MACMILLAN.
CANCER SUPPORT

Shaping the future healthcare experience for people with cancer

January 2023

Contents

Executive summary

The last couple of years have been challenging for us all. The NHS is still grappling with the impact of the pandemic and is under severe pressure. But at the same time it has been inspiring to see how our country came together, and how people across healthcare innovated and rapidly transformed to continue to care.

The last years have showcased how quickly our world changes, and how resilience and optimism can be the foundation of future success. Cancer care now faces significant challenges, from demographic trends to capacity challenges, but we are optimistic and inspired by the rapid advancements in diagnostic technology, new precision medicines and innovative treatments revolutionising cancer care. Together we all can deliver a better healthcare experience in the future for all people with cancer.

We've only scratched the surface of what is possible for diagnostics and treatment innovations. With continued efforts, the next 10 to 15 years could completely transform health outcomes and benefit everyone in the UK.

New technologies promise to transform how we find and treat cancer with less invasive, targeted diagnostics and screening

Early diagnosis saves lives. New transformative technologies and advances in science are introducing cutting-edge screening methods (including increased adoption of liquid biopsies and at-home testing), genomic sequencing expansion, and advanced data and analytics. We are at the cusp of opportunity; supporting screening uptake and early diagnosis will improve outcomes. We must design local interventions for communities based on the barriers they experience and spread equitable care locally, regionally, and nationally across the UK. We believe innovative technologies will be transformational in the next 10-15 years for changing the cancer care experience, supporting the workforce and people living with cancer, as well as democratising access to services.

Scientific breakthroughs in genome sequencing, bioinformatics, cellular and genetic engineering will enable everyone to benefit from precision medicine

There is great optimism about tailored treatments as they become increasingly available in clinical practice, and many are on track to be licensed in the next decade. But there are still challenges in our healthcare system's capacity to adopt these innovations, and we need new funding models to deliver broader patient access. We need a workforce which is supported to deliver, including developing skills, new roles and continually evolving standards of care.

Every aspect of healthcare will be shaped by digital technologies and data

Our everyday lives have fundamentally changed over the last few decades due to the widespread adoption of new technology. Health is no different, and the use of data and digitalisation will transform three key areas: administration, clinical practice, and patient-facing communications. For healthcare professionals, digital tools will further automate routine tasks and optimise clinical time, transforming clinical practice. Likewise, people living with cancer will benefit from a personalised approach at scale, better communication, and improved outcomes and experience. The leap forward in adopting digital health by patients and healthcare professionals during COVID-19 highlighted its potential. However, sustaining and building on this will require significant shifts in interoperability, digital inclusion, improving data equity and quality, and supporting the navigation of digital technologies where needed while building public and patient confidence in data sharing.

ACTION AREAS

Delivering these innovations requires collaboration to implement new scientific and technological tools and broaden access to innovation through novel payment models, adequate funding, and a robust, integrated system. To see real change from scientific and technological innovation, the system and workforce's readiness to adopt needs to accelerate to match the pace of innovation.

To improve people's lived experience, person-centred care throughout a person's experience with cancer is not a 'nice to have', it's as essential tomorrow as it is today

A future vision for cancer care sees more people understanding their cancer risks and being aware of what behaviour changes can be adopted to better manage their risk

Digital adoption and increased access to genetic testing have created a doorway for people to learn and develop an understanding of their own cancer risk. This knowledge will accelerate as more people are impacted and live with cancer for longer, and genetic testing becomes more accessible. Education and awareness campaigns are foundational as new screening approaches become available (e.g., lung health checks and liquid biopsies). But there remain deep-rooted issues in accessing and understanding health information which negatively affect health equity. We must work with local groups across the UK through targeted educational interventions, particularly with seldom-heard populations, to increase people's awareness of risk and improve prevention.

Improving navigation across the cancer pathway will enable the delivery of person-centred care that is tailored to individual needs

No two people are the same; cancer pathways must be tailored to individual needs. Person-centred care improves the experience for the individual as they can co-create and tailor their journey based on their own circumstances and needs. Being able to navigate the cancer pathway is essential, particularly as treatments become more complex, the amount of available information keeps increasing, and numerous healthcare professionals become involved. This places significant pressure and stress on individuals and impacts outcomes and general well-being. People want to be seen as individuals with needs beyond their cancer diagnosis, and want to feel supported, empowered and in control where possible throughout their cancer, before, during, and after treatment. There must be a robust system in place so that with the right support everyone can benefit from taking control of their health care journey to ensure they too are properly supported.

As people live longer with cancer, a future vision relies upon ongoing support for people living with cancer during and beyond treatment

As an increasing number of people live with cancer alongside multiple conditions, the links between primary and secondary care will need strengthening to support communication, data sharing and ways of working across settings in the complex system. A new multidisciplinary approach where specialists apply knowledge from different disciplines in clusters (e.g., oncology and geriatrics) will enhance individuals' treatment. Support during and after treatment is often disconnected, so care needs to be not only multidisciplinary but also joined-up and cohesive, centred on a holistic approach. At end-of life, the narrative around death and dying need to be rewritten, and support needs to be put in place to enable culturally sensitive and open conversations about end of life to ensure it is considered and happens at the location of choice.

The future of cancer care relies on bringing care closer to home where possible, to improve convenience and experience

Providing more care closer to home will relieve many of the pressures people living with cancer experience daily and which impact their ability to recover and feel holistically supported. For those needing expert care from specialist centres, how and when people access this care can make a significant difference to their experience, as well as the level of follow-on support available closer to home. Today, those in remote areas are often left out of the equation, not receiving the support or quality of care they require, amplifying a lack of health equity across the nation. Diagnostic centres, home sampling, community pharmacists, at-home treatments, mobile care units, virtual wards, and digital healthcare, to name a few, will transform the cancer pathway in the next decade. This will not only improve the patient experience but also help free up capacity in secondary and tertiary care, with generalists being virtually supported by specialists to provide specialist care in the community. These shifts will require an increase in support from the generalist workforce in community settings.

ACTION AREAS

To ensure a personalised experience which is needs-based for the person living with cancer and their loved ones throughout the pathway, care must be coordinated and holistic, and adapted to needs that will change over time.

The healthcare workforce also needs to be supported with the skills and capacity to deliver person-centred care which will become even more important in the future as a result of evolutions in precision medicine, digitalisation, and provision of care closer to home.

> Today, those in remote areas are often left out of the equation, not receiving the support or quality of care they require, amplifying a lack of health equity across the nation.

Capacity and skills must be bolstered to meet future ambitions and manage system pressures

Healthcare staffing needs to be in place to meet rising demand so that people living with cancer receive the level of care that's right for them

Improving healthcare professionals' experience and the patient pathway is exceptionally challenging when demand outweighs capacity. With the increasing number of people living longer with cancer, professionals will be even more under pressure in future if capacity issues are not addressed. The need to do so is across roles, such as specialists, generalists, including GPs, nurses, and pharmacists, and across functions, such as diagnostics and enhancing the person-centric pathway.

The current model cannot be sustained indefinitely as healthcare staff are under pressure in a way that impacts their health and, in many cases, forces them to leave the health service. It will be vital to ensure recruitment, retention, and reinvention of the workforce. There needs to be a robust workforce strategy that is backed up with adequate funding, clinical supervision, and support. There also needs to be an understanding that healthcare roles are transforming and how we deliver care today is very different from how it will look in 10 to 15 years. As a result, role descriptions and the type of providers need to be reimagined to deliver the needs of future.

With the explosion of knowledge and therapeutic innovation, staff need to be supported and adequately upskilled to deliver increasingly complex future cancer care

Person-centred care requires collaboration between community, secondary and tertiary care, while developing an increasingly flexible workforce. With the revolution in treatment and technologies, healthcare professionals need to be supported in developing new knowledge and skills (e.g., the use of data or AI-powered decision-support tools, genetic counselling, and bioinformatics), and in integrating them into clinical practice, as well as putting in place the new roles.

Healthcare staff need to feel that they are progressing in their careers and have opportunities to develop personally and use their skills to feel fulfilled.
To accelerate the workforce transformation required, exceptional leadership is needed to break a vicious circle of high vacancy rates, pressure on existing staff, and low morale leading to high turnover of healthcare professionals. It also needs to lead the charge in reinventing ways of working and building a culture that enables care pathways and delivery models to evolve continuously and leverage scientific advances. The workforce of the future will need to be upskilled and be supported by digitalisation, funding and targets to break down siloes between specialists and generalists and support integrated person-centred care across all sectors and settings throughout the pathway.

ACTION AREAS

To create the workforce required for the future, new approaches to recruitment and retention will be critical. Reinvention of roles, skills, and new ways of working will also be key to close current gaps and address new care needs.

> Healthcare staff need to feel that they are progressing in their careers and have opportunities to develop personally and use their skills to feel fulfilled.

Cancer must remain a policy priority underpinned by strong collaboration between organisations, including the independent and voluntary sector

To improve quality of life, experience and outcomes, there needs to be a long-term commitment to funding for cancer and robust policies that recognise what matters most to people living with cancer

Cancer will remain a priority in policy but, in the context of a stretched healthcare system, funding needs to increase substantially to match the needs and complexity of cancer care. Policymakers need to work collaboratively with people with lived experience to measure and align policy to what matters most. There is a risk that policy neglects the wider needs of people living with cancer when the focus pivots towards treatment outcomes alone.

The role that independent and voluntary sector health organisations play will continue to increase and will require stronger collaboration across the system to deliver an integrated experience

The independent and voluntary sector already plays a significant role within cancer care, in addition to public NHS provision, and that role is expected to increase in the future – particularly within diagnostics, although currently independent sector provision is lower in the devolved nations. At the same time increased collaboration with other organisations across the health value chain, from academia, research, to life science and technology delivery, will increasingly shape health experiences. Some people are increasingly behaving as consumers to take charge of their own health, using health solutions provided by private companies, as well as the NHS. The last couple of years have also seen a surge in the percentage of private healthcare spend. There has also been an explosion in digital solutions including apps, and the availability of direct-to-consumer home-testing (e.g., genomics). The voluntary sector is also increasingly providing services to support people living through and beyond treatment. It will also continue to play a vital role in enabling and empowering people from all communities to have their voices heard.

To deliver a step change for the future, collaboration between organisations across the system needs to be stronger and deliver a joined-up experience for people living with cancer and other health conditions. Increased integration of services, enabled by data, across settings, whether delivered by public, private or the voluntary sector, will enable improved navigation of the cancer pathway.

ACTION AREAS

The future of cancer care is dependent on a long-term commitment to funding for cancer, driven by an ongoing momentum to prioritise cancer in policy. To deliver on the promise of data and digitalisation and enable an integrated experience, policymakers need to address concerns around trust and governance in data sharing.

As a foundation we must ensure that cancer care is accessible to all, addressing current and future barriers to health equity

Planning for the future must enable equity in access to the best care and outcomes possible. Despite improvements seen over the years in cancer treatment and outcomes, there are still major challenges to delivering health equity across the UK. There is a risk that these are exacerbated in coming years by the current economic outlook and as a potential result of implementing innovation inequitably. New health inequalities will arise in the future and can come from advances in technology and increased complexity in cancer care pathways and in health information (e.g., genomic risk). New types of digital exclusion are likely to be driven by barriers from the introduction of a 'digital first' health or user experience, rather than connectivity.

> Despite improvements seen over the years in cancer treatment and outcomes, there are still major challenges to delivering health equity across the UK.

Transforming care services for the future must ensure equitable access considering not only current root causes, but also those that might arise or be exacerbated in coming years. We need a targeted national ambition to provide inclusive and equitable access, activated locally by prioritising work with seldom heard community groups.

ACTION AREAS

To deliver health equity in cancer care, there is a need to identify and address both existing and new root causes, and ensure everyone benefits from access to screening, diagnostics, and improvements in experience, outcomes, and quality of life.

What needs to happen?

We recognise that we have been living through one of the most difficult periods in the UK healthcare system's history and the legacy of this period will be felt in health services for years to come. The current challenges mean it is now critical to identify the right opportunities and actions to drive forward our vision for the future of cancer care:

- Designing for the future to maximise the promise and benefits of innovations in science and technology and ensuring these can be delivered into care pathways (e.g., through the implementation of innovation boards and shared best practice groups).
- Placing person-centred care at the heart of cancer pathways – going beyond treatment and ensuring that people's holistic needs are supported is more important than ever
- Continuing to push for the investment required, and collaboration with independent and voluntary organisations as they play a greater role
- Addressing workforce challenges – including recruitment, retention, and reinvention of workforce models – especially for the increasingly critical role of generalists, through upskilling, attractive career pathways, education, and training to support different and new models of care
- Delivering health equity, through prevention and increased understanding of both existing and future health inequalities which may emerge as a result of the way care evolves in the future.

Our research has identified 12 factors across the treatment pathway and healthcare system that are shaping and changing the experience of people living with cancer. These will continue to evolve over the next 10-15 years.

Treatment Pathway

- People's understanding and awareness of cancer risks and symptoms
- Early diagnosis (including targeted screening)
- New and precision treatments
- Person centred care (including wellbeing)
- Living with and beyond cancer (including with multiple health conditions) and end of life care
- Location of care

System

- Health Equity
- Workforce availability
- Workforce skillset
- Data and digitalisation of healthcare
- Prioritisation of cancer in policy (including funding of cancer care)
- Collaboration between public, independent and voluntary sector healthcare organisations

We have set out a future ambition for these 12 factors

Treatment Pathway

There will be an **increased role for diagnostics, innovative care and treatment solutions in the community**, allowing specialist centres to increase capacity for novel therapies and complex cases, and reducing travel requirements

The majority of cancers will be diagnosed early due to a transformation and expansion of screening programmes, use of proactive targeting and innovative diagnostics.

Rising awareness of genetics and changing health attitudes means that the **general public is more aware of cancer risk factors and more likely to attend screening tests**.

New science and breakthroughs will allow **all cancers to be targeted using precision medicine**. People will live longer after treatment and have lower treatment toxicity.

Primary and secondary care will be **coordinated to provide support for both physical and mental health when living with and beyond cancer and at end of life**, supported by multidisciplinary ways of working.

A focus on person-centred care and the use of digital tools to access holistic care at scale will increase **equitable access to a personalised care experience**.

System

Improved use of digital solutions and secure data sharing across health and care settings and real time analytics will enable more timely treatment and personalised decisions for better predictions and better outcomes.

Health equity will be prioritised through public health solutions, to address social determinants of health. When designing cancer care, the health system will be on alert to tackle new health inequalities, enabling equitable access, experience and outcomes.

Cancer remains highly prioritised in policy, and policymakers will measure what matters to people living with cancer. As new innovative therapies and diagnostics come to market, the funding envelope will grow to match future needs.

Increased **recruitment, retention, and reinvention of roles will address shortages**, and meet the changing workforce needs.

Increased collaboration across workforce and care settings, support to develop **new skills, equip generalists with cancer competencies**.

There will be a greater role for the independent and Voluntary, Community and Social enterprise sectors, with **increased collaboration with the NHS to improve pathway navigation and provide a seamless experience**.

About this report

This report is a call to action to influence the future of cancer care across the UK. It is an opportunity to shape the conversation and drive the changes needed to respond to the evolving needs of people living with cancer, the avalanche of scientific and technological innovations which are expected, and the system challenges which are barriers to improvements in outcomes and experience.

Aims

- Establish the best possible care and experience for people living with cancer, both now and in the future.
- Put lived experience at the heart of our plans, when developing longer-term strategies for the healthcare system and workforce.
- Work with partners to deepen understanding and agree how to influence the best possible experience and outcomes for people living with cancer in the next 10-15 years.

Methodology

We have completed primary and secondary research on the current and future system challenges and new possibilities for the future, grounded the research in the experiences of people living with cancer, and consulted a wide group of professionals from across the UK health system and internationally.

This report is the culmination of a **comprehensive narrative literature review** of the existing body of evidence relating to the cancer pathway, **roundtable discussions,** and **interviews** with leaders from across the health system, representing views from policy, academia, NHS, private sector, innovators and clinicians.

In creating this report we used an inclusive and collaborative process through our networks of professionals in the field of cancer care and people with lived experience. This involved insightful **conversations with people living with cancer** and **workshops** with cancer professionals and industry experts in England, Scotland, Wales, and Northern Ireland to understand what the future can bring and what challenges need to be addressed.

To build an **evidence-based framework of 12 key factors** shaping the future of cancer care, we consulted with a wide variety of stakeholders across the UK cancer care ecosystem and identified the opportunities to deliver an ambitious view of what cancer care could look like in 2035.

In this report, we begin by contextualising cancer care in the UK and then share our ambition for 2035, grounded in the experience of people living with cancer. We identify 12 factors shaping the future of cancer care and describe how we see them interplaying within the complex healthcare ecosystem.

This report is about the future, but we cannot plan ahead and call for action to build a better future without recognising the challenges cancer care is facing today. We explore this in detail in the chapter, ‘Current challenges and what the future can bring’, followed by a collection of case examples. Key actions to transform the future of cancer care are highlighted but in our extensive research we have identified a more comprehensive list of actions which are grouped in the following chapter, ‘The actions required to make progress’. Finally, we end this report with a call to action which we hope will serve as a catalyst for the change needed to realise our ambition for a future with equitable access to a personalised cancer care experience, with improved outcomes that everyone can benefit from equally.

Reviewed existing body of evidence (June 2022 – January 2023)	**Gained input from people living with cancer (October – November 2022)**	**Gained input from cancer professionals and ecosystem experts (September – November 2022)**
• Cancer landscape assessment and pathway review • Reviewed data on trends impacting the cancer pathway • Roundtable discussions with cancer experts from Macmillan and Deloitte • Expert interviews, representing views from across the health system from policy and academia to NHS and clinicians	• Incorporated Macmillan's existing body of lived experience evidence • 2x workshops with 20 participants, drawn from Macmillan's Cancer Voices Community and the NI Cancer Panel	• 4 x workshops in England (27th Sep), Scotland (29th Sep), Wales (4th Oct) and Northern Ireland (10th Oct), with over 80 participants: – National / Industry bodies – NHS Hospitals & Universities – Clinicians from primary and secondary care – Private Sector, including: genomics, diagnostics, med tech, digital health, pharma, private providers – Professional Associations – Alliances, Policy and Charity Organisations • Consulted with Macmillan Advisory Groups: – AHP Advisory Group – UK Clinical Advisers – Volunteer Consultant Advisory Network • Other Groups – UK Lead Cancer Nurse Forum
Outputs		
• Evidenced based framework of key factors shaping the future of cancer care • Formed an ambitious view for how these factors could play out in 10-15 years	• Understand the current experiences of people living with cancer, and cross-cutting themes • Captured stories and insights from people living with cancer about 'what matters most'	• Validated and refined key factors • Discussed what is likely to happen in the future • Formed a view on actions required to deliver better outcomes and experience for people living with cancer in the future • Gathered good practice examples

Context

There is a huge amount of optimism about the progress that can be drawn from science, research, and technology across stakeholders in the UK health and life sciences ecosystem. At the same time there is strong alignment about the fundamental challenges that must be faced to deliver on the promise of this innovation given the demographic, economic, and healthcare context. We are at a turning point. The potential progress that can be achieved in the next 15 years is significant but requires planning ahead, acting now, and avoiding repeating past mistakes.

Why is this message important now?

Science, technology, and society are evolving rapidly, and the pace of change over the last 15 years has seen huge shifts. Improvements usually feel linear, but change driven by innovation is often exponential, and delivered in significant step changes. Looking back 15-20 years to the early 2000s places us in a world before transformational events such as Apple's launch of the iPhone and the arrival of Google maps.[1]

At the same time cancer care has also experienced huge leaps forward (**Figure 1**). Cancer treatments were once a blunt instrument. But throughout the 2010s targeted treatments became more widely available. Immunotherapies are now used for cancers which were previously not treated, and surgeries and radiation therapy have become more targeted to improve recovery. Recently new methods of diagnostics, identifying more types of cancer early, as well as new screening programmes, have become available. As a result, outcomes have improved substantially. For example over 10 years, between 2007-2009 and 2017-2019, breast cancer age standardised mortality has decreased by nearly 20 per cent.[2]

Figure 1. Changes in cancer care and wider society in 2007-2022

1990s
57 new drugs approved

- Introduction of targeted chemotherapy
- Mortality rate starts to decline despite aging population

2000s
57 new drugs approved

- **2003:** Tomotherapy system developed using CT-guided intensity-modulated radiation therapy
- **2008:** HPV vaccine offered to girls aged 12-13 at schools across UK

2010s
143 new drugs approved

- **2011:** Immunotherapy drug ipilimumab approved in UK for melanoma, followed by pembrolizumab and nivolumab in 2015
- **2016:** Minimally invasive and robotic surgery
- **2018:** CAR-T therapy approved in UK
- **2018:** UK's first proton beam centre opened
- **2019:** Histology independent treatments

2020-2022
76 new drugs approved

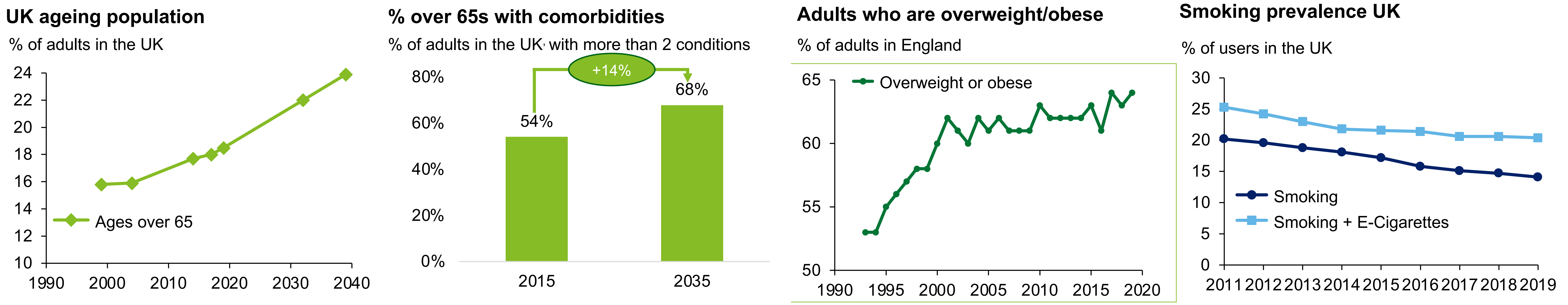
- **2020:** International Pan-Cancer analysis of whole genomes – analysed 2,600 whole genomes from 38 cancer types
- **2021:** record number of drugs approved for cancer (30)
- **2021:** Liquid biopsy – cfDNA under trial for clinical use in UK
- **2022:** National Screening Committee recommends targeted lung cancer screening is made available across the UK

Source: Deloitte Analysis; Memorial Sloan Kettering Cancer Centre – A decade of progress in cancer care[3], Assessment of the evolution of cancer therapies[4]

While we have come a very long way, the NHS in 2022 is exceptionally challenged by shifts in the demographic and healthcare context. The UK's population is ageing (Figure 2) and growing. In the future more people will be living longer, resulting in increased cancer prevalence and a higher number of people living with multiple health conditions. Not all cancers are preventable, but modifiable lifestyle factors such as obesity and a stagnation in the reduction in smoking are negative influences behind this trend (Figure 2). At the same time other changes such as greater HPV vaccination and the higher rate of PSA testing will have a positive impact.[5]

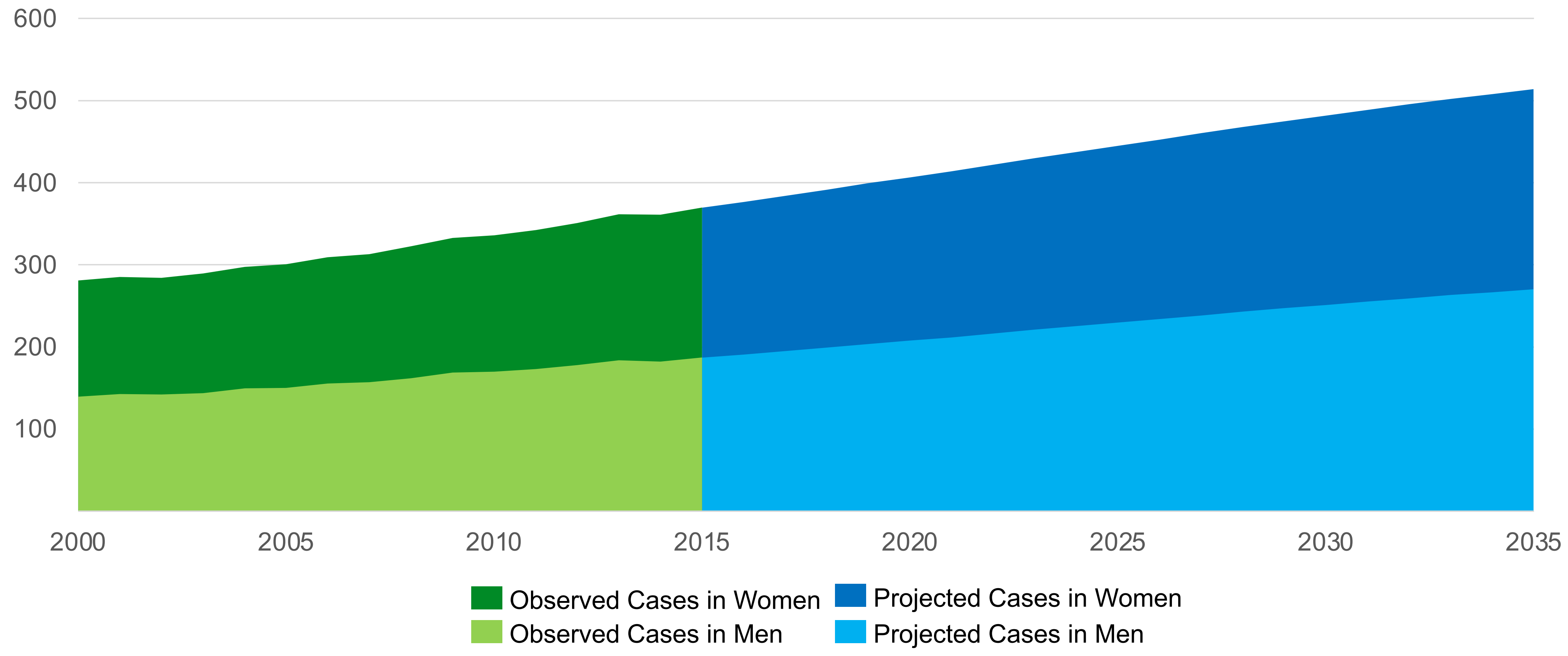
Improvements in the detection of cancer and treatments lead to people living longer with cancer, adding to cancer prevalence. The characteristics of the population living with cancer will also change – more people will live with cancer and multi-morbidities (**Figure 2**, **Figure 3**), and the proportion of those people who have treatable but not curable cancer will change depending on the balance between early diagnosis or new treatments that prevent cancer progressing to late stage and allow people to live with treatable but incurable cancer longer.[6]

Figure 2. Trends in risk factors driving cancer prevalence – ageing population, comorbidities, smoking and obesity rates



