Cancer in the UK:

Deprivation and cancer inequalities in Scotland

cruk.org

Together we will beat cancer

CANCER RESEARCH UK

Foreword

This landmark report offers the first comprehensive picture of deprivation and cancer in Scotland, setting out in detail the stark inequalities in health and cancer across the country.

Cancer inequalities – unfair, avoidable and systemic differences between population groups – are present at every stage of the cancer pathway, including the prevalence of cancer risk factors, screening uptake and barriers to seeking help. Together, these factors contribute to stark differences in cancer incidence and outcomes between the most and least deprived populations across Scotland. It is unacceptable that today, cancer-related deaths are 74% higher in the most deprived population than the least deprived in Scotland.

Scotland has the highest proportion of cancers attributable to preventable risk factors in the UK, with smoking alone responsible for nearly one in five cancer cases. Smoking and excess weight, the two biggest causes of cancer, remain persistently high among Scotland's more deprived populations, which leads to a higher incidence of cancer amongst these groups. We need bold government action that enables all people to live healthier lives if we are to reduce cancer inequalities.

We also must act to ensure everyone has the best chance of their cancer being diagnosed at the earliest stages, when their chances of survival are better. Right now, people from more deprived populations are much less likely to take up their invite for cancer screening, are less likely to know whether some symptoms are a sign of cancer and face greater barriers to seeking help for potential cancer symptoms.

There is also evidence that access to timely cancer care across Scotland's NHS is not equal. All Health Boards are failing to meet the target for 95% of patients beginning treatment within 62 days of an urgent suspected cancer referral. Throughout 2021, there was a 40% difference in performance between the best and worst performing Health Boards – with challenges heightened by regional variation in diagnostic workforce capacity. We need to further understand what role deprivation plays in driving these geographical differences.

Our ability to understand and tackle cancer inequalities is dependent on access to high-quality data. The evidence available to us today clearly highlights that more deprived groups in Scotland face greater barriers to good health and experience unacceptable inequalities in cancer outcomes. While there is more to understand, action is required immediately.

The Scottish Government is developing a new cancer strategy, which aims to slow the rate of increase in cancer incidence and improve cancer outcomes over the next decade to 2033. I'm pleased that reducing cancer inequalities has been identified as a goal. This report from Cancer Research UK highlights key inequalities across the cancer pathway and where we need to make changes – reducing preventable causes of cancer, taking bold action to diagnose cancers earlier, ensuring equitable access to optimal treatments and improving the quality and availability of data.

The new cancer strategy is a once-in-a-generation opportunity which must be seized. Now is the time to go further, faster and ensure that beating cancer means beating cancer for everyone.

Michelle Mitchell OBE
Chief Executive, Cancer Research UK

Contents

Our ability to understand and tackle cancer inequalities is heavily dependent on the quality of data we have. Much of the evidence in this report uses data that has been provided by patients and collected by the health service as part of their care and support. The data is collated, maintained and quality assured by different organisations, including the Scottish Cancer Registry, which is managed by Public Health Scotland.

Compiled by the Cancer Intelligence team, Cancer Research UK; November 2022

Comments, questions or feedback to stats.team@cancer.org.uk

Introduction

Health inequalities are unfair, avoidable and systemic differences in health between different groups within society (1). They exist due to differences between groups in age, sex, ethnicity, disability status, gender identity, sexual orientation and social and cultural factors. Differences in these wider determinants lead to differences in money, power and resources, which can impact behaviours that improve health and the accessibility of health care. The COVID-19 pandemic has highlighted and exacerbated the pre-existing health inequalities experienced by those living in the most deprived areas (2,3).

People's identities, and the circumstances that shape their behaviours and experiences, are complex. Many people will belong to multiple demographic groups, and this may mean they face numerous barriers to good health, resulting in health inequalities. These barriers in turn are related to and reshape one another. Comparing groups through the lens of one factor helps to understand the scale of inequalities. However, we need to acknowledge that this can obscure the extent and experience of the inequalities faced by people that belong to more than one disadvantaged group.

The focus of this report is inequalities in relation to deprivation across the cancer pathway in Scotland. Deprivation encompasses a wide range of different factors, including income, employment, education, health, access to services, crime and housing (4). It is one of the most influential factors in driving differences in cancer incidence, diagnosis and outcomes in the UK. While it is just one aspect of the wider determinants of health, it is connected to many other factors that influence health.

The scale of deprivation is often quantified using a relative measure called the Scottish Index of Multiple Deprivation (SIMD), which is used throughout this report, except where stated otherwise. Data breakdowns by deprivation level are not available for certain measures included in this report. We know that deprivation contributes to differences in performance between regions, so in the absence of deprivation data, we have looked at geographical variation.

This report first looks at levels of deprivation across Scotland and how deprivation can have an impact on cancer incidence and outcomes. It then focuses on three key areas – prevention, early diagnosis and treatment – to demonstrate the impact that deprivation has on the cancer pathway and make recommendations for change.

We are already seeing lower levels of cancer risk factors, better engagement with the health system and improved outcomes for some people in Scotland, but not all. We need to make sure we push to achieve this for everyone and close the gap, because beating cancer must mean beating it for everyone.

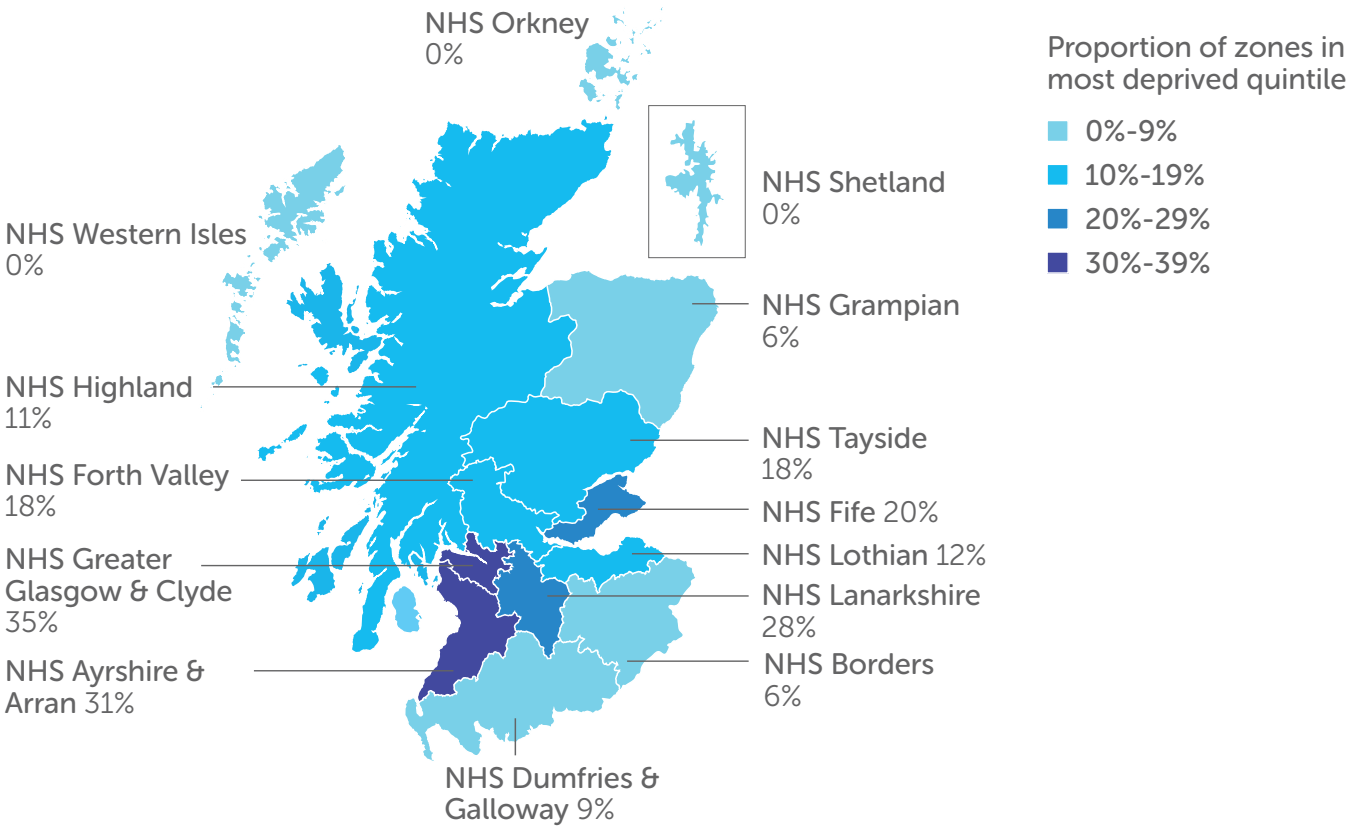
Overview

Deprivation levels vary across Scotland

NHS Health Boards in Scotland are made up of 'zones'. Each zone is ranked by level of deprivation, which is used to assign the zone to one of five groups – or 'quintiles' – with an increasing level of deprivation between each quintile. However, a zone in the least deprived quintile can still have people facing high levels of deprivation living in that zone (4,5).

