A programme for UK Government
for cancer research and care

CANCER
RESEARCH
UK

Together we are
beating cancer

Acknowledgements

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About Cancer Research UK

We're the world's leading cancer charity, dedicated to saving and improving lives through our research, influence and information. And we're the largest charitable funder of cancer research in the world, funding around 50% of all publicly funded cancer research in the UK.

For the past 120 years, we've been making discoveries that have saved countless lives and benefit millions of people around the world.

Our research has helped prove the link between tobacco and cancer. And it has led to the development of more than 50 cancer drugs, which are being used to treat 3 in 4 people who receive cancer drugs on the NHS.

These developments have been at the heart of the progress that has already seen cancer survival in the UK double in the last 50 years.

Our vision

We want to bring about a world where everybody lives longer, better lives, free from the fear of cancer. A world where:

- Some types of cancer are effectively **eliminated.**
- Many more cancers are **prevented** from developing in the first place.
- People who do develop cancer are diagnosed at an earlier stage, where there is a **better chance of survival.**
- Treatments are **more effective, kinder and more targeted**, so people can lead better, more fulfilling lives.
- **Everyone shares in this progress equally**, regardless of who they are, where they're from or what type of cancer they have.

Read more in **our strategy**

Foreword

The UK faces a fundamental choice as the country approaches a general election.

Should we accept world-lagging, not world-leading, cancer outcomes? Accept a real-term decline in cancer research funding? Accept some of the worst performance against waiting time targets in recent history? Accept cancer inequalities across the country? Accept that we can't do better for people affected by cancer? The answer is, of course, no. Cancer Research UK does not accept any of this. Nor should any government.

We must be more ambitious. We must take a different direction. We must make long-term decisions to improve the health, wealth and productivity of the country.

You'll read about our ambition for the UK Government to reduce relative cancer mortality rates by 15% by 2040 and our five key missions that will enable us to achieve this. We believe this is a realistic ambition. Now is the time to act and build on the success of previous decades, where we've seen a doubling of cancer survival in the last 50 years. Now is the time to go further and faster.

The UK needs to get better at harnessing the power of discovery science – developing and trialling new tests and treatments and making them available to everyone who needs them as quickly as possible. This needs to be done alongside investing in research, data and new technology if the UK is to be a leading destination for cancer research, innovation and clinical trials: all of which will benefit our families, friends and loved ones.

The burden of cancer will grow significantly over the coming years. Our projections suggest that by 2040, the UK will see around half a million new cases diagnosed each year. The UK must put measures in place now so that we're ready.

What's more, the public expects action. Almost 8 in 10 people in England think the UK Government needs to develop a long-term and fully funded cancer plan. Around 80% think the UK Government should be directly responsible for funding cancer research. Nearly three quarters support increasing the age of sale for tobacco.

Investing in cancer research and care is a win-win. If the UK Government seizes this chance, we can harness the huge potential for both our health and wealth – and we can help everyone to live longer, better lives, free from the fear of cancer.

Thank you to everyone who helped turn our initial thinking into clear missions and actionable policy recommendations. Your engagement, insight and expertise has been invaluable throughout the development of our manifesto for cancer research and care and programme for UK Government.

Michelle Mitchell

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Chief Executive of Cancer Research UK

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Longer, better lives

We've made huge progress on cancer in the past 50 years.

In the 1970s, only 1 in 4 people in the UK survived their cancer for 10 years or more. Now, twice as many survive[1].

Over a million lives have been saved in the UK thanks to improvements in prevention, detection, diagnosis and treatment of cancer since the 1980s[2]. In the last decade, cancer mortality rates have fallen by 10%[3] and are projected to fall by a further 6% by 2040[4].

This is all thanks to the power of groundbreaking research, improvements in healthcare and the tireless efforts of NHS staff.

But cancer is still the defining health issue of our time.

Almost 1 in 2 of us will get cancer in our lifetimes, and all of us will be affected by it. More years of healthy life are lost to premature mortality or disability because of cancer than any other disease[5].

For some cancers, we've made huge strides. In 1971, if you were diagnosed with breast cancer, you had around a 40% chance of surviving for ten years. By 2018, that had risen to nearly 80%[6].

For other cancers, we haven't seen the same progress. Pancreatic cancer survival has hardly changed since the 1970s[7].

Overall, the UK lags behind other comparable countries when it comes to cancer survival[8].

The challenge is only growing.

The number of new cancer cases each year is increasing as our population grows and ages.

By 2040, the number of new cases is projected to increase by a fifth from today, meaning around half a million new cases diagnosed each year[9]. Behind every one of these numbers is a person, their friends, and families – the impact is immense.

And the inequalities in who gets and dies from cancer are stark, with more than 33,000 cases each year across the UK attributable to deprivation[10].

But so is the opportunity.

We are in a golden age for cancer research.

The progress we've seen in recent years has been driven by decades of research by scientists and clinicians in the UK and across the world.

For example, more than 20 years ago Cancer Research UK scientists proved the link between cervical cancers and human papillomavirus (HPV). In 2008, this link led to the UK implementing a vaccination programme for children and people at higher risk from HPV. We now know that HPV vaccination is highly effective, reducing cervical cancer rates amongst vaccinated populations by around 90%, and vaccine programmes are in use around the world.

The UK is a global leader in cancer research. Our universities and institutions are amongst the best for discovery, oncology and clinical sciences, and our academics produce some of the most highly cited and impactful research studies[11]. The NHS' cancer data is some of the best in the world.

Cancer Research UK has championed research into early detection and diagnosis. The unique role of charities, backed by the generosity of the British public, is to support cutting-edge science and innovation that is essential to develop our understanding of cancer and how we transform the prevention, diagnosis and treatment of it.

Now, with advances in digital, genomics, data science and AI thrown into the mix, we're able to reimagine what's possible.

We've never known as much about cancer as we do now. The tools at our disposal mean we can do in hours things that used to take years. This puts us on the brink of making huge leaps in how we understand, prevent, diagnose and treat cancer and save lives.

But the promise we see for people affected by cancer is not guaranteed. Cancer research is not a 'nice to have': it is vital. We need to back cancer research and vastly strengthen our ability to quickly translate research into improvements for patients and their families, improve productivity and strengthen the economy.

Cancer is a fixable problem.

Three decades ago, England and Denmark were improving cancer outcomes at broadly the same rate. Since then, Denmark has raced ahead, with consistent funding and long-term cancer strategies central to their success[12].

Across the UK, cancer waiting times are being consistently missed, and some have not been met for over a decade. While they wait for diagnosis and treatment, patients and their families face an anxious and worrying time. Some groups are more likely to have a poor experience of cancer care than others. Investment in prevention, NHS staff, equipment and facilities is needed to turn the tide.

Many of the treatments patients receive today are a direct result of research done in the UK over decades. The life sciences sector is a UK success story, and it welcomed the UK Government's decision to rejoin Horizon Europe.

But many in the research and innovation community are sounding the alarm as the UK slips compared to our peers as a place to invest, with a significant fall in the amount of foreign direct investment in 2022 compared to 2021[13]. Some of our most innovative entrepreneurs and companies are looking elsewhere to develop the next generation of cancer tools, as the UK's share of global life sciences Initial Public Offerings (IPOs) slips compared to our peers[14].

These problems are not inevitable. Cancer is a problem. But it's a fixable one.

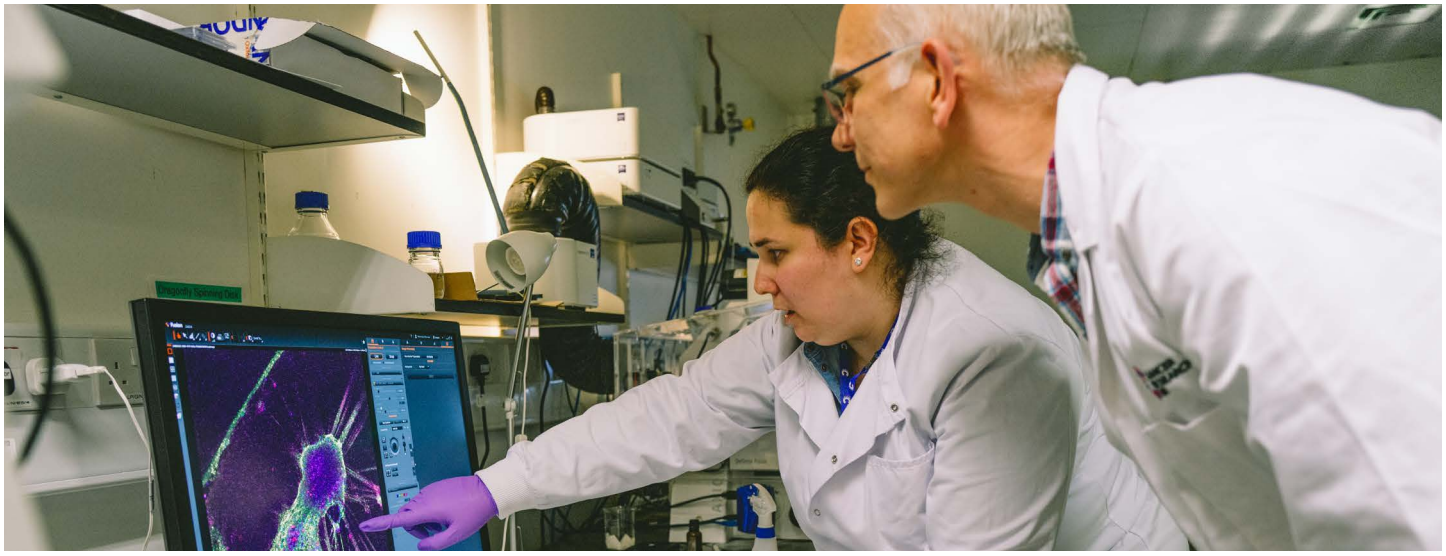
Fixing it will take leadership, political will, investment and reform. And it will take a coalition united by a clear mission. The upsides are without doubt worth the investment and hard work: more years of healthy life, more weddings, more school concerts, more moments with the people we love.

And an investment in a healthier, more productive UK with a stronger economy.

Improvements in cancer research, prevention and care would reduce health, social care and 'informal' care costs, contribute to treating other health conditions, and have a positive impact on workforce productivity and quality of life.

It has been estimated that on average, people with cancer in England are £570 a month worse off and 1 in 3 stop working either permanently or temporarily[15]. One study estimates that the UK total productivity cost from premature cancer deaths would be nearly €180bn by 2040[16]. The UK's Office for Budget Responsibility cites the rise in economic inactivity because of ill-health as one of the biggest risks to our economy[17].

What's more, in 2020/21, there was £1.8bn of investment in cancer research in the UK. This investment generated more than £5bn of economic impact. This means every £1 invested in cancer research generated £2.80 of economic benefits[18].



The time to act is now.

To reduce cancer deaths, increase survival and improve the lives of those living with cancer, we need action now. We need:

A national commitment to reduce the cancer mortality rate by 15% by 2040 – **preventing 20,000 cancer deaths every year.**

The public expect action. Almost 8 in 10 people in England think the UK Government needs to develop a long-term and fully funded plan specifically for cancer[19].

The projected increase in cases over time will mean that, unless we act now, the impacts of cancer on our society will only grow. Unless we act now, we could lose our advantages as a global life sciences leader – the ability to attract the best researchers, innovative companies and life science investors.

Working together, we can turn the tide on cancer.

Achieving this target to reduce the number of people dying from cancer cannot be achieved by one organisation alone. It will require concerted, long-term action by governments, political leaders, the NHS, universities, charities, industry and the public.

But it can be done.

Help us deliver our vision.

The cancer crisis is urgent and it is real. To overcome it requires strong leadership and political will.

Our manifesto and programme for UK Government set out both the immediate measures and long-term commitments a post-election government can make to elevate UK cancer survival to amongst the best in the world (see Technical annex for more).

We're calling on politicians, policymakers, health leaders, industry, research funders, Cancer Research UK supporters and the public to support us.

The challenge ahead is significant: it will take two parliamentary terms to be on track to achieve our vision. The prize is a legacy of life-saving cancer research and care that will benefit the UK for decades to come.

Our ambitions, missions and key actions

The ambition

To reduce cancer mortality by 15% by 2040 – improving survival in the UK and saving the lives of 20,000 people every year.

To be on the path to achieve this ambition, we would expect to see:

4%▼

reduction in the cancer mortality rate by the end of the next parliament (2030)

9%▼

reduction in the cancer mortality rate by 2035, compared to 2023 (see Technical annex for more)

We're setting out the following missions to help us achieve this ambition.

Mission 1

Rebuild the UK's global position in biomedical research.

Priority actions:

- The UK Government should set an ambition, in its first 100 days, to lead the G7 in research intensity and set out a plan to get there by increased government investment and making the UK an attractive research destination.
- Within a year of the general election, the UK Government should work with industry, research funders and research charities to set out a plan to, at least, close the more than £1bn funding gap for cancer research over the next decade.

Mission 2

Prevent thousands more cancer cases.

Priority actions:

- Within a year of the general election, the UK Government should have raised the age of sale of tobacco products and started to implement a sufficiently funded programme of measures to help people who smoke quit, with the aim of making England smokefree (see Technical annex for more) and preventing around 18,200 cancer cases in England by 2040.
- Within a year of the general election, the UK Government should implement the 2022 legislation on TV and online advertising restrictions on foods high in fat, salt and sugar (HFSS).

Mission 3

Diagnose cancers earlier and reduce inequalities.

Priority actions:

As part of a long-term cancer strategy for England published within 12 months of the general election, the UK Government should:

- Implement measures that reduce late-stage diagnosis of cancer.
- Transform and optimise cancer screening programmes through:
  - Full rollout of the lung cancer screening programme in England by 2028.
  - Creation of a roadmap for the reduction of FIT threshold in the bowel screening programme.
  - Accelerating the implementation of modern IT infrastructure in all cancer screening programmes.
- Direct Integrated Care Boards (ICBs) to accelerate locally tailored approaches to reducing inequalities in earlier diagnosis.
- Set out plans to improve our understanding of treatment variation with better data, including investment in audits, and address unwarranted variation in access to cancer treatment across England through targeted action plans.

Mission 4

Bring tests, treatments and innovations to patients more quickly.

Priority actions:

- The UK Government and NHS England should direct ICBs and Health Innovation Networks to accelerate the translation of innovations to better detect, diagnose and treat cancer.
- As part of a long-term cancer strategy for England published within 12 months of a general election, the UK Government should set out plans for addressing NHS resource gaps by developing a 10-year cancer-specific workforce plan, eliminating the wider NHS maintenance backlog by 2030 and committing to rolling, ringfenced capital investment for cancer.
- The UK Government must commit to consistently meeting all Cancer Waiting Times targets for England by the end of the next parliament, including a higher Faster Diagnosis Standard target of 85%.

Mission 5

Build a national movement to beat cancer, together.

Priority actions:

- Within a year of the general election, the UK Government should publish a 10-year cancer strategy for England, underpinned by rolling three-year action plans.
- Within a year of the general election, the UK Government should establish a broader leadership model for cancer in the UK, including a National Cancer Council for England, accountable to the prime minister, for coordinating cross-government action on cancer for the long term, supported by mechanisms for ensuring long-term focus on cancer and independent scrutiny of performance. This approach will bring together discovery, translation, cancer prevention, detection, diagnosis and treatment, health system investment and reform.

The case for change for these missions can be found in our **manifesto for cancer research and care**

What is the programme for UK Government for cancer research and care?

This document sets out what the next UK Government needs to do to make progress against our ambitions, missions and priority actions (see page 11).

It is split into six chapters.

1. **Discover**
The UK is a world-leader in cancer research and the life sciences, which saves lives, improves the nation's health and strengthens the economy. But there is a real risk our position and progress will falter. To prevent this, the UK Government needs to build a more sustainable approach to funding biomedical research, attract the best international talent and form strategic collaborations across borders.

2. **Translate**
To fully harness the UK's strong science base, the UK must get better at translating research into improvements for people with cancer. The UK Government must attract more innovators and entrepreneurs to the UK, maintain the UK's status as a top destination for clinical trials and improve the UK's regulatory and health system capability to get new tests and treatments to cancer patients more quickly.

3. **Prevent**
Preventing cancers saves and improves lives, bolsters productivity, saves taxpayers money and reduces pressure on the NHS. By taking action against known preventable cancer risks – tobacco, unhealthy diets and alcohol – government could prevent nearly 37,000 cancers in total in the UK by 2040.

4. **Detect, diagnose and treat**
An earlier diagnosis and timely access to tests, screening and treatment gives people with cancer the best chance of survival. The UK Government must deliver a programme of proven interventions – such as the lung cancer screening programme – to transform cancer screening, improve access to healthcare and reduce unwarranted variation in treatment.

5. **Enablers for success**
With the number of cancer cases rising, the health system must be reformed and resourced to respond to the opportunities and challenges in cancer research and care – for today and for the future. The UK Government should use behavioural science to increase the effectiveness of policy in practice, take a long-term strategic approach to building the health system's capacity, and better harness the power of data to improve research and care.

6. **Lead for change**
The scale of the challenges cancer poses, and the scale of the solutions needed to tackle them, mean we need a new approach from the UK Government on cancer. We need strong leadership to build a cancer mission, vision and plan, with dedicated funding and robust accountability mechanisms, so we can maintain momentum to reduce the number of people who die of cancer.

Box A
How do we tackle inequalities in cancer?

There are stark, unacceptable and unwarranted differences in cancer research and care. Cancer incidence rates are higher for people from more deprived populations in every UK nation, with more than 33,000 cases each year across the UK attributable to deprivation[20].

People from more deprived groups[21], some ethnic groups[22] and people with learning disabilities[23] are all more likely than comparable groups to be diagnosed at a later stage for certain cancers. What treatment you receive can vary depending on where you live in the UK[24]. And cancer mortality rates are higher for people from the most deprived areas compared to people from the least[25], with the 'deprivation gap' greatest for smoking-related cancers (lung, laryngeal and oral cavity)[26].

To tackle inequalities in cancer, we need more research to improve our understanding of what cancer inequalities exist and how we can address them. We need to reduce barriers to taking part in clinical trials and ensure that the benefits of new cancer tests and treatments are shared equitably. We need to end smoking for everyone. And for communities that face greater barriers to getting an early diagnosis of cancer, we need tailored interventions to improve uptake in screening, help-seeking and access to the health system.

In 2021, NHS England developed the Core20PLUS5 initiative. It supports national and local systems in driving targeted action to improve inequalities in healthcare. The initiative defines a target population – the 'Core20PLUS' – and identifies '5' focus clinical areas, of which early cancer diagnosis is one. It also highlights the importance of smoking cessation.

These actions and initiatives will help. But to make significant progress to reduce health inequalities, governments need to address their underlying determinants – such as poverty, housing and structural inequalities based on a person's background or identity. A cross-government strategy that considers the role of every department and every available policy lever is needed to achieve this.[27]

Our programme for UK Government has 69 policy recommendations in total. A summary can be found on page 15.

Policy recommendations

Chapter 1: Discover

Investing in research and development (R&D) to advance outcomes and boost the economy

01	The UK Government should set a target in its first 100 days to lead the G7 in research intensity. The Treasury and the Department for Science, Innovation and Technology (DSIT) should set out a plan for stable and sustained investment and/or fiscal safeguards to provide long-term stability to the R&D sector.	UK
02	Research England must increase mainstream quality-related (QR) funding in line with inflation and wider increases to R&D funding. The Charity Research Support Fund (CRSF) should also receive an uplift to ensure that government support underpins the indirect cost of charity investment in universities and enables effective partnerships.	England
03	The Department for Levelling Up, Housing and Communities (DLUHC) and DSIT should develop clear UK-wide and local strategies to grow diverse research clusters of excellence. As part of this, the UK Government should work with higher education institutions, industry and funders to seed new large-scale research institutes, including a new life sciences cluster in Scotland.	UK
04	DSIT and the Treasury should work with charities, industry and public funding agencies to establish a Commission on Sustainable Biomedical Research. This should be tasked with developing a new long-term investment solution for late-stage basic and early-stage translational life sciences research within one year of being established, and include setting out a plan for closing the more than £1bn funding gap for cancer research over the next decade.	UK

Attracting, developing and retaining diverse, international scientific talent

05	By the end of the next parliament, the Home Office should reduce overall and upfront immigration costs for researchers so they are competitive with comparable leading research nations. To support this, by 2026, the Home Office should work with DSIT to initiate a review on the impact of the immigration system on the recruitment of international research staff.	UK
06	DSIT should work with UK Research and Innovation (UKRI) to strengthen the UK's research culture. This should include action to increase the stability of roles, support sectoral mobility and ensure incentives for universities to improve research culture are considered in the development of REF2028.	UK

07	DSIT should increase the value of the data collected in future versions of the R&I workforce survey by improving coverage, data collection and disaggregation to provide a comprehensive nationwide overview of equality, diversity and inclusion in research. DSIT should then publish an action plan to address the inequalities in the research workforce that have been identified.	UK

Taking a global approach to tackle the biggest challenges in cancer

08	The UK Government must continue to support prestigious multinational research funding programmes (including Horizon Europe and successor EU framework programmes after 2027), and should join and lead the development of further global research programmes, including on cancer.	UK
09	The UK Government must prioritise compatibility with the EU's clinical trials regulatory framework to avoid bureaucracy, cost and duplication. Reducing new frictions that undermine research collaboration should also be prioritised in the implementation review of the UK-EU Trade & Cooperation Agreement.	UK

Chapter 2: Translate

Fostering the commercialisation of research

10	DSIT should work with the Treasury and the Department for Business and Trade (DBT) to enhance and expand government-backed schemes that encourage investment from larger investment funds into the early stages of translation to support UK-based life sciences companies. This includes, but is not limited to, collaborating with the pension industry to re-allocate pension funds.	UK
11	Building on existing progress embedding commercial innovation into institutional reward systems (such as REF2028), DSIT should work with research councils and universities to better incentivise and reward individual entrepreneurs, such as in promotion criteria and grant applications.	UK
12	The Department of Health and Social Care (DHSC) and equivalents in the other UK nations, DSIT and Office for Life Sciences (OLS) must work with public funders to coordinate investment in early detection and diagnosis (ED&D) research. They should also convene a cross-sector working group (to include the health service, funders, National Institute for Health and Care Excellence (NICE), industry, economists and patients) to develop a comprehensive health economics model for ED&D.	UK

Transforming UK clinical research

13	NHSE should develop a faster and less bureaucratic set-up process for non-commercial trials. This should involve mandating a single negotiation and sign-off process for costing and contracting within the NHS, and learning lessons from the development and delivery of the National Contract Value Review (NCVR).	England
14	NHSE should develop a coordinated set of metrics to monitor and evaluate commercial and non-commercial NHS research engagement and impact at Trust, regional and national levels. This should include an annual target in the NHS mandate that is reported to parliament.	England
15	NHSE should work with Trusts to increase the total supply of dedicated research time in health service staff job plans, paying particular attention to professions underrepresented in research such as nurses, midwives and allied health professionals.	England
16	The Health Research Authority (HRA), the ISRCTN registry and NIHR Be Part of Research should make it easier for sponsors to update study records, while also strengthening accountability. BMC, which manages the ISRCTN registry, will require the right level of dedicated resource to deliver such changes.	UK
17	The Medicines and Healthcare products Regulatory Agency (MHRA) and HRA should develop updated guidance to support and promote decentralised clinical trials (DCTs), incorporating lessons from the pandemic and the NIHR's scoping review. To deliver DCTs, the UK Government and NHSE will need to invest in the necessary infrastructure and consider training and skills in future workforce planning.	England

Streamlining and strengthening, from approval to adoption

18	DHSC, OLS and DSIT should prioritise working with NHSE, NICE, Cancer Research UK, funders, industry and academia to map emerging cancer innovations to areas of clinical unmet need and develop comprehensive 'target product profiles' (TPPs) to bolster demand signalling efforts and provide clarity to innovators. This includes defining roles and responsibilities for the development of TPPs and how they will be used throughout the adoption pathway.	England
19	DHSC, MHRA and NICE, collaborating with NHSE, should clearly define routes to adoption from pre-market authorisation to commissioning for emerging innovations, including AI applications, digital technologies and diagnostic tests. This should involve outlining the accountabilities and responsibilities of the relevant partners, as well as evaluation criteria, evidence thresholds and cost-effectiveness requirements.	England

20	DHSC must urgently address capacity and resourcing issues within MHRA to speed up clinical trials approval processes for innovations and post-market surveillance. This includes providing adequate and sustained funding for the agency via grant-in-aid to ensure capacity can keep pace with demand, and addressing staff and skills shortages through recruitment and retention measures.	England
21	DHSC and the NHSE Accelerated Access Collaborative should routinely conduct targeted horizon scanning to identify the most impactful cancer interventions that must be prioritised for national rollout. This must involve working closely with the NHSE Cancer Programme, NHSE Screening Teams, Cancer Alliances, Academic Health Science Networks (ASNs), clinicians, researchers and Cancer Research UK.	England
22	To fulfil their duty as mandated by the 2022 Health and Care Act to ensure the use of evidence obtained from research in the health service, the UK Government and NHSE should direct ICBs to work with their Cancer Alliances and AHSNs to develop a coherent, shared strategy for the identification, adoption and implementation of approved cancer innovations across their geographies.	England

Promising innovations for cancer, and key enablers for their implementation

23	DSIT, DHSC and OLS must work with the wider innovation ecosystem to align priorities and strategies intended to support innovation in healthcare. This should include the development of a cross-department action plan to address the enablers (such as those set out below) to accelerate the adoption of health innovation to improve cancer outcomes.	England

Chapter 3: Prevent

The economic gains of preventing ill health

24	The UK Government must change its approach to investing in prevention, ensuring that investment decisions in England adequately capture the financial, wider economic and long-term value associated with improvements in health.	England

Investing to 'stop the start' and 'start the stop'

25	The UK Government should fund tobacco control measures – including smoking cessation services and public health campaigns in England, and stronger enforcement of existing and new regulations – to at least the level of an additional £125m per year recommended in the Khan Review, and do so throughout the next parliamentary term. To ensure sufficient investment is secured until we reach smokefree for all, the UK Government should commit to making the tobacco industry foot the bill, without letting the industry have any influence on how the funds are spent.	England

Ending smoking through innovative regulation

26	The UK Government should swiftly introduce and implement legislation raising the age of sale of tobacco in England.	England
27	The UK Government should immediately close existing loopholes used by the tobacco industry in the marketing of their products, including those across tobacco flavours, health warnings, and tobacco packaging and brand names.	UK
28	The UK Government should take steps towards implementing innovative policy measures to further reduce the appeal and availability of tobacco, and help people quit.	England/ UK

Maximising the health service's potential to help people quit

29	NHSE should improve the delivery of smoking cessation interventions in primary care and ensure that the NHS Long Term Plan commitments to roll out tobacco dependence treatment services by 2023/24 are fully implemented, sustainably funded and maintained past 2023/24.	England

Driving a generational shift in cancer prevention in the UK

30	The UK Government should implement the 2022 legislation on TV and online advertising restrictions on HFSS foods across the UK no later than October 2025.	UK
31	The UK Government should implement the legislation restricting volume-based price promotions on HFSS products in England by October 2025.	England
32	The UK Government should introduce restrictions on alcohol marketing to protect children and vulnerable people.	England
33	The UK Government should commit to reducing harmful atmospheric levels of PM2.5 more quickly, by setting a target to reach 10 micrograms per cubic metre PM2.5 levels by 2030 and outlining a pathway to achieving it.	England

34	NHSE, with DHSC, should work to increase HPV vaccination coverage across England. Targeted action is needed in areas and amongst groups with lower uptake to reduce inequalities in coverage.	England

The UK's role in global cancer prevention

35	The UK Government should replace the current Global Health Framework, which expires in 2025, with a comprehensive Global Health Strategy and associated funding commitments.	UK
36	The UK Government should support low- and middle-income countries (LMICs) to implement WHO Framework Convention on Tobacco Control (FCTC), hold the tobacco industry to account when contravening the FCTC, and reaffirm its commitment to implementing Article 5.3 of the FCTC.	UK
37	The UK Government should demonstrate leadership in accelerating progress on cervical cancer elimination in LMICs, by integrating all three pillars of WHO's Global Strategy into its own work and maintaining the UK's position as a leading donor to Gavi.	UK

Chapter 4: Detect, diagnose, treat

38	The UK Government and NHSE should strive to diagnose 75% of cancers at stage 1 and 2 by 2028 in England, as per the ambition set in the NHS Long Term Plan in 2019. In addition, steps should be taken to reduce the number of cancers diagnosed at stage 4, with a focus on cancers that would lead to the greatest benefit in survival, such as lung, bowel and prostate cancers.	England

Transforming and optimising screening

39	NHSE, with DHSC, should set the strategic direction and establish a robust governance framework to drive forward the transformation of screening. This should be actively supported through a tripartite agreement between the NHSE Screening team, Diagnostics team and Cancer Programme.	England
40	The UK Government should expedite the implementation of a high-quality national lung cancer screening programme in England to 2028, to help achieve its earlier diagnosis targets sooner. It must also provide the annual investment required for this, including the resource to develop robust data infrastructure, fully integrated smoking cessation services and its equitable rollout.	England
41	NHSE should develop a roadmap for the reduction of the FIT threshold in the bowel cancer screening programme by mid-2024, with an aim to start implementing the lower threshold during 2025.	England

42	NHSE, working closely with Cancer Alliances and integrated care boards (ICBs), should take immediate steps to implement evidence-based screening uptake interventions at scale. This should build the repertoire of best practice interventions by evaluating more initiatives, like financial incentives for out-of-hours services, social media campaigns and those targeting inequalities.	England
43	NHSE should improve data collection and access to data to support service evaluation and quality improvement. NHSE should publish local and national annual reports on screening programmes, including data that assesses screening pathways 'end to end'. Reports should provide breakdowns by demographics, updates on efforts to optimise the programme or implement innovation, and provide recommendations for service improvement.	England
44	NHSE must accelerate the implementation of modern IT infrastructure for cancer screening programmes and publish a transformation roadmap detailing how and when each screening IT system and wider technical infrastructure will be updated to support the optimisation of cancer screening.	England
45	The NHSE Cancer Programme and NHSE Screening Programme should jointly issue guidance to screening commissioners, screening providers and Cancer Alliances setting out how they should work together to improve screening uptake and coverage, with particular focus on how to reduce inequalities.	England

Engaging the public and widening access

46	DHSC should make a long-term strategic commitment to funding national public awareness campaigns in England that enable positive health behaviours. These should include evidence-based targeting of population groups facing inequalities, and continuous robust evaluation to strengthen and refine further campaigns and interventions.	England
47	To ensure suspected cancer patients can access healthcare promptly via an appropriate pathway, DHSC and NHSE must increase primary care capacity for cancer in England and establish a centralised programme that coordinates the design, evaluation and implementation of different routes into healthcare that are accessible to everyone.	England
48	NHSE should assess how the 'Making Every Contact Count' principles across NHS services could support help-seeking behaviours, building on the successes of this approach to support the COVID-19 vaccination campaign.	England

Detecting and diagnosing cancer earlier – sustaining the momentum

49	NHSE should commission an immediate refresh of the 2020 Richards Diagnostics Review. This should identify the key actions and investment required to rapidly deliver diagnostic capacity to expedite improvements in early diagnosis of cancer.	England

Variation in access to optimal treatment

50	NHSE should improve datasets to aid quality improvement across cancer treatment services. This should include better data capture of core patient outcomes in the Radiotherapy Dataset (RTDS) and Systemic Anti-Cancer Therapy (SACT) dataset. NHSE should also ensure there is appropriate infrastructure, such as online patient portals, to capture patient reported outcome measures relating to quality of life.	England
51	DHSC and NHSE should ensure that a new 10-year cancer strategy for England sets out a strategic approach to addressing unwarranted variation in access to treatment. This should be developed in conjunction with tumour-specific clinical leads to provide oversight and advice for content on cancer treatment.	England
52	DHSC should fund the NHSE Cancer Programme, in partnership with relevant stakeholders, to implement a routine strategic audit and quality improvement programme for cancer in England. Accordingly, resource should be directed to pathways, services and patient groups where action is likely to result in improved outcomes.	England
53	NHSE's Specialised Commissioning team should develop and publish 'success criteria' for the devolution of commissioning specialised services in advance of formal devolution expected in April 2024.	England

Empowering health systems in England to make rapid progress

54	The UK Government should set a clearer expectation that improving cancer outcomes is a responsibility of all statutory bodies and system partners across the NHS and wider health and care system, and that integrated care systems (ICSs) should facilitate strong system working to achieve national objectives for cancer.	England

Delivering a minimum standard of care

55	NHSE should raise the Faster Diagnosis Standard target to 85% during the next parliament.	England
56	The UK Government must commit to consistently meeting all Cancer Waiting Times targets for England by the end of the next parliament, including a raised Faster Diagnosis Standard target of 85%.	England

Focusing on the right things

57	DHSC and NHSE should jointly convene an independent expert group to undertake a comprehensive review of health system oversight for cancer, tasked with making recommendations for improving the overall approach and delivering the right balance between operational performance and other measures.	England

Chapter 5: Enablers for success

Behavioural and implementation science

58	The UK Government should establish a Chief Behavioural Scientist for Health, to accelerate the integration of behavioural and implementation science across policymaking and the health system. The role should champion and facilitate the implementation of behaviourally informed policies and initiatives to address complex challenges in healthcare, at both the local and national levels.	England

A cancer workforce that's fit for the future

59	The UK Government should immediately instruct NHSE to begin the planning cycle for the 2025 Long Term Workforce Plan refresh, so sufficient preparation can be made to address weaknesses in the current plan for England.	England
60	The UK Government should instruct NHSE to develop a specific cancer workforce plan as a companion to the NHS Long Term Workforce Plan for England, to be delivered within one year of the next general election. The plan should consider the specialties essential to the diagnosis and treatment of cancer, with an initial focus on sub-specialisms in endoscopy, pathology, radiology, tumour-specific oncologists and nurse specialists.	England
61	As a baseline, the UK Government must invest £1.5bn between 2024-29 in training the staff to fill 16,000 full-time equivalent (FTE) specialist roles in the seven key cancer professions identified in the 2018 HEE Cancer Workforce Plan, as requiring a 45% growth.	England
62	As part of the two-yearly refresh of the plan, NHSE should improve data collection on staff leavers, with an aim to regularly publish this data by 2025 and use it to target efforts to boost retention at the issues and staff groups where they will make the most difference.	England

Investing in capital for impact

63	The UK Government should eliminate the NHS maintenance backlog in England by 2030. Alongside this, to support the NHS to replace aging equipment and make long-term strategic investment, the UK Government should ensure the DHSC capital budget at least matches the EU average by population.	England
64	The UK Government must provide ringfenced capital investment targeted to essential cancer infrastructure. This should be wide-ranging and engage the full range of cancer services, including diagnostics and specialist or less visible services.	England
65	DHSC and the Treasury should consult on changes to the healthcare capital allocation and approvals regime, with the aim of enabling more strategic use of capital budgets, including the role of expert organisations such as Cancer Alliances and Operational Delivery Networks (ODNs).	England

Unlocking the potential of data

66	DHSC and NHSE should form a UK cancer data collaborative to transform data access, quality, linkage and flow. This collaborative should involve data custodians, clinicians, charities, academics and researchers, research organisations and patients across all four nations. The collaborative should take a UK-wide approach so that our data systems are joined up across the UK.	UK

Chapter 6: Lead for change

Setting a national mission for cancer

67	The UK Government should publish a new, comprehensive 10-year national cancer strategy within one year of the next general election, underpinned by a national ambition to reduce cancer mortality by 15% by 2040.	England

Strengthening national leadership and accountability

68	The UK Government should establish a National Cancer Council within one year of the next general election, which will hold leaders to account for delivering on key actions and outcomes, including cross-government actions.	England
69	The UK Government should establish a clear mechanism for ensuring scrutiny and transparent annual reporting on its progress in key areas for cancer. This should include publication of an annual account of progress against the strategy and any associated plans.	England

The programme for UK Government

Note on the geographical scope of this document:

We want to see all four UK nations make progress on cancer, so we can achieve our ambition of reducing mortality by 15% by 2040 and saving lives in every part of the UK.

In advance of the UK general election, our programme for UK Government sets out our recommendations for the UK Government over the next parliamentary term.

For reserved matters (for which decisions taken by the UK parliament at Westminster have effect in all four nations), our recommendations are UK-wide. For devolved matters (areas of government where decision-making for Scotland, Wales and Northern Ireland has been delegated by UK parliament to those respective nations), our recommendations are for England.

Many or all of our recommendations in Chapter 4 (Detect, diagnose and treat), Chapter 5 (Enablers for success) and Chapter 6 (Lead for change) are specifically for England. Some recommendations in Chapter 2 (Translate) and Chapter 3 (Prevent) are for England, whereas others are for the UK. And almost all recommendations in Chapter 1 (Discover) are for the UK.

We will be working with stakeholders and people affected by cancer in the devolved nations to develop and publish our recommendations on devolved matters for Scotland, Wales and Northern Ireland in the coming years.

Chapter 1
Discover

Which missions and priority actions are covered by this chapter?

Mission 1

Rebuild the UK's global position in biomedical research.

Priority actions:

- The UK Government should set an ambition in its first 100 days to lead the G7 in research intensity and set out a plan to get there by increased government investment and making the UK an attractive research destination.
- Within a year of the general election, the UK Government should work with industry, research funders and research charities to set out a plan to, at least, close the £1–2bn funding gap for cancer research over the next decade.

Sections in this chapter:

1.1. Introduction
1.2 Investing in R&D to advance outcomes and boost the economy
1.3. Attracting, developing and retaining diverse, international scientific talent
1.4. Taking a global approach to tackle the biggest challenges in cancer

1.1. Introduction

Research is fundamental to preventing more cancers, detecting and diagnosing them earlier, and finding more effective and kinder treatments.

From Nobel prize-winning discoveries about how cells divide, to demonstrating the link between smoking and cancer, through to TRACERx – our flagship lung cancer study that seeks to understand how cancer evolves over time – our scientists have been at the heart of progress in understanding cancer for over 120 years.

Medical research charities are a vital part of the UK's diverse research ecosystem, investing almost £2bn in research in 2022, making sure patients' priorities shape research and addressing areas of unmet need[28].

Government, industry and charities all have a vital role to play in beating cancer. And we should work together to ensure the UK has a world-leading research environment, so we can make progress for people affected by cancer, now and in the future.

The UK Government needs to collaborate with the whole life sciences sector to make sure the life science ecosystem is vibrant, strong, resilient and sustainable for the long term. Strengthening the life sciences sector will improve the nation's health and strengthen the economy. Investment in medical research drives inward investment, creates jobs and brings wider economic benefits.

Researchers are the driving force behind discoveries that led cancer survival to double in the last 50 years in the UK[29]. We need to foster a diverse and collaborative research workforce and address major challenges in recruiting and retaining research talent in the UK.

But no one country can solve cancer alone. Research needs to cross borders to pool resources, knowledge and expertise to make more impactful breakthroughs. The UK Government must secure its global scientific standing through international scientific collaboration.

The UK can capitalise on its strengths in cancer research and life sciences to cement its status as a world-leading science nation. But it will take strong national leadership.

Ambitions have been set in recent years for the UK to be at the global epicentre of science and life sciences – but these ambitions must be achieved. The establishment of the DSIT and a cabinet-level science post provide a solid foundation to oversee delivery of the necessary changes – for researchers and ultimately wider society.

1.2. Investing in R&D to advance outcomes and boost the economy

In the last 50 years, cancer survival in the UK has doubled[30]. Research – and the funding that makes it possible – has been central to this. Working together, public, charity and private funding can accelerate research from the lab bench to the bedside, and save and improve more lives.

But at Cancer Research UK, we are concerned about the sustainability of the biomedical research funding landscape over the next decade, and the role government plays in this is under scrutiny. Research is becoming increasingly global and competitive. If the UK continues with an unsustainable research funding model it will fall behind, unable to attract the necessary investment and talent to unleash the potential of life sciences for our collective health and wealth.

The UK Government must take the lead. It should increase overall UK R&D spending, thereby making the biomedical research funding landscape and university research system more resilient. And it should support the development of world-class research facilities.

1.2.1. Making UK R&D investment internationally competitive

The UK can remain at the forefront of cancer research. But it will take sustained, long-term investment across the research sector.

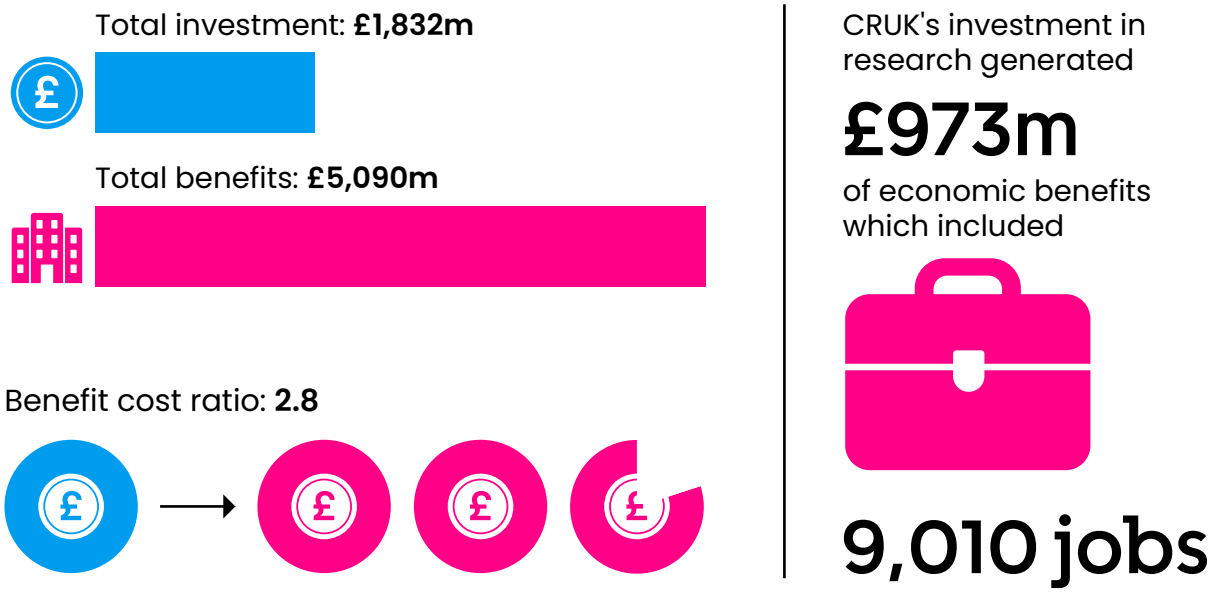
As emphasised in the recent review of the UK's research, development and innovation organisational landscape by Sir Paul Nurse, a significant increase in investment is crucial for the future success of the UK's research sector[31]. As an area of comparative strength internationally, this is particularly true for cancer and life sciences R&D.

R&D drives economic growth but the UK is not keeping pace globally

Cancer research has huge benefits for patients. But it also has significant benefits for our economy. In 2020/21, there was £1.8bn of investment in cancer research. This generated more than £5bn of economic impact[32]. These numbers give a benefit cost ratio of 2.8 – meaning every £1 invested in cancer research generated £2.80 of economic benefits. Cancer Research UK's own research generated £973m of economic benefits, including 9,010 jobs, in 2020/21.

If historical growth in cancer research investment can be maintained, funding would reach £3bn in 2040, which would support over 80,000 jobs and generate more than £13bn in total economic benefits. But this growth should not be taken for granted. These benefits will only be realised by maintaining current growth in public and private investment.

Figure A
Economic value of UK cancer research in 2020/21



The UK Government's funding for R&D is a crucial component of overall R&D intensity. In 2020, government-commissioned research found that in the long run, every £1 of government R&D spend stimulates between £1.96 and £2.34 of private R&D[33]. But government funding for R&D in the UK lags notably behind many comparable countries[34].

UK Government spend on R&D as a percentage of GDP ranks well below the OECD average, with the Nurse review finding the UK ranks 24th out of the 37 OECD nations on government spend on R&D per capita. The UK would have to increase this by 40% to match the US, and almost 110% to match the leading country, Norway[35].

The UK should aim to be a global scientific leader by setting ambitious R&D targets

We strongly welcome recent commitments from the UK Government to increase R&D spending, with £20bn a year to be spent on R&D by 2024/25 and commitments from all parties to support UK R&D. But to establish itself as a global scientific leader, the UK needs to go further and faster.

The UK should set a long-term goal to lead the G7 in R&D intensity over the next decade. The US leads the G7 in R&D intensity, spending almost 3.5% of GDP on it, while Japan and Germany both also spend over 3%[36]. Based on 2020 GDP, matching the US would represent a 34% increase in R&D spending in the UK.

This long-term goal needs to be underpinned by long-term funding settlements. Not only would this demonstrate the UK Government's commitment to UK science, it would also provide stability in policy and funding to those across the R&D sector. The existing short-term approach to allocating R&D funding results in risk aversion, sizable costs of bureaucracy and a neglect of the long-term strategy and support that enables scientific breakthroughs[37].

The Treasury should work with DSIT to explore setting fiscal safeguards for R&D investment to ensure the longer-term stability of funding and priorities. This could include committing to a 10-year funding settlement for R&D, accompanied by a commitment that the public R&D budget will increase in real terms over that period. Alternatively, it could set a small number of longer-term programmes for sectors where the UK is genuinely competitive, such as life sciences.

Policy recommendation 01

The UK Government should set a target in its first 100 days to lead the G7 in research intensity. The Treasury and DSIT should set out a plan for stable and sustained investment and/or fiscal safeguards to provide long-term stability to the R&D sector.

Geography: UK

1.2.2. Putting university medical research on a sustainable financial footing

Research in universities currently operates in a deficit and is not financially sustainable

Universities are an integral part of the UK's science base, bringing together different elements to produce ground-breaking research. They are also a vital draw for international talent. In 2022, 85% of Association of Medical Research Charities' (AMRC) member-funded research in the UK took place in universities[38].

A healthy university research sector is crucial to building a future where the UK is a global epicentre of life sciences. But UK universities face a sector aggregate deficit of almost £4.5bn for research (up from £3.8bn in 2020/21)[39]. This contributes to an overall deficit in higher education institutes across all activities[40], which threatens the impact and quality of their research.

The long-term, flexible nature of QR funding is critical to university research sustainability. However, the value of mainstream QR funding has eroded over time. Analysis from 2021 shows that this has declined in real terms by 14% in the last 10 years. The 10% increase in QR funding announced in August 2022 was welcome, but as the significant sector deficit shows, it's only a start[41].

Government must properly resource the indirect costs of research

Charity-funded medical research is essential to the UK's diverse life sciences research base, alongside government and industry funding.

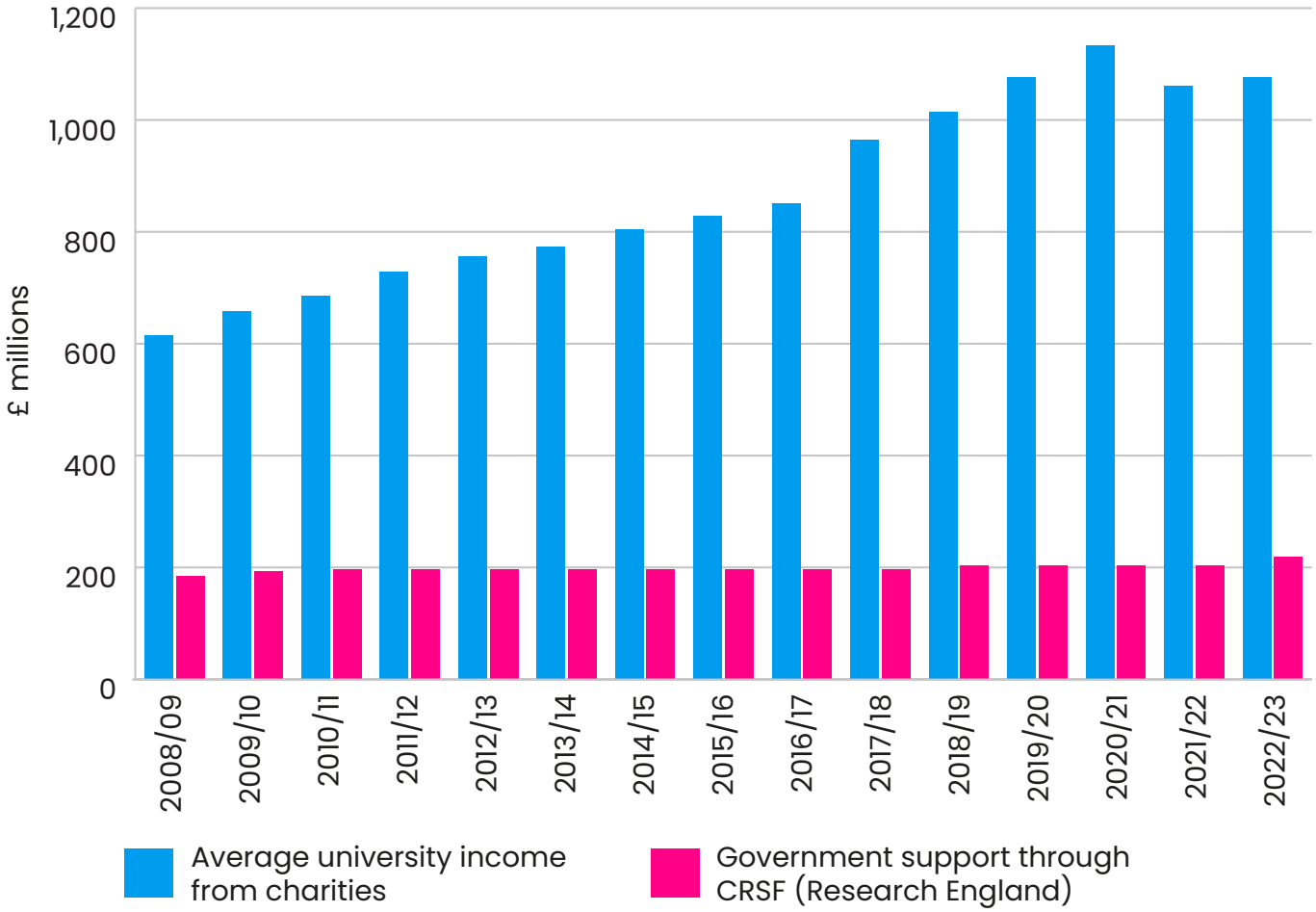
University research funding is a partnership between funders and the UK Government – with the UK Government needing to put in place the conditions for a sustainable university sector. Then other funders, including charities and industry, fund specific projects that align with their mission and objectives, providing an additive effect.

The CRSF and devolved nation equivalents are one way the governments recognise this. It aims to boost charity grants up to a percentage of the full end-to-end cost of research given by research councils.

However, the CRSF is not fulfilling its purpose. There has been a real-terms decline in its value as it has failed to keep pace with previous increases in charity research and inflation (see Figure B). As set out by the AMRC, in England the CRSF declined from 28p for every £1 of charity investment in 2010/11, to less than 20p per £1 in 2017/18, as growth in charity funding in universities far outpaced minimal growth in the CRSF. According to the AMRC, based on that trend the CRSF is expected to provide less than 12p per £1 of charitable investment by 2030[42].

The partnership between the UK Government and funders is breaking down because the indirect costs of charity-funded research are not fully met by government, which was the original intention of the CRSF.

Figure B
Government support of charity-funded research in universities has not kept up with charity research funding



Policy recommendation 02

Research England must increase mainstream QR funding in line with inflation and wider increases to R&D funding. The CRSF should also receive an uplift to ensure that government support underpins the indirect cost of charity investment in universities and enables effective partnerships.

Geography: England

1.2.3. Building research infrastructure for the future

There are insufficient critical concentrations of life sciences research across the UK

At Cancer Research UK, we award funding and make investments in research based on strategy and quality, wherever it is located across the UK. This relies on having research infrastructure in place, which we can't fund alone.