Source: Deloitte Analysis; 1 – Overview of the UK Population (ONS)[7,8,9]; 2 – NIHR, Multimorbidity 20-year predictions[10]; 3 – Obesity profile (England only data)– Weight, NHS Digital (2019)[11], 4 – ONS data GOV UK (2020)[12]

Figure 3. Incidence ('000) of all cancer types for males and females in the UK, projected to 2035

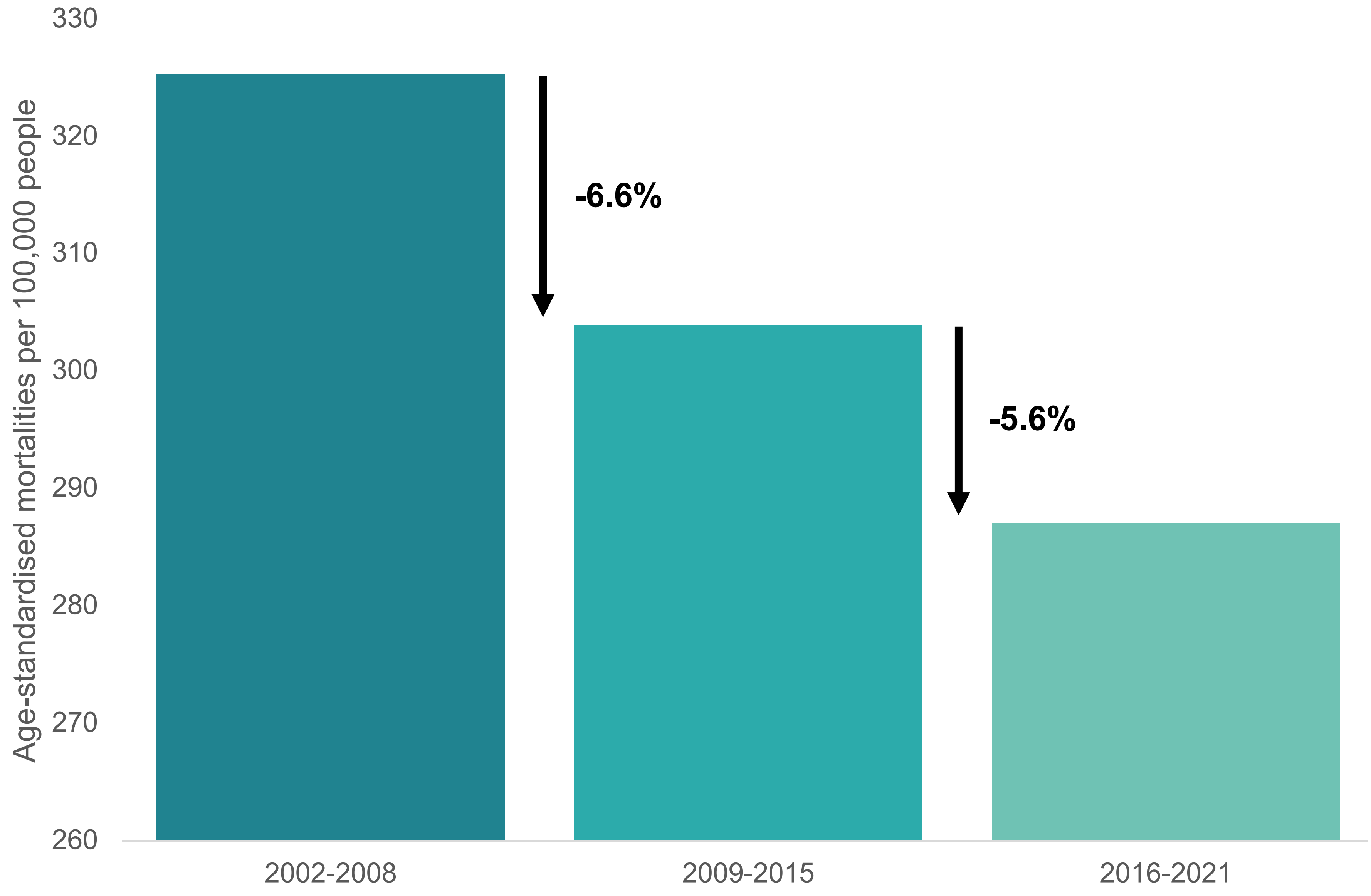


Source: Cancer Research UK Projected and Observed Cancer Cases (2015)[13]

We have seen a significant and consistent decrease in mortality rates for all cancers combined over the past two decades across the UK (**Figure 4**), mainly due to major improvements in cancer treatments and care. There is hope for a future with continued drops in cancer mortality, but equally as important is the experience people with cancer have throughout their treatment and beyond.

Results from a survey run by Picker Institute Europe between 2015 and 2018 show an overall average of a 1.8 per cent increase in patients' scoring of their experience of cancer treatment, with a larger improvement in areas like information around financial help and other benefits, discussions of clinical research options, and being given enough privacy to discuss the condition or treatment (**Figure 5**). In 2018, the highest experience scores were given to things like the cancer specialist having the right medical documentation, being given all the necessary information about their surgery and tests, the GP being given sufficient information about their patient's condition and treatment from the hospital, and receiving a point of contact to address worries after leaving the hospital (**Figure 6**). On the other hand the poorest scores were given to having someone to talk to about worries during the hospital visit, being given enough support during and after treatment, receiving a care plan, and being asked if they wish to take part in cancer research (**Figure 6**).

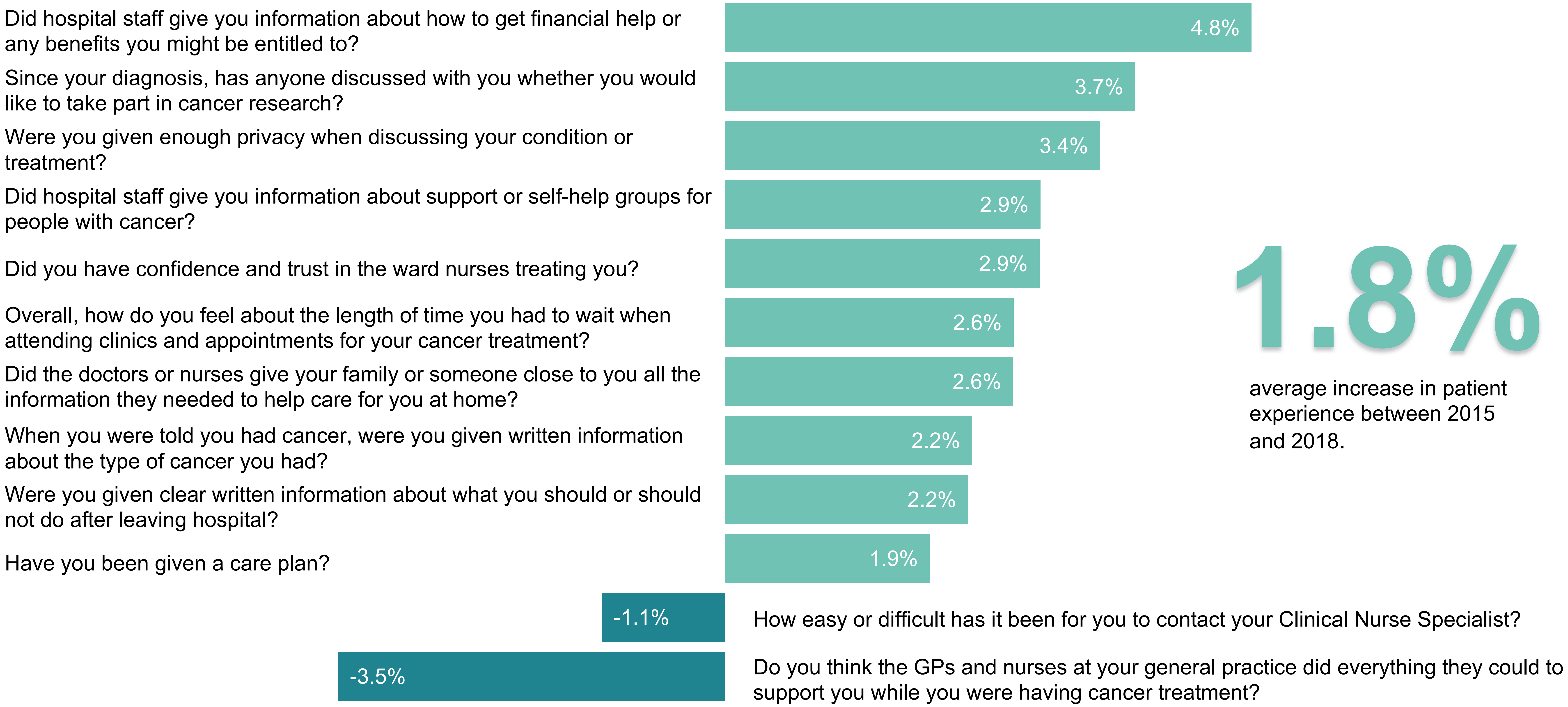
Figure 4 . Age-standardised cancer mortality rate in UK nations since 2002.



Source: Deloitte Analysis; Northern Ireland – Northern Ireland Cancer Registry[14]; Wales – Welsh Cancer Intelligence and Surveillance Unit[15]; Scotland – Public Health Scotland[16]; England – CancerData[17]

> There is hope for a future with continued drops in cancer mortality, but equally as important is the experience people with cancer have throughout their treatment and beyond.

Figure 5. Changes in patient experience between 2015 and 2018 – Picker Institute Europe survey.

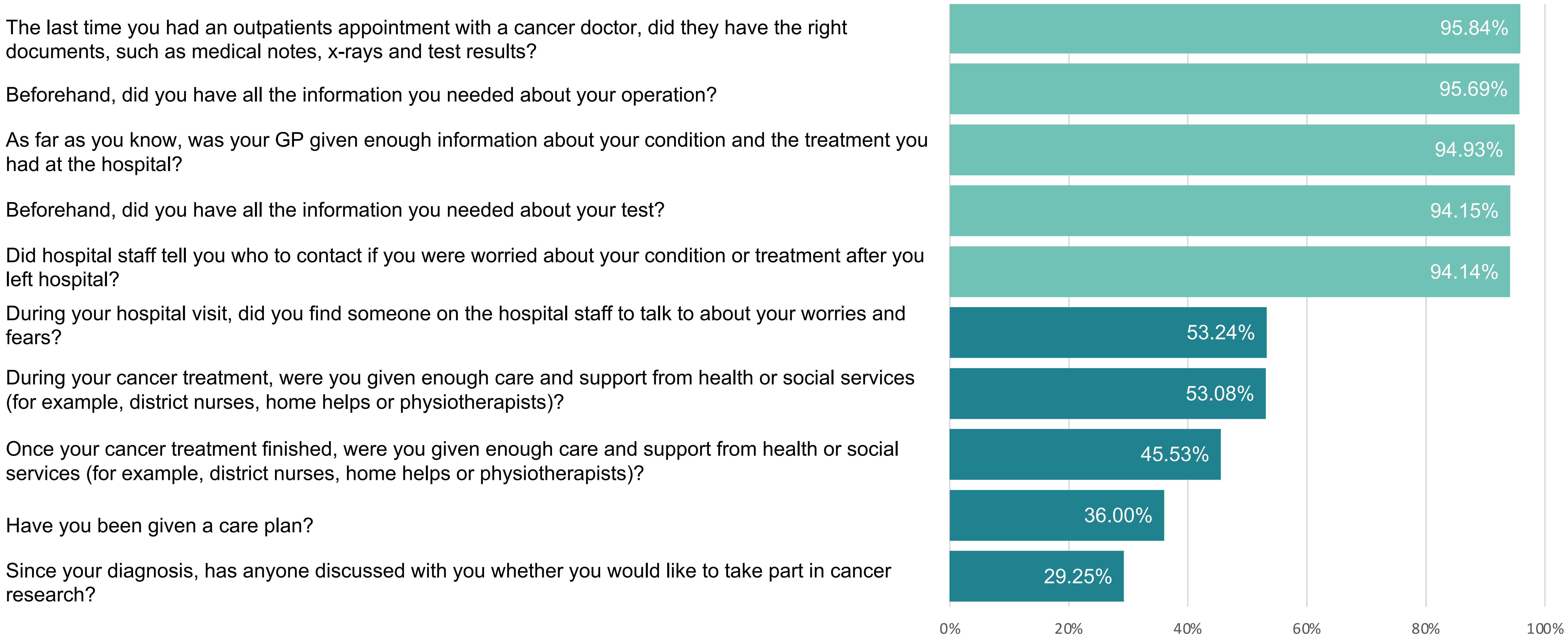


1.8%

average increase in patient experience between 2015 and 2018.

Source: National Cancer patient experience survey[18]

Figure 6. Highest and lowest scores of patient experience in 2018 – Picker Institute Europe survey.

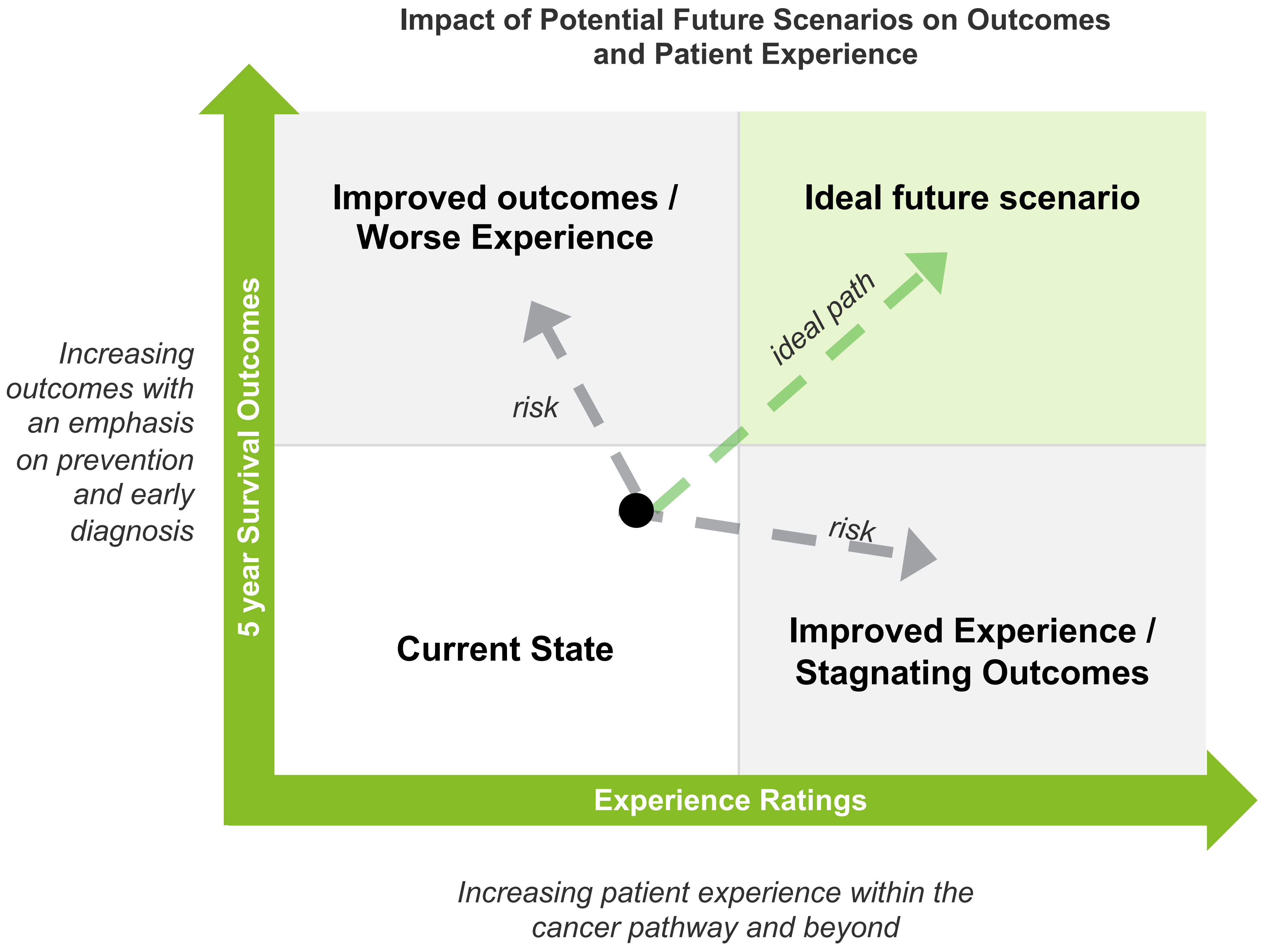


Source: National Cancer patient experience survey[19]

Following the pandemic we are in a unique political, social, and economic moment. Societal shifts, including an increasingly diverse UK population, equity gaps – including those between the bottom quartiles of deprivation, and between regions – will contribute to the need to change the way cancer care is delivered.[20] There are also fundamental challenges ahead from a rising cost of living, pressure on the health system and global challenges to our climate and peace. This pressure means there is a real risk that the benefits we have seen from progress in cancer outcomes may not translate into improved experience, and that these outcomes will not be delivered equitably to all people living with cancer (**Figure 7**).

> There are also fundamental challenges ahead from a rising cost of living, pressure on the health system and global challenges to our climate and peace.

Figure 7. Trajectory for cancer outcomes and experience



Key

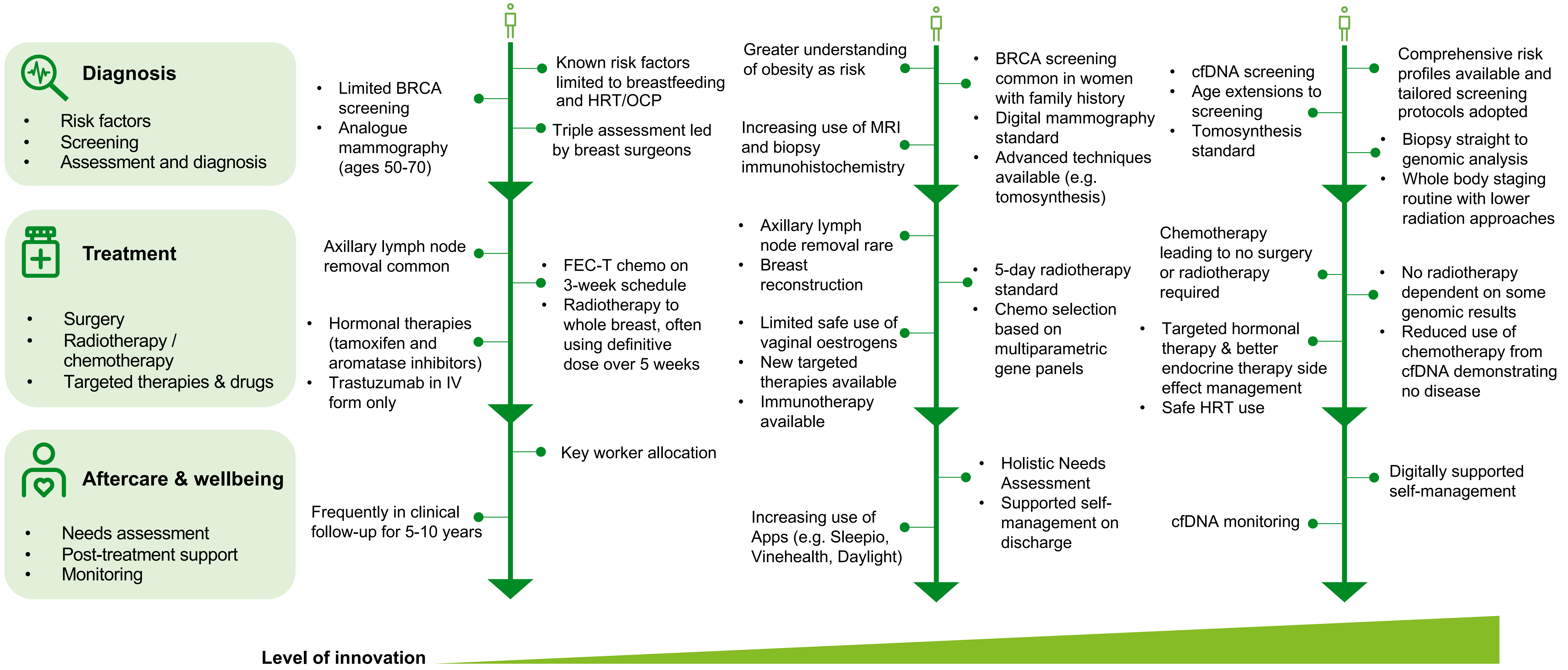
Ideal future scenario	Improvements seen in person centred care, as a result of an integrated care system, prioritisation of cancer and reimbursement schemes. Improved access, better treatments and diagnostics are available for all patients, improving survival and experiences of PLWC
Improved outcomes / Worse Experience	Survival increases due to availability and access of precision medicine and novel therapies, however, access to location of care and fragmented person-centred care could worsen experiences of PLWC
Improved Experience / Stagnating Outcomes	Survival worsens as budgets are deprioritised, and diagnostic access and new therapies have slow uptake. Experience however improves, as those that are undergoing cancer care receive better holistic wellbeing support.
Current State	In recent years cancer survival has been improving. However, survival from 2013-2018 was approximately 50%* and still needs significant growth.[1] While experience was ranked at 8.7/10, which demonstrates a promising satisfaction but this still needs to improve significantly.[2]

Source: Deloitte Analysis; 1 – Cancer survival in England: adult, stage at diagnosis and childhood – patients followed up to 2018; 2 – National Cancer Patient Survey (2020).

Despite these risks, we have great reasons to believe the future of cancer care can be brighter, both for outcomes and experience. Sometimes it is difficult to grasp how much things can change in the span of 15 years but looking to the past demonstrates how much can be changed (for the better) in that timeframe. **Figure 8** shows how much the typical breast cancer patient journey has changed from 2007 to today, and some of the developments expected by 2035.

> Sometimes it is difficult to grasp how much things can change in the span of 15 years but looking to the past demonstrates how much can be changed (for the better) in that timeframe.

Figure 8. Patient journey over the years – breast cancer example.



Diagnosis

- Risk factors
- Screening
- Assessment and diagnosis

- Limited BRCA screening
- Analogue mammography (ages 50-70)

Known risk factors limited to breastfeeding and HRT/OCP

Triple assessment led by breast surgeons

Greater understanding of obesity as risk

Increasing use of MRI and biopsy immunohistochemistry

- BRCA screening common in women with family history
- Digital mammography standard
- Advanced techniques available (e.g. tomosynthesis)

- cfDNA screening
- Age extensions to screening
- Tomosynthesis standard

Comprehensive risk profiles available and tailored screening protocols adopted

- Biopsy straight to genomic analysis
- Whole body staging routine with lower radiation approaches

Treatment

- Surgery
- Radiotherapy / chemotherapy
- Targeted therapies & drugs

Axillary lymph node removal common

- Hormonal therapies (tamoxifen and aromatase inhibitors)
- Trastuzumab in IV form only

- FEC-T chemo on 3-week schedule
- Radiotherapy to whole breast, often using definitive dose over 5 weeks

- Axillary lymph node removal rare
- Breast reconstruction

- Limited safe use of vaginal oestrogens
- New targeted therapies available
- Immunotherapy available

- 5-day radiotherapy standard
- Chemo selection based on multiparametric gene panels

Chemotherapy leading to no surgery or radiotherapy required

- Targeted hormonal therapy & better endocrine therapy side effect management
- Safe HRT use

- No radiotherapy dependent on some genomic results
- Reduced use of chemotherapy from cfDNA demonstrating no disease

Aftercare & wellbeing

- Needs assessment
- Post-treatment support
- Monitoring

Frequently in clinical follow-up for 5-10 years

Key worker allocation

Increasing use of Apps (e.g. Sleepio, Vinehealth, Daylight)

- Holistic Needs Assessment
- Supported self-management on discharge

cfDNA monitoring

Digitally supported self-management

Level of innovation

Source: Macmillan analysis.

What is the health system context?

The great potential of expected innovations gives rise to what would need to change for this potential to be realised. Our ambition for people living with cancer in 2035 focuses on this change and the action required and is realistically ambitious.

We recognise there are different contexts for cancer care across the UK, which has four distinct health systems for England, Wales, Scotland, and Northern Ireland.

This report provides a consolidated UK view and draws out nuances for each nation's healthcare system as we address the factors which are key to shaping the future of cancer care.

Health System Context – England

Health System Structure – England's healthcare system is highly centralised around the setting of national priorities and policymaking particularly for cancer care. The NHS's direction is set by planning guidance that is issued annually.[21] National 2022 reforms have devolved operational running of healthcare to 42 Integrated Care Systems (ICSs), responsible for planning, commissioning, and delivering local services – including workforce planning, primary care, and end of life care. They are expected to work closely with 21 Cancer Alliances, which oversee cancer care for their geographic areas. Government guidance has indicated that specialised commissioning will also be devolved to ICSs, giving them control over commissioning of radiotherapy and chemotherapy, though NHS England will retain a key role (this handover is expected to be delayed until 2024). National Arm's Length Bodies take responsibility for setting standards and overseeing the NHS. They include NHS Digital and Health Education England (workforce training) – both of which will merge into NHS England from April 2023 – the Care Quality Commission (independent regulator), National Centre for Health and Care Excellence (evidence-based healthcare recommendations) and the Health Security Agency (public health).

Cancer strategy – Cancer is overseen by the NHSE Cancer Programme, led by the National Director for Cancer. The cancer policy priorities are set out in the 10-year NHS Long Term Plan (2019) – including a new faster diagnosis standard and personalised care for people diagnosed with cancer. However, the pandemic severely derailed a number of these priorities. In 2022, the Government announced its intention to publish a new 10-year Plan for cancer services. Macmillan submitted a response to the Call for Evidence.[22] Subsequent political changes and the NHS crisis have put this work on hold. A national workforce strategy has been developed by NHSE and is expected to be published early this year.

Key challenges – The pandemic has added to pressures facing England's cancer services, creating a backlog of people for tests and treatment – the number of people starting treatment is still almost 21,000 lower than expected. There are workforce shortages today that are predicted to worsen in the future (Macmillan's modelling shows that by 2030 we will be short of over 3,300 roles just for specialist cancer nursing, not including thousands of other professionals).[23] Patients can face long waits for diagnostics and treatment. For example, 2022 data (up to Oct 2022) shows more than 18,679 patients with an urgent referral for suspected cancer waited at least 104 days for treatment.[24]

Health System Context – Scotland

Health System Structure – Scotland has devolved powers for health and social care which means there is significant policy divergence from other UK nations. Integrated health and social care is well established, with delivery of personalised care remaining a key strategic priority within the Scottish Government's partnership with Macmillan, called Transforming Cancer Care (TCC). This partnership involves scale and spread of the 'Improving the Cancer Journey' (ICJ) model across the whole of Scotland, with social care being a key partner organisation to deliver this service.

NHS Scotland has 14 Health Board areas and 31 Health & Social Care Partnerships (HSCPs) which work together to plan and deliver health and social care services through an integration model (reporting to Integration Joint Boards – IJBs). There are three Network areas and five cancer centres across the country.

Cancer Strategy – A new 10-year cancer strategy will be published in Spring 2023, which is expected to focus on stabilising, reforming, and transforming cancer services. The strategy will be inter-dependent with existing digital and workforce strategies and will be rooted in the principles of Realistic Medicine.