There is large variation between Health Boards in the proportion of zones they contain that are in the most deprived quintile, ranging from 0% to 35% (4). Many of the most and least deprived zones in Scotland are in urban areas. The Greater Glasgow & Clyde and Ayrshire & Arran Health Boards contain the highest proportion of the most deprived zones (35% and 31%, respectively), but also 19% and 13% of the least deprived zones, respectively (4). The Western Isles, Orkney and Shetland Health Boards do not contain any of the most deprived zones (4). However, in rural areas, transport and distance to employment and services (including GPs and hospitals) can act as barriers to good health (4).

Scottish Health Boards, by proportion of zones that are in the most deprived quintile, 2020



Deprivation-related differences in cancer incidence, mortality and survival in Scotland

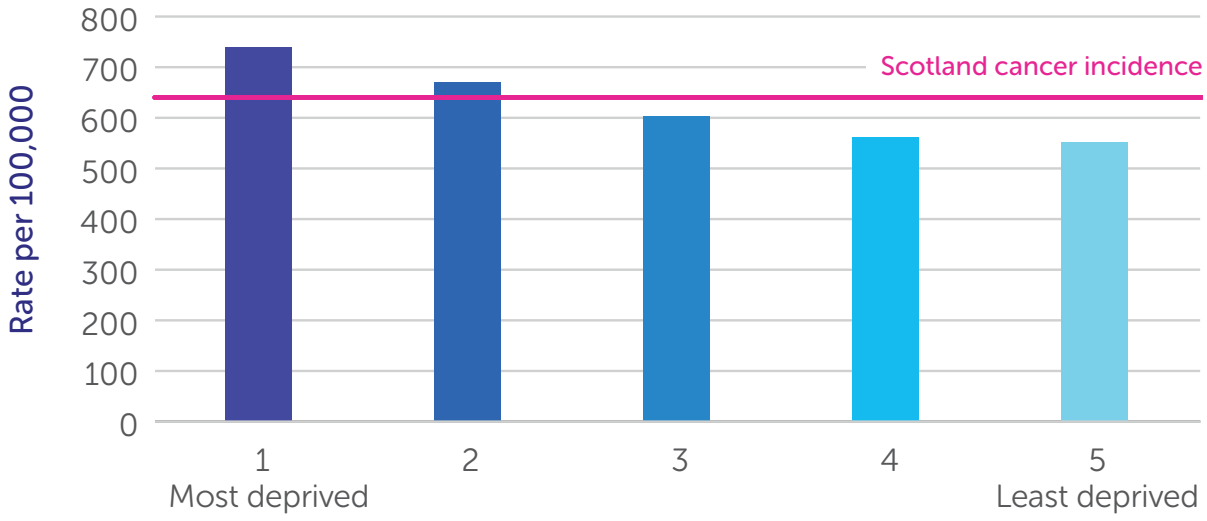
Cases	Deaths	Survival
4,900	+74%	Lower
Extra cancer cases each year due to deprivation	Higher cancer mortality in more deprived groups	Lower 1- and 5-year survival in more deprived groups

Cancer incidence is higher for more deprived populations

Cancer is more common in more deprived populations in Scotland. Cancer incidence rates including the COVID-19 period in the most deprived group in Scotland are 33% higher than in the least deprived (6); this deprivation gap is comparable to the pre-pandemic period, which is shown in the figure below.

It is estimated that there are around 4,900 extra cancer cases each year in Scotland attributable to deprivation (7). That's more than 13 extra new diagnoses per day that could be avoided if the rates of cancer in sites where it is higher for the most deprived were the same rates as for the least deprived. Lung cancer contributes nearly half of these extra cases, with 2,400 extra cases linked to lung cancer being more common in more deprived populations.

Age-standardised cancer incidence rates by deprivation, Scotland, 2015-2019



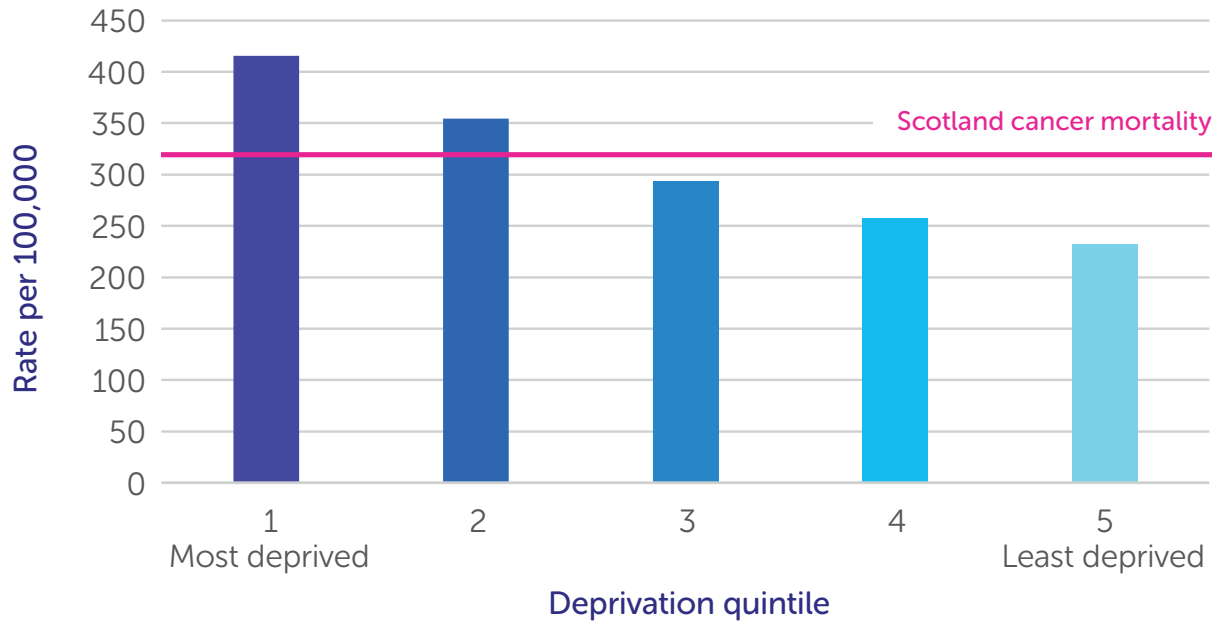
Cancer is more common in more deprived areas in Scotland. This is due, in part, to inequalities in risk factors such as smoking and obesity. Bold action on cancer prevention, targeted to more deprived areas, could help to reduce these inequalities.

Cancer outcomes are worse for more deprived populations

There are more cancer deaths in more deprived populations than less deprived. In Scotland, cancer mortality rates that include the COVID-19 period are 74% higher in the most deprived populations compared to the least deprived (6).