Building research infrastructure can tackle regional economic inequalities. And building a critical mass of high-quality research in a location has the potential to leverage additional research funding from private investors and from industry.

Reports like NESTA's 'Missing £4bn' highlight how geographical imbalances in economic performance are exacerbated by regional

imbalances in UK R&D spending[43]. It estimates that £4bn would be needed to recalibrate R&D spending nationally to the levels seen in London and the South East, which would unleash the potential of research in a broader range of locations across the UK. The UK Government recognised this in making R&D a core component of their Levelling Up White Paper, with a commitment to increase government investment in R&D outside the Greater South East by 40% by 2030.

As the UK Government implements steps to tackle regional inequalities, they should develop clear UK-wide and local strategies for the development of diverse research clusters of excellence, built on quality and long-term infrastructure investment.

Large-scale institutes anchor and support the growth of research clusters

One way of building 'critical mass' is by creating large scale research facilities. Institutes, for example, help foster collaborations between disciplines. The creation of more of these facilities, funded through increased overall investment in R&D, could help make sure the UK remains a competitive research destination on the global stage.

Sir Paul Nurse's recent review of the UK's research, development and innovation organisational landscape outlined the unique role institutes can play in UK research and how, when properly led and sustainably funded, they can attract the highest quality researchers and deliver internationally competitive, multidisciplinary research[44].

Box B
Cancer Research UK's world-leading institutes

Our four institutes are our major investments in discovery research. These are the Francis Crick Institute, the CRUK Scotland Institute (formerly the CRUK Beatson Institute), the CRUK Cambridge Institute and the CRUK Manchester Institute.

As a central pillar of our strategy, they provide long-term support for innovative research into fundamental cancer biology. The institutes' world-class facilities, technological platforms and research programmes give researchers the freedom and resources to pursue novel ideas and make discoveries that can go on to save and improve lives.

Research at the institutes has a range of direct, indirect, and catalytic effects, with far-reaching impacts on the UK's health and economy. They attract and retain top international talent, improve knowledge creation through collaboration and deliver impactful translational programmes.

Our Cambridge Institute has seeded several successful spin-out companies, driving translation of its research into practical biomedical and commercial applications.

The Francis Crick Institute is an exemplar of a multi-partner collaboration across the public, university, charity and industry sectors, including GSK and AstraZeneca. As Europe's largest biomedical research institute, the concentration of expertise and critical mass of researchers at the Crick makes it a vital hub for partnership and collaboration.

The UK Government should help expand the multi-partner institute model, with clarity of mission, sustainable funding and high-quality leadership providing the conditions for beating cancer and tackling other diseases and societal problems.

A new life sciences cluster in Scotland should be established

At Cancer Research UK, we support the creation of a new Scottish health and biomedical institute (SHBI), of a similar scope to the biggest and most innovative institutes in the world, such as the Francis Crick Institute in London or the Koch Institute in Boston.

Delivering multi-disciplinary, multi-disease research with an uncompromising focus on research excellence, this institute would be a nexus for a new life sciences cluster in Scotland and ensure Scotland maintains a globally-significant critical mass and a reputation for global excellence for research well into the next decade.

Our analysis has found that a new SHBI has the potential to contribute £3.3bn of gross value added (GVA) to the UK economy, driven by high value-adding research activity together with construction activity in building the institute[45].

Policy recommendation 03

DSIT and DLUHC should develop clear UK-wide and local strategies to grow diverse research clusters of excellence. As part of this, the UK Government should work with higher education institutions, industry and funders to seed new large-scale research institutes, including a new life sciences cluster in Scotland.

Geography: UK

1.2.4. Creating a robust and resilient biomedical research funding landscape

The current funding model for cancer research lacks resilience

The diversity of funding in UK medical research is one of its key strengths. Government, the private sector and medical research charities fund research across a range of sites – including industry-led facilities, universities, charity core-funded institutes and the health service.

Non-commercial research plays a crucial role in the UK's research environment, focusing on areas of unmet need or where research is not commercially viable, such as paediatrics, radiotherapy and disease prevention. It also works to de-risk research that industry is then able to take forward.

Charities have had to pick up the burden of decades of under-investment by government. Of all publicly-funded (government and charitable) cancer research in the UK, around 38% comes from the government and around 62% comes from charities[46].

The US Government funds five times more cancer research per capita than the UK Government[47] and the Norwegian Government funds over 2.5 times more[48]. In Canada and France, the ratio of government-funded to charity-funded cancer research is 3:1 and 2:1 respectively[49].

Cancer Research UK plays a significant role as a funder in this landscape and is the biggest independent funder of cancer research in the world. In 2022/23, we committed almost £400m to fund new research proposals[50]. We fund around 50% of all publicly-funded research here in the UK[51].

This unique situation, where charities make up a significant proportion of medical research, creates a challenge for the resilience of the system in the UK. Long-term research programmes are being funded from an annual cycle of charitable income generation, which is highly dependent on changes to the external environment – such as rising costs and changes in consumer behaviour or the economy.

At Cancer Research UK, we will continue to fundraise despite challenging economic environments, backed by the generous UK public. But this funding cannot be guaranteed. Lessons from the impact of the COVID-19 pandemic are a stark reminder of the risks associated with a research funding landscape that lacks resilience, with significant reliance on one funding source.

The UK Government must recognise the role it needs to play in cancer research.

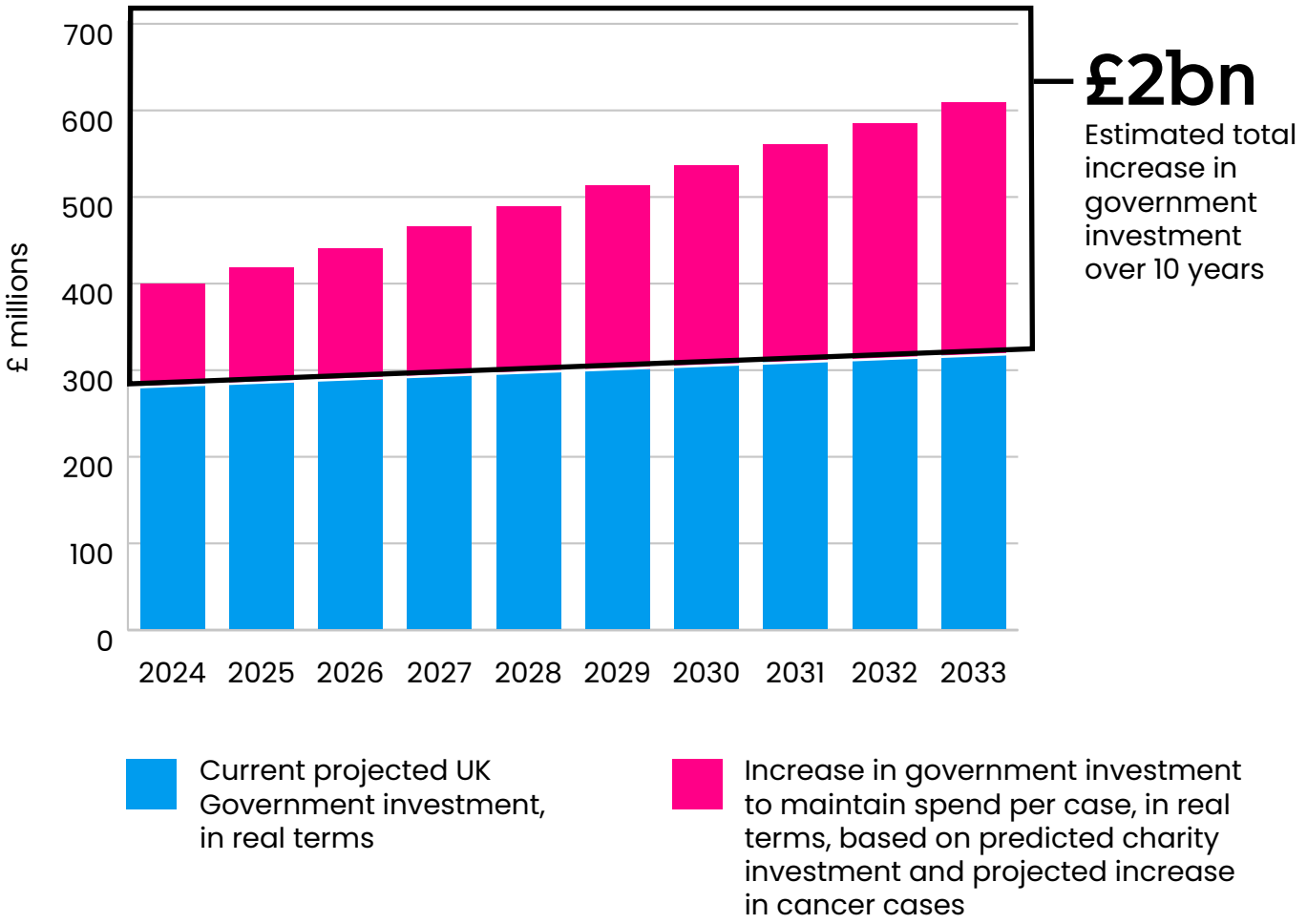
We estimate a shortfall of more than £1bn in cancer research investment over the next decade

Oncology is an area of considerable strength in the UK, with a high volume of high-impact research. Out of 255 research areas, oncology ranks third within the UK for the volume of publications and seventh for citation influence[52]. However, the UK could have significantly more outstanding cancer research than it currently does. Every year, we at Cancer Research UK must decline applications that our independent expert reviewers consider of the highest quality because we don't have sufficient income to fund them.

Assuming charity investment in cancer research is static (which is reasonable given pressures on charity income generation), Cancer Research UK analysis estimates that to maintain an investment equivalent to that of 2019 in real terms, government investment in cancer research would need to rise to ~£121m above inflation annually by 2033. If no additional funding is provided and the government contribution only has a real-terms increase, our analysis estimates that it would lead to a total shortfall of £930m over the next decade (see Technical annex for more)[53].

The number of cancer cases is rising. Therefore the £930m shortfall is an underestimation of what is needed. The government must commit to maintaining the current level of research spending in real terms on a per-cancer-case basis. To maintain an investment equivalent to £1.6m per thousand cases (as per the 2019 baseline), total government investment in cancer research will need to increase each year, reaching ~£609m annually in real terms by 2033. Without this increase in government investment, we estimate there would be a funding gap equivalent to around £2bn for cancer research that needs to be filled between 2023 and 2033 (see Figure C)(see Technical annex for more)[54].

Figure C
Increased UK Government investment in cancer research to maintain spend per case in next decade



In our recent polling, 74% of people either strongly or somewhat agreed that the UK Government should increase its investment into cancer R&D[55]. And around 80% of the public think the government should be directly responsible for funding cancer research, compared to 40% for charities. While the public see a vital role for charitable funding, most expect the government to be doing more.

The current funding model for biomedical research is short-sighted

As set out in section 1.2.1., research cycle timeframes do not line up with much shorter funding cycles, creating challenges to the stability and competitiveness of the UK's research environment.

Institutes are often established with 20–50-year timeframes in mind, but only with five-to-seven-year funding settlements. A new model that provides long-term funding for biomedical research would create better conditions for research and could help drive long-term infrastructure initiatives. This might include a network of multi-partner institutes that conduct basic and translational research, such as the Francis Crick Institute.

Box C

TRACERx and the impact of strategic long-term investment at a multi-partner institute

At Cancer Research UK, we have been at the heart of progress in lung cancer research for over 50 years[56] – from uncovering its causes through to contributing to the development of drugs used to treat it.

But lung cancer is still the third most common cancer in the UK, with around 49,200 people diagnosed every year[57]. Lung cancer survival has not shown much improvement in the last 50 years in the UK, with only 1 in 20 people surviving their disease for 10 years or more[58]. Every year in the UK, there are around 34,800 lung cancer deaths[59]. The most common form of the disease, non-small cell lung cancer (NSCLC), is often diagnosed late, making it harder to treat.

In 2014, we made a strategic long-term investment of £10m in TRACERx – the TRAcking Cancer Evolution through treatment (Rx) lung study – with £4m of additional funding from partners. TRACERx is designed to address this unmet need. Its unprecedented scale matched its ambition, with 250 investigators based at 13 hospital sites across the UK analysing blood and tumour samples from 815 people with NSCLC – a national effort with significant global impact.

The programme has unveiled new insights into how lung cancer evolves over time, unlocked potential new ways to diagnose and treat it, fostered a growing lung cancer research community in the UK and generated new areas for commercial science.

Thanks to TRACERx, researchers can now predict whose lung cancer will return after surgery and who may need additional therapy to help prevent the disease returning. Our understanding of how lung cancer develops has also improved greatly thanks to the TRACERx data. Researchers showed that cells within a tumour evolve differently depending on how many immune cells surround them, and identified several different tactics tumour cells use to avoid immune detection.

Most recently, the lead investigator, Professor Charles Swanton, presented results from TRACERx that revealed how tiny pollutant particles in the air cause inflammation in the lungs that can lead to cancer, fundamentally changing how we view lung cancer in people who have never smoked.

We will be carrying this work into its next stage soon, through an even greater investment of £14m in the TRACERx EVO programme, which aims to build on the foundations of the results from TRACERx and involve more than 450 volunteers with NSCLC. This ambitious programme will combine world-leading scientific and clinical expertise to pursue multiple avenues of research. Strategic, long-term research investment is essential for projects like TRACERx.

We need a resilient and sustainable model for funding biomedical research

The current funding model for cancer research – and for biomedical research more broadly – needs to be reviewed.

Public donations to charity-funded medical research should be on top of robust government-funded research and infrastructure, not a replacement for it.

Getting the best funding model in place would improve outcomes for patients, strengthen UK medical research and better support the UK Government's aspirations for economic growth, prosperity and our position as an international leader in life sciences.

Several options could be explored, including a biomedical research endowment. These are explored further in Box D.

Policy recommendation 04

DSIT and the Treasury should work with charities, industry and public funding agencies to establish a Commission on Sustainable Biomedical Research. This should be tasked with developing a new long-term investment solution for late-stage basic and early-stage translational life sciences research within one year of being established and include setting out a plan for closing the more than £1bn funding gap for cancer research over the next decade.

Geography: UK

Box D
Lessons from other national approaches to providing stable funding streams with potential for return on investment

There are many options that could be explored by a Commission on Sustainable Biomedical Research, including the creation of a biomedical research endowment, capital investment, pension investment, dormant asset investment, bonds and sovereign wealth funds.

Several national endowments have been set up in the UK and overseas with varying levels of government involvement, to provide stable long-term funding for priority initiatives.

The UK's first national endowment, the **National Endowment for Science, Technology and the Arts**, was set up in 1998 using National Lottery funding. It's responsible for setting up many initiatives including digital curriculum innovations, some What Works Centres, GoodGym and the Behavioural Insights Team.

The **Education Endowment Foundation** was founded in 2011 by lead charity the Sutton Trust in partnership with the Impetus Trust (now part of Impetus-Private Equity Foundation), with a £125m founding grant from the Department for Education (DfE). It's now the largest funder of schools research in England.

The USA set up the **National Endowment for the Humanities** in 1965. It's been responsible for the writing of 7,000 books (16 Pulitzer Prize winners), a project to catalogue 63.3m pages of historic newspapers and supports 56,000 lectures, discussions, exhibitions and other programmes annually.

The Australian Government set up the **Medical Research Future Fund** in 2015 to transform health and medical research using priority-driven investments. Their government contributed savings from the health budget to the fund until it reached the goal of AUS$20 billion in July 2020. It's managed through Future Fund (Australia's sovereign wealth fund) with an investment mandate set in legislation to have an average target return of 1.5-2%, which provides around AUS$650m annually to invest in research.

1.3. Attracting, developing and retaining diverse, international scientific talent

To beat cancer we need the brightest minds doing research in an environment that enables them to thrive. This means attracting, developing and retaining talent, and equipping researchers with the skills to succeed.

We must tackle system-wide issues to ensure that research careers are attractive and accessible for everyone, remove the barriers that may stop international talent coming to the UK to do their research, and build a diverse research community. If we do this, we can be confident that we have the best talent to take on the biggest questions in cancer research.

1.3.1. Making the UK attractive, affordable and accessible to global research talent

UK research benefits from an international workforce

Research is an inherently global endeavour. Cancer crosses borders, so research needs a cross-border approach to beating it.

The research workforce in the UK is highly international, and that is part of what makes UK research thrive. In the 2022 UK Research and Innovation Workforce Survey, over half of all respondents had worked abroad in their career and a quarter held non-British citizenships[60]. International talent makes up a significant proportion of our researchers. At the CRUK Scotland Institute (formerly the CRUK Beatson Institute), 24% of staff are from the EU and 18% are from the rest of the world. In applications to CRUK Fellowships for 2020–23, 40% were international, with 25% from the EU and 15% from the rest of the world[61].

Recruiting internationally raises the quality of research undertaken because organisations can draw from a pool of the best global talent[62]. International researchers can also bring new skills, approaches and networks[63]. There's also an immediate need for international recruitment to meet the government's own estimate of needing 380,000 additional researchers by 2027[64].

To help attract research talent, the immigration system needs to be more affordable

Following the UK's exit from the EU, the immigration system was significantly overhauled and free movement for EU/EEA Nationals ended on 1 January 2021. Some aspects of the new visa offering are welcome, including the introduction of the Global Talent Visa, and reductions to the skill level and minimum salary for the Skilled Worker Visa, which made it more accessible to technicians[65].

However, barriers in the new system are limiting the recruitment and retention of the best international research talent. This is a major concern for the cancer research community.

A critical barrier is the high upfront costs of obtaining a UK visa. These are some of the highest in the world. They include the visa fee, Immigration Health Surcharge (IHS) and Immigration Skills Charge (ISC). In July 2023, the UK Government announced a 66% increase to the IHS and 15–20% increases to work or study visa application fees – raising upfront costs and exacerbating barriers to attracting and recruiting research talent[66].

- UK visas, especially the Global Talent Visa (GTV) and Skilled Worker Visa (SWV), are significantly more expensive than for comparable research-intensive countries. Visa fee increases came into effect on 4 October 2023. The SWV now costs £719–£1,500 (depending on length) and the GTV is £716. The GTV equivalent is significantly cheaper in the US (£377) and France (£232), and is under £100 in Germany, Canada and Portugal. There is a similar picture for the Skilled Worker Visa, costing £574 in the US, and under £100 in France, Germany, Canada and Portugal[67].
- The requirement to pay the Immigration Health Surcharge for all visa years upfront (currently £624 per year or £470 for students[68]), compared to countries where health insurance is paid over time, means the UK has the highest upfront costs for researchers in the world, especially when factoring in dependents. The IHS is set to increase to £1,035, at a date to be confirmed[69].

- The Royal Society modelled that a person coming to the UK with three family members on a five-year SWV would pay up to £16,591 upfront, or £13,372 on the GTV, prior to the cost increases[70]. The Campaign for Science and Engineering estimate that this will increase to £20,980[71].

When the burden of these costs falls on individuals, it reduces the UK's ability to compete for international talent. When the burden falls on employers – for example, a research institute – it reduces the amount of life-saving research those organisations can fund.

As EU/EEA citizens now require visas to conduct research in the UK, they also face these upfront costs. This has reduced their motivation and ability to come to the UK, as they can continue to move within the EU for free. Findings from our research community (see Box E) show it has become harder to recruit and retain international talent since the UK left the EU.

Box E

Findings from our research community on recruitment and retention of talent since the UK left the EU[72]

In a recent survey of our research community, 76% of people said that the recruitment and retention of talent was one of the three factors most important to successful research.

But 76% said they had faced difficulties in recruitment and retention of staff and/or their own plans due to the new UK-EU relationship.

According to Professor Julian Downward, Head of the Oncogene Biology Lab at the Francis Crick Institute: "EU originating post-doctoral students [...] were the majority of my workforce. Now we struggle to find anyone from the EU willing to come to the Francis Crick Institute – a top UK cancer research centre. This loss has been a major negative factor for UK scientific achievement since 2016.

"We need to improve the immigration system, making it easier to bring in talented people from abroad. We spend a huge amount of money on immigration fees – money that would better be spent on research."

Current immigration policies are damaging the UK's access to global talent, directly undermining our ambition to be a world-leading science nation. The UK Government must take action to reduce immigration costs to a level competitive with comparable leading research nations. There is large public support for doing so: 73% of the public support the UK Government making it easier for medical researchers/scientists to come to the UK for work[73].

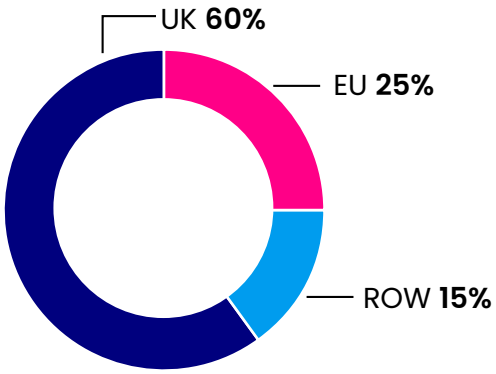
Policy recommendation 05

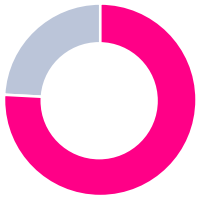
By the end of the next parliament, the Home Office should reduce overall and upfront immigration costs for researchers so they are competitive with comparable leading research nations. To support this, by 2026, the Home Office should work with DSIT to initiate a review on the impact of the immigration system on the recruitment of international research staff.

Geography: UK

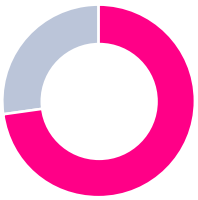
Figure D
International researchers are vital to cancer research, but it is becoming harder to recruit them

Applicants to CRUK Fellowship, 2020-2023[1]





76% of surveyed cancer researchers have faced difficulties with recruitment and retention since Brexit[2]



73% of the public are in favour of making it easier for researchers to come to the UK for work[3]

Sources:
1. CRUK internal data
2. CRUK researcher survey on UK-EU relationship, 2023
3. CRUK public opinion polling 2023

1.3.2. Building a research culture that fosters a diverse and collaborative research workforce

To attract, develop and retain researchers during their careers, we need to create a supportive, accessible and rewarding environment. But today, issues around the trajectories of research careers, research culture, assessment and diversity in the research workforce can limit innovation and lead to talented people being lost from the sector.

Researchers lack stable employment contracts

There are not enough stable, permanent contracts, particularly for early- and mid-career researchers. This is due to scarcity of funding, funding streams being directed to projects rather than individuals and limited growth in un-hypothecated QR funding to universities. CEDARS 2021 survey results found that only 19% of early-career respondents were on permanent contracts, compared to 89% of established researchers[74].

Tackling the financial sustainability of universities as set out in section 1.2.2. would make it more feasible to provide longer-term contracts to researchers. But universities should also consider other options to provide more stability to researchers, such as open-ended limited contracts.

Career paths need to facilitate better sectoral mobility

Sectoral mobility, where researchers move across academia, industry and other sectors, has benefits for individuals and the whole system. It improves skills, allows for the transfer of knowledge and fosters collaboration[75]. But issues in academia – including the lack of stability, the 'publish or perish' culture, and limitations on re-entry into academic roles – can lead to a one-way loss of talent from academia, meaning we don't realise the full benefits of sectoral mobility.

We need to increase the flexibility in career paths, including through re-entry into academia. Harmonised secondment, exchange and joint appointment schemes could also help tackle the one-way sectoral mobility.

Improving incentives and reward systems could improve research culture

Traditional academic assessment systems that use markers such as people's publication rate and grant award history have created a research culture that focuses on individual success. This has created a 'publish or perish' culture, where people cannot secure funding, progression and career stability without a recent history of paper authorship.

This reduces re-entry into academia after career breaks or time in other sectors and creates pressure for publications to be produced at speed, which often risks lower quality papers and reproducibility of research outputs, as well as affecting the wellbeing of researchers. People from under-represented groups often feel the biggest impact, which perpetuates inequalities and reduces workforce diversity[76].

The 2021 R&D People and Culture Strategy acknowledged these pressures and set out how incentives and assessments could be changed to value a wider range of contributions[77]. DSIT and UKRI have taken positive steps. This includes the use of narrative CVs (which look at wider academic contributions) to replace publication and impact factor-focused CV formats. They also announced that the Research Excellence Framework 2028 will shift focus from individuals to broader institution-level measures of research excellence and culture. These steps, which we welcome, need to be evaluated to ensure they are making a positive impact and to mitigate any unintended negative effects.

Policy recommendation 06

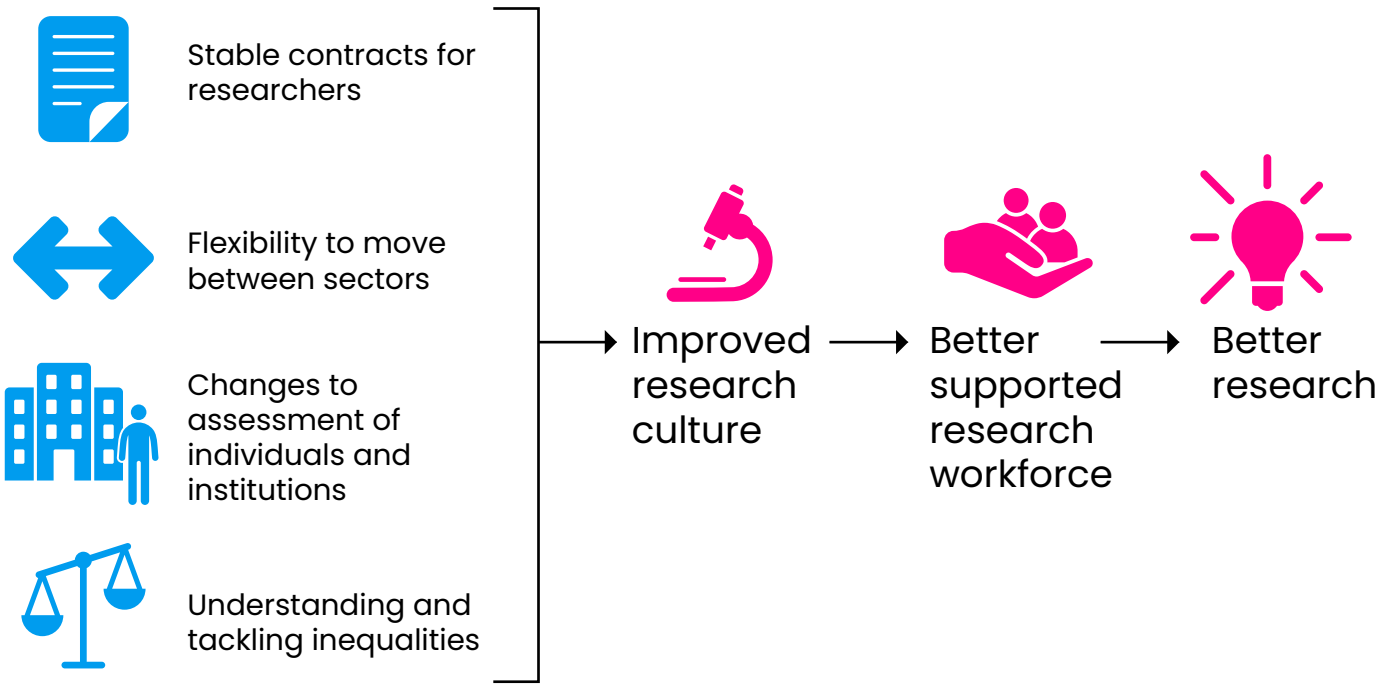
DSIT should work with UKRI to strengthen the UK's research culture. This should include action to increase the stability of roles, support sectoral mobility and ensure incentives for universities to improve research culture are considered in the development of REF2028.

Specific actions could include:

- Implementing models to fund individuals rather than projects.
- Expanding and establishing schemes to enable bidirectional movement between sectors.
- Continuing to roll out and evaluate narrative CVs.
- Continuing to roll out and evaluate the REF2028 shift in focus from individual to institutional-level measures of research excellence and culture, in consultation with the sector.

Geography: UK

Figure E
Addressing sector-wide issues to improve research culture and careers



Improvements in data collection will help foster a diverse research workforce

A diverse research community means having the best talent working on the full range of questions in cancer research. It also means maximising scientific creativity and excellence, and conducting research that is inclusive of society as whole.

But society is not fairly represented in research. Data on the diversity of our researchers shows there is lower representation of women, Black researchers and those with disabilities, with substantial attrition through seniority levels. This picture is consistent with data available across the wider sector. For example, HESA data for 2021/22 shows that only 4% of STEM PhD students were from Black backgrounds, falling to 2.5% at staff level and even lower in the most senior roles[78].

There are a broad range of factors that impact the diversity of people entering and progressing in research. These include systemic underrepresentation, research culture and career instability, prejudice and bias, and bullying and harassment. Progress isn't happening fast enough and it's hampered by a lack of comprehensive data, which means that the full picture of inequalities in research is unclear and the impact of interventions to address them is difficult to monitor.

To make meaningful progress, we need a greater understanding of inequalities, the barriers that perpetuate them and effective interventions to address them. This requires a collaborative effort from all parts of the system – research institutions, industry, research funders, policymakers, individuals and the government.

Government strategies on the research environment and culture should set out actions to better understand inequalities in the research workforce and have a clear, monitorable action plan to tackle them to increase diversity and inclusivity. This should be underpinned by better data monitoring.

The Research and Innovation Workforce Survey 2022, recently published by DSIT, is welcome as it provides a UK-wide cross-system analysis of the people working in research and innovation (R&I)[79]. However, because of the scale and scope of data collection, its results are not sufficiently broken down by sector, field or seniority level. In addition, the narrow engagement method used in the survey isn't ideal as it led to reduced coverage of the UK workforce and was skewed towards UKRI grant holders, which limits the accuracy of the results.

Policy recommendation 07

DSIT should increase the value of the data collected in future versions of the R&I workforce survey by improving coverage, data collection and disaggregation to provide a comprehensive nationwide overview of equality, diversity and inclusion in research. DSIT should then publish an action plan to address the inequalities in the research workforce that have been identified.

Geography: UK

Box F

Cancer Research UK's efforts to address inequalities in research

Whilst the UK Government must support the improvement of equality, diversity and inclusion across the whole of UK research, we recognise that tackling inequalities requires a collaborative effort from all parts of the system. As the largest independent funder of cancer research, we know that we have a responsibility to lead by example.

We are committed to understanding and acting to improve diversity in our research, including in how we fund, who we fund and what we fund.

- **We now annually monitor and publish data on the diversity in our grant funding**, using Diversity and Inclusion Survey (DAISY) question guidance to identify barriers and assess how we can take effective action against them[80].
- **We set out an EDI in research action plan for 2021–23** to lay out our commitments to tackle inequalities that are identified in this data, including by ensuring fair and inclusive funding processes, providing career development and support and pursuing inclusive research design[81].
- **We run positive action schemes** to provide support for people from underrepresented or disadvantaged groups, including supporting Black researchers through the Black in Cancer Conference and the Black Leaders in Cancer PhD Programme[82].

We're proud of the progress we're making. But we are not complacent. We know that most of our priorities aren't quick wins, so we'll continue to hold ourselves to account and strive for significant long-term change.

1.4. Taking a global approach to tackle the biggest challenges in cancer

> "I don't care about geographical boundaries in Europe (or most of the rest of the world). I just care about scientists being able to work together."
>
> Response to our online survey of people affected by cancer, 2023

Tackling the biggest challenges in cancer requires a global approach. 61% of Cancer Research UK research published in the last five years involved international collaboration[83]. Almost 80% of cancer researchers we recently surveyed are currently involved in multinational collaborations and evidence shows collaborating overseas makes research more impactful[84,85]. And the rise in cancer cases across the world[86] is leading to increased awareness and greater prioritisation of cancer as a major global health challenge.

The UK Government must make sure UK cancer researchers can collaborate as seamlessly as possible with colleagues around the world. This will increase the impact of research and speed up the development of groundbreaking discoveries. Cross-border collaboration is also essential to research rarer cancers, as trial participants from one country alone can't generate enough data to draw conclusions. In a recent survey of people affected by cancer, 99% agreed that our researchers must be able to start and continue new projects easily with partners around the world, including those based in EU countries[87].

Box G
Cancer Research UK's role in global research

We are a key part of the global cancer ecosystem:

- We maintain strong research partnerships with many countries, including the USA. Our flagship Cancer Grand Challenges (CGC) initiative, founded with the US National Cancer Institute and supported by a growing network of international partners (including the Scientific Foundation of the Spanish Association Against Cancer, the Dutch Cancer Society, The Mark Foundation for Cancer Research, and most recently France's Institute National Du Cancer), has funded projects across 10 countries with a total investment of £230m to date, around half of which we have leveraged from the other partners.
- Our partnership with five world-leading transatlantic centres on the International Alliance for Cancer Early Detection (ACED) funds innovative research across the translational pipeline.
- We host the International Cancer Benchmarking Partnership (ICBP), a unique multidisciplinary collaboration including 22 jurisdictions across eight countries and three continents. It measures global variances in cancer, identifies factors that might drive these differences, shares best international practice and generates insights needed for policy and practice change. The ICBP has shown, for example, that countries with consistent cancer policies supported by robust implementation and funding plans had the greatest improvements in cancer survival during the analysis period[88].

1.4.1. Participating in multinational research funding programmes

Researchers and patients want the UK to be closely involved in EU funding programmes

Association to the world's largest research and innovation funding programme, Horizon Europe, offers unparalleled opportunities for the UK. It helps foster international collaborations and helps to make the UK an attractive destination for world-leading scientists. Now this has been unlocked, UK-based cancer scientists are in a strong position to win funding from Horizon Europe, including its Cancer Mission.

In our 2023 researcher survey, 75% of respondents wanted to see associate membership of Horizon Europe and future EU funding programmes[89]. This is a view shared by people affected by cancer, with 95% of those we surveyed agreeing that the UK must continue to participate in, and fund its proportion of, major EU research programmes that support scientific collaboration around the world[90].

Policy recommendation 08

The UK Government must continue to support prestigious multinational research funding programmes (including Horizon Europe and successor EU framework programmes after 2027), and should join and lead the development of further global research programmes, including on cancer.

Geography: UK

Box H

Multinational partnerships help address cancer's biggest challenges

It's becoming increasingly clear that bowel cancer – the third most common cancer worldwide[91] – is intricately linked to microbes in the gut. By exploring how these microbes drive cancer and influence a person's response to treatment, Team OPTIMISTICC could transform outcomes for people around the world.

Team OPTIMISTICC is located in Canada, the Netherlands, Spain, the USA and the UK, and funded by us through the Cancer Grand Challenges programme.

The scope of their plan is unprecedented. Within five years, they aim to have revolutionised our understanding of the role the microbiome plays in cancer development, found new ways to prevent bowel cancer and defined new treatment strategies that manipulate the microbiome.

And while their project is focused on bowel cancer, the team is confident their findings could open new avenues of exploration for many other types of disease.

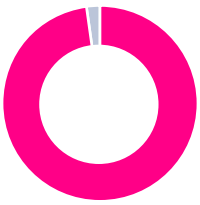
1.4.2. Minimising barriers to cross-border research

UK and EU regulatory frameworks must be compatible, and trade friction must be reduced

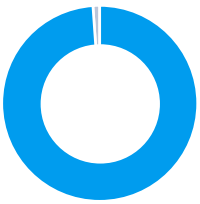
Cross-border research is critical for faster progress and is a key component of UK cancer research. In our 2023 researcher survey, 78% of respondents said they were involved in multinational collaborations. 58% said they plan to collaborate with scientists in the USA in the immediate future, and 92% said the same for scientists in the EU. While nearly all (98%) respondents said collaboration with EU-based scientists is important, nearly four in five (79%) said that since the UK left the EU, it has been harder to begin new collaborations with scientists and researchers based in EU countries[92].

Figure F
International collaboration

We have 150+ research partnerships worldwide[1]



98% of CRUK's research community believes collaboration with EU-based scientists is important.[2]



99% of people affected by cancer think it should be easy for CRUK scientists to collaborate on projects with global and EU researchers.[3]

Sources:
1. https://www.cancerresearchuk.org/funding-for-researchers/how-we-deliver-research/our-research-partnerships
2 CRUK online researchers' survey, 2023
3. CRUK online survey of people affected by cancer, 2023

Almost all (90%) paediatric trials carried out in clinical trial units we fund are international[93]. These are most likely to involve cross-border partnership because childhood cancers are rare and therefore large studies are needed to gather enough participants. Often a trial is the only treatment option a child with cancer has, meaning it can be a family's last hope. But the new UK-EU relationship has made it harder to set up trials between the UK and EU countries.

Compatibility with international standards and practices is vital to cross-border trials. The extent of UK-EU collaboration, coupled with the fact the EU market is considerably larger than the UK's, means compatibility with EU regulations is essential. While an EU member, the UK clinical trial community was instrumental in driving through welcome changes to the EU's new clinical trials framework, which should benefit UK researchers and patients. With the UK making up only 2.4% of the global pharmaceutical market and slipping from 4th to 10th globally for phase 3 clinical trials, maintaining compatibility with larger markets is essential to stay competitive and attract industry investment[94,95].

As the UK continues to develop a new relationship with the EU, making sure future regulations are compatible is essential, along with reducing other barriers to cross-border research. For example, the cost of importing drugs for use in the E-SMART children's cancer platform trial – a collaboration between long-established partners at Gustave Roussy in Paris and our world-leading Clinical Trials Unit in Birmingham – almost quadrupled from €52,000 to €205,000 after the UK-EU Trade and Cooperation Agreement came into force in 2021[96].

Additional bureaucratic hurdles have resulted in delays and a complete block in delivering some trial drugs in the UK, depriving children in the UK of new cancer treatments. Cancer researchers must have access to a stable supply of items for research settings at a more reasonable cost.

Policy recommendation 09

The UK Government must prioritise compatibility with the EU's clinical trials regulatory framework to avoid bureaucracy, cost and duplication. Reducing new frictions that undermine research collaboration should also be prioritised in the implementation review of the UK-EU Trade & Cooperation Agreement.

Geography: UK

Box 1
Global collaboration helps UK patients to access potentially life-saving treatments faster

The DETERMINE trial, funded by Cancer Research UK, has joined a Europe-wide effort to boost patient access to precision cancer medicine, including for children and young people's cancers. The PRIME-ROSE consortium – within Horizon Europe – will come together over the course of five years and work with regulators, policymakers, healthcare providers and patient advocacy groups to implement evidence-based precision cancer medicine in routine clinical practice.

Dr Matthew Krebs, Chief Investigator for the DETERMINE trial, says "Our collaboration with European colleagues within the PRIME-ROSE consortium will help to speed up assessment of the role of these treatments across Europe and provide potential to bring new life-prolonging treatment options to patients with rare cancers."

Chapter 2
Translate

Which missions and priority actions are covered by this chapter?

Mission 1

Rebuild the UK's global position in biomedical research.

Priority actions:

- The UK Government should set an ambition, in its first 100 days, to lead the G7 in research intensity and set out a plan to get there by increased government investment and making the UK an attractive research destination.

Mission 4

Bring tests, treatments and innovations to patients more quickly.

Priority actions:

- The UK Government and NHS England should direct ICBs and Health Innovation Networks to accelerate the translation of innovations to better detect, diagnose and treat cancer.

Sections in this chapter:

2.1. Introduction
2.2. Fostering the commercialisation of research
2.3. Transforming UK clinical research
2.4. Streamlining and strengthening, from approval to adoption
2.5. Promising innovations for cancer, and key enablers for their implementation

2.1. Introduction

Making discoveries about cancer is the key to beating it. But discoveries alone aren't enough. They need to be translated into tests and treatments that can save and improve lives.

At Cancer Research UK, we have made discoveries across the scientific disciplines that have deepened our understanding of cancer and have provided solutions to address some of cancer's greatest challenges. But we are yet to unlock the full potential of the decades' worth of cancer research.

The UK must get better at translating research into real-world applications and rolling these applications out for widespread use. Not only will this improve health outcomes, but it will also strengthen the economy by creating and attracting life sciences companies and bringing in new jobs.

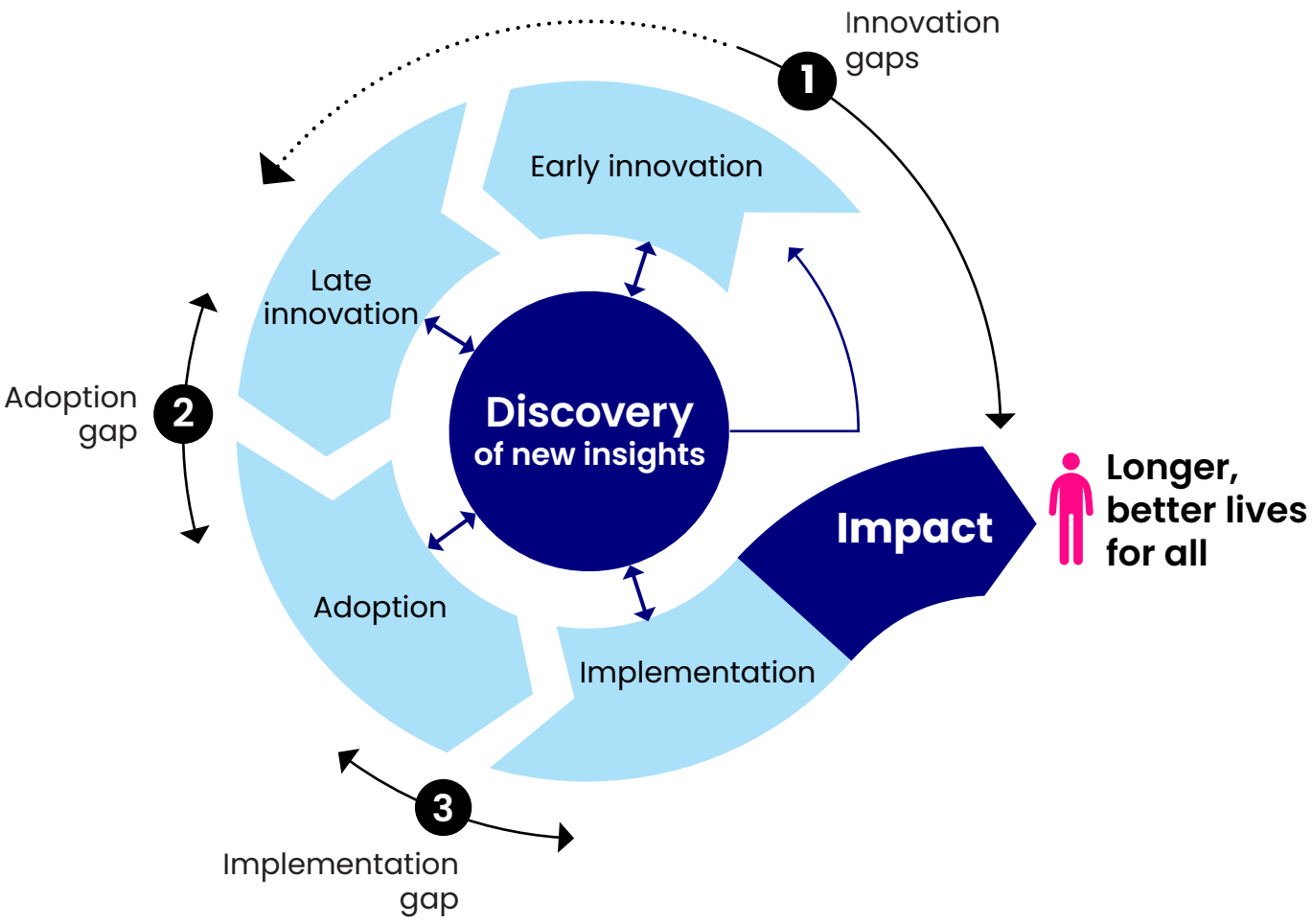
The innovation wheel (see Figure G) sets out the stages of translating discovery research into new innovations, and then adopting and implementing them so they can benefit patients. To pull a scientific or technological advancement into the innovation wheel and

move it through each step of the pathway takes coordinated efforts across several stakeholder groups – groups that currently exist in a fragmented and complex landscape.

The 'early innovation' and 'late innovation' phases rely on developing research into useable tools and technologies through commercialisation and conducting clinical research, including trials to test their safety and effectiveness. There are then several steps across the 'adoption' and 'implementation' phases – from determining that an innovation is safe and effective and gaining full approval, to wide-scale implementation.

If the UK Government can optimise this process, it could make the UK a world-leader in pioneering new tools and technologies that help us beat cancer.

Figure G
Innovation wheel



The UK innovation environment can be strengthened at all stages of the pipeline

Medical research charities, academic institutions, small and large life science and pharmaceutical companies, regulators and the national, regional and local teams within the NHS all play significant roles across this pipeline. The UK Government must make sure that the right leadership, investment and resource is given to stakeholders across this landscape.

Responsibility for the innovation pipeline in England currently sits across several departments, including DSIT, DHSC and OLS. Determining clearer points of responsibility for different parts of the pipeline would help drive forward progress and coordinate other players in the sector.

The early stages of translation need to be better supported across the research and health ecosystem, through government-backed interventions, prioritisation by public funding bodies, and by incentivising translation in academia.

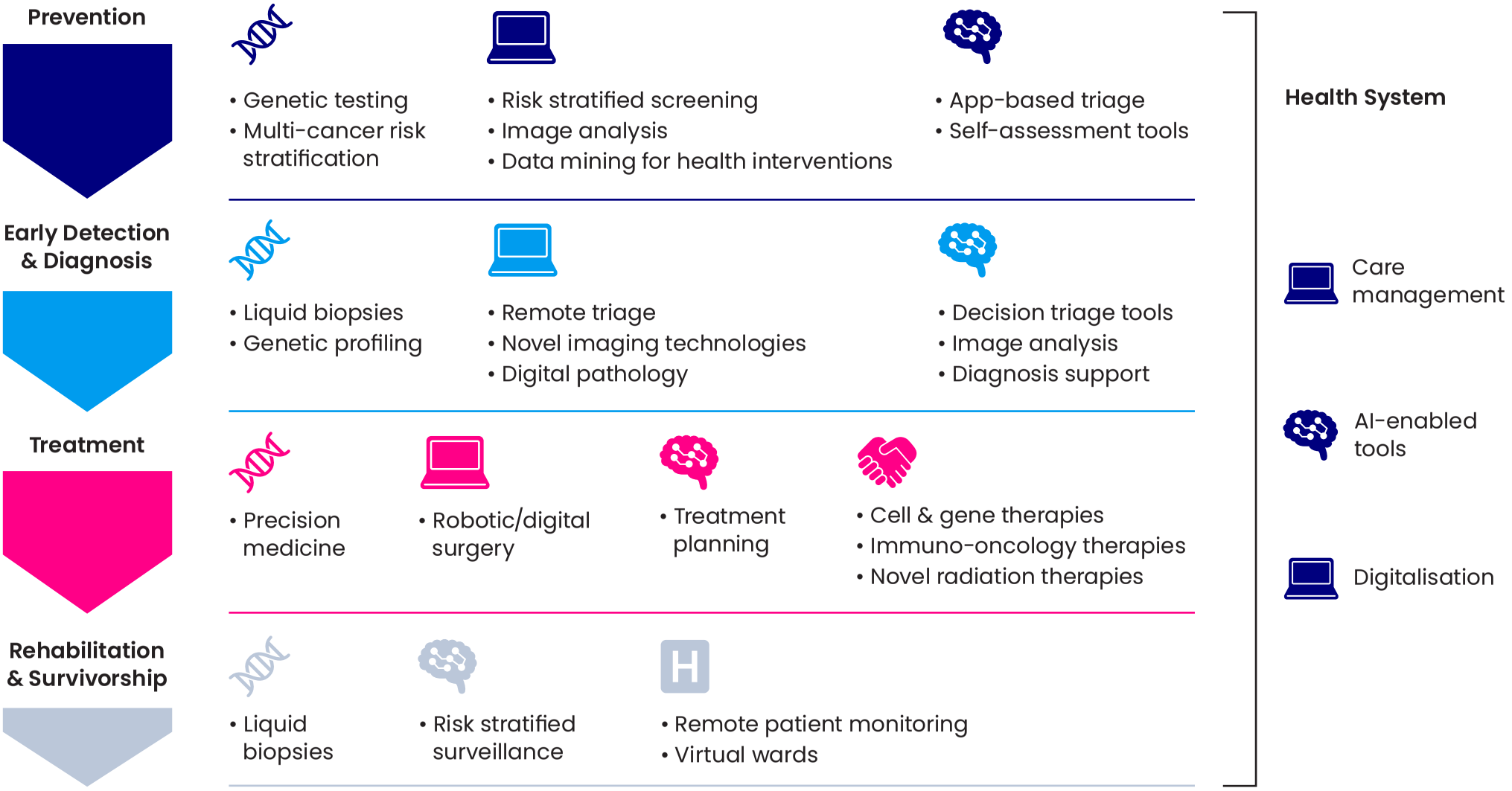
The later stages of translation, adoption and implementation need to be supported by greater capacity and resource from the health system. And the infrastructure of the health system needs to be better prepared for the successful adoption of innovations. This means embedding a culture of research and innovation into the NHS, with sufficient time given to health professionals to conduct research. It means upgrading and maintaining infrastructure, estate and equipment. And it means engaging with patients and the public, and training healthcare professionals so that proven innovations can be effectively and equitably rolled out. Harnessing expertise from social and behavioural science will ensure people implementing and receiving innovations are ready for these changes.

If we can strengthen the environment for innovation in the UK, the potential for improving cancer outcomes is enormous – from new detection and diagnostic tools and novel medicines to digital technology and data platforms, through to the transformation of pathways for diagnosis or treatment (see Figure H).

Innovations also have the potential to help relieve pressure on the NHS, by providing more efficient ways of diagnosing and treating disease, reducing the administrative burden and making sure resources are being used in the most effective way.

With its flourishing life sciences and tech industry and its unique, population-wide health system, the UK could become a world leader in cancer innovation.

Figure H
Innovations over the pathway



This is not an exhaustive list of innovations across the cancer pathway
Produced by Strategic Evidence, Policy Information and Communications Directorate, Cancer Research UK

2.2. Fostering the commercialisation of research

To improve cancer outcomes, discoveries need to be turned into useable tests, tools and treatments. The process of commercialisation is a collaboration between medical research charities, universities, the health service and small and large life science and pharmaceutical companies.

Medical research charities play a significant role in de-risking early-stage research and attracting industry investment for translational research, which drives growth. For example, in 2020, 10 of our largest spinouts together spent £421m in real terms on cancer R&D in the UK. This generated 10,850 jobs and £824m of GVA in the private sector[97].

Approximately 63% cancer research in the UK is funded by the private sector, so it's critical this sector thrives and is internationally competitive[98]. But the UK is increasingly struggling to attract private investment – with the government's 2023 Life Sciences Competitiveness Indicators finding a 47% drop in inward life sciences Foreign Direct Investment, seeing the UK drop from second to ninth out of the 18 comparator countries used[99]. This trend urgently needs to be reversed.

2.2.1. Capital to support the early stages of translation

We support cancer researchers to turn their ideas for new cancer innovations into companies. Our innovation arm, Cancer Research Horizons, has supported the creation of nearly 70 startups who have raised over £3bn to date[100].

Lack of access to capital is a barrier for life science companies

When life science companies are founding and growing, they face barriers unrelated to the quality of their science and potential impact for patients. One major barrier highlighted at a roundtable of life sciences spin-out experts we hosted in summer 2023 was lack of access to capital. Tackling these financial barriers could help the UK become a magnet for international investment and talent.

The lack of access to 'scale-up' capital means promising companies are unable to list (become a publicly traded and owned entity), grow and stay in the UK. Instead, they might fail, list too early or list and scale overseas. As many as 50% of scale-up leaders surveyed do not think they have the right amount or type of funding in place to support their growth ambitions[101].