Key priorities are expected to include Acute Oncology, Prehabilitation, delivery of a Single Point of Contact and spread of Rapid Cancer Diagnostic Services. A new genomics strategy is also expected to be published.

Organisations key to delivery of the strategy will include the Centre for Sustainable Delivery (CfSD) which will lead on establishing new and more sustainable delivery of services, including uptake of innovation. In addition, the newly formed Scottish Cancer Network will drive improvements in clinical management pathways ensuring a 'Once for Scotland' approach. The existing Scottish Primary Care Cancer Group (SPCCG) will be key to supporting implementation of the strategy within primary care, especially with regard to reducing variation in care and promoting education of the generalist workforce. It is also important to note that there is the development of a new innovation scheme (ANIA – Accelerated National Innovation Adoption) to help fast track the adoption of technological innovations across NHS Scotland. The 2021 Digital Healthcare Strategy will remain a key driver accelerating uptake of digital developments, building on digital advances seen throughout the pandemic. There remains limited private sector provision of specialist cancer services in Scotland, with the NHS Golden Jubilee Hospital the key organisation involved in helping to address the cancer backlog. Innovations seen in other parts of the UK, such as community diagnostic hubs, do not have the same presence or level of maturity.

Key challenges – Scotland is three fifths the size of England and has large remote and rural areas with poor road networks and accessibility. This presents a significant challenge for workforce recruitment in some of the more rural areas of the country. Key challenges within Scotland are levels of financial stress and deprivation, as well as access to services for those living in remote and rural areas. This is especially true of island populations which often have to travel to the mainland for cancer services.

Health System Context – Wales

Health System Structure – NHS Wales governs health care provision through the Senedd Cymru, seven local health boards (responsible for planning and delivering NHS services in their geographical area) and three NHS trusts (which cover public health, ambulance services and a specialist cancer centre in Cardiff). Local health boards are responsible for the planning and delivery of cancer services in line with professional standards. They are directed, supported, and enabled to deliver improved services by the NHS Executive function, discharged through the Wales Cancer Network Board.

Cancer Strategy – Quality Statements were introduced in Wales through A Healthier Wales and are the next level of national planning for specific clinical services, integral to the future planning and accountability arrangements for NHS Wales. The Cancer Quality Statement builds on the work of the 2012 and 2016 Cancer Delivery Plans. The Welsh Government is expected to publish a Wales Cancer Services Action Plan in January 2023, owned and led by the NHS in Wales.

Key challenges – Wales has a relatively small population of 3.1 million and a distinctive bilingual culture but faces higher levels of deprivation and rurality and an older and ageing population. In December 2022 the Welsh Government published its draft budget. In the current economic climate the budget is challenging. in the history of devolution. With limited tax raising powers at its disposal the Welsh Government has made clear that without additional funding from the UK Treasury the situation in Wales will remain difficult, implying a pessimistic backdrop for future investment in cancer care.

There are no district general hospitals in Powys and people need to travel out of county and across the border to England for cancer care and treatment. The overarching strategic ambition of the Powys Macmillan ICJ is to make sure everyone living with cancer gets the support they need and are empowered to self-manage their identified needs, where appropriate, with support close to home in local communities.

Health System Context – Northern Ireland

Health System Structure – Northern Ireland's Department of Health is part of the Northern Ireland Executive and has overall responsibility for health and social care services. The Department of Health does this through the Public Health Agency, five Health and Social Care trusts – organised by geography, which are the main providers responsible for the delivery of primary, secondary and community health care to the public (each controlling its own services, budget, and staff), as well as an Ambulance Trust covering the whole of Northern Ireland and other healthcare professional and policy groups.[25]

Cancer Strategy – The highly anticipated Cancer Strategy for Northern Ireland 2022-2032 was published in 2022, listing 60 comprehensive actions covering everything from workforce, personalised care and addressing inequalities. It is a roadmap for creating impactful change for people living with cancer and Macmillan will continue to press for the actions to be comprehensively implemented and the necessary funding ring-fenced to create significant improvements.

Key Challenges – Northern Ireland faces unique factors, including its geography, population and political situation. As a relatively small nation, with large pockets of rurality, Northern Ireland does not have capacity for extremely specialist cancer treatment, which can result in healthcare being sought in other parts of the UK and Ireland, including cross-border cooperation for certain treatments. This not only adds an extra layer of stress and cost to people living with cancer but also dictates that certain contractual arrangements are in place to support this need between jurisdictions.

Instability in government is a major challenge. Long periods of shutdown of the NI Assembly lead to poor governance, which ultimately impacts health and social care. Many reports have been published, most significantly the 2016 "Systems, not Structures", which clearly lay out the impact of a lack of reform. Currently pockets of change are happening, but systematic reform has been hampered.

If this continues it will have major implications for cancer strategy in Northern Ireland and for attempts to implement broader change across the whole system.

Conclusions

More broadly, for the UK, we take optimism from how rapidly science and technology have advanced and how far cancer care has come in the last 15 years, as illustrated above.

Despite the risks and challenges both within the healthcare system and more widely, healthcare professionals have shown tremendous resilience and adaptability in tackling challenges and engaging with people living with cancer.

Our ambition for 2035 is that cancer care will advance further in the coming decade as economies of scale, new ways of working and accessibility improve. The challenge for us is to focus, plan effectively and act today to achieve this vision for the future. This means across each of the four systems there is an imperative for more funding and more staff (which transcends all the other factors discussed later in this report).

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Our ambition for cancer care in 2035

Our ambition for 2035 expresses our vision for people living with cancer, focusing on overall quality of life, experience of cancer care, and clinical outcomes. It is grounded in evidence from lived experience and shaped by the discussions we have had with people with cancer during the research for this project.

We believe our ambition statements for people living with cancer will remain as true in the future as they are today. However, the healthcare systems, clinical practices and technologies shaping how they are achieved must change significantly. In the following sections we explore what each of these ambition statements will mean for people with cancer by 2035.

Across all these ambitions, achieving equity in quality of life, experience and outcomes is critical. When the ambitions are broad the risk is that they can mask inequalities. We need to go beyond the aims of current ambitions to ensure that everyone can benefit.

> We believe our ambition statements for people living with cancer will remain as true in the future as they are today.

Our ambition for overall quality of life

People with cancer live their life to the fullest before, during and after treatment. What matters to them – and their loved ones – is prioritised, and they know what choices they have to meet their physical, emotional, practical, and financial needs.

People...	This means, in 2035...
... live their life to the fullest	• People living with cancer are not defined by their diagnosis or the other health conditions they are living with and are supported to keep doing the things that make them 'feel like me'. • People's quality of life is measured by what matters to them, but also in a consistent and standardised way.
... have what matters to them – and their loved ones – prioritised, and care is delivered equitably	• People living with cancer are all treated as individuals and given tailored options which are right for them. • Personalised cancer care is prioritised for all people equitably. • When a person living with cancer so wishes, the people that matter to them are involved in their care and provided with targeted support if needed. • Healthcare professionals across settings are able to access and act on information about the person's priorities quickly and easily.
... understand the choices available to meet their physical, emotional, practical, and financial needs	• People living with cancer participate in shared decision-making about their cancer care, supported by honest, open communication. • Holistic support is provided which addresses people's greatest needs (e.g., anxiety, depression, fatigue, pain, financial challenges, practical support, support for loved ones) as part of their care.

Our ambition for experience of cancer care

People with cancer are provided with clear information about their condition and options for their cancer care and can navigate and have visibility on all aspects of their care experience. Care is delivered wherever possible in locations that are more convenient to them, and digital tools are used to their benefit and to enhance access to care.

People...	This means, in 2035...
... can easily and efficiently navigate their cancer care	• Strong coordination and communication across all healthcare teams involved in care in different settings. • People living with cancer are supported to navigate an increasingly complex health system, including care provided by independent and voluntary sector organisations. • People living with cancer are well supported to navigate the wider system (beyond healthcare), to help address financial and employment challenges.
... receive clear up-to-date information and communication, so they know their options and what choices they can make about their cancer care	• Clear information from trusted sources is delivered in a format and language that is easy to understand via a channel that works for each individual (e.g., face-to-face / virtual, paper / digital). • Healthcare professionals are supported to maintain up-to-date knowledge e.g., on genomic risk and new treatment options. • Healthcare professionals have the appropriate time, space, and environment to conduct difficult and sensitive discussions with people with cancer.
... are enabled by technology to have better care	• Continued investment in new digital tools support healthcare professionals to focus on clinical care, reducing administrative burdens, and to connect virtually with other healthcare teams involved in the person's care. • People are supported to use digital tools and technologies alongside face-to-face interactions to manage and personalise their care in a way that works for them.
... can access care in locations that are convenient to them	• Diagnostics and care are delivered closer to home wherever possible, enabled by close working with specialist centres. • People still need to travel to highly specialised centres for cancer care, but there is support with hospital transport or accommodation for those who need it.

Our ambition for clinical outcomes

People with cancer have the right support to understand their cancer risk, equitable access to faster diagnostics, and to treatment and care that is tailored to them.

People...	This means, in 2035...
... have the right support to understand and manage their risk to help prevent cancer, where possible	• People have a better understanding of cancer risk and are supported to manage those risks through increased awareness and educational campaigns and targeted interventions, particularly communities with lower awareness. • Increased uptake of existing and new screening programmes, including by people who are not genetically at risk. • Increased availability and specificity of genetic testing enables more tailored identification and management of people's cancer risk.
... have equitable access to quick & accurate diagnostics	• More cancers are diagnosed earlier and more rapidly, leading to better outcomes because of faster and more accurate diagnostics, including implementation of cell-free DNA blood tests for cancer (liquid biopsies), and rapid access to community diagnostics. • More personalised support to enable equitable access to diagnosis.
... have equitable access to precision treatment and care that improve their outcomes and quality of life	• Improved overall survival and progression-free survival, particularly for cancers or groups of people with poor outcomes today, to improve health equity. • Broad and equitable access to novel treatments and precision medicine across UK regions, which delivers both outcomes and quality of life. • Reduced inequalities in access to treatment and care, as a result of targeted initiatives co-designed with local communities.
...are supported during and beyond treatment to better understand and manage side effects and know what signs and symptoms to look out for should their cancer recur	• Ongoing support (including counselling, mental health, and well-being services) for people (and their loved ones) to live well after treatment for cancer, for reassurance if needed, increased communication about signs and symptoms of progression or recurrence, and confidence they will have rapid access to specialist care if they need it. • Greater care and support for people with cancer and other health conditions, multiple remissions/recurrence, or new forms of cancer, as the nature of living with cancer changes in the future. • When needed, end of life care focuses on ensuring the wishes of the individual are met and there are more open conversations to help those close to them in supporting those decisions.

Key factors shaping the future of cancer care

Through our research we have identified 12 factors that are shaping the experience of people living with cancer. They will continue to evolve over time and will be integral to achieving the potential future for cancer care in 2035. Whilst we consider each factor separately, there is significant intersectionality between them and therefore they cannot be looked at in isolation.

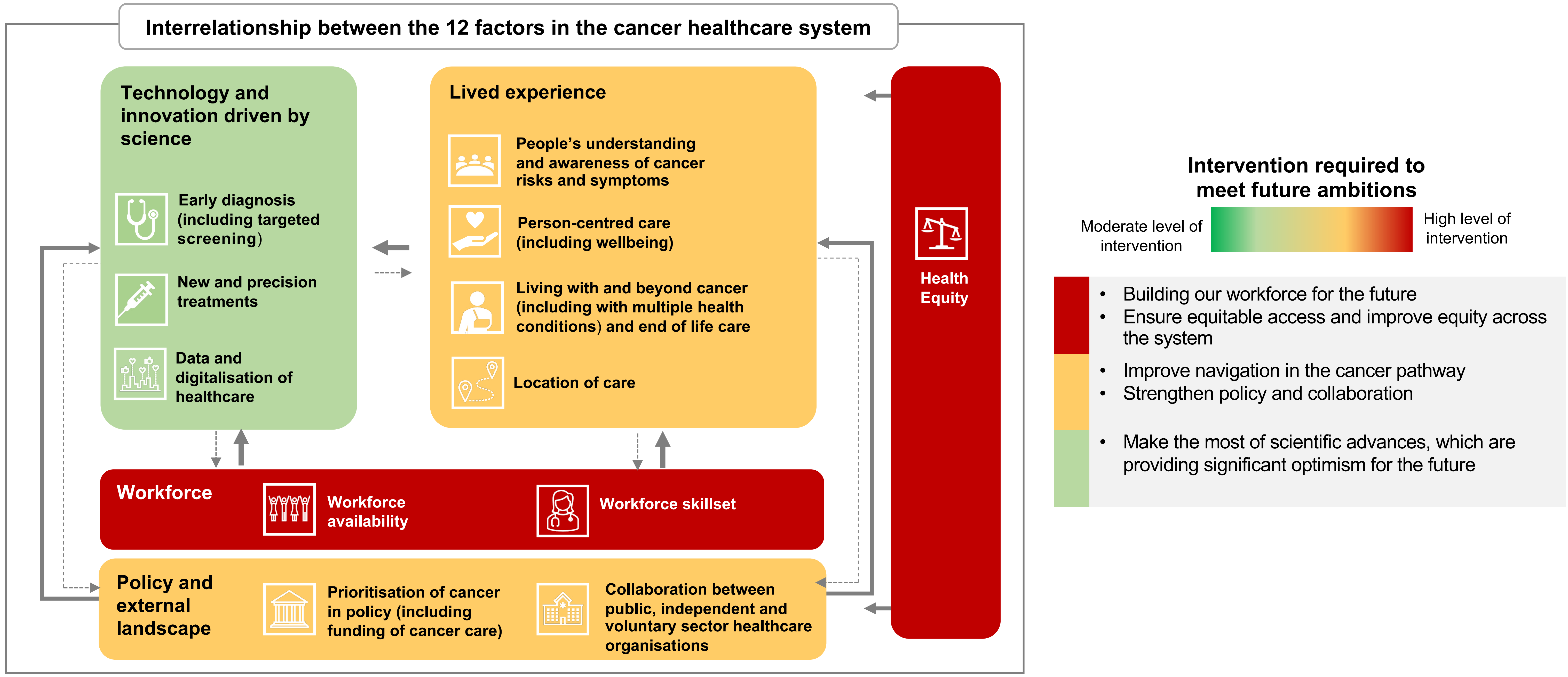
The 12 factors are drawn from the cancer pathway and the health system which surrounds it:

- **Across the pathway:** People's understanding and awareness of cancer risks and symptoms, early diagnosis (including targeted screening), new and precision treatment, person-centred care (including well-being), living with and beyond cancer (including with multiple health conditions) and end of life care, and health equity.
- **Across the health system:** Location of care, workforce availability, workforce skillset, data and digitalisation of healthcare, prioritisation of cancer in policy (including funding of cancer care), and collaboration between public, independent and voluntary sector healthcare organisations.

The interplay between the 12 factors is complex and the level of intervention required to meet the future desired state varies considerably. We have represented these factors in five categories (listed below) and three different 'levels of intervention', from dark orange, medium orange and green, to indicate the level of intervention required to realise the vision for the future of cancer care, from moderate to high (**Figure 9**).

It is important to note that all these factors are connected and feed in both directions.

Figure 9. A systems view of the interrelationship between the 12 factors affecting the cancer pathway and the level of intervention required to reach the future state.



Source: Deloitte analysis.

Technology and innovation driven by science

Factors which are anticipated to benefit from significant innovations driven by science and technology if the healthcare system harnesses their potential.

- **Early diagnosis (including targeted screening).** The role of early diagnosis, risk stratification, and screening e.g., self-testing, genetic sequencing, liquid biopsies, and artificial intelligence (AI) algorithms for imaging and risk detection.
- **New and precision treatments.** New approaches to treatments which are tailored to the person and their disease to increase effectiveness and reduce side effects, including precision immunotherapy, such as cell and gene therapies, as well as cancer vaccines.
- **Data and digitalisation of healthcare.** Using linked data and technology to enable the integration of healthcare, support clinical decision-making, and support the well-being of people with cancer. This would include the use of a robust and interoperable IT system that leverages multiple technology platforms, including advanced technologies such as AI and machine learning (ML), underpinned by transparency as a core element of data protection and secure data sharing.

Lived experience

Factors affecting the experience and outcomes for people living with cancer across the pathway.

- **People's understanding and awareness of cancer risks and symptoms.** The degree to which the population is engaged in managing their own health, aware of health promoting behaviours (including awareness of screening) and have the required health literacy to appropriately seek help or to participate in making shared decisions around new investigations, treatments, or innovations.
- **Person-centred care (including well-being).** The seamless coordination of support across organisations and throughout personalised care pathways from diagnosis through treatment to impact positively on the well-being of people with cancer.
- **Living with and beyond cancer (including with multiple health conditions) and end of life care.** The holistic care of people during and after cancer treatment, who might be living with other long-term conditions; this could also include palliative and end of life care.
- **Location of care.** The location of the provision of services, e.g., whether in primary, community, secondary and/or tertiary care, as well as the effect that a person's location has on their ability to access care. This includes how different models can be used to deliver care across locations and overcome barriers.

Workforce

To deliver for the future, the system will need both capacity and relevant knowledge and skills needed to embed the innovations which are anticipated across the pathway.

- **Workforce availability.** The number, capacity, and distribution of workforce throughout the healthcare system and across settings, including primary and community care, where generalist roles may in future have an increased role in supporting people living with cancer. Also including maintaining levels of recruitment and retention and securing sufficient personnel for new roles.
- **Workforce skillset.** A healthcare workforce that is capable and empowered to work collaboratively within multi-disciplinary teams and across settings. A workforce that has the required skill sets to work differently, adapting to and embracing new technologies, treatments, and ways of working.

Policy and external landscape

Factors relevant to priority and funding of cancer in policy, as well as responding to shifts expected in the way public, independent, and voluntary sectors work together.

- **Prioritisation of cancer in policy (including funding of cancer care).** The extent to which cancer care is seen as a priority by the NHS and UK governments and which outcomes are favoured as a marker of good quality care. This includes new or novel funding models which support new ways of working, research, and innovation, including new treatments.
- **Collaboration between public, independent and voluntary sector healthcare organisations.** The role played by collaboration between public, independent, and voluntary sector organisations, both delivering and enabling the delivery of healthcare across the end-to-end cancer pathway.

Health equity

Health equity forms a spine that runs across the whole system and impacts outcomes and experience of people living with cancer.

- **Health equity.** Recognition that systematic difference in outcomes and barriers to accessing support exist between different groups, requiring tailored interventions to promote equity of access, outcomes, and benefit from new models of healthcare delivery including digital health.

In the following chapters we will explore the current challenges facing each of these factors and what the future could look like if the right actions are taken.

Current challenges and what the future can bring

To look ahead at what the future of cancer care could look like in 2035 we need to look at the current pain points and issues that need to be addressed to shape the cancer pathway positively and achieve the future we envision.

The following sections cover **where strong progress is being made towards our future goals and where the system is falling short today**.

Where strong progress is being made towards our future goals

Technology and innovation driven by science

Future ambition for factors relating to technology and innovation

Early diagnosis (including targeted screening)

- There will be increased **proactive public health action** to achieve behaviour change and reduce risk, and proactive targeting of red flag symptoms through rapid diagnostic pathways and diagnostic centres in the community.
- A **technology assisted approach will be used in early diagnosis**, including using AI to identify symptom clusters in primary care; to proactively identify cancer signs from individuals' medical notes or to identify signs of cancer in imaging.
- **More cancers will be detected**, and detected early, due to the **expansion of screening programmes**.

New and precision treatments

- Developments in therapeutics will **allow all cancers to be targeted through precision medicine, which will move to standard of care**.
- Timely routine **genetic testing** will **match individuals to appropriate therapies**.
- As a result of advances, **more people will be living longer with cancer**, with **better outcomes and less treatment toxicity**.

Data & digitalisation of healthcare

- Seamless **data sharing and open access to medical records for healthcare professionals** across IT systems and services, encouraging collaborative working.
- An increase in **mainstream adoption of advanced analytics** will support clinicians to make predictions and decisions informed by real-world and real-time data.
- **Digital inclusion will improve**, and socio-economic drivers will be addressed.
- Trust issues will be tackled to **increase public confidence in data sharing**.

New scientific advancements are driving innovation of care across the pathway, from prevention and early diagnosis to new and more personalised treatments. Precision medicine enables treatments that are tailored specifically to people's disease by using genomic information and other biological characteristics, increasing effectiveness, and reducing side effects compared to more traditional treatments like chemotherapy. Precision medicine treatments will increasingly be part of first-line standard of care agents, improving outcomes.

Early diagnosis (including targeted screening)

Diagnosing cancer at an early stage increases the chance of treatment being successful and improves overall chances of survival, as well as better quality of life compared with those diagnosed at later stages.[26] For example, data from England and Wales shows bowel cancer survival has more than doubled in the last 40 years; if diagnosed early, more than 90 per cent of patients survive the disease for five years or more.[27]

Given its importance, national policies and charity initiatives (e.g., the Early Diagnosis Initiative by Cancer Research UK) have worked towards improving early diagnosis of cancer.[28,29,30,31,32] Improving early diagnosis is a health strategy goal across the UK's devolved nations, exemplified by the NHS Long Term Plan for England, published in January 2019, which sets out an ambition to diagnose 75 per cent of cancers at an early stage (stage one or two) by 2028.[33] In Scotland, the Detect Cancer Earlier Programme aims to improve earlier diagnosis rates, and reduce health inequalities through a whole system approach focusing on; public awareness, primary care, screening, diagnostics and data.[34]

Today, early diagnosis relies on the effectiveness of national screening programmes and on people coming forward early with signs and symptoms of cancer which primary care professionals recognise so that people can be referred into diagnostic pathways. The pandemic has had a significant impact, meaning there is some evidence of a higher rate of people being diagnosed later for some cancer types.[35,36]

If progress towards early diagnosis goals is achieved, there will be implications for demand planning, treatment pathways and service design, as well as workforce capacity, as a result of increased demand for surgery and knock-on impacts on holistic treatment and support (covered in greater depth in the Lived Experience and Workforce sections).

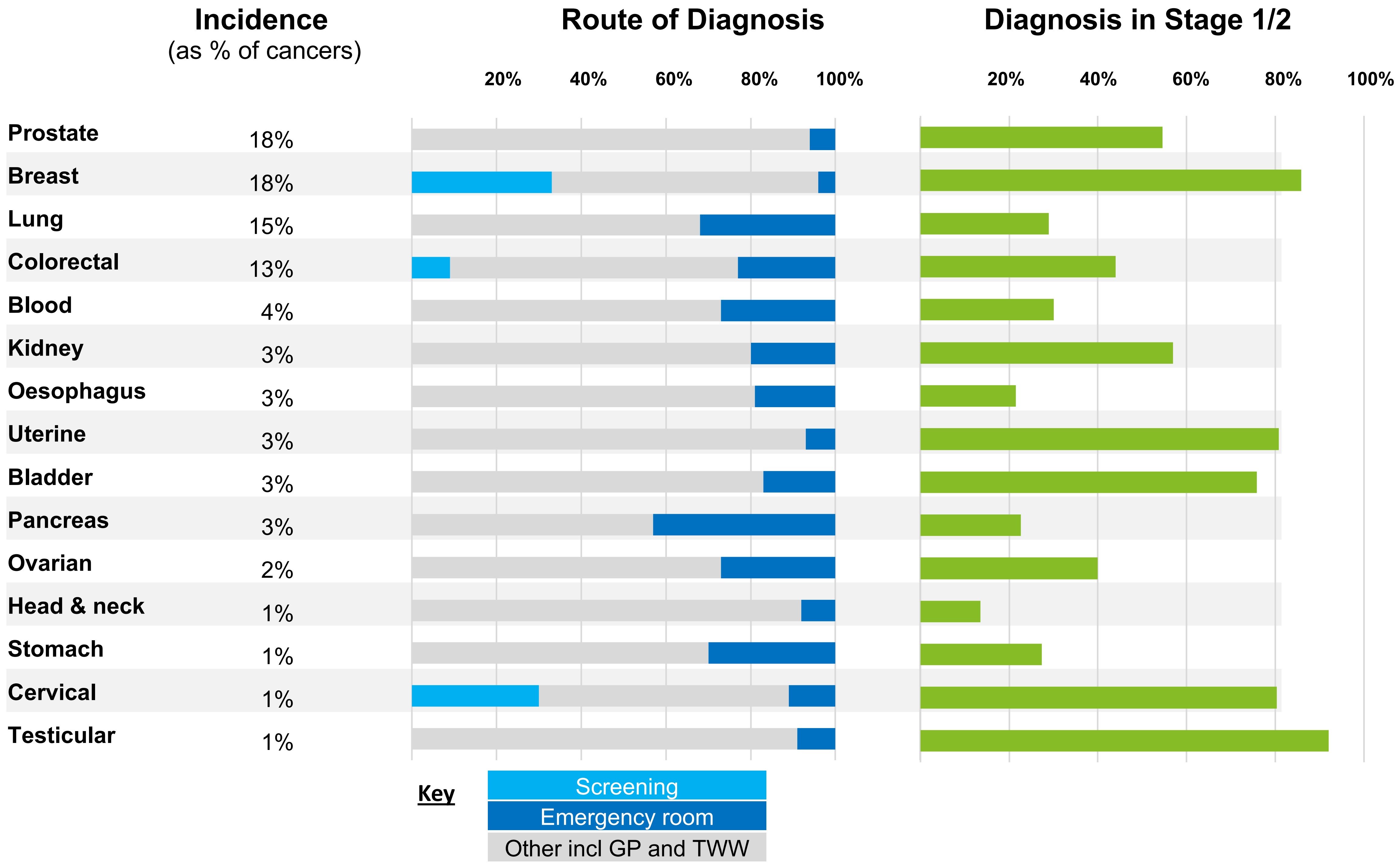
National screening programmes are not reaching as many people today as they could

Currently the three national population screening programmes which target large groups of the population to identify early risk or signs of cancer – bowel (colorectal), breast and cervical cancer screening – are not reaching as many people as they could.[37,38] For example, the majority of colorectal cancer cases are diagnosed outside the official screening programme, resulting in over 50 per cent of diagnoses being made at later stages (**Figure 10**).[39] Historical data, however, is showing that colorectal screening has increased steadily over time (**Figure 11**), which hopefully will translate into more early diagnoses in the coming years.[40]

Importantly, a simpler and more sensitive test that people can use at home for sample collection – the Faecal Immunochemical Test (FIT) – was introduced and rolled out to the bowel cancer screening programmes in the UK. The FIT test was introduced in England in 2019, which might explain the observed increase in the uptake (**Figure 11**).[41]

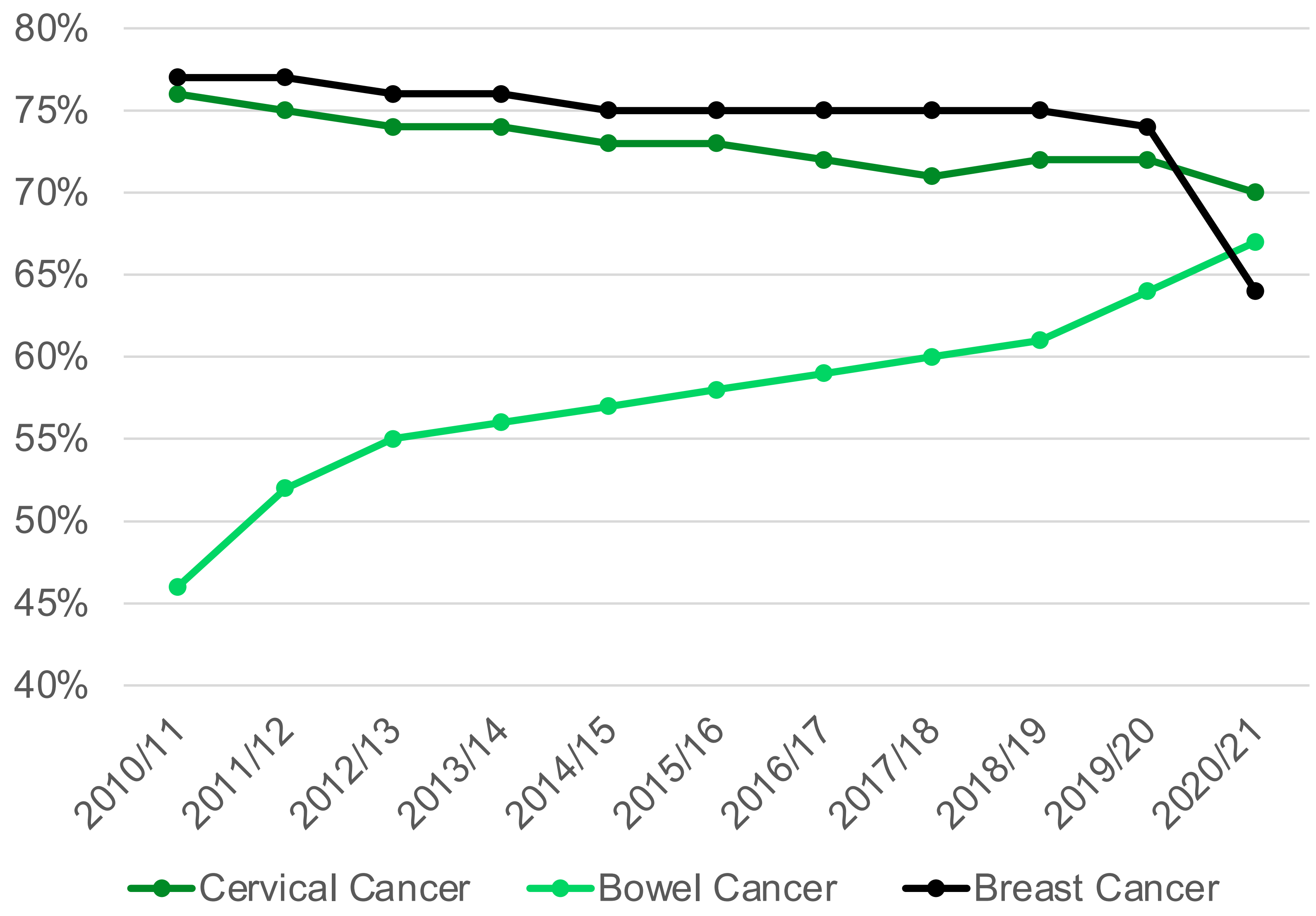
To ensure everyone can benefit from national screening programmes, health equity needs to be delivered. Evidence shows stark differences in access, experience, and outcomes by ethnicity. For example, Black people in England are less likely to have their cancer diagnosed through screening.[42] In addition, screening for some cancers stops after a certain age. Across the UK, bowel cancer screening ceases to be offered to people over the age of 74, breast cancer screening over the age of 70, and cervical screening over 64 years of age.[43] After no longer being called for cancer screening, people might believe they are no longer at risk of developing cancer and not check for symptoms themselves. And in the future, as independent sector providers play a greater role, particularly in provision of diagnostics, the unequal geographic distribution of these across the UK and in devolved nations versus England could exacerbate existing inequalities, as well as cause new ones.

