	1 898 518	4809	17.4	330	93	4479	2 063 366	1809	17.2	355	80	1454
65–69	1 715 932	5448	27	463	91	4985	1 898 126	1493	25	475	68	1018
70–74	1 099 046	4044	40.9	450	89	3594	1 279 448	1148	33.9	434	62	714
75–79	937 796	3290	61.1	573	83	2717	1 228 485	1172	46.6	572	51	600
80–84	726 400	2862	87.3	634	78	2228	1 128 190	1092	61.9	698	36	394
85+	597 816	1685	87.3	522	69	1163	1 330 620	877	61.9	824	6	53
Total	19 346 946	29 097	–	3603	88	25 494	21 664 671	11 353	–	4161	63	7192

Table 4 Estimated number and proportion (PAF) of lung cancer cases attributable to domestic passive smoking in France in 2015

Age in 2015 (years)	Males					Females				
	Never smokers in 2015 (%)	Lung cancer cases not attributable to smoking	Lung cancer cases among never smokers	PAF of domestic passive smoking (%)	Lung cancer cases attributable to domestic passive smoking	Never smokers in 2015 (%)	Lung cancer cases not attributable to smoking	Lung cancer cases among never smokers	PAF of domestic passive smoking (%)	Lung cancer cases attributable to domestic passive smoking
Source	(1) Baromètre 2014	(2) Table 3	(3) (3)=(1)/100*(2)	(4) Supplementary table S4a	(5)=(4)/100*(3)	(1) Baromètre 2014	(2) Table 3	(3) (3)=(1)/100*(2)	(4) Supplementary table S4b	(5)=(4)/100*(3)
30–34	26.0	32	8.2	0.3	0	37.8	51	19.3	0.7	0
35–39	30.1	47	14.0	2.4	0	32.6	63	20.6	3.1	1
40–44	28.4	75	21.2	5.5	1	36.6	95	34.9	5.2	2
45–49	23.7	103	24.5	7.3	2	36.3	136	49.4	6.7	3
50–54	27.0	155	41.8	7.9	3	34.9	194	67.6	7.1	5
55–59	20.4	220	45.0	7.4	3	37.1	264	97.9	8.2	8
60–64	19.7	330	65.1	6.9	5	46.2	355	164.0	8.6	14
65–69	19.4	463	89.9	4.8	4	49.0	475	232.5	9.3	22
70–74	24.5	450	110.1	4.4	5	56.3	434	244.2	8.9	22
75–79	24.5	573	140.4	3.2	4	56.3	572	322.3	8.6	28
80–84	24.5	634	155.4	3.0	5	56.3	698	393.2	6.8	27
85+	24.5	522	127.9	2.4	3	56.3	824	463.7	2.4	11
Total	–	3603	*843*	*4.2*	*36*	–	*4161*	*2110*	*6.7*	*142*

Several limitations should be considered. First, we used the lung cancer incidence rates among never smokers in the US to estimate the PAFs for lung cancer in France, assuming the factors that cause lung cancer among never smokers and the exposure to these factors among never smokers to be identical in both populations. Second, the sensitivity analyses using RRs from CPS II and smoking prevalence in France (with different latency times) are not ideal, as it assumes that the smokers in France and in the CPS II cohort have the same past smoking history. Results from sensitivity analysis (see Supplementary material) using RRs from the European Prospective Investigation into Cancer and Nutrition (EPIC) study suggest that this may be a concern for the PAF estimates for some cancer sites (e.g. oesophagus) where the RRs from the CPS II and the EPIC study differ markedly. Third, for most cancer sites, we used the RRs of deaths instead of incidence. This is based on (i) the assumption that the death rates are the same among cancer patients whether their cancer is tobacco related or not and (ii) the clear advantage of using RR estimates from a study with large sample-size and long duration of follow-up i.e. 20 years in CPS II.