Better access to funding is also needed at the early stages of translation, before company formation, so start-ups aren't formed too soon. Cancer Research Horizons' new seed fund looks to bridge this by attracting early-stage risk capital with a rolling £15m/ five-year investment for startup propositions across oncology[102].

The UK Government should address these capital gaps through better use of incentives, such as tax credits, creating 'pull' via health service procurement, and making more early-stage translational funding available through public funding agencies to de-risk novel ideas at the pre-company stage.

Government could also incentivise and promote alternative longer-term investment sources to help companies scale up. The estimated time between investment in cancer research and the eventual impact it will have for patients is around 15 years in the UK[103]. Supporting longer-term investment in innovative firms will help ensure novel research-driven innovations reach their full potential for improving health outcomes. One way this could be achieved is through engagement with the pension industry to unlock pension funds for high-growth life sciences start-ups. There have been recent positive steps, including the Mansion House Compact, to unlock these funds. This should now be further built on and expanded.

Policy recommendation 10

DSIT should work with the Treasury and DBT to enhance and expand government-backed schemes that encourage investment from larger investment funds into the early stages of translation to support UK-based life sciences companies. This includes, but is not limited to, collaborating with the pension industry to re-allocate pension funds.

Geography: UK

2.2.2. Creating a culture of entrepreneurship in academia

A culture of innovation and entrepreneurship supports commercialisation through the development of and access to talent. However, at our roundtable of life sciences spinout experts in summer 2023, we heard that the successes of entrepreneurs are not celebrated in UK academia and there is a stigma of failure. We heard indications that this culture may be shifting, but entrepreneurship is still not normalised.

This is reflected in the UN's World Intellectual Property Organization (WIPO) 2023 global innovation ranking, where at 42%, the UK ranks 34th for the percentage of research talent in business[104]. The USA, where there is a greater acceptance of risk – and sometimes an expectation on students to set up companies – is ranked second with nearly double the UK's percentage at 80%[105]. The result is a huge imbalance between the number of UK institutions that rank highly on research versus those that rank highly on innovation – with 17 UK universities in the top 100 in the 2022 QS World University Rankings, but just five in Reuters top 100 for innovation[106].

The commercialisation process is complex. For example, navigating intellectual property requires specific expertise that academics and some universities don't have. This can block or slow down the translation of a brilliant idea into a company.

These barriers are more pronounced in some locations than others. There is promising growth in spin-outs from some institutions, but over 50% of spin-outs originate from only 10 universities, with over half of these formed in the South East[107]. These suggests there is untapped potential across the UK to take excellent research ideas through to patient benefit.

Better incentives are needed to promote entrepreneurship in the UK

To tap into these opportunities, we need to make research translation and commercialisation more of a priority in academic careers. Cancer Research Horizons provides support through a suite of entrepreneurial programmes, and our competency framework ensures that translational and entrepreneurial efforts are recognised and valued appropriately in the assessment of our fellowships applications[108,109].

But there is still an important role for government to provide incentives and support. This includes continuing to recognise commercial innovation as an institutional measure of success in research reward systems, such as REF2028, and improving rewards for people to be entrepreneurial. Government action to connect the biosciences sector to UK business schools could increase the number and quality of business leaders able to support life sciences start-ups.

Talent gaps can be addressed by increasing the porosity in career paths, including sectorial mobility between industry and academic sectors as set out in section 1.3.2. It's also important that large pharmaceutical companies stay in the UK to provide a talent pool for smaller or forming companies. Therefore, making the UK more attractive to the established pharmaceutical industry also has indirect value.

Policy recommendation 11

Building on existing progress embedding commercial innovation into institutional reward systems (such as REF2028), DSIT should work with research councils and universities to better incentivise and reward individual entrepreneurs, such as in promotion criteria and grant applications.

Geography: UK

2.2.3. Developing a health economics model for ED&D technology

Ambitions for the early detection and diagnosis of cancer will not be achieved without significant focus and investment in research and innovation. There is a huge need to develop more technologies that detect and diagnose cancers earlier. There are still only four recommended screening programmes in the UK that detect cancers asymptomatically, and very few tests and innovations that can help primary care to recognise and quickly refer those who do present with symptoms.

A health economics model for ED&D would incentivise R&D investment

As identified in our Early Detection and Diagnosis Roadmap[110], there are several barriers. These include a historic under-investment in research for the early detection and diagnosis of cancer, a complex regulatory landscape, inappropriate reimbursement models, and lack of support for promising technologies. One critical barrier is a lack of a health economics model, which ultimately disincentivises R&D investment.

ED&D tests do not routinely include health economics components early enough in their development. This is often due to uncertainty around what targets to aim for and because characteristics like cost effectiveness depend on factors beyond the test itself, such as where and how it is implemented in practice. And without a robust mechanism to decide what the healthcare system is willing to pay for a novel test, there is less willingness to pay for detection technologies than there is for drugs.

A health economics model would encourage more investment from both public and private sectors, allow new business models to be developed and tested, and encourage global investment via more clearly defined pathways to adoption. The UK Government should work with the wider sector – including DHSC, DSIT, OLS, the health service, NICE, funders, industry, economists and patients – to develop this.

There is an urgent need to address this challenge, particularly as novel and potentially transformative ED&D technologies, such as multi-cancer early detection tests, start to produce trial results. It's essential that decisions about whether to adopt emerging technologies are transparent and provide clarity to innovators.

If the UK is unable to garner sufficient industry investment for ED&D technologies, the translation of early-stage research can only go so far. In this case, the UK Government would need to step in to ensure ED&D research achieves its full potential to have a positive impact on health and patient outcomes and the economy.

Policy recommendation 12

DHSC and equivalents in the other UK nations, DSIT and OLS must work with public funders to coordinate investment in ED&D research. They should also convene a cross-sector working group (to include the health service, funders, NICE, industry, economists and patients) to develop a comprehensive health economics model for ED&D.

Geography: UK

2.3. Transforming UK clinical research

"I knew nothing about clinical trials before I joined one. Now I realise how important they are. They're needed to test new treatments, new drugs, and new drug combinations. Without them we wouldn't be able to make any progress; things would just stand still.

"I'm so grateful to have been given the opportunity to join a clinical trial. I truly believe it's what's allowed me to see my grandson Tommy grow up. He's my little mate. We do everything together. But if it wasn't for research, I might not have got to see him at all."

Tommy, Cancer Research UK trial participant

Clinical research plays a critical role in translating scientific discoveries into safer, kinder and more effective cancer diagnostics and treatments. Through clinical trials, current patients can access the latest drugs and technologies while their suitability for future use in the health service is determined.

Evidence shows that greater research activity in the health service is associated with an overall higher quality of care, lower levels of patient mortality and improved staff recruitment and retention[111, 112, 113, 114].

The economic benefits of clinical research to the health service are also clear[115]. Non-commercial research, supported by the National Institute for Health and Care Research (NIHR) Clinical Research Network, also contributes approximately £0.9bn of GVA and nearly 19,000 FTE jobs per year to the wider economy[116].

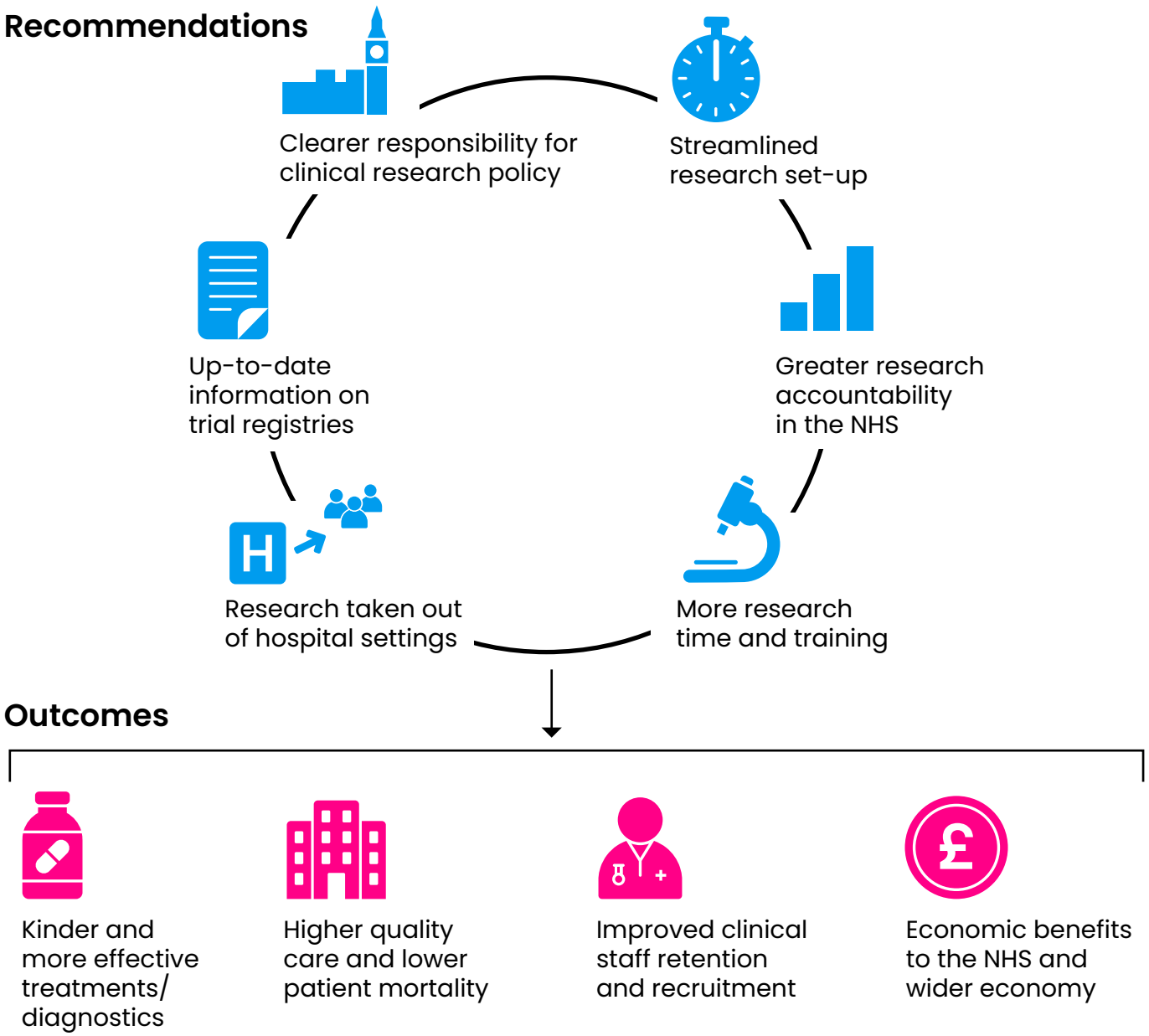
However, according to Cancer Research UK's 2023 survey of the UK clinical research workforce, 74% of people found it more difficult to deliver research in a timely manner in the past 18 months, while 69% feel it has also become more difficult to meet research recruitment targets[117]. And the number of commercial trials initiated in the UK per year has fallen by 41% between 2017 and 2021[118].

There is acknowledgement across the sector that the drop-off in industry activity must be addressed, not least because the fall in recruitment to industry trials in the last five years means the NHS is estimated to have missed out on approximately £930m of direct income[119].

Whilst it's critical to prioritise restoring the UK's reputation as a world-leading research base for industry, we must not forget that more than 922,000 patients access non-commercial research in England each year[120]. Many patients rely on this research, often run by universities and research institutes and funded by medical research charities, for potentially life-saving treatments. This is particularly true of people with rare and paediatric cancers where research is not considered commercially viable or is deemed high-risk.

There is a clear consensus in the life sciences sector about the steps needed to improve the clinical research environment, with no shortage of promising policies, strategies and initiatives[121, 122, 123]. But to accelerate improvements, there needs to be clearer points of responsibility for, and better governance of, clinical research in government, with input from key health research stakeholders, including charities.

Figure I
An interconnected policy response: unlocking the benefits of clinical research



2.3.1. Speeding up and streamlining clinical trial set-up

The UK is falling behind on clinical trial set-up times

Regulators, along with the health service, must streamline how clinical research is set up and delivered, so we can increase efficiency and ensure more patients have access to new treatments and technologies. Between 2018 and 2021, the median time taken for a commercial trial applying for regulatory approval and that trial delivering its first dose to a participant rose by 22%, to 271 days[124]. This puts the UK ninth amongst 10 comparator countries. The United States had a median of 159 days in 2021[125].

Recent steps taken by MHRA, HRA and NIHR to publish more regular and detailed breakdowns of UK set-up performance are welcome, but the findings are concerning. In August 2023, it took the MHRA an average of 144 days to provide an outcome for an initial Clinical Trial Authorisation application[126]. In August 2022, it took just 34 days. Alarmingly, only 17% of applications were approved within the 30-day target between July 2022 and June 2023[127]. The delays were primarily due to

the loss of assessors with key expertise during a major organisational restructure. MHRA has made impressive progress in clearing the resulting backlog, but steps must be taken to protect the long-term capacity of the regulator, with greater resilience required in a challenging employment market[128]. This is set out further in section 2.4.2.

The process of costing and contracting research in the health service is another significant bottleneck to fast and efficient clinical trial set-up. 'Costing' involves determining which trial costs should be paid by a funder versus the health service, while 'contracting' refers to the negotiation of contracts with all parties who help deliver a trial. Too many hospital trusts carry out their own bespoke processes, requiring trial sponsors to conduct duplicative negotiations with each participating site. In our recent survey, 53% of the clinical research workforce said costing and contracting inefficiencies are a substantial or extreme barrier to the delivery of clinical research[129].

Other countries have already made this process simpler and quicker, and therefore cheaper. Spain successfully reduced contracting timelines from 117 days in 2016 to 90 days in 2020, putting it ahead of the UK[130]. Similarly, France introduced a mandated contract template that cannot be negotiated and is one of the fastest countries to approve and set up clinical trials[131].

The UK is taking welcome steps to address inefficiencies for industry research. This includes introducing a standardised, national process for determining contract values for commercial research in the health service. In the first six months of rollout, the NCVR improved set-up timeframes by an average of 95 days[132]. NHSE must now do the same for non-commercial trials.

Policy recommendation 13

NHSE should develop a faster and less bureaucratic set-up process for non-commercial trials. This should involve mandating a single negotiation and sign-off process for costing and contracting within the NHS, and learning lessons from the development and delivery of NCVR.

Geography: England

2.3.2. Strengthening the research culture in the health service

The profile of clinical research grew considerably during the COVID-19 pandemic, including a greater appreciation of the role played by research in delivering and improving care. But research is still seen as a 'nice to have' by the health service. Coupled with the huge pressures on care services right now, this is limiting the development of safer, kinder and more effective diagnostics and treatments.

The need for services to prioritise reducing waiting times for patients is indisputable, and in the short term it's to be expected that service leaders will prioritise delivering immediate care needs. But in the longer term, patients will suffer if the health service does not also encourage services to improve standards and capacity in other areas, such as research.

Research generates and saves the health service millions of pounds, improves staff retention and makes it easier to recruit healthcare professionals[133, 134, 135, 136, 137]. We would like to see research embedded into clinical practice and viewed as a solution to many of the health service's challenges.

The NHS lacks accountability for clinical research

As ICSs become better established in England, there is the opportunity to build a culture of research across the NHS by improving accountability and increasing the visibility of the benefits of research. Our recent survey found that 64% of healthcare professionals felt a lack of accountability and prioritisation

of research at senior levels of the health service is making it substantially harder to deliver clinical research[138].

The enhanced NHSE duty to promote research in the Health and Care Act 2022 was welcome, but a lack of data on R&D activity for NHS bodies at any level makes this hard to monitor or enforce. The absence of any performance metrics on research is notable, compared to performance metrics on service provision. NHSE national performance standards, like the Cancer Waiting Times targets, are a critical part of monitoring performance and motivating improvements in clinical service delivery.

Policy recommendation 14

NHSE should develop a coordinated set of metrics to monitor and evaluate commercial and non-commercial NHS research engagement and impact at Trust, regional and national levels. This should include an annual target in the NHS mandate that is reported to parliament.

Geography: England

2.3.3. Creating time for research

One of the main consequences of the health service's weak research culture is a lack of time for healthcare professionals to train and deliver research alongside their clinical responsibilities. In our survey of the clinical research workforce, 69% of healthcare professionals identified lack of dedicated time for research as a substantial or extreme barrier[139].

The same survey found that limited opportunities for career progression is a key factor for people who are considering leaving behind research careers. While all health service staff may face barriers to research, certain professions (including nurses, midwives and allied health professionals) encounter greater obstacles to accessing support[140]. We therefore welcome NIHR's commitment of an additional £30m per year to expand the suite of initiatives available to healthcare professionals who want to develop their research careers.

There are economic benefits to providing dedicated time for research

Individual Trusts should be required to set out their plans to provide dedicated research time and training through their own strategies and budgets. As recommended by the Academy of Medical Sciences, Trusts should pilot contracts that include a proportion of time dedicated to research[141]. To exemplify the potential economic benefits, Table A shows the costs and benefits of 20% of relevant healthcare professions having 20% of their time allocated to research. These benefits would apply regardless of the model adopted in different locations.

Table A
Costs and benefits of 20% of consultants and advanced clinical practitioners (ACPs) across all Trusts in England having 20% of their time dedicated to research
(see Notes for more, Note 1)

		Benefits			
Job role	Costs of dedicated research time	Leveraged commercial funding	Net health value from government R&D spend	Wider economic value, GVA (Illustrative)	Benefit to cost ratio (Excl. GVA)
Consultants	£529m - £661m	£519m	£614m	£2bn	1.71 - 2.14
Advanced Clinical Practitioners	£32m - £39m	£31m	£37m	£124m	1.78 - 2.14
Combined	£561m - £700m	£550m	£651m	£2.2bn	1.72 - 2.14

GVA = gross value added

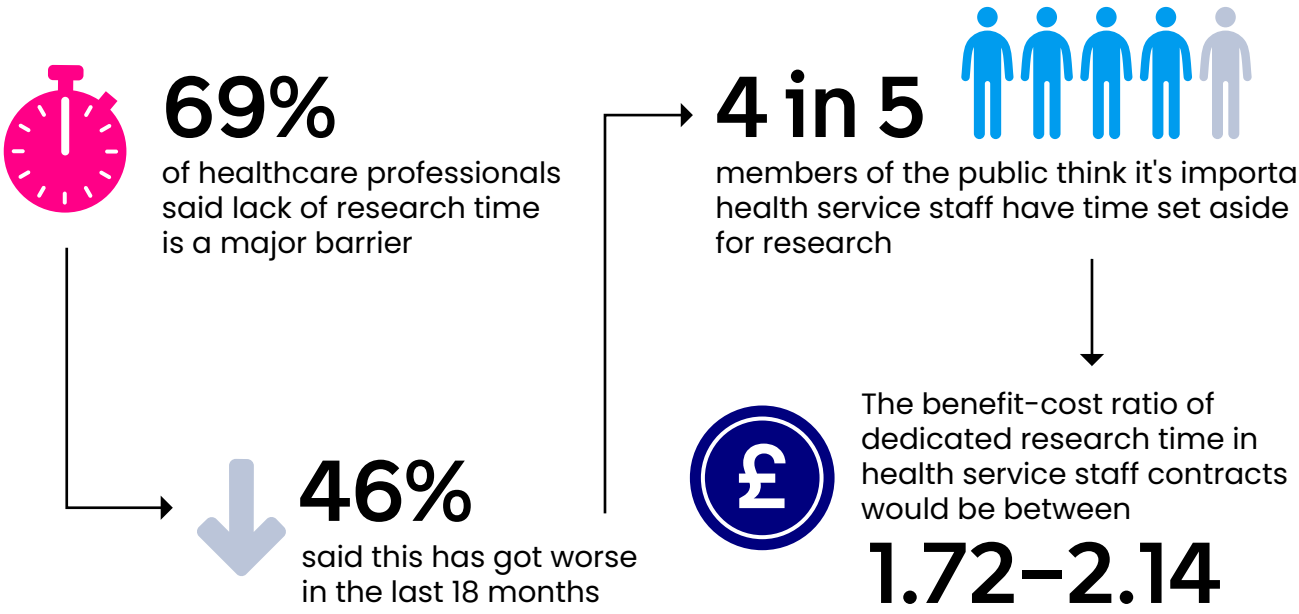
There is widespread support to allocate dedicated research time to healthcare professionals, with 96% of surveyed healthcare professionals and 80% of the public believing it's important for health service staff to have protected time for research, even when the health service is under pressure[142,143].

Policy recommendation 15

NHSE should work with Trusts to increase the total supply of dedicated research time in health service staff job plans, paying particular attention to professions underrepresented in research such as nurses, midwives and allied health professionals.

Geography: England

Figure J
The case for protecting research time in the health service



Sources: CRUK public opinion polling 2023 and CRUK survey of UK clinical research workforce 2023

2.3.4. Making research participation an option for everyone

Up-to-date study information is necessary alongside efforts to join up UK trial registries

Time pressure combined with the weak research culture in the health service impacts the ability of clinicians to meaningfully engage with patients about the research opportunities that are available to them. This was reflected in our clinical research workforce survey, with nearly half of healthcare professionals reporting that limited awareness of available research opportunities amongst clinicians and the public is a substantial or extreme research barrier[144].

In 2022/23, only 43% of cancer patients in England were made aware of research opportunities[145]. This is despite a separate survey reporting that 95% of cancer patients thought patients should be offered access to treatments through clinical trials[146].

Making conversations about research a normal part of peoples' care isn't just the responsibility of clinicians and the health service. Medical research charities, royal colleges and unions, research delivery teams, industry and government all have a role to play in connecting the public with research. This includes equipping clinicians and the public with the tools and information they need.

Promising initiatives are already underway, including the NIHR's new 'Be Part of Research' service, now integrated into the NHS app. The platform provides people with a single point of access to a range of easy-to-understand information about clinical research, as well as a way to sign up for updates on future research opportunities.

In 2022, the HRA began to automatically register clinical trials approved through the UK's combined ethics and regulatory review service on the ISRCTN registry. If a trial is registered on ClinicalTrials.gov, there is an option to opt out of automatic registration on ISRCTN. Study information from both registries is then pulled through to 'Be Part of Research', making it the UK's centralised trial directory for patients and clinicians looking to participate in research.

We welcome efforts to join up different registries. However, registries including ISRCTN are not currently being kept reliably up to date. Unless this is addressed, there's a risk that patients will continue to miss out on potentially life-saving opportunities to take part in research. This can be a particular issue if recruitment dates are extended, new sites are added or the study closes early. The UK Government should consult medical research charities with expertise in patient involvement to learn lessons from successful registries, such as the Cancer Research UK Trial Database and Experimental Cancer Trial Finder (see Box J).

Policy recommendation 16

HRA, the ISRCTN registry and NIHR Be Part of Research should make it easier for sponsors to update study records, while also strengthening accountability. BMC, which manages the ISRCTN registry, will require the right level of dedicated resource to deliver such changes.

Geography: UK

Box J
The ECMC Experimental Cancer Trial Finder and Cancer Research UK Trial Database

Experimental Cancer (EC) Trial Finder

The EC Trial Finder enables all oncologists across the health service to search for early-phase oncology trials quickly and easily in the Experimental Cancer Medicine Centre (ECMC) network. The database is updated monthly, custom designed to allow medical staff to quickly identify suitable trials and includes contact details for recruiting sites.

Its set up and maintenance took considerable time and resource, but nonetheless, the EC Finder provides a strong operating model for other registries.

During its six-month pilot phase, there was a 55% increase in the speed, ease and feasibility of matching patients to clinical trials[147].

Cancer Research UK's Trial Database

Our patient-facing trial database aims to include easy-to-understand information about all cancer trials that have recruitment sites in the UK.

Our trial database team regularly contacts research teams to ensure those using the service have up-to-date information about the status of different trials. While our information nurses are available to discuss trials with patients, the only way patients can join most trials is via a medical referral from their doctor.

Decentralised trials have the potential to expand patient access

Patients not being able to get to research sites can lead to inequalities in cancer treatments[148]. Decentralising parts, or all, of a clinical trial can help address this by taking research outside of the physical structures of the traditional trial (ie hospitals) and closer to people.

Decentralised clinical trials (DCTs) use community facilities like local pharmacies, deliver medicines to patients' homes and use digital tools to collect consent remotely or connect people with their doctors. The expansion of DCTs would help research to better serve people with disabilities and/or limited mobility, rare diseases and those living further from a research site.

The benefits would not just be felt by the public. Greater decentralisation could also help alleviate and avoid health service capacity pressures, while saving sponsors and investigators money, improving recruitment and retention of participants and enabling the faster collection of data[149]. For instance, the RELIEVE IBS-D trial sped up recruitment by 67% during the pandemic after switching to digital technologies instead of traditional on-site visits[150].

The global clinical trials sector is developing rapidly. Denmark launched guidance on the implementation of DCTs and is encouraging these trials by working together with the regulator, clinicians, companies and patients[151]. Similarly, the FDA in the USA has now issued draft guidance on the use of decentralised trials[152].

The UK is well positioned to be a leader in DCTs, and can learn from success stories like the RELIEVE IBS-D trial, the guidance developed by MHRA and HRA during the pandemic, and an ongoing review by the NIHR to better understand the processes involved in planning, setting up and running DCTs[153].

Policy recommendation 17

MHRA and HRA should develop updated guidance to support and promote DCTs, incorporating lessons from the pandemic and the NIHR's scoping review. To deliver DCTs, the UK Government and NHSE will need to invest in the necessary infrastructure, and consider training and skills in future workforce planning.

Geography: England

2.4. Streamlining and strengthening, from approval to adoption

The process of taking an innovation from approvals from regulators through to adoption and implementation within the health system is complex, slow and confusing – even for innovations that are well-evidenced and advocated for by stakeholders across disciplines. In England, each step of the pipeline is governed by different organisations, including MHRA, NICE and commissioning bodies at national, regional and local levels.

For an innovation to be adopted into the health service in England, it typically must first receive market authorisation and undergo an appraisal of cost-effectiveness and potential benefits. Depending on the innovation, this may include a formal evaluation process by NICE and the development of a business case to convince commissioners of its value. The pathway is similar in devolved UK nations, with the addition of other organisations such as Health Technology Wales, Scottish Health Technology Group and Scottish Medicines Consortium.

Innovators need certainty that their products have a route to adoption. Without this, they may be less likely to develop or seek market approval for their products in the UK. However, for innovations that are not traditional medicines, the pathways to adoption are at best unclear or inconsistent, and at worst non-existent.

The lack of standardised routes to adoption for different types of innovations is not only an issue for innovators. It also poses challenges for commissioners and budget holders within Trusts and at ICS level in England. It's increasingly difficult to know when an innovation is ready to be adopted, whether it's cost effective and what alternative options exist.

Several innovations are ready for implementation now. Many more will be ready but will need support to move down the pipeline in the next three, five and ten years. These hold the potential to transform cancer outcomes and help create a much more equitable and efficient health service. It's critical that the health service is ready to adopt these innovations if we are to get the most benefit from them.

2.4.1. Signalling demand across the sector in areas of unmet need

As areas like digital technology, AI, genomics and novel screening approaches evolve, gaps in the journey for innovations into the health service are become increasingly apparent. This is delaying the adoption of potentially transformative new tests, treatments and tools.

It is essential that we prepare the pathway for new developments so that regulation and evaluation processes don't cause delays. For the most 'disruptive' innovations – those that might significantly change the demand for services, affect workforce, skill and kit requirements, or require new models of diagnosis or treatment to be developed – the health system as a whole needs to prepare in advance for their adoption.

As set out in our **Early Detection and Diagnosis Roadmap**[154], the UK Government should explore the utility of 'target product profiles' (TPPs). Based on a mapping of emerging technologies, TPPs can serve to signal demand from the health system to industry in areas of unmet need, and to highlight where the health system needs to be prepared for their adoption, including defining new adoption pathways where required.

A body could be established to do this mapping and evaluation on an ongoing basis. The use of TPPs would also help give innovators clarity about the criteria and characteristics required of an innovative solution[155].

We are funding research into the role of TPPs for cancer diagnostics, how they could be developed and what is required to incentivise their development and use. Results from this work will be disseminated in early 2024 to support cross-sector discussions and offer recommendations for the UK Government to consider.

Policy recommendation 18

DHSC, OLS and DSIT should prioritise working with NHSE, NICE, Cancer Research UK, funders, industry and academia to map emerging cancer innovations to areas of clinical unmet need and develop comprehensive 'target product profiles' (TPPs) to bolster demand signalling efforts and provide clarity to innovators. This includes defining roles and responsibilities for the development of TPPs and how they will be used throughout the adoption pathway.

Geography: England

2.4.2. Defining and resourcing approval processes for new technologies

Approval processes for new technologies are not clear

For some types of innovation, attempts have been made to clarify the route through different approvals processes. The Innovative Licensing and Access Pathway (ILAP) scheme is a partnership between the MHRA, NICE, the Scottish Medicines Consortium, All Wales Therapeutics and Toxicology Centre and NHSE that coordinates the authorisation and approvals process for medicines that meet pre-determined prioritisation criteria.

A similar pilot pathway called the Innovative Devices Access Pathway (IDAP) was set up and launched in September 2023 for certain types of medical devices, including detection and diagnostic tools, digital technologies and AI tools. But technologies that successfully navigate this pathway are not automatically adopted by the health system. Unlike for NICE

recommended medicines, organisations aren't required to ensure people have access to these types of innovation.

Other efforts have been made to clarify the approvals process for these types of innovation. NHSE now provides technical standards for digital technologies through the Digital Technology Assessment Criteria for health and social care. And NICE has recently developed an evaluation framework that advances guidance and evidence standards for apps and standalone software products. But this does not add up to a clear or comprehensive framework for the approval of digital technologies in England.

Securing approval for the use of innovations can be slow

Even where routes are clear, securing approval can be slow. The average time it takes for a new medicine or medtech product to go from market authorisation to availability for patients is 329 days in England[156]. By contrast, in Germany this process takes 128 days[157].

A bottleneck in the system is MHRA, which does not have capacity to keep up with the demand for assessments[158]. The capacity, resource and processes for post-market surveillance also need to be improved to keep pace with the rapidly expanding medical devices field. As set out in section 2.3.1., lack of MHRA capacity is also a barrier in rapid clinical trial set-up.

A £3m package was provided to MHRA in May 2023 to rebuild capacity between 2023 to 2026. But more long-term investment is needed to future-proof MHRA capacity without raising fees for applicants. There are deep-rooted difficulties attracting people with the necessary skills and expertise in a competitive environment. The private sector and civil service pay scales and processes have been cited as particular issues[159].

This bottleneck is slowing down innovations getting to the market, according to industry reports[160]. Not only it is impacting the effectiveness of the ILAP but, if not addressed, it may also hamper the piloting of the IDAP.

Opportunities have also been identified for NICE to explore and adopt more agile processes for assessing innovative products, including reflecting on its committee processes[161].

Policy recommendation 19

DHSC, MHRA and NICE, collaborating with NHSE, should clearly define routes to adoption from pre-market authorisation to commissioning for emerging innovations, including AI applications, digital technologies and diagnostic tests. This should involve outlining the accountabilities and responsibilities of the relevant partners, as well as evaluation criteria, evidence thresholds and cost-effectiveness requirements.

Geography: England

Policy recommendation 20

DHSC must urgently address capacity and resourcing issues within MHRA to speed up clinical trials approval processes for innovations and post-market surveillance. This includes providing adequate and sustained funding for the agency via grant-in-aid to ensure capacity can keep pace with demand, and addressing staff and skills shortages through recruitment and retention measures.

Geography: England

2.4.3. Horizon scanning to prepare the health system to adopt innovation

Better national horizon scanning capabilities would accelerate the adoption of innovations

There are many promising innovations out there, but it's often not obvious to health systems which these are and how to implement and evaluate them. Some innovations could significantly change demand for services, affect workforce, skill and kit requirements, or require new models of diagnosis or treatment to be developed. These impacts need to be fully understood so the system can be prepared.

More information about the types of cancer innovation that exist or are in development, their potential impact on services or outcomes, and the actions needed to implement them would help accelerate their effective and equitable roll out.

Whilst the NHSE Accelerated Access Collaborative currently carries out a vital horizon-scanning function to identify innovations that merit rollout across England, it's not specific to cancer and its resources are limited.

Building national capability in horizon-scanning for cancer, especially when combined with a clear mechanism for demand-signalling, could help national and regional leaders (such as the NHSE Cancer Programme Team and Cancer Alliances in England) to take action to prepare the health system. It would also contribute to identifying areas of unmet need for cancer, which can be used to inform strategic direction-setting in R&D for UK Government, funders and industry. This would help DHSC and NHSE scrutinise and select game-changing areas of innovation where the case should be made for national funding.

Any horizon scanning capability should link up with existing innovation schemes – most importantly, the NHSE Accelerated Access Collaborative – and should work with the NHSE Cancer Programme, NHSE Screening Teams (particularly the Research and Development Advisory Committee – RIDAC), Cancer Alliances, Academic Health Science Networks (AHSNs – soon to be known as Health Innovation Networks – HINs), sector experts including Cancer Research UK and the wider clinical and academic community.

Policy recommendation 21

DHSC and the NHSE Accelerated Access Collaborative should routinely conduct targeted horizon scanning to identify the most impactful cancer interventions that must be prioritised for national rollout. This must involve working closely with the NHSE Cancer Programme, NHSE Screening Teams, Cancer Alliances, AHSNs, clinicians, researchers and Cancer Research UK.

Geography: England

2.4.4. Making the adoption and spread of innovation a priority for ICSs in England

Securing regulatory approval for an innovation does not guarantee uptake in the NHS in England. In practice, decisions to implement an innovation are often left to individual Trusts or regions. This can lead to disparities in access. For example, although best practice guidelines state that 90% of lung cancer patients should receive a pathological confirmation of their diagnosis, as recently as 2021 some Cancer Alliance footprints were only offering it to 60% of patients, whereas others offered it to everyone[162].

Adopters routinely cite 'being given permission' by leaders as a key factor in successful implementation of an innovation[163]. Yet studies have found that some NHS leaders regard innovation as a prohibitively expensive optional extra, perceiving it as a 'nice to have' rather than an intrinsic part of improving the efficiency and quality of diagnosis and care[164].

For England, the Health and Care Act 2022 has signalled a welcome move towards expanding the role of health systems in implementing innovation. It introduced a new legal duty for ICBs to make use of evidence obtained from research within their systems. However, this is unlikely to translate into meaningful change without addressing leadership gaps.

ICBs need to build local leadership on innovation

ICBs must play a leading role in convening system partners, encouraging joint working to foster research and deploy innovations. DHSC has set out that all ICSs should develop a footprint-wide research strategy that aligns to local and national research priorities, develops and supports their workforce and includes plans to embed research in their system's governance and leadership[165]. The Hewitt Review in 2023, commissioned by the government, highlighted the need for ICBs to collaborate with AHSNs and others to align national and local priorities for research and innovation[166].

Cancer Alliances are well placed to work with ICBs on this. They have the expertise to advise leaders on innovations that can address areas of unmet need and that will make the most difference to their populations. They hold and distribute funding to support adoption of innovation. And they have expertise in change management. ICBs research impact could be further strengthened through greater collaboration with AHSNs.

We welcome the Innovation Ecosystem review, which is being led by the National Director for Life Sciences at NHSE, the NHSE Accelerated Access Collaborative and local NHSE leaders. This review is considering how best to align and mobilise NHS infrastructure at a local, regional and national level to support the rapid adoption of priority innovations and holds promise in building local leadership around innovation.

Schemes such as the Innovation Champion Programme being developed by NHSE with the Wessex AHSN, and the Innovation Leadership Model at the Royal Cornwall Hospitals NHS Trust[167], may provide practical examples that ICBs can adopt to further promote leadership for innovation adoption.

Policy recommendation 22

To fulfil their duty as mandated by the 2022 Health and Care Act to ensure the use of evidence obtained from research in the health service, the UK Government and NHSE should direct ICBs to work with their Cancer Alliances and AHSNs to develop a coherent, shared strategy for the identification, adoption and implementation of approved cancer innovations across their geographies.

Geography: England

2.5. Promising innovations for cancer, and key enablers for their implementation

At Cancer Research UK, we conduct horizon scanning to identify exciting innovations that show the most promise for transforming cancer outcomes and what the health system needs to do to be ready to implement them. We also highlight the wider changes needed in the system to optimise the rollout of established innovations.

Below, we set out our findings across digital technology, automation and AI, biomarker tests and precision and personalised treatment, including a checklist of enablers that need to be met in order to maximise the opportunities they present for cancer.

Policy recommendation 23

DSIT, DHSC and OLS must work with the wider innovation ecosystem to align priorities and strategies intended to support innovation in healthcare. This should include the development of a cross-department action plan to address the enablers (such as those set out below) to accelerate the adoption of health innovation to improve cancer outcomes.

Geography: England

2.5.1. Digital technology

Healthcare is becoming increasingly digitised across primary and secondary care, catalysed by the COVID-19 pandemic, which saw the rise of remote consultations and virtual wards.

Digital technology is already transforming how cancer services are delivered. Services like surgery and pathology are becoming fully or partially digitised. And cutting-edge imaging technology is being used to improve radiology and endoscopy efficiencies and performance.

However, there is significant variation across the health system in the quality, interoperability and maintenance of the underpinning digital infrastructure that's critical to digitisation of care. This limits its rollout and impact. Integrating some new technologies and implementing digital and data-driven innovations will not be possible until the health service's ageing IT infrastructure is improved.

There is strong appetite from the UK Government to seize the opportunities presented by digital technology, as evidenced in the recent MedTech Strategy[168]. But for this ambition to be realised, it needs to be matched by long-term, strategic commitment and investment. Whilst some aspects of the changes needed are being driven by the NHSE Transformation Directorate following the Data Saves Lives strategy[169], several areas still lack national oversight.

Alongside this, it's important that digital skills training for staff is routinely updated to keep pace with newly emerging technologies. This will ensure that the latest digital technologies are used more consistently throughout the health system. We also need to build patient and public confidence and digital literacy to support the use of digital technologies in healthcare.

Below we consider two current applications of digital technology within cancer diagnosis and treatment, which hold clear potential but have only been implemented in some parts of the country.

Spotlight on **Digital surgery**

Digital surgery can be defined as the use of digital technology to enhance preoperative planning, surgical performance, therapeutic support or training to improve outcomes and reduce harm. This includes the use of robotic systems in surgery.

The Commission on the Future of Surgery (Royal College of Surgeons, 2018) highlights robotic-assisted surgery (RAS) as one of the four technology areas that will make the greatest positive impact on the NHS[170]. Benefits represented by RAS include facilitating minimally invasive surgery and improving accuracy, precision and access during surgery. This can offer improved patient outcomes and quality of life (including reduced recovery times and pain, and less scarring), whilst reducing the risk of complications.

RAS may therefore increase capacity for the healthcare system by providing more efficient surgeries in addition to faster recovery times and fewer complications for patients. Robotic surgery can also result in less onerous surgeries for surgical teams and improve training and performance of surgeons[171, 172, 173, 174].

Spotlight on **Digital pathology**

Digital pathology involves using whole-slide imaging (WSI) scanners to generate digital images of pathology specimens, as opposed to viewing a physical slide down a microscope.

Digital pathology has the potential to improve care and support the pathology workforce by making the diagnosis and monitoring of disease more accurate and efficient. Digitising pathology slides can facilitate remote working for pathologists, which could boost retention and help reduce staff burnout, improve inter-reader variability and provide more timely access to clinical specialist expertise, without needing to send a physical slide and track its whereabouts.

Like robotic systems for surgery, WSI scanners also lay the foundation for further digital and data-driven technology to layer on top, such as the use of AI in computer aided image analysis and decision support. The Royal College of Pathologists is supportive of digital pathology, and has produced a strategy for its implementation and a range of guidance and best practice documents for the profession[175].

Unfortunately, both innovations suffer from variable uptake and access[176, 177]. A lack of national leadership, approach and investment for digitising surgery and pathology has meant that their adoption has been driven by individual clinicians at individual Trusts. They either secure grant funding or can convince budget holders of the cost-benefit of adoption. This can be a difficult case to make because there is no national approach to evaluating safety and efficiency, and because traditional methods of cost-effectiveness assessments do not account for the full range of benefits and costs of digital technologies. Developing evaluation and health economics models for these types of complex technologies and interventions could help address patchy uptake.

While initial funding from the UK Government for centres of excellence to digitise pathology was welcome, this must be sustained so that systems can be kept up to date and staff (including IT staff, pathologists and biomedical scientists) can be further trained up as digital pathology evolves. The UK Government should take a national approach to investing in these digital technologies, so they can be rolled out to all areas of the country[178].

Key enablers for the implementation of digital technologies

- Improve the health service's ageing IT infrastructure, through long-term strategic investment.
- Update digital skills training for health service staff.
- Build patient and public confidence in the use of digital technologies in healthcare.
- Develop a health economics model to fairly evaluate these types.
- Take a national approach to evaluation and rollout, with investment to make it possible.

2.5.2. Automation and AI

More data is being captured about people's health than ever before – including patient medical records, test results and images from diagnostic investigations. Applying advanced analytical approaches, like AI, to such large datasets is enabling us to better understand health and disease, as well as how health systems can operate most efficiently. This gives us the ability to develop data-driven solutions for healthcare. For cancer, AI holds promise to improve the development and delivery of care right across the pathway[179, 180].

The AI landscape is expansive and rapidly evolving, and we can expect it to improve the health system in several ways over the next five-to-ten years. Figure K estimates when different applications of AI may come to fruition.

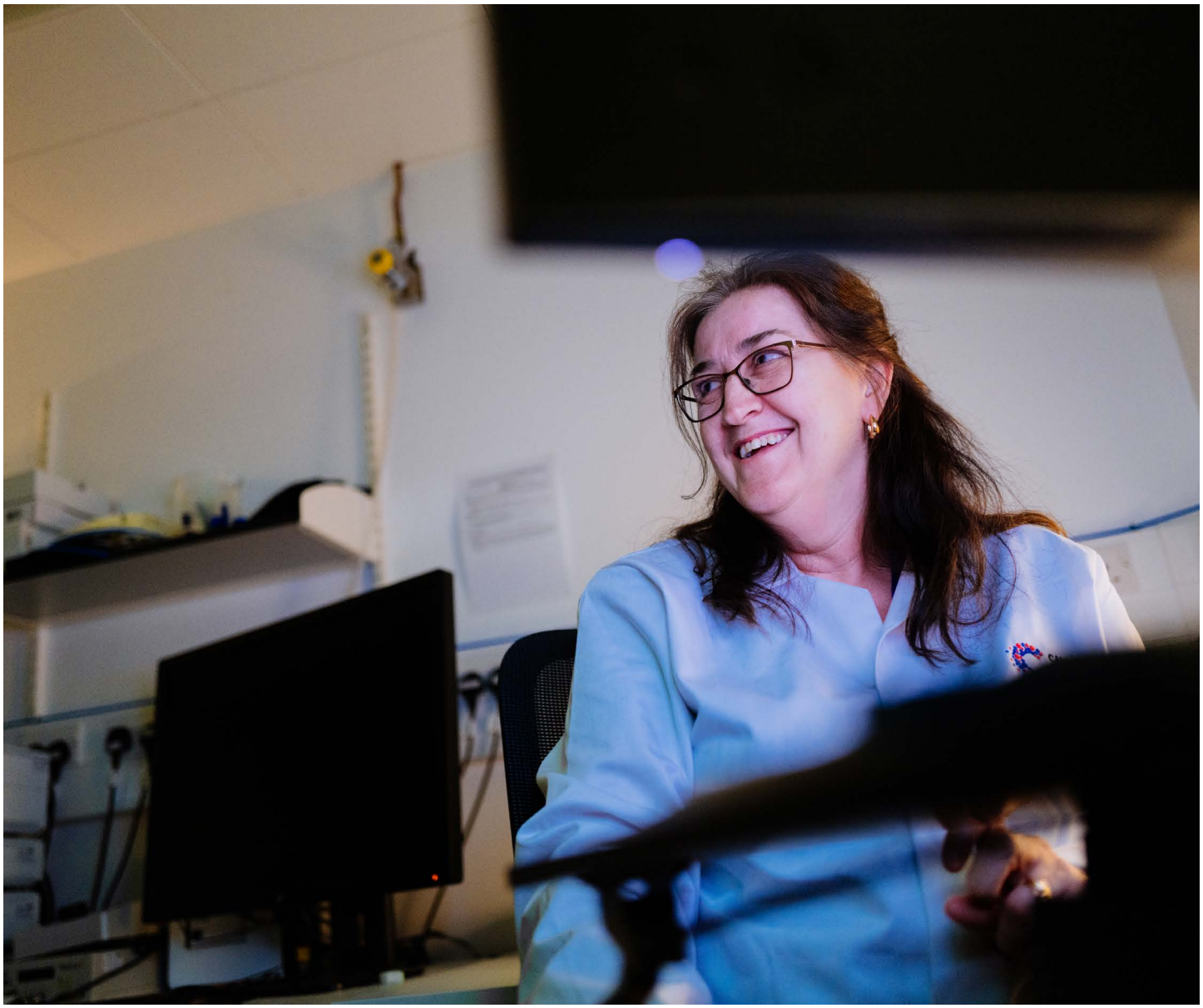
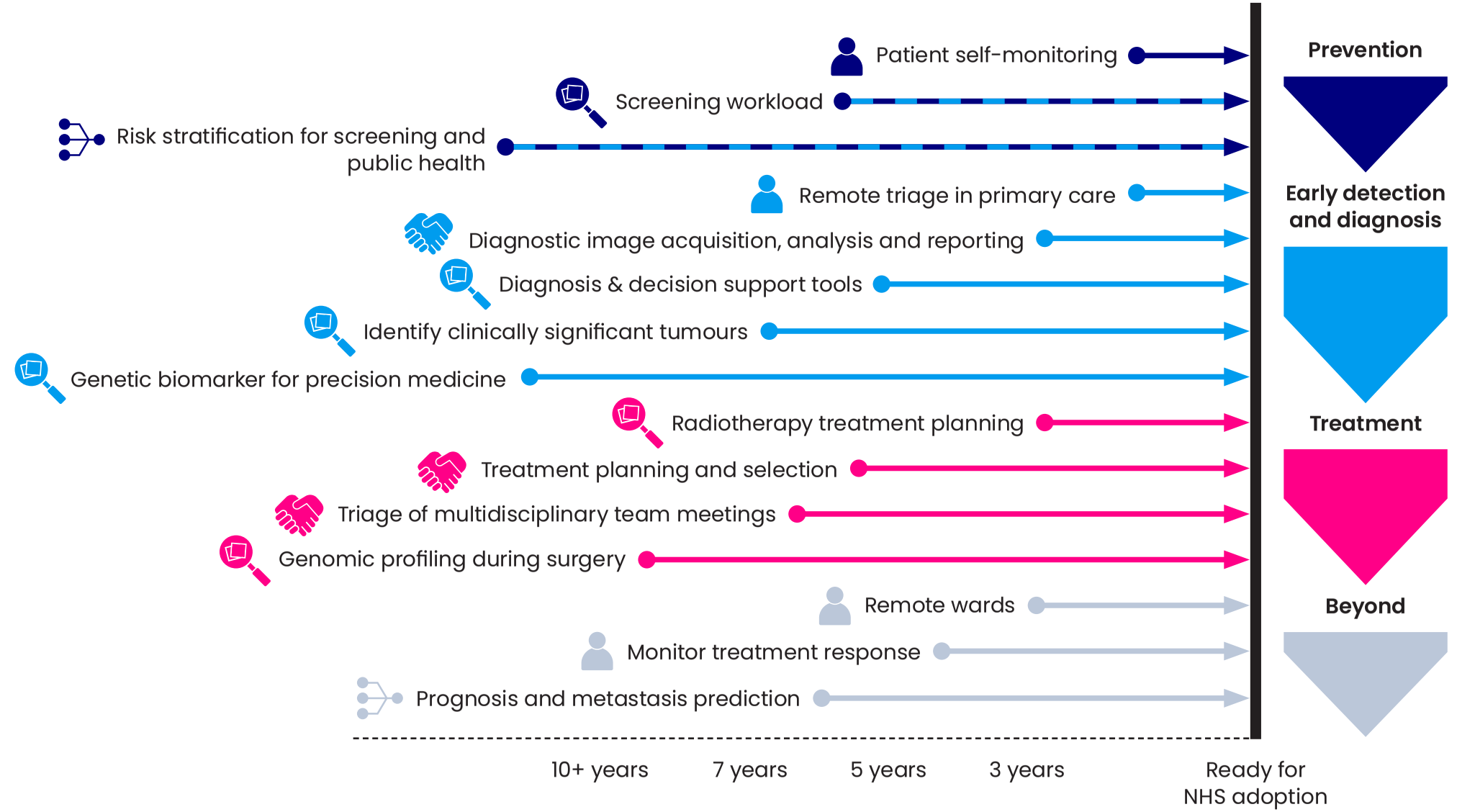


Figure K
AI across the cancer pathway



This is not an exhaustive list of innovations across the cancer pathway

Produced by Strategic Evidence, Policy Information and Communications Directorate, Cancer Research UK

- In the immediate and shorter term, AI could drastically improve efficiency within services and increase clinicians' capacity, with computers taking on simple routine tasks. Research has shown that a significant proportion of clinicians working time is spent on administrative tasks and almost half of all administrative work in general practice could mostly or fully be automated[181]. Automation of non-clinical tasks such as triaging and appointment scheduling could create huge capacity savings.
- In the intermediate term, services and in some cases delivery of care, will become increasingly automated and able to assist clinicians. Risk prediction using AI will improve healthcare professionals' ability to triage cancer patients, helping to reduce bottlenecks in the pathway and improve our ability to determine the aggressiveness of cancers and the likelihood of successful treatment. Coupled with up-to-date digital clinical trial registers, AI tools could be used to identify patients who may be eligible for trials and to flag this information to patients or clinicians.
- In the longer term, AI's ability to find patterns in large complex datasets will unleash opportunities to predict, detect, diagnose and treat cancer. AI will likely be able to better predict who is at risk of cancer, based on patients' medical, biological and lifestyle characteristics, and suggest personalised interventions.

The use of AI could garner significant gains for cancer outcomes and the health system. But for healthcare professionals, patients and the system, there are multiple challenges that must be addressed by the UK Government to make this a reality[182].

To fully harness the potential of data-driven technologies such as AI, the health service's fundamental IT and data infrastructures must be fit for purpose, interoperable and regularly updated. Additionally, relevant, high-quality data must be collected and accessible for R&D purposes (see section 5.5.). And as some areas of the country have been quicker to digitise than others, adoption of AI innovation is not currently equitable.

Staff need to be confident in and trained how to use AI to enable them to most effectively adopt emerging applications. Initiatives such as the NHSE Digital Skills Academy will help improve workforce digital literacy. It's also promising to see plans underway to create workforce development opportunities, via the NHSE AI Lab and the AI and Digital Healthcare Technologies Capability framework.

Routes to adoption for digital and AI technology are particularly difficult to navigate because the speed of technological advancement means that regulation is struggling to keep up. There have been marked efforts to help guide innovators through the regulatory and adoption process (such as the MHRA's Software and AI as a Medical Device Change Programme, NICE's Early Value Assessment for MedTech, and the creation of the NHS AI and Digital Regulations Service and AI Lab). These programmes are welcome but must be underpinned by sustained support and appropriate resourcing if they are to be successful.

Currently, there is ad hoc trialling, evaluation and implementation of AI technologies, resulting in patchy patient access.

The recent creation of the AI Diagnostic Fund should go some way towards addressing this by giving NHS Trusts the ability to roll out the most promising AI imaging and decision support tools for diagnostics. However, national coordination and guidance on evaluation are needed to make sure there is consistency and the sharing of learnings across the system.