Figure 10. Incidence, routes to diagnosis and diagnosis in stage 1/2 across England, 2018.



Source: Deloitte Analysis; Incidence – National Disease Registration Service[44]; Routes of diagnosis and diagnoses in stage 1/2 – NHS Digital[45].

Figure 11. Percentage of the eligible population screened over time in England.



Source: Deloitte Analysis; Bowel – PHE[46]; Breast – NHS Digital[47]; Cervical – NHS Digital[48].

Prompt presentation and recognition of potential symptoms and early signs of cancer are key in early diagnosis

An important aspect of achieving earlier diagnosis is the prompt presentation of potential cancer symptoms and early signs in primary care, particularly given that most cancers are detected outside screening programmes – data from England shows more than 90 per cent of cancer cases are detected outside the three national screening programmes.[49]

Primary care plays a vital role in diagnosing cancer; however, recognising cases that require further investigation can be challenging for GPs, particularly in groups of people with other medical conditions that may mask signs of cancer. Macmillan Cancer Support, together with other organisations, has helped to introduce electronic risk assessment tools (eRATs) via the ERICA trial to determine their clinical effectiveness to improve referral rates, particularly in early stages of diagnosis; so far these are available in 477 GP practices across England, with the future ambition to extend across the UK.[50]

Supporting GP practices and increasing their confidence in diagnosing cancer will help reduce late-stage diagnosis and save lives. Health equity needs to be at the core when implementing these tools, as evidence shows that Black people in England are less likely to have their cancer diagnosed through screening and are more likely to visit their GP to present symptoms three or more times before receiving a referral, compared to White people.[51]

During this research, we heard from people with lived experience who, like Daisy, shared their journey to getting diagnosed.

In order to achieve the ambition to improve earlier cancer diagnosis across all nations there needs to be greater understanding of the reasons for stagnation in early diagnosis and invest in screening programmes. While it is difficult to compare data across the UK, figures for England demonstrate the number of early diagnoses have stagnated (under 55 percent) in the last decade (**Figure 12**), and this is supported by data from Scotland where the diagnosis rate was 51% in 2018.[52]

> Primary care plays a vital role in diagnosing cancer; however, recognising cases that require further investigation can be challenging for GPs, particularly in groups of people with other medical conditions that may mask signs of cancer.

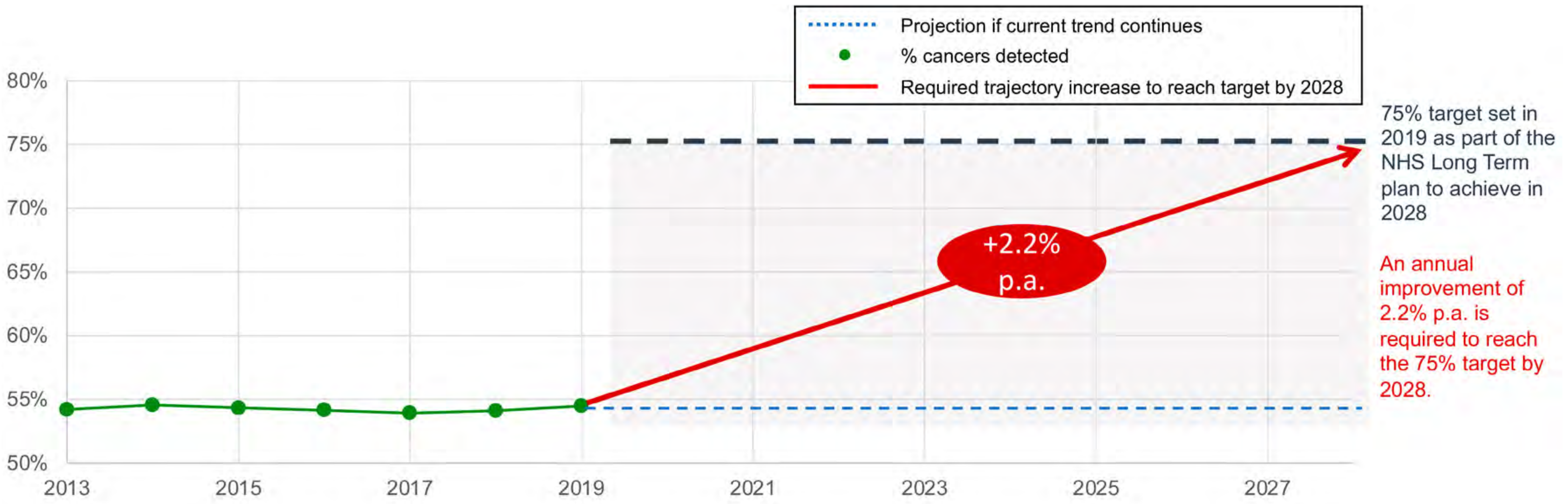
Daisy

Daisy struggled to get the tests she wanted. It took four months from first experiencing symptoms for Daisy to be diagnosed with thyroid cancer. By the time of diagnosis, her cancer had already progressed to Stage 3.

Daisy's GP referred her to different clinical departments at the hospital for what seemed to her to be the wrong tests given her knowledge of her symptoms.

Daisy felt she had to carry out her own research to understand the tests she needed. At one point Daisy felt so frustrated she decided to print out guidance from the National Institute for Health and Care Excellence to demand to be referred for tests which ultimately diagnosed her cancer.

Figure 12. Yearly rolling percentage of cancers diagnosed at stage 1 and 2 in England, 2013-2019.



75% target set in 2019 as part of the NHS Long Term plan to achieve in 2028

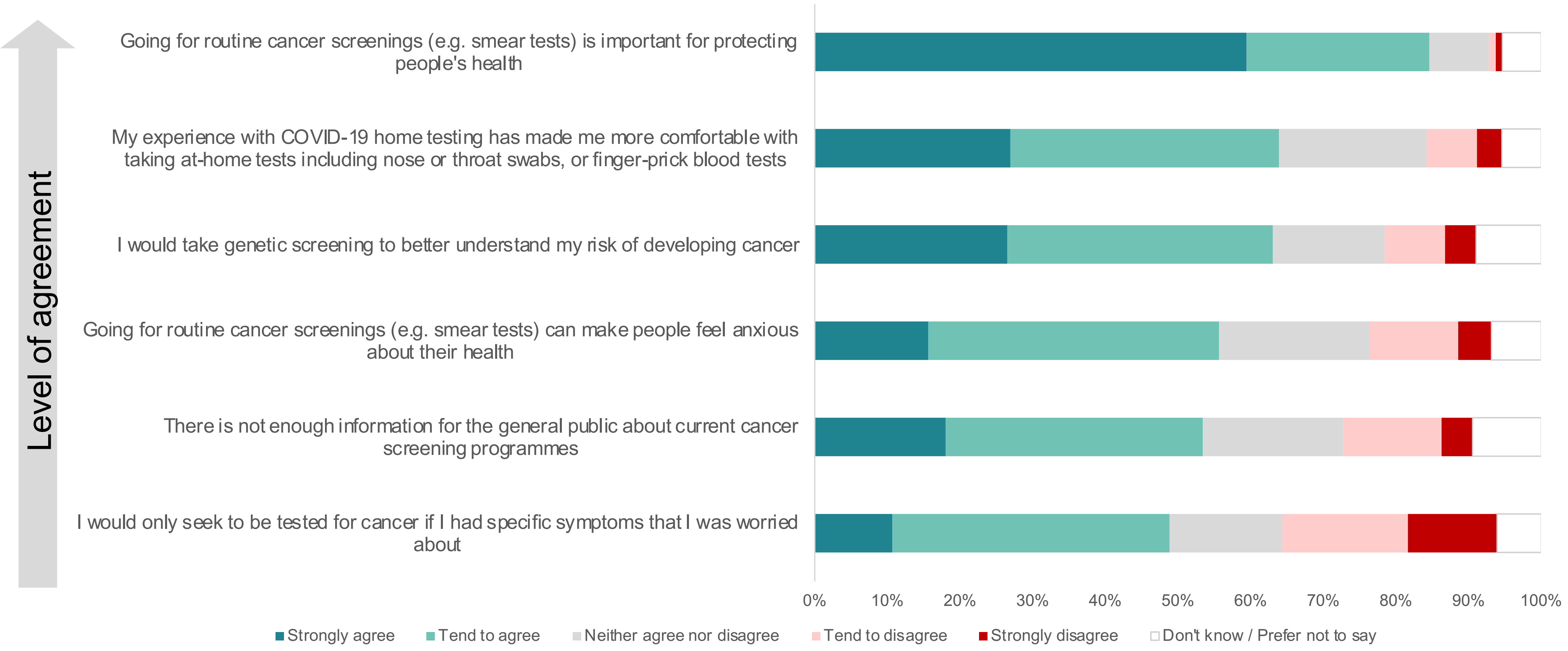
An annual improvement of 2.2% p.a. is required to reach the 75% target by 2028.

Source: Deloitte Analysis; Staging data in England (2022).[53]

In December 2022, as part of this research, a UK-wide survey reaching over 2,000 people was conducted to understand public attitudes towards cancer screening. 84 per cent agree that going for routine cancer screenings is important for protecting people's health (**Figure 13**). However, 56 per cent agree that such tests can make people feel anxious about their health, 53 per cent agree there is not enough information for the general public about current screening programmes and 49 per cent agree they would only seek to be tested if they had specific symptoms concerning them (**Figure 13**). Reasons for hesitancy in attending cancer screenings vary and are both societal and personal. Understanding what the drivers behind hesitancy are will be key to unlocking potential uptake.[54]

Figure 13. Public attitudes towards cancer screening.

Q: To what extent do you agree or disagree with each of the following statements?



Note: survey conducted between the 13th and the 14th of December, 2022 with a sample size of 2055 participants across the UK nations.
Source: Macmillan & Deloitte Health Awareness Post-COVID YouGov survey 2022.

The pandemic has also had a major impact on early diagnosis and targeted screening, yet **we see three major reasons to be confident about the future** and the progress which can be made over the next 10 to 15 years if the right actions are taken.

The first reason to be confident about the future is genome sequencing technology. Next-generation sequencing technology can be used to detect genes associated with the formation and progression of cancer, allowing for early screening and preventative action for those with identified risk (inherited cancer genetic risk). In addition, rapid advances and increased affordability of sequencing methods offer the potential to target cancer in a personalised way – precision diagnostics – by looking into the cancer genomic profile and will be an integral part of precision medicine to tailor treatment plans (explored in the next section of this report).[55,56]

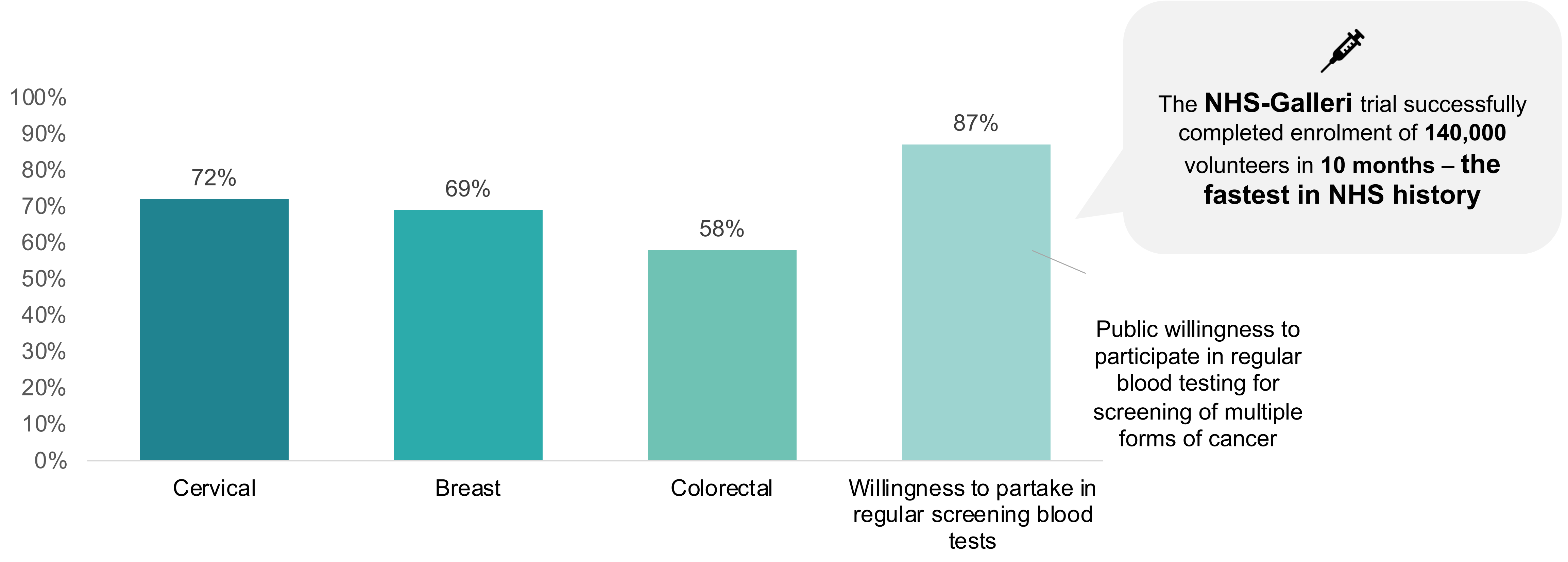
Second, new methods can transform screening. Screening is set to be transformed in many ways over the next 10 to 15 years. In the future we are likely to see a significant increase in the role of screening programmes across the population, with a focus on different approaches, for example, cell-free DNA blood testing. New approaches will have improved reach, detecting multiple cancers with one test, resulting in a greater number of cancers that are detected accurately and earlier at the pre-cancerous stage or stages one and two, including those which were previously hard to detect.

New technologies will enable further non-invasive, targeted screening. For example, liquid biopsies can detect tumour DNA among cell-free DNA (cfDNA) circulating in the blood and have ignited hope of improving detection of numerous types of cancer, particularly those that do not have screening tests available, such as ovarian, liver, stomach, pancreatic and oesophageal cancers.[57] Such a test is being clinically evaluated as part of the NHS-Galleri trial to assess its potential to transform early cancer detection in England.[58] This trial offers participants aged 50 to 79 with no cancer symptoms the opportunity to take the test and is registering an impressive record uptake in participation (**Figure 14**). In line with this evidence, our survey showed that 85 per cent of the public are willing to take this blood test (**Figure 15**). If successful, this test has the potential to not only revolutionise how we find and treat cancer, but also how we manage recurrence (**Figure 16**).

KEY ACTION

Prioritise and ramp-up adoption of liquid biopsies, as the sensitivity of such tests is increased and can allow for earlier diagnosis, revolutionising how we find and treat cancer.

Figure 14. Uptake in cancer screening types among eligible patients in England (2021) versus percentage of the population willing to participate in regular blood tests for cancer.

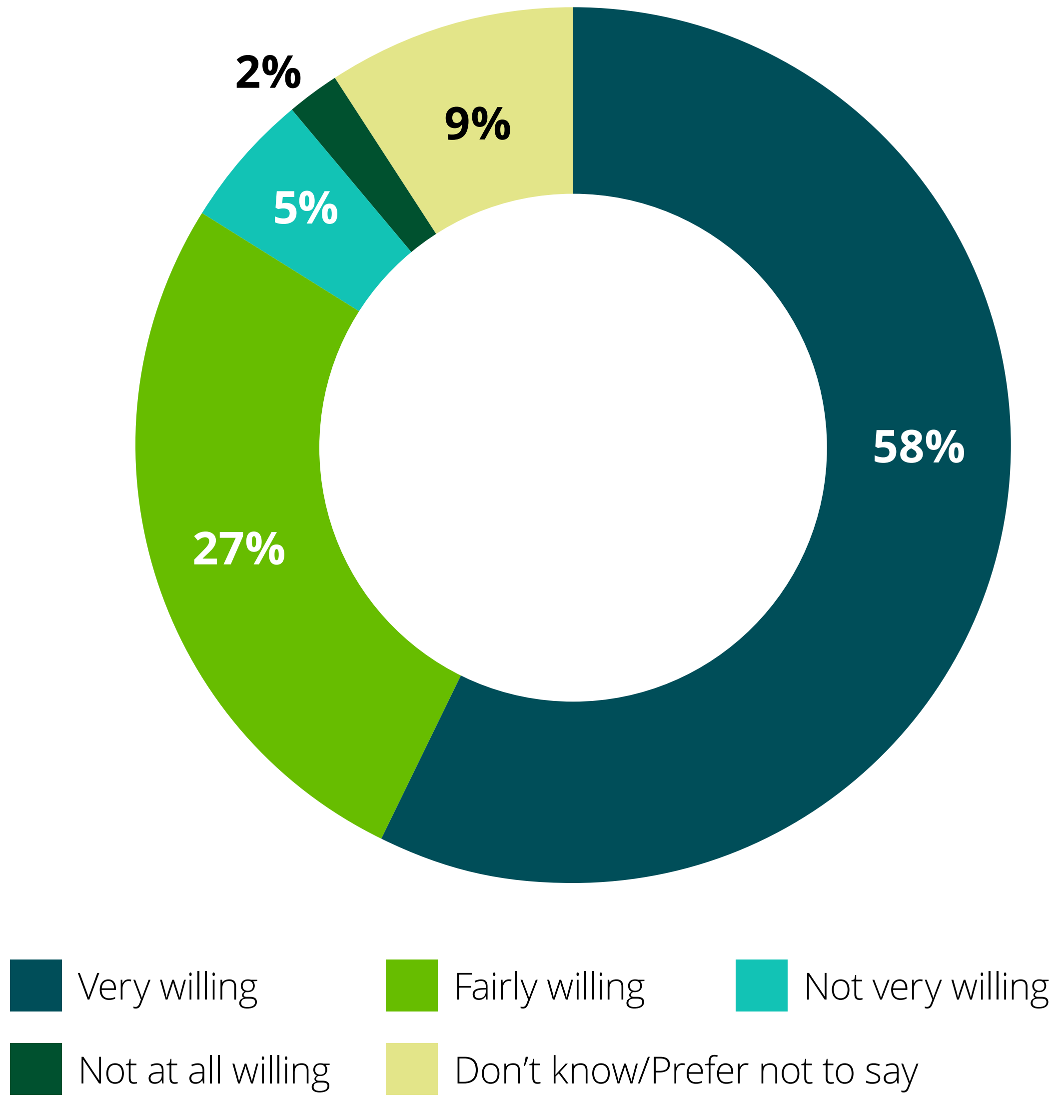


The **NHS-Galleri** trial successfully completed enrolment of **140,000** volunteers in **10 months** – **the fastest in NHS history**

Source: Deloitte Analysis; NHS Digital (2021)[59,60,61]; Future Oncology (2021)[62]; NHS England[63]

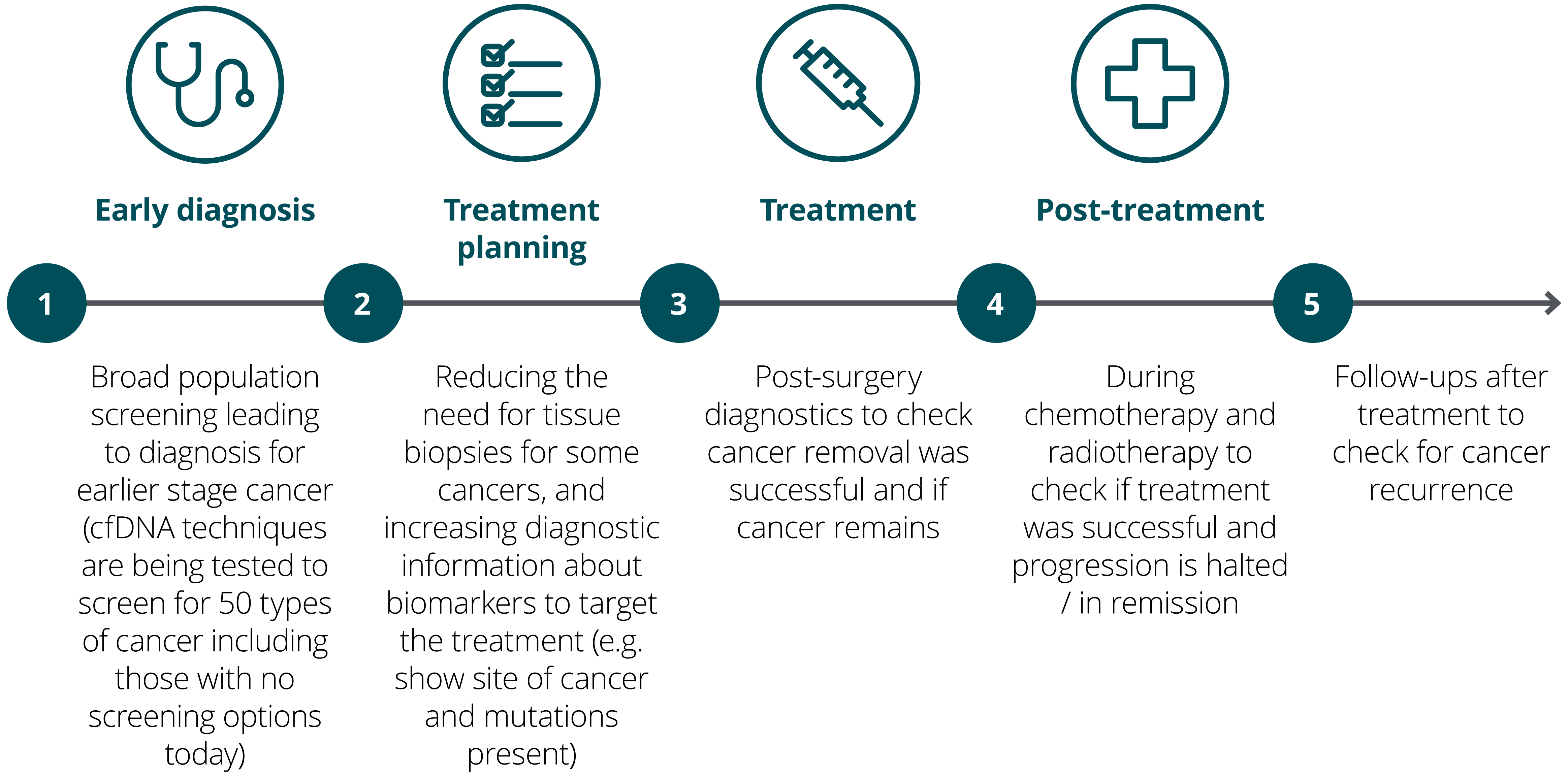
> Next-generation sequencing technology can be used to detect genes associated with the formation and progression of cancer, allowing for early screening and preventative action for those with identified risk (inherited cancer genetic risk).

Figure 15. Willingness to take the NHS-Galleri blood test across the UK, December 2022 (survey).



Note: survey conducted between the 13th and the 14th of December of 2022 with a sample size of 2055 participants across the UK nations.
Source: Macmillan & Deloitte Health Awareness Post-COVID YouGov survey 2022.

Figure 16. Potential applications of cell free DNA liquid biopsies across the cancer pathway.