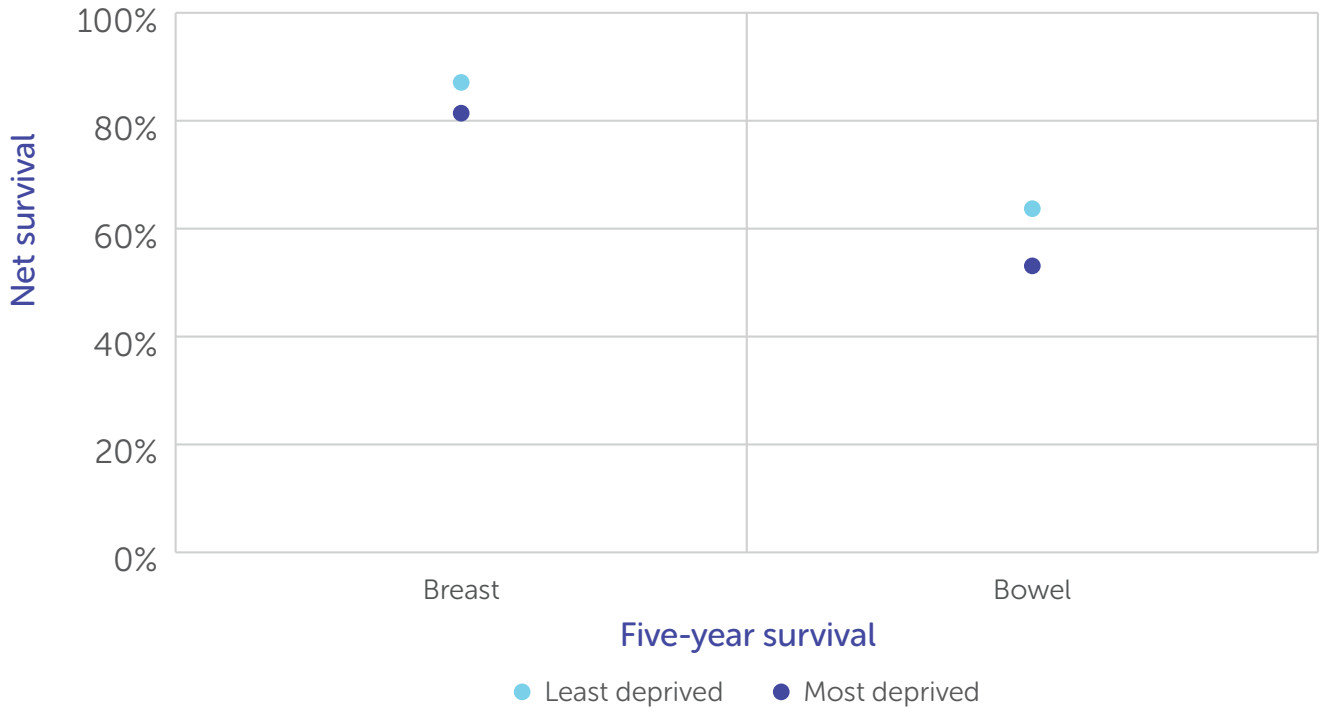
Trends shown below for the pre-pandemic period are broadly in line with this but demonstrate a slightly wider deprivation gap. The deprivation gap in cancer mortality appears to have slightly reduced over the COVID-19 period, which may be because people from more deprived areas were more likely to die from COVID-19 than those in less deprived areas.

Age-standardised cancer mortality rates by deprivation, Scotland, 2015-2019



More deprived groups also have worse cancer survival compared to the least deprived (8), which is reflective of the many barriers across the cancer pathway. For example, for bowel cancer, five-year survival rates are 10 percentage points lower in the most deprived group compared to the least deprived.

Five-year age-standardised net survival by deprivation, Scotland, 2013-2017



Cancer Research UK wants to accelerate progress and see 3 in 4 people surviving their cancer by 2034 – but we must work together to ensure improvements are made for everyone. There is much further still to go in closing the gap in survival between the most and least deprived groups, and this requires focus across the entire cancer pathway.

Prevention

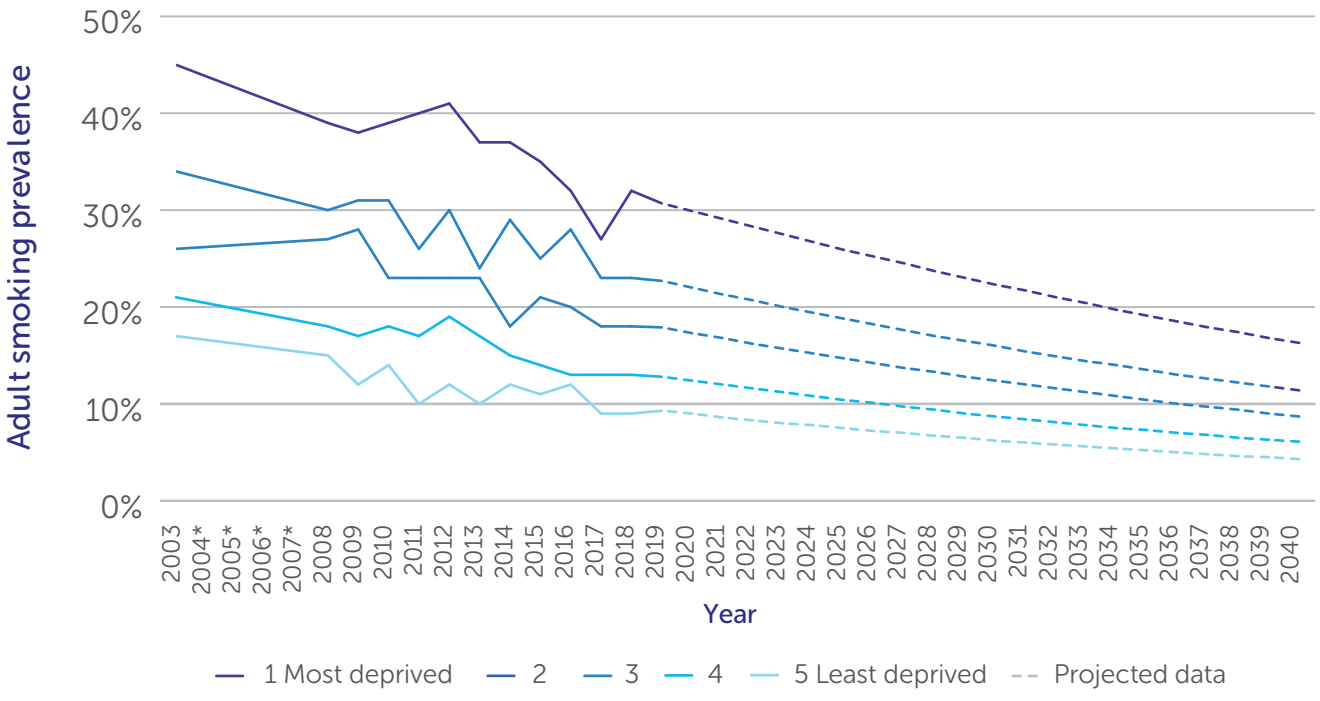
Smoking is more common in the most deprived populations

Smoking is the biggest cause of cancer in Scotland, being responsible for nearly 1 in 5 cases (9). Smoking prevalence has been falling across Scotland, mainly due to policies that discourage smoking, including advertising bans, standardised packaging and smoke-free zones (10). However, smoking rates in the most deprived populations have consistently been much higher than in the least deprived (11).

A 'tobacco-free' target of less than 5% of adults smoking by 2034 has been set in Scotland (12). This target will not be met without sustained efforts to reduce smoking in more deprived groups. In 2019, 32% of people in the most deprived quintile smoked, compared to 6% in the least deprived (13). Projections indicate smoking prevalence will still be 20% in 2034 for the most deprived groups, far short of the tobacco-free target.

Unless bold action is taken, smoking prevalence for the most deprived groups may not reach even 10% in the next 25 years. These differences will manifest in a higher risk of getting and dying from cancer for many decades to come.

Rates of smoking by deprivation for adults, Scotland, 2003-2018, projected to 2040