AI platforms are prone to biases based on the data they are trained with[183]. This means there is a very real risk that the use of AI algorithms could exacerbate existing health inequalities. For example, where AI is being integrated into dermatology services, its performance for patients with darker skin tones has been poorer[184]. To prevent AI discriminating against certain groups, datasets used in machine learning algorithms must be representative and fair. The MHRA recognise the need to examine health inequalities in medical device regulation and has committed to examine how this should be tackled through the use of regulation[185, 186].

Finally, patient and public trust in AI and public service use of data from AI algorithms is evolving, but there is still a long way to go to. Government and health services need to communicate clearly with the public about the use of AI in healthcare to build this trust. Surveys from The Health Foundation found

public and healthcare staff opinion divided on whether automation and AI in healthcare is positive or negative[187]. Further research is needed to understand the interaction between AI and human decision making, and clinician and public attitudes. Learnings from other industries will be important (for example, AI and automobiles).

Key enablers for the implementation of automation and AI technologies

- Upgrade IT and data infrastructures so they are fit for purpose.
- Facilitate regular training for NHS staff on emerging AI applications.
- Provide national guidance and coordination to ensure consistent rollout across the system.
- Coordinate and support the safety and efficacy of AI for healthcare, via MHRA, ensuring that due attention is given to reducing inequalities.

2.5.3. Biomarkers for cancer

Biomarker testing involves looking for genes, proteins or other substances that can reveal important details about a person's cancer or risk of cancer. The tests are underpinned by a range of technologies – including imaging, chemical and genomic analysis – and are often supported by AI. Biomarkers are essential for detecting and diagnosing cancer or cancer precursors. They are also becoming increasingly useful to guide treatment decisions as well as to predict a person's prognosis.

The technology used to discover and analyse biomarkers is becoming more sophisticated and sensitive. Coupled with the ability to generate, manage and analyse the deluge of data regarding people's biological, physical and environmental characteristics, the types and numbers of biomarkers used for cancer detection and diagnosis will continue to expand.

Current healthcare tests can be expensive, invasive and painful or embarrassing, meaning uptake can be low[188]. Biomarker tests that use blood, urine, breath or other 'liquid' samples (eg liquid biopsies) are being investigated for their use in detection, diagnosis and guiding treatment options. Liquid biopsies offer the potential for asymptomatic diagnosis, where tissue biopsy is not possible and imaging may be too expensive or not sensitive enough. They also offer opportunities for testing at the point of care, which could speed up early detection and diagnosis and improve clinical decision making. For example, these tests could be carried out at a GP practice or even at home and sent for analysis with potentially very fast results.

In the next decade, improvements in our understanding of the biology of cancer will likely lead to better biomarkers for predicting the risk of disease, which is important for reducing overdiagnosis and improving treatment. We will also start to see improvements in our ability to determine risk in the asymptomatic population, which could have implications for precision prevention strategies, as well as stratified screening and care.

Spotlight on
Multi-cancer early detection tests

Multi-cancer early detection tests (MCEDs) typically use liquid samples or breath biopsies to look for multiple cancers in one sample. There is a growing market for MCEDs which use different methods and technologies to detect and interpret results[189]. GRAIL's Galleri test is one such example, which is currently being trialled in the NHS for asymptomatic screening of cancers, with a study of its use in symptomatic triage having just completed[190, 191]. Other examples include Delfi Diagnostic's DELFI test and Guardant Health's Shield test TruCheck, which are being trialled in other countries.

Traditional diagnostic tests that look for the presence of one type of cancer require a strong suspicion of where the person's potential cancer is, but MCEDs can be used without knowing the potential cancer location, meaning they could be used to aid referral decisions in primary care.

Primary care is the most common route to cancer diagnosis in England[192, 193], with nearly 3 million people being referred by their GP per year on the urgent suspected cancer referral route[194]. However, the proportion of these people who are subsequently diagnosed with cancer is relatively small, at under 7%[195]. MCEDs could provide a way to help GPs assess for cancer risk ahead of referral and speed up investigation and diagnosis for those at high risk[196].

MCEDs could also help detect cancer before the onset of symptoms. Screening for additional cancer sites, beyond current screening programmes, would be beneficial if we could detect cancers at an earlier stage, leading to improved mortality. At present, asymptomatic, whole population screening for a single cancer is only cost-effective for common cancers. However, screening for multiple cancers with one test via MCEDs could allow rarer cancers to be screened for in a cost-effective way, which would constitute a paradigm shift for screening[197]. These tests could also improve the sensitivity and specificity of screening programmes, which currently rely solely on imaging, such as the identification of pulmonary nodules.

Many MCEDs for asymptomatic screening are currently in development, but there isn't yet any evidence on the detection of early-stage cancers in large trials and much more evidence is needed to be certain that the tests would be cost-effective, with benefits outweighing potential harms[198]. Moreover, consensus is needed on how MCEDs will be evaluated, including accounting for unintended consequences to the health system, existing screening programmes, patients and the public, whether any surrogate endpoints to mortality would be appropriate and if so, a commitment to collect mortality data as programmes are rolled out[199]. This should include consultation with the wider research and cancer community to inform transparent decision-making processes.

Evidence suggests MCEDs could contribute to diagnosing cancers earlier[200, 201, 202]. Our provisional modelling, using optimistic stage shift assumptions, has shown that a screening programme using MCEDs to detect 7–12 cancers in people aged 50–77 could drive an overall stage shift of up to five percentage points, from stage 3 and 4 to stage 1 and 2 in all cancers in England[203], which could mean more treatment options in some cancer sites[204]. The actual shift would depend on the test used, as well as the implementation of the programme and uptake, and would vary across cancer sites.

MCEDs hold great promise for the detection and diagnosis of cancer. But there are still many unanswered questions, and significantly more research is needed before we can safely and effectively implement any MCED. The ability of MCEDs to correctly detect cancer signals in those who go on to receive a diagnosis and rule out those who do not have cancer, will have important implications for health system resource and patient care[205].

The UK Government, National Screening Committee (UK NSC) and NHSE Screening and Cancer Programmes will need to ensure that the impacts of MCEDs on patient and healthcare professional behaviours, demand on services and cost-effectiveness are evaluated before any decision is made regarding implementation.

Despite the research and health sectors' growing attention on the potential of biomarkers, more work is required to help and incentivise researchers and industry to translate them into products that improve patient outcomes and quality of life. As set out in section 2.2.3., to incentivise R&D for ED&D technologies, it is essential to provide clarity on how new tests for cancer will be valued and evaluated by the health system. Similar challenges apply to the development of biomarkers that inform treatment and management options[206].

Key enablers for the implementation of biomarkers for cancer

- The development of robust mechanisms, underpinned by health economics models, to inform decisions around adoption and reimbursement of biomarker tests across the pathway.
- Conducting more research into the impact of novel biomarker tests that will be disruptive to current models of care, including on the benefits and harms of MCEDs in screening, the impact of MCEDs on service demand and their cost-effectiveness.
- Building consensus on how MCEDs will be evaluated, including whether surrogate endpoints will be acceptable, and developing frameworks for continuing to monitor the impact of MCEDs once programmes are rolled out.
- The implementation of new biomarker tests must be supported by adequate workforce training, sample pathways and the collection of data regarding test uptake and performance that can be included in national datasets linked to patient outcomes.

2.5.4. Precision and personalised treatment and genomics

Advances in technology and our understanding of cancer are leading to cancer treatments becoming increasingly specific and personalised to a person's disease. 'Mainstreaming' genomic testing of tumours has made precision medicine a reality, meaning we can more accurately target drugs to the molecular biology of an individual tumour and therefore improve outcomes.

More precise treatments – such as those that remove or specifically target cancerous cells or tissue, while sparing healthy tissue – improve patient outcomes, prevent over-treatment and minimise short and long-term adverse side effects. And there are several different approaches to personalising treatments, with decisions based on the clinical and biological features of a person's disease, their fitness and personal priorities.

We've heard from people affected by cancer that the side effects of their treatment often cause significant trauma. It's essential that we get better at not only treating cancer more effectively, but ensuring new treatments are kinder, with less severe side effects, sustaining a person's quality of life after treatment. We also need more treatment options for rare types of cancer, including for children and young people's cancers, for whom there are limited options for life-saving treatment.

Some precision and personalised approaches are based on the specific biology of the patient, and some are specific to the biology of the cancer. Examples include:

- Pharmacogenomics, a treatment or dose tailored to an individual based on their genetics.
- Hormone therapies, which block or lower the level of certain hormones to stop or slow the growth of cancer.
- Immunotherapies, which activate the immune system to detect and fight cancerous cells.
- Other targeted therapies, such as drugs that target specific proteins or pathways in cancer cells based on tumour mutations.
- Advanced radiotherapy approaches, which allow radiation doses to be precisely targeted to the tumour, giving a lower dose to surrounding healthy tissue.

Whilst some immunotherapies are non-specific, others are designed specifically for a person's cancer biology or using a person's own cells to target cancer. These are known as advanced therapy medicinal products (ATMPs) and constitute a class of drugs that include gene and cell therapies, as well as personalised therapeutic cancer vaccines. ATMPs are especially important in providing treatment options for children and young people with cancer, as well as patients with rarer cancers and patients who have run out of other treatment options.

Spotlight on **Cancer vaccines**

Vaccines to treat cancer are of significant interest. Currently in early-stage trials, it's hoped that vaccines can be used to stimulate the immune system to recognise and eliminate cancer cells, and provide a foundation for other types of immunotherapies.

Cancer vaccines could be transformative for patients, reducing the need for invasive treatment and offering improved outcomes. They are typically given as a single injection, making them quicker to administer than other forms of treatment such as chemotherapy.

NHSE's Cancer Vaccines Launchpad, designed to support and expedite clinical research on vaccines, is a welcome initiative. But this programme – and any further transition of cancer vaccines to routine care – must not place additional strain on already overstretched pathology and genomics services. Whilst the introduction of genomic pathology hubs will go some way to alleviate pressure on pathology labs and genomic laboratories hubs, more planning needs to go into managing demand for the future.

Genomics is a critical foundational component underpinning precision and personalised treatment, with targeted therapies often requiring genomic testing. To deliver existing precision and personalised treatments, as well as discover, develop and deliver future biomarker tests and treatments, we need to equip the health system with the capability and capacity for comprehensive genomic testing. All patients across the UK should have equitable and timely access to genomic tests and the opportunity to participate in genomically stratified clinical trials.

We welcome the UK Government and NHSE's commitments and aspirations to cement the UK as a world leader for genomic healthcare and embed genomics into healthcare, as outlined in Genome UK: future of healthcare, Genome UK: the 2022 to 2025 implementation plan for England, and Accelerating genomic medicine in the NHS. However, there is a large gap between the current reality of genomics in healthcare and these ambitions.

Capacity in Genomics Laboratory Hubs is already strained, workforce is scarce and the system is struggling to deliver standard care. NHSE is making the first crucial steps to overcome this challenge by providing support for embedding new sample pathways, clear guidelines for turnaround times and adopting innovation that will aid automating lab processes. However, fundamental issues like workforce shortages, demand on capacity, the logistics of sample handling and operational procedures require urgent attention in parallel, especially as demand is set to increase.

The adoption and implementation of precision and personalised treatments presents other barriers too. By its nature, population numbers of these types of treatments are small, reducing their commercial viability. They also tend to be expensive, meaning that they may not pass NICE cost-effectiveness assessments and are often deemed too expensive for NHSE to adopt. Flexible pricing mechanisms such as outcome-based payments[207] can help address rising cancer medicine prices by ensuring the NHS only pays for outcomes that are achieved for individual patients. However, limitations with data capture limit the ability to put these into practice[208].

Enablers of precision and personalised treatments

- Equip the health system with the capability and capacity for comprehensive and equitable genomic testing, to deliver standard of care as well as supporting research.
- Address challenges related to commercialisation, particularly for treatments that are effective for smaller cohorts of patients.
- Improve data capture to support flexible pricing schemes.

Chapter 3
Prevent

Which missions and priority actions are covered by this chapter?

Mission 2

Prevent thousands more cancer cases.

Priority actions:

- Within a year of the general election, the UK Government should implement an increase in the age of sale of tobacco products and publish a sufficiently funded programme of measures to help people who smoke quit, with the aim of making England smokefree (see Technical annex for more) and preventing around 18,200 cancer cases in England by 2040.
- Within a year of the general election, the UK Government should implement the 2022 legislation on TV and online advertising restrictions on foods high in fat, salt and sugar (HFSS).

Sections in this chapter:

3.1. Introduction
3.2. The economic gains of preventing ill health
3.3. Showing political leadership on tobacco
3.4. Investing to 'stop the start' and 'start the stop'
3.5. Ending smoking through innovative regulation
3.6. Maximising the health service's potential to help people quit
3.7. Driving a generational shift in cancer prevention in the UK
3.8. The UK's role in global cancer prevention

3.1. Introduction

"My amazing dad only met one of his grandchildren and didn't live to see any of his four children marry. He is one of those nine million people who have died from smoking in the UK since the 1960s.

"I cannot begin to describe the impact on me and my family of losing my dad, and know that there are so many similar stories. However, it doesn't need to be like this. We can choose to put an end to this entirely preventable suffering, save lives and boost the economy by working together and bringing about change."

Alice Wiseman, Director of Public Health for Gateshead and Board Member of the Association of Directors of Public Health

Preventing more cancer cases would save lives, boost productivity and reduce pressure on the health service. Around 4 in 10 cancers in the UK are preventable[209]. We need to shift from treating ill health to preventing it in the first place.

As our population grows and ages, reducing the number of preventable cases of cancer will be essential if we are to avoid the need for ever-growing health budgets. And cancer is not just a disease of the elderly – cancer rates are increasing fastest among people aged 25–49, and adults of working age account for around a third of all cancer cases[210].

And this isn't just about cancer.

Smoking, the biggest cause of cancer linked to at least 15 different cancer types, causes more than 50 serious health conditions[211, 212, 213]. Nothing would have a bigger impact on reducing the number of preventable deaths in the UK than ending smoking[214].

Overweight and obesity is the second biggest preventable cause of cancer, and it increases the risk of type 2 diabetes, coronary heart disease and strokes[215, 216]. The UK Chief Medical Officer's drinking guidelines advise against regularly exceeding more than 14 units of alcohol spread over a week[217] to reduce the risk of cancer, multiple cardiovascular health conditions and deteriorating mental health[218]. And air pollution, a known cause of lung cancer, exacerbates respiratory conditions like asthma and has been linked to the increased likelihood of developing heart conditions and strokes[219].

Because the factors that increase people's risk of these conditions are more common in some groups, these health conditions are not distributed equally – the most deprived people in society experience higher rates and even fewer years in good health[220].

The good news is that these are all fixable problems. We already know many of the answers for what's needed to reduce the prevalence of key risk factors.

We need continued political leadership to prevent more cancer cases

The UK has a proud history of leading the way in implementing the necessary solutions, such as the 2008 ban on smoking in public places in England and 2016 plain packaging legislation to reduce smoking rates. With the introduction of the Soft Drinks Industry Levy, the UK has significantly reduced household purchases of sugar in soft drinks[221]. Most recently, in Scotland the implementation of minimum unit pricing for alcohol has had a positive impact on health outcomes there[222].

We can now add the landmark plans to raise the age of sale of tobacco products announced in October 2023 and the 2022 legislation to restrict TV and online advertising of HFSS products, though neither has been implemented yet.

We need sustained, bold political leadership on public health to move forward.

We have a prevention programme ready for UK Government

In this chapter, we set out an ambitious, achievable and publicly-supported programme for UK Government to put in place over the next parliamentary term. These measures would help people from all socioeconomic groups quit smoking. For children growing up today, smoking could be a thing of the past, meaning that the next generation could live healthier lives.

To unlock a future without cancer caused by smoking, the UK needs sufficient, predictable and long-term investment in critical measures such as smoking cessation services, public health campaigns and stronger enforcement of existing and new restrictions. We welcome the UK Government's 2023 pledges of new funding for measures and services that help people quit smoking as a significant step towards this[223, 224]. Making the tobacco industry foot the bill, with the Treasury and DHSC deciding how the money is spent, could help ensure funding is maintained as long as is necessary to achieve a smokefree UK.

This chapter also highlights choices the UK could take to drive a major shift in the prevalence of overweight and obesity, drinking alcohol above recommended levels, air pollution and HPV infection, to significantly reduce the burden of disease in future generations.

And we also look at how the UK Government can help accelerate global progress towards the UN Sustainable Development Goal to

reduce premature mortality from cancer and other non-communicable diseases through its domestic and global health policies.

The public wants the government to help people maintain healthy lives

People want to see the UK Government take effective action to prevent ill-health. Right now, they don't have confidence that it is doing this. In 2022, public polling commissioned by the Health Foundation showed that fewer than 1 in 5 people believed the government was working effectively to improve diets (18%), reduce alcohol-related harm (17%) and reduce obesity (16%)[225].

People want governments to address these issues. Polling shows that after preventing illegal drug use, reducing obesity was considered the biggest priority for the prevention of poor health, and tackling smoking and alcohol also ranked highly[226]. Public support for government action to reduce smoking has also grown in the last 10 years. Polling by Action on Smoking and Health (ASH) shows that the proportion of people who think the government isn't doing enough to tackle smoking has risen from 29% in 2009 to 49% in 2023[227]. Ultimately, people want government to make healthier living as affordable and achievable as possible.

The public also see it as the government's responsibility to make the industries that contribute to poor public health responsible for the cost their products impose on the health service. In 2022, almost 8 in 10 (78%) of people surveyed by the Health Foundation supported additional taxes or levies on tobacco companies, and two thirds (66%) supported the same for unhealthy food and drink companies[228].

Making it easier to be healthy is the first step

Our report, Trolley Trends: Shifting the nation towards healthier shopping, used anonymised Tesco Clubcard data to show that people intend to make healthier choices when they shop, but they struggle in practice[229]. This trend repeats across risk factors. People's basic health knowledge and intent are there, but there are many practical and psychological barriers to why this doesn't translate to behaviour.

The world around us makes it hard for people to be healthy. Consumer-facing messages of 'everything in moderation' are overshadowed by an abundance of marketing on alcohol and HFSS food and drink, unhelpfully shaping consumer perceptions and practices.

The well-established marketing practices and big budgets of major brands have made less healthy behaviours the social norm. This is hard to counteract. It's taken concerted government effort over decades to change this for tobacco. And even then, the job is not complete.

In 2022, according to Cancer Research UK-funded analysis, the tobacco, alcohol and food industries (and associated intermediaries such as retailers and distributors of each product) derived around £52.7bn of revenue from high-risk consumption[230]. Industry expends significant efforts to maintain these revenues, including trying to influence public policy and limit appropriate regulatory measures via a 'common playbook' of tactics. This can even include discrediting evidence, informing opinion through public relations activities and threatening litigation[231]. Government, regulators and civil society have roles to play in redressing this imbalance by protecting public health policymaking from these vested interests, and in protecting consumers.

To prevent more cancer cases, we need to reduce health inequalities

People born today in England's most affluent areas are expected to live on average up to a decade longer than people in the least affluent[232]. Smoking is the single biggest driver of this inequality[233].

Our analysis shows that nearly twice as many cancer cases are caused by smoking in England's most deprived areas compared to the least deprived[234]. Our analysis also suggests that ending smoking could more than halve England's inequality gap for cancer incidence, and reduced lung cancer rates would play a significant part.

Tobacco and alcohol, when used together, increase the risk of some cancer types even more, with their combined effect greater than the sum of their parts[236]. Disadvantaged groups also tend to have a higher prevalence of combined use of these products[237, 238].

Children from more disadvantaged groups are also more likely to be living with overweight or obesity and continue to live with them throughout adult life[239, 240, 241]. The gap between obesity rates in less and more disadvantaged groups is also currently widening[242].

Addressing deep-seated inequalities in health outcomes needs action to reduce poverty and increase household incomes. But efforts to reduce smoking rates, heavy drinking and air pollution, and support people to maintain a healthy weight would make a genuine contribution. And UK Government action to directly reduce poverty and increase household incomes might help speed up the pace of becoming smokefree and make it easier for people to afford to eat a healthy diet[243].

"Both of my wife's sons work in low paid manual jobs and smoke. Our eldest grandson has now started working for his father and has also now started smoking. Unless we break this cycle of low paid jobs and associated smoking which is definitely linked with these jobs, this culture – and its impact on lives – will continue to haunt the next generation."

Colin, Cancer Research UK campaigner, Lancashire

Box K
Cancer prevention ambitions for the next UK Government

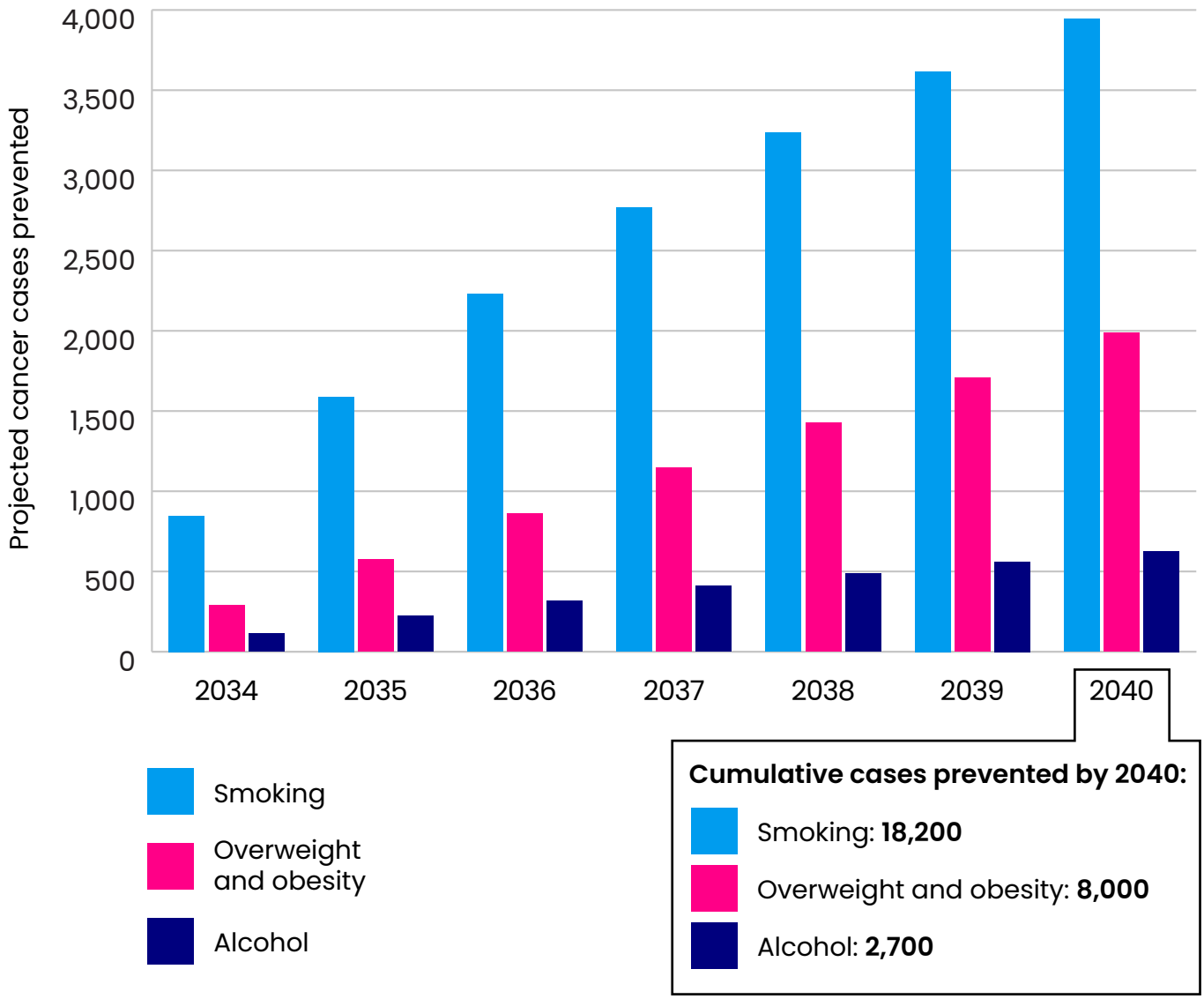
The actions set out in this chapter would contribute to reductions in the prevalence of key risk factors for cancer over the next five years and reduce the number of cancer cases in the long term (See Notes for more, Note 2).

For England:

- Around 18,200 total cancer cases in England could be avoided by 2040 if smoking rates were on target to reduce to 5% of the adult population by 2030, instead of the current projection of 2039.
- Around 8,000 total cancer cases in England could be avoided by 2040 if 10% of people projected to be obese (BMI 30+) by 2030 will remain or become overweight instead, and if 10% of people projected to be overweight will remain or become a healthy weight instead by 2030.
- Around 2,700 total cancer cases in England could be avoided by 2040 if 10% of people projected to be very heavy drinkers (50+ units per week) by 2030 will remain or become heavy drinkers (15-49 units per week) instead, and if 10% of people projected to be heavy drinkers will remain or become moderate drinkers (1-14 units per week) instead by 2030.

If the UK Government were to successfully reduce the prevalence of smoking, overweight and obesity, and drinking alcohol above recommended levels in England by 2030, as set out above, that would prevent around 29,000 cancer cases in total by 2040, compared with current projections (see Figure L).

Figure L
Cancer cases prevented by 2040 if our prevention ambitions are achieved in England by 2030



- Smokefree 2030: smoking rates reduced to 5% average amongst adult population
- 10% of those who are overweight and obese shift down one BMI category by 2030
- 10% of those drinking alcohol above recommended levels shift down one intake category by 2030

Source: CRUK calculations for manifesto for cancer research and care, October 2023

3.2. The economic gains of preventing ill health

Preventing ill health would help the economy. The Office for Budget Responsibility says that one of the major risks to public finances is the rise in economic inactivity due to ill health[244]. Other recent reports have sounded similar alarm bells. For example, the Institute of Public Policy Research found that the UK's current "trajectory towards.... less healthy lives causes significant economic harm – both for individuals and for the nation as a whole"[245].

Reversing this trajectory by improving the public's health would not only save money, but could be a catalyst for economic growth[246] and help make progress towards levelling up all parts of the UK[247].

Preventing ill health benefits household finances

Poor health can lead to a loss of earnings[248]. But there's a more immediate impact on people's pockets. Promotions on less healthy food and drinks are likely to take attention and spending away from healthier food and result in greater overall spending than intended[249]. People who smoke spend on average at least £2,000 a year on tobacco products[250].

Because smoking and obesity prevalence is higher amongst people from lower socioeconomic groups[251, 252], it is people on the lowest incomes and people who live in deprived areas who stand to gain proportionally the most.

Preventing ill health benefits the health service and public finances

A far greater proportion of all health spending currently goes towards treating ill health over promoting health and wellbeing[253]. Yet prevention approaches are good value for money. It costs the NHS around £13,500 to improve population health by one Quality-Adjusted Life Year (QALY), but it only costs £3,800 to local authorities' public health grant[254]. And 75% of public health interventions assessed by NICE are either highly cost-effective or cost-saving in the long run[255].

Take smoking, for example. Our analysis estimates that 75,000 GP appointments could be freed up each month in England if the UK Government put an end to smoking[256]. And it's estimated that around 500,000 hospital admissions every year in England are attributable to smoking – equivalent to one person being admitted every minute[257]. In total, smoking cost the health service about £2.2bn in 2022 across the UK, with a further £1.3bn falling on the social care system[258]. There are potentially significant savings that could be made if smoking prevalence was reduced.

Cancer risk factors are also risk factors for other diseases too, such as cardiovascular disease, dementia and mental ill health. Taking action on risk factors would also reduce the disease burden and costs of other conditions.

Public health interventions benefit productivity and the wider economy

A systematic review has found that for every £1 spent on public health interventions, there was an average £14 of benefit to wider society. This includes healthcare savings and longer-term health gains to wider society[259].

ASH estimates the gross cost of smoking to public finances (including health service and social care costs) in the UK was £20.6bn in 2022. Of this, around £17bn was from a reduction in taxes and increased benefit payments from productivity costs, including from tobacco-related lost earnings, unemployment and premature death[260]. This is notably more than the £10.2bn collected in tobacco duty in 2022[261].

With cancer rates increasing fastest in people aged 25–49, who have many years of employment and earning potential ahead of them, the productivity gains to be made from a reduced number of cancer cases are likely even greater, alongside saving more lives[262].

Changing the framework for investing in prevention

The King's Fund concludes that "the costs of improving population health are relatively small compared to the costs of treating illness, more cost-effective in the long term and joint action would mean that the costs fall widely across government, business and society"[263].

But despite all the evidence of potential benefits, the UK Government does not routinely prioritise prevention. As the Tony Blair Institute for Global Change has identified, "tensions between fiscal and economic priorities… have hampered investment in prevention, new technologies and population-health measures that take time to bear fruit"[264].

Prevention measures are cost-effective. But it can be hard for decision-makers to see past a lack of immediate savings and fully take on board a longer-term view, which takes into account savings to the health service and wider societal benefits. With limited budgets, it can also be difficult to prioritise prevention when there are competing demands to treat existing ill health.

As recognised and recommended by an ever-increasing number of policy experts, including most recently the thinktank Demos[265], the UK Government needs to change the framework for investment decisions in prevention. A broader evaluation of spending decisions and priorities would better take account of the bigger picture and longer-term benefits.

The UK Government is missing an opportunity to revolutionise the approach to health. Investing in prevention and ensuring the structures and incentives within government are set up to do so, would help to mitigate future pressures on the health service, increase productivity and strengthen the economy.

Policy recommendation 24

The UK Government must change its approach to investing in prevention, ensuring that investment decisions in England adequately capture the financial, wider economic and long-term value associated with improvements in health.

Geography: England

Box L

The economic gains of the UK Government achieving its cancer prevention ambitions

If the UK Government successfully reduces the prevalence of smoking, overweight and obesity, and drinking alcohol above recommended limits to prevent 29,000 cancer cases in total by 2040 (see Box K), it could save around £720m in health and informal care costs for cancer and lead to around £773m more in productivity gain (see Figure M) (see Notes for more, Notes 3).

In England:

- If smoking rates were on target to reduce to 5% of the adult population by 2030 instead of the current projection of 2039, around £503m health and informal care costs could be saved by 2040, and this would lead to almost £600m of productivity gains.
- If 10% of people projected to be obese (BMI 30+) by 2030 remain or become overweight instead, and 10% of people projected to be overweight remain or become a healthy weight instead by 2030, around £138m health and informal care costs could be saved by 2040, and this would lead to around £111m of productivity gains.
- If 10% of people projected to be very heavy drinkers (50+ units per week) by 2030 remain or become heavy drinkers (15–49 units per week) instead, and 10% of people projected to be heavy drinkers remain or become moderate drinkers (1–14 units per week) instead by 2030, around £78.8m health and informal care costs could be saved by 2040, and this would lead to around £61.8m of productivity gains.

Figure M
Economic gains by 2040 if our prevention ambitions are achieved in England by 2030

	Health system and informal care efficiencies	Productivity gain
Smoking	£503m	£600m
Overweight and obesity	£138m	£111m
Alcohol	£78.8m	£61.8m

- Smokefree 2030: smoking rates reduced to 5% average amongst adult population
- 10% of those who are overweight and obese shift down one BMI category by 2030
- 10% of those drinking alcohol above recommended levels shift down one intake category by 2030

Source: CRUK calculations for manifesto for cancer research and care, October 2023

3.3. Showing political leadership on tobacco

> "My father suffered with emphysema, my mother's two sisters both died of lung cancer, my father's brothers died of lung cancer... all caused by smoking... The aim to make the UK smokefree is an amazing target."
>
> Lynne Phillips, Cancer Research UK Campaigns Ambassador

Preventing someone from ever starting to smoke will mean they avoid increased cancer risk. Most people who smoke have tried to quit (around 8 in 10)[266, 267] and regret ever starting[268]. But smoking is an addiction and people need support to stop. Given that in 2022, around 5.3 million people in England smoked, there are significant gains to be made in helping people stop smoking[269]. If recent trends continue, smoking could cause around one million cancer cases in the UK between now and 2040[270].

UK Government action on tobacco control should strive to be world-leading

Smoking rates have come down with government action. Such action is critical to further reducing smoking rates. The UK Government can end cancers caused by smoking sooner.

The foundations are already there, with an existing ambition to achieve a smokefree England (meaning smoking prevalence among the adult population reduced to 5%) by 2030. But this has not yet been matched by the policy action needed to drive the shift quickly enough on the ground. In 2022, 12.7% of adults in England smoked – only marginally down from 13% the previous year[271]. Cancer Research UK modelling, based on data up to 2021, suggests that if current trends continue, England won't reach its smokefree target until 2039[272].

The UK Government needs to build on the intent of its October 2023 announcements and ensure the Khan Review's main recommendations are swiftly implemented, so England can become smokefree and curb smoking for good. Polling shows that the public want governments to take bold action on tobacco and support for individual tobacco control policies is consistently high[273].

Box M

Taking inspiration from New Zealand's approach to reduce smoking rates

Countries such as New Zealand have shown how governments can pursue bold strategies to reduce smoking rates and put the communities most affected by tobacco-related health inequalities at the heart of developing and implementing these policies.

New Zealand pioneered the landmark policy now proposed for the UK – increasing the age of sale of tobacco products so that no child born after a specific year will ever be legally sold tobacco products. On top of that, they have put in place other measures to make smoking less affordable and accessible, including dramatically reducing the legal amount of nicotine in tobacco products and substantially reducing the number of retailers that can sell them.

The New Zealand Government's action plan to achieve a 'Smokefree Aotearoa' sets out how these policies would benefit the disadvantaged communities who most need them. The action plan also acted as a rallying call for civil society and as an explanation of the rationale for the scale of government action on tobacco. The UK Government can draw inspiration from this approach.

Becoming smokefree by 2030 would lead to rewards by 2040

By 2030, we want to see a nation where the risks of smoking are kept front of mind. A nation where a higher proportion of people who smoke across all socioeconomic groups want to quit and can easily access effective smoking cessation services and tools. This includes use of legal e-cigarettes (see Note 4), which are an effective way to stop smoking – and while they are not risk-free, evidence indicates that they are far less harmful than smoking[274]. But we also want less illicit tobacco and vapes and a nation where fewer young people are sold – or take up – tobacco or vapes.

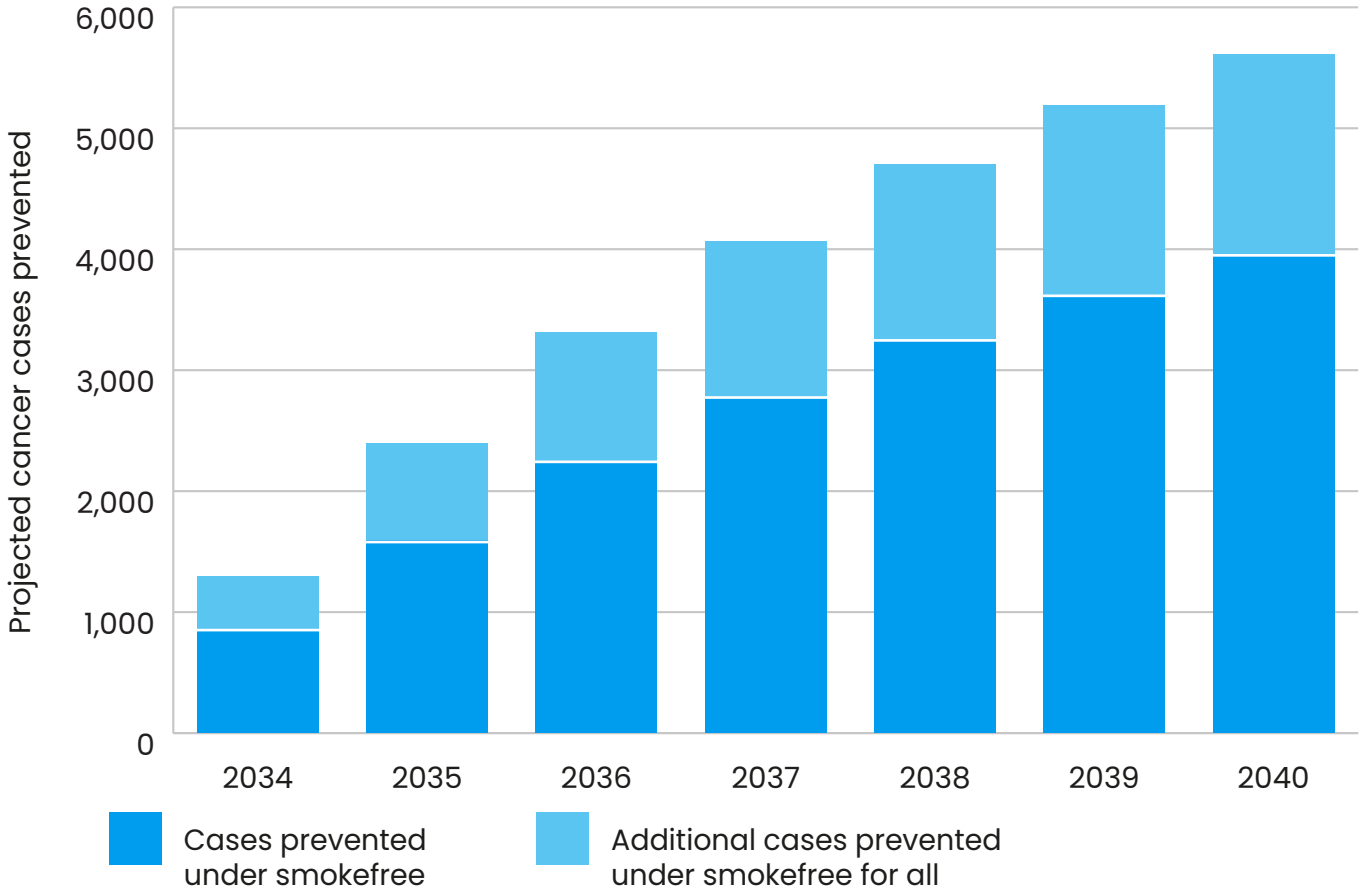
Dr Javed Khan's independent review on 'making smoking obsolete', commissioned by the UK Government, clearly set out the parameters of what was needed to achieve this, with a particular emphasis on support for the communities who need it most[275].

If the UK Government and the NHS were to take decisive action in the next parliamentary term to become smokefree by 2030, this could prevent over 18,000 cancer cases in total in England by 2040. It could also set up much greater health and economic benefits for future generations.

And if we became smokefree by 2030, not as a population-wide average but across all socio-economic groups, it would prevent around 26,600 cancer cases in England by 2040 – that's around 8,400 more cancer cases prevented (see Figure N).

But if recent trends continue, England's most deprived areas would become smokefree almost three decades after the least deprived[276]. Realising the smokefree ambition across all socioeconomic groups would be one of the most impactful and equitable actions any government could make.

Figure N
Cancer cases prevented by 2040 if smokefree, or smokefree for all, is achieved in England by 2030



- Smokefree 2030: smoking rates reduced to 5% average amongst adult population
- Smokefree for all: smoking rates reduced to 5% of adult population across all income groups

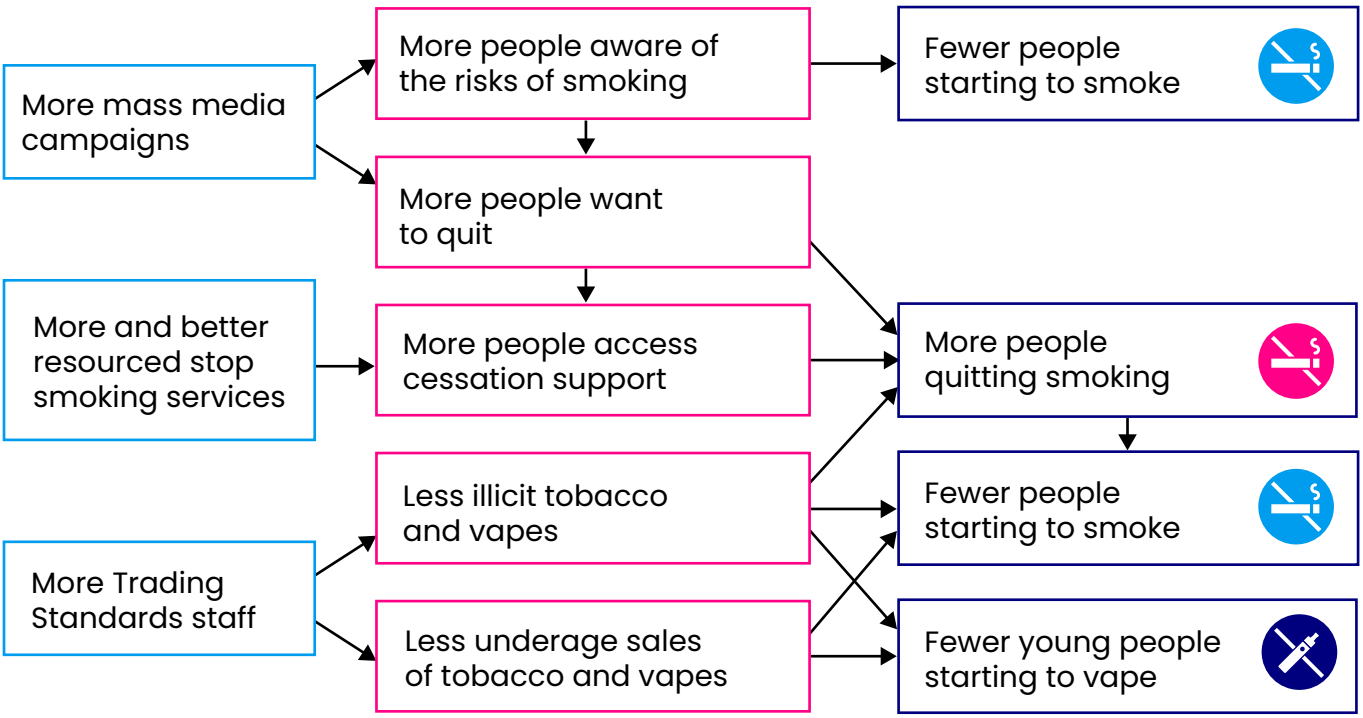
Source: CRUK calculations for manifesto for cancer research and care, October 2023

3.4. Investing to 'stop the start' and 'start the stop'

3.4.1. Doing more of what works

It's vital that people who smoke can easily access the services and tools that help them stop and that they are motivated to do so. This needs to be accompanied by the effective enforcement of existing regulations, and the implementations of new regulations to reduce the appeal of smoking and the availability of illicit tobacco to stop young people from starting smoking in the first place (see Figure O).

Figure O
Investing in more of what works to reach smokefree



Mass media campaigns motivate people to stop smoking and discourage them from starting

Mass media campaigns can be highly effective[277, 278, 279] and cost-effective[280] in motivating people to stop smoking or not take it up in the first place. But they must be sustained and sufficiently intense to have an ongoing impact[281].

Yet national spending in England on public education campaigns dropped from £24.91m in 2009/10 to just £660,000 in 2021/22[282, 283]. The UK Government has now pledged an additional £5m this year and £15m per year after that for funding national stop smoking campaigns in England[284]. This needs to be secured for the duration of the next parliament.

Locally accessible stop smoking services are vital resources

Stop smoking services generally provide a combination of behavioural support and prescription medication. People using them are around three times more likely to successfully stop smoking than people attempting to quit without help[285, 286]. But, primarily due to pressure on local authority budgets, only 67% of local authorities in England commissioned a specialist service open to all local people who smoke in 2022[287]. And between 2015/16 and 2023/24, total local authority spending on stop smoking services and tobacco control in England fell by 45% in real terms[288].

In October 2023, the UK Government announced that it would be more than doubling the funding available (to around £138m) for local stop smoking services. This was to support a total of around 360,000 people a year to quit smoking, according to their analysis[289]. This is an important commitment, especially as these services have not been sufficiently funded in the past. And the scale of it matches what the public want to see, with 76% of people surveyed supporting an increase in the availability of local services to help people quit smoking[290]. This funding must be secured for as long as it is needed to make the UK smokefree across all socioeconomic groups and distributed to the areas that need it most.

E-cigarettes can be an effective tool for quitting smoking

Given that the long term impacts of e-cigarettes are still unknown, they should not be used by people who have never smoked – especially young people. It's right that the UK Government is consulting on measures to reduce the availability and appeal of vaping to children.

At the same time, the evidence so far suggests that legal e-cigarettes are far less harmful than smoking[291, 292] and can help people quit smoking[293]. E-cigarettes are the most popular smoking cessation tool in England[294]. Initiatives such as the national 'Swap to Stop' scheme – which offers people who smoke a vape starter kit and behavioural support to help them quit smoking, and is tailored to the needs of local populations – are welcome. In October 2023 proposals to reduce the availability and appeal of vaping to children, the UK Government explicitly recognised that e-cigarettes should still be available to adults to help them quit smoking[295].

It's important that this balanced approach is maintained. Further considerations on e-cigarette policy are set out in Box N.

Enforcing tobacco and vaping age of sale rules and countering the illicit trade underpins all measures

Trading Standards enforce the existing age of sale laws and combat illicit tobacco and vaping products. They do a critical job, but in recent years, funding cuts and capacity constraints have reduced their effectiveness. Recent public polling showed 82% of people surveyed supported tightening the enforcement of existing rules aimed at preventing young people from taking up smoking[296].

The effectiveness of the UK Government's proposal to raise the age of sale of tobacco would likely be increased by strengthening enforcement on retailers. That's why we welcome the UK Government's announcement of an additional £30m a year to support enforcement agencies such as Trading Standards, Border Force and HMRC[297]. This needs to be secured for the duration of the next parliament.

Box N
Further policy considerations on e-cigarettes and youth vaping

So far, the evidence suggests that legal e-cigarettes are far less harmful than smoking and can help people to quit. But e-cigarettes are a relatively new product and their long-term impacts are unknown[298], so they cannot be considered risk-free. They should not be used by people who have never smoked – especially young people. There has been a concerning increase in the use of e-cigarettes by people who have never smoked[299], and their experimental use by people aged under 18[300].

It's right that the UK Government is consulting on measures to reduce the availability and appeal of vaping to children. Measures announced in Spring 2023 were a positive first step, but more should be done to reduce the likelihood of vapes appealing to and falling into the hands of children. This is an area that needs stronger regulation.

The harmful effects of smoking are indisputable, and any action on vaping must be taken alongside, not instead of, action on tobacco.

When developing vaping policy, the UK Government needs to continue to strike a balance between protecting people who have never smoked from taking up vaping, and supporting people who smoke to quit.

The UK Government should particularly consider the potential impact of any vaping policy changes on:

- Helping people who smoke to quit – limiting the availability or appeal of e-cigarettes as a cessation tool could have potential unintended consequences on how people who smoke perceive and use e-cigarettes, and on smoking rates more generally.
- Preventing young people from taking up smoking – growing up in a household where someone smokes places children at risk of exposure to harmful second-hand smoke and increases their risk of starting smoking. Limiting the availability or appeal of e-cigarettes as a cessation tool could have unintended effects on parents' or family members' ability to quit smoking and in turn have an impact on young people themselves.
- Ensuring that young people who vape can quit and don't switch to illicit vapes or smoking instead – measures that curb youth vaping must also consider and mitigate against the potential unintended consequence of those young people switching to illicit vapes or smoking.
- Reducing health inequalities – e-cigarettes are currently a popular and effective smoking cessation tool across all socioeconomic groups, with some evidence that they are more commonly used by more deprived people who smoke and tried to quit[301, 302].

3.4.2. Investing in becoming smokefree

The interventions listed in the previous section are the key to unlocking the smokefree ambition. But to make that ambition a reality, they need adequate and sustainable investment. The public agree, with 69% supporting investing more money in tobacco control, public health campaigns and stop smoking services in a recent poll[303].

In 2022, the Khan Review noted that it would take an additional investment of at least £125m per year on interventions like these to get England on track to reach smokefree by 2030. From this, an increase of £70m a year was recommended for stop smoking services, ringfenced specifically and distributed according to smoking prevalence data. While this amount is not the total needed, it would get us much closer to adequately and sustainably funded tobacco control in England.

That's why we welcome the UK Government's 2023 announcements of substantial new funding for smoking cessation services, mass media campaigns and enforcement activity as a huge step towards investing in what works to reduce smoking rates[304,305].

This additional investment needs to be secured for the length of time needed to make England smokefree for all, and be sufficient to meet that goal. Too often, government funding of prevention measures is hindered by short-term political and economic considerations and can be reduced or withdrawn prematurely. Predictable, longer-term funding is essential.

Make the polluter pay to cover the costs of tackling tobacco

Making tobacco companies foot the bill for tackling smoking is a popular way to source the funds needed through the next parliament. It also has the added benefit of not directly costing the taxpayer. In these challenging economic times, there is a real opportunity here should the government choose to seize it.

In the UK, the four largest tobacco manufacturers make around £900m in profits each year[306]. When used as recommended by the manufacturer, cigarettes are the one legal consumer product that will kill most users – 2 out of 3 people who smoke will die from smoking[307, 308, 309, 310]. Yet profit margins on cigarette sales are significantly higher than typical consumer products. In 2022, the tobacco industry operating profit margins in the UK were as much as 67%[311, 312, 313, 314].

When it comes to the funding needed to tackle tobacco, people want to see the tobacco industry held responsible for the damage its products cause. In a YouGov poll conducted in August 2023 in England, 72% of people surveyed supported the government investing more money to help England become smokefree. Of those, 84% preferred this money coming from making the tobacco industry pay (see Notes for more, Note 5)[315]. Insight from our patient panels further confirms such strong support[316].

Almost 14,000 members of the public and over 20 organisations signed a petition calling for more funding to be provided to help people across the UK quit smoking[317]. This petition suggested that the UK Government use tobacco industry's funds – without industry interference – to help pay for the cost of tobacco control through a 'smokefree fund'. Politicians across the political spectrum and a range of organisations, charities and researchers have also backed these calls through our Smokefree UK campaign.

There are many ways to raise revenue from the tobacco industry

This money could come from income from tobacco duties, a 'polluter pays' smokefree fund or another approach. Whichever way the Treasury decides to do it, it's imperative that the tobacco industry has no influence over how the funds are spent and is not treated as a partner in this initiative, given that its interests are in direct conflict with the goals of public health. This is critical to safeguard the UK's commitments to Article 5.3 of WHO's Framework Convention on Tobacco Control[318].

Academics and advocacy organisations have investigated two possible mechanisms for a polluter pays approach:

- **A price-capping and tax increases mechanism.** Capping the price of tobacco products and increasing excise taxes would shift what were industry profits to the government. This method has been proposed by Dr Rob Branston and colleagues[319, 320, 321].
- **A price-capping and profit-control mechanism.** Alongside economists, ASH have suggested a price-capping and profit-control mechanism that would redistribute tobacco industry profits to the UK Government[322]. This scheme takes elements from the Voluntary Scheme for Branded Medicines Pricing and Access (VPAS) and its long-standing predecessor, the Pharmaceutical Price Regulation Scheme (PPRS), which operate within DHSC already. Economist Dr Henry Featherstone calculated up to £700m per year could be raised by a polluter pays levy that capped profits at around 10%.

Our modelling of these two possible mechanisms shows that the revenues generated would comfortably cover the minimum additional investment needed for smoking policy interventions throughout the next parliament and still leave additional revenue for the UK Government to decide how best to reinvest[323].

There is a case for this additional revenue to be put towards funding the restoration of the public health grant to its original value, reflecting what that amount would be in today's terms[324]. This would help reverse the real terms per-person cuts to public health funding since 2015, and provide funding for other critical local functions and services that prevent ill health, including cancer.

Policy recommendation 25

The UK Government should fund tobacco control measures – including smoking cessation services and public health campaigns in England, and stronger enforcement of existing and new regulations – to at least the level of an additional £125m per year recommended in the Khan Review, throughout the next parliamentary term. To ensure sufficient investment is secured until we reach smokefree for all, the UK Government should commit to making the tobacco industry foot the bill, without letting the industry have any influence on how the funds are spent.