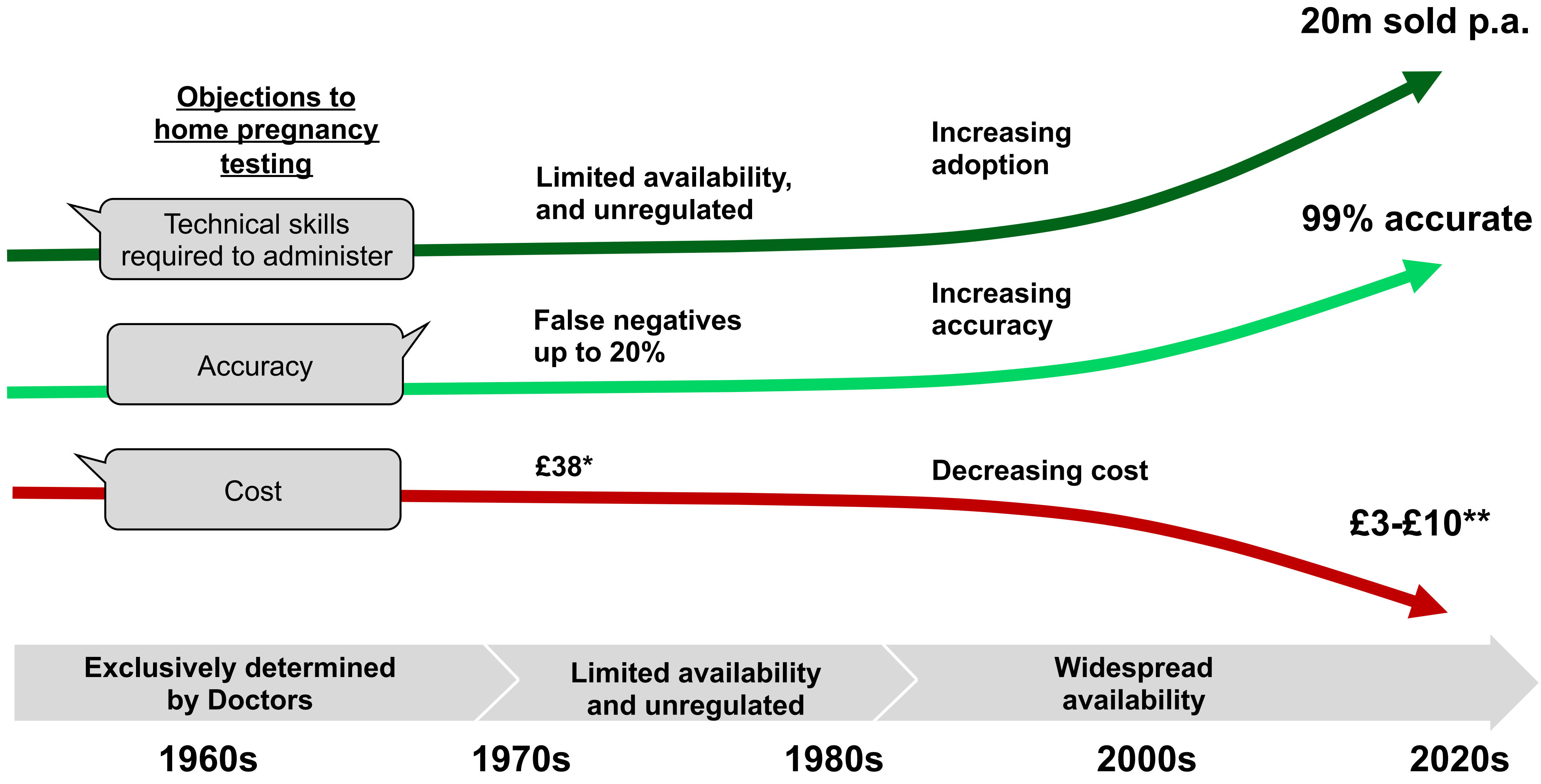
1. Broad population screening leading to diagnosis for earlier stage cancer (cfDNA techniques are being tested to screen for 50 types of cancer including those with no screening options today)
2. Reducing the need for tissue biopsies for some cancers, and increasing diagnostic information about biomarkers to target the treatment (e.g. show site of cancer and mutations present)
3. Post-surgery diagnostics to check cancer removal was successful and if cancer remains
4. During chemotherapy and radiotherapy to check if treatment was successful and progression is halted / in remission
5. Follow-ups after treatment to check for cancer recurrence

Source: Macmillan 'What's new in cancer? cfDNA and liquid biopsies'[64].

In addition, in the future we will likely see more diagnostic tests taken from people's own homes with easy-to-use kits. **Figure 17** shows how pregnancy home testing evolved over time, after being met with objections to its use. Interestingly, we can draw a similar pattern of resistance followed by quick uptake with COVID-19 testing from home, particularly for rapid antigen tests. Today, three types of cancer screening tests are available for at-home sample collection in the UK – PSA (prostate specific antigen that may be elevated in prostate cancer), HPV/smear test (to detect high risk strains for cervical cancer) and FIT (to detect blood in the stool as part of the bowel cancer screening).[65,66,67] All three tests can be accessed privately. The NHS offers the FIT test as part of the bowel cancer screening programme and is currently trialling and rolling out at-home smear (HPV) test as part of the national cervical screening programme.[68,69] The option to self-sample at home can be a game changer in cancer screening and achieving early diagnosis, particularly for those who are more hesitant to partake in screening tests in clinical settings.

> Interestingly, we can draw a similar pattern of resistance followed by quick uptake with COVID-19 testing from home, particularly for rapid antigen tests.

Figure 17. Pregnancy home testing uptake over time



*First pregnancy test cost $10 in 1970s, equivalent to ~$45 today (£38)
**Pregnancy tests today
Source: Deloitte Analysis.[70,71,72]

Third, advances in data and analytics. There is now a real potential for a shift towards a more proactive approach, with the healthcare system able to target modifiable behaviours for those with high risk factors (risk-stratified approaches), which will likely become more holistic, including new biomarkers, behavioural factors, imaging findings, and polygenic risk scores.[73] Advances in Artificial Intelligence and Machine Learning models, coupled with progress in genomic sequencing technologies, will enable multidimensional risk profiling in order to target the right populations and support healthcare professionals in the delivery of screening.

Across all of these, health equity is key to success. A sustained increase in screening and risk profiling will require proactive engagement at a community level, particularly in deprived populations where engagement and uptake are low, to improve awareness on the importance of preventative screening and early diagnosis. Importantly, succeeding in increasing the number of early diagnoses compared to late diagnosis will have implications in how care is delivered across the pathway.

KEY ACTION

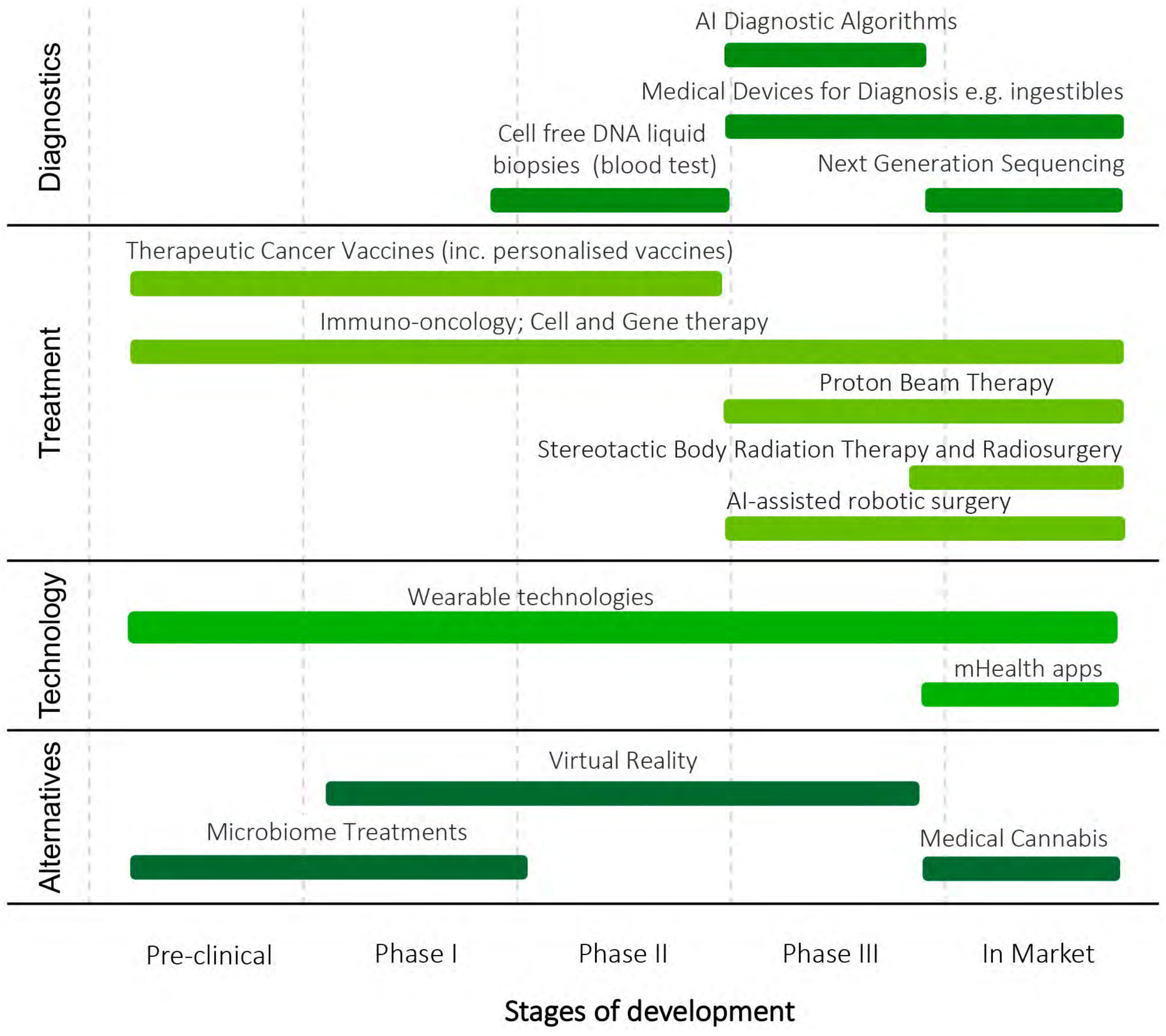
Set up adequate funding streams (through government and private funding), to maximise investment in new technologies for diagnostics to keep up with the advancements in multi-cancer liquid biopsies, genetics (including pharmacogenetics) and genomics, radiology, image processing, and AI/ML that will support healthcare professionals in the delivery of screening.

Understand the root causes to address health equity in cancer and take action within affected communities to address them. For example: address barriers to screening and access to funding which is inclusive of less well represented communities.

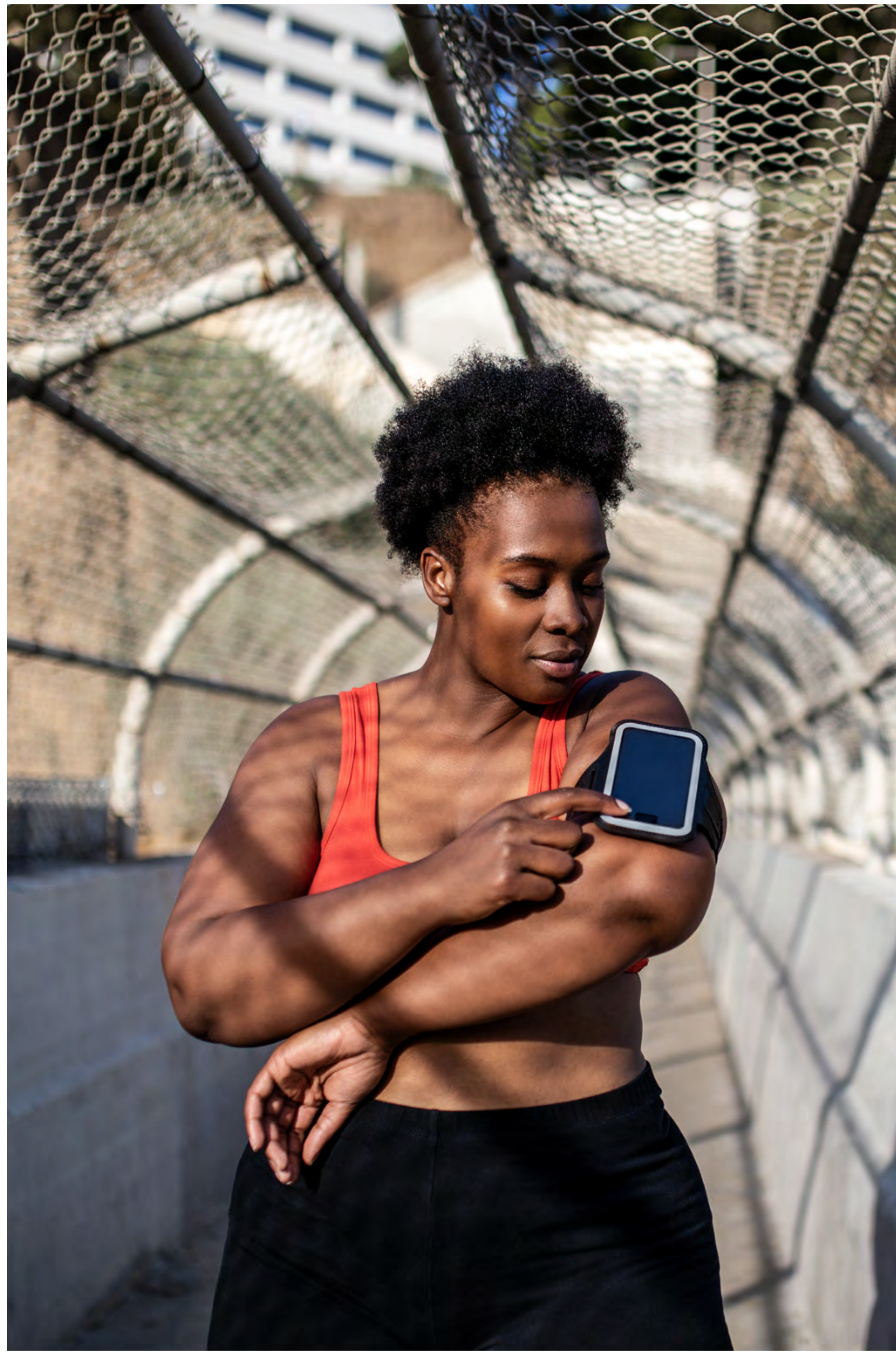
New and precision treatments

We are currently in a transitional period from practising 'population oncology' to 'precision oncology', due to a plethora of scientific breakthroughs in technology, cellular and genetic engineering, genome sequencing, and bioinformatics (**Figure 18**).

Figure 18. Examples of diagnostics, treatments, technologies, and alternatives in their development stages.



Source: Deloitte Analysis; Current Oncology (2020)[74]; Frontiers in Oncology (2021)[75]; Cancer Treatment Reviews (2022)[76]; Nature Reviews Drug Discovery (2022)[77]; BioNTech (2022)[78]; The Lancet Digital Health (2022)[79]; JMIR (2022)[80]; Journal of Geriatric Oncology (2019)[81]; Contemporary Clinical Trials Communications (2022)[82]; BMC Cancer (2021)[83]; Nature Medicine (2019)[84]



Emerging cancer treatments are increasingly combining targeted therapies and pairing those with traditional ones, like chemotherapy and radiotherapy, to address different aspects of the disease. The number of clinical trials in oncology continues to grow over the years. A record 30 new molecular entities (NMEs) to treat various forms of cancer came to market globally in 2021.[85] From the wide range of drugs in clinical trials today, we expect to have around 171 drugs in the market over the next 10 to 15 years (**Figure 19**, showing breakdown of estimated launch years). Given there are thousands of new oncology trials registered every single year, we can only expect this trend to continue growing considerably. In addition, both existing and new drugs are being tested in clinical trials for multiple indications (i.e., different types of cancer) to try and offer treatment options for previously untreatable cancers. For example, Keytruda, a known cancer drug, has been tested and approved for 13 indications and is under clinical trials for multiple others.[86,87]

This wave of innovation brings enormous opportunity to have more effective treatment for cancer in the future and gives us reasons to believe we will see more people surviving and thriving beyond cancer.

First, advances in cancer genome sequencing. This technology has become faster and cheaper over the years, mainly due to major scientific breakthroughs that have progressively streamlined the process. As genetic sequencing becomes more affordable the more potential there is for healthcare systems to harness its use for personalising cancer treatments to each individual so that everyone can benefit.

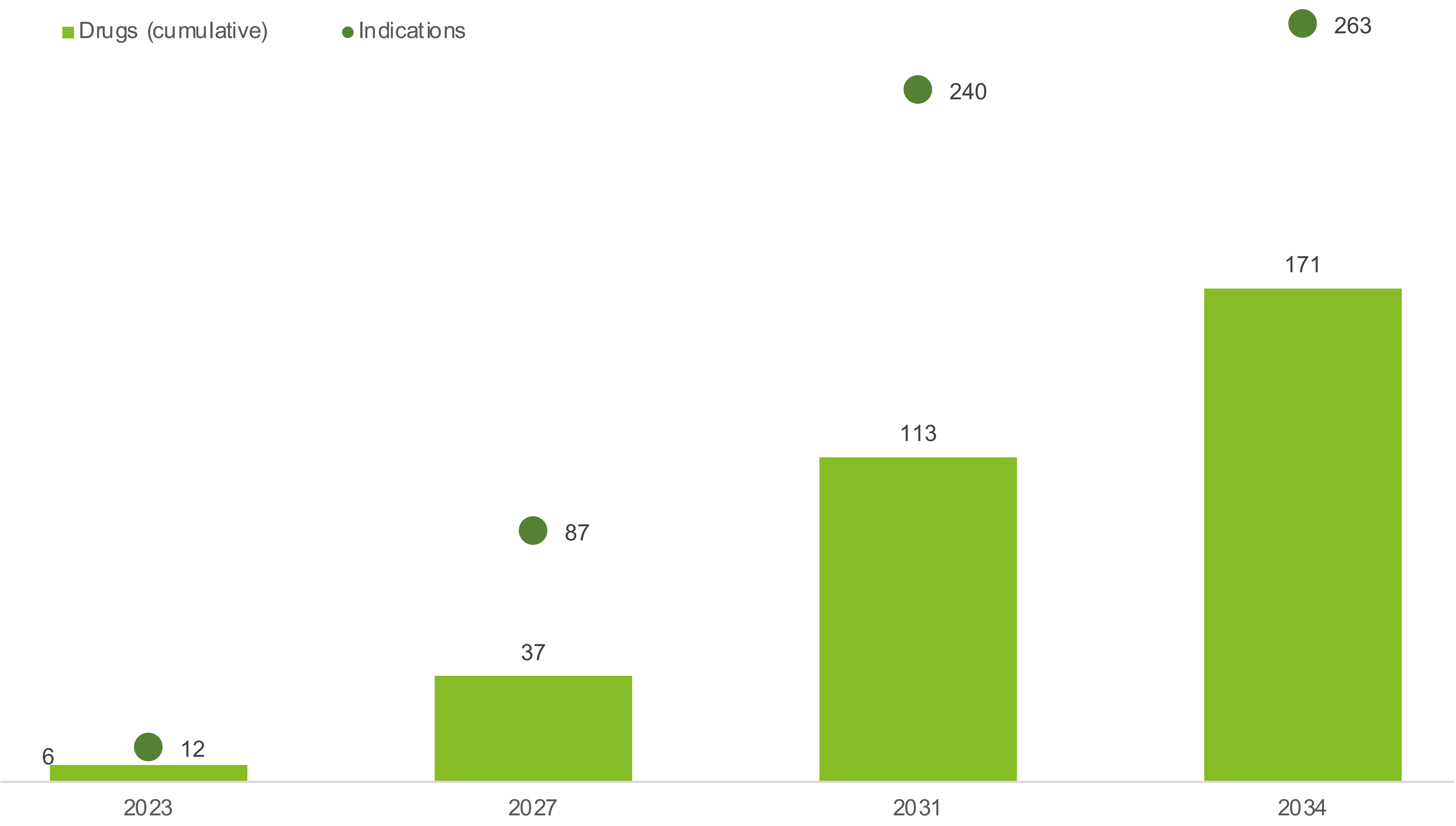
Recent research has shown the potential of genome sequencing to find specific genetic cancer fingerprints to better understand how the disease might have developed, its potential behaviour as it progresses and what treatment options could be more effective by finding weaknesses in the cancer's genetics.[88]

However, there is still a significant data gap in genomic databases, as historically most human studies have been done in populations of European ancestry, which creates biases and limits applicability and generalisability of the data.[89] Long-standing gaps and biases cannot be corrected overnight, but the growing number of initiatives to include underrepresented and underserved populations with meaningful and targeted engagement bring hope that current shortcomings in data diversity will be redressed.[90] We need to take further actions to ensure that by 2035 genomic profiling will be equitably and routinely used to diagnose and tailor a treatment plan for each cancer patient.

KEY ACTION

Use cancer genetic fingerprints as common practice to better understand how the disease has developed, its potential behaviour and what treatment options could be more effective.

Figure 19. Expected drug approvals in oncology (based on active clinical trials as of November 2022).



Note: this analysis uses a clinical trials dataset and the extrapolation is based on benchmark numbers for phase duration in clinical development and likelihood of approvals.
Source: Deloitte Analysis; Global Data Intelligence Center Database (November 2022)

In the future, we will see these genetically targeted precision therapies become first-line treatments for existing cancers. As the effectiveness of treatments improves, so does the chance of surviving more cancers, but we will need to be prepared to support people living with cancer in dealing with side effects. The currently known side-effects of traditional forms of treatment may reduce, but potential novel side-effects from innovative new treatments are likely to occur, which will have an impact on how follow-up care is managed.

Second, people living with cancer will benefit from precision immunotherapy treatments. For decades researchers have tried to harness the immune system to treat cancer with little success until recently with the development and approval of the first adoptive cell immunotherapy (CAR T-cell therapy) in 2017, in which the patient's own immune cells are engineered to detect and kill cancer cells. CAR T-cell immunotherapy combines immunotherapy and gene therapy, showing how the fields of immuno-oncology and precision oncology are merging gradually. Unlike traditional treatments such as chemotherapy, it is administered once and has the potential to have anti-cancer effects indefinitely in the patient's body.[91]

KEY ACTION

Increase access to precision cancer treatments.

Another example of a precision immunotherapy treatment that might be within our grasp in the next 10 to 15 years is mRNA cancer vaccines.[92] This type of vaccine, which has become a household name during the COVID-19 pandemic, works by teaching the immune system to identify and attack cancer cells. Even though no mRNA cancer vaccine has been approved for use as a cancer treatment, the lessons from developing this type of vaccine against COVID-19, as well as recent breakthroughs made with this technology, have fuelled optimism that mRNA cancer vaccines might be available for clinical use sooner than previously thought. We can envision a future where we know the specific molecular fingerprint of each individual's cancer and a highly personalised mRNA vaccine can be developed and administrated within weeks of the biopsy results.

Third, advances in precision radiotherapy are bringing great optimism. We have never been closer to 'precision radiotherapy', whereby an individual treatment plan can be tailored to the precise properties of the tumour, due to rapid technical and technological advances, such as image-guided radiotherapy, intensity-modulated radiotherapy, stereotactic body radiotherapy (SBRT), proton beam therapy, and flash radiotherapy.[93,94] Further advances in imaging techniques and integration of automated processes will take us to the next step in making radiotherapy more precise and personalised and with reduced side effects, which we believe will be a routine practice by 2035.

In addition, recent years have seen a huge increase in research around a new class of drugs called radiopharmaceuticals, which deliver radiation therapy directly to cancer cells.[95] Recent approvals of radiopharmaceuticals have shown remarkable potential and fuelled further optimism for the future of this approach to radiotherapy.[96]

KEY ACTION

Ensure universal access to radiotherapy (adequate equipment replacement, training and upskilling, access to proton beam, address current geographic inequalities in SBRT).

Fourth, people living with cancer will benefit from advances in Artificial Intelligence (AI) and robotic surgery. We expect to see an increase in the use of advanced technologies such as AI in robotic surgery and the integration of augmented reality to enhance surgical care, particularly around computer vision (CV).[97] CV is a field of AI that allows computers and systems to analyse videos and images and derive meaningful information from them. Recent progress in AI and CV methods together with the growing availability of surgical videos have led to the development of AI-based algorithms to improve surgical care.[98] There are, however, unique ethical considerations associated with AI models, including when trained with data sets that disproportionately exclude underrepresented groups of the population, which need to be considered for their broad applicability and reproducibility.[99] In the future, we foresee surgeons leveraging AI to play a crucial role in navigation, decision-making and automation for increased surgery safety and efficiency.[100]

> We can envision a future where we know the specific molecular fingerprint of each individual's cancer and a highly personalised mRNA vaccine can be developed and administrated within weeks of the biopsy results.

Enabling implementation of innovation at pace for the future

The development of new therapies, some of which will require a more complex treatment protocol, is also **creating additional challenges and pressures in the provision of cancer care delivery**. In preparing for a future filled with innovation, we need to ensure the healthcare system can not only cope but thrive in delivering the improved cancer care we envision.

To be fit for the future the system needs to be designed to be able to adapt rapidly to new innovations. New requirements to adapt treatment pathways and service design to new or changing treatment options, at scale and at a faster pace than ever before, will place new demands on health care professionals and colleagues to configure services, adapt the workforce, and develop and implement new capabilities.

KEY ACTIONS

Create frameworks that enable the system to adopt new service improvement technologies at pace. Apply lessons learned from rapid adoption of technology during the pandemic.

Ensure an infrastructure is in place and systems are integrated to sustain the adoption of technology and innovation.

Case example

In **Scotland**, the upcoming commissioning of a new Scottish Cancer Research Strategy is expected to improve access to novel therapies. Leveraging outputs from the Scottish Cancer Research Strategy (combining research, service, and genomics to deliver a cohesive approach) will help **improve integration of services within care pathways** to facilitate access to precision medicine (and support the principles of 'realistic medicine').

Implementing such advanced technologies at scale will require sustained investment in integrated digital infrastructure across the health system, ensuring systems are compatible with specialist equipment, reducing the risk of errors, gaining access to patient records across care settings, overall improving efficiencies, and adequate support to staff delivering these treatments.[101]

In addition, realising the increase in accessibility to new – often expensive – targeted treatments and technologies will rely on innovative, value-based pricing and funding models that are based on outcomes and what matters to people living with cancer (e.g., survival, quality of life and patient reported outcome measures – PROMs). Long-term funding security, equity of access and greater availability of information for higher cost specific genetic treatments and cures will be needed to ensure the greatest advancements in opportunities and successful implementation.

KEY ACTIONS

Put in place value-based payments for treatments (precision medicine and next generation cancer therapies)**, diagnostics, and devices**, using what matters most to people living with cancer (Survival, Quality of Life, and PROMS).