* Smoking prevalence data by deprivation quintile not available for 2004-2007

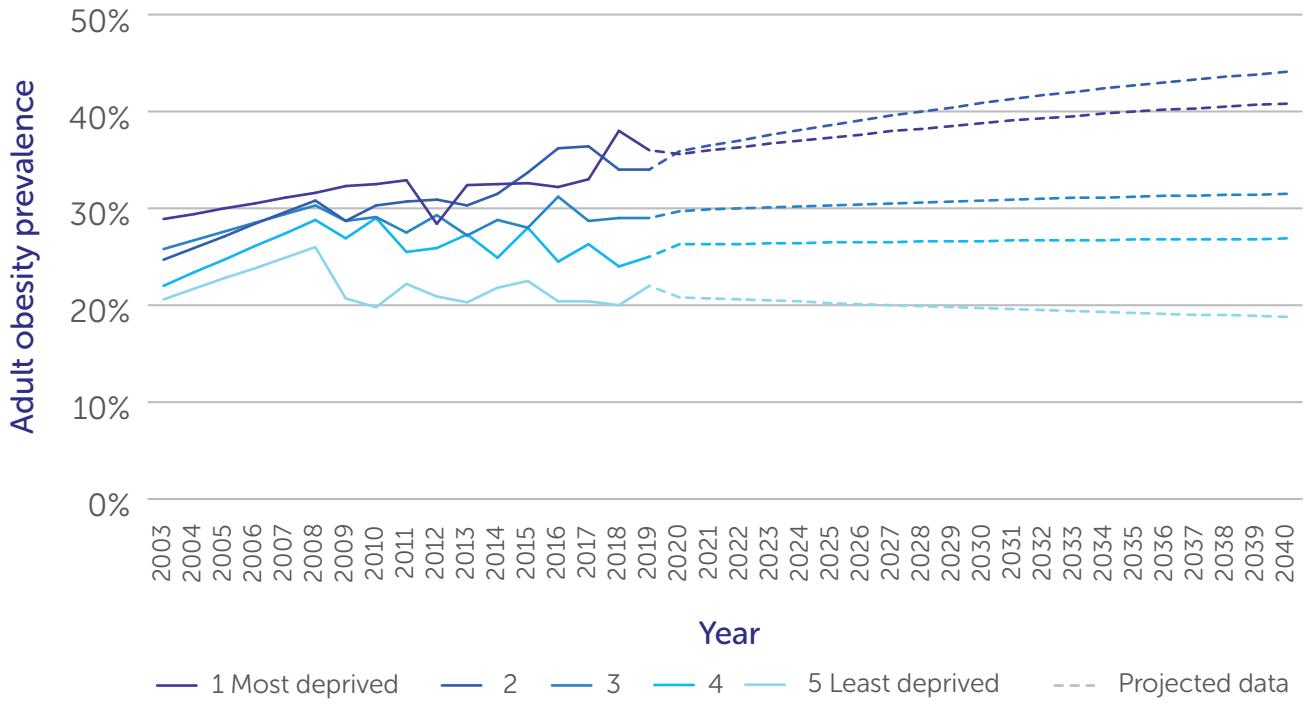
The Scottish Government must ensure that its next tobacco strategy includes bold measures to reduce smoking and inequalities. We need more government action to ensure young people don't start smoking, and more funding for the measures and services needed to help people quit. A Smokefree Fund – making the tobacco industry pay for the harm it causes, but without their influence on how the money is spent – is needed. We encourage the Scottish Government to work with the UK Government to make this happen.

Obesity is more common in children and adults from more deprived populations

Overweight and obesity is the second biggest risk factor for cancer in Scotland after smoking, with nearly 7% of cancer cases each year in Scotland caused by excess weight (9). Adults from the most deprived populations are more likely to be obese than those from the least deprived populations (13). Current projections indicate that the adult obesity prevalence is likely to decrease from 22% in 2019 to 19% by 2040 for the least deprived quintile but increase from 36% to 41% over the same time period for the most deprived (14).

Obesity rates in Scotland are twice as high among children living in the most deprived areas compared with those in the least deprived. Over the last 20 years, the proportion of children who are overweight or obese has increased for the most deprived and decreased for the least deprived. This could lead to a greater burden of cancer amongst more deprived groups in the future.

Obesity (BMI 30+) prevalence by deprivation for adults, Scotland, 2003-2019, projected to 2040



Reducing obesity levels requires a comprehensive approach that addresses its environmental causes, improves the availability of healthy food and drink options, empowers people to make and maintain healthier habits and provides evidence-based interventions to those who need it. The Scottish Government must fully implement the measures outlined in its obesity strategy, including the forthcoming legislation restricting price promotion offers on unhealthy food and drink.

Early diagnosis

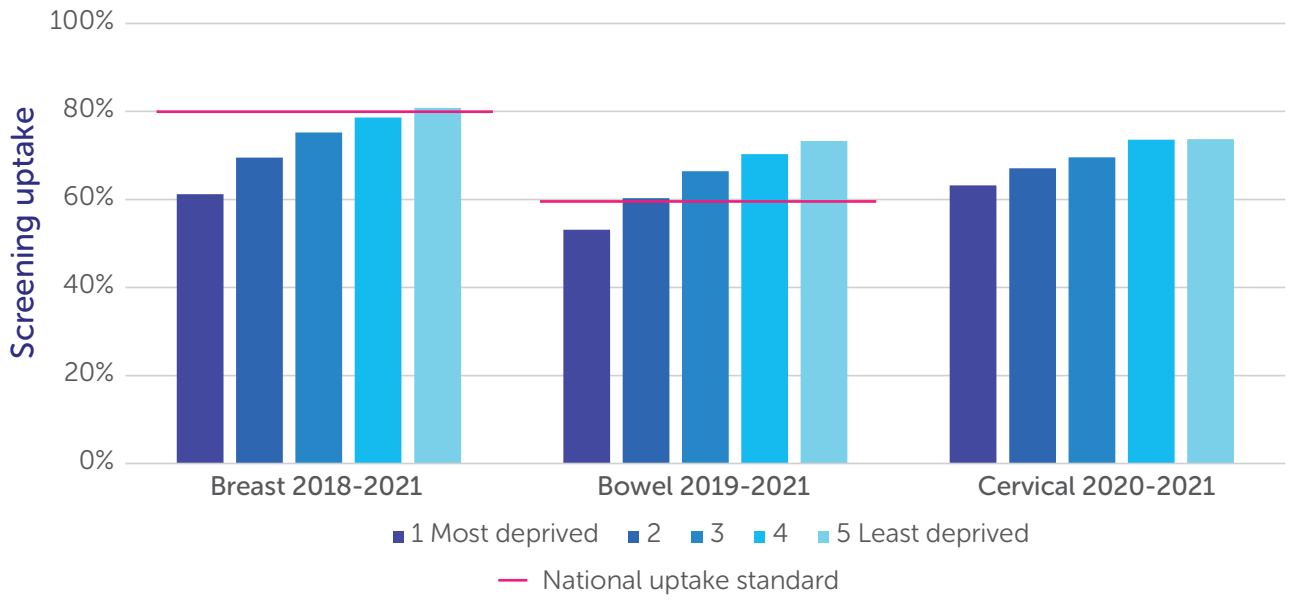
Screening uptake is lower in more deprived populations

Cancer screening can help prevent cancers developing, as well as detect cancers at an early stage when treatment is more likely to be successful. Around 7% of all cancer cases in Scotland are detected through the breast, bowel and cervical screening programmes (15). However, there is a large discrepancy in the uptake of screening invitations between more and less deprived groups.

For both breast and bowel screening, uptake is 20 percentage points lower in the most deprived populations compared to the least deprived (16,17). A similar trend is seen for cervical screening, with a difference of 11 percentage points between the most and least deprived groups (18).

The introduction of a new faecal immunochemical test (FIT) for bowel screening in November 2017 led to an overall increase in screening uptake (19,20), but major variation in uptake still exists between the most and least deprived groups. There is still more work required to eradicate this inequality and address the barriers people face in taking up screening, so that we can tackle variation in breast, bowel and cervical cancer screening.

Screening programme uptake by deprivation, Scotland



Note: The acceptable uptake standard for the Scottish Breast Screening Programme is 70% and the achievable standard is 80%

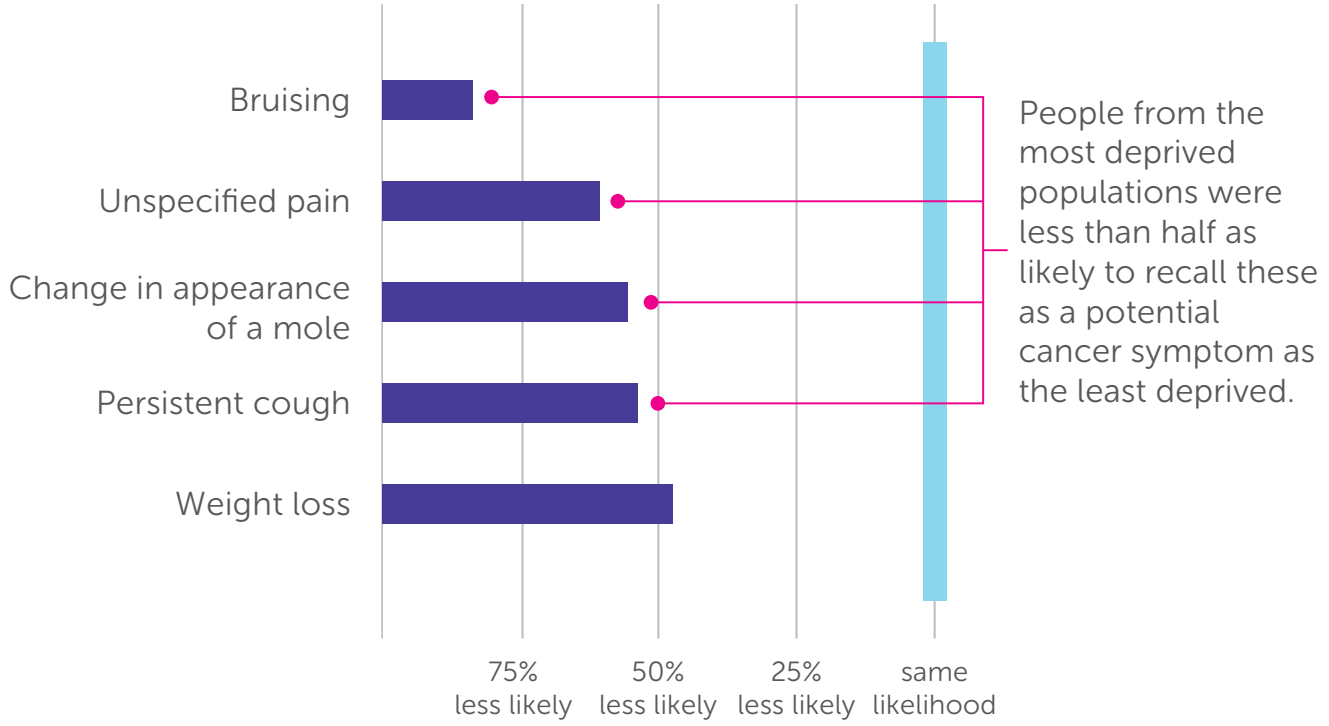
Participating in cancer screening is an individual choice, but it must be a choice that is equally accessible to all. Efforts to improve screening uptake should address the barriers that different groups face. We welcome targeted efforts to reduce inequalities in existing cancer screening programmes. Furthermore, where new cancer screening programmes are introduced in future – for example, a targeted lung screening programme as recently recommended by the UK National Screening Committee – ensuring equitable access must be a core part of implementation planning.

