CRUK analysis brief

Preventable cancer cases in England, 2023

January 2026

Together we are beating cancer

CANCER RESEARCH UK

Contents

About this document

Reference

This report should be referred to as follows:

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Authors

Lucy Clark, Karis Betts, Katrina Brown, Magdalena Mikolajczyk, Sofia Migues, Nadine Zakkak, Sam Finnegan, Rae Foulkes, Sophie Brooks, Mei Ying Chen, Julia Cotterill, Milly Bennett-Day, Barney Johnson, Nick W S Payne, Eleonora Giordano, Jon Shelton for the Policy, Information and Communications Directorate at Cancer Research UK.

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About Cancer Research UK

We're the world's leading cancer charity dedicated to saving and improving lives through research. We fund research into the prevention, detection and treatment of more than 200 types of cancer through the work of over 4,000 scientists, doctors and nurses. In the last 50 years, we've helped double cancer survival in the UK and our research has played a role in around half of the world's essential cancer drugs. Our vision is a world where everybody lives longer, better lives, free from the fear of cancer.

Executive summary

There are over 346,000 newly diagnosed cases of cancer in England each year. A substantial proportion of cases are preventable through reducing prevalence of key risk factors.

To support the National Cancer Plan in England, we have published updated analysis of the estimated number and proportion of cancer cases in England in 2023 which were attributable to ten proven risk factors. These estimates are an update on previously published figures for England, and use the highest quality input data available.

We estimate that around a third (34%) of cancer cases in England in 2023 were attributable to known risk factors. This is lower than previous estimates as some risk factors previously included were omitted here because more recent evidence challenges their direct causal link with cancer; others were excluded in order to be consistent across risk factor groups; for some cancer site-risk factor pairings, the level of risk increase has recently been shown to be slightly lower than previously thought. This does not represent a reduction over time in the total proportion of cancer cases attributable to known risk factors.

Smoking remains England's leading cause of cancer, contributing 14% of all cases in 2023. Overweight and obesity is the next-biggest risk factor (8% of 2023 cases). The remaining risk factors individually contribute 4% or less of all cases.

Introduction

Cancer is the biggest cause of death in England, with more than 346,000 new cancer cases and more than 139,000 cancer deaths each year.[1,2]

Policies to reduce the cancer burden should prioritise actions with the largest potential for population-level impact. There is clear evidence that a substantial proportion of cancer cases in England could be prevented by reducing exposure to known risk factors.[3,4]

Evidence in this area is constantly developing, and the prevalence of risk factors changes over time. Some new associations between risk factors and cancer sites are identified; some older associations are challenged. Estimates of the size of risk factors' impact on cancer incidence are refined, through better adjustment for competing risks, and more granular assessment of population subgroups.

All these pieces of evidence can be combined to estimate the population-level cancer burden of known risk factors. The most recent estimates for England are for 2015,[4] so this briefing provides an update to support the National Cancer Plan for England.

This study set out to estimate the number and proportion of cancer cases in England in 2023 attributable to known modifiable risk factors.

Methods

This work uses the Population Attributable Fraction (PAF) method.[3,4]

Combinations of risk factor and cancer site were included if there was evidence of a definite causal link, as classified by internationally-recognised expert bodies.[5,6] A small number of combinations meeting this criterion were excluded from analysis due to lack of data or very low expected exposure prevalence in the UK population. A similarly small number of combinations which did not meet this criterion were included, where there was robust epidemiological and mechanistic evidence of carcinogenicity in humans, in literature published more recently than the expert bodies' latest relevant review.

For most risk factors, PAFs were calculated by ten-year age band, sex, and cancer site using Levin's formula, which combines the proportion of the population in each exposure level, and the relative risk of cancer diagnosis following exposure at that level. The PAF was then multiplied by cancer incidence to give the number of attributable cases, and attributable cases were summed across ages and sexes as required.

To avoid double-counting attributable cases with more than one cause when combining PAFs across risk factors, figures were summed sequentially e.g. applying PAFs only to those cases not already accounted for by risk factors already included in the sum. Confidence intervals are not presented for this work so as not to imply precision: a traditional confidence interval calculation cannot meaningfully accommodate the multiple components in PAF calculations. All comparisons between risk factors are based on point estimates only.