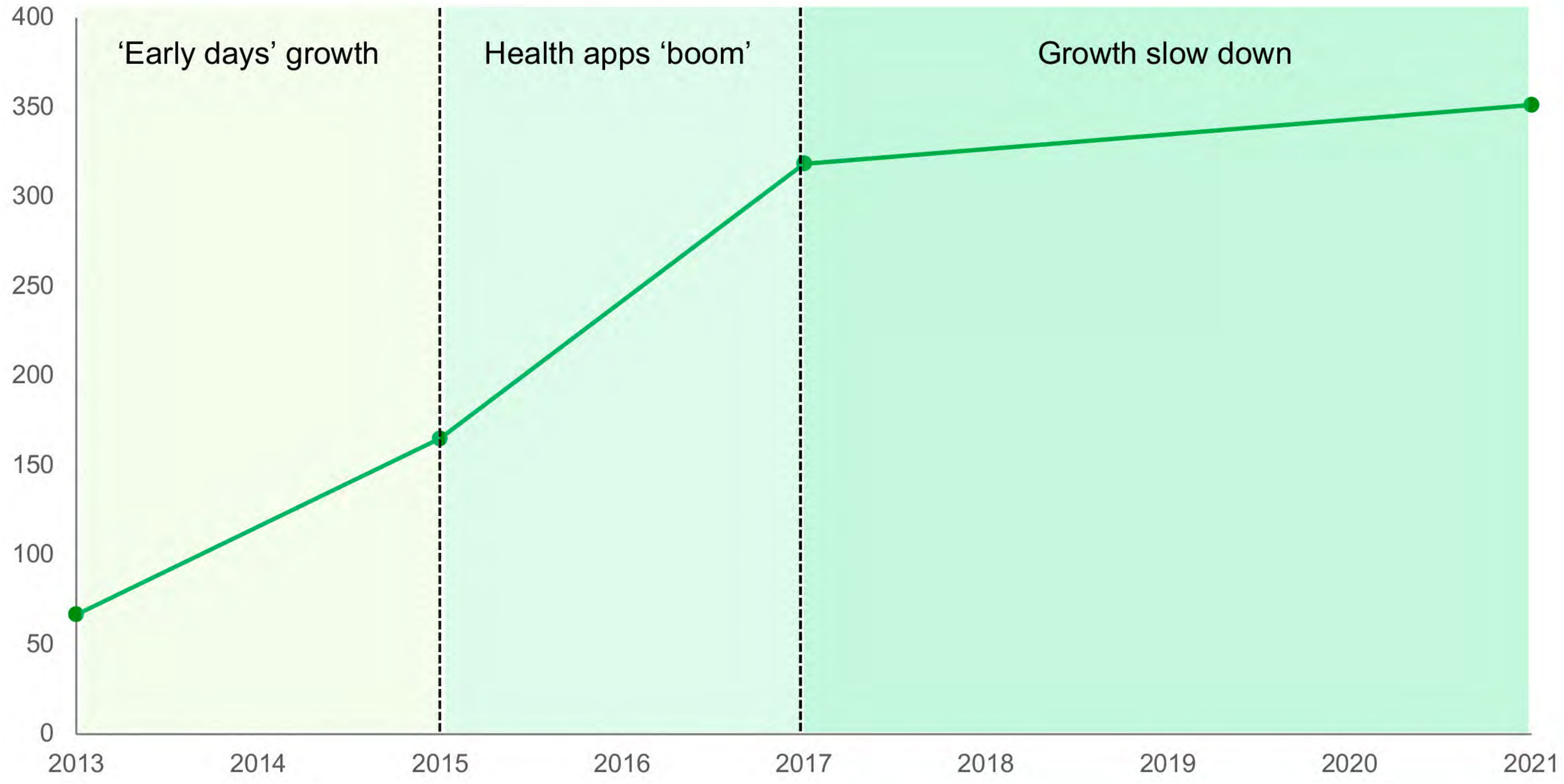
Ensure value-based payments take into account the on-cost of delivery/preparation/ optimisation for treatment and ongoing support needs (workforce, resource etc.).

Data and digitalisation of healthcare

The past 15 years have seen very rapid advances in data and digital technologies and we can only expect this trend to continue. Technology is driving an enormous and fast change in the collection of data, and in data capture, storage, analysis, and transmission, **leading to an explosion in the volume of data available** from multiple sources, including electronic health records, medical devices, self-reported and in-home monitoring data, genetic testing, wearables, smartphone apps, to name a few.

Recent decades have seen the emergence of a vast number of digital health apps in the market, with over 350,000 health, fitness, or medical apps now available to consumers globally, generating vast amounts of personal health-related data (**Figure 20**). Since 2017, however, this growth in the number of digital health apps has slowed in comparison to the 2015 to 2017 period. Global investment in digital health apps has increased over the years, albeit with a short period of decrease between 2018 and 2019, with a record $24 billion investment in 2020.[102] We expect this trend to lead to more consolidation of high-quality apps in the market to support patient health.

Figure 20. Growth in numbers of digital health apps (thousands).



Source: IQVIA (2021).[103]

Today approximately 30 per cent of the world's data volume is being generated by healthcare, the fastest rate of growth across all industries. By 2025, the compound annual growth rate of data for healthcare is estimated to reach 36 per cent (**Figure 21**). The amount of data generated is increasing rapidly, resulting in large-scale datasets from across fields such as genomics, imaging, and real-world data. For example, two to four terabytes of data are being generated from single patient's tumours in clinical trials. Yet 97 per cent of healthcare data remains unused – and advanced analytics tools are required so we can unlock the opportunities from this data.

Just collecting data is not sufficient to make use of all this information in a way that everyone can benefit. Some of the greatest technological advancements have been in computing power, advanced analytics, artificial intelligence (AI), and improved network connectivity. Together, these technologies can help us interrogate datasets and draw new insights to improve people's cancer care and experience. Over the next 10-15 years, technological advances will go even further with **pattern recognition algorithms, AI prediction, virtual models such as digital twins** (where a virtual model of a physical thing e.g., a hospital, surgery, or patient – can be used to simulate real world effects)**, and voice and facial recognition and analysis**, to name a few**.**

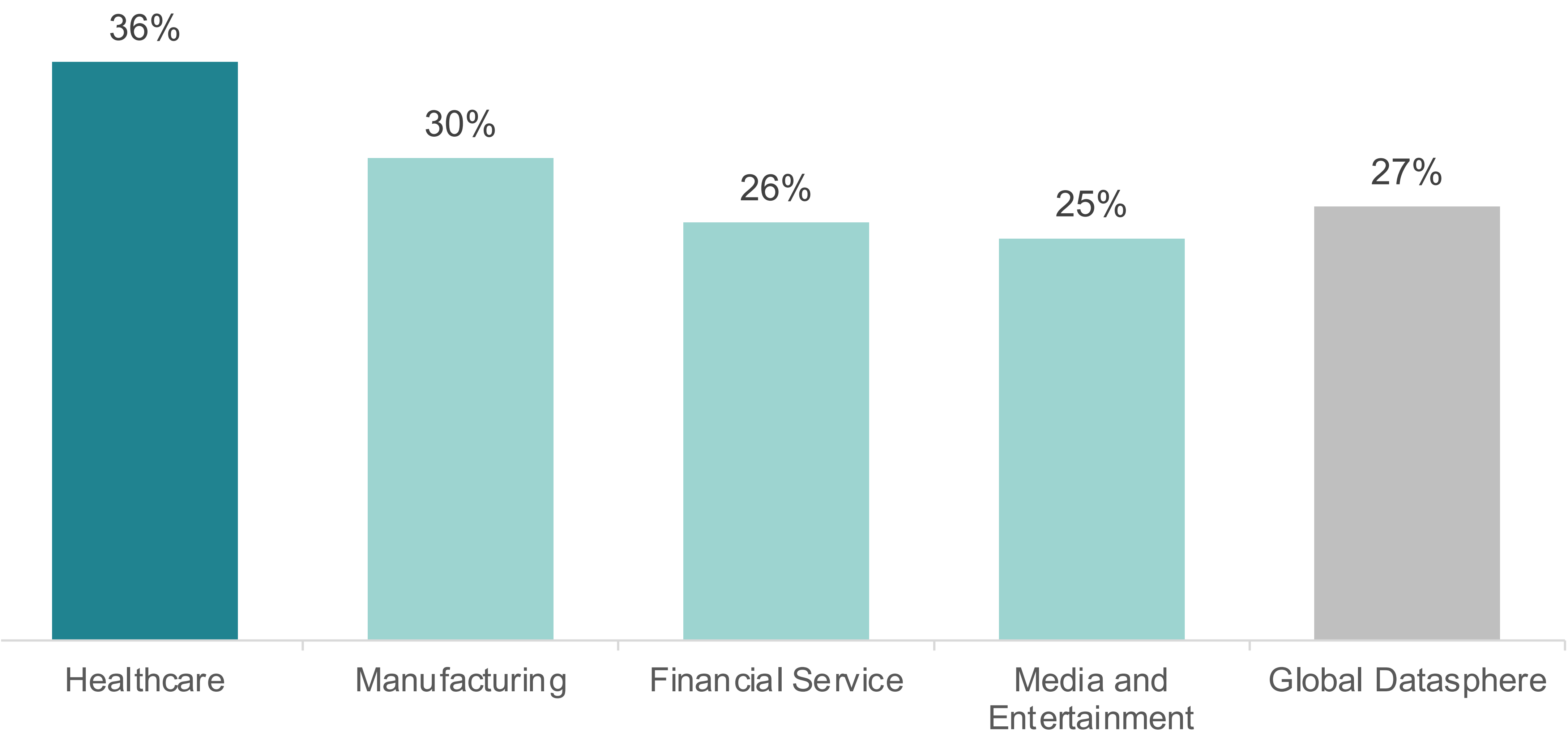
Digital health and data-driven insight will increasingly shape the experience of people with cancer both individually and collectively:

- For **individuals with cancer**, this brings the potential to make more informed decisions and experience more personalised prevention and treatment, and better outcomes.
- For **people with cancer collectively**, data will increasingly drive healthcare decision-making and delivery so people with cancer benefit from population-level insight to improve their outcomes and experience.

For people with cancer, data and digital health will have an impact on **personalisation, decision-making**, and **improved outcomes and experience**.

Personalisation: data will make it easier to personalise and target prevention, prediction, and treatment. Digital health means support can be tailored to individual needs, enabling people to connect with others and monitor their health, sharing data with others to personalise the care they receive. Digital solutions can support people living with cancer, facilitating self-management by encouraging them to report and track symptoms and to provide clinicians with direct, real-time access to care data. Such solutions have the potential to empower patients during treatment to take action when necessary.[108]

Figure 21. Compound Annual Growth Rate (CAGR) of data across industries, 2018-2025.



Source: RBC Capital Markets, The healthcare data explosion.[107]

Decision-making: real-time, personal data generated by digital technologies enables better decision-making, with algorithms that can support people's access to relevant information and support.

- Using linked, robust data and technology to enable the integration of healthcare will support clinical decision-making and the well-being of people with cancer.
- Interoperability of robust and diverse patient data will also mean that there is mainstream adoption of advanced analytics, which will support clinicians to make predictions and clinical decisions informed by real-world and real-time data.
- Gathering and analysing anonymised real-time patient-reported outcomes data with advanced analytical models has the potential to ultimately improve oncology outcomes.

Improved outcomes and experience: data-driven insight enabling earlier diagnosis and bringing population level insight into best care, with digital tools enabling personalised monitoring and follow-up.

Having an interoperable IT and data infrastructure in place in parallel to digital and technical solutions, such as telehealth services, smartphone apps, and more advanced technologies like AI, will also accelerate patient care as real-time data is collected and delays in care can be mitigated. These tools can further empower people living with cancer to manage their own care better.

Seamless data sharing and open access across IT systems and services in the NHS, independent sector, and voluntary, community and social enterprise (VCSE) will allow different teams to work more collaboratively with patients in a safe and secure way. For professionals it will release clinical capacity from routine, repetitive tasks to allow more time for clinical care. One of the greatest benefits of digitalising healthcare is to help ease workforce pressures by releasing staff time and increasing service productivity.[109]

There is enormous potential to transform cancer care, but to enable rapid adoption and realise the potential benefits for both people living with cancer and the cancer workforce, key issues must be addressed, including having an integrated digital infrastructure in place across interoperable care settings, and improved data quality, particularly around legacy data. A complete digitalisation and integration of healthcare records will be pivotal for the NHS to realise the full benefits of digital health. Effective information sharing is required for data to be optimally utilised, in clinical settings and beyond (e.g., in research).

Achieving transformation goes beyond technology infrastructure, as recognised in policy – for example in England's Plan for Digital Health and Social Care. Realising this potential will require redesigning roles and ways of working, as well as changing the way care pathways are structured and how people interact with services.[110]

The healthcare system made rapid progress during the pandemic and today we can see that digital technologies are already transforming how people interact with healthcare providers and manage their own health. In the survey conducted as part of this research in December 2022 and reaching over 2,000 people across the UK, we found that 59 per cent of respondents tend to use online search or Google as their first point of call for health concerns. Then we have telehealth services, which include telephone and video appointments. There is also a plethora of smartphone apps from which patients can order repeat prescriptions, request online appointments, and be supported in managing their healthcare. As increased priority is placed on the use of data to improve health outcomes and experience, digital tools should be employed along the care pathway, to reduce the load on the workforce and improve the patient experience.

However, major issues must be addressed to realise the potential of data and digitalisation:

- Currently systems are not interoperable and there are significant issues with legacy systems.
- Underlying systems are convoluted and ill-equipped to allow for the adoption of data and innovative technologies.
- There are barriers to data sharing due to lack of interoperable systems and data standards. Data silos across primary and secondary care, as well as within and across trusts means that decisions are delayed and often made with an incomplete picture. IT services are not centralised nor structured in a systematic and integrated way. Different people in the clinical care pathway cannot access the same system, ultimately leading to poor service delivery.

KEY ACTION

Solve issues of data sharing between all healthcare professionals involved in the person living with cancer's care to ensure seamless transfer of data between care settings and healthcare professionals.

> There is enormous potential to transform cancer care, but to enable rapid adoption and realise the potential benefits for both people living with cancer and the cancer workforce, key issues must be addressed

Data quality challenges. Poor data quality, due to inaccuracy, inconsistency, duplication, or lack of data, leads to misleading results and, ultimately, poor decision-making. Advanced technologies, including AI, that will shape the future of healthcare all require high-quality data and organisations will need to establish data quality standards and closely monitor datasets.

Data equity challenges. Data must be representative of the population it is meant to serve and avoid data bias. Data equity needs to be considered and applied at every step of the data lifecycle from sourcing and collection through to analysis, interpretation, communication of insights and decision-making.

Slow progress in important areas, such as digital prescribing (see **case example**). Digital prescribing systems will improve patient safety and reduce errors, as well as save time and money.

Case example

Across the UK, electronic prescribing systems are on course to replace paper prescriptions in an effort to improve patient safety and reduce errors, as well as save time and money. For example, NHS England's Long Term Plan committed to introduce digital prescribing across the entire NHS in England by 2024.[111] In 2020, it was expected that the proportion of trusts with an electronic prescriptions and medicines administration (ePMA) system would increase from 19 per cent in 2018 to more than 80 per cent by March 2021.[112] However, following rollout delays due to the disruptions caused by the COVID-19 pandemic, recent 2022 figures show that around 50 per cent of trusts are currently using ePMA systems.[113]

- Electronic prescribing integrated with electronic records has been rolled out at select, highly specialised cancer care centres to allow healthcare professionals to review the previous medical history of patients, including treatment plans and medication dosage. Data systems are needed that operate across health organisations and across country boundaries, to enable the seamless sharing of data across the UK.
- There is still low, but growing, public participation in digital health. Despite more than 90 per cent of the population of the UK using the internet on a regular basis, as of 2019 less than a quarter has registered for online services with a GP.[114]

To realise benefits for everyone, we need to see three important areas being prioritised:

First, is it essential to take an approach which promotes digital inclusion.

At an individual level, there is a real risk some people with cancer do not benefit from advances in digital health and data because they lack access to the digital devices; the motivation, health literacy or self-efficacy to use the insight generated to personalise their experience; and support from confident, skilled professionals.

Technological innovation in health has the potential to reduce or exacerbate inequities. In future we can expect that age will not be such a determinant factor as is today, but it is likely there will still be a digital divide to be tackled among specific groups e.g., those who live on a low income, those with low literacy levels and/or language barriers. A major risk associated with shifting to digital is it may follow a 'one size fits all approach' which risks increasing exclusion. Evidence is accumulating that digital medicine benefits some groups within the population, but the development and adoption of technology should not be disruptive to the wider health ecosystem.[115] Before implementing and using digital technologies on a large scale, the healthcare system needs to listen to and address the concerns of the public, including those around digital exclusion.

Having the requisite skills and access to digital technologies is crucial to enable people to fully participate in our increasingly digital society. Despite consistent improvements lessening the digital divide over the years and the number of adults who do not use the internet steadily declining over recent years, 10 per cent of the UK adult population still did not use the internet in 2018.[116] Addressing digital exclusion, which is closely linked to wider inequalities in society and is more likely to affect people on low income and those who are over 65 years of age, is essential to ensure every community can navigate and access services, including telehealth.[117]

To introduce digital health solutions inclusively, patients need to be included in a meaningful conversation about development and implementation of digital health solutions. Concerns must be understood and addressed, particularly among more vulnerable and marginalised groups to ensure equitable access, including connectivity issues in more rural areas. This will be particularly vital for public-facing technologies, including online appointment booking systems and smartphone apps offered for monitoring and continuous support, as these will impact everyone who needs to use the healthcare system.

Second, people need to be supported in navigating and using digital solutions.

Digital solutions such as health apps bring benefits to both sides of the 'healthcare coin' – to healthcare providers and professionals and to patients. For healthcare providers and professionals, such tools can enhance productivity and help alleviate pressure points, while providing the high-quality care experience to meet patients' needs. For patients, they can help enhance access to healthcare services, even from remote locations, as well as offer support with self-management and monitoring. However, given the wide range of health apps that are available today, with varying ease of use, it remains a significant challenge for a trusted healthcare organisation such as the NHS and National Institute for Health and Care Excellence (NICE) to assess and signpost credible online health information and locally commissioned apps, so that people can be reassured that these digital solutions are fit-for-purpose, safe and secure.

> Having the requisite skills and access to digital technologies is crucial to enable people to fully participate in our increasingly digital society.

KEY ACTIONS

Use affordable, simple to use digital tools to support remote self-monitoring (report and monitor their symptoms) in people's own home and deliver in an equitable way**.** This will help limit follow-up appointments, reduce travel to specialist centres, and improve the care experience.

Act on existing health equity barriers and those that are expected to arise as a result of increasing use of digital tools and remote monitoring. Digital literacy, access to infrastructure/connectivity, and empowerment/confidence to self-management of follow-up care, and flag needs for additional care to the cancer care team.

Finally, build confidence in data sharing within robust safeguards.

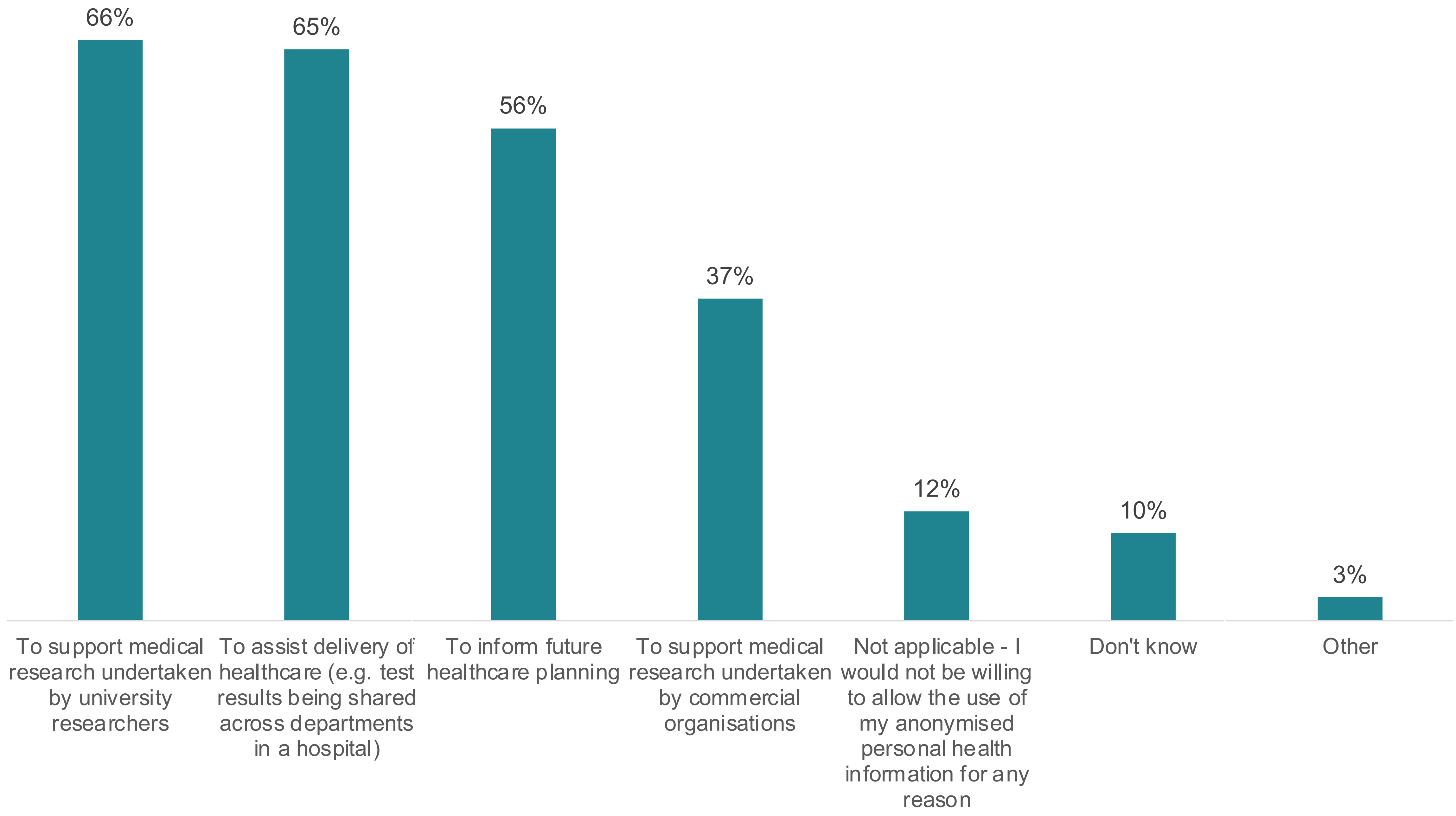
A recent survey to understand public attitudes to data and AI has shown that the public trusts the NHS more than any other organisation in the study, with 83 per cent of respondents comfortable with sharing personal information with the NHS so that new treatments can be delivered.[118,119] However, 28 and 24 per cent are concerned their data might be hacked or stolen, or sold for profit, respectively.[120] The survey conducted as part of this research from December 2022 has shown that 66 per cent of people would allow their anonymised personal health information to be used to support medical research, 65 per cent to assist delivery of healthcare and 56 per cent to inform future healthcare planning (**Figure 22**). However, 12 per cent said they would not allow the use of their health information for any reason.

KEY ACTION

Build trust in the healthcare system and solve information governance challenges to strengthen public confidence in data sharing. Address root causes for mistrust in public sector data sharing. For example: demonstrate to clinicians and citizens that data can fulfil its promise.

Figure 22. Public attitudes towards use of personal health information (UK, December 2022).

Q: For which, if any, of the following reasons would you allow your anonymised personal health information to be used?



Note: survey conducted between the 13th and the 14th of December 2022 with a sample size of 2055 participants across the UK nations.
Source: Macmillan & Deloitte Health Awareness Post-COVID YouGov survey 2022.

This means leaders in the healthcare system need to work closely with regulators to ensure a compliant and transparent use of data and digital solutions by ensuring robust compliance with regulation, particularly around cybersecurity, and data privacy. The healthcare system will need to address the public's worries and concerns about data sharing, as well as co-create applications and solutions that benefit clinicians and people living with cancer. For example, acting as a decision support mechanism for clinicians and improving convenience for people living with cancer If digital solutions can complement existing care (e.g., reduce travel time).

KEY ACTION

Learn from specific groups that have a higher willingness to share data, replicating and scaling proof cases (e.g., lessons learned from glioblastoma patients' willingness to share data).

Where the system is falling short and action is needed

Lived experience

Future ambition for factors relating to lived experience

People's understanding and awareness of cancer risks and symptoms

- More people will have a **better understanding of cancer risk and their own health generally**. This will likely mean more people are **seeking action sooner over cancer signs and symptoms**, as they have increased access to screening tests which are accepted widely.
- A **customised / localised** approach will be taken to **increase health literacy and raise understanding, awareness, and trust**, particularly in less represented communities.

Person-centred care (including well-being)

- People will have equitable access to a personalised care experience.
- There will be greater **emphasis on the needs of the individual and measuring outcomes that matter to people living with cancer**.
- The use of **digital tools** at scale will complement the workforce to support people and meet their holistic needs. A greater range of technologies will allow support to be tailored to each individual's needs, maximising the impact for people living with cancer and the people that matter to them.

Living with and beyond cancer (including with multiple health conditions) and end of life care

- As people live longer with cancer alongside other long-term conditions, primary, **community and secondary care will coordinate better to provide holistic support**.
- There will be **big shifts away from siloed working** to a more multidisciplinary and cluster medicine way of working.
- **A large part of end-of-life care will move** from secondary/tertiary centres **to community/home settings**. There will be a **cultural shift regarding death and dying**, and people living with cancer will expect to have **open conversations about end of life and their choices**.

Location of care

- **Community diagnostics** – including blood tests and local diagnostics – **will play a much greater role in diagnosing cancer**.
- There will be an increased role for **community and home-based care** to support treatment for less complex cases of cancer care, including innovative solutions (e.g., chemotherapy buses, virtual wards) underpinned by increased cancer knowledge in the generalist workforce.
- This will decrease reliance on specialist centres and increase their capacity to **deliver novel therapies** to treat complex cancers.
- **And there will be a reduced requirement for patients to travel long distances to specialist centres**, with virtual multidisciplinary teams (MDTs) connecting specialists in tertiary centres with the wider workforce locally.

No two people living with cancer experience the same journey, and, in the future, this will become even more stark with the increased use of genetics, biomarkers, and precision treatments.

A fragmented system limits the ability to look at people as individuals with distinct needs. People living with cancer, as well as with other comorbidities, are struggling to navigate an increasingly complex system. There is a need to ask people living with cancer, "What are your priorities?" and "What matters to you?". Each person's personalised care experience needs to be unique. This also includes where the care is delivered.

Diagnostic hubs in the community, better transport links, and less invasive tests are all opportunities to bring the location of care closer to home and improve convenience for people living with cancer.

The importance of person-centred care is as important tomorrow as it is today. While there has been progress to date, with more services becoming available to support people living with cancer, funding challenges and siloed thinking are still hindering progress. Health equity must be delivered by addressing unequal access to care and improving outcomes for communities which are not yet benefitting from person-centred care.