Awareness of signs and symptoms of cancer is lower among more deprived populations

Patients diagnosed at an early stage have higher survival (21). Early diagnosis can mean that more treatment options are available and that treatment is more likely to be successful. Identifying symptoms that could indicate cancer is one of the many factors that could support earlier diagnosis.

People in 'routine and manual' occupations (used as a proxy for more deprived groups (22)) in Scotland are less likely to recall some signs and symptoms of cancer than those in 'managerial and professional' occupations (proxy for less deprived groups) (23). When unprompted, people from the most deprived groups were less than half as likely to identify 'bruising', 'pain', 'change in appearance of a mole' and 'persistent cough' as potential symptoms for cancer.

Unprompted awareness of cancer symptoms in the most deprived groups compared to the least deprived, Scotland, September 2021



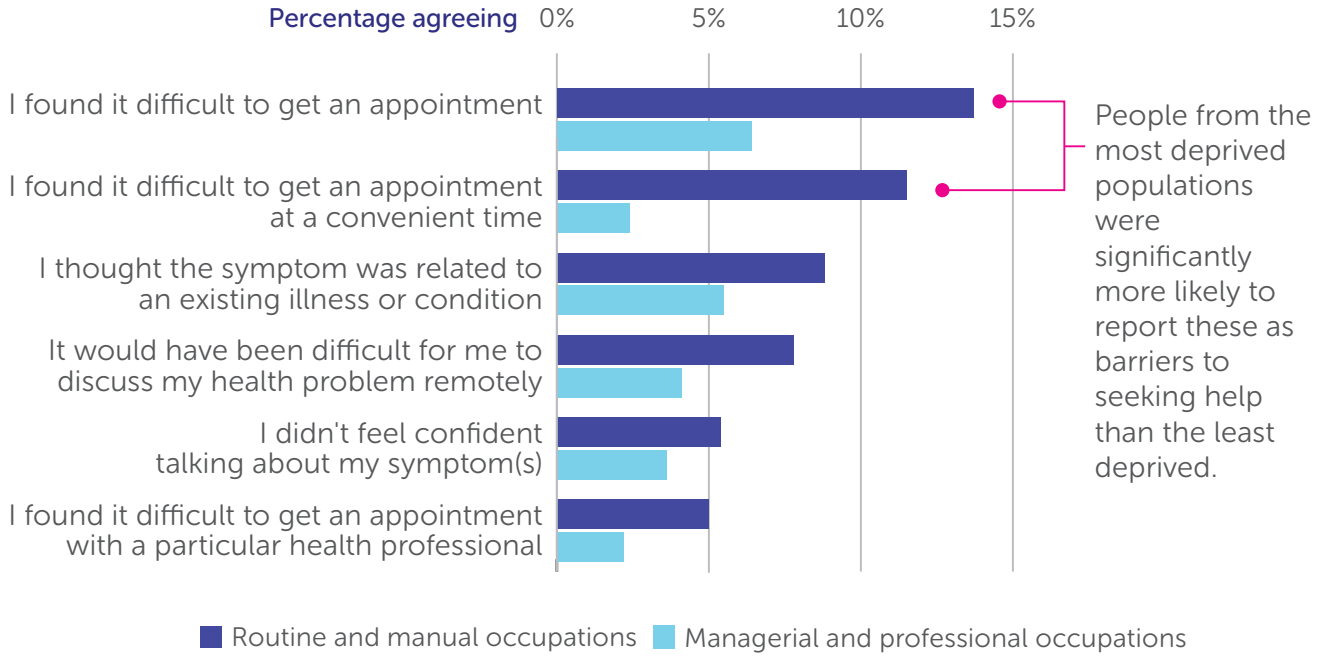
It is important to encourage everyone to seek help, and to tackle the barriers people face to doing so. Building on existing positive work, targeted campaigns, activities and information need to be accessible, engaging and relevant to those most at risk of developing and dying from cancer. This requires evidence-based interventions that are designed for and with specific communities, including robust evaluation.

More deprived groups report more barriers to seeking help

There are many reasons why people delay or feel put off from seeking help. In Scotland, those in 'routine and manual' occupations (proxy for more deprived groups) experience more barriers to seeking help compared to those in 'managerial and professional' occupations (proxy for less deprived groups) (24).

People in routine and manual occupations are more likely to report delaying or being put off going to the doctor than those in managerial and professional occupations. They are also more likely to mention facing difficulty getting an appointment with a doctor, thinking the symptom was related to an existing condition, having difficulty discussing the problem remotely (via email, phone or video call) and not feeling confident talking about symptoms.

Proportion citing barriers to seeking help by occupation group, Scotland, February 2022



It is crucial that everyone is able to get timely access to health services that are right for them and feels comfortable doing so. We must do more to address the barriers that people face accessing care and ensure that no one is left behind as innovations such as remote consultations are introduced to the NHS, with each patient offered the most appropriate appointment for them. We cannot rely on awareness alone to encourage people to seek help, we also need to tackle the main barriers to speaking with a health professional.

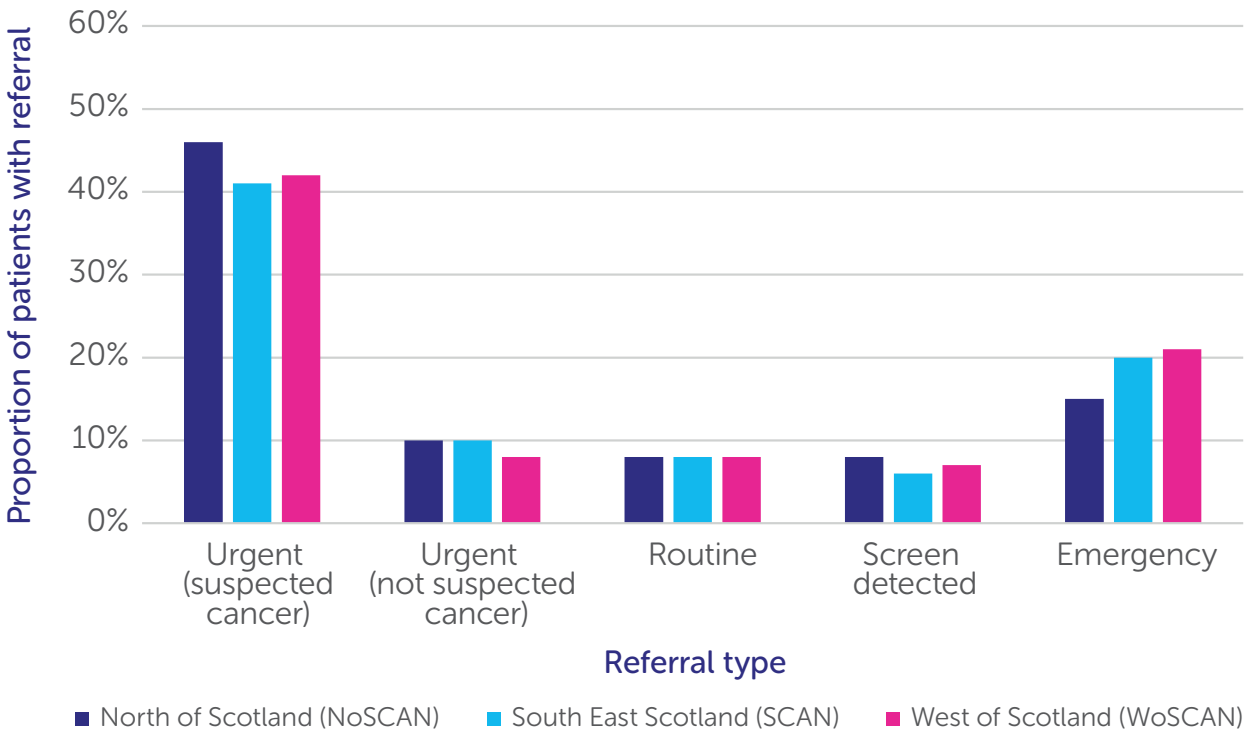
More deprived populations are more likely to be diagnosed following an emergency referral

People diagnosed through an emergency presentation are more likely to have poor survival, even when accounting for the fact that they are more likely to be diagnosed at a late stage (25). Nearly 1 in 5 people with cancer in Scotland are diagnosed through emergency referral routes (15).