Geography: England

3.5. Ending smoking through innovative regulation

The UK has a proud history of introducing bold regulation to help combat tobacco, including smokefree legislation to tackle exposure to second-hand smoke in public places and introducing standardised packaging. If implemented, increasing the age of sale of tobacco products by one year every year would join that list.

Meanwhile, the tobacco industry continues to adapt to existing regulatory measures on tobacco, finding loopholes through which to make their products appealing. In the face of this, the UK Government needs to be more dynamic, not only employing new techniques to dissuade people from smoking, such as those recommended below, but also by being quicker to respond to industry's own innovations. This approach would be popular – 82% of the public support tightening loopholes in existing laws aimed at making smoking unappealing to people under 18[325].

3.5.1. Increasing the age of sale of tobacco

The UK Government's proposal to raise the age of sale of tobacco by one year each year, so that no child born on or after 1 January 2009 will ever be legally sold cigarettes, is a bold step forward for tobacco control[326].

Raising the age of sale of tobacco could help prevent young people from suffering a lifetime of addiction, ill health and premature death when introduced as part of the wider package of interventions described here. It would also clearly demonstrate the UK Government's intention to cement the reduction in smoking prevalence for generations to come. The public back this measure – even before the prime minister announced the UK Government's own proposals, 73% supported raising the age of sale for tobacco products[327].

Almost 9 in 10 people who smoke report they took up smoking before the age of 21[328]. And almost 4 in 10 people who have ever smoked in England say they started smoking aged 18 or older[329]. Raising the age of sale of tobacco could help prevent people from ever starting smoking. As with existing age of sale rules, this policy would criminalise the sale of cigarettes to those age groups, as opposed to the purchase by young people.

Raising the age of sale would take the legal purchase of cigarettes beyond school age[330] and so protect younger children from exposure to older pupils in school who smoke and whose behaviour they may want to imitate[331]. It may also have further benefits, such as helping to reduce smoking during pregnancy amongst younger mothers covered by the legal age change, and further denormalising tobacco use which could lead to higher rates of quitting in other age groups.

Modelling data from New Zealand, where this policy has recently been introduced, suggests it will have a significant impact on reducing smoking uptake[332], although more time is needed to see this in practice. Modelling also indicates that the greatest benefits would be seen when raising the age of sale was implemented as part of a suite of other tobacco control measures[333].

In advance of legislation being tabled, it's important for the UK Government to learn from New Zealand and consider how the measure is best implemented in England, given contextual differences between the nations such as geography, smoking prevalence and wider regulatory measures.

As the Bill proceeds, we would hope to see cross-party support for raising the age of sale. We would hope to see it implemented swiftly in the next parliament, if it hasn't been done already, and for Scotland, Wales and Northern Ireland to follow suit.

Policy recommendation 26

The UK Government should swiftly introduce and implement legislation raising the age of sale of tobacco in England.

Geography: England

3.5.2. Fixing loopholes in existing measures to further reduce the appeal of smoking

A lot of progress has already been made to reduce the appeal of continuing to smoke and prevent people from taking up smoking in the first place. The challenge is that it doesn't take that long for the industry to find loopholes and adapt.

In the face of this, the UK Government needs to be more dynamic – not only employing new techniques to dissuade people from smoking, such as those recommended below, but also by being quicker to respond to the industry's own innovations. Rapid-response policy analysis is a critical part of this.

Prohibit all tobacco flavours

In 2020, a requirement prohibiting cigarettes from having 'characterising' flavours fully came into force through the Tobacco and Related Products Regulations (TRPR). A 'characterising' flavour is defined as "a clearly noticeable smell or taste other than one of tobacco".

Tobacco companies have used extensive product innovation to get around the ban and maintain a market for their flavoured products. For example, they have created accessories, such as 'cards' that can be

inserted into cigarettes or 'roll your own' pouches to add a menthol flavour[334]. In addition, prohibiting 'characterising' flavours rather than simply banning all flavours creates significant ambiguity around what constitutes a characterising flavour – ambiguity and enforcement challenges which can then be exploited by the tobacco industry.

The TRPR needs to be amended so that all tobacco flavours are prohibited, rather than just characterising flavours. And the UK Government needs to bring all tobacco products and possible accessories that could be used to circumvent the ban into the scope of this regulation.

Standardised packaging and health warning regulations should be extended to all tobacco products

Standardised packaging regulation, as set out in the Standardised Packaging of Tobacco Products Regulation 2015, removes all brand images, variation in colours and promotions from tobacco packaging. It also restricts specific terminology in brand names. And under the TRPR, tobacco products are required to feature a combined text-and-picture health warning.

However, these regulations don't apply to all tobacco products, such as herbal cigarettes, smokeless tobacco products and novel tobacco products. This creates a loophole that encourages manufacturers to create new products, or market existing products, that are less heavily regulated and therefore more appealing to consumers, thereby undermining efforts to reduce smoking prevalence across the UK.

The UK Government should extend the requirements of standardised packaging and health warnings to all products containing tobacco on sale in the UK. This should also be applied to accessories that are used for smoking, such as packages of rolling papers and filters.

Tobacco packaging and brand names needs stricter regulation

The UK's standardised packaging regulation has helped to reduce the attractiveness of cigarette packs to young people and enhance the salience of health warnings[335].

However, research shows that loopholes may be undermining the impact of this legislation, with tobacco companies introducing new features to differentiate their products. These included bevelled (rounded) edges on the packs and a 'pro-seal' closing mechanism that was claimed to maintain freshness. Tobacco companies have paid particular attention to innovating cheap products that are attractive to price-sensitive consumers. These innovations are not prohibited by the UK standardised packaging legislation and research has found that they can reduce adolescents' intended negative reactions to standardised packs[336].

Tobacco companies also use regulatory loopholes on brand names to create misconceptions. For example, some companies replaced prohibited names with new brand variant names that use colours and adjectives to invoke the same connotations – for example, changing 'smooth' to 'bright blue' or 'sky blue'. The colours chosen replicate the colour of the former fully branded packs and may lead to continued misconceptions about the relative harms of products.

The UK Government needs to close existing loopholes used by the tobacco industry that enable tobacco companies to differentiate their products from others on the market and ban the use of colours or other descriptors in product variant names.

Policy recommendation 27

The UK Government should immediately close existing loopholes used by the tobacco industry in the marketing of their products, including those across tobacco flavours, health warnings, and tobacco packaging and brand names.

Specifically, the UK Government should:

- **Amend the TRPR so that all tobacco flavours are prohibited, rather than just characterising flavours, and bring in legislation so that all tobacco products and possible accessories are brought into the scope of this regulation.**
- **Extend the requirements of standardised packaging and health warnings to all products containing tobacco on sale in the UK. This should also be applied to accessories which are used for smoking, such as packages of rolling papers and filters.**
- **Close existing loopholes used by the tobacco industry that enable tobacco companies to differentiate their products from others on the market and ban the use of colours or other descriptors in product variant names.**

Geography: UK

3.5.3. Implementing innovative measures to further reduce the appeal and availability of tobacco and help people quit

Regulatory measures introduced over the past few decades have helped to reduce the appeal of smoking. But there is evidence to show that the effectiveness of tobacco warnings can somewhat decrease over time as people who smoke become more used to them. We also know that most people who smoke have tried to quit[337, 338], but smoking is an addiction and people need support to do so. That's why it's important that the UK Government examines and implements new techniques to effectively dissuade people from starting to smoke and help people stop.

Pack inserts can help people to quit

Pack inserts, which go inside tobacco product packaging, provide behavioural recommendations for quitting and emphasize the benefits of stopping smoking. Research from Canada, where the policy has already been introduced, suggests that people who read the inserts at least a few times per month are more likely to try to quit than people who don't[339]. This finding is supported by research on the perception of inserts in the UK, where participants who had tried to quit within the six months prior to the survey said that the inserts would help them to stop[340, 341]. The public also supports this measure, with 71% of people surveyed supporting making companies include material inside cigarette packs with information to help people quit[342].

We welcome the UK Government's recent consultation on including pack inserts in tobacco products[343] and support the introduction of a range of mandatory pack inserts for all tobacco products. The messaging should be user tested to ensure it is accessible to all and does not perpetuate smoking-related stigma.

Dissuasive cigarettes could deter people from starting to smoke

Most young people get cigarettes from their peers[344] and may therefore not see the extensive health warnings on packs.

Dissuasive cigarettes are designed to put people off smoking by making the cigarette itself more unappealing to use – for example, by putting health warnings directly on cigarettes or making them an unattractive colour. This approach would mean health messaging extends from purchase to packaging and through to consumption.

Perception research suggests that people who don't smoke, including young people, would be less likely to try a dissuasive cigarette than a standard cigarette[345, 346, 347, 348, 349, 350]. This means dissuasive cigarettes could deter people from starting to smoke in the first place, including young people. User testing would be needed to establish the best combination of messaging and/or colour, and to ensure that any messaging is targeted to groups with the highest smoking rates and does not perpetuate smoking-related stigma.

A licensing system should be put in place for tobacco retailers

Unlike with alcohol retailers, there's currently no licensing system attached to selling tobacco in the UK. In Scotland and Northern Ireland there's a tobacco retail register, but there are currently no conditions attached to registering[351]. This means outside the HMRC Track and Trace economic operator ID system, there is no register of the retailers that can sell tobacco in the UK[352].

Having a licensing system for retailers that sell tobacco in each UK nation could allow for the stipulation of public health conditions. Options that have been suggested and successfully implemented in other countries include prohibiting sales near schools, reducing the total number of retailers and limiting tobacco trading hours[353]. A fee has also been added to the mandatory license in some countries[354], providing the funds needed to administer the system or else invested in other public health measures.

In line with this, the UK Government should introduce a mandatory licence of retailers that can sell tobacco products in England. The licence should be able to be removed for breaching point of sale laws, including age of sale laws, and should be designed so that public health conditions or a fee could be added in the future. This list of retailers who can sell tobacco should be made publicly accessible to facilitate further tobacco control research.

Denicotinisation could reduce the addictiveness of tobacco products

Nicotine is the addictive substance in tobacco products[355]. 'Denicotinisation' is the process of reducing the nicotine content in tobacco products to a level where people who are starting smoking or experimenting with cigarettes do not get addicted, and people who already smoke and are addicted either no longer find smoking satisfying and quit, switch to non-tobacco containing nicotine products or gradually lower their dependence.

Such cigarettes are known as 'very low nicotine content cigarettes', or 'reduced nicotine cigarettes'. Research from New Zealand and America suggests that denicotinisation could have a positive impact on reducing smoking rates[356, 357, 358]. But the evidence base is currently lacking in the UK, including for the impact on younger people, people from more deprived backgrounds and people unmotivated to quit.

More research is needed on the impact denicotinisation would have in the UK. We suggest that the UK Government conducts a formal review of the modelling and impact in other countries with a view to implementing changes in the UK if the evidence supports it.

Policy recommendation 28

The UK Government should take steps towards implementing innovative policy measures to further reduce the appeal and availability of tobacco and help people quit.

Specifically, the UK Government should:

- **Introduce a range of mandatory pack inserts for all tobacco products in the UK, with different evidence-based cessation messaging that is user tested so it is accessible to all and does not perpetuate smoking-related stigma.**
- **Add evidence-based warning messages and/or dissuasive colours to cigarettes sticks and other tobacco products in England, with user testing to establish the best combination of messaging and/or colour and to ensure that it is targeted to groups with the highest smoking rates and does not perpetuate smoking-related stigma.**
- **Introduce a mandatory licence of retailers that can sell tobacco products in England. The licence should be able to be removed for breaching point of sale laws, including age of sale, and should be designed so that public health conditions or a fee could be added in the future. This list of retailers who can sell tobacco should be publicly accessible to facilitate research.**
- **Commission research into the impact denicotinisation would have in the UK and commit to a formal review of the modelling and impact in other countries, with a view to implementing changes in the UK by 2030 if the evidence supports it.**

Geography: England/UK

3.6. Maximising the health service's potential to help people quit

The health service plays a vital role in helping people to stop smoking. The NHS Long Term Plan and, previously, the Tobacco Control Plan for England, set out several smoking cessation objectives for the health service[359, 360]. NICE also sets guidelines for tobacco, which commissioners, providers and healthcare professionals should keep abreast of to maximise their role in helping people quit[361].

Primary care should more routinely deliver smoking cessation support

GPs have an important role to play in encouraging people to stop smoking, especially given people who smoke see their GP 35% more than people who do not smoke[362]. That's why it's important they make every contact count with their patients to help them quit smoking. But in our recent survey of UK GPs, only 55% said they either always or frequently deliver very brief advice (VBA) – an intervention that aims to identify and support patients who smoke to try to quit[363] – to patients who smoke[364].

However, some of the most cost-effective smoking cessation medications, such as Varenicline, are not currently available in England. While we welcome the UK Government working with suppliers and prescribers to get access for people who need it most[365], more needs to be done to ensure that people who smoke have access to the most effective treatment options to stop.

A report we published 2021 found that improved smoking cessation support in primary care would result in a significant decline in smoking prevalence across all socioeconomic groups, which would help get the UK closer to smokefree targets[366]. However, smoking inequalities are still projected to widen by 2039 with or without improvement of smoking cessation support in primary care, given the modelled interventions would similarly benefit all socioeconomic groups[367]. More needs to be done to target the most deprived groups.

Further research is needed on use of digital technology for smoking cessation

Digital technologies are increasingly being used as a means of helping people to quit smoking. There's some evidence to suggest that digital technologies could help extend the reach of services to groups that may not otherwise engage with face-to-face services. They could also complement person-based support to meet the people's needs.

There isn't enough evidence yet to suggest that digital forms of support are superior to non-digital forms[368, 369, 370]. They should not replace existing 'mainstream' ways of delivering smoking cessation, such as the use of VBA in primary care and face-to-face support. It's also possible that digital technologies are less accessible to some groups due to the level of digital literacy needed to use the apps and people's access to the internet, modern digital hardware and software. More research is needed here.

Tobacco treatment services in secondary care need to be fully rolled out

As part of the NHS Long Term Plan[371], by 2023/24, all people admitted to hospital in England who smoke should be offered NHS-funded tobacco treatment services. This model has also been adapted for expectant mothers and their partners, with the rollout of a new smokefree pregnancy pathway. And a new universal smoking cessation offer should also be available within specialist mental health services for long-term users, as well as in learning disability services.

But the rollout of these services has been complex and challenging, not least due to the disruption caused by the COVID-19 pandemic and funding pressures. Only 31% of the 29 ICBs surveyed in March 2023 were confident that tobacco dependence treatment services would be fully implemented in acute and mental health hospitals in their ICS area by March 2024. Half (n=14) also said they didn't know if tobacco dependence treatment services would be retained following the end of the transformation period in March 2024[372].

Tobacco dependence treatment services can also play an important role in 'prehabilitation', which involves preparing patients for cancer treatment with the intention of improving outcomes[373]. It's a programme of support and advice that some NHS hospitals are already using[374] and covers three key areas: diet and weight, physical activity and mental health. Emerging research shows that if this support is provided to patients early on, they could be more likely to have more treatment options, leave hospital sooner after surgery, have fewer side effects from their treatment, cope better with the side effects they do have and have better long-term health[375, 376].

Box O
Targeted lung cancer screening

The UK Government's announcement of the full national rollout of the targeted lung cancer screening programme in England is very welcome. Given smoking is the leading cause of lung cancer, we strongly support the integration of smoking cessation services into this programme.

People are invited to screening based on smoking status data, so it's critical to the success of the programme that the data collected on smoking status within the NHS is accurate. Without this, people who are eligible may be missed and people who are ineligible may be incorrectly invited.

Smoking cessation interventions must be integrated into targeted lung cancer screening, with ongoing smoking cessation support (for example, at a stop smoking service) made available for people who want to stop smoking. But for this, stop smoking services must be properly funded. System-wide coordination of NHS and local authority smoking cessation services at the ICS level would be a helpful exercise. More detail on the broader lung cancer screening programme can be found in section 4.2.2.

Policy recommendation 29

NHSE should improve the delivery of smoking cessation interventions in primary care and ensure that the NHS Long Term Plan commitments to roll out tobacco dependence treatment services by 2023/24 are fully implemented, sustainably funded and maintained past 2023/24.

Geography: England

3.7. Driving a generational shift in cancer prevention in the UK

Polling consistently shows that the public wants action from politicians to create a healthier environment for every child, and to make it more likely that the next generation will be healthier and more prosperous[377].

The twin pressures of the cost-of-living crisis and the after-effects of the pandemic have driven a short-term approach to the prevention of non-communicable diseases in recent years. But it's time to reset this approach.

There are several measures that we know would drive a major reduction in the prevalence of key risk factors in the UK in future generations – including overweight and obesity, drinking above recommended levels, air pollution and HPV. In many cases, they build on existing policies across the UK nations.

For cancer, the full impact wouldn't be felt for many decades. But this doesn't diminish the importance of taking these actions and the other benefits they would bring.

3.7.1. Marketing restrictions to reduce the consumption of less healthy food and drink

Overweight and obesity is the second biggest cause of cancer in the UK after smoking and is linked to 13 types of cancer[378]. A child who is obese is around five times more likely to be obese in adulthood – so acting early is critical[379].

Our research has shown that young people report exposure to junk food marketing clearly influences their food choices[380]. These findings align with findings from systematic reviews and wider research, which show advertising increases food intake in children[381, 382].

There is a strong link between advertising and health inequalities, with children and families from more deprived backgrounds being more exposed to junk food advertising than their less deprived peers[383]. Even a one-off exposure to food advertising can potentially increase children's food intake by around 30 calories during or shortly after the exposure[384]. Research has also suggested that an energy gap of only 69–77 kcal per day over a number of years can make the difference between normal weight and overweight in young children[385].

In 2022, regulations came into force to restrict the placement of HFSS food and drinks in stores. Thanks to this and the expectation of restrictions to volume-based promotions on HFSS foods, implementation of which has been delayed, industry has already started to reformulate some of its unhealthier products or bring in new products[386].

We now strongly urge the UK Government to implement the UK-wide TV and online advertising restrictions on HFSS foods, which were passed into law in 2022 but which the UK Government delayed coming into force until October 2025. The implementation of these restrictions requires minimal effort and no further legislation.

The UK Government's own figures suggest that implementing the HFSS advertising restrictions could reduce the number of children living with obesity by around 20,000 over the coming years[387]. The policy also garners consistently high public support, with 8 out of 10 UK adults supporting the government banning advertising of unhealthy food on TV and online to children[388].

The UK Government should also implement restrictions on volume-based promotions, which has also faced delays. Volume-based promotions (including multi-buy deals) are shown to encourage shoppers to spend more money than they planned to and are a mechanism to drive sales[389]. As HFSS products are more commonly on offer than healthier products[390], volume-based promotions can normalise the purchasing of unhealthy food and drink categories, contributing to an obesogenic environment for consumers[391]. Implementing restrictions on volume-based price promotions would positively influence food purchasing choices in England[392].

Companies have a choice as to which products they advertise and/or place on promotion. These regulations would incentivise industry to rebalance their product ranges and offers in favour of healthier options.

Policy recommendation 30

The UK Government should implement the 2022 legislation on TV and online advertising restrictions on HFSS foods across the UK no later than October 2025.

Geography: UK

Policy recommendation 31

The UK Government should implement the legislation restricting volume-based price promotions on HFSS products in England by October 2025.

Geography: England

Box P
Obesity Health Alliance

The Obesity Health Alliance is a coalition of over 50 health organisations, including Cancer Research UK, who have joined together to advocate for policies to improve population health and address obesity.

The Obesity Health Alliance has three main asks of the next UK Government[393]:

- Give children's health the priority it deserves – including renewing the commitment to halve childhood obesity by 2030, alongside tangible measures to achieve this.
- Build on the success of the Soft Drinks Industry Levy to design further fiscal measures that incentivise industry to sell healthier food and drink options, and to invest revenue raised in funding policies to improve children's health, especially for people on lower incomes.
- Empower local communities to make the places they live healthier. Do this by updating planning laws to enable local authorities to increase the number of healthy food and drink options and reduce the prevalence of unhealthy food outlets. And do this by increasing the powers of local authorities to tackle the flood of unhealthy food and drink advertising in outdoor areas, especially near places children congregate.

We endorse the Obesity Health Alliance's manifesto.

3.7.2. Marketing restrictions to reduce alcohol consumption

In the UK, around 70 people die due to alcohol every day[394]. The COVID-19 pandemic appears to have exacerbated this crisis, with alcohol-specific death rates having increased by 25% between 2019 and 2021, reaching record highs[395].

Alcohol is known to cause seven types of cancer, including two of the most common cancers, breast and bowel[396]. Cutting down on alcohol consumption would reduce the risk of cancer[397].

Alcohol marketing contributes to alcohol use being seen as a normal and even an essential part of everyday life in the UK. 68% of alcohol industry sales revenue in the UK comes from people drinking above recommended levels[398]. Restrictions on alcohol marketing would be an effective way to help reduce harm from alcohol.

Alcohol marketing is currently subject to a mix of advertising codes, either wholly or partially regulated by the alcohol industry. These codes are inadequate as they fail to protect children from being exposed to large amounts of alcohol marketing. Sporting events, popular with children, whether televised or otherwise, fall outside the scope of existing advertising regulatory guidance and expose children to alcohol marketing and advertising. The UK Government should introduce higher standards for how the industry can market and sell its products. This could include adding alcohol into the definition of 'unhealthy products' under the existing marketing regulations for HFSS products.

The UK Government should follow the successful approach in Scotland and Wales and introduce minimum unit pricing (MUP) in England. Evaluation of the implementation of MUP in Scotland shows it has had a positive impact on health outcomes there, including an estimated 13% reduction in alcohol-attributed deaths[399]. But it could have an even bigger impact if the 50p per unit rate, set a decade ago, was increased to 65p – as now proposed by the Scottish Government itself[400].

Policy recommendation 32

The UK Government should introduce restrictions on alcohol marketing to protect children and vulnerable people. It should also hand responsibility for ensuring alcohol marketing practices adhere to higher standards to an independent body with no links to the alcohol or advertising industries.

Geography: England

Box Q
Alcohol Health Alliance

The Alcohol Health Alliance is a coalition of more than 60 organisations, including Cancer Research UK, working together to reduce the harm caused by alcohol.

Reducing the number of alcohol-attributable cancer cases will mean implementing comprehensive policy measures which reduce the availability, marketing and affordability of alcohol.

We support the Alcohol Health Alliance's key policy recommendations for the UK Government to reduce harm from alcohol. These include[401]:

- Introducing minimum unit pricing for alcohol in England, to prevent the sale of ultra-cheap high strength drinks that lead to high social costs.
- Ensuring alcohol duty at least keeps pace with inflation and that all stronger products are always taxed at a higher rate than lower strength products.
- Mandatory alcohol product labelling that provides consumers with information relating to ingredients, calories, units, the Chief Medical Officers' guidelines and health risks such as alcohol during pregnancy and cancer.
- Inclusion of 'public health' as a licensing objective in England so that licensing bodies must consider local alcohol harm data when making their decisions.
- Committing to long-term funding of proven and cost-effective early interventions and alcohol treatment services across the UK.

3.7.3. Setting ambitious and properly monitored targets to reduce air pollution

Outdoor air pollution causes almost 1 in 10 cases of lung cancer (8%) in the UK[402]. Low income and ethnic minority communities are at greater risk, as their neighbourhoods are statistically more likely to be pollution hotspots[403].

Findings from research we funded at the Francis Crick Institute and University College London show how air pollution can cause lung cancer in some people who have never smoked[404]. The research explored the smallest type of particulate matter (PM2.5) and found that exposure to these particulates from outdoor air pollution promotes the growth of cells in the lungs carrying cancer-causing mutations.

The UK Government need to do more to reduce the harmful atmospheric levels of PM2.5. The current legal limits in England are far above WHO's Guidelines[405], and the UK Government is only planning to reach the interim WHO target of 10 micrograms per cubic metre by 2040. But the UK Government's own modelling suggests that it's achievable to reach this target by 2030 at the latest, and Imperial College London have published a detailed roadmap for achieving this[406]. The Confederation of British Industry also estimates the UK could see an annual £1.6bn economic benefit if WHO air pollution guidelines were met[407].

Policy recommendation 33

The UK Government should commit to reducing harmful atmospheric levels of PM2.5 more quickly, by setting a target to reach 10 micrograms per cubic metre PM2.5 levels by 2030 and outlining a pathway to achieving it.

Geography: England

3.7.4. Vaccination programme for HPV

There is now strong evidence that the HPV vaccine prevents cervical cancer. We funded the first study of its kind, which showed that the bivalent Cervarix HPV vaccine dramatically reduced cervical cancer rates by 87% in women in their 20s who were offered it at ages 12 to 13 in England[408]. This is why it is essential that all who are eligible receive their HPV vaccine.

The HPV vaccination programme in England is one of the most comprehensive in the world. However, the COVID-19 pandemic disrupted the school-based immunisation programme and coverage rates have not recovered to pre-pandemic levels, despite promising efforts to reach people who missed their vaccinations[409]. This disruption added to existing disparities in coverage. England does not routinely report data on HPV vaccination coverage by deprivation or ethnicity, but cross-sectional research shows that vaccination coverage is lower in children previously excluded or not in school[401, 411], some ethnicities[412, 413, 414] and the most deprived groups[415, 416, 417].

Combined with cervical screening, HPV vaccination could reduce cervical cancer incidence to the point where almost no one develops it.

Policy recommendation 34

NHSE, with DHSC, should work to increase HPV vaccination coverage across England. Targeted action is needed in areas and amongst groups with lower uptake to reduce inequalities in coverage.

- **To facilitate this, the UK Health Security Agency should work with NHSE to ensure that data on coverage by deprivation quintile, and where possible ethnicity, is collected and reported on.**

Geography: England

As set out in section 4.2.4., more effort is also needed from the UK Government and the NHS to increase informed uptake and screening coverage, including for cervical screening, which is critical to the early diagnosis of cervical cancer.

3.8. The UK's role in global cancer prevention

There is an urgent need to prevent more cancers and other NCDs globally

Cancer is a global health issue, with the burden increasingly impacting LMICs. The number of new cancer cases is expected to rise by around 400%, from 0.6 million to 3.1 million per year in low-income countries over the next 50 years. This compares with an increase of around 50% (from 7.2 million to 11.1 million) in very-high-income countries over the same time period[418].

There is an urgent need to make progress on cancer prevention in LMICs to save lives and relieve pressure on fragile health systems. Prevention strategies delivered through primary healthcare and addressing common risk factors will also help tackle other non-communicable diseases (NCDs) such as cardiovascular and chronic respiratory diseases, and diabetes.

Each year, 17 million people die from a NCD before the age of 70. And NCDs have a significant social and economic impact through their effect on people's wellbeing and productivity, hitting the world's most vulnerable populations hardest with 86% of these premature deaths occurring in LMICs[419]. As experience from the COVID-19 pandemic shows, high NCD prevalence also increases the vulnerability of people and health systems to epidemics and pandemics.

In 2015, the global community committed to UN Sustainable Development Goal (SDG) 3.4 to reduce premature mortality from NCDs by one third by 2030. Despite this commitment, the share of global health funding dedicated to NCDs in LMICs has stagnated at just 1%[420]. Implementing a series of cost-effective interventions to target NCD risk factors, identified as 'Best Buys' by WHO, is estimated to save close to 7 million lives by 2030[421]. These best buy interventions include tobacco taxation and vaccinating adolescent girls against HPV, and can be delivered through primary care, making them accessible and affordable.

As a recognised leader in global health, the UK Government can play a significant role in accelerating global progress towards SDG 3.4 through its domestic and global policies. The current UK Global Health Framework (2023–25) sets out welcome and bold ambitions for the UK's role in global health, and the opportunity for a more coherent, cross departmental approach. But it neglects some key SDG3 targets, including those addressing NCDs, and lacks clarity on how plans will be operationalised and how progress will be measured. A long-term strategy will be required once the Global Health Framework expires in 2025, and should include a focus on NCDs, a clear delivery framework and funding commitments.

Policy recommendation 35

The UK Government should replace the current Global Health Framework, which expires in 2025, with a comprehensive Global Health Strategy and associated funding commitments.

- **This should assist LMIC progress towards universal health coverage by fully integrating cancer and NCD prevention in its support for primary healthcare and health system strengthening. And it should actively promote the implementation of WHO 'Best Buys', including tobacco taxation and HPV vaccination.**

Geography: UK

Implementing the Framework Convention on Tobacco Control

Tobacco use is the leading cause of preventable death globally. It is responsible for an estimated 8.7 million deaths each year, of which 2.6 million are from cancer[422]. Deaths from tobacco are costing the global economy US$1.4 trillion in healthcare spending and reduced productivity every year[423]. With around 80% of the world's 1.3 billion tobacco users living in LMICs[424], tobacco represents a significant global health and development challenge.

The WHO FCTC came into force in 2005, aiming to address the global public health impact of tobacco through cost-effective measures to reduce its use. But its implementation has been uneven, with just 32% of the countries signed up the FCTC likely to be on track to reduce tobacco use by 30% by 2025[425].

It has also not been accompanied by enough financial and technical assistance for LMICs. It is estimated that the current level of international funding covers just 4% of the estimated costs of scaling up tobacco control to FCTC-compliant levels[426]. The UK Government, together with Norway and Australia, have previously provided welcome support to FCTC implementation through the FCTC2030 project.

Article 5.3 of the framework aims to counter tobacco industry interference and protect public health policy from its interests[427]. But we have seen instances of the UK Government overseas posts promoting tobacco industry interests[427]. Revised guidance for engagement with the tobacco industry has been issued by DHSC in 2023 and must be promoted and enforced across all government departments[428].

Policy recommendation 36

The UK Government should support LMICs to implement WHO Framework Convention on Tobacco Control (FCTC), hold the tobacco industry to account when contravening the FCTC, and reaffirm its commitment to implementing Article 5.3 of the FCTC.

Specifically, the UK Government should:

- **Support LMICs to implement WHO FCTC and the protocol to Eliminate Illicit Trade in Tobacco Products. This must include increased sustainable financial and non-financial support, building on the UK's support and learnings from WHO FCTC 2030 programme.**
- **Ensure tobacco industry organisations headquartered in the UK are held accountable when their actions in LMICs contravene the FCTC.**
- **Reaffirm its commitment to implementing Article 5.3 of the FCTC across all government departments and diplomatic missions around the world, to ensure no endorsement or promotion of the tobacco industry, and the promotion and enforcement of the UK Government's guidance for engagement with the tobacco industry.**

Geography: UK

Action is needed on cervical cancer to accelerate global progress

Around the world, someone dies every two minutes from cervical cancer[429]. That equates to over 340,000 deaths every year[430]. Of these deaths, 90% occur in LMICs due to the inaccessibility of preventative measures, diagnostics and treatments[431], which severely impacts vulnerable families and communities.

In 2020, WHO launched a landmark initiative to address this inequity: the Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem[432]. This strategy sets out three pillars of work across vaccination, screening and treatment. As an interim target, the strategy recommends that

90% of girls in every country are vaccinated against HPV by age 15 by 2030. But in 2022, just 21% of age-eligible girls globally received a dose of the HPV vaccine, partly due to disruption caused by the COVID-19 pandemic[433].

Gavi, the Vaccine Alliance, is a key vehicle for LMICs to access HPV vaccines at an affordable price, and the UK is currently the largest sovereign donor to its core programmes[434]. The next Gavi replenishment is scheduled for 2025. Continued support from the international community will be critical to meeting the vaccination target of WHO's cervical cancer strategy.

The Foreign, Commonwealth and Development Office (FCDO) recently launched the International Women & Girls Strategy 2023 to 2030, to advance female health and rights[435]. But this new strategy does not include cervical cancer elimination, failing to seize the opportunity to minimise a significant threat to female health.

Policy recommendation 37

The UK Government should demonstrate leadership in accelerating progress on cervical cancer elimination in LMICs, by integrating all three pillars of WHO's Global Strategy into its own work and maintaining the UK's position as a leading donor to Gavi.

Specifically, the UK Government should:

- **Integrate commitments to all three pillars of WHO's Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem (vaccination, screening and treatment) within its women and girls work, including its approach to sexual and reproductive health and rights.**
- **Maintain the UK's position as a leading donor to Gavi, the Vaccine Alliance, and advocate for the continued prioritisation of equitable access to HPV vaccination through Gavi programmes.**

Geography: UK

Box R
Research into new methods of cancer prevention

To help future-proof the nation's health for many more generations and prevent even more cancer cases, we must continue to improve our understanding of how cancers develop and find new ways to tackle them. A new era of biological tools and insights is unlocking opportunities to transform what's possible in cancer prevention research. These have the potential to significantly increase the proportion of cancers that are considered preventable and to develop much more precise preventive interventions to tackle them.

Prevention research is underfunded and faces unique barriers

A report published in 2021 by the Medical Research Council highlighted that, of the £2.5bn spent on health research by the major funders in the UK in 2018, only £54m (just over 2%) was on research to prevent NCDs such as cancer, diabetes, heart disease and depression[436].

For approximately every £40 spent on health-relevant research in the UK, we spend only £1 on primary prevention research[437]. The picture is similar when looking specifically at cancer.

Continued...

Continued...

In 2018/19, only 6.3% of the aggregated total research spend in cancer across all UK major funders was for primary cancer prevention research[438].

Prevention research faces unique barriers:

- Prevention research programmes tend to be long-term and high risk. This is because it takes time to demonstrate whether upstream factors have had an impact on outcomes, particularly as there is a lack of validated surrogate biomarkers. This acts as a disincentive for funders. Limited clinical use of cancer prevention therapies means that industry do not view development of these therapies as commercially viable. Collectively, this contributes to a significant funding gap for prevention research.
- This has a knock-on impact for attracting and retaining talent in the field. As set out in section 1.3.2., the current culture within academic research drives a 'publish or perish' mindset, which may have disproportionate implications within prevention research where projects are long-term and high risk.
- Interventional trials that test non-preventative cancer treatments are normally compared with standard-of-care treatments. But prevention trials are compared against placebos. The use of placebos can incur very high costs due to 'placebo labelling' which can make prevention trials unfeasible, particularly given their longer timelines[439].

Tackling these challenges will require sustained effort across the research ecosystem.

What is Cancer Research UK doing to support prevention research?

In 2022, we published our Prevention Research Strategy, which recognises these challenges and declares a step-change in our approach to prevention research[440]. We set our five strategic themes to shape our future funding on prevention research:

- Bringing biology to prevention: Harness fundamental biological insight to provide new targets for cancer prevention.
- Deepening our understanding of risk: Deliver a more thorough and integrated understanding of population and individual risks of developing cancer to develop precision prevention measures.
- Reaching further with precision prevention: Develop novel, disruptive preventive interventions, precisely targeted to risk factors and mechanistic pathways, through behavioural, pharmacological and immunological means.
- Understanding and addressing health inequities in cancer incidence: Deliver research to support a more effective and equitable public health agenda in cancer prevention.
- Building prevention research capacity and community: Attract new researchers and novel thinking across career stages and disciplines.

There is hope for preventing many more types of cancer in the future. Our strategy sets out a vision and framework for how we might accelerate progress in prevention research towards that future.

Chapter 4
Detect, diagnose, treat

Which missions and priority actions are covered by this chapter?

Mission 3

Diagnose cancers earlier and reduce inequalities.

Priority actions:

As part of a long-term cancer strategy for England published within 12 months of the general election, the UK Government should:

- Implement measures that reduce late-stage diagnosis of cancer.
- Transform and optimise cancer screening programmes through:
  - Full rollout of the lung cancer screening programme in England by 2028.
  - Creation of a roadmap for the reduction of FIT threshold in the bowel screening programme.
  - Accelerating the implementation of modern IT infrastructure in all cancer screening programmes.
- Direct ICBs to accelerate locally tailored approaches to reducing inequalities in earlier diagnosis.
- Set out plans to improve our understanding of treatment variation with better data, including investment in audits, and address unwarranted variation in access to cancer treatment across England through targeted action plans.

Mission 4

Bring tests, treatments and other innovations to patients more quickly.

Priority actions:

- The UK Government must commit to consistently meeting all Cancer Waiting Times targets for England by the end of the next parliament, including a higher Faster Diagnosis Standard target of 85%.

Sections in this chapter:

4.1. Introduction
4.2. Transforming and optimising screening
4.3. Engaging the public and widening access
4.4. Detecting and diagnosing cancers earlier – sustaining the momentum
4.5. Variation in access to optimal treatment
4.6. Empowering health systems to make rapid progress
4.7. Delivering a minimum standard of care
4.8. Focusing on the right things

4.1. Introduction

We've made significant progress on cancer survival in the UK in recent decades. But we still lag behind many comparable countries.

This is likely due to a combination of factors. Firstly, we diagnose too many cancers too late. And secondly, not everyone has access to the best possible treatment. This can be seen when we look at the differences in survival by stage[441].

There is no one thing that would put the UK amongst the best countries in the world in cancer outcomes. It will take a concerted effort across a range of areas.

For many cancers, we already know how to improve outcomes thanks to decades of research and innovation. But putting in place the things we know work is still a challenge. For other cancers, the solutions are still unknown and we need more research and innovation to unlock the answers.

Diagnosing cancers earlier saves lives

We need a paradigm shift in our ability to accurately detect and diagnose cancer at an earlier stage so we can transform health outcomes.

Many cancers are diagnosed late (at stages 3 and 4), when people's treatment options are limited and their prognosis is poor. Being able to diagnose cancers earlier (at stages 1 and 2) will mean more people have more treatment options and substantially improve their chances of survival.

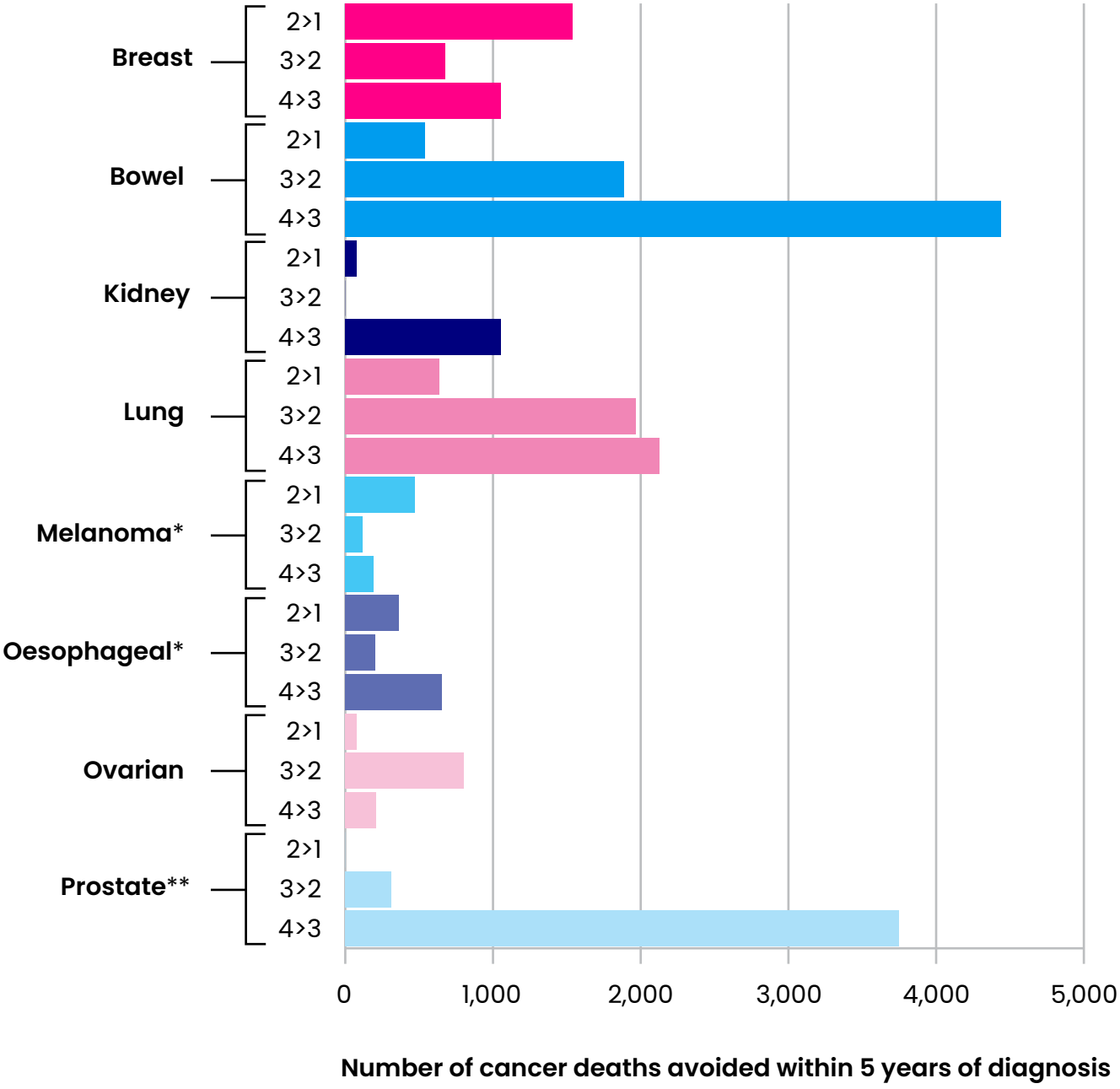
It's important we focus on diagnosing cancers both 'early' and 'earlier'. For cancer types where there is a particularly high burden of late-stage disease – such as bowel (colorectal), prostate and lung cancer – many more people could survive their cancer for at least five years if they were diagnosed at least one stage earlier (see Figure P). The potential gains would be even greater if we are able to make this multiple stages earlier.

Continued efforts are needed to achieve the NHS ambition on early diagnosis

The UK Government and NHSE have been committed to diagnosing cancers earlier for a long time, as demonstrated by the NHS Long Term Plan ambition set in 2019 to diagnose 75% of cancers at stages 1 and 2 by 2028.

To achieve this ambition, the NHSE Cancer Programme has been carrying out a significant programme of work. And we've already seen progress in some areas – for example, early data suggests that the targeted lung health checks programme is helping to diagnose lung cancers earlier, particularly in more deprived areas of the country[442, 443]. And the rollout of community diagnostic centres (CDCs) will give patients quicker access to diagnostic tests and better use of diagnostic capacity across primary and secondary care, helping to diagnose cancers earlier.

Figure P
Potential cancer deaths avoided within 5 years of diagnosis if patients were diagnosed one stage earlier



Produced by the CRUK Cancer Intelligence team using data from:

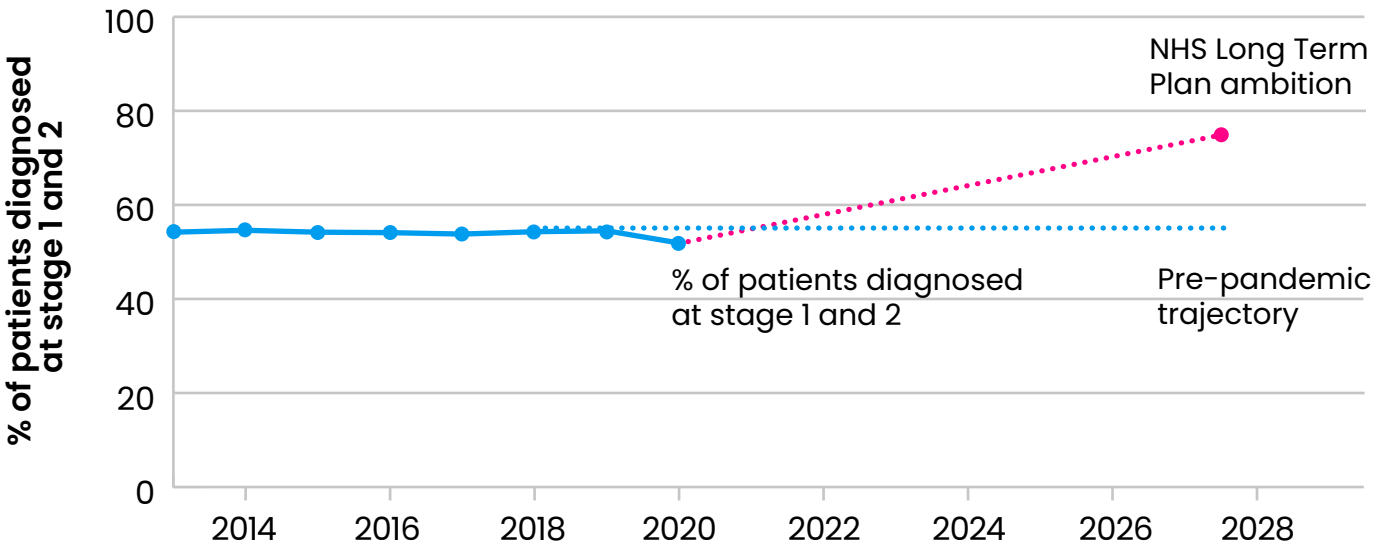
- NHS England, Cancer Survival in England for cancer cases diagnosed between 2016 and 2020 – followed up to 2021
- NHS England, Staging Data In England (for 2018)

* Missing survival estimates for stage 4 melanoma and oesophageal cancer were replaced with non-age-standardised estimates from the 2014–2018 data instead

** Missing survival estimates for stage 1 and 2 prostate cancer were assumed to be 100%

But with five years to go, we are still some way off achieving the NHS early diagnosis target (see Figure Q). The latest NHSE data suggests that there has been little improvement in the proportion of cancers being diagnosed at an early stage over recent years. The COVID-19 pandemic has undoubtedly slowed progress, but it is also a reflection of how challenging it is to achieve meaningful stage shift.

Figure Q
Trajectory towards the NHSE ambition to diagnose 75% of cancer patients at stage 1 and 2



Gold-standard cancer registration data
Data source: NHS England, Staging data in England

We urge the UK Government and NHSE to continue to invest in and implement activities that will help us achieve the early diagnosis target. This should happen alongside steps to reduce late-stage cancer diagnoses, with a target to reduce the number of cancers diagnosed at stage 4 in England to below 42,000 by 2028 (from a baseline of around 66,000 in 2018)(see Notes for more, Note 6). Not only would this save lives, but it would also help ensure we are not hitting the early diagnosis target through over-diagnosis (ie diagnosing cancers that would not have gone on to cause harm).

Around 1 in 5 cancer patients are diagnosed through emergency routes[444]. This is associated with poorer outcomes and worse patient experience[445, 446]. At Cancer Research UK, we want to see as many patients as possible diagnosed through managed routes and think that the UK Government should consider officially committing to reducing this to 1 in 10 by 2035.

Policy recommendation 38

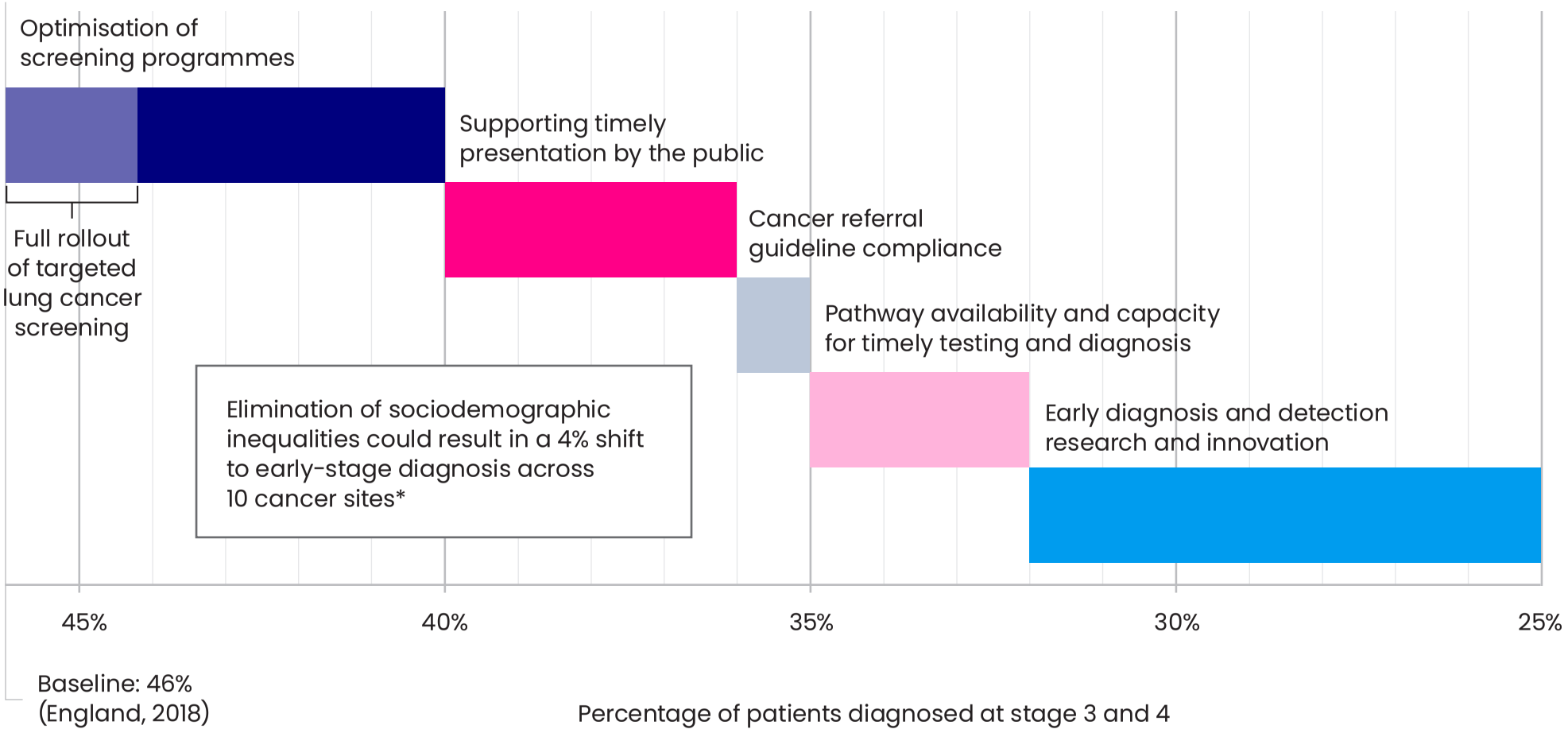
The UK Government and NHSE should strive to diagnose 75% of cancers at stage 1 and 2 by 2028 in England, as per the ambition set in the NHS Long Term Plan in 2019. In addition, steps should be taken to reduce the number of cancers diagnosed at stage 4, with a focus on cancers that would lead to the greatest benefit in survival, such as lung, bowel and prostate cancers.

Geography: England

The early diagnosis ambition will only be achieved if the UK Government drives action across policymakers, health leaders, researchers and industry. As set out in Figure R, action is needed immediately to implement what we know works, but also to catalyse research and innovation on early detection and diagnosis.

The recommendations we set out below to optimise screening and promote better public awareness of symptoms and access to healthcare, alongside the recommendations set out in the 'Discover' and 'Translate' chapters to develop and bring innovations to patients more quickly, will help achieve these ambitions.

Figure R
Driving reductions in late-stage diagnosis of cancer
No one thing will address late-stage cancer diagnosis – action is needed on all fronts. Increases in workforce and diagnostic kit, alongside the provision of optimal treatment options, will be crucial to achieve earlier diagnosis.



*Barclay, M. E., et al. British Journal of Cancer, 2021
Produced by the Strategic Evidence team, Policy Information and Communications Directorate, Cancer Research UK, 2023

There is unwarranted variation in patient access to treatment

The benefits of diagnosing cancers earlier are only realised if people who are diagnosed earlier have access to the right treatment options. But evidence suggest that patients in the UK are receiving suboptimal treatment. This is demonstrated by the UK's worse outcomes compared to similar countries[447] and variation in care depending on where a person lives or their socioeconomic background[448, 449].