People's understanding and awareness of cancer risks and symptoms

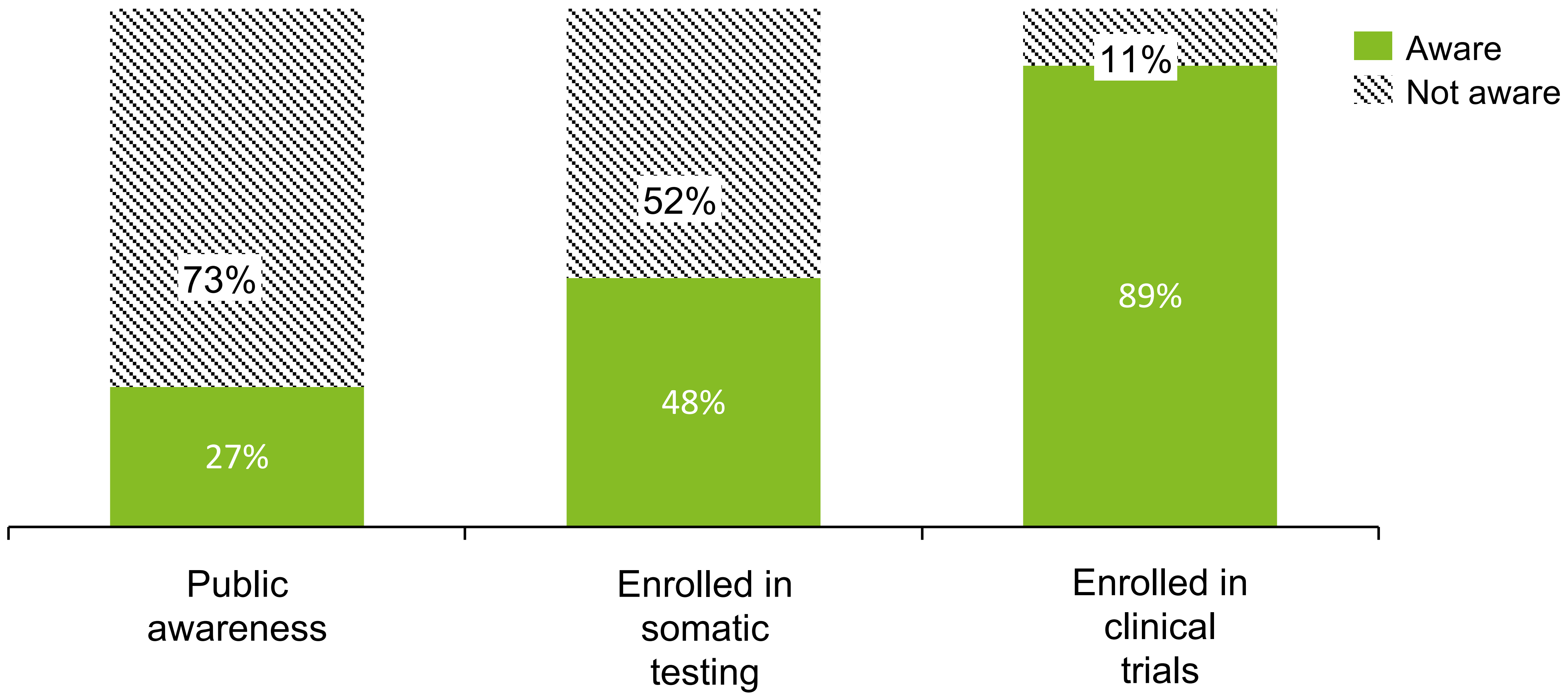
Our ambition for cancer care in 2035 sees more people understanding and engaging in their own health and developing a better understanding of their risk of cancer. This includes ways of managing their risk where possible, and increased knowledge of the different types of therapies and treatments available. Knowing the options could empower people to seek action sooner (e.g., presenting for investigations and diagnosis at earlier stages, seeking genetic testing), and help to reduce fatalism – through improved understanding of how much cancer outcomes have improved, especially if identified at earlier stages. This would lead to better risk management, earlier diagnosis, and improved outcomes overall.

At treatment stage, people's participation in shared decision-making will increase in quality and quantity, and support determining the right course of action for them. With the avalanche of innovations ahead, this will be more complex and tailored to the individual than ever before. Enabling patients to participate in a meaningful way will require an increase in the general public's health literacy and understanding of new topics such as genomics and precision medicine.

The current lack of understanding and awareness of cancer risks and symptoms presents a significant challenge to improving prevention and meeting early diagnosis goals.

Research suggests that only a small percentage of the population understand their cancer risk, signs, and symptoms, and how to present early. This undermines confidence in participating in decisions about new diagnostic and treatment options. For example, a meta-analysis of over 3,000 global participants, conducted and published in 2021, indicates that the public is largely (73 per cent) unfamiliar with precision medicine for cancer (**Figure 23**). Awareness of precision medicine was much higher among cancer patient cohorts, particularly for those enrolled in clinical trials (89 per cent) compared with the cohort of participants undergoing testing to inform their treatment (48 per cent).[121]

Figure 23. Awareness of precision medicine by patient group, 2021.



Source: Future Healthcare Journal (2021).[122]

According to a study conducted on awareness surrounding prostate cancer in the UK, only 46 per cent of the UK could identify where the prostate is, 63 per cent of the UK have never heard of the PSA test, and 45 per cent of UK men (and 63 per cent of UK Black men) would like to know more about prostate cancer risk factors.[123] This indicates the lack of knowledge surrounding cancer, and the desire to be informed about one of the most common forms of cancer in the UK. With a lack of awareness about different types of cancer and who is more prone to develop specific types, there is a risk that people who are statistically more likely to get cancer are not able to take the preventative measures required to reduce their risk.

Such examples reveal an **opportunity for educational interventions to increase awareness of cancer risk among the public, improve prevention, and help patients improve their understanding of their treatment options**.

According to the World Cancer Research Fund, in 2020 over 409,000 people were diagnosed with cancer in the UK, and around 40 per cent – approximately 164,000 cases – could have been prevented by addressing risk factors associated with lifestyle behaviours.[124] Many such cases could have been diagnosed at early stages (one and two) to improve chances of successful treatment, survival and experience. However, in the past 10 years the rate of diagnosis at early stages has not changed and has stagnated at around 54 per cent (**Figure 12**).[125]

This trend follows stagnating public health investment (e.g., in smoking cessation), as well as limited availability and accessibility of monitoring for high-risk groups, as well as a lack of preventative screening uptake and early symptom presentation by individuals).[126] Reducing cancer incidence will be vital for public health and will require integrated efforts across the healthcare system, policymakers, and society to increase people's understanding and awareness of their risks.

Strategies to increase cancer awareness

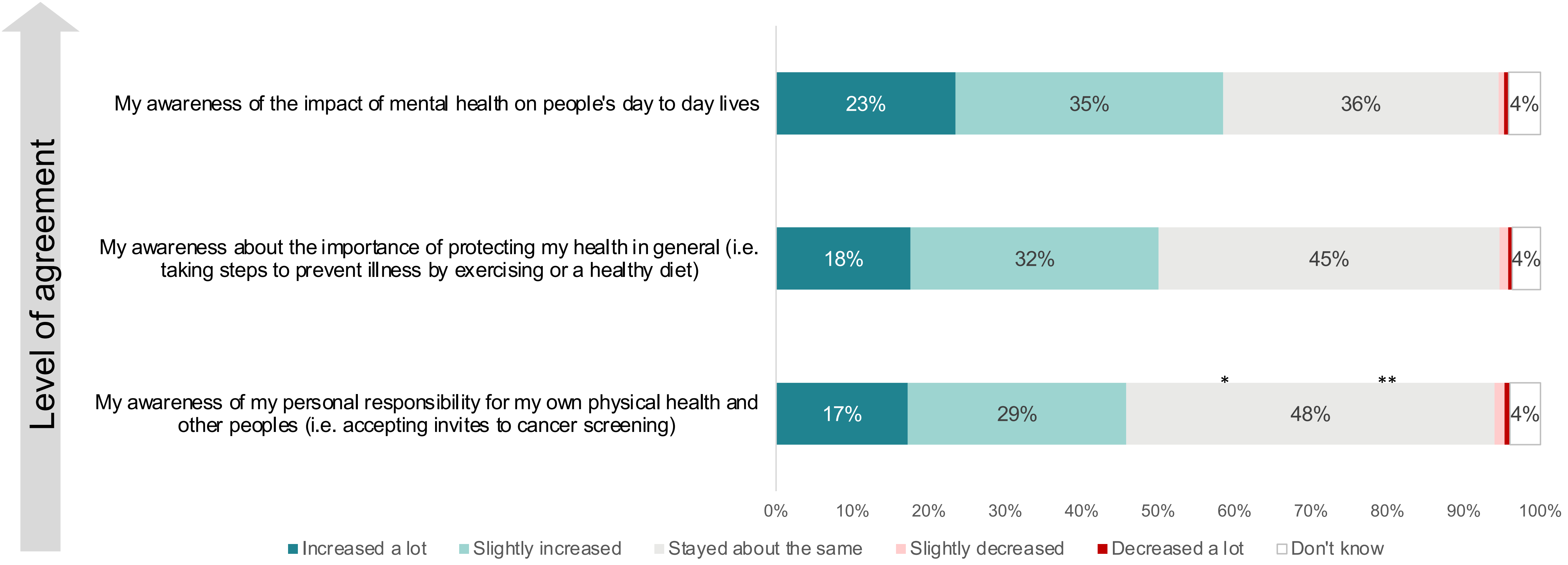
A localised, tailored approach (e.g., working through community groups, leaders) will be required to increase awareness and understanding and raise health literacy in less represented communities, and understand and address reasons for low engagement in screening methods. Creating new routes and mechanisms into diagnostics could help enable earlier diagnosis and better outcomes.

Translate opportunities from successful engagement techniques used during the COVID-19 pandemic to increase awareness and understanding of risks for cancer. There is a potential for a halo effect from recent awareness campaigns which are helping to change attitudes and encouraging people to become more engaged in their own health. In our UK-wide survey of over 2,000 people conducted in December 2022, 50 per cent of respondents say they are more aware of the importance of protecting their health, including taking steps to prevent illness by exercising or adopting a healthy diet, and 46 per cent say they are more aware of their personal responsibility for both their own health and other people's since the start of the COVID-19 pandemic (**Figure 24. Public awareness of personal health since the start of the COVID-19 pandemic.**).

> With a lack of awareness about different types of cancer and who is more prone to develop specific types, there is a risk that people who are statistically more likely to get cancer are not able to take the preventative measures required to reduce their risk.

Figure 24. Public awareness of personal health since the start of the COVID-19 pandemic.

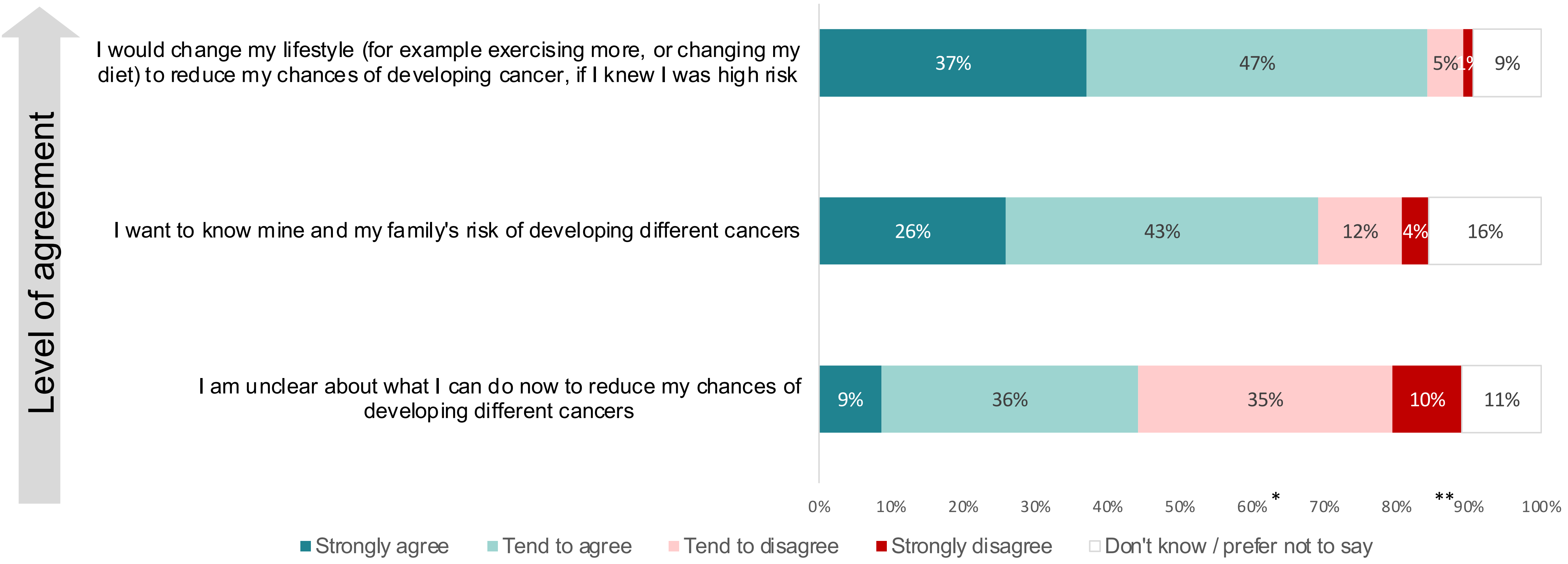
Q: Thinking about your experiences since the start of the COVID-19 pandemic (i.e., since March 2020), would you say your awareness of each of the following has increased, decreased, or stayed about the same?



Note: survey conducted between the 13th and the 14th of December, 2022 with a sample size of 2,055 participants across the UK.
Source: Macmillan & Deloitte Health Awareness Post-COVID YouGov survey 2022.

Figure 25. Public attitudes towards cancer prevention.

Q: To what extent to you agree or disagree with each of the following statements?



Note: survey conducted between the 13th and the 14th of December with a sample size of 2055 participants across the UK.
Source: Macmillan & Deloitte Health Awareness Post-COVID YouGov survey 2022.

Furthermore, our survey shows that 87 per cent of people are keen to change their lifestyle to reduce their chances of developing cancer if they know they are at high risk and 69 per cent want to know their own and their family's risk of developing different cancers (**Figure 25**). However, 45 per cent say they are unclear about what they can do now to reduce their chances of developing cancer (**Figure 25**) which further supports the need for improved education and awareness to provide individuals with the knowledge and tools to act proactively.

Increasing awareness of individual cancer risk and treatments. Using a localised and personalised approach to equip communities and individuals with relevant and targeted information. A more active role by local healthcare professionals – such as community pharmacists – to help inform, engage and build trust, as well as take control of and adhere to treatment or individual risk prevention plans, could help to increase population awareness.[127] In the future individuals will have an even greater role in shared decision-making about their care and, if needed, treatment, and will be empowered to seek on-demand, real-time support from their multi-professional team in times of concern, and if taking treatment decisions. This could be organised at scale through use of digital tools or apps recommended by their team of healthcare professionals.

There is a need to **tailor awareness campaigns,** and specifically target communities in order to improve health equity – for example, communities with high levels of deprivation, low levels of health literacy and low digital engagement. Information sharing should not rely solely on digital means and should be tailored to communities' needs. There is an opportunity to increase education in schools which could have a halo effect on parents and carers in older generations.

In summary, awareness is the critical step to preventing cancer and accessing care. Communication that works for specific communities needs to be used to ensure that people understand their responsibilities better and the importance of screening and diagnostics. There are opportunities to harness the potential of awareness in cancer prevention and better access to care, ultimately resulting in improved cancer health outcomes, by engaging the population in the conversation and enabling them to have the knowledge and control to manage their health outcomes. Overall, we expect to see communication around cancer broadening away from early signs and symptoms recognition to more preventative care, including modifiable risk factor prevention, genetic analysis, and higher uptake of screenings, as well as up-to-date facts about outcomes (which may help to address fatalism) and treatment options, all enabled by the backbone of technology and data.

> In summary, awareness is the critical step to preventing cancer and accessing care.

Person-centred care (including well-being)

Our vision for cancer care in 2035 focuses on expanding the delivery of person-centred experience for all people living with cancer. This is already underway in Scotland where there is a nationwide plan to roll out Holistic Needs Assessments so that every person is offered a holistic approach to their care. Across the UK person-centred care must become a need-to-have not a nice-to-have. As people live longer with cancer and other conditions and the significance of quality-of-life increases, the need for cancer care to focus on the holistic needs of the individual (including well-being) will become increasingly important. People living with cancer should be able to participate and take control of decisions on their care path, acknowledging that everyone has different needs and outcomes that matter to them.

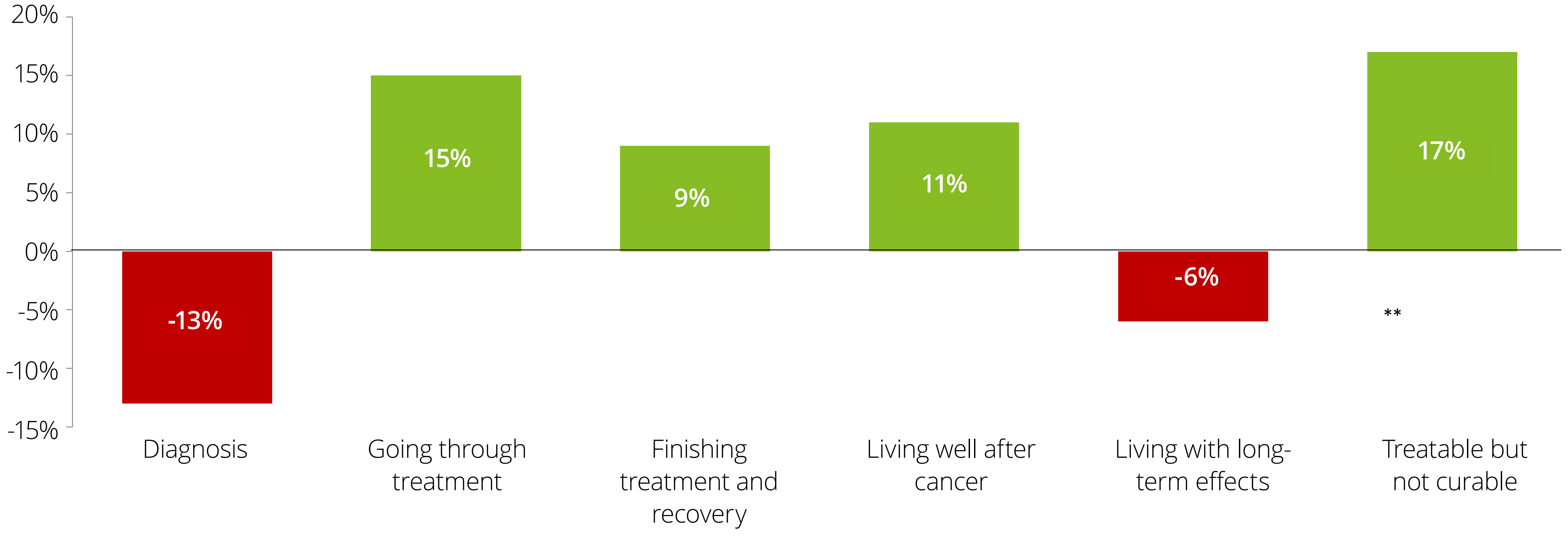
However, in the future delivering person-centred care could become even more challenging as workforce and budgets continue to be stretched. The increasing use of digital tools such as electronic Holistic Needs Assessments (eHNA), digital resources and apps will change the model for how person-centred care is delivered both virtually and face-to-face. The increasing number of healthcare professionals and organisations involved in each person's care will also increase the importance of a single view of people's needs so that a person living with cancer is not required to continually repeat their story and needs.

People living with cancer need their wider holistic needs met

In the future the cancer care pathway will become increasingly complex and difficult to navigate – placing further burdens on people living with cancer. Today 35% of people say their care team has not fully met their key needs as they were not sufficiently asked about their support needs throughout their journey, particularly around diagnosis and living with long-term effects (**Figure 26**).[128]

Figure 26. Variance between per cent of people living with cancer who were asked about all their key support needs versus those who were not (among those who have used NHS healthcare), June 2022.

To what extent do you agree or disagree with each of the following statements – I was asked about all my key support needs, including those that were physical, emotional, financial, and practical?

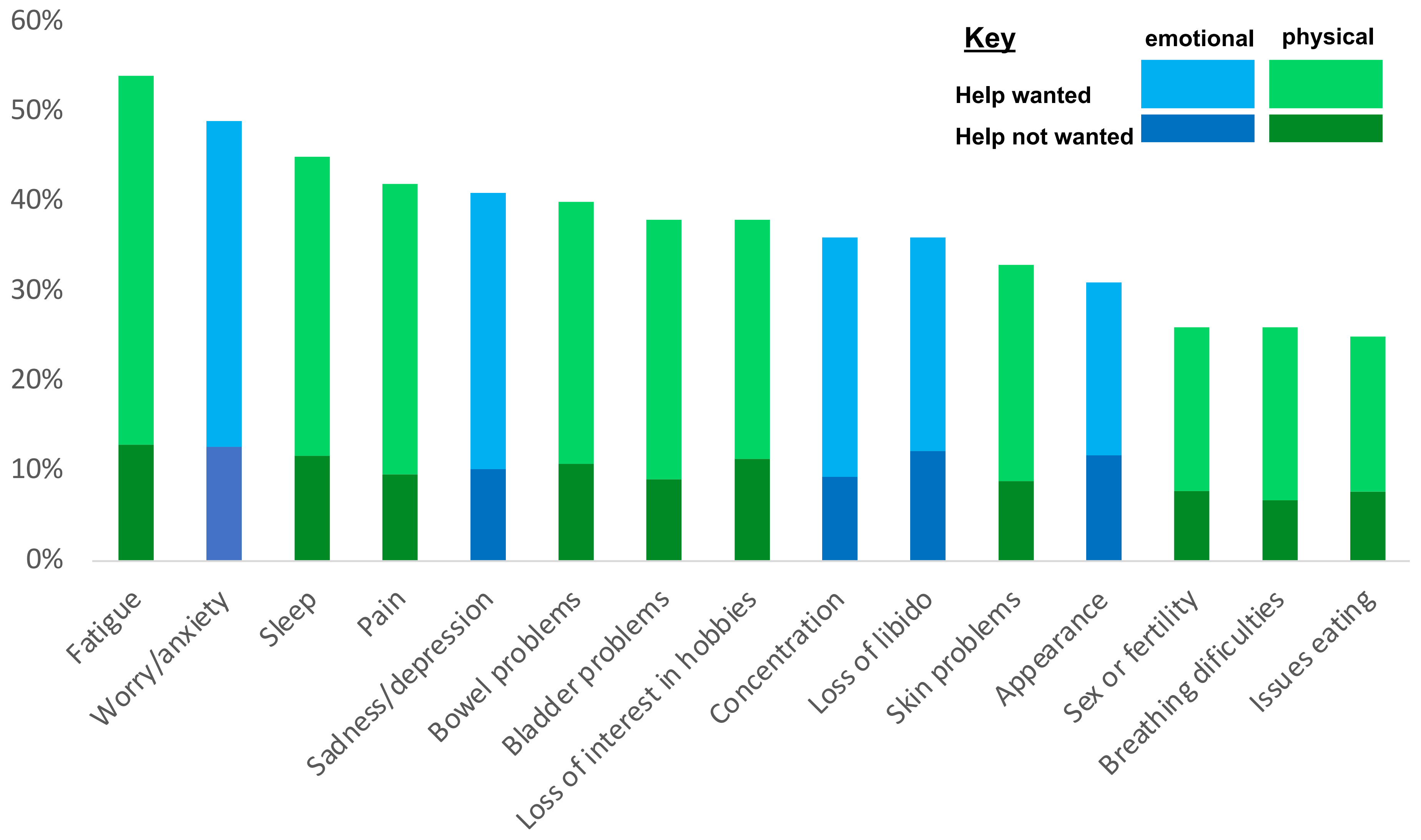


Base: All people living with cancer who have used NHS healthcare by time of need Jun-22; Diagnosis (82), Going through treatment (132), Finishing treatment and recovery (251), Living well after cancer (787), Living with long-term effects (321), Treatable but not curable (79)

Source: Macmillan – The lived experiences of people living with cancer (June, 2022).

Further, some people living with cancer have a poor experience. They report feeling lost, angry and sad, and suffering with fatigue, sleep and mental health challenges, and currently there is not enough support to overcome these challenges (54, 45 and 42 per cent of people living with cancer are concerned about fatigue, sleep and pain, respectively; and 49 and 41 per cent of are concerned about worry/anxiety and sadness/depression, respectively) (**Figure 27**).[129]

Figure 27. Physical and emotional issues that are most concerning to people living with cancer, 2022.



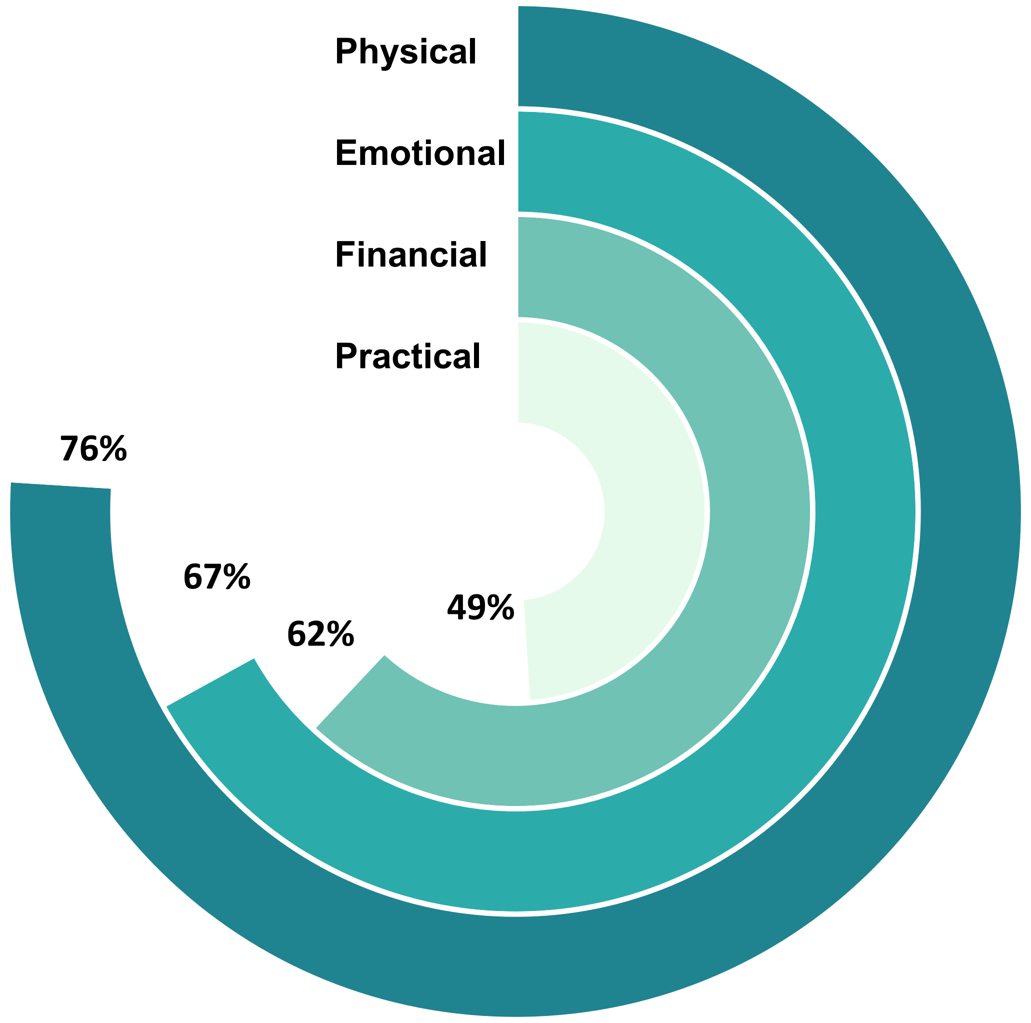
Source: Macmillan – The lived experience of people living with cancer (June 2022)

Sixty-two per cent of individuals living with cancer are concerned about one or more financial issues, while 49 per cent are concerned about one or more practical issues. Furthermore, 76 per cent are concerned about one or more physical issues (**Figure 28**).[130]

Psychological care is also an essential part of holistic care and will grow in future with more complex decisions to be made and as people live longer with cancer. However, mental health services are currently disparate, fragmented and vary across the different regions, making it challenging to receive the most appropriate care for individuals' needs. As these services will continue to be under pressure in the future, the gap between needs and services will remain, and solutions to scale up access are required.