While no data on emergency referrals by deprivation level are available in Scotland, data from other countries suggest that the most deprived populations are 50% more likely to be diagnosed through an emergency presentation route compared to the least deprived (26).

In Scotland, there is some evidence of differences in types of referral between cancer networks (15). In the North of Scotland Cancer Network, where 1 in 10 zones are the most deprived, 15% of patients were diagnosed through an emergency referral. In the West of Scotland Cancer Network, where nearly 1 in 3 zones are the most deprived, 21% of patients were diagnosed through an emergency referral. We need a better understanding of the factors that may contribute to variation in emergency referrals in Scotland, including the role that deprivation plays in geographical differences.

Type of cancer referral by Regional Cancer Network, Scotland, October 2018-September 2019



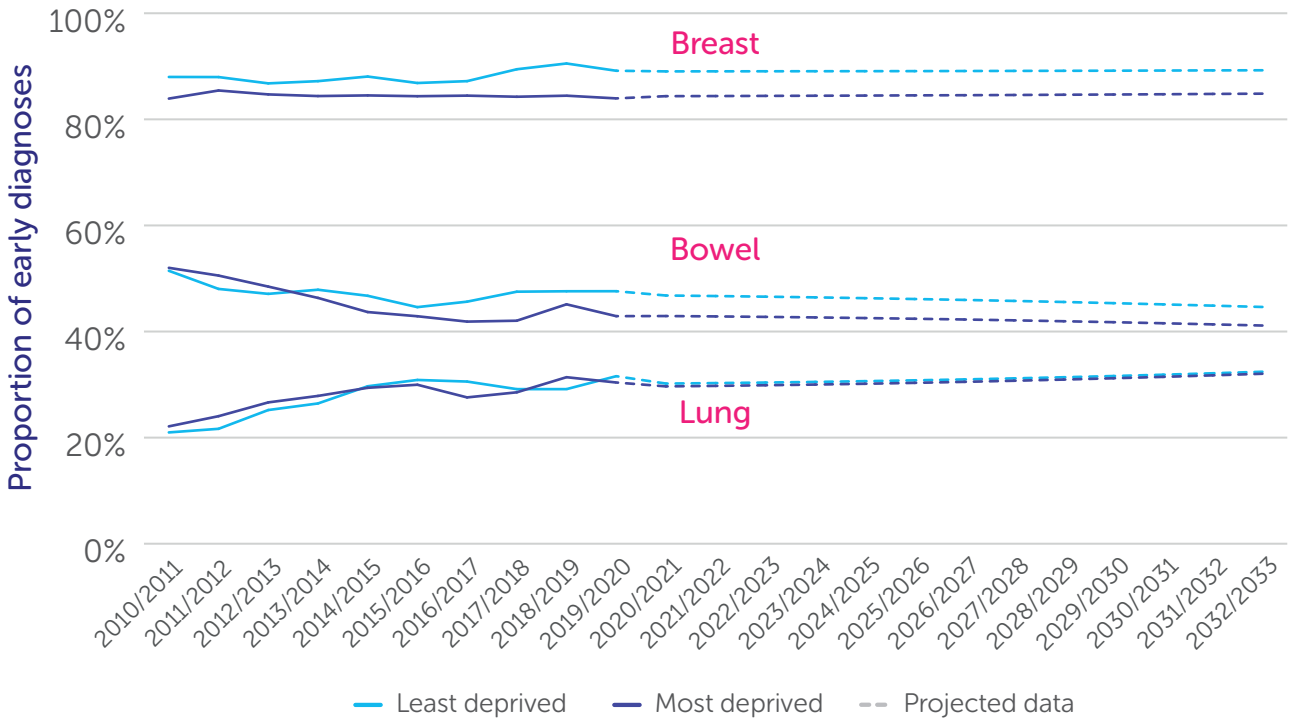
We need better data to understand deprivation differences in cancer referrals so that we can take appropriate action to reduce inequalities in emergency referrals. The introduction of Rapid Cancer Diagnostic Services is welcome, but we need to ensure it is accessible to everyone. Removing barriers to seeking help, supporting primary care to recognise and refer patients in a timely way and providing prompt access to a specialist could help to ensure that fewer patients are diagnosed as an emergency.

More deprived populations are diagnosed at a later stage for some cancer sites

Patients diagnosed with cancer at an early stage are more likely to survive their disease for longer (27). However, people from more deprived populations are more likely to be diagnosed with advanced stage disease for some cancers (28). This contributes to poorer survival for people from more deprived areas.

Staging data by deprivation is available for breast, bowel and lung cancers in Scotland (29). The difference in the proportion of people diagnosed early between the most and least deprived populations is largest for breast and bowel cancers, with these showing around a 4–5 percentage point difference between the most and least deprived quintiles. Cancer Research UK projections estimate that this difference will remain the same by 2032 if no further action is taken to improve early diagnoses (30). The available data is limited, therefore these estimates are provisional and should be interpreted cautiously, but they demonstrate the scale of the challenge over the next 10 years.

Proportion of early diagnoses (stages 1 and 2), Scotland, 2010-2020, projected to 2032



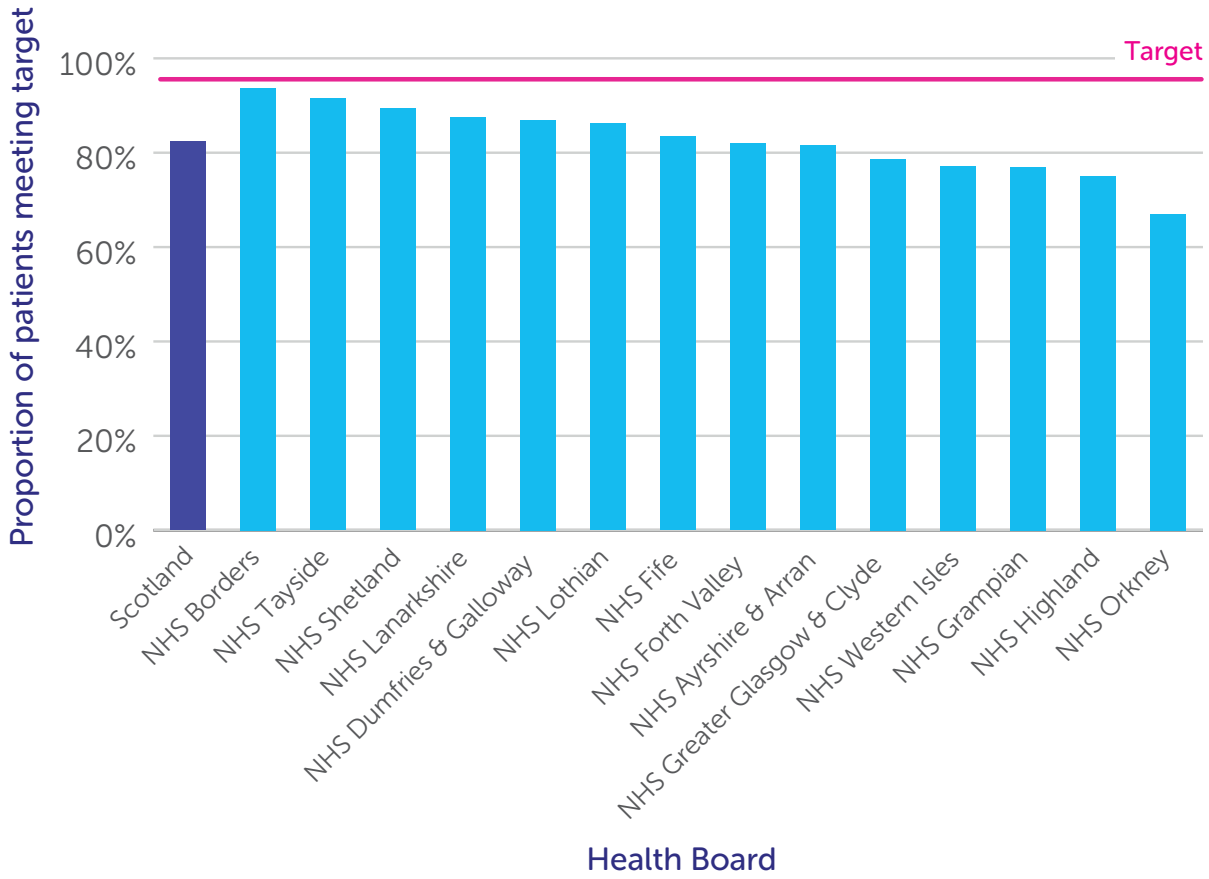
Improving earlier diagnosis is a complex problem that requires action on all fronts, including action to address the unacceptable variation in late-stage diagnosis between different groups, which can lead to poorer outcomes for people from more deprived populations. Removing barriers to screening and seeking help, and ensuring sufficient staff and resources to conduct timely and appropriate diagnostic tests, are key.