There are various initiatives and programmes, such as Getting It Right First Time, that are already in place to support efforts to improve quality of services and reduce variation. We know that these interventions can be successful[450]. However, existing initiatives are not comprehensive, some are potentially duplicative, and their impact is being hampered by a lack of timely, accessible data and capacity within the system to implement change.

We want to see a stronger national focus on improving treatment quality and reducing unwarranted variation to help drive progress.

We can make progress on lung and bowel cancers by implementing what we know works

For some cancers, such as lung and bowel cancers, several proven interventions exist to help diagnose cancers earlier and improve survival. Both lung and bowel cancer affect huge numbers of people. But not all interventions have been implemented equitably, and some have yet to be adopted at all by the health service in England.

Lung cancer is the most common cause of cancer death in the UK with around 35,000 deaths every year[451]. Many patients are diagnosed at a late stage and via an emergency route[452, 453]. And around half of lung cancer patients are diagnosed at stage 4, where only 4% survive their disease up to five years after diagnosis[454].

Bowel cancer is the second most common cause of cancer death in the UK, with around 16,800 deaths every year[455]. Like lung cancer, many people are diagnosed at a late stage and via an emergency route[456, 457]. And around a quarter of patients are diagnosed at stage 4, where only 10.5% survive their disease up to five years after diagnosis[458].

For both bowel and lung cancer, survival is worse in the UK compared to countries with similar health systems[459], and it's worse in the most deprived population groups[460]. Throughout this chapter, we highlight how our recommendations could transform outcomes for bowel and lung cancer.

4.2. Transforming and optimising screening

Screening programmes help diagnose cancers earlier

The national cancer screening programmes are an important part of the UK's arsenal for diagnosing cancers earlier. Some of them also have the benefit of preventing cancers by finding and treating pre-cancerous lesions.

Figure S summarises the screening programmes available or planned across each UK nation and how they align to what the UK National Screening Committee (UK NSC) recommends. Across the breast, bowel and cervical screening programmes, 90% of cancers are diagnosed early (at stage 1 or 2) compared to only 2% at the latest stage.We estimate that over 5,000 lives (see Notes for more, Note 7) are saved by breast, cervical and bowel screening each year across the UK.

At present, only 6% of cancers are diagnosed through screening[461]. Optimising and expanding existing programmes, including lung and bowel cancer screening programmes, should lead to more cancers being diagnosed through screening. We welcome recent ministerial commitments to establish a national lung cancer screening programme in England, and now seek the similar commitments to be made in Scotland, Wales and Northern Ireland. We also welcome NHSE plans to expand the bowel screening programme to more people, and would like to see plans put in place to optimise the programme further.

The future of cancer screening is promising

There is huge potential for innovation in cancer screening. Risk stratification can be used to tailor who is eligible for a screening programme or how often people are invited to screening programmes based on their risk. This approach could help reduce pressures on services and increase public engagement in screening. Risk stratification is likely to drive more targeted screening programmes, such as the lung screening programme. With this comes a pressing need to ensure the right processes and quality assurances are in place ahead of time.

There are also several new screening technologies on the horizon – for instance, MCEDs (see section 2.5.3.) – that could fundamentally change what we think of as 'screening' in the next decade and beyond. These changes offer critical opportunities to improve earlier diagnosis of cancer and save lives.

We need to get the basics right first

To reap the full benefits of these developments, the UK Government and NHSE must invest in getting the basics right. This means robust governance of existing screening programmes, clear and engaging health information to make it easier for people to make informed choices about participating in screening, and putting in place the right infrastructure and workforce to make sure that everyone can access screening services. There must also be clear and transparent processes in place, alongside investment and resource, to support the implementation of any new screening approaches.

In 2019, Professor Sir Mike Richards published the report of an Independent Review of Adult Screening Programmes in England[462]. This report identified several areas where the programmes faced challenges and noted the multi-pronged approach required to address them. Despite the reduction in screening activity caused by the COVID-19 pandemic[463], progress has been made on some key recommendations, including steps towards bowel screening optimisation and efforts to increase capacity to deliver screening. However, many recommendations remain outstanding, and some now require updating to reflect the latest data, evidence and insight.

Figure S
Cancer screening programmes at a glance

UK NSC provides independent, evidence-based recommendations for how a screening programme should be implemented to strike a favorable balance of benefits and harms. UK NSC recommend 4 cancer screening programmes for bowel, breast, cervix and lung.

Key (alignment with UK NSC recommendation) **full** **progress** **limited**

Bowel	UK NSC recommend	England	Scotland	Wales	Northern Ireland
Age	50–74	60–74 [a]	50–74	51–74 [a]	60–74
Frequency	2 years	2 years, on request from 75		2 years	
Threshold	20µg/g [b]	120µg/g	80µg/g	120µg/g [c]	120µg/g
Test	FIT	FIT			

Breast	UK NSC recommend	England	Scotland	Wales	Northern Ireland
Age	50–70	50–70			
Frequency	3 years	3 years, on request over 70			
Test	Mammography	Mammography			

Cervix	UK NSC recommend	England	Scotland	Wales	Northern Ireland
Age	25-64	25-64			
Frequency	HPV +ve: 1 year HPV -ve: 5 years	25–49: 3 years 50–64: 5 years	HPV +ve: 1 year HPV -ve: 5 years		25–49: 3 years 50–64: 5 years
Test	HPV primary testing	LBC with HPV triage HPV primary testing			LBC with HPV triage in some circumstances HPV primary testing TBC

Lung	UK NSC recommend	England [d]	Scotland	Wales	Northern Ireland
Age	55–74 with smoking history	55–74 with smoking history	Waiting for ministerial approval		
Frequency	2 years	2 years			
Test	LDCT	LDCT			

a. People aged 50–59 will be invited to participate, as a phased approach over the next few years. b. A manageable threshold as low as endoscopy and pathology services allow (down to 20 µg/g). c. Wales are planning a phased approach to reduce the threshold to 80µg/g in 2024/25. d. Rollout will focus on reaching 40% of the eligible population by March 2025 and 100% coverage by March 2030. FIT: Faecal Immunochemical Test HPV: Human Papillomavirus LBC: Liquid Based Cytology LDCT: Low-dose Computerised Tomography

4.2.1. Improving governance of screening in England

Delivering operational improvements in screening while successfully harnessing the potential of innovation is a demanding task. It will rely on strong strategic direction, governance and delivery structures.

Governance of screening in NHSE has been recently boosted by the appointment of a National Director for Vaccination and Screening, supported by Directors of Screening, Strategy and Public Health. And we welcome ongoing work in NHSE to set the strategic direction for screening, that will focus on updating and future-proofing commissioning and operational delivery models, making them digitally enabled with a strong platform for research and innovation.

Though overall accountability for the end-to-end screening pathway sits within NHSE, accountability for different aspects is fragmented, across the National Public Health Commissioning team (Section 7A), the Diagnostics team and the NHSE Cancer Programme. It is important that the teams work closely together, so planning for improvement activities or for future screening programmes is well coordinated.

With new approaches to screening imminent, now is the time to put in place the strongest governance structures.

Policy recommendation 39

NHSE, with DHSC, should set the strategic direction and establish a robust governance framework to drive forward the transformation of screening. This should be actively supported through a tripartite agreement between the NHSE Screening team, Diagnostics team and Cancer Programme.

Geography: England

4.2.2. Delivering the national lung cancer screening programme in England

The introduction of the national lung cancer screening programme, which only invites participation from people at higher risk of lung cancer based on their age and smoking history, marks a turning point in England's approach to screening. Though age has often been used to stratify screening eligibility, the use of smoking history signals a future in which behavioural information on people's risk of developing cancer will be used to tailor and streamline programmes, potentially enabling new ways of diagnosing cancers earlier.

The UK Government's announcement of the full national rollout of the national lung cancer screening programme across England by 2030 is welcome. The programme builds on an existing programme led by the NHSE Cancer Programme team, which saw early success in picking up early stage cancers. It found that 76% of cancers identified through the programme were diagnosed at stages 1 or 2[464], with signs that those from the most disadvantaged communities reap the most benefit[465]. With a wider range of treatment options available when lung cancer is diagnosed earlier, this could herald a step-change in outcomes.

The UK Government should expedite implementation of the national lung cancer screening programme

If the national lung cancer screening programme is fully implemented across England, the estimated numbers of lives saved and the economic benefits will be significant. Given this, the UK Government and NHSE should expedite implementation timelines to 2028 and provide the additional resource and investment needed to make this happen. It would also help achieve England's earlier diagnosis targets sooner.

Our provisional estimates indicate that at least 1,500 lung cancer deaths could be avoided in England each year with a 50% uptake of the national lung screening programme when fully rolled out (see Notes for more, Note 8). Estimates also suggest that every lung cancer death leads to a productivity loss to the economy of £32,000

(2023 prices) and a loss of 8.45 QALYs, leading to wider economic benefits of around £940m per annum (see Note 9).

Several enablers are needed to make the national lung cancer screening programme a success

Building on existing work from the lung clinical community, and validated and emphasised through roundtable discussions with health systems leaders, to make the programme a success, it will be important to:

- Establish strong, centralised governance arrangements that align and integrate with the other national screening programmes, accompanied by sufficient staff and funding.
- Deliver tailored and targeted public engagement to encourage informed participation, particularly from seldom heard groups and to mitigate against potential unintended consequences such as reinforcing stigma.
- Ensure that smoking cessation interventions are funded and integrated into the programme, with stop smoking services fully funded to ensure that support is available for those who want to continue their journey to quitting.
- Improve the quality and completeness of smoking history data in primary care records, to ensure that all eligible people receive invitations to participate in lung cancer screening. This could be achieved through incentivisation and improving, or innovation in current data entry processes, such as using the NHS app.
- Develop and implement a single national lung cancer screening IT system, covering invitation, recall and communication of results. This should be embedded as a key part of the Digital Transformation of Screening Programme.
- Ensure the implications of the programme are reflected in the NHS's investment in diagnostic capacity, so people participating in the programme can be diagnosed and treated in a timely manner.
- A commitment to quality assurance and ongoing monitoring of the programme to ensure the impact of lung cancer screening on reducing late-stage lung cancer diagnoses is being assessed.

Policy recommendation 40

The UK Government should expedite the implementation of a high-quality national lung cancer screening programme in England to 2028, to help achieve its earlier diagnosis targets sooner. It must also provide the annual investment required for this, including the resource to develop robust data infrastructure, fully integrated smoking cessation services and its equitable rollout.

Geography: England

4.2.3. Continuing optimisation of the national bowel cancer screening programme in England

The bowel cancer screening programme uses a test called the faecal immunochemical test (FIT) to screen people for bowel cancer. In England, people aged 60–74 are invited to participate, with NHSE currently expanding the programme to include people aged 50–59 as well. This expansion is an important step forward in optimising the programme.

But plans now need to be put in place to further optimise the programme. In line with UK NSC recommendations, the threshold for a positive test should be reduced from the current level of 120µg/g. This would mean that more people will be referred for further tests, allowing more bowel cancers to be diagnosed through screening. As an example, over 1,000 extra cancers and nearly 7,000 extra potentially pre-cancerous growths could be detected through screening every year if the England screening programme used the same threshold (80 µg/g) as Scotland (see Notes for more, Note 10).

Optimising the bowel cancer screening programme will lead to higher demand in endoscopy and pathology services (see Box AB). An implementation plan that accounts for this will need to be developed. Insights from other nations that have recently implemented a FIT threshold reduction could prove valuable.

NHSE should also be preparing now for longer term optimisation of the bowel cancer screening programme, including considering emerging research on how risk stratification could be used.

Policy recommendation 41

NHSE should develop a roadmap for the reduction of the FIT threshold in the bowel cancer screening programme by mid-2024, with an aim to start implementing the lower threshold during 2025.

Geography: England

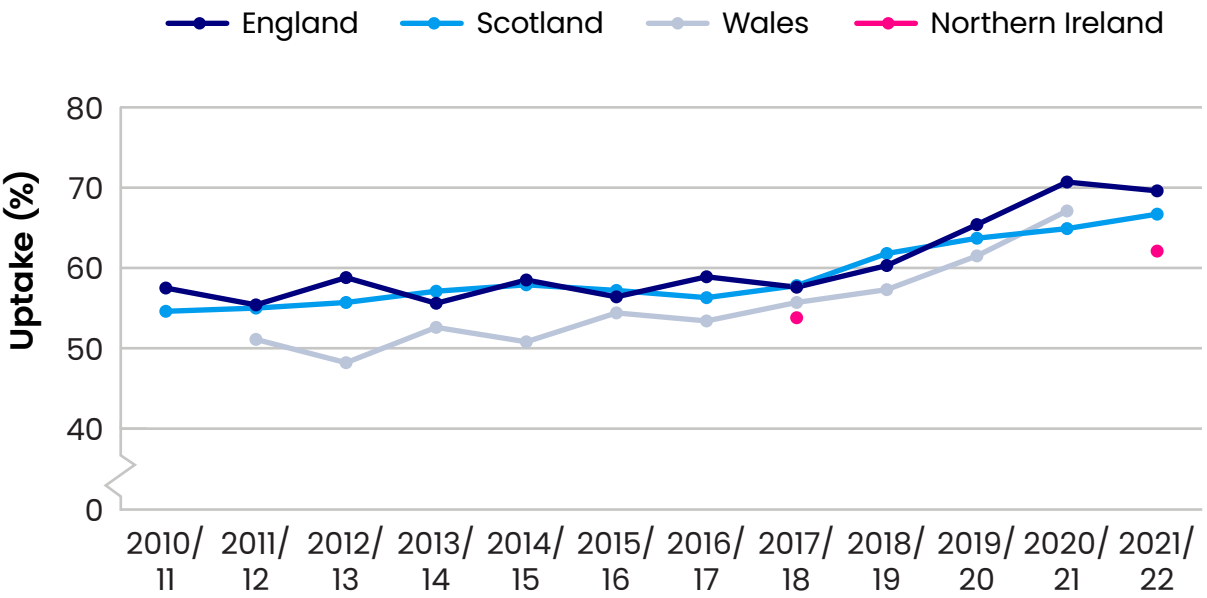
4.2.4. Increasing informed uptake and screening coverage

Uptake in screening can be significantly improved

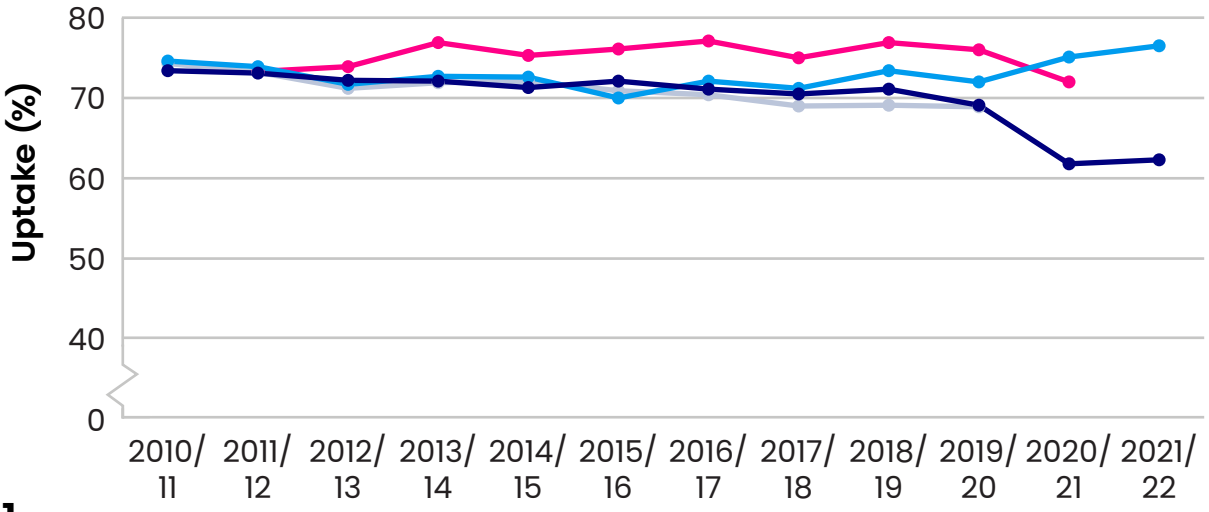
At present, targets for breast screening uptake and cervical screening coverage in England aren't being achieved. For breast screening in particular, participation is declining[466]. We also see significant regional variation. See Figure T.

Figure T
Cancer screening uptake and coverage in the UK

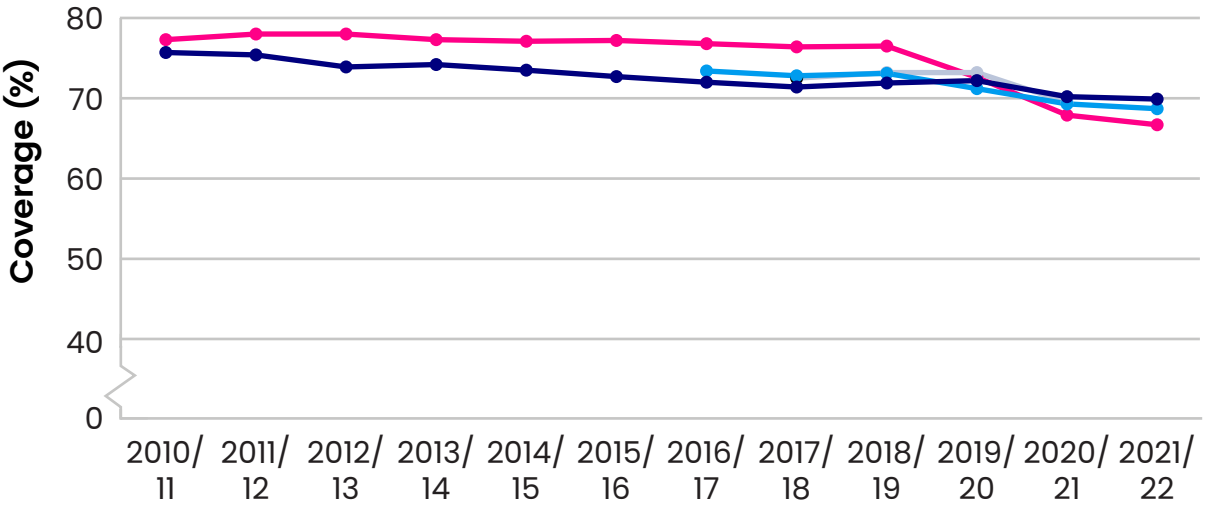
Bowel



Breast



Cervical



Data sources
England: Fingertips (bowel), NHS Digital (breast and cervical). Scotland: Public Health Scotland
Wales: Public Health Wales. Northern Ireland: Public Health Agency (bowel and cervical),
Northern Ireland Breast Screening Programme (breast)

We know that informed choice to participate in screening is essential, and we know for some of the population not attending screening is a choice. But there is more work to do to ensure those who want to take up screening have the information they need and don't face barriers to taking up their invitation or attending follow-on diagnostic tests.

Data for autumn 2022 in England shows that 42% of eligible people were not screened for breast cancer, and 34% were screened for neither bowel nor cervical cancer[468]. For bowel and cervical screening, this data underplays the problem as it does not capture the people who did not attend a colonoscopy or colposcopy appointment after their first screening test.

Our analysis estimates that if uptake for all three cancer screening programmes in England increased to 80%, around 4,000 extra cases could be diagnosed each year (see Notes for more, Note 11).

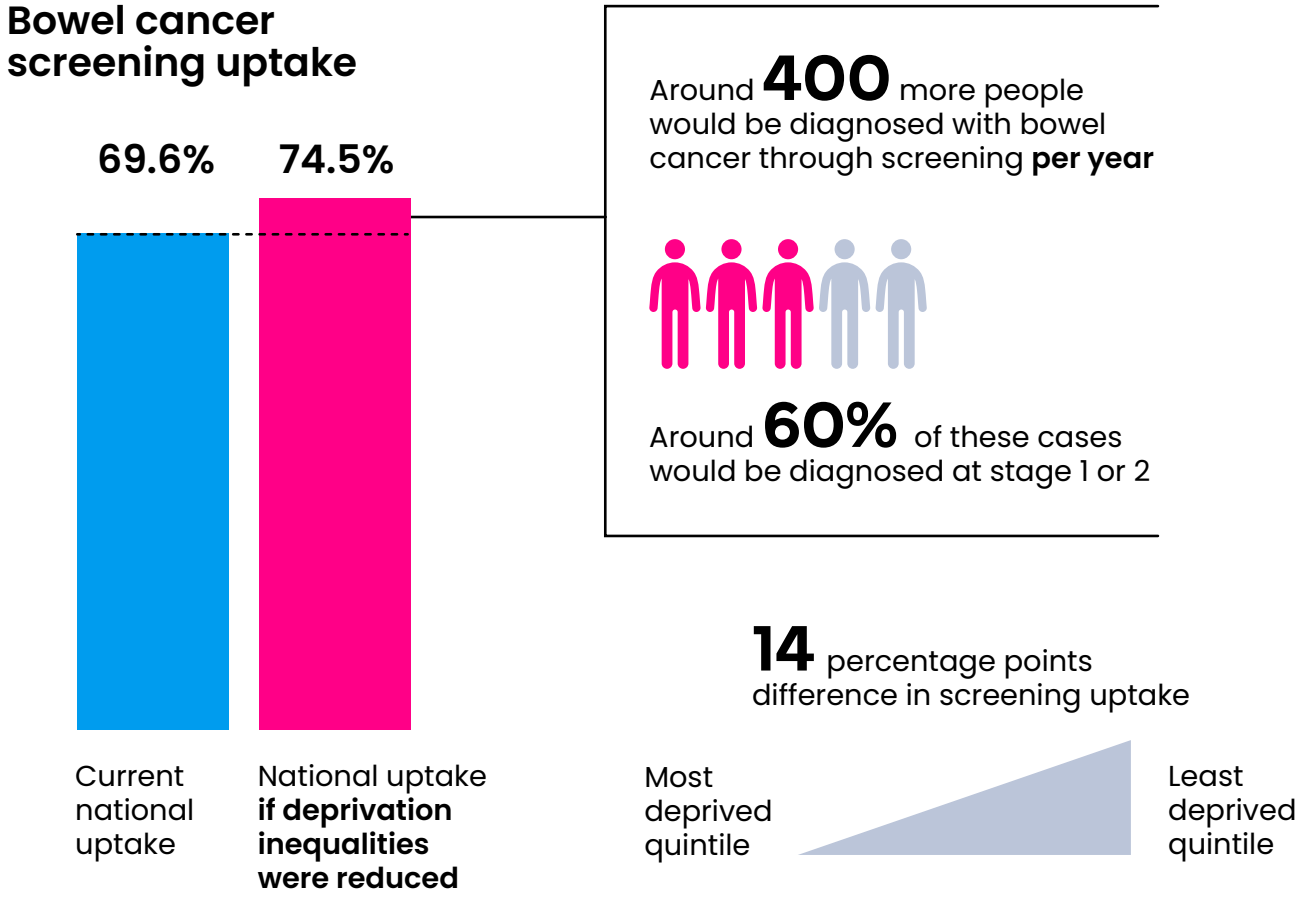
Box S
Inequalities in screening uptake

We know that inequalities in the uptake of cancer screening exist, though gaps in data hamper our ability to fully understand the problem and limit how efficiently we can respond.

Evidence suggests that across the UK, participation in cancer screening is lower in more ethnically diverse communities[467, 468, 469], people living in deprived areas[470] and people with learning disabilities or severe mental illness[470, 471]. For bowel and cervical cancer screening, inequalities extend to who is more likely to attend their follow-up[472, 473, 474, 475].

Our analysis shows that if bowel screening uptake in all communities matched uptake in the least deprived quintile, this could lead to a 7% increase in the number of bowel cancers diagnosed through screening, or an extra 400 diagnoses each year (see Figure U) (see Notes for more, Note 12).

Figure U
The impact of reducing deprivation inequalities in bowel cancer screening



This analysis addresses one form of inequality in uptake in England only – other factors contribute to screening uptake inequalities across the UK.

Analysis by Cancer Research UK using data in England on bowel cancer screening uptake in 60–74 year olds and deprivation by GP practice from Fingertips. Applying screening uptake from GP practices in the least deprived quintile to GP practices in the other quintiles, while accounting for differences in age (proportion of screening-eligible cases aged 70–74 in each GP practice) and CCGs.

Proven interventions to increase uptake need to be rolled out

In some cases, there is already good evidence on what could help increase the uptake of screening programmes. These interventions need to be implemented equitably, with ongoing evaluation to understand their impact and inform further rollout.
For example:

- Text reminders could improve uptake across all screening programmes[476, 477, 478], with one case study finding that cervical screening uptake doubled when text reminders were rolled out[479].
- Awareness campaigns can help increase uptake both nationally and regionally – as evidenced by, for example, the national cervical screening awareness campaign. The impact of social media as part of awareness raising and supporting help-seeking should also be assessed.
- Some evidence indicates that providing both office hours and out-of-hours services can improve cancer screening uptake[480, 481], but more pilot and evaluation is needed. In a public survey of those reporting they did not attend breast cancer screening the last time they were invited, 13% said they found it difficult to get an appointment at a convenient time[482].

While there has undoubtedly been a national drive to understand what interventions work[483] and provide guidance and resources to regional and local leaders[484], evidence-based interventions have not been rolled out optimally[485]. In some cases – such as the rollout of text reminders – this is because the necessary infrastructure is not in place.

There needs to be a stronger national steer and guidance from national health leaders to regional and local leaders to implement interventions that are known to be effective. National leaders should also play an active role in building the evidence for new interventions that show promise, with particular attention paid to those that could help reduce inequalities in uptake.

Policy recommendation 42

NHSE, working closely with Cancer Alliances and ICBs, should take immediate steps to implement evidence-based screening uptake interventions at scale. This should build the repertoire of best practice interventions by evaluating more initiatives, like financial incentives for out-of-hours services, social media campaigns and those targeting inequalities.

Geography: England

4.2.5. Improving data and the digitisation of screening

To make improvements in screening uptake, and to be prepared for the future of screening, there needs to be modernisation of the UK's screening data and digital systems.

Better data collection and reporting would improve screening services

At present, there are gaps in the existing data on how well screening services are working, as well as variation in the timeliness and accessibility of this data. This means there are missed opportunities to use data that can help to improve screening through research and evaluation.

For example, screening datasets don't capture key information, such as some demographic characteristics (eg ethnicity), meaning that we have an incomplete picture of how well we're addressing known inequalities in participation. It's only when screening data are linked to other datasets, often through research analysis, that we can start to piece together a fuller picture of screening performance. This reduces the ability of the system to respond to issues and trends in a timely way.

To address these gaps, more transparent reporting of a wider range of measures of screening delivery is needed – for example, reporting of incidents or implementation of improvement activities. This is also an opportunity to future-proof screening services by expanding datasets to include wider data

collection on patient characteristics – such as genetic information – that will support anticipated changes, such as tailoring screening based on individual risk.

IT upgrades are needed to support the adoption of emerging innovations

More needs to be done to improve the timeliness and accessibility of screening data. There urgently needs to be a transformational upgrade of IT systems to support high-quality cancer screening programme delivery and enable the adoption of emerging innovations. We're pleased to see the recent announcements outlining a new Cervical Screening Management System[486], but note that this change is long overdue, with the system being described as "no longer fit for purpose" by the Department of Health as far back as 2011[487]. We also need to see immediate action for the other cancer screening programmes.

Table B sets out why a transformational upgrade of IT systems is needed across cancer screening pathways.

Table B
Benefits of a transformational upgrade of IT systems to the cancer screening pathway

What	Why
Invitations	To ensure everyone who is eligible is invited, including helping to reduce inequalities. For example, some trans and non-binary people currently must request breast and cervical screening as they are not automatically invited.
Appointment management	To allow people to choose how they manage their screening appointments, including digital options.
Reminders	To uniformly provide evidence-based interventions to improve informed uptake of screening, such as text reminders.
Tracking	To enable the transfer of patient information between providers for continuity and capacity sharing, as well as monitoring people who do not attend.
Recall	To enable an easier process for modifying the eligible screening cohort, in response to emerging evidence and innovations.
Future-proofing	To put in place the IT infrastructure that will be needed to roll out innovations in screening, such as risk stratification and AI approaches.

We welcome the UK Government's 2022 plan for digital health and social care in England, which committed to defining the full digital delivery programme for screening transformation and developing the 'technical architecture' designs – firstly for breast screening and then for other screening services. However, we now need to see more detail of the planned technical architectures and a roadmap with milestones for screening transformation.

Policy recommendation 43

NHSE should improve data collection and access to data to support service evaluation and quality improvement. NHSE should publish local and national annual reports on screening programmes, including data that assesses screening pathways 'end to end'. Reports should provide breakdowns by demographics, updates on efforts to optimise the programme or implement innovation, and provide recommendations for service improvement.

Geography: England

Policy recommendation 44

NHSE must accelerate the implementation of modern IT infrastructure for cancer screening programmes and publish a transformation roadmap detailing how and when each screening IT system and wider technical infrastructure will be updated to support the optimisation of cancer screening.

Geography: England

4.2.6. Strengthening local action on screening in England

Although transformation is needed in the national screening programmes, many of the changes that we need to see – from engaging with communities to encourage participation, through to adjusting local service delivery arrangements to reduce barriers to attending – require action at the system level. The establishment of ICSs, with their focus on population health, place-based models of care and partnerships across the health and care system, offers the opportunity to increase the profile of screening in local strategies and plans.

This opportunity is not yet being realised. At present, the responsibility for improving uptake and coverage sits with screening providers and commissioners, with little emphasis on integrated working with ICSs. This fails to capitalise on the role of ICSs in putting in place strategies matched to their local populations, and in building the coalition of organisations needed to truly engage communities (including, for example, public health departments, the voluntary sector and local community groups that work with people who are least likely to take up screening).

Although NHSE has previously indicated its intent to delegate screening commissioning to ICBs[488], the shape of a future system-led commissioning model is not yet clear. We have heard from system leaders that uptake and coverage of screening tend to have far less visibility in planning and governance than other issues, like operational performance in the symptomatic pathway. As a result, it's likely that systems are missing opportunities to intervene to improve screening uptake and coverage.

Policy recommendation 45

The NHSE Cancer Programme and NHSE Screening Programme should jointly issue guidance to screening commissioners, screening providers and Cancer Alliances setting out how they should work together to improve screening uptake and coverage, with particular focus on how to reduce inequalities.

- **This guidance should be reflected in the wider NHS Planning Guidance, setting out the role of ICBs in facilitating effective action on screening uptake, and ensuring that appropriate system-wide oversight is in place to assure progress.**

Geography: England

4.3. Engaging the public and widening access

Even if we achieve optimal informed screening uptake, for many patients, their journey to a cancer diagnosis will start with symptoms and a visit to a GP. To support timely presentation, it's therefore essential that people are supported to recognise the signs and symptoms of cancer and are empowered to seek help, while ensuring timely, easy access to healthcare.

But according to the 2023 Cancer Awareness Measure (CAM) survey, only 49% of people who experienced a cancer symptom contacted their doctor about it within six months of noticing it[492]. The consequences of delays between symptoms starting and seeking help may be serious. It could mean a later stage diagnosis, leading to fewer treatment options, or a deterioration in health to the point where cancer is diagnosed as an emergency rather than through a managed cancer diagnostic pathway. About 1 in 5 cancers are diagnosed in this way[466], with higher rates in people from more deprived groups[489]. Evidence shows that these patients are more likely to have poorer outcomes.

4.3.1. Increasing public awareness and supporting people to seek help

Behavioural science research suggests that it takes time to change public awareness, attitudes and behaviours[490]. This is why there needs to be a long-term approach to increasing awareness of cancer signs and symptoms, and addressing barriers to help-seeking.

Mass media campaigns encourage people to seek help

Mass media campaigns play an important role in this approach, building on past campaigns such as Be Clear on Cancer, which successfully influenced help-seeking behaviours and referral patterns by GPs, with some impact on earlier diagnosis[491]. For example, evaluation data shows that an early Be Clear On Cancer campaign which focused on lung cancer increased public awareness of persistent cough as a lung cancer symptom and increased GP referrals for suspected lung cancer, leading to increases in lung cancers diagnosed at an early stage[492, 493].

More recent campaigns under the 'Help Us, Help You' banner are welcome, but they have been limited by a year-on-year funding model, which can compromise strategic campaign planning. Evaluation of the campaigns has also been limited, particularly hampered by lack of data that help assess if campaigns are reaching the target demographic groups and having an impact on reducing late-stage diagnoses.

We know that inequalities exist in people's awareness of cancer symptoms and differences exist in how beliefs, perceptions and emotions influence help-seeking behaviour. For example:

- Our research recently found that people from more deprived groups and Black or Asian minority ethnic groups were significantly less likely to recognise cancer symptoms[494].
- People with fatalistic beliefs about cancer are less certain about the positive value of early detection[495, 496]. For example, some ethnic minority groups may hold stronger cancer fatalism beliefs[497]. Current or ex-smokers may also hold fatalistic beliefs about lung cancer and have been found to be less likely to seek help for possible lung cancer symptoms[498].
- Stigma can also present a barrier to seeking help, particularly for lung cancer symptoms[499, 500].

These differences highlight how campaigns must be tailored to the needs of different population groups, using multi-layered messaging to address general and community-specific barriers. This could be achieved by co-designing interventions and campaigns with the target audience. Encouragingly, strategies to apply behavioural science to improve health and wellbeing do exist – but they need to be more robustly implemented[501]. We also know that community-based interventions that are culturally adapted are particularly effective[502]. Campaigns are one part of the strategy to addressing barriers to help-seeking. Addressing structural barriers is also important and is something we consider in section 4.3.2.

To improve on past interventions, DHSC, NHSE and regional and local partners should apply a more strategic approach to the design, delivery and evaluation of campaigns. Future campaigns must be planned over longer periods of time and be tailored to address inequalities. Activities need to be aligned at the national and system level, giving local leaders the tools and resources to build on and adapt national messaging based on deep understanding of, and links with, their local communities over multiple years.

However, in the current architecture, it's not clear that any statutory organisation has explicit responsibility for enabling timely presentation at the system level. Instead, Cancer Alliances work closely with NHSE to ensure coherence between national and local activities. Unfortunately, they are limited by inflexible funding settlements and a lack of capacity for the ongoing evaluation and improvement of awareness campaigns.

Policy recommendation 46

DHSC should make a long-term strategic commitment to funding national public awareness campaigns in England that enable positive health behaviours. These should include evidence-based targeting of population groups facing inequalities, and continuous robust evaluation to strengthen and refine further campaigns and interventions.

Geography: England

4.3.2. Widening access to healthcare

Around 6 in 10 people diagnosed with cancer in England are diagnosed via GP routes, which are associated with a more managed and earlier diagnosis than people diagnosed via an emergency presentation[503]. But unfortunately, in some areas the public is struggling to gain timely entry into primary care, which may contribute to delays in diagnoses and missed opportunities to prevent emergency presentations of cancer[504].

There are several barriers to accessing primary care

GPs have faced a significant increase in workload, which has not been matched proportionally in increased resources[505]. General practices in England performed 4.6 million more appointments in December 2022 and January 2023 than in the same months pre-pandemic[506], whilst the number of full-time equivalent fully qualified GPs dropped by 7% since 2015[507]. Primary care is ill-equipped to respond to the mounting demands of a growing patient population which, to exacerbate matters, is increasingly elderly and complex.

The growing tension between GP capacity and patient demand leads to untimely GP access, knock-on delays to diagnosis[508] and negative patient experience[509]. In an audit of cancer diagnoses, around 1 in 4 GPs said there had been an avoidable delay to diagnosis, with 1 in 3 delays due to health system factors such as waiting for an appointment[510]. Data from our CAM survey also highlights that concerns about adding to pressure on NHS services could contribute to some people's decisions to delay help seeking[511].

And there are additional barriers that make it harder for certain populations to access GP services – populations that are at higher risk of cancer, of late diagnosis or of emergency presentation – exacerbating inequalities in cancer outcomes.

For example, there is an uneven distribution of GPs in areas of deprivation, which generally have a higher prevalence of cancer risk factors. Older people, who are at greater risk of cancer, have poorer access to healthcare[512] and may struggle to use automated GP telephone systems[513]. Logistical and communication issues – such as access to transport and access to information or interpreters – can prevent older people, those with learning disabilities and those who are deaf or blind from accessing and attending appointments[514, 515, 516]. As current routes into the health system do not work well for everyone, there is an increasing appetite to improve existing routes and develop new, more accessible routes that are tailored to specific needs.

More accessible routes into healthcare are being developed

Any pathway to a cancer diagnosis needs to be:

- Accessible – people should be able to access the routes, health professionals and appointment mode that is right for their health needs.
- Timely and well managed – people should be able to access care in a timely and well-managed way.
- Equitable – everyone should be able to access healthcare, without facing unwarranted barriers into the health system.
- Usable – it must be clear how, when and where individuals seek help, and who from. Services should be designed around the person and joined up so that the patient journey is clear and seamless.
- Functional – routes to accessing healthcare must be efficient, safe, flexible to changing demands and helping diagnose cancers at an early stage.

Encouragingly, there are efforts underway to develop more accessible routes into healthcare, as shown in Figure V.

Figure V
Widening access to healthcare: RAG rating new initiatives

Key interventions seeking to aid early diagnosis of cancer by improving public access to healthcare.	**RAG rating***
The use of **community pharmacies** to support timelier and earlier cancer detection and diagnosis.	
Self-referral for specialist tests or consultations (virtually or in person).	
Digital tools that improve practice efficiencies, support patient triage and appointment booking, and expand the choice of consultation types. Tools may include the use of AI.	
The use of **nurses, physician associates, paramedics etc** to expand routes into the health system.	
Navigation services that support the individual's timely movement through a complex and often fragmented health system.	

*Each intervention has been rated based on the strength of available evidence to show it could widen access to healthcare for people with signs and symptoms of suspected cancer.

- It can widen access and is working in practice
- It has potential to widen access, but evidence is only emerging
- There is limited supporting evidence to show it can widen access

These interventions have potential to widen and improve access, but currently they lack strategic direction, system-wide coordination, and robust and consistent evaluation. It is important that these interventions help reduce inequalities. And the public must be involved in their design to ensure they cater to specific access needs. Strategic oversight and support from government is needed to unlock their potential.

Alongside improving and providing alternative routes into healthcare, the principle of Making Every Contact Count (MECC) should be embedded in the health service to support help-seeking, as highlighted in the MECC consensus statement, published in 2016[517]. MECC is the principle that the health service and wider community organisations should use day-to-day interactions with people to support positive changes to their health and wellbeing. Until now, this has focused on tackling the causes of ill health, for example smoking or obesity. However, building on the success of widening MECC to support the COVID-19 vaccination campaign, MECC could also be used to support help-seeking behaviours to diagnose cancers earlier.

Policy recommendation 47

To ensure suspected cancer patients can access healthcare promptly via an appropriate pathway, DHSC and NHSE must increase primary care capacity for cancer in England and establish a centralised programme that coordinates the design, evaluation and implementation of different routes into healthcare that are accessible to everyone.

- **Specifically, the design and delivery of new models should include input from diverse and representative population groups, as well as clinicians and health professionals, to ensure these approaches better meet population needs and address existing inequalities.**

Geography: England

Policy recommendation 48

NHSE should assess how the 'Making Every Contact Count' principles across NHS services could support help-seeking behaviours, building on the successes of this approach to support the COVID-19 vaccination campaign.

Geography: England

Box T
Supporting primary care with onward referral

The 2015 NICE cancer recognition and referral guidance (NG12) provided a much needed steer for primary care in the management of suspected signs and symptoms of cancer. It helps primary care to determine when to refer patients to secondary care, or whether to request further tests themselves through 'direct access' diagnostic services.

New evidence and insights continue to emerge that need to be frequently reviewed and incorporated into guidance, and primary care staff need to have easy access to the latest guidance. NICE plays a crucial role in this space and should continue to work closely with relevant stakeholders (royal colleges, societies, NHSE and UK NSC) to ensure timely updates to the NG12.

Consideration should be given to integration of referral guidance into electronic health records to help ease of access and improve adoption of guidance.

4.4. Detecting and diagnosing cancer earlier – sustaining the momentum

More than 15 years ago, the importance of early diagnosis to improving cancer survival was put on the map via the Cancer Reform Strategy[518]. Since then, early diagnosis has been championed by leaders across the cancer community[519, 520].

We must diagnose more cancers earlier and fewer cancers later.

By reducing late-stage diagnoses we could avoid thousands of deaths a year. This can be achieved by implementing what we know works, but also investing in more research and innovation where we need new solutions.

Reducing late-stage diagnosis is also a critical part of achieving world-class cancer outcomes in England. International comparisons show that whilst England has been making improvements in cancer survival in recent decades, we still lag behind many comparable countries. Much of the difference in survival has been attributed to late diagnosis, with studies reporting that for some cancer types, patients in England were diagnosed at a later stage than those in countries reporting higher survival, notably Australia.

A range of factors have been previously highlighted as drivers of late diagnosis in the UK, such as the public in the UK reporting being more 'worried about wasting the doctor's time'[521], and data showing that GPs in the UK are less ready to investigate and refer patients compared to those in other countries[522].

To tackle late diagnoses, and diagnose more cancers earlier, we need to act across a range of fronts.

We've made a lot of progress already.

Over the last 15 years, in collaboration with the wider cancer community, we've driven a range of activity to diagnose more cancers earlier. This includes:

- Designing and implementing campaigns to tackle cancer symptom awareness and help-seeking barriers[523].
- Supporting primary care professionals in timelier recognition and referral of suspected cancers.
- Driving the development of novel cancer data studies (such as Routes to Diagnosis[524], which highlighted later diagnoses through an emergency presentation).
- Continuing to learn, through the ICBP, how other countries have achieved better stage distributions and ultimately better survival.

And along with the wider community, we made the case for the importance of early diagnosis. This led to a strong national commitment from the UK Government and NHSE to diagnose more cancers earlier, as articulated in the NHS Long Term Plan published in 2019. This stated that: "By 2028, the proportion of cancers diagnosed at stages 1 and 2 will rise from around half now to three-quarters of cancer patients."

But much more needs to be done.

With this stretching ambition comes an even stronger incentive to focus on what is really going to achieve meaningful stage shift – ie reducing the number of late-stage cancers while avoiding over-diagnosis, to drive improvements in survival.

For some cancers, such as pancreatic and prostate cancer, we need more research to help us develop better detection tools. At Cancer Research UK, we have played a crucial role in driving forward research in early detection and diagnosis, with a dedicated research funding stream for it. And we have been at the forefront of understanding and addressing the barriers to translation, adoption and implementation of innovations that could help detect and diagnose cancers earlier, as illustrated through our Early Detection and Diagnosis of Cancer Roadmap[525]. In the 'Translate' chapter, we highlight promising areas of research, such as liquid biopsies and the use of AI. We also highlight how academia and industry need to be better supported to drive progress in areas of unmet need, such as in early detection innovation, and how health system leaders need to ready the system for the quicker adoption and implementation of proven interventions.

For other cancers, such as lung and bowel cancer, we know what we need to do, and the focus must be on implementing what we know works. As outlined in the 'Detect, diagnose, treat' chapter, there is huge opportunity to diagnose more of these cancers through screening, increasing the chance of an earlier diagnosis.

A significant proportion of cancers are diagnosed symptomatically and via the GP. That's why we outline actions that support timelier presentation by the public, as well as widening and improving access to healthcare. These actions reach beyond the NHS, demanding approaches that draw on public health expertise and are based in local communities. For this reason, we also propose ways in which the UK Government could support better coordinated action on cancer through newly-formed ICSs.

More diagnostic capacity is critical to diagnosing more cancers earlier.

Without enough capacity in diagnostic services, we can't offer tests to people that need them in a timely way. In his 2020 Review of Diagnostic Services, Professor Sir Mike Richards reported that diagnostic services were already at a "tipping point" where they were no longer able to keep up with demand[526].

To diagnose more cancers earlier, the NHS must have the right diagnostic equipment, workforce and digital infrastructure in place. As set out in the 'Detect, diagnose, treat' chapter, over 1,000 extra bowel cancer cases and nearly 7,000 extra potentially pre-cancerous growths could be identified through screening each year if England used the same FIT threshold as Scotland.

Insufficient capacity in endoscopy services is a key factor holding us back. And lengthy waits for diagnostic tests can mean patients are waiting far too long to start their treatment. Recent analysis of cancer patients who waited 104 days or more between being urgently referred and starting treatment showed that the average length from urgent referral to treatment decision was more than five times longer than the wait between making a treatment decision and starting their treatment[527].

More funding is needed for diagnostic equipment.

In the 2021 spending review, the UK Government announced £2.3bn in capital funding for diagnostics between 2022/23 and 2024/2025[528]. This is welcome and has already supported the rollout of important initiatives such as targeted lung health checks and CDCs. However, as set out in the 'Enablers for success' chapter, the UK is far behind comparator countries in its provision of essential MRI, CT and PET-CT scanners, and we have substantial maintenance backlogs across the NHS estate. The next UK Government must rapidly commit to further investment in diagnostic capacity, with a plan for targeting investment at areas of national concern, such as endoscopy services.

And expansion and innovation in the diagnostic workforce is vital.

The NHS Long Term Workforce Plan (LTWP) takes a long-needed strategic approach to workforce planning. But it does not go far enough to ensure that demand for diagnostic clinicians will be met. Our modelling, set out in the 'Enablers for success' chapter, suggests that in just a small subset of key diagnostic professions, the NHS in England will need to either train or recruit enough people to fill approximately 13,000 full-time posts by 2029[529]. The UK Government must go beyond the LTWP commitments to ensure that funding for this is made available.

Expanding the workforce should go hand-in-hand with measures to increase the uptake of innovative skill-mix models, such as embedding reporting radiographers, clinical endoscopists and advanced biomedical scientists in imaging, endoscopy and pathology services. Such models can offer faster routes to expanding the diagnostic workforce than traditional approaches[530].

A cancer workforce plan must be developed as a companion to the LTWP, and should encourage adoption of these models and actions to address barriers. It must also set out action on staff training and development so the diagnostic workforce can keep up with the pace of innovation – for example, to prepare for the adoption of AI technology, as set out in the 'Translate' chapter.

A roadmap is needed to transform diagnostic capacity in the NHS.

Sufficient diagnostic capacity is critical, not just for cancer patients, but for all patients across the NHS. Over 1.5 million people are waiting for key diagnostic tests in the NHS[531]. To properly address the early diagnosis challenge, we need to expand diagnostic capacity. Any approach to expanding diagnostic capacity must take a broad view across different types of tests and different patient cohorts. Given the ambition of this task, we need a clear roadmap that brings together actions on workforce, capital and service models.

Policy recommendation 49

NHSE should commission an immediate refresh of the 2020 Richards Diagnostics Review. This should identify the key actions and investment required to rapidly deliver diagnostic capacity to expedite improvements in early diagnosis of cancer.

Geography: England

4.5. Variation in access to optimal treatment

We know that inequalities in access to treatment persist across different regions in England and between different patient groups, with evidence suggesting a similar picture elsewhere in the UK[532, 533, 534]. While decisions about treatment are complex, with many different factors involved, this variation leads to some patients receiving suboptimal treatment.

Despite being a world leader in cancer research, UK survival lags behind many other comparable countries – even after accounting for differences in the stage at which people are diagnosed. For example, survival for women with more advanced ovarian cancers at three years after diagnosis varies from 47% in Norway and Australia to just 33% in the UK, and 32% in New Zealand[535].

A further exploratory study found that jurisdictions with lower stage-specific ovarian cancer survival, including those in the UK, were less likely to undertake more extensive or ultra-radical surgery, had poorer access to some therapies and were more likely to report health system barriers (such as more limited critical care capacity) to providing cancer treatments[536].

Our analysis shows that efforts to tackle regional variation within England in survival by stage, primarily through reducing variation in access to treatment, could result in improved survival for many patients. Each year, if survival by stage across England matched that of the best performing Cancer Alliances, around 1,400 more patients diagnosed with lung cancer and 840 more patients diagnosed with bowel cancer could survive their disease for two years or more (see Notes for more, Note 13).

The cancer treatment landscape continues to change at pace. As research progresses, novel therapies such as therapeutic cancer vaccines (see section 2.5.4.) may move into mainstream cancer care. If ambitions to diagnose more cancers earlier are met, demand for treatments like surgery and radiotherapy – along with follow-up care – will substantially increase. And a wider range of people, including older people with more complex healthcare needs, are likely to require cancer treatment.

Reducing variation and ensuring everyone can benefit from the optimal treatment for their disease is likely to come from a series of carefully sequenced shifts, rather than the implementation of a few 'game-changing' interventions. Given these circumstances, the UK Government needs to work with NHSE to develop a strategic view of the future of cancer treatment in England and act now on key issues such as national coordination, better use of data, uptake of innovation and crucially, addressing variation in access and quality in existing services.

Box U

Access to timely and quality care along the cancer pathway – a lung cancer example

There are opportunities across the lung cancer pathway to improve timeliness, quality and reduce variation in access to optimal treatment.

The national optimal lung cancer pathway in England clearly defines the pathway that patients should follow up to the point of starting treatment for lung cancer, unless they choose not to. This includes the sequencing of diagnostic and staging investigations and the timeframe in which these should take place[537]. However, we know that these timeframes are not being met for all patients[538].

Evidence suggests there is scope to reduce variation in access to lung cancer treatment. Cancer Research UK analysis estimates that if all Cancer Alliances met the relevant National Lung Cancer Audit targets, around 300 additional non-small cell lung cancer (NSCLC) patients in England may have received surgical resection (a procedure to remove a tumour and some of the surrounding healthy tissue), and around 100 additional early-stage NSCLC patients may have received treatment intended to cure their cancer (as opposed to palliative treatment) in 2021 (see Notes for more, Note 14). Furthermore, if all Cancer Alliances achieved the same treatment rate as the highest performing Cancer Alliance, around 500 additional early-stage NSCLC patients may have received curative intent treatment in 2021 (see Notes for more, Note 14).

There are likely to be many reasons why the NHS is not delivering best practice care for lung cancer, but we know that workforce pressures and access to the right equipment are likely to be part of the picture. For example, the lung cancer Getting It Right First Time (GIRFT) report highlights access to investigations such as endobronchial ultrasound bronchoscopy and PET-CT scanning as a barrier[539]. We've also heard concerns from experts that as the current lung cancer clinical nurse specialist workforce retires, we may see a gap in the crucial support they provide to patients.

4.5.1. Taking a strategic approach to reducing unwarranted variation

There is a clear need for action to ensure that all cancer patients have equitable access to timely, quality and effective treatment. The UK Government and NHSE should be more explicit in promoting efforts to reduce unwarranted variation in treatment, taking a strategic nationally-coordinated approach.

High-quality datasets are essential to identify where unwarranted variation exists

To make this possible, there need to be improvements in how unwarranted variation is identified in the first place. Datasets that are used to drive quality improvement need to be strengthened. Currently some key treatment datasets – RTDS and SACT – do not reliably capture core elements of quality (for example, disease recurrence or treatment side-effects). There are also no routine methods for collecting patient-reported outcome data within treatment datasets, such as measures relating to quality of life.

To interpret this data meaningfully, we need to know 'what good looks like'. Some progress has been made towards this, with several new clinical audits being established in England, but they are not universal across cancer types[540, 541]. Research we conducted in 2023 identified five domains of cancer care quality (effectiveness, patient-centricity, timeliness,

resource and equity), but for most types of cancer there is no accepted framework that describes best practice against these domains in quantifiable terms[542].

Rolling out best practice and new approaches in cancer treatment requires national support

Identifying variation is just the first step in improving outcomes. It then must be accompanied by a robust approach to acting on these findings. Rolling out best practice in cancer treatment suffers from the same difficulties in implementing innovations across the rest of the pathway, and history shows us that implementation of quality improvement initiatives for cancer treatment, such as those recommended in the Calman-Hine report in 1995[543] or the Improving Outcomes Guidance in 1997[544], has been variable.