As for domestic passive smoking, the RRs were derived from never smokers currently living with smokers. The corresponding PAF is therefore likely to be underestimated since the estimation fails to account for: (i) never smokers who have previously lived with a smoking partner and separated only recently; (ii) never smokers currently living with a former smoker who quit smoking only recently. To reduce this bias, following Parkin (2011), we estimated the PAF using the proportion of never smokers who were living with someone who had ever smoked in 2005. However, we may still have underestimated the true burden of passive smoking. First, the best data source we could find for marital status does not include unmarried partners living together, a common demographic status in France. Second, the current analysis does not include exposure to smoking from cohabiting members other than their partners, as such data are lacking. All these limitations are potential sources of underestimation.

Additionally, the choice of 10-year latency for lung cancer in never smokers is arbitrarily based on data availability and the assumption that the prevalence of living with an ever-smoking partner has been constant over the past 2–3 decades. This could also lead to underestimations, as the level of passive exposure to indoor smoking was likely higher in the 1990s due to limited awareness of the harmful effects of passive smoking on health and tobacco control regulations in place. Finally, we were unable to assess the PAFs for exposure to passive smoking at workplaces and other public spaces due to lack of data.

In conclusion, smoking was responsible for a significant share of cancer cases in France in 2015. Over the past decades, legislation has been passed to reduce tobacco consumption and exposure to second-hand tobacco smoke (e.g. loi Veil, 1976; loi Evin, 1991; décret, 2006).[25] Comprehensive smoking-free policy was further strengthened in February 2007 for workplaces, shopping centres, transportation hubs, hospitals and schools.[26] Subsequently, the bans were extended to hospitality places, such as bars, restaurants, hotels and casinos in January 2008.[26] Despite France's commendable initiatives to de-normalize tobacco use, including the recent adoption of plain packaging, tobacco taxation and advertizing restrictions, a sizeable proportion of the country's population are currently tobacco smokers. France also remains one of the highest tobacco-consuming developed countries, falling behind the U.K., Canada, Australia and New Zealand which all have reduced smoking prevalence to below 20% (vs. over 30% in France).[27,28] Accordingly, the present and predicted smoking pattern in France and its impact on population health should be alarming to the pro-tobacco control stakeholders.

Due to the long latency time between smoking and the occurrence of cancer, and the high historical smoking prevalence in France, cancer incidence and mortality are not likely to decline in the foreseeable future, particularly for female cohorts that smoked most heavily and are still young. More tobacco control policies specifically targeting females should be devised. Given the recent rise in tobacco consumption in 2005–10 (has stabilized since) and the rising smoking prevalence among adolescents, the long-term smoking-related cancer burden may continue to increase.[7,29] Hence, more in-depth research must be done to better understand the reasons for the present failures to reduce tobacco consumption despite generally strong tobacco control policies.[28] Specifically, we need to investigate how increases in the retail price of tobacco products and their magnitude affect consumption, why its positive effects on consumption have often not been sustained over time in France, and whether periodic adjustment by changing the affordability will address this. As 17% of smokers in France used the less expensive roll-your-own cigarettes in 2010, monitoring the consumption and regulating the price of cheap cigarettes and other substitute products are also necessary.[30] Meanwhile, reinforcement and adoption of more effective regulations on smoking are needed to achieve sustained reduction in smoking and thus lower the cancer burden in France.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Key points

- A total of 54 142 and 12 008 cancer cases, in adult (30+ years old) males and females respectively, were attributable to active smoking in France in 2015.
- Cancer sites that account for the largest number of cases due to smoking include lung, oral cavity and pharynx, bladder and oesophagus.
- A total of 36 and 142 of all lung cancer cases, among adult male and female never smokers respectively, were attributable to second-hand smoke resulting from their partner's active smoking.
- Cancer incidence and mortality are not likely to decline in the foreseeable future in France, given its high historical smoking prevalence.
- Effective tobacco control regulations need to be adopted and strengthened to achieve sustained reduction in smoking and thus reduce the cancer burden in France.

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