Cancer waiting times performance is declining; variation between deprivation groups needs to be fully understood

NHS Scotland has two targets for cancer waiting times. One of these is that at least 95% of eligible patients wait no more than 62 days from an urgent suspected cancer referral to begin treatment. The target has not been met since 2012 and performance has been steadily declining (31).

There is no data available on differences in cancer waiting times by deprivation level. There is, however, data showing large variation between Health Boards. In 2021, performance against the 62-day target ranged between 67% and 94%. There is also regional variation in the diagnostics workforce: the North of Scotland has 6.4 clinical radiology oncologists and speciality trainees per 100,000 people compared to 10 and 10.2 per 100,000 people in South East and South West Scotland, respectively (32).

62-day target performance by Health Board for all cancers combined, Scotland, 2021



The Scottish Government must invest to expand capacity across NHS cancer services and, in particular, ensure long-term funding for workforce education and training for key cancer specialties. This investment should be particularly targeted to tackle regional variation in the cancer workforce. This would help ensure that patients have equitable access to timely, high quality care, irrespective of where they live.

Treatment

The impact of deprivation on cancer treatment activity is unclear

Currently, there is no routinely reported data on the cancer treatment people in Scotland receive that provides breakdown by deprivation level. We know that there is variation in the treatment received between more and less deprived populations for different cancer types in other countries (33), but it is unclear whether similar variation is seen in Scotland. It is important to understand whether this is the case and if so, what is driving this variation and what impact it has on cancer outcomes.

Barriers to accessing treatment, such as people living at a distance from treatment centres, are likely to be a significant factor in deprivation-related differences in treatment. Some patients have reportedly chosen, or have been prescribed, treatment modes that are less optimal to avoid having to travel (34). Travel times to treatment centres may also delay some patients from starting treatment. For more deprived groups living in rural areas without easy access to treatment centres, this could worsen any potential inequalities in treatment activity between more and less deprived groups.

Patients also face a number of barriers when accessing clinical trials, which disproportionately impact certain groups. The barriers can include frequent travel, which can deter patients with disabilities, and healthcare professionals discounting elderly and disabled patients as research participants despite them being eligible. This subsequently leads to some groups being under-represented in cancer research. This in turn exacerbates health inequalities because clinical trials are an important way of accessing treatment for rare cancers, and because future treatments aren't tested on diverse patient groups (35).

Health systems must collect high-quality data covering treatment intent, performance status, comorbidities and patient demographics, including deprivation. This will help us to develop a better understanding of where variation in treatment may be unwarranted and based on assumptions about a patient's health and suitability for treatment, rather than each patient's individual eligibility and wishes.

> **All patients should be offered optimal treatment for their disease, based on clinical advice and patient choice. Further work is needed to assess variation in treatment by deprivation in Scotland and the factors that may be driving it. The Scottish Government should also commit to monitoring who is participating in clinical trials in Scotland to understand where targeted action is needed to improve access.**

Beating cancer for everyone in Scotland

This report highlights that more deprived groups face significant barriers to good health across the cancer pathway, creating unacceptable inequalities in cancer incidence and outcomes. However, these inequalities are not inevitable. In order to achieve progress for everyone, we must work together across health organisations, governments, communities and charities.

It is crucial that no one is left behind in our shared mission to beat cancer. This will require a comprehensive approach across several priority areas.

Firstly, the Scottish Government and NHS must fund and roll out interventions that tackle the known drivers of inequalities. This includes smoking and obesity, which are cancer risk factors that disproportionately affect more deprived populations Smoking prevalence must be reduced, alongside ensuring that young people don't start smoking. Additionally, we need a comprehensive approach to reducing obesity levels, such as improving the availability of healthy food options and implementing measures to restrict price promotion offers on unhealthy food and drink contained in the Scottish Government's 2022-2023 Programme for Government (36).

Secondly, we must take bold action to diagnose cancers earlier and ensure everyone has access to the right treatments for them. This starts with removing barriers to seeking help for all groups, enabling people to get timely access to health services, including screening. The Scottish Government must expand capacity across NHS cancer services, with particular focus on regional variations in the cancer workforce. Furthermore, efforts to tackle inequalities should be a core element of the framework for driving and measuring system performance; a focus on national targets should not obscure variation between groups and regions.

Thirdly, we must build a much stronger understanding of where inequalities exist and what is driving them through strengthening data collection, infrastructure and access. Evidence for cancer and deprivation is not currently available across the entire pathway for Scotland. Data should be routinely collected on patient characteristics, including age, gender, ethnicity, sexuality and deprivation, and published by Public Health Scotland in a timely and accessible manner, aggregating data where needed to protect patient confidentiality.

The Scottish Government must commit to providing timely, high-quality, transparent and integrated data to enable a better understanding of the cancer landscape in Scotland, particularly where unwarranted variation exists. Without this, it will not be possible to develop targeted and tailored interventions that reduce inequalities nor meaningfully measure their success over the coming years. Robust evaluation and data will also be important when adopting new technologies – ensuring these are implemented to improve rather than worsen existing cancer inequalities.

This report sets out priority areas and some proposed actions. However, we must continue to review new evidence and engage with more deprived communities across Scotland to ensure we continue to develop targeted interventions with and for these communities. The Scottish Government has set out to take bold actions to diagnose more cancers earlier, offer the best treatments and improve cancer outcomes – tackling inequalities must be the core component connecting these, because beating cancer has to mean beating it for everyone in Scotland.

Together we will beat cancer.

References

1. The King's Fund. **What are health inequalities?.** 2022. https://www.kingsfund.org.uk/publications/what-are-health-inequalities
2. British Medical Association. **The impact of the pandemic on population health and health inequalities.** 2022 Jul. https://www.bma.org.uk/advice-and-support/covid-19/what-the-bma-is-doing/the-impact-of-the-pandemic-on-population-health-and-health-inequalities
3. The Health Foundation. **The continuing impact of COVID-19 on health and inequalities.** 2022. https://www.health.org.uk/publications/long-reads/the-continuing-impact-of-covid-19-on-health-and-inequalities
4. Deprivation in Scotland is defined using the Scottish Index of Multiple Deprivation (SIMD). The SIMD combines more than 30 indicators of deprivation across multiple domains: income, employment, education, health, access to services, crime and housing. Scotland is split into nearly 7000 data zones with roughly equal populations; the seven domains are combined into one index, with all the data zones in Scotland ranked in terms of deprivation. Scottish Government. **The Scottish Index of Multiple Deprivation**. 2020. http://www.gov.scot/publications/scottish-index-multiple-deprivation-2020/
5. Scottish Government. **Scottish Index of Multiple Deprivation 2020**. http://simd.scot/
6. Public Health Scotland. **Cancer mortality in Scotland - Annual update to 2021.** 2022 Oct. https://publichealthscotland.scot/publications/cancer-mortality/cancer-mortality-in-scotland-annual-update-to-2021/
7. Calculated by the Cancer Intelligence team at Cancer Research UK, August 2022 using 2015-2019 cancer incidence data from Public Health Scotland. Excess cases were calculated as the sum of cases observed, minus the sum of cases expected if every deprivation quintile had the same age-standardised incidence rates (all ages combined) as the least deprived quintile. Only cancer sites where higher deprivation is significantly associated with greater incidence are included. https://publichealthscotland.scot/publications/cancer-mortality/cancer-mortality-in-scotland-annual-update-to-2020/
8. Public Health Scotland. **Cancer survival statistics - People diagnosed with cancer between 2013 and 2017.** 2021. https://publichealthscotland.scot/publications/cancer-survival-statistics/cancer-survival-statistics-people-diagnosed-with-cancer-between-2013-and-2017/
9. 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;118(8):1130–41.
10. NHS Scotland. **Review of 'Creating a tobacco-free generation: A tobacco control strategy for Scotland'.** 2017. http://www.healthscotland.scot/media/1545/review-of-creating-a-tobacco-free-generation-a-tobacco-control-policy-for-scotland.pdf
11. Cancer Research UK. **Smoking prevalence projections for England, Scotland, Wales, and Northern Ireland, based on data to 2018/19.** 2020 Feb. https://www.cancerresearchuk.org/

sites/default/files/cancer_research_uk_smoking_prevalence_projections_february_2020_final.pdf