Initiatives to reduce variation exist, such as the GIRFT programme, which takes an evidence-based approach to addressing unwarranted variation. We also welcome the new cancer-specific workstream for the GIRFT programme. As noted above, tackling variation between Cancer Alliances could lead to significant improvements in outcomes.

We urge more focus from the UK Government and NHSE to roll out new approaches in cancer treatment. Greater integration of implementation science into policy making and service design is important for ensuring that approaches are rolled out effectively and equitably.

The examples below set out where there has already been some success, as well as where further national support could be beneficial.

Box V
A national approach to SABR rollout

Stereotactic ablative radiotherapy (SABR) is a type of radiotherapy that more precisely targets cancers. It provides a high dose of radiation to the tumour while the tissues around it receive a much lower dose, lowering the risk of side effects[545]. The higher dose also means patients can have fewer outpatient visits compared to conventional radiotherapy. SABR is approved for a range of cancers, including some lung[546], liver[547], pelvic[548] and oligometastatic cancers[549].

The implementation of SABR for lung cancer was initially limited to the centres that had the equipment, skills and expertise to deliver it –only around 6 in 10 radiotherapy centres in the UK in 2019[550]. This meant some patients would have to be referred away from their local centre, potentially increasing travel times and creating barriers to access.

But now, all eligible centres are able to deliver SABR for lung cancer. This was thanks to the SABR expansion programme funded by NHSE, and further catalysed by the COVID-19 pandemic (where treatment via SABR led to reduce hospital visits and therefore potential exposure to COVID-19)[551]. Clinicians and centres worked together to provide quality assurance and mentorship, coordinated by the SABR Consortium.

This illustrates how the rollout of best practice can be significantly improved when there is a combination of national funding, national-level leadership, a clear rationale for local services to prioritise change and collaboration between clinicians and centres to drive fast and safe expansion.

Box W
A national approach to 'prehabilitation'

Establishing 'prehabilitation' (or 'prehab') services in the cancer pathway is a prime example of where it would be beneficial to take a strategic approach to delivering best practice. Prehab refers to activities that help a patient prepare for their treatment by improving their general health and ability to care for themselves[552].

Implementation of prehab for cancer treatment in England seems to have been largely driven locally, meaning that data evaluating its delivery and impact is patchy. The recently published Scottish Cancer Action Plan has committed to universal implementation and evaluation of prehab for people with cancer[553].

The UK Government and NHSE should learn from other nations ahead of embedding a programme. Such a programme would need to address structural barriers to widespread rollout, including lack of capacity in key services such as therapies and smoking cessation, and manage potential tensions between incentives to deliver prehab and meet the 62-day treatment standard.

Any prehab programme should seek to fill existing gaps in the evidence base – for example, in bowel cancer where the evidence is promising but further research and evaluation is needed[554].

Policy recommendation 50

NHSE should improve datasets to aid quality improvement across cancer treatment services. This should include better data capture of core patient outcomes in the RTDS and SACT dataset. NHSE should also ensure there is appropriate infrastructure, such as online patient portals, to capture patient reported outcome measures relating to quality of life.

Geography: England

Policy recommendation 51

DHSC and NHSE should ensure that a new 10-year cancer strategy for England sets out a strategic approach to addressing unwarranted variation in access to treatment. This should be developed in conjunction with tumour-specific clinical leads to provide oversight and advice for content on cancer treatment.

Geography: England

Policy recommendation 52

DHSC should fund the NHSE Cancer Programme, in partnership with relevant stakeholders, to implement a routine strategic audit and quality improvement programme for cancer in England. Accordingly, resource should be directed to pathways, services and patient groups where action is likely to result in improved outcomes.

Geography: England

4.5.2. Specialised commissioning for cancer treatments

Many cancer treatments in England are categorised by the NHS as 'specialised services', which are currently directly commissioned by NHSE. Over the course of 2023/24, NHSE will devolve greater commissioning responsibility for many these services to ICBs, under ambitions to support smoother integration between different parts of the pathway and potentially more investment in preventative interventions.

Whilst better integrated pathways and more emphasis on prevention is welcome, the history of different models of specialised commissioning illustrates the potential pitfalls of these changes. For example, a weakening of centralised decision-making about service configuration could lead to the fragmentation of existing networked services or missed opportunities where centralisation could improve outcomes.

There is also a risk that the proliferation of commissioning organisations introduces greater scope for unwarranted variation in pathways, models and uptake of best practice or innovations – especially if expertise about specialist provision or small services becomes diluted across commissioners. At present it is unclear how these risks will be mitigated.

Policy recommendation 53

NHSE's Specialised Commissioning team should develop and publish 'success criteria' for the devolution of commissioning specialised services in advance of formal devolution expected in April 2024.

- **This 'success criteria' should be developed with input from the cancer community and set out how they will be measured, as well as outlining risks and the mitigations that are being put in place.**
- **NHSE's Specialised Commissioning team should publish annual reviews against these success criteria and risks, which should be reported to the NHSE Board.**

Geography: England

Box X

Cancer Research UK's work to discover, develop and optimise cancer treatments

Part of our vision is to see a world where treatments are more effective, kinder and more targeted. Treatments that are more effective will enable people to return to healthy, cancer-free lives and kinder treatments will enable people to live well with the disease where a cure is not yet an option.

Our research strategy sets out our role in this.

Cancers that affect children and young people

Survival for some children's cancers hasn't improved since the 1970s[699]. And many of those who do survive experience serious, long-term side effects from their treatment. We need more research to better understand this disparate group of diseases and develop more effective and less toxic treatments.

By building research capacity across this area, fostering a coordinated research community and ensuring the research community has the tools and infrastructure it needs to progress, we aim to increase high-quality research in all types of paediatric cancer. We want to support researchers to overcome challenges so we can increase the chance of survival for children and young people with the disease and improve their quality of life.

RadNet – our radiation research network

It's estimated around 4 in 10 people with cancer in the UK should receive radiotherapy as part of their treatment[700] and it's a key component of curative and palliative care and long-term cancer control. However, radiotherapy could bring even more benefits to people if we can further refine treatment approaches and combine it with other treatments.

RadNet is our network of seven centres of excellence across the UK, which provide infrastructure and expertise to research how to make radiotherapy more effective while minimising side effects.

4.6. Empowering health systems in England to make rapid progress

Effective working across local systems is vital to improving cancer services

When it comes to putting changes into practice, it's the health system at the local level that must work to make many of them happen. Local systems must be supported in this endeavour, but as we already know, there is unwarranted variation across local footprints on important cancer measures. For example, the percentage of patients diagnosed at stage 1 and 2 ranges between 50% and 58% in different local areas, even after accounting for differences in case-mix[555].

ICSs in England have the potential to make rapid progress on cancer outcomes, bringing together work on prevention, early diagnosis and optimal treatment to meet the needs of local communities. Given the plethora of organisations involved in delivering these services, it's critical that ICSs can build a sense of 'shared stewardship' of the health of local populations, navigating an intensely complex range of divergent cultures, financial models and governance frameworks to do so[556].

Cutting through this complexity to achieve integrated planning and delivery for cancer is essential. The challenge is made harder by the fact ICBs are still maturing and facing significant cuts in staffing levels. However, support can be found from England's 21 Cancer Alliances, which were set up in 2016 to lead transformational activities for cancer through strong local partnerships. Cancer Alliances are well-placed to provide ICBs with the expertise, dedicated resource and expert leadership that cancer needs.

Cancer must be a shared priority for the whole health and care system

Cancer Alliances should be at the heart of ICSs' efforts to strengthen system-working for cancer. But Cancer Alliances are not statutory bodies, and stakeholder insight indicates that they are sometimes given direction by NHS leaders that is inconsistent with the priorities that are set for their constituent ICBs.

The UK Government should be clear that improving outcomes for cancer is a shared priority across a full range of system partners, and that ICBs work closely with Cancer Alliances to deliver this. There should be consistency between the transformational activities led by Cancer Alliances and the expectations set for ICBs as commissioners, to guarantee that successful initiatives – like non-specific symptom pathways[557] – are brought into the scope of routinely commissioned services as quickly as possible.

Local systems would benefit from long-term funding certainty and flexible planning processes

Whole-system approaches to cancer will take time to mature, but there are practical steps that the UK Government and NHSE can take now. Loosening constraints on the funding model for Cancer Alliances could help systems to be more ambitious in their plans.

We welcome the shift from annual to two-year funding allocations for Cancer Alliances. But longer-term funding – for example, aligned with the parliamentary period – would unlock greater capability for developing and delivering long-term strategic approaches to transform cancer outcomes. If, as has been suggested by some, Cancer Alliances become more involved in supporting ICBs with specialised commissioning for cancer, it will be even more important to make sure that expert staff have long-term security in their roles.

There's also a delicate balance to be struck between the instruction to deliver national priorities and the freedom to respond to local needs on the ground. The implementation of targeted lung health checks demonstrates that strong national direction (combined with ringfenced funding) can drive the delivery of high-profile national initiatives. The need for central leadership to drive implementation has also been evidenced internationally[558].

But stakeholder insight indicates that the annual planning process for Cancer Alliances can be overly regimented and prescriptive. This means it doesn't leave enough time, capacity or scope for alliances to work with local partners to also develop and implement the strategies that make the most sense in the local context. Inflexible planning processes could even be counterproductive to national priorities for cancer in the long run, as many priorities ultimately rely on local action and relationships to be delivered in practice.

Policy recommendation 54

The UK Government should set a clearer expectation that improving cancer outcomes is a responsibility of all statutory bodies and system partners across the NHS and wider health and care system, and that ICSs should facilitate strong system working to achieve national objectives for cancer.

This expectation should be backed up by:

- Setting Cancer Alliance budgets for at least the whole period of the next spending review, and ringfencing them to ensure they are preserved for activities aimed at transforming cancer outcomes.
- Publishing ICB budget envelopes over the same period to provide local systems with sufficient stability to plan and deliver long-term change.
- Delivering future planning guidance that sets clear expectations of all NHS bodies in England with respect to their role in delivering cancer transformation. This should include a fully funded set of national programmes, whilst also allowing scope for local strategies to be developed to meet national objectives.

Geography: England

4.7. Delivering a minimum standard of care

Patients are waiting too long for tests and treatment

Waiting times are important to cancer patients. Ensuring that people can be tested and, if needed, treated within target timeframes can help alleviate some of the anxiety that accompanies a referral for suspected cancer. And for some patients with fast-growing cancers, a few weeks of delay can mean the difference between whether or not they can be offered curative treatment[559].

This is why Cancer Waiting Times (CWT) standards are so important. They represent minimum expectations that people should have for their care in the health service. They also provide a vital indicator of the health of cancer services, which is particularly important to monitor given the pressure that services currently face.

But a growing cohort of people are facing long waits for diagnosis and treatment. At the end of January 2020, nearly 15,300 people had been waiting more than 62 days to begin treatment for cancer or to have cancer ruled out following an urgent suspected cancer referral in England. By the end of August 2023, this number was at around 23,800 people[560].

And depending on where they live, some people are more likely to be affected by long waits than others. In August 2023, cancer patients in some parts of England were around 2.7 times more likely to wait longer than 62 days for treatment than patients in other areas[561].

Long waiting times are a worry for the public, with public polling showing that 95% of people are concerned about the time it takes for patients to be diagnosed with and start their cancer treatment[562].

All CWT targets must be consistently met, including the FDS at a higher threshold

The last time all CWT targets were met in England was December 2015[563] (see Figure W). As a minimum offer to people with cancer, the UK Government must commit to consistently meeting these targets again by the end of the next parliament.

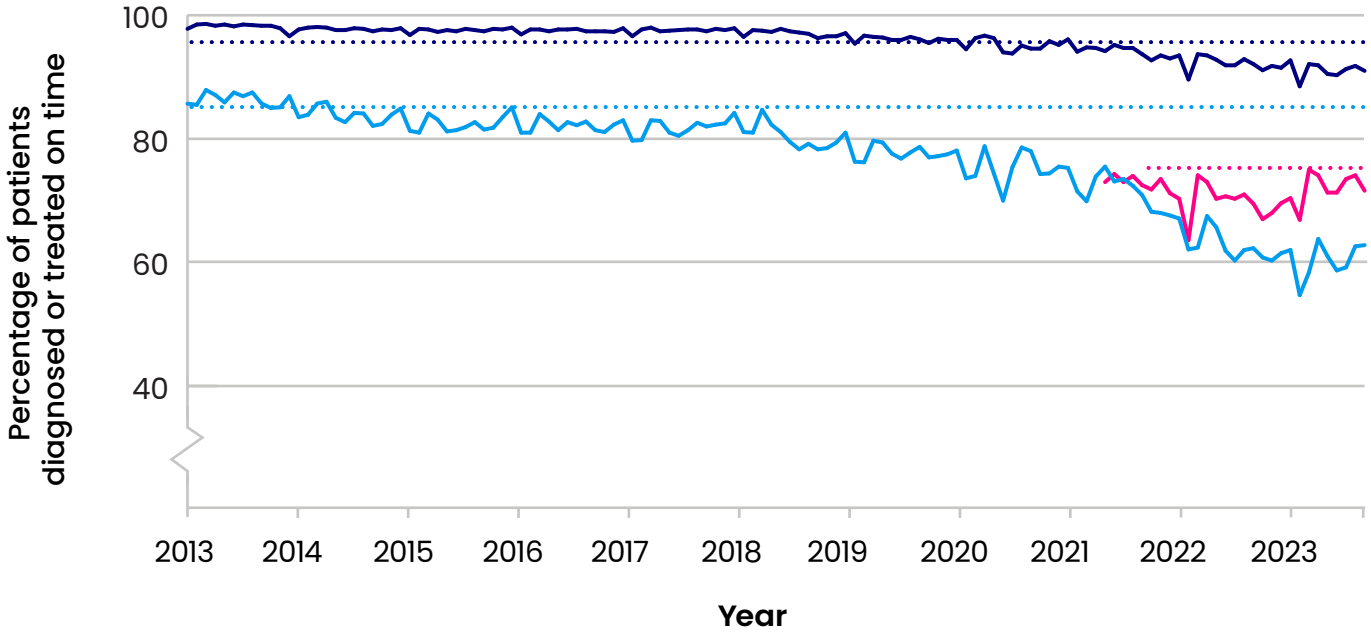
A new standard, the Faster Diagnosis Standard (FDS), was introduced in 2021. The target for this standard is to diagnose or exclude cancer for 75% of patients within 28 days of their referral. But this target of 75% is set well below the originally recommended target of 95%, as per the 2015 Cancer Strategy for England[564]. We estimate that meeting the target at only the 75% level, compared to 95%, means that around 49,000 people per month could wait longer than 28 days to receive their diagnosis or have cancer ruled out (see Notes for more, Note 15).

NHSE has set out an ambition to meet the 75% target for the FDS by the end of March 2024[565], and committed to raising the target to 80%

in 2025/26. While this is welcome, the UK Government should continue to work towards implementing the originally proposed 95% target in the longer term, with a commitment to raising it to 85% over the course of the next parliament.

Figure W
Cancer Waiting Times targets have been consistently missed for years

Performance against Cancer Waiting Times targets in England, Jan 2013–August 2023



NHS England has Cancer Waiting Times standards which outline how quickly people should expect to be diagnosed and treated for cancer. They measure performance against these standards and their associated targets.

Standards	Targets
Faster Diagnosis Standard - People should have cancer diagnosed, or ruled out, within 28 days of an urgent referral from a GP for suspected cancer or breast symptoms, or following an abnormal screening result	75%
62-Day Standard – Patients should begin treatment within 62 days of GP urgent suspected cancer referral	85%
31-Day Standard – Patients should start treatment within 31 days of a decision to treat	96%

Source: NHS England. Cancer Waiting Times. Data are for all cancers combined, Jan 2013–Aug 2023. England only. Data accessed October 2023.

Achieving CWT targets requires more capacity in the health service

The biggest single barrier to improving CWT performance is the systemic lack of capacity in the health service – particularly diagnostic capacity. Our analysis shows that in 2021/22, the most common reason for patients waiting excessively long for cancer treatment (more than 104 days after an urgent referral) were 'service initiated', meaning they were caused by issues in the NHS (see Notes for more, Note 16). And the NHS took more than five times as long to get these patients from referral to the decision to treat (the time during which patients are tested and diagnosed) than it did to treat their cancer once a decision was made (see Notes for more, Note 16). We set out recommendations for improving capacity in the health service in sections 5.2. and 5.3.

Innovation can also help unlock capacity, making services more efficient and improving staff productivity. For example, as set out in section 2.5.2., even in the short term, AI could drastically improve efficiency within services and increase clinicians' capacity, with computers taking on simple routine tasks and assisting clinicians with decision making. But innovation is not a replacement for staff and equipment and can only ever be part of the picture.

Policy recommendation 55

NHSE should raise the Faster Diagnosis Standard target to 85% during the next parliament.

Geography: England

Policy recommendation 56

The UK Government must commit to consistently meeting all Cancer Waiting Times targets for England by the end of the next parliament, including a raised Faster Diagnosis Standard target of 85%.

Geography: England

4.8. Focusing on the right things

CWT targets are important, but aren't the only metrics that matter

Transforming cancer outcomes will take long-term planning and joined-up system working. But this will not be possible unless the regulatory environment encourages it. At present it does not.

Whilst CWTs are important, focusing on achieving them should not come at the expense of ensuring we are making progress on the ultimate outcomes we want to improve for cancer patients – such as diagnosing cancers earlier and improving one, five and ten-year survival. Nor should it come at the expense of improving standards across other aspects of cancer research and care, such as preventing cancers, addressing inequalities or access to clinical trials.

The overwhelming majority of people affected by cancer (84%) feel that the health system should weight outcomes-based measures equally with operational performance measures such as waiting times[566]. Two thirds (65%) of the general public also agreed that health service and government performance on cancer should be judged through a mixture of waiting times and other factors that influence outcomes[567].

Driving meaningful change requires joined-up accountability across the system and better use of data

Compared to other disease areas, the UK has a rich set of data on cancer epidemiology and pathways. This provides a strong starting point for strengthening oversight of the health system for cancer, so it's more holistic and outcomes-focused. But there are some considerations to take into account.

- Population health approaches, like improving screening uptake or tackling unequal access to care, are key to preventing cancer and diagnosing it earlier. But if systems are to prioritise such issues, corresponding population-based metrics must have more visibility in system governance than they currently do, with political and NHS leaders giving them equal importance to CWTs.

- A different model of accountability is needed. Currently, there is fragmentation in national oversight of the different players at the regional and local level. Whilst ICSs are an important vehicle for driving on-the-ground integration between such bodies, fundamental change will be difficult without implementing a model of accountability that genuinely incentivises leaders to accept shared stewardship of population health. Only then will it be possible to hold multiple organisations to account together for making progress on these broader metrics.
- Local systems need better visibility of their position and progress on key measures of population health for cancer. It's still difficult to access and analyse the right data in a timely manner. This is particularly the case for data on outcomes which, by their nature, are slow to collect. For example, gold-standard data on early or late diagnosis rates can take several years to become available (although the Rapid Cancer Registration Dataset, which makes preliminary data available around six months after diagnoses, has helped address this issue). But even when data is available, the NHS tends to lack the expert analytical or statistical capacity to make the best use of it. More action is needed to bring together data and make it accessible in a timely way, and this should go hand-in-hand with building capability across the NHS to generate, interpret and use cancer data in a nuanced and constructive way.
- The range of standards to which the health system is held to account needs to be manageable, as well as meaningful. The recent Hewitt Review identified the need to reduce the number of national targets in the health system[568]. Any changes should not unduly add to the bureaucratic burden of measuring performance, but meaningfully shift focus onto the approaches that are most necessary to impact outcomes.

These challenges are not insurmountable. As ICSs become established in England's health system, an ambitious approach to cancer oversight must be put in place, with a renewed focus on system leadership for better outcomes.

Policy recommendation 57

DHSC and NHSE should jointly convene an independent expert group to undertake a comprehensive review of health system oversight for cancer, tasked with making recommendations for improving the overall approach and delivering the right balance between operational performance and other measures.

This expert group should:

- Draw on the expertise of leaders in the fields of good governance, regulation and cancer epidemiology and data, including Cancer Research UK and the NHSE Cancer Data and Analytics Advisory Group.
- Develop guidance on a set of metrics focused on cancer population health outcomes that should be used alongside CWTs in planning, oversight and assurance. This should include consideration of inequalities and patient access to clinical trials.
- Work with health systems leaders, Cancer Alliances, regulators and the UK Government, to develop detailed recommendations for how the regulatory regime needs to adapt in order to provide constructive oversight in areas that span multiple organisations, or where accountabilities are currently ambiguous or absent.
- Identify and develop recommendations that address practical barriers to improved system oversight for cancer, including data availability and workforce capability to analyse data.
- Publish their recommendations within one year.

Geography: England

Chapter 5
Enablers for success

Which missions and priority actions are covered by this chapter?

Mission 4

Bring tests, treatments and other innovations to patients more quickly.

Priority actions:

- As part of a long-term cancer strategy for England published within 12 months of a general election, the UK Government should set out plans for addressing NHS resource gaps by developing a 10-year cancer-specific workforce plan, eliminating the wider NHS maintenance backlog by 2030 and committing to rolling, ringfenced capital investment for cancer.
- The UK Government must commit to consistently meeting all Cancer Waiting Times targets for England by the end of the next parliament, including a higher Faster Diagnosis Standard target of 85%.

Sections in this chapter:

5.1. Introduction
5.2. Behavioural and implementation science
5.3. A cancer workforce that's fit for the future
5.4. Investing in capital for impact
5.5. Unlocking the potential of data

5.1. Introduction

In the chapters above, we have set out how the UK Government can transform cancer outcomes. But success relies on a strong and sustainable research and health system.

The health system is under enormous pressure, and this is only set to increase with the number of cancer cases rising as our population grows and ages. But as we've seen, research and innovation also provides many opportunities. It's critical that the health system is reformed and resourced to respond to the challenge and harness the opportunities on offer.

Changing the behaviour of those who work in the health system, patients and the public is essential to making policy work in practice. Currently the health system does not make the best use of evidence from behavioural and implementation science, resulting in the sub-optimal design of policies, interventions and services. Drawing more on behavioural science at the local and national level could help accelerate progress against cancer, and across the health system more widely.

Significant gaps in the workforce and failing infrastructure acts as a drag on the pace of improvement and implementation of innovation. The health system is failing to deliver the minimum standards of timely, quality care that people affected by cancer deserve – as illustrated by the persistent failure in England to meet CWTs.

The cancer workforce needs to be fit for the future. To do this, the UK Government will need to build on the NHS Long Term Workforce Plan published in 2019 and recent funding commitments to make sure it delivers the workforce that cancer needs – both now and in the future. It will also need to reform England's current approach to capital

investment in the NHS, by bringing funding in line with comparable countries and removing barriers to long-term investment.

There is enormous opportunity to transform the prevention, diagnosis and treatment of cancer through the depth and scale of cancer data we're already collecting. We could use it to carry out cutting-edge research, develop new innovations and improve how we deliver services. And the data landscape continues to rapidly evolve, with advances in data science and technology-enabled data collection meaning we'll only see a greater breadth of data being generated over the coming years. But improvements are needed to infrastructure, governance and access if we are to unlock the full potential of this data.

Investing in these fundamental enablers would dramatically increase the pace at which we can make progress against cancer.

5.2. Behavioural and implementation science

Many of the changes needed to improve cancer outcomes – and health outcomes more widely – involve changes to public, patient and health professional behaviour, from addressing preventable causes of cancer, increasing public participation in screening programmes and empowering people to seek help earlier, through to enabling clinicians to adopt the latest innovations and best practice[569, 570].

Given this, interventions and policies must be informed by an understanding of human behaviour and the conditions needed for research and evidence to be translated into real-world impact.

In 'messy' real-world contexts, the success of an intervention or policy is dependent on several things, which often interact and change over time. These include:

- Individual behaviours (including of patients, health professionals, managers and administrators).
- Characteristics of the setting (such as the resources available to support its initial and ongoing delivery).
- Features of the wider environment (including policies, regulation, clinical guidelines and financial incentives and disincentives)[571].

For example, the success of the cervical screening programme depends on individual participation, but there are many surrounding factors that affect participation rates, which differ between groups and depend on the wider environment. People who have experienced sexual abuse or certain ethnic minority communities may be less likely to participate[572, 573]. Participation rates also dropped during and after the COVID-19 pandemic[574].

Research in the behavioural and social sciences, and the rapidly developing field of implementation science, has led to the development and ongoing refinement of theories, frameworks and practical tools. These can help us to predict behaviour, explain variability in behaviour between and within populations, understand the factors influencing the translation of research evidence into real-world impact, and use these insights to develop more effective approaches to behaviour change, service design and policy implementation[575, 576].

The Behavioural Insights Team (popularly known as the 'Nudge Unit'), which was set up in 2010 and spun out from the Cabinet Office in 2014, brought significant attention to some behavioural science approaches. In recent years we have seen increasing prominence of the wider interdisciplinary contributions of the behavioural and social sciences across policy, health and communications, including in government guidance[577, 578, 579], medical curricula[580, 581] and NICE guidance[582, 583], as well as from NIHR[584]. But more work is needed to systematically embed behavioural and implementation science across policy and practice.

A detailed understanding of the factors that shape peoples' behaviour, and evidence-based approaches to address the barriers to behaviour change, should underpin every new policy and service design. And, given the urgency and scale of change needed to drive improvements in cancer, we believe more attention on it is needed.

Behavioural and implementation science can help develop impactful interventions across the cancer pathway

Behavioural science research is already helping us to understand a range of issues relevant to policy and practice. Recent studies have examined, for example, factors contributing to delays in diagnosing blood cancers[585], the acceptability of smoking cessation referral strategies within lung cancer screening[586] and perceptions of MCEDs[587]. It's also helping to advance our understanding of cancer inequalities and develop interventions to address them. Recent studies have looked at socioeconomic differences in help-seeking for bowel cancer symptoms during COVID-19[588] and cervical screening attendance and risk amongst women who have sex with women[589].

Behavioural science and implementation science frameworks enable people designing and evaluating interventions to adopt a systematic, evidence-based approach to the development of interventions and initiatives. This includes specifying the behaviours to change, identifying barriers preventing behaviour change and linking these to evidence-based techniques and interventions, and working with stakeholders to plan for their adoption, implementation and sustainability in real-world contexts, ensuring that monitoring and evaluation plans are built in from the start.

One of the key challenges of cancer care in the UK – increasing help-seeking behaviour among lower socioeconomic or marginalised groups without overwhelming diagnostic services – would benefit significantly from this approach.

Box Y

Example of a behavioural science framework supporting the development of interventions in cancer screening

Von Wagner et al[590] developed a framework that links components of socioeconomic status (life stress, educational opportunities, experience of illness) with known psychosocial determinants of screening uptake (beliefs about the value of early detection, fatalistic beliefs about cancer, self-efficacy). This framework helps explain why individuals from lower socioeconomic status backgrounds perceive cancer screening tests as more threatening, more difficult to accomplish and less beneficial.

This in turn is helping to inform the development of interventions to reduce inequalities in screening. For example, Kerrison et al[591] demonstrated the effectiveness of reminders to non-participants in increasing their uptake of flexible sigmoidoscopy screening. Theory-based information designed to target barriers to screening added significantly to this strategy.

Behavioural and implementation science needs to be promoted locally and nationally

Professor Sir Chris Whitty, Chief Medical Officer for England, has previously highlighted that many policies and initiatives fail because they are not based on an understanding of the way people actually behave[592]. The behavioural and implementation sciences are becoming increasingly prominent in public sector organisations, but researchers emphasise that decisions still tend to be made using 'common sense' assumptions, which has led in the past to costly failures[593].

For example, during the COVID-19 pandemic, it was assumed that the failure to self-isolate indicated a lack of motivation, which led

to fines being introduced to motivate this behaviour. However, it turned out that failure to self-isolate was related to not knowing the symptoms and not having the financial resources to do so[594].

More support is needed to use behavioural and implementation science in decision-making at the local level, particularly amongst people who are responsible for commissioning and delivering services. For example:

- Current staff should be trained in behavioural science through online modules, and behavioural science should be integrated into professional training curricula to educate future staff. Tools and resources should be developed to support behaviourally-informed decision-making on the job.
- The health service should be equipped with external support and advice on behavioural science – for example, by expanding behavioural science units and by promoting the Crown Commercial Services Procurement Framework for Research and Insight, which enables rapid access to behavioural expertise for health from third-party organisations[595].
- A behavioural science in cancer network could be established, along similar lines to the Behavioural Science in Public Health Network[596]. This could improve access to expertise and advice and create communities of practice by bringing together academic experts, leaders and those responsible for commissioning and delivering interventions and services.

But to drive a significant step-change in how behavioural and implementation science is used, it needs to be promoted from the heart of government. Establishing a national role in central government, such as a Chief Behavioural Scientist for Health, could accelerate the adoption of behavioural science across policymaking and health systems.

The role – held by a high profile, respected senior professional with established expertise in behaviour change and implementation science – could raise the profile of behavioural and social sciences, champion its use in policymaking, oversee the delivery of a programme of change at the local level and provide expertise and advice in ministerial decision-making.

Further consideration, including wide-ranging stakeholder engagement, needs to go into developing the specification of such a role to ensure its scope, remit and any supporting function is integrated into and enhances existing functions. But this role could significantly improve the effectiveness and cost-effectiveness of policy and interventions to improve cancer outcomes – and health outcomes more widely.

Policy recommendation 58

The UK Government should establish a Chief Behavioural Scientist for Health, to accelerate the integration of behavioural and implementation science across policymaking and the health system. The role should champion and facilitate the implementation of behaviourally informed policies and initiatives to address complex challenges in healthcare, at both the local and national levels.

Geography: England

5.3. A cancer workforce that's fit for the future

Specialist and generalist staff across a range of services are the bedrock of the health service and are vital to the diagnosis, treatment and care of every person with cancer.

But the healthcare workforce in England is in crisis. Staff shortages affect almost every aspect of healthcare, and cancer is no exception.

Box Z
Resourcing the screening pathway

We want to see more people participate in screening, but the resources need to be there to be able to handle this. If screening uptake is successfully improved, current screening programmes optimised and new innovative screening programmes developed and rolled out in the future (as set out in the 'Detect, diagnose, treat' chapter), there will be an unprecedented number of people participating in screening. There will need to be more staff and infrastructure in place to diagnose and treat those that do have cancer.

Even now, workforce shortages are impacting on performance standards, which are not being met across breast, bowel and cervical cancer screening programmes. This means that people are not being offered their screening appointments and follow-up tests in a timely manner and there are lengthy processing times for samples[597, 598, 599]. And we know that capacity concerns are a major factor holding back improvements in bowel screening, such as increasing the sensitivity of FIT testing (see section 4.2.3.).

Progress is being made on building up diagnostic capacity through initiatives such as the Regional Endoscopy Training Academies (formerly known as the Clinical Endoscopist Training Programme) [600], funding for CDCs[601, 602, 603] and new breast cancer screening units[604]. But we've still got a long way to go, and patient need is only set to increase.

5.3.1. The NHS Long Term Workforce Plan for England

The health service in England needs a breakthrough in its approach to staffing.

We strongly welcome this year's publication of the NHS LTWP. It's the first NHS workforce strategy for England since the 2000s and comes with some significant investment. It takes an ambitious 15-year perspective, and we particularly welcome the commitment to refreshing the plan every two years. It will be important for the refresh in 2025 to address weaknesses in the existing plan and ensure that workforce planning in England stays on the right track.

One key weakness in the plan – which is common across international examples of workforce planning – is the poor quality of workforce data[605, 606]. Without reliable, accurate and complete data, the health service's ability to plan for the future workforce intelligently will be persistently limited.

Another weakness is that the plan relies on ambitious and poorly evidenced productivity assumptions, without setting out clearly how these will be attained. It also doesn't pay enough attention to regional variation in workforce distribution, and to the importance of having enough highly skilled non-clinical workers such as managers and analysts. They are crucial in maintaining service quality, implementing strategy and embedding innovations – and without them the benefits of investment in innovation, data and information systems cannot be realised[607].

The next refresh of the LTWP should address these issues.

Policy recommendation 59

The UK Government should immediately instruct NHSE to begin the planning cycle for the 2025 Long Term Workforce Plan refresh, so sufficient preparation can be made to address weaknesses in the current plan for England.

In this process, NHSE should work collaboratively with external stakeholders to develop:

- **Actions to address data accuracy and completeness issues in available workforce data, broken down by staffing groups and in particular improving data about the non-clinical workforce.**
- **Dedicated modelling on transformation and analytical staffing needs to support service improvement and innovation.**
- **An updated modelling framework detailing how NHSE will estimate staffing needs. NHSE should then publicly consult on this model to ensure it is independently verified.**

Geography: England

5.3.2. NHS workforce planning on cancer

The LTWP was meant to offer a vision for the whole NHS in England. But it does not speak to many areas that are centrally important to cancer diagnosis and treatment.

Staffing shortfalls exist across the 'cancer workforce'

The 'cancer workforce' is hard to define. Cancer patients interact with almost every sphere of care delivery – from primary care through to diagnostic services, secondary and specialist care, as well as care in the community and hospice and palliative care. But limitations to existing data mean we don't know how the NHS workforce is deployed across cancer-relevant services, hampering efforts to understand the 'cancer workforce'. We need to be able to gather and analyse the relevant data so the nature of the 'cancer workforce' can be better understood.

Despite this, we know that many of the professions essential to cancer diagnosis and care are facing acute shortfalls. A lack of staff to support endoscopy remains a critical issue in diagnosing upper and lower gastrointestinal cancers quickly[608]. Gastroenterology workforce shortfalls are expected to grow, due both to staff retirement and because population growth means we will need a 7–9% yearly expansion[609]. We are also facing a shortage in histopathology, with a 25% shortfall in staff who can report cancer diagnoses[610]. Some regions have even higher shortages[611], and only 3% of surveyed departments report having enough staff to meet patient needs[612].

Some shortages are being addressed through 'skill mix' models

'Skill mix' models can help increase workforce productivity. They equip members of the wider clinical team with the skills to perform some duties previously undertaken only by doctors or other experienced clinicians. This frees up doctors' time for other duties and offers a faster route to filling capacity gaps. This may include, for example, enabling radiographers to report images or training clinical endoscopists and advanced biomedical scientists to undertake or report diagnostic tests[613, 614, 615].

We welcome recent efforts to support these approaches, such as the introduction of training academies for imaging and endoscopy[616, 617]. But numerous barriers still exist to expanding the use of skill mix models, including a lack of funding for professional development, a lack of universally accepted accreditation models and practical barriers to accessing training such as lack of staff time.

And these approaches will only take us so far in addressing the significant work shortages facing cancer.

We will need at least 16,000 more staff in key cancer professions by 2029

In 2017, Health Education England (HEE) identified seven professions that are closely linked to the diagnosis and treatment of cancer. These are histopathology and healthcare sciences, gastroenterology, clinical radiology, diagnostic radiography, medical and clinical oncology, therapeutic radiography and specialist cancer nursing[618].

Alongside the publication of the LTWP, the UK Government made a welcome promise to fund more medical school and nursing training places. But there is no firm commitment to increase staff numbers in the key cancer professions listed by HEE, or to invest in the foundation and specialty training needed to convert expanded student numbers into an expanded consultant workforce. This is despite the fact that HEE anticipated the NHS would need to see 45% growth across these seven groups between 2019 and the end of the 2020s to meet demand for cancer care and support systemic transformation.

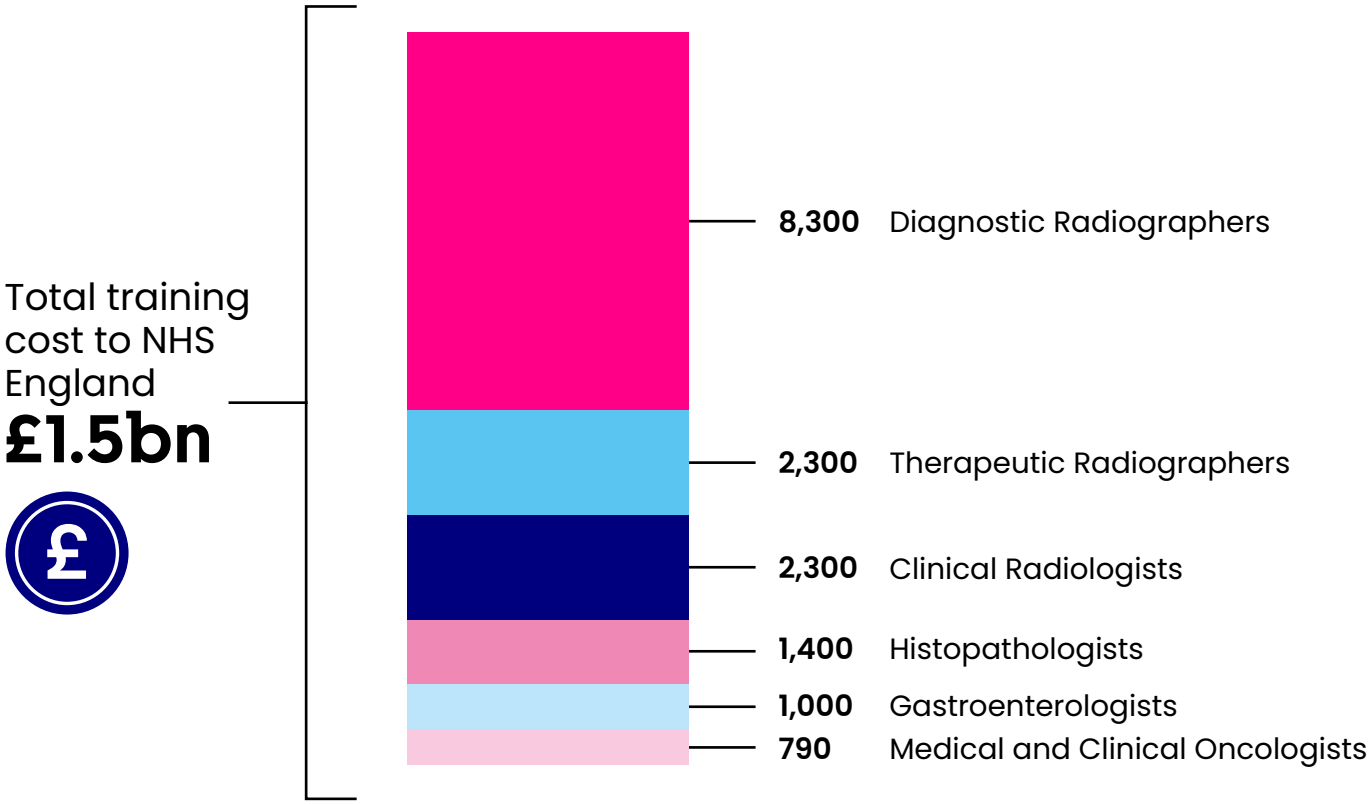
Our modelling estimates that, based on the situation as of 2023, achieving HEE's target would require training and recruiting enough staff to fill 16,000 FTE posts between now and 2029, at an investment of around £1.5bn (see Figure X)[619].

Although it is possible that some of this gap will be filled by expanded use of skill-mix models or uptake of other innovations, on current trends, England will fall substantially short of this figure. But notably, this investment of £1.5bn – which would be spread over six years – is substantially less than the roughly £2.4bn that the NHS has spent on agency staffing every year since 2017[620, 621, 622].

It's essential that the UK Government does not stop at the commitments currently made in the LTWP and moves to invest in the professions and specialty training posts that are desperately needed to ensure cancer care can be delivered at the end of the decade. This will need to come alongside a financial settlement that incorporates the ongoing costs of employing these additional staff.

Figure X
Providing a world-class cancer workforce

NHS England needs to train or recruit enough people to fill around 16,000 FTE posts to meet HEE's workforce ambitions for a world-class cancer service by 2029*



*Achieving an overall 45% growth in the cancer workforce 2019-2029 and maintaining current projected growth 2024–2029. Calculated using Electronic Staff Record data provided by NHS England. Methodology developed in partnership with RAND Europe and the University of Cambridge, see "Estimating the cost of growing the NHS cancer workforce in England by 2029" for more details. Costing data from: NHS payment scheme 2023–25, Health Education England (HEE) study leave budget and NHS education and tariffs 2022–23.

Workforce plans need to consider the future of cancer care

Cancer incidence is rising[623]. An ageing population will likely have more complex health needs. And the pace of innovation is accelerating. Workforce plans will need to be reviewed and upgraded to account for skills needed to deliver the cancer care of the future.

For example, as set out in section 2.5.2., AI-based tools have the potential to introduce significant benefits for patients and staff. But they will also require additional training across the workforce. A patient told us that during the two years they were undergoing treatment, the treatment guidance for their cancer changed six times, reflecting just how quickly innovation is changing the way cancer care is delivered and underlining the need to frequently upskill staff to keep pace.

The health service will also need to prepare for the introduction of new service models and interventions. The lack of strategic planning in workforce needs has already hampered the benefits of new service models and interventions – for example, though the rollout of CDCs has been largely successful, their benefits have been limited by system-wide shortages in the diagnostic workforce[624].

Ensuring we have the right staff with the right skills will be critical to adopting innovations and new service models that will form the future of cancer care.

Box AA
Preparing the workforce for the future of genomic medicine

Genomic medicine has huge potential in improving early and more precise diagnosis of cancer, by enabling more accurate diagnosis and prognosis for certain cancers, as well as more precise treatment targeted to an individual patient's genetics.

But genomics capacity is already strained, workforce is scarce and the system is struggling to deliver against existing expectations, let alone prepare for future workforce needs supporting the rapid growth of precision medicine.

Whilst some staff groups are clearly vital to providing genomic medicine, such as pathology and biomedical sciences, the role of other staff groups such as primary care in genomic medicine – for example through GPs with an extended role in genomics – is less well defined.

In line with recommendations from Genome UK 2022–25, the Genomic Medicine Service are currently gathering and analysing data on the current and projected capacity of the genomic workforce in the UK. This will provide vital data on which professions are undertaking genomic medicine, and where there are potential shortfalls.

This modelling should fully consider future demand, with funding delivered to address shortfall areas.

Training the clinical workforce is also important. NHS England's Genomics Education Programme (GEP) delivers learning and development opportunities that prepare current and future NHS professionals to make the best use of genomics in their practice. While the GEP has developed a positive platform for genomics training, barriers remain to staff having the protected time to engage in training and upskilling.

Policy recommendation 60

The UK Government should instruct NHSE to develop a specific cancer workforce plan as a companion to the NHS Long Term Workforce Plan for England, to be delivered within one year of the next general election. The plan should consider the specialties essential to the diagnosis and treatment of cancer, with an initial focus on sub-specialisms in endoscopy, pathology, radiology, tumour-specific oncologists and nurse specialists.

This should include:

- A full audit of the range of workforce groups key to delivering cancer care, including both clinical and non-clinical staff.
- Fully published modelling on workforce growth needs across all identified staffing groups, with adequate consideration of rising cancer incidence and changing patient needs, as well as required workforce growth to facilitate the implementation of new service models and interventions in cancer care.
- Actions to support the adoption of 'skill mix' approaches in key areas of workforce shortage.

Geography: England

Policy recommendation 61

As a baseline, the UK Government must invest £1.5bn between 2024-29 in training the staff to fill 16,000 FTE specialist roles in the seven key cancer professions identified in the 2018 HEE Cancer Workforce Plan, as requiring a 45% growth.

Geography: England

5.3.3. Improving workforce retention

Alongside a long-term approach to address staff shortages, action needs to be taken now to address the high numbers of experienced staff who leave the workforce in England every year.

One in nine NHS nurses left active service in England in the first half of 2022[625], and one in 18 consultants left active service in the year up to September 2021[626]. People leave the NHS for many reasons, with retirement the most common[627]. But worryingly, in specialties critical to cancer, early retirement has become common. For example, 76% of consultant radiologists who left the workforce in 2022 were under the age of 60[628]. While issues around pensions taxation that have now been addressed were a likely contributor, it is important to take additional measures to keep experienced staff in the healthcare workforce wherever possible.

Experienced staff have a higher level of efficiency, training capacity and expertise compared to new staff. They provide clinical leadership to help improve services and implement innovations in cancer care. Their value should not be underestimated.

A better understanding of why healthcare staff leave is needed to turn the tide

It's unlikely that the LTWP goes far enough to meet its ambitious targets for retention in the face of record rates of staff leaving. There are proven interventions that we know can boost retention, such as access to training and professional development opportunities[629, 630], flexible working[631, 632], wellbeing support[633] and creating dedicated time to engage in clinical research (see section 2.3.3.)[634]. Although the LTWP points to these, it does not go far enough in committing to the steps needed to turn the trend around.

In particular, the LTWP does not pay due attention to improving the NHS's understanding of why staff are leaving at such a high rate, which will inhibit the development of further targeted measures to support retention. There is poor data on why people leave the NHS, which is often published in aggregate with many gaps. The LTWP provides no additional insight into the factors driving staff departures, instead pointing to existing evidence which we know is incomplete.

Exit interviews should be a valuable source of information, helping us to identify interventions and strategies to maximise retention – and yet they are not always held. While we can gain some insights from the reasons people give for leaving, the most common recorded reason remains 'other/unknown'[635].

Policy recommendation 62

As part of the two-yearly refresh of the plan, NHSE should improve data collection on staff leavers, with an aim to regularly publish this data by 2025 and use it to target efforts to boost retention at the issues and staff groups where they will make the most difference.

Geography: England

5.4. Investing in capital for impact

5.4.1. Increasing capital investment for cancer

World-class cancer care cannot be delivered with failing infrastructure. Yet capital investment in estates, equipment and infrastructure like IT is inadequate across the health service.

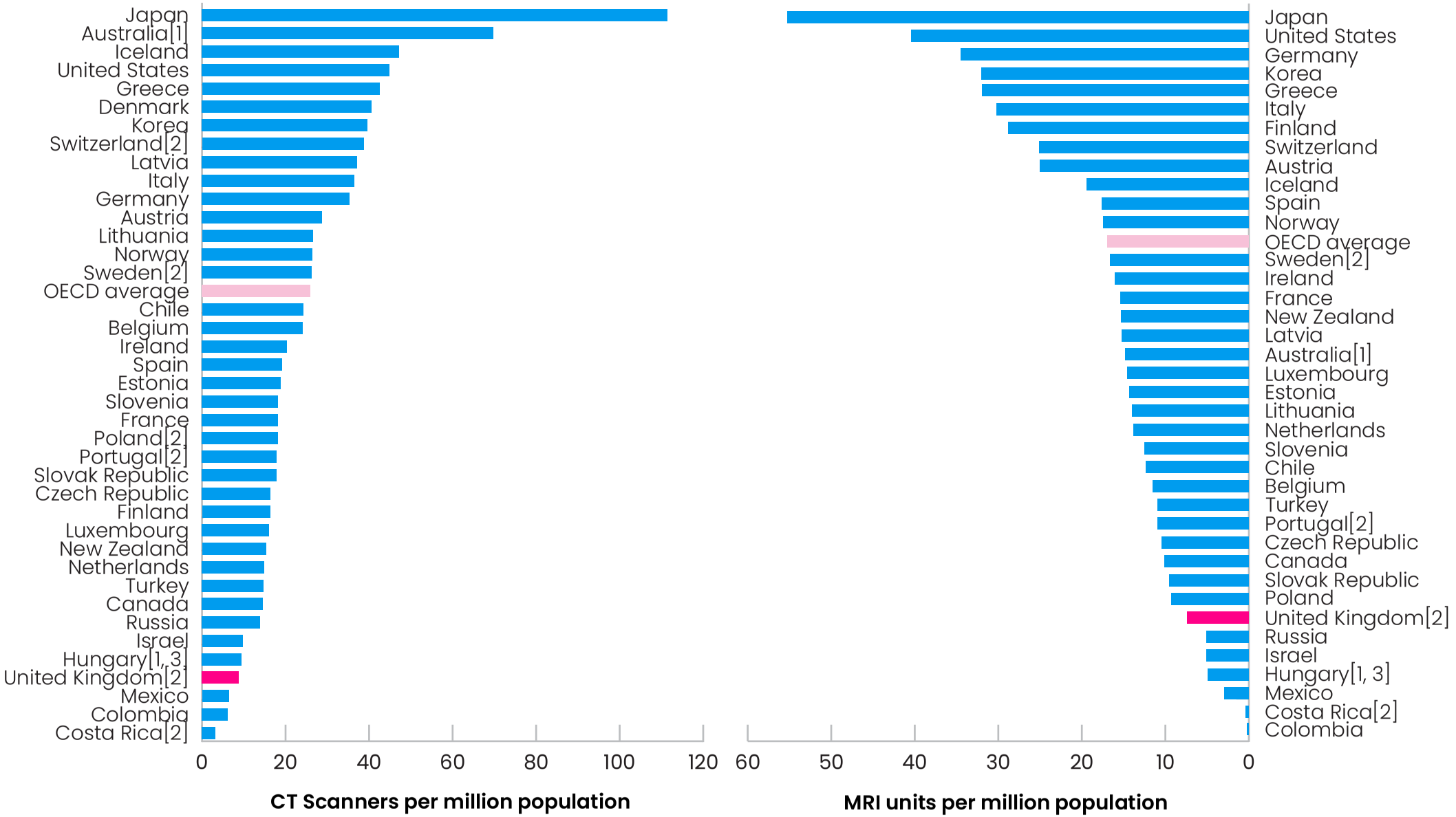
The UK's capital spending on health has long lagged behind its near neighbours. If the UK had matched EU 14 levels of total capital from 2010–19, it would have invested an additional £33bn in health infrastructure[636]. In England, budgets do not even cover day-to-day maintenance costs, which has led to a maintenance backlog of £10.2bn (up from £4bn in 2013/14)[637]. The result is that scarce funds are being diverted from efforts to expand or improve services and towards safety-critical works[638].

This affects patients across all aspects of cancer care. Imaging is a key shortage area, with the UK ranking close to the bottom of 36 OECD countries on average number of CT and MRI scanners per million population[639] (see Figure Y). England also has the third lowest number of PET-CT scanners per 100,000 population among ICBP jurisdictions[640].

The 2020 Richards Review of Diagnostics Services argued that the NHS must introduce 'community diagnostic hubs', and grow the overall number of scanners alongside replacing older, less advanced and less reliable scanners[641]. This resulted in the welcome commitment to establish 160 CDCs – but there is still a long way to go.

And demand is growing. We estimate that, by 2035, around 3.8 million key tests for diagnosing cancer will be required just for those people referred through screening and urgent suspected cancer referrals in England – that's around 715,000 extra diagnostic tests compared to 2018 (see Notes for more, Note 17).