For most risk factors, a 10-year lag between risk factor exposure and cancer incidence was used, e.g. risk factor exposure in 2013 for cancer incidence in 2023. A 10-year lag was selected to align with length of follow-up in relative risk sources, and due to lack of consistent evidence on true latency.

Data were collected wherever possible from gold-standard sources: nationally representative population health surveys for exposure prevalence, and peer-reviewed meta-analyses of cohort studies for relative risks. Cancer incidence data were projected using an age-period-cohort model with attenuation to prevent exponential increases or decreases, using observed data up to 2019 (the most recent year with non-COVID-impacted incidence data available across the UK).[7]

Further details of the methodology are available on request.

Results

The estimated number and proportion of cancer cases in England in 2023 attributable to ten known risk factors individually and in combination are presented below (Table 1). Full results by cancer site and sex (for all the individual UK nations and the UK as a whole) will be published separately.

RISK FACTOR	PROPORTION OF CANCER CASES	NUMBER OF CANCER CASES
TOBACCO	14%	47,300
OVERWEIGHT AND OBESITY	8%	27,700
UV RADIATION	4%	14,400
INFECTIONS	4%	12,000
OCCUPATIONAL EXPOSURES	3%	10,700
ALCOHOL	2%	8,200
AIR POLLUTION	1%	4,300
IONISING RADIATION	1%	4,000
PROCESSED MEAT	<1%	3,200
INSUFFICIENT PHYSICAL ACTIVITY	<1%	1,500
ALL OF THE ABOVE	34%	114,300

Table 1: Number and proportion of cancer cases attributable to risk factors, England, 2023, persons

Around a third of all cancer cases (34%, 114,300) in England in 2023 were attributable to known risk factors. This is lower than previously estimated,[4] primarily due to evidence changes for some risk factors, and does not represent a reduction over time.

Tobacco was by far the biggest risk factor, contributing around 1 in 7 (14%, 47,300) of all cases. Around 1 in 12 cases (8%, 27,700) were attributable to overweight and obesity. The remaining risk factors contributed much smaller proportions of cancer cases.

Conclusion

This study estimates around a third of cancer cases in England in 2023 – over 114,000 cases – were attributable to the combination of ten modifiable risk factors, chiefly tobacco, and overweight and obesity.

This overall figure is lower than previously estimated for 2015,[4] because of methodological differences: fewer risk factor-cancer site pairings have been included (due to evidence strength reclassifications and for consistency across groups of exposures), and some specific relative risk figures included in the calculations are lower due to improvements in evidence quality.

Although smoking rates have been falling for decades in England, almost 4 in 10 people have ever smoked (currently or in the past) and therefore have an increased risk of cancer compared with people who have never smoked.[8] However, people who quit smoking have lower cancer risk versus those who continue,[9,10,11] so efforts to increase cessation as well as reduce initiation (e.g. through the proposed Tobacco and Vapes Act) remain worthwhile.

Overweight and obesity remains the second largest risk factor and prevalence of this risk factor continues to increase. Population prevalence of this risk factor may be reduced through prevention and/or treatment; both approaches are challenging at both the individual and systemic level. Evidence gaps remain regarding effective interventions for sustained healthy weight, and how best to reduce the population cancer impact of overweight and obesity.

The method used here to estimate the number and proportion of UV-attributable cancer cases is well-established,[12] and the only viable option as there are no formal exposure prevalence data for UV exposure, however it is subject to confounding by changes over time in the diagnosis of melanoma skin cancer.[13] The figures reported here should therefore be interpreted with some caution, but the ranking of this risk factor is unlikely to change unless melanoma overdiagnosis is markedly more common than current evidence suggests.[14]

Air pollution and processed meat contribute small proportions of cases because they are each causally linked with only one cancer site. The alcohol PAF is similarly small because alcohol has a fairly low impact on cancer risk at the exposure levels most common in the population. For infections, occupation and ionising radiation, the evidence incorporated in the current analysis is suboptimal and a more granular review and update is warranted.

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