12. Scottish Government. **Creating a tobacco-free generation: A tobacco control strategy for Scotland**. 2013. https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2013/03/tobacco-control-strategy-creating-tobacco-free-generation/documents/creating-tobacco-free-generation-tobacco-control-strategy-scotland/creating-tobacco-free-generation-tobacco-control-strategy-scotland/govscot%3Adocument/00417331.pdf

13. Scottish Government. **Scottish Health Survey 2019**. 2020 Sep. http://www.gov.scot/publications/scottish-health-survey-2019-volume-1-main-report/

14. Cancer Research UK. **Overweight and obesity prevalence projections for the UK, England, Scotland, Wales, and Northern Ireland, based on data to 2019/20**. 2022 May. https://www.cancerresearchuk.org/sites/default/files/cancer-stats/adult_overweight_and_obesity_prevalence_projections_18-05/adult_overweight_and_obesity_prevalence_projections_18-05.pdf

15. Emergency referrals include patient self-referral to A&E/hospital, and patient referral to A&E/hospital with or without prior GP consultation. Public Health Scotland. **National Cancer Diagnosis Audit: Summary information from an audit of patients diagnosed between 1 October 2018 and 30 September 2019**. 2021. https://publichealthscotland.scot/media/8583/2021-08-03_ncda-2019-20_report.pdf

16. Public Health Scotland. **Scottish Breast Screening Programme Statistics: Annual update to 31 March 2021**. 2022 Apr. https://publichealthscotland.scot/publications/scottish-breast-screening-programme-statistics/scottish-breast-screening-programme-statistics-annual-update-to-31-march-2021/

17. Public Health Scotland. **Scottish Bowel Screening Programme Statistics: For the period of invitations from May 2019 to April 2021**. 2022 Feb. https://publichealthscotland.scot/publications/scottish-bowel-screening-programme-statistics/scottish-bowel-screening-programme-statistics-for-the-period-of-invitations-from-may-2019-to-april-2021/

18. Public Health Scotland. **Scottish Cervical Screening Programme Statistics: Annual update to 31 March 2021**. 2021 Oct. https://publichealthscotland.scot/publications/scottish-cervical-screening-programme-statistics/scottish-cervical-screening-programme-statistics-annual-update-to-31-march-2021/

19. Public Health Scotland. **Scottish Bowel Screening Programme Statistics: For the two-year period of invitations between 31 May 2017 and 30 April 2019**. 2020 Feb. https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-bowel-screening-programme-statistics/4-february-2020/

20. Quyn AJ, Fraser CG, Stanners G, Carey FA, Carden C, Shaukat A, et al. **Uptake trends in the Scottish Bowel Screening Programme and the influences of age, sex, and deprivation**. J Med Screen. 2018;25(1):24–31.

21. Scottish Government. Beating cancer: ambition and action. 2016 Mar. https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2016/03/beating-cancer-ambition-action/documents/00496709-pdf/00496709-pdf/govscot%3Adocument/00496709.pdf

22. National Readership Survey. Social Grade. https://www.nrs.co.uk/nrs-print/lifestyle-and-classification-data/social-grade/

23. Cancer Research UK. Cancer Awareness Measure (September 2021) [unpublished survey data]. 2021 Sep. https://doi.org/10.17605/OSF.IO/H2KSV

24. Cancer Research UK. Cancer Awareness Measure (February 2022) [unpublished survey data]. 2022 Feb.

25. Zhou Y, Abel GA, Hamilton W, Pritchard-Jones K, Gross CP, Walter FM, et al. Diagnosis of cancer as an emergency: a critical review of current evidence. Nat Rev Clin Oncol. 2017;14(1):45–56.

26. The Emergency Presentation Route comprises different emergency pathways into secondary care, including A&E attendance, emergency GP referrals to an inpatient setting and emergency admissions to either an inpatient or outpatient setting. GA, Abel GA, Shelton J, Johnson S, Elliss-Brookes L, Lyratzopoulos G. Cancer-specific variation in emergency presentation by sex, age and deprivation across 27 common and rarer cancers. Br J Cancer. 2015;112(1):S129–36.

27. Office for National Statistics. Cancer survival in England - adults diagnosed. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/datasets/cancersurvivalratescancersurvivalinenglandadultsdiagnosed

28. Lyratzopoulos G, Abel GA, Brown CH, Rous BA, Vernon SA, Roland M, et al. Socio-demographic inequalities in stage of cancer diagnosis: evidence from patients with female breast, lung, colon, rectal, prostate, renal, bladder, melanoma, ovarian and endometrial cancer. Ann Oncol. 2013;24(3):843–50.

29. Public Health Scotland. Detect cancer early staging data - Year 9 (1 January 2019 to 31 December 2020). 2021. https://publichealthscotland.scot/publications/detect-cancer-early-staging-data/detect-cancer-early-staging-data-year-9-1-january-2019-to-31-december-2020/

30. Calculated by the Cancer Intelligence team at Cancer Research UK, August 2022 using 2010-2019 cancer incidence data from Public Health Scotland. The graph shows the proportion of cases diagnosed early for breast, bowel and lung cancers as reported from 2010/2011 to 2019/2020, and projected values from 2020/2021 to 2032/2033. Projected values were calculated using a linear regression model with attenuation. The attenuation combines values predicted by the linear model, with the last 3 years observed data, in a weighted average. The weighting is 90:10 predicted to observed in the first projected year, changing incrementally each year to reach 50:50 in the last projected year.

31. Public Health Scotland. Cancer Waiting Times - Scottish Health and Social Care Open Data. 2022. https://www.opendata.nhs.scot/km/dataset/cancer-waiting-times

32. The Royal College of Radiologists. **Clinical radiology UK workforce census 2020 report**. 2021 Apr. https://www.rcr.ac.uk/system/files/publication/field_publication_files/clinical-radiology-uk-workforce-census-2020-report.pdf

33. Henson KE, Fry A, Lyratzopoulos G, Peake M, Roberts KJ, McPhail S. **Sociodemographic variation in the use of chemotherapy and radiotherapy in patients with stage IV lung, oesophageal, stomach and pancreatic cancer: evidence from population-based data in England during 2013–2014.** Br J Cancer. 2018;118(10):1382–90.

34. Cancer Research UK. **Where next for cancer services in Scotland?**. 2016 Oct. https://www.cancerresearchuk.org/sites/default/files/where_next_for_cancer_services_in_scotland_june_2017_-_exec_summary.pdf

35. Varma T, Jones CP, Oladele C, Miller J. **Diversity in clinical research: public health and social justice imperatives.** J Med Ethics. 2022; https://jme.bmj.com/content/early/2022/04/14/medethics-2021-108068

36. Scottish Government. **A Stronger & More Resilient Scotland: The Programme for Government 2022-23.** 2022 Sep. https://www.gov.scot/programme-for-government/

CANCER
RESEARCH
UK

Cancer Research UK (CRUK) is the world's leading cancer charity dedicated to saving lives through research, influence and information. In 2021/22, we spent £443 million on new research. We support research into all aspects of cancer through the work of over 4,000 scientists, doctors and nurses. This pioneering work into the prevention, diagnosis and treatment of cancer has helped save millions of lives. Cancer Research UK wants to accelerate progress so that 3 in 4 people survive their cancer for 10 years or more by 2034.

cruk.org