Figure Y
International comparison of CT and MRI capacity in the UK compared to other OECD countries



1. Data include only equipment eligible for public reimbursement. 2. Data exclude equipment outside hospitals. 3. Data include only equipment outside hospitals. Data source: OECD. 2021. 'Diagnostic technologies' in Health at a Glance 2021: OECD Indicators OECD Publishing, Paris

Capital is key to unlocking service transformation, but often not available

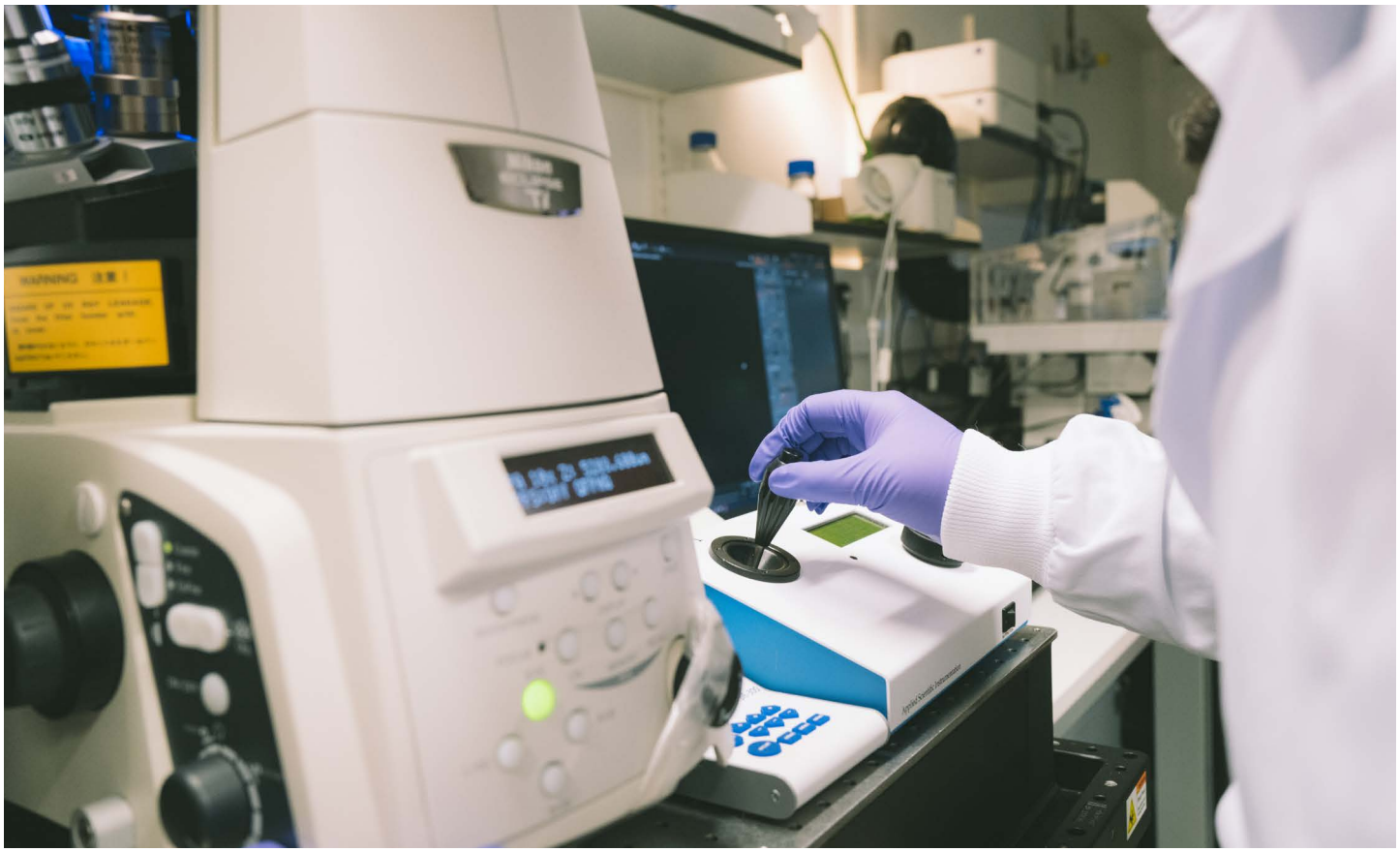
Modern equipment, facilities and infrastructure are essential for delivering timely and improved cancer care. They will also unlock the opportunity for greater efficiencies through the adoption of innovations such as digital technologies.

Capital budgets are also essential for embedding the kind of digital infrastructure that underpins modern diagnostic and screening services. After problems with outdated IT systems resulted in 5,000 women not receiving invitations to their final breast screening in 2018[642], funding was secured to upgrade these systems – but the slow pace of capital investment means this will not be completed until at least late 2025. In pathology services, IT systems have become increasingly outdated[643, 644, 645].

Yet in 2022/23, the NHS in England reduced budgets for investment in technology and new diagnostic capacity to fund the cost of that year's NHS staff pay award[646]. This is just one recent example of the short-sighted practice of reallocating capital budgets to meet day-to-day spending pressures – a practice that has meant DHSC has underspent against its capital budget in almost every year since 2010/11[647, 648]. Not only does this impact on the day-to-day running of the health service, but it also means that the NHS lacks the essential foundations necessary to implement the wide range of innovations that depend on strong digital infrastructure.

Diagnostics is not the only area where a lack of capital investment matters. Cancer treatments can also be capital-intensive. Radiotherapy is a key treatment for many people affected by cancer, plays a critical role in both curing early-stage cancer and in palliative care, and relies on capital investment in advanced radiotherapy machines known as linear accelerators (LINACs).

While there was significant investment in new LINACs as part of the 2015 Cancer Strategy for England, this piecemeal approach to LINAC replacement has meant that there are still many machines in use that have passed their recommended lifespan[649]. Older LINACs have more downtime and require repairing more often, which affects treatment capacity and leads to inefficiencies in service delivery.



Box AB
Resourcing endoscopy services to detect more bowel cancers

Endoscopy is a vital test for many types of upper and lower GI cancers. Colonoscopy, a type of endoscopy, is also an essential follow-up test for those who have tested positive as part of bowel cancer screening.

But workforce shortages and a lack of adequate capital investment in equipment and facilities are causing unnecessary delays to people receiving a cancer diagnosis. The latest waiting times for August 2023 show almost 4 in 10 people waiting for an endoscopy in England (needed for any reason) had been waiting six or more weeks – that's around 71,000 people[650].

A lack of capacity in endoscopy services is also slowing the pace at which the bowel cancer screening programme can be optimised. As set out in section 4.2.3., England has yet to fully implement the UK NSC's recommendations to reduce the threshold for FIT, the test used in the bowel cancer screening programme, in part because there is insufficient capacity in the system to manage the additional endoscopies that would be needed.

Addressing the shortages

Skill-mix approaches in endoscopy are allowing nurses and physician associates to perform certain endoscopic procedures. And efforts have been made to train more clinical endoscopists to carry out standard endoscopies, to free up time for gastroenterologists to take on more complex cases. This is already helping to meet service demands in their Trusts, reduce waiting lists and contribute to a better patient experience[651]. But there are still barriers, including completing the process to become accredited and insufficient time to complete training due to service pressures[652].

There also needs to be sustained investment in the capital and infrastructure to support screening. NHSE's 2023/24 Capital Guidance advised systems to increase the number of endoscopy rooms, with a guide level of 3.5 rooms per 100,000 population over 50 years of age by March 2025[653]. Whilst this is welcome, there's still a long way to go to upgrade endoscopy infrastructure that has seen years of underinvestment.

Investment via the CDC programme offers an important opportunity to incorporate endoscopy facilities where they are most convenient to the local population. But the significant infrastructure required to support endoscopy means it will only be able to be included in large CDCs[654], potentially limiting its ability to achieve scale and patient accessibility.

Policy recommendation 63

The UK Government should eliminate the NHS maintenance backlog in England by 2030. Alongside this, to support the NHS to replace aging equipment and make long-term strategic investment, the UK Government should ensure the DHSC capital budget at least matches the EU average by population.

Geography: England

Policy recommendation 64

The UK Government must provide ringfenced capital investment targeted to essential cancer infrastructure. This should be wide-ranging and engage the full range of cancer services, including diagnostics and specialist or less visible services.

At a minimum, the UK Government should ensure:

- **Sufficient investment for endoscopy services to ensure that the NHS can keep up with growing patient needs, new technologies and the delivery of optimisation and risk stratification in bowel screening, alongside delivery of the bowel Faster Diagnostic Standard pathway. This should be based on an urgently commissioned review of endoscopy services with a focus on setting out the level of capital investment needed over and above current commitments.**
- **Provision of additional ringfenced capital funding for systems to replace LINACs nearing the end of their lifespan, and development of a long-term solution for replacing LINACs on a rolling basis.**

Geography: England

5.4.2. Taking a strategic approach to capital investment

The overall level of capital funding is only part of the problem. If the health system is to make the most of its capital budgets, there needs to be major reform of the UK Government's approach to capital investment in the NHS in England.

Despite recent high-profile examples of NHS capital schemes falling into difficulties[655, 656, 657], the lack of a strategic approach to investment in health infrastructure – particularly with respect to budget setting and approvals processes – has meant that too often capital investment hasn't delivered for the NHS.

These challenges are further compounded by volatility in the processes for securing approval to access or spend capital. Approval for high values or certain categories of capital, including diagnostics and digital, must be sought from a potentially large number of external organisations including NHSE, DHSC and the Treasury[658, 659]. And approval processes are known to be complex, onerous and beset by delays that can leave plans in limbo[660].

Misalignment between capital and other planning processes in national programmes can also impede service improvement. For example, in recent years, the NHSE Cancer Programme has allocated revenue funding to implement the best practice timed pathway for prostate cancer, which requires providers to offer multiparametric MRI as the first-choice test for prostate cancer. But the NHSE Cancer Programme does not allocate capital funding on a routine basis, which is needed to upgrade older MRI machines that may not be capable of this kind of scanning. Capital funding therefore may need to be sought through unconnected capital approval processes, making it vulnerable to deprioritisation, delays or non-approval.

In recent years, there have been positive changes in capital planning guidance, strengthening the role of system leadership in coordinating capital plans and introducing a three-year operational capital envelope from 2022/23 to 2024/25[661, 662] (whereas previously, capital budgets were annualised). In theory, this will help with strategic allocation of these budgets[663]. But annual accounting and the approvals pipeline still continue to present difficulties – as was brought into stark relief

earlier this year, when it was reported that the future of up to 30 new CDCs was uncertain after the Secretary of State for Health and Social Care refused to give approval for centres that could not open by the end of 2023, despite the UK Government's own target to open 160 such CDCs[664].

It is essential that the UK Government and NHSE continue to work towards a more flexible and navigable regime for allocating capital, cementing multi-year settlements alongside a reformed approvals pipeline that empowers systems and delivers far greater responsiveness to the strategic needs of the health service. The role of Cancer Alliances and Radiotherapy Operational Delivery Networks in contributing to system capital planning should be considered in any such regime.

Policy recommendation 65

DHSC and the Treasury should consult on changes to the healthcare capital allocation and approvals regime, with the aim of enabling more strategic use of capital budgets, including the role of expert organisations such as Cancer Alliances and Operational Delivery Networks.

Geography: England

5.5. Unlocking the potential of data

The opportunities presented by the depth and scale of cancer data already being collected could transform the prevention, diagnosis and treatment of cancer, with potential benefits to clinical trials, AI, real-world evidence, translational research, epidemiological studies, health system research and service improvement.

The UK's national cancer data assets have been curated to a high standard for decades. But the data landscape is rapidly evolving, and advances in data science and technology-enabled data collection mean we are seeing a greater breadth of data being generated. If we are to unlock the full potential of this, the UK's IT and data infrastructure must be set up to facilitate its collection, processing and availability.

The cancer registration data we have in the UK is one of the most comprehensive collections of individual health data globally. Registries in each UK nation collate the exact type of cancer diagnosed in each patient along with their demographic characteristics. This can be used for research and quality improvement, as well as for policymaking on cancer. Data collected by hospitals is provided to the four national registries (NHSE, PHW, PHS and NICR) to generate cancer registrations, as well as oversee the collection of cancer-specific data, such as on SACT or radiotherapy.

Yet while we are already getting some value from this data, there are barriers to realising its full potential – in the accessibility of data for researchers, the consistency and completeness of datasets, sub-optimal data flows and limited data linkage.

Whilst there are examples of good practice across the UK – such as the work in Scotland led by the Innovative Healthcare Delivery Programme[665] – in general, these barriers are holding back progress in driving quality improvement across cancer services and delaying or limiting research. Tackling these barriers requires collaboration with stakeholders across the sector to develop shared solutions and national leadership to coordinate delivery.

5.5.1. Patient and public trust is a fundamental prerequisite to the effective use of data

Efforts to improve the data landscape of the UK necessarily rely on the public viewing the health service as safe and secure, guided by a transparent decision-making process, and ultimately driven by what is best for patients and the public.

In recent years, we have seen how a lack of effective public and patient engagement can have detrimental consequences on the success of data-related initiatives. Programmes such as General Practice Data for Planning and Research (GPDPR) were paused indefinitely or scrapped after public trust in them collapsed, following mishandled rollouts that led to large increases in the

number of people opting out of having their health data shared for research purposes. Opt-outs are not randomly distributed, especially across some protected characteristics such as age, sex and ethnicity, which risks adding significant bias to future studies[666].

Public polling from 2023 suggests that, when properly informed, the public instinctively support the secondary use of their health data to support health service improvement and clinical research. Nearly three-quarters (73%) of those polled agreed when asked whether it was appropriate for data to be collected, used and shared in a similar way to during the pandemic for researching chronic and/or serious diseases like cancer and Alzheimer's[667]. However, as failed initiatives demonstrate, this support can be fragile. Mistakes – real or perceived – in the use and handling of data can lead to large numbers of people opting out of sharing their data, leading to limited usefulness in the data that is collected.

When undertaking national data programmes, it's essential that the UK Government and health service learn the lessons from past mistakes. It's critical to develop and roll out a comprehensive programme of proactive communication and engagement to build public confidence and understanding. This requires effective engagement with charities and research organisations.

In England, NHSE must meaningfully include patients and the public in all stages of development of key programmes of work relating to patient data, in particular where there is a risk of misinformation and misunderstanding.

5.5.2. Key barriers to unlocking the potential of data

The speed at which cancer data can be accessed is holding back research and quality improvement

Ensuring researchers have timely and efficient access to cancer data is integral to advancing our understanding of the disease. The importance of ensuring that health data is made accessible has been highlighted repeatedly – for example, the 2013 Caldicott Review into data sharing and governance outlined how the duty to share information can be as important as the duty to protect patient confidentiality[668]. But cutting-edge cancer research requires faster access to cancer data than is currently available.

In recent years, lengthy, costly and inconsistent data access processes have become a significant impediment to the effective and timely use of cancer data in support of improving outcomes. This has added to existing pressures on the research community and led to the cancellation of research projects. For example, in 2020, the NCRI found that only 47% of researchers surveyed were successful when trying to access data for cancer research[669]. We have heard that fewer requests for potentially identifiable cancer data are being submitted.

Organisational changes in the data custodians of NHS data have further exacerbated existing issues, with the movement of the National Disease Registration Service (NDRS) from Public Health England (PHE) to NHS Digital and then to NHSE, resulting in changing processes and a loss of cancer-specific expertise and capacity. And a culture of risk aversion regarding the sharing of NHS data persists, despite efforts to highlight the importance of patient data for research and quality improvement.

Researchers need fast, predictable and streamlined data access routes to plan and deliver research projects. We suggest that, ideally, researchers should be able to access the data for their study within a month of submitting their data request (providing they have the necessary approvals).

Box AC
The Data for R&D programme

Following the Goldacre Review and DHSC's 2022 Data Saves Lives strategy, the UK government has launched the Data for R&D programme, which seeks to develop a network of national and subnational Secure Data Environments (SDEs). SDEs give approved researchers access to de-identified data from national health settings through a secure platform. If executed correctly, it will give researchers quick access to a wide range of data, whilst assuring the security and anonymity of patients' personal information.

It will be important that approval processes are quick and efficient, with researchers able to access data via a single 'front door', and that researcher costs for accessing the data are reasonable so that getting access to the data does not come at the expense of other valuable research.

Public polling has found an overwhelming support for an SDE-like model over a data sharing model, of 86% vs 8%[670]. But this support must not be taken for granted and a proactive communications strategy should be put in place to maintain public trust. Otherwise, high opt-out rates will threaten the integrity of the entire programme.

Datasets must be consistent and complete to drive quality improvement across the health service

Patient data can only be used to deliver meaningful systemic change if the data collected is of a high quality. It must capture datapoints with sufficient breadth and granularity to allow the generation of intelligence that is both accurate and reliable at local and national levels.

Improving the consistency and completeness of data is critical for maximising the impact of existing cancer interventions. For example, plans to roll out a national targeted lung screening programme in England, which will invite people to be screened for lung cancer based in part on their smoking status, rely on access to accurate smoking status data. Without this, people who are eligible may be missed, and people who are ineligible may be incorrectly invited – reducing the impact of the programme and wasting resources.

Consistent and complete datasets will also give us the tools to make significant leaps on how we prevent, diagnose and treat cancers. Novel risk-stratified screening approaches, which could help detect and diagnose more cancers earlier, will rely on high-quality datasets to be put into practice. And efforts to reduce unwarranted variation in patients' access to the best treatments require improvements to treatment datasets, such as RTDS and SACT.

Better data flows and linkage across datasets would increase efficiency and value

Data infrastructure should be underpinned by processes that allow data to 'flow' from one part of the system to another, so that data is collected once and then securely available to all those who need to access it. As more types of data are generated, improved data flows will become even more important to ensure complex arrays of datasets are kept manageable and usable.

Datasets also need to be linked to one another if we are to get the most value from them. Unfortunately, a lack of access to nationwide primary care data and routine linkage with secondary care data could be holding back our ability to understand early signs of disease, which is vital in

improving patient outcomes. For example, when a patient is diagnosed with cancer via emergency routes, which are associated with poorer outcomes compared to other routes[671], we are not yet fully able to understand what happened to the patient before the cancer was diagnosed, undermining our ability to reduce emergency presentations.

Improvements to the flow and linkage of patient data could lead to the creation of an ecosystem which supports access to data in real time. This would allow clinicians to have the relevant health records at their fingertips and enable managers to use automated dashboards to efficiently monitor performance. And better linking patient and clinical data to study data could seriously accelerate research in developing more precise and effective ways of preventing, diagnosing and treating cancer.

A standardised national data framework would allow data to flow effectively through the research and care system. As set out in the terms of reference of the recently commissioned Sudlow Review, standardisation and interoperability – both prerequisites for good data flow and linkage – are fundamental to unlocking the full potential of health data in the UK[672].

5.5.3. Supporting data custodians to transform data systems

The power of data to enhance research, service efficiency and patient outcomes is widely acknowledged. In recent years, there have been several major strategy documents, reviews and guidance documents published by the government and the NHS on the subject, as well as promising commitments that will help unlock the potential of data – such as the launch of the Data for R&D programme set out above.

However, there is much more to do to address the barriers described above, and solutions are complex and sit across many stakeholders in the data ecosystem, including NHSE, Trusts, researchers, charities and industry.

But funding and headcount at the organisations responsible for owning, storing and providing access to health data for research – often referred to as data custodians – has been cut[673]. And organisational changes – such as the NDRS moving from PHE to NHS Digital, and then to NHSE in only a few years – have led to a loss of cancer data capacity and expertise within the body responsible for ensuring timely and secure access to data.

Cancer registration data is collected to a particularly high standard, meaning the potential to transform cancer outcomes through the effective use of data is particularly high. The GRAIL-Galleri trial's data-led patient recruitment showed what can happen when data is effectively used, but that required a bespoke arrangement through the Data for R&D programme.

Whilst improving our data systems will have benefits across healthcare, we think that cancer can be an exemplar. Cancer registration data is already collected to a very high standard. If we get the system right for cancer, it could provide a blueprint for other areas of healthcare.

There is already a strong community of cancer charities, clinicians, researchers and analysts who want to collaborate to transform the data system for cancer. The UK Government and NHSE should capitalise on this to drive change, bringing in patient and public perspectives from the start.

Policy recommendation 66

DHSC and NHSE should form a UK cancer data collaborative to transform data access, quality, linkage and flow. This collaborative should involve data custodians, clinicians, charities, academics and researchers, research organisations and patients across all four nations. The collaborative should take a UK-wide approach so that our data systems are joined up across the UK.

This collaborative should develop and oversee the implementation of a programme of work to:

- Proactively involve, engage and communicate to patients and the public to build and maintain trust.
- Speed up access to data for the research and healthcare community, without compromising on data security.
- Improve the consistency and completeness of key cancer datasets such as the Cancer Outcomes and Services Dataset.
- Rationalise cancer data flows and data linkage, using real-use cases to prioritise where to focus efforts.

The UK cancer data collaborative should report publicly on their progress against an agreed set of objectives.

Geography: UK

Chapter 6
Lead for change

Which missions and priority actions are covered by this chapter?

Mission 5

Build a national movement to beat cancer, together.

Priority actions:

- Within a year of the general election, the UK Government should publish a 10-year cancer strategy for England, underpinned by rolling three-year action plans.
- Within a year of the general election, the UK Government should establish a broader leadership model for cancer in the UK, including a National Cancer Council for England, accountable to the prime minister for coordinating cross-government action on cancer for the long term, supported by mechanisms for ensuring long-term focus on cancer and independent scrutiny of performance. This approach will bring together discovery, translation, cancer prevention, detection, diagnosis and treatment, health system investment and reform.

Sections in this chapter:

6.1. Introduction

6.2. Setting a national mission for cancer

6.3. Strengthening national leadership and accountability

6.1. Introduction

Cancer survival in the UK has doubled over the last 50 years[674]. This is an enormous achievement, but it didn't happen overnight. Transforming cancer outcomes takes time and relies on many things, one of which is creating the environment for change.

We have set out how we can transform how we do research, get innovations to patients quicker and better prevent, diagnose and treat cancer while reducing inequalities, and resource and reform the health system.

Now we need government to take the lead. The UK Government must develop and deliver a vision, long-term strategy and plan, with dedicated funding and the resources needed, to transform cancer outcomes in England. And it must put in place strong mechanisms to hold itself and the cancer community to account and maintain momentum.

We need political leadership and commitment at the very highest levels. The kind of leadership that welcomes expertise and challenge. The kind of leadership that brings together all parts of government and the cancer community. The kind of leadership that builds strong and sustainable governance, and that secures the funding we need to achieve a shared long-term vision.

6.2. Setting a national mission for cancer

A strong national cancer strategy is key to success

An ambitious, long-term national cancer strategy is the bedrock of success. International evidence has shown that countries that have had a consistent set of cancer strategies over time, such as Denmark, have done best at improving outcomes[675].

WHO has long advocated for countries to develop national cancer control plans[676]. And these plans are most successful when they build on one another or are refreshed over their lifespan, giving a consistency in focus that has been central to Denmark's success.

For the first time in two decades, England does not have a long-term, clear strategy for beating cancer. This situation is not typical for the UK – Scotland, Wales and Northern Ireland each have one. It's also not in line with England's twenty-year history of long-term cancer strategies, which began with the publication of the 2000 NHS Cancer Plan and ended with the expiry of the most recent strategy in 2020.

Each of these cancer strategies left its mark on the country, though none more so than the 2000 NHS Cancer Plan. It laid down ambitions, actions and measurable targets across research, cancer prevention and cancer care, and was supported by a significant funding settlement[677].

This plan has been credited with dramatically increasing the national and local focus on cancer, including leading to the successful implementation of 'cancer networks' across England. A 2005 review by the National Audit Office found that it drove important improvements in cancer services, such as the expansion of training for cancer clinicians and substantial investment in modernising and expanding cancer diagnostic and treatment facilities[678].

This plan was so successful because of a combination of factors – not least the public support of the then prime minister, who made clear that cancer was a top priority for government during his tenure.
The appointment of Professor Sir Mike Richards as England's first National Cancer Director and the significant funding settlement provided for cancer reflected the profile given to cancer during this period[679].

Right now, England needs a clearer focus on beating cancer

Since 2020, there has been no dedicated cancer strategy in place for England. Other plans, such as the NHS Long Term Plan published in 2019[680] and the forthcoming Major Conditions Strategy, provide some view on cancer, but neither takes the place of a long-term, integrated approach to transforming cancer research and care, with near-term action plans to drive progress.

The NHS Long Term Plan includes bold ambitions, including for dramatically improving the early diagnosis of cancer, and sets out a range of positive actions towards this. But reflecting the limits of the NHS's own remit in England, it doesn't commit to enough on prevention or cancer research. It also lacks detail on cancer treatment, with commitments to actions that were already underway, such as establishing proton beam therapy centres, which had already been announced in 2015.

The UK Government's forthcoming Major Conditions Strategy, which focuses on cross-cutting themes across a range of different common illnesses, has the potential to improve the experiences and outcomes for people living with these conditions – and often with several conditions at once. However, given its breadth and limited timeframe of five years, it's unlikely to contain the ambition, depth and specificity to meet the serious challenges of tackling cancer.

A comprehensive cancer strategy is vital – and achievable

Developing a long-term cancer strategy for research and care is an essential and urgent task. By 2038-40, more than half a million people will be diagnosed with cancer each year across the UK – an increase of a fifth on the number of new cases today[681]. It's unacceptable that there is no plan in place to prepare for this, or to move towards better outcomes for people diagnosed with cancer.

It's also an achievable task. Independent evaluation of cancer strategies in comparable countries has shown the elements that go into making and delivering an effective cancer strategy and plan[682]. This forms the basis of the key tests that any new cancer strategy must fulfil (see Figure Z).

Cancer Research UK can help. Drawing on our expertise and experience as the world's largest independent funder of cancer research, we make it our job to identify the latest evidence on what works. We can also help incorporate the learnings from 20 years of previous cancer strategies – not least because we hosted the Independent Cancer Taskforce, responsible for developing the 2015 Cancer Strategy for England.

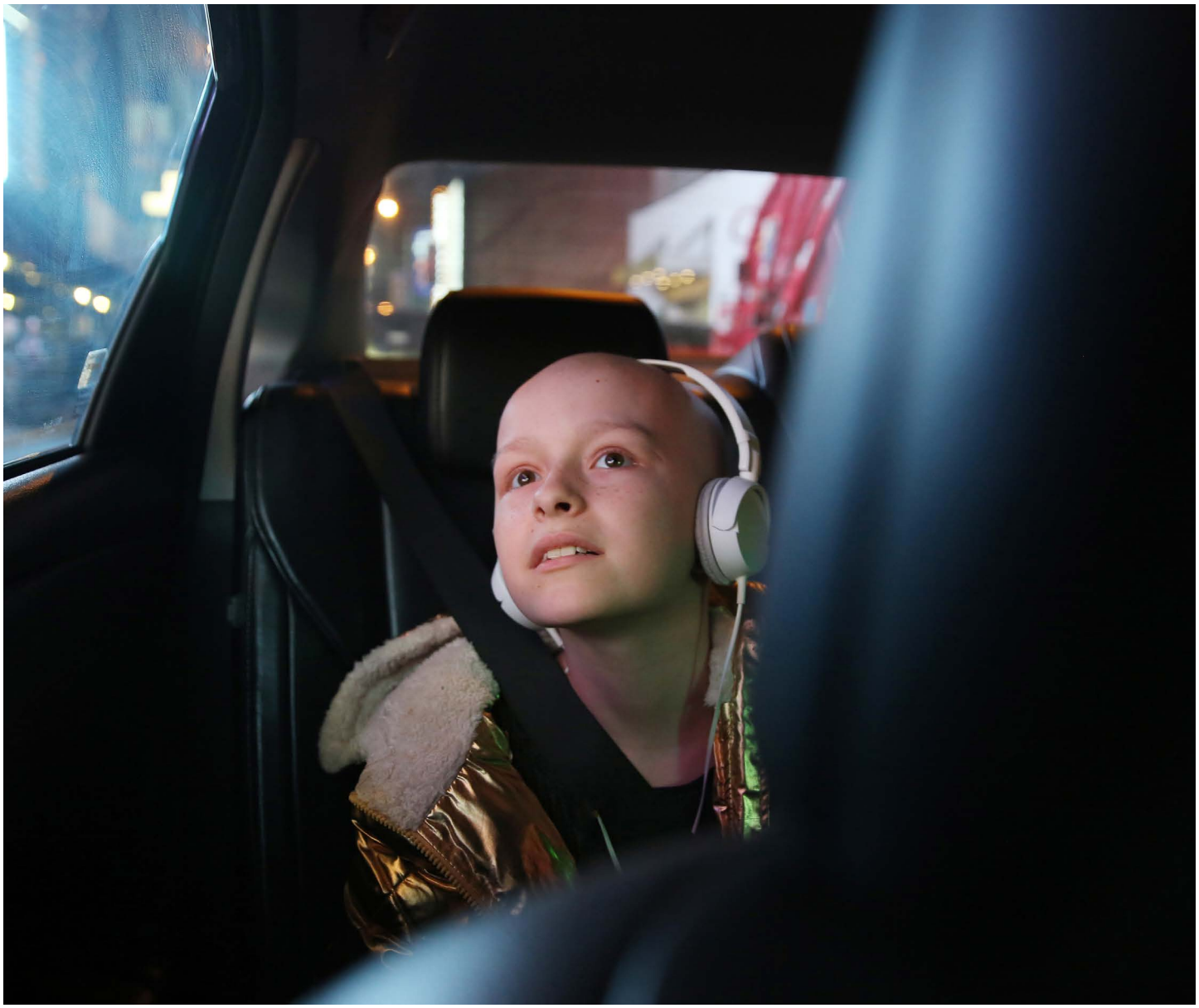


Figure Z
Our tests for a new cancer strategy

Bold, comprehensive and long-term ambitions

A comprehensive strategy should aim for long-term transformation across all aspects of cancer prevention, research and care, with bold ambitions that are developed with and can bring together the whole cancer community around a shared vision for change.

Leadership

Success requires political leadership to marshal government focus and resources, as well as to hold responsible bodies to account for delivery - dedicated leadership to bring together stakeholders to develop a strategy and coordinate its implementation - and expert and clinical leadership across all elements to ensure the strategy is evidence based.

Dedicated governance and oversight

There must be a robust central coordinating and oversight function with a mandate to bridge the disconnected structures of government and ensure implementation across all aspects of cancer policy.

Implementation

A detailed implementation plan must have measurable objectives and achievable timelines. Plans must sequence actions, considering what can be achieved more quickly and where groundwork must be laid for longer-term transformation.

Evaluating progress

There must be regular, robust and transparent reporting of implementation, measuring what matters most to improving outcomes and enabling meaningful accountability for progress. There should be signposted points where the strategy is independently reviewed through a process that involves stakeholders across the cancer community.

Funding and capacity to deliver

Dedicated funding to deliver the strategy, alongside sufficient resource in the wider health system to enable transformative change, is key to success.

Developed from: Nolte, E et al 2022; Seguin, M. et al. 2022; Morris, M. et al. 2021; and insight from stakeholder interviews.

Policy recommendation 67

The UK Government should publish a new, comprehensive 10-year national cancer strategy within one year of the next general election, underpinned by a national ambition to reduce cancer mortality by 15% by 2040. (See Technical annex for more information)

This strategy should be:

- **Developed under the leadership of an independent expert and cover all aspects of cancer research and innovation, prevention and healthcare. It should also include consultation, collaboration and co-production with the whole cancer community, including clinical and research leaders, charities and people affected by cancer.**
- **Underpinned by a series of rolling three-year action plans that set out measures to address short-term challenges and opportunities, while also laying the groundwork for the longer-term transformative changes to cancer research and care needed to deliver the 2040 ambition – with a clear expectation that the strategy will be followed by subsequent strategies up to 2040.**

Geography: England

6.3. Strengthening national leadership and accountability

Beating cancer requires political leadership at the highest level

A new national strategy will provide the roadmap for action on cancer. But to successfully deliver it, government must create the right environment for progress to happen.

Many of the building blocks for success are already in place. The NHSE Cancer Programme has been sustained over several years and it has delivered significant successes. The network of Cancer Alliances across England now play a well-established role in cancer transformation on the ground. And we have seen some welcome focus on the importance of cancer research and innovation through the Office for Life Sciences Cancer Mission and the NHSE Small Business Research Initiative Innovation Open Call scheme[683].

But these organisations sometimes work independently of each other without much coordination around a shared vision for cancer that covers all aspects of cancer research and care. For example, the National Cancer Board, which oversees the NHSE Cancer Programme, is tasked with ensuring that the NHS delivers on cancer elements of the NHS Long Term Plan. Yet it has limited representation and responsibility for oversight of vital areas such as prevention and research, which largely falls outside the general remit of the NHS[684].

We need political leadership from the very top of government, signalling across Whitehall and to the public that beating cancer is a priority for the nation. It must involve the whole of government and the health and research systems in a shared mission, ambition and set of actions and outcomes. Bold political leadership is also critical in making sure that ambitions and actions are matched with long-term investment needed to make them real[685].

The prime minister should establish a National Cancer Council

The prime minister can make sure all corners of government bring their strengths to bear on the cancer challenge, by committing to establish and chair a new National Cancer Council. Much like the 'Cancer Cabinet' recently formed by President Biden in the United States, the National Cancer Council would bring together leadership across the different departments and agencies that have a role to play in implementing different parts of a cancer strategy[686]. This would allow for coordination and collaboration between departments, while also holding departmental leadership to account for delivering on their individual remits.

The Institute for Government has found that such councils are most successful when the leadership of the prime minister is backed up by a sufficiently resourced secretariat, and when meetings are frequent enough to maintain focus on the goal[687].

The Council should keep an emphasis on external expertise and input from people affected by cancer, learning from examples such as the former Danish National Cancer Steering Group[688]. It had a broad membership across national and regional government, medical professional organisations, major hospitals and public health bodies, and the third sector. This gave it the ability to incorporate relevant expertise and patient views, and to direct focus onto the areas of greatest importance for cancer in Denmark[689].

Organisations across the third sector will also provide an important voice – including ourselves, the largest independent funder of cancer research with a breadth and depth of expertise across cancer and strong patient engagement networks.

Mechanisms should be put in place to maintain momentum over the long term

Beating cancer is a long-term challenge. The UK Government will need to put in place mechanisms to make sure focus on cancer is maintained in the face of competing priorities and ongoing changes to the policy environment.

Even well-supported cancer strategies can lose momentum over time[690]. The Public Accounts Committee suggested that the 2000 NHS Cancer Plan needed a refresh mid-way through its 10-year period[691]. But cuts to programme resources and a weakening of the role of the National Cancer Director led to progress in England slowing down[692].

Ambitious plans for other diseases have also lost profile in recent years. The prime minister's Challenge on Dementia 2020 achieved some early success to strengthen dementia research but it has not formally reported on its progress since 2018[693, 694, 695].

It's vital that focus isn't lost this time round. Part of the answer is to invest in the right kind of leadership. Based on our insights from international cancer strategies and methods of governance, it is clear that political leadership needs to be matched with dedicated expert insight to deliver on plans. For England, this means building outwards from the well-established leadership for cancer within NHSE, to draw upon a network of engaged clinical and non-clinical leaders at every level of the system[696]. In sections 5.1. and 5.4., we have also identified the need to embed behavioural science into cancer policy and practice and to transform the cancer data landscape.

Another part of the answer is to make sure the UK has the right structures and processes in place to drive consistent, concerted action on cancer across government for the long term, supporting the work of the National Cancer Council. The UK system of government often struggles with developing and delivering policy that cuts across multiple departments. These challenges will need to be overcome[697, 698].

Lastly, progress must be reported transparently and independently – at least annually – so that government, the health and research systems, the public and people affected by cancer know what progress has been made and can hold the system to account on the promise to improve cancer outcomes. There is currently no routinely published report that summarises the activities or progress on cancer. Quarterly public reporting by the NHS on progress in the NHSE Cancer Programme appears to have been suspended since early 2021.

Policy recommendation 68

The UK Government should establish a National Cancer Council within one year of the next general election, which will hold leaders to account for delivering on key actions and outcomes, including cross-government actions.

The Council should:

- Be chaired by the prime minister and consist of, at a minimum, the Secretaries of State for Health and Social Care and Science, Innovation and Technology, representatives of the Treasury, the Chief Executive of NHSE and the National Cancer Director, public research funders and expert advisors, including those across the third sector.
- Be supported by a robust secretariat and meet every six months.
- Commission expert advice on how best to implement a long-term model for cancer leadership across government, building on existing evidence and considering international examples, to be established by the end of the first three-year action plan.

Geography: England

Policy recommendation 69

The UK Government should establish a clear mechanism for ensuring scrutiny and transparent annual reporting on its progress in key areas for cancer. This should include publication of an annual account of progress against the strategy and any associated plans.

- This could be a new role given to an individual acting as 'rapporteur', or a function delegated to existing watchdogs such as the National Audit Office.
- Government departments and agencies should be mandated to provide information to support this function as required, to enable these reports to be comprehensive and transparent.

Geography: England

Glossary

ACED	International Alliance for Cancer Early Detection
AHSNs	Academic Health Science Networks*
AI	Artificial intelligence
AMRC	Association of Medical Research Charities
ATMPs	Advanced therapy medicinal products
BPTP	Best practice timed pathway
CAM	Cancer Awareness Measure
CDC	Community diagnostic centre
CFIR	Consolidated Framework for Implementation Research
CGC	Cancer Grand Challenges initiative
CRSF	Charity Research Support Fund
CRUK	Cancer Research UK
CWTs	Cancer Waiting Times
DAISY	Diversity and Inclusion Survey
DALY	Disability-adjusted life years
DBT	Department for Business and Trade
DCT	Decentralised clinical trial
DfE	Department for Education
DHSC	Department of Health and Social Care
DLUC	Department for Levelling Up, Housing and Communities
DSIT	Department for Science, Innovation and Technology
ECMC	Experimental Cancer Medicine Centre
ED&D	Early detection and diagnosis
EEA	European Economic Area
EU	European Union
FCDO	Foreign, Commonwealth and Development Office

* This will soon be referred to as Health Innovation Networks (HINs)

FCTC	Framework Convention on Tobacco Control
FDA	Food and Drug Administration (USA)
FDS	Faster Diagnosis Standard
FIT	Faecal Immunochemical Test
GEP	Genomics Education Programme
GIRFT	Getting It Right First Time
GPDPR	General Practice Data for Planning and Research
GTV	Global Talent visa
GVA	Gross valued added
HEE	Health Education England
HFSS	High in fat, sugar or salt (relating to food and drink)
HMT	His Majesty's Treasury
HRA	Health Research Authority
HSC	Health and Social Care (Northern Ireland)
ICB	Integrated care board
ICBP	International Cancer Benchmarking Partnership
ICS	Integrated care system
IDAP	Innovative Devices Access Pathway
IHS	Immigration health surcharge
ILAP	Innovative Licensing and Access Pathway
LINAC	Linear accelerator
LMIC	Low- and middle- income country
LTWP	(NHS) Long Term Workforce Plan
MCED	Multi-cancer early detection
MECC	Making Every Contact Count
MHRA	Medicines and Healthcare products Regulatory Agency
NCD	Non-communicable disease
NCRI	National Cancer Research Institute
NCVR	National Contract Value Review

NDRS	National Disease Registration Service
NHS	National Health Service
NHSE	National Health Service England
NICE	National Institute for Health and Care Excellence
NICR	Northern Ireland Cancer Registry
NIHR	National Institute for Health and Care Research
NOLCP	National Optimal Lung Cancer Pathway
NSCLC	Non-small cell lung cancer
ODN	Operational Delivery Network
OLS	Office for Life Sciences
PHE	Public Health England
PHS	Public Health Scotland
PHW	Public Health Wales
QALY	Quality-adjusted life year
QR funding	Quality-related funding
R&D	Research and development
RAS	Robotic-assisted surgery
RTDS	Radiotherapy Dataset
SABR	Stereotactic ablative radiotherapy
SACT	Systemic Anti-Cancer Therapy
SDE	Secure Data Environment
SWV	Skilled Worker visa
TDF	Theoretical Domains Framework
TPPs	Target product profiles
UKNSC	UK National Screening Committee
UKRI	UK Research and Innovation
VBA	Very Brief Advice
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WSI	Whole Slide Imaging

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Notes

1 Economic modelling undertaken by Economics By Design Ltd for Cancer Research UK to provide an update of previous estimates undertaken using the methodology adopted in Nick Hex, Cameron Collins, Anne Webb, Estimate of the economic costs and literature review of the benefits of dedicated research time for Hospital Consultants in the NHS: Final Report for the Academy of Medical Sciences, YHEC, (October 2019). The modelling also included Advance Practitioners as having a research role.

2 Analysis by Cancer Research UK. Reduction in number of cancer cases if risk factor prevalence is reduced to specific levels, compared with number of cancer cases projected assuming recent cancer incidence and risk factor prevalence trends continue. See Technical annex for more.

3 Analysis undertaken by Economics By Design Ltd. Economic value estimates are based on calculation of the prevention ambitions explained in annex and estimates of health systems and productivity costs of different types of cancer obtained from a review of the published literature.

4 Electronic cigarettes (also called e-cigarettes, e-cigs and vapes) are handheld devices that heat a liquid ('e-liquid') to create a vapour that people can breathe in. They don't contain tobacco but usually contain nicotine.

5 84% calculated by Cancer Research UK analysis based upon endorsement of (a) money coming from a charge applied on the profits the tobacco industry makes from selling cigarettes, and (b) corporation tax (tax that businesses pay on their profits) on tobacco manufacturers' profits.

6 This figure factors in Cancer Research UK's cancer incidence projections to 2028, including changes in cancer incidence that's likely, mostly due to the aging and growing population. In 2028 in England, it's projected that there will be around 372,000 cancers diagnosed – a combined figure for the stageable cancer types currently included in the NHSE stage at diagnosis indicator (NHSE, Staging Data England). This would be around 300,000 cancers with a known stage if the proportion of cancers diagnosed with a known stage stays the same as it did in 2018 (a pre-pandemic baseline). If there was no change in the proportion of cancers diagnosed by stage between 2018 and 2028, the absolute number diagnosed at stage 4 would naturally increase over time due to the increasing overall incidence. But if the proportion diagnosed at stage 1 and 2 improved to 75% by 2028, we would hope the number diagnosed at stage 4 would decrease by nearly 40%, from around 66,000 in 2018 to below 42,000 cases per year by 2028 if there was a meaningful stage-shift for patients – ie the 75% target was not achieved through an increase in the overdiagnosis of cancers that would not have gone on to cause harm.

7 Analysis by Cancer Research UK. The figure combines lives saved from all three screening programmes. It is estimated that 1,300 lives are saved from breast cancer screening (Marmot et al. The benefits and harms of breast cancer screening: an independent review. Br J Cancer 2013;108(11):2205–40. doi:10.1038/bjc.2013.177), at least 2,000 lives are saved from bowel cancer screening (Parkin et al. Predicting the impact of the screening programme for colorectal cancer in the UK. J Med Screen 2008;15(4):163–74) and at least 2,000 lives are saved from cervical cancer screening (calculated by Cancer Research UK, based on findings published by Landy et al, Impact of cervical screening on cervical cancer mortality: estimation using stage-specific results from a nested case–control study, Br J Cancer. 2016;115(9):1140–1146).

8 Analysis by Cancer Research UK. Assuming 1) 50% of lung cancer deaths in 55–74-year-olds are in people who would have been eligible for targeted lung health checks (based on Gracie et al 2019 (The proportion of lung cancer patients attending UK lung cancer clinics who would have been eligible for low-dose CT screening; European Respiratory Journal 2019; 54: 1802221), and using incidence as proxy for mortality); 2) 50% of those eligible will take part in a targeted lung health check (based on currently reported uptake and expert opinion of feasible maximum uptake); 3) targeted lung health checks will reduce lung cancer deaths by 24% in males and 33% in females (based on de Koning et al, Reduced Lung-Cancer Mortality with Volume CT Screening in a Randomized Trial N Engl J Med 2020; 382:503-513).

9 Analysis undertaken by Economics By Design Ltd for Cancer Research UK, applying unit costs and QALY data from Adrian Gheorghe, Camille Maringe, James Spice, Arnie Purushotham, Kalipso Chalkidou, Bernard Rachet.

10 Analysis by Cancer Research UK. This analysis was done in 2019 based on data from the England FIT pilot study (eg Moss et al 2016. Increased uptake and improved outcomes of bowel cancer screening with a faecal immunochemical test: results from a pilot study within the national screening programme in England. Gut 66(9):1631-164). We applied estimates from the FIT pilot for the cancer and adenoma detection rates at 80ug/g (the sensitivity in Scotland) and at 120ug/g (the sensitivity in England), onto the number of 60–74-year-olds estimated to participate in bowel screening in 2019/20 and looked at the difference in potential numbers of cancers and adenomas diagnosed through screening.

11 Analysis by Cancer Research UK based on screening data for 2018/2019 taken from Fingertips (for bowel screening uptake), and NHS Digital (for cervical screening coverage and cancer detection rate and breast screening uptake and cancer detection rate). The cancer detection rate for bowel screening was based on data from GOV.UK – NHS screening programmes: annual reports for 2020/2021 to get a more accurate idea of the positivity rate following the adoption of FIT. Extra cases diagnosed were calculated by deducting the difference between people diagnosed via screening using the actual uptake in 2018/2019 and assuming 80% uptake and the provided detection rates. Please note that for cervical cancer, we are using coverage, not uptake.

12 Analysis by Cancer Research UK using data on bowel screening uptake in 60–74-year-olds and deprivation by GP practice from Fingertips. Applying screening uptake from GP practices in the least deprived quintile to GP practices in the other quintiles, while accounting for differences in age (proportion of screening-eligible cases aged 70–74 in each GP practice) and CCGs. The figure is an underestimate as it does not account for the age extension to bowel screening.

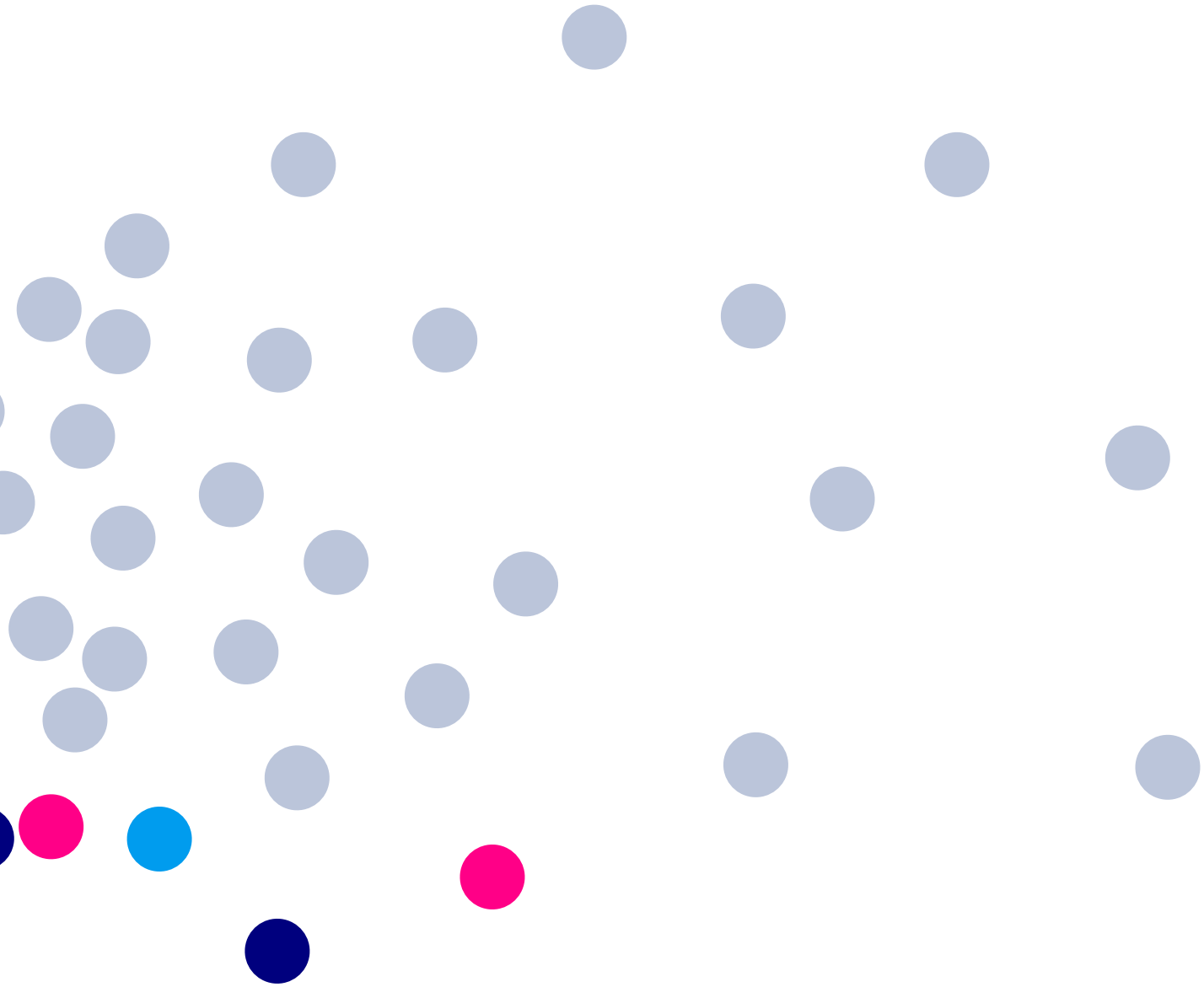
13 Analysis by Cancer Research UK-NDRS partnership using cancer registration data from the NDRS to calculate net two-year cancer survival by stage and Cancer Alliance for lung and colorectal cancer patients diagnosed between 2014 and 2018. The 'best' survival was calculated as the average survival for each age group for the three alliances with the highest age-standardised net survival for each stage. These 'best' survival estimates were applied to the age distribution of cancer diagnoses for England to calculate the increased number of patients who would survive their cancer for two years or more, compared to the current survival in England. Patients with missing stage at diagnosis are excluded from this analysis.

14 Analysis by Cancer Research UK. National Lung Cancer Audit 2023 benchmarking standards: Proportion of patients with non-small cell lung cancer undergoing surgery >=17%; Proportion of patients with non-small cell lung cancer who had curative treatment (stage I/II, Performance Status 0-2) >=80%. Pleas note, all figures are adjusted for case-mix (age, comorbidity, stage, performance status and tumour type) and therefore estimated numbers of additional patients who may be eligible for treatment may not reflect the real-world case-mix in each cancer audit.

15 Analysis by Cancer Research UK of NHS Cancer Waiting Times Data from NHS England (2022). Cancer Waiting Times. Accessed September 2023 via https://www.england.nhs.uk/statistics/statistical-work-areas/cancer-waiting-times/. From January to July 2023 there were 1,708,785 urgent referrals that qualified for the FDS. On average, if a 95% target were met 231,907 people would have received a diagnosis or have cancer ruled out within 28 days, compared to 183,084 if the target were met at 75%. Assuming similar future monthly numbers, this means that each month more than 48,800 people would not receive a diagnosis or have cancer ruled out within 28 days if the target were met at 75% compared to 95%.

16 Analysis by Cancer Research UK–NDRS partnership using Cancer Waiting Times data for all patients resident in England starting treatment in financial years 2017/2018, 2020/2021, 2021/2022 and the first two quarters of 2022/2023 from the NDRS. The analysis investigated the characteristics of adult patients waiting over 104 days from Urgent Suspected Cancer Referral to treatment, the reasons for delay from referral to treatment for these patients, and their intervals in various diagnostic and treatment intervals. The most common specific delay reasons within the healthcare provider-initiated delay group were 'Healthcare provider-initiated delay to diagnostic test or treatment planning', 'Inadequate out-patient capacity', and 'Inadequate elective capacity'.

17 Cancer Research UK analysis conducted in 2023 based on: NHS England Diagnostic Waiting Times and Activity, NHS England Diagnostic Imaging Dataset, NHS Digital Routes to Diagnosis 2022, Cancer Research UK cancer incidence projections. 2023. Key diagnostic tests included in the analyses: colonoscopy, flexi-sigmoidoscopy, cystoscopy, gastroscopy, CT, MRI, ultrasound, x-ray, PET-CT scan. Diagnostic test activity is for all people referred for these tests, not just those ordered for suspicion of cancer. Other tests are known to be commonly used for the cancer sites of interest, but do not have routine data available. Estimates based on determining the number of suspected cancer cases referred through screening and urgent suspected cancer referrals in 2018 for the top 20 most common cancer sites in England. Screening and USCR are the only routes with known conversion rates, so only these routes to diagnosis have been included in the analysis as the number of people seen with suspected cancer through these routes can more accurately be estimated. To determine the number of suspected cancer cases in 2035, the number of suspected cancer cases through the routes of interest in 2018 were multiplied by the number of new cancer cases projected in 2035. The proportion of people with suspected cancer who undergo diagnostic tests was estimated with clinician input, and then applied to the number of suspected cancer cases in 2035 to estimate the number of key diagnostic tests required for cancer in 2035.



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