

CRUK analysis brief

Preventable cancer cases in Northern Ireland, 2023

September 2026

Contents

About this document.....3

Executive summary..... 5

Introduction 6

Methods.....7

Results..... 8

Conclusion..... 9

References.....12

About this document

Reference

This report should be referred to as follows:

Cancer Research UK, 2026. CRUK analysis brief: Preventable cancer cases in Northern Ireland, 2023.

Authors

Lucy Clark, Karis Betts, Katrina Brown, Magdalena Mikolajczyk, Sofia Miguez, 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.

Acknowledgements

We are grateful to the many organisations across the UK which collect, analyse, and share the data which we use, and to the patients and public who consent for their data to be used. Find out more about the sources which are essential for our statistics here <https://www.cancerresearchuk.org/health-professional/cancer-statistics/cancer-stats-explained/data-collection-implications>.

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.



Cancer Research UK is a registered charity England and Wales (1089464), Scotland (SC041666), the Isle of Man (1103) and Jersey (247).

Executive summary

There are around 10,900 newly diagnosed cases of cancer in Northern Ireland each year. A substantial proportion of cases are preventable through reducing prevalence of key risk factors.

To support CRUK's: *A manifesto for cancer and research and care in Northern Ireland*, we have published updated analysis of the estimated number and proportion of cancer cases in Northern Ireland in 2023 that were attributable to ten proven risk factors. These estimates are an update on previously published figures for Northern Ireland, and use the highest quality input data available.

We estimate that around a third (34%) of cancer cases in Northern Ireland 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 Northern Ireland'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 Northern Ireland, with around 10,900 new cancer cases and around 4,600 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 Northern Ireland 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 Northern Ireland are for 2015,[4] so this briefing provides an update to support CRUK's: *A manifesto for cancer research and care in Northern Ireland*.

This study set out to estimate the number and proportion of cancer cases in Northern Ireland 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: considerable additional estimation or imputation would be required to obtain the input data needed to construct a traditional confidence interval, which would in itself be uncertain. 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 obtained from the Northern Ireland Cancer Registry, ^[1] with some additional estimation for morphological subtypes and some haematological malignancies where required.

Further details of the methodology are available on request.

Results

The estimated number and proportion of cancer cases in Northern Ireland 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%	1,500
OVERWEIGHT AND OBESITY	8%	830
UV RADIATION	4%	460
INFECTIONS	4%	460
OCCUPATIONAL EXPOSURES	3%	380
ALCOHOL	2%	210
PROCESSED MEAT	1%	160
IONISING RADIATION	1%	120
AIR POLLUTION	<1%	100
INSUFFICIENT PHYSICAL ACTIVITY	<1%	60
ALL OF THE ABOVE	34%	3,600

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

Around a third of all cancer cases (34%, 3,600) in Northern Ireland 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%, 1,500) of all cases. Around 1 in 12 cases (8%, 830) 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 Northern Ireland in 2023 – around 3,600 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 fallen since records began in Northern Ireland, around 1 in 3 people have ever regularly smoked (currently or in the past) and therefore have an increased risk of cancer compared with people who have never smoked.[7] However, people who quit smoking have lower cancer risk versus those who continue,[8,9,10] so efforts to increase cessation as well as reduce initiation (e.g. through the proposed impact of the Tobacco and Vapes Act) remain worthwhile.

Overweight and obesity remains the second largest risk factor and prevalence of this risk factor continues to increase.[7] 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,[11] and the only viable option as there are no formal exposure prevalence data for UV exposure, however it is subject to confounding by international changes over time in the diagnosis of melanoma skin cancer.[12] 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.[13]

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.

References

- ¹ Data were accessed from the [Northern Ireland Cancer Registry website](#) and averaged across 2021–2023.
- ² Data were accessed from the Registrar General Annual Report of the [Northern Ireland Statistics and Research Agency](#) and averaged across 2022–2024.
- ³ Parkin DM, Boyd L, Walker LC. The fraction of cancer attributable to lifestyle and environmental factors in the UK in 2010. *Br J Cancer*. 2011;105 Suppl 2:S77–81. Available from: <https://www.nature.com/articles/bjc2011489>
- ⁴ Brown KF, Rumgay H, Dunlop C, Ryan M, Quartly F, Cox A, et al. The fraction of cancer attributable to modifiable risk factors in England, Wales, Scotland, Northern Ireland, and the United Kingdom in 2015. *Br J Cancer*. 2018 Apr;118(8):1130–41. Available from: <https://www.nature.com/articles/s41416-018-0029-6>
- ⁵ International Agency for Research on Cancer. Agents classified by the IARC Monographs [Internet]. Lyon: International Agency for Research on Cancer. Available from: <https://monographs.iarc.who.int/agents-classified-by-the-iarc/>
- ⁶ World Cancer Research Fund. Interactive Cancer Risk Matrix [Internet]. London: World Cancer Research Fund. Available from: <https://www.wcrf.org/research-policy/interactive-cancer-risk-matrix>
- ⁷ Department of Health. Health survey Northern Ireland: first results 2024/25 . Available from <https://www.health-ni.gov.uk/publications/health-survey-northern-ireland-first-results-202425>. Accessed September 2026.
- ⁸ Le TT, Mendez D, Warner KE. The benefits of quitting smoking at different ages. *Am J Prev Med*. 2024 Nov;67(5):684–688. doi: 10.1016/j.amepre.2024.06.020. Available from: <https://pubmed.ncbi.nlm.nih.gov/38936681/>
- ⁹ Yin W, Lin Z, Gong WJ, Wang WX, Zhu YY, Fu YL, et al. Smoking cessation is a protective factor for lung cancer onset and mortality: a population-based prospective cohort study. *BMC Cancer*. 2025 Jan 15;25(1):86. doi:10.1186/s12885-025-13475-8. Available from: <https://pubmed.ncbi.nlm.nih.gov/39815190/>
- ¹⁰ Cho ER, Brill IK, Gram IT, Brown PE, Jha P. Smoking cessation and short- and longer-term mortality: meta-analysis of four national cohorts. *N Engl J Med Evid*. 2024;3(3):EVIDo2300272. doi: 10.1056/EVIDo2300272. Available from: <https://evidence.nejm.org/doi/10.1056/EVIDo2300272>
- ¹¹ Langselius O, Rumgay H, de Vries E, Whiteman DC, Jemal A, Parkin DM, et al. Global burden of cutaneous melanoma incidence attributable to ultraviolet radiation in 2022. *Int J Cancer*. 2025 Sep 15;157(6):1110–1119. doi: 10.1002/ijc.35463. Epub 2025 May 27. Available from: <https://pubmed.ncbi.nlm.nih.gov/40421619>
- ¹² Karponis D, van Bodegraven B, Mistry K, Nikolaou V, Stratigos AJ, Levell NJ, et al. Incidence and mortality of melanoma in situ and malignant melanoma in England between 2001 and

2020. Br J Dermatol. 2025 Sep 18;193(4):687–695. doi: 10.1093/bjd/ljaf136. Available from: <https://pubmed.ncbi.nlm.nih.gov/40228809>

¹³ Bjørch MF, Gram EG, Brodersen JB. Overdiagnosis in malignant melanoma: a scoping review. BMJ Evid Based Med. 2024 Jan 19;29(1):17–28. doi: 10.1136/bmjebm-2023-112341. Available from <https://pubmed.ncbi.nlm.nih.gov/37793786/>.