Figure 28. Concerns for people living with cancer issues, June 2022.

Concerns for people living with cancer issues (Jun-22)



Top 5 concerns

- Fatigue
- Worry/Anxiety
- Sleep
- Pain
- Sadness/Depression

Source: Macmillan.

KEY ACTIONS

Ensure holistic care is embedded as a core part of the pathway. With needs identified by people's electronic Holistic Needs Assessment (eHNA).

The full breadth of services are available and easily accessible. Including complementary support commissioned or provided by the third sector.

We also heard directly from those who have lived with cancer or taken care of those living with cancer. Leanne shared her story of navigating the complex healthcare pathway and how, if there was a more personalised healthcare process, she would have been able to make better use of the final days she had with her husband before he passed away.

Leanne's story

Leanne's husband was diagnosed with advanced pancreatic cancer and predicted to have three months to live.

Leanne and her husband both worked as healthcare professionals for the NHS and so felt more able than many to navigate the healthcare system and find support to meet their needs. For example, they were able to access pre-bereavement counselling for Leanne and her young daughter to help them prepare for a different future.

Despite feeling more confident navigating the system, Leanne and her husband were frustrated and demoralised to find themselves repeatedly in treatment bottlenecks and delays. Securing the medication her husband needed to manage his symptoms, including his pain, was particularly difficult. Leanne spent hours waiting at the GP practice for medications that were not ready, given in the wrong amounts or not held in stock by the pharmacy. This meant Leanne had to visit multiple pharmacies across a wide geography. This lack of planning and coordination within the healthcare system to support Leanne's husband was both exhausting and a waste of their very limited precious time together.

There is great value in person-centred care planning and an opportunity to develop a holistic care model that looks beyond cancer:

- **A personalised care plan** that empowers individuals, promotes independence, and helps people to be more involved in decisions about their care is not unique to cancer care. Only one in five people living with cancer have a personalised cancer care plan. But we know from England's NHS Personalised Healthcare Plan 2022 that those with access to a personalised healthcare plan have been satisfied with the programme, with 89 per cent of participants reporting being happy with the level of support provided.

In Scotland progress is being made on the delivery of holistic person-centred care through the Transforming Cancer Care (TCC) partnership. This partnership with the Scottish Government will see the scaling up and spread of programmes such as Improving the Cancer Journey (ICJ) service, which will see everyone in Scotland offered a Holistic Needs Assessment (HNA) by an ICJ Link Worker as part of their care pathway.

Some organisations offer services involving personalised care models, leveraging the use of digital platforms that allow patients to track their appointments, have a daily to-do list, and compile their health information in one place.[131] Such tools can offer a clear picture of the patient's journey while tailoring the information to their needs. However, there are significant barriers to widespread adoption of these platforms, including an absence of signposting to the right resources and a lack of interoperability with NHS data systems to drive useful insight.

- **Cancer care coordinator**. The increasing complexity navigating the pathway highlights the need for adequate coordination. A cancer care coordinator, which may be a clinical or non-clinical role, is someone who accompanies the person living with cancer throughout their journey and plays a pivotal role ensuring they are well equipped to either design a plan that best fits their individual holistic needs, or to signpost the right resources. Cancer care coordinators will help increase awareness of and access to the appropriate services when the patient needs them while also ensuring this does not put too much burden on the patient by demanding they make decisions they may not want or have the capacity to make.[132]
- **Social prescribers**. Increasing collaboration from Voluntary, Community and Social Enterprise (VCSE) organisations can support people living with cancer, and social prescribing can connect people living with cancer with those services, as well as other link workers from non-health organisations who can also support people's wider holistic needs, especially where they are not covered within the health ecosystem directly e.g., finance, housing. It can also support people to access peer support within their communities for themselves or their loved ones.

BACK CONTENTS NEXT

KEY ACTIONS

Ensure every person living with cancer has a personalised care plan and a cancer key worker – Clinical Nurse Specialist (CNS) or other Healthcare Professional (HCP) – who can support them and be a first point of contact.

As a number of different care coordination models are under pilot but there is no consensus on the best model to roll out, **build consensus on the right model of care coordination to:**

- Ensure the needs of a person living with cancer are identified and taken into consideration throughout the pathway and beyond
- Provide additional capacity to the key worker, and triage non-clinical queries, navigation & support
- Provide a new career path for trained non-clinical staff as care coordinators.

In summary, although person-centred care models are already in use, they are not equitably available, and there is a need to go beyond and offer an even more tailored care experience for people living with cancer and their loved ones. Cancer is an overwhelming experience that often burdens people intensely, potentially with long-term mental health implications if not supported appropriately. As such, there is a need to consider holistic support, rather than solely focusing on the disease. This doesn't always happen today due to capacity constraints and a stretched workforce, and needs to become a need-to-have, not only a nice-to-have. Actions to support the workforce to deliver this are covered in later sections within this report.

A positive future vision allows for a proactive approach to personalised care, considering the needs of the person living with cancer, what matters most to them, meeting them where they are in their journey.

Living with and beyond cancer (including with multiple health conditions) and end of life care

In the future the number and nature of cancer care will change, due to:

- **Ageing population with multiple health conditions** – We will see an increasingly older population, at higher risk of cancer and with other health conditions. Estimates for people living with multiple health conditions in England and Scotland vary from 15 to 30 per cent, and people with long-term conditions account for 50 per cent of GP appointments, 64 per cent of outpatient appointments, and 70 per cent of the total health and care spend in England.[134,135]
- **Living longer with cancer –** Through collective advancements in diagnostics and cancer therapies, cancer survival in the UK has more than doubled in the last 40 years – approximately 50 per cent of people diagnosed with cancer in the UK survive their disease for 10 or more years.[136]
- **Increased risk of recurrence** – As people live longer with and beyond cancer, they will increasingly be facing potential – and in some cases multiple – recurrences of cancer during their lifetime. This could be offset by the potential for liquid biopsies to detect cancer at earlier stages, before they have metastasized, and brings hope that potential recurrence could be detected at earlier stages, allowing timely follow up.

As a result of advancements in cancer treatment and care, a growing number of people are and will continue living with cancer as a chronic condition. For example, melanoma saw mortality rates increasing by 7.5 per cent between 1986 and 2013 in the US but, with the introduction of 10 new therapies for metastatic melanoma since 2011 there was an unprecedented shift in reduction of mortality rates, with overall mortality sharply decreasing by 17.9 per cent between 2013 and 2016. The introduction of new therapies for melanoma has had a clear association with a significant reduction in mortality.[137]

Despite tremendous achievements in improving cancer survival, there is work to be done to improve people's quality of life and experience of care. From speaking to people with lived experience of cancer, there is a feeling of "a real disconnect between pre-surgery, surgery, and aftercare", with a lack of attention on preparing people for surgery, post-operative care and the provision of support and advice, leaving people feeling unsure of the next steps at a very vulnerable time. Being given an 'all-clear' after treatment can bring a mixture of feelings, happiness but also anxiety and fear for the future. After treatment is complete, there needs to be an ongoing Holistic Needs Assessment with planned personalised support. Where people don't get access to this support, it can impact function and long-term side effects, including pain, with physical and psychosocial impacts on health. The future of cancer care needs to ensure prehabilitation and rehabilitation are non-negotiable, standard features within the treatment plan, considering their importance in recovery and patient experience, and strong communication with primary care teams via end of treatment summaries.

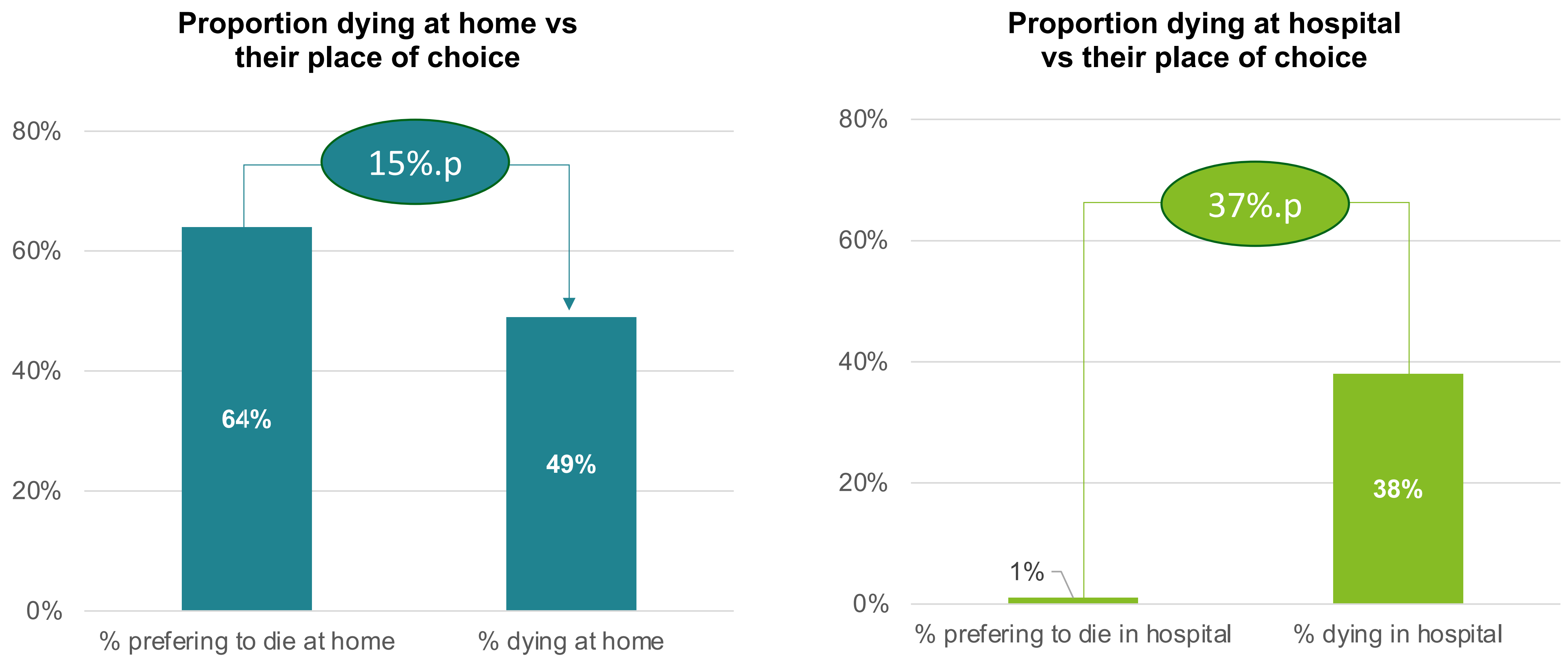
> “My surgeon really took the time to walk me through exactly how the operation would work, exactly what the potential side effects might be. They let me make choices. And I really appreciated that – that was really fantastic. My post op care was, “here’s a leaflet, follow these instructions.” The leaflet was for an operation much less severe than mine. I came out of my op not being able to talk. There was literally no information about when that would go away or what support was out there.”
>
> **Quotes from people with lived experience**

Sadly, around half of people diagnosed with cancer do not survive longer than 5 years.[138] Currently, although many will go through palliative and end of life care, funding does not meet the demand and the cost of services is rising. There is a lack of integration in the pathway and many people do not have the opportunity to discuss their preferred care plans in advance.[139] Palliative care can also benefit from a more person-centred approach, integrating care with a cancer care coordinator who supports patients during and beyond treatment, improving their comfort, overall experience, and quality of life. Palliative and end of life care should be considered of equal importance to any other NHS provision, supported by adequate funding and resources in order to ensure that people living with cancer die with choices, care and dignity, to improve quality of life at end of life.

Palliative care needs to foster a safe environment to have difficult conversations around where and how people want to spend their end of life. Evidence from before the pandemic showed a clear gap between where people were dying with cancer versus their place of choice – 64 per cent preferred to die at home, against 49 per cent who did so, and only one per cent expressed a preference to die in hospital, while 38 per cent died in a hospital environment (**Figure 29**).

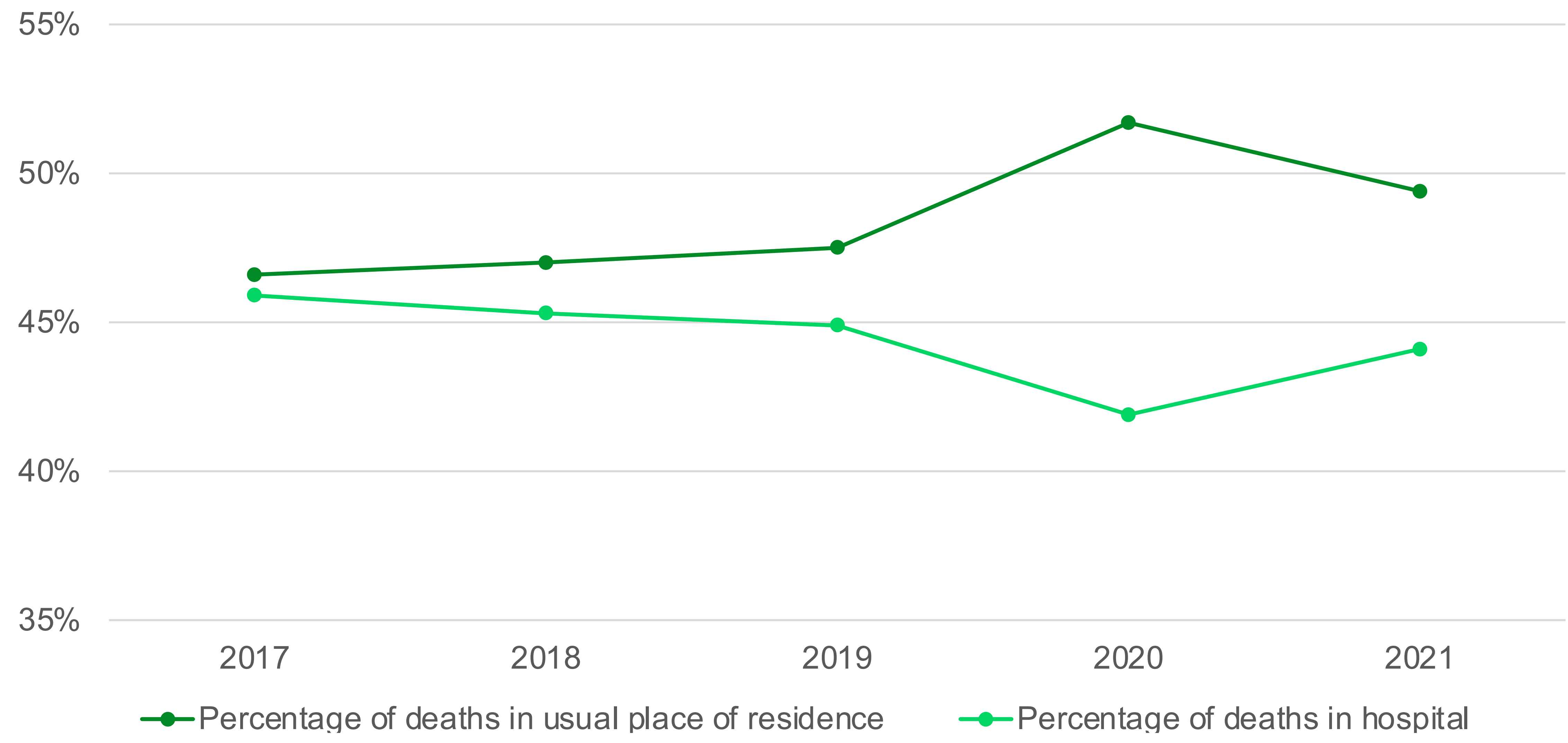
The proportion of people dying from all causes at their usual place of residence (home, care home or religious establishment) has increased over time, as the number of people dying in hospital showed an overall decline (**Figure 30**). Research by Marie Curie shows this trend is consistent across the UK.[140] There needs to be improvement in equity for palliative care at end of life. It has been affected by the pandemic, with many people dying at home through fear of accessing support or because the usual support was unavailable.[141]

Figure 29. Proportion of people with cancer dying in their place of choice.



Note: %.p = percentage points.
Source: Deloitte analysis; Macmillan – The Final Injustice Report (2017).

Figure 30. Proportion of deaths taking place at home versus hospital settings over time, England.



Source: Nuffield Trust, End of Life Care, 2022.

In the future changes to cancer demographics will mean the number of people dying from and with cancer and with complex needs and multi-morbidities will increase. People increasingly want to die at home, but not all homes offer a suitable environment.[144] There is a need to understand every individual's preference and choices, as well as to take into account new needs from the UK's increasingly diverse population. As more people choose to die at home, the role of care homes in supporting people during their end of life is likely to increase. This requires an integrated approach and joined up local services to support people and their loved ones. An even greater role will emerge for generalists who understand and can respond to people's preferences and orchestrate the delivery of those choices within their local community.

This evidence highlights the changing landscape in the provision of palliative and end-of-life care, and the need for increased resources and bespoke training to equip and support the generalist workforce in the community, including paramedics, care home staff, and allied health professionals (AHPs) with the clinical and emotional skills to deliver high-quality end of life care. A recent survey on public attitudes to death and dying by Marie Curie found that having a trained carer nearby was the top priority to be managed in the final years of life.[145] A shift in the palliative care landscape will help support a change in the cultural conversation about end of life and dying, in turn leading to more pressure for funding to improve services. There is a heavy reliance today on the third sector to deliver this care, for example in hospices.

However, there are also inequalities in the support available. Much hospice care support does not feel relevant to people from non-White, non-Christian communities. Population changes mean that people are living longer, with multi-morbidities and a more diverse group than before, meaning there is a need to think differently about how to reach and support people in the way that is most relevant for them.

KEY ACTION

Increase resources to deliver changing models of end-of-life care in the future. Funding, facilities, and training to support the generalist workforce response to changing demands in the community, and increased specialist palliative care focus on the most complex cases.

Alongside an increased focus and investment in end-of-life care, there is a need to capture the experience of those who have suffered loss to help positively shape the future of cancer services. The development of metrics to cover palliative care outcomes and the overall end of life experience will support service improvement for the future and enable deeper integration in the cancer pathway.

A future model involves a transition from the current siloed delivery of healthcare that treats diseases separately to an integrated model that focuses on treating individuals beyond their diagnosis.

Location of care

People living with cancer often need to travel long distances to access specialist care

Today, cancer care is concentrated within secondary and tertiary care services, usually in large urban areas, making it harder for more rural communities to access. In addition, there is a trend towards centralisation of specialist cancer services (in many countries, including the UK) driven by the goal of improving outcomes and efficiency.[146] However, this means people with cancer are often expected to travel long distances to access specialist care, increasing inequalities in access and travel.

Centralised specialist centres – where skills are focused, and services can be delivered within a population catchment area which supports highly specialist teams – will remain important, but there is an opportunity to disseminate knowledge through regional centres of excellence and deliver expanded care closer to home in the future. New community delivery models (e.g. Lloyds have partnered with the NHS to deliver immunotherapy locally using highly skilled staff) and technological developments (e.g. pharmacogenomics to identify people who are more likely to experience side effects) can be used to triage patients who can be treated safely and effectively locally.[147]

Access to specialist centres is a particular issue for people living with cancer in remote areas where investment in the community and digital delivery pathways are needed. Sometimes specialist care is provided across the borders of UK nations. For example, someone living in Wales might need to travel to England to access the specialist care they need. This creates inconvenience and presents additional patient data transfer challenges between health systems, highlighting the need for interoperability and the seamless transfer of real-time data.

People prefer specialist centres or hospitals that have shorter waiting lists, offer more advanced technology, including robotic surgery, and better overall indicators of service quality, including by reputation, compared to other hospitals or centres.[148] Therefore, if they have the means, people are prepared to travel long distances, bypassing their nearest specialist centre, to receive the treatment and care that they feel best meets their needs.

> "I had intensive radiotherapy treatment. I found it a strain travelling 50 miles from my home every day to the specialist centre. There are many people much more disadvantaged than me – the elderly, people with mental illness, people weakened by treatment, people with physical disabilities etc. The problem will be much greater with the move to more specialist centres. People will have to travel greater distances to get their treatment. This may lead to them accepting an inferior treatment because they can't travel."
>
> **Quote from a person with lived experience**

There is potential to deliver much more care in the community and close to home by 2035, both to improve people's experience and to support the creation of capacity within secondary and tertiary settings.

There are opportunities to deliver a greater range of services in the community and closer to the patient:

- **Community diagnostics**. Conducting diagnostics in community settings means that GPs will be able to refer patients to local centres for diagnostic tests, reducing the need for hospital outpatient visits. Community diagnostics can offer a 'one-stop shop' solution closer to home that delivers a range of diagnostic checks, MRI and CT scans, and tests out of the hospital setting (see **case study 1**).
- **Home sampling**. Home-testing kits for a wider number of cancer types will improve the convenience of sample collection, while supporting early diagnosis efforts and making diagnostics more accessible (see Early diagnosis (including targeted screening) section), particularly among more vulnerable groups.[149]
- **Local treatment centres, at-home treatment, and mobile cancer care units.** There will be an increased role for community and home-based care for less complex treatments to increase patient accessibility and convenience. However, we recognise that increased community support will present additional logistical challenges and the requirement for increased capacity and staffing for care delivery (e.g. chemo suite chair capacity).[150] Mobile cancer screening/care units, which can deliver screening (see **case study 2** and Early diagnosis section), or chemotherapy and other supportive treatments, can deliver expert care and treatment within communities, reducing the need to travel for appointments.[151,152]
- **Designing healthcare estates prepared for a digital future.** Caring for people's health remotely must ensure that healthcare estates and facilities, as well as technology and infrastructure, are maintained and create safe spaces and environments for sensitive conversations.
- **Virtual wards and digital healthcare**. The NHS is introducing virtual wards to offer patients the care they require while staying at home, rather than in-hospital care. We expect virtual wards to be expanded to cancer care in the future so that care and support can be delivered remotely via the use of apps and other technology platforms, such as wearables and medical devices, complementing face-to-face care from MDTs in the community.[153] The increasing use of digital tools by healthcare professionals will also enable joined-up working between the specialist and generalist workforce so that people can cared for closer to home throughout their journey.

Case study 1: The Finchley Memorial Community Diagnostic Centre

The Finchley Memorial Community Diagnostic Centre (CDC) in North London was established in July 2021 and was one of the first CDCs to become fully operational. It provides a range of diagnostic services, including MRI, CT and ultrasound scanning, blood testing and ophthalmology services. The hub is open 12 hours a day, 7 days a week and saw 50,000 patients in its first year of operation, alleviating pressure on nearby acute hospitals.

Improvements in efficiency are clear: the patient journey time through certain tests averages 40 minutes, in comparison to 2-3 hours seen at nearby hospital sites. Locating the hub in the community improves access, and 100 per cent of MRI patients say that they have had a positive experience.[154,155]

Case study 2: Manchester 'scans in vans'

A partnership between Macmillan and the lung cancer team at Wythenshawe Hospital (Manchester University NHS Foundation Trust) set up lung health checks trialled in Greater Manchester.

The lung health check used 'scans in vans' to deliver community screening in convenient community locations, targeting communities in deprived and more isolated areas.

The programme addressed perceived barriers to screening through improving convenience, accessibility and early detection health messages. Eighty per cent of cancers detected were at early stages.[156]

KEY ACTIONS

Reduce barriers to non-invasive screening methods that can be delivered and performed at home (e.g., FIT and HPV home test kits), by removing geographical and practical barriers obstructing uptake.

Use affordable, simple to use digital tools to support remote self-monitoring (report and monitoring of symptoms) in people's own home and deliver in an equitable way. This will help limit follow-up appointments, reduce travel to specialist centres, and improve the care experience.

Strike a balance between face-to-face and virtual care delivery, ensuring that digital solutions complement but do not replace physical appointments.

Some care – particularly complex cases, and where access to super-specialists is required – will continue to be delivered in centralised secondary and tertiary centres. This care should be targeted so that people only need to travel when they must.

Travel to specialist centres for novel treatments will still be needed for complex conditions, and some specialist appointments and care planning should consider minimising travel distances particularly for those individuals who face greater difficulties (physical, emotional or financial) in accessing the services that best meet their treatment needs.[157] With different elements of cancer care being delivered across different locations, it will be essential for care settings to join up their ways of working and seamlessly share information.

In the future, by delivering alternative models for the location of care, the expectation would be that more people will be able to engage with diagnostic services and diagnose cancer at an earlier stage. This will help to improve health equity by removing barriers associated with accessing diagnostic services or cancer treatments. As there are many options for improving location of care, these solutions must be cocreated with the community, incorporating its specific needs.

Where people need support to travel, hospital transport or accommodation needs to be provided, so no one is excluded.

In our research, we heard directly from people with lived experience of cancer that they would be willing to travel long distances if that is the only way to get the treatment they need, despite the emotional and financial burden.

However, not everyone can travel a long distance. Bringing care closer to home can improve equity for those without the means to pay for travel, older people and the less physically able.[158] Care planning must be done with equity and individual considerations in mind, so that everyone can access and benefit from the best possible care.

Where travel is required, both transport and accommodation need to be supported so that it is not limited only to those with the means and the ability and considers and provides for the impact that travel for treatment can have on loved ones and the support system of the person living with cancer.

Workforce – Building our workforce for the future

Future ambition for factors relating to workforce

Workforce availability

- **Increased recruitment and retention supported by funding**, addressing chronic healthcare workforce shortages, including primary and community care.
- **New roles will be implemented and expanded** to meet future need.
- To meet changing demand, the workforce will also **increasingly work differently across settings**, supported by technology and **better use of skills within the expanded generalist workforce**.

Workforce skillset

- Increased **collaboration of workforce across community, secondary and tertiary care** will enable a more integrated healthcare system.
- There will be a need for the **generalist workforce to have a core set of skills and competencies** to support people with cancer both in **acute** and **community settings to help manage and support those with multimorbidity**.
- The workforce will be supported in developing **a flexible portfolio of skills to respond to advances in treatment and technologies** e.g., genetic counselling and bioinformatics.

> With different elements of cancer care being delivered across different locations, it will be essential for care settings to join up their ways of working and seamlessly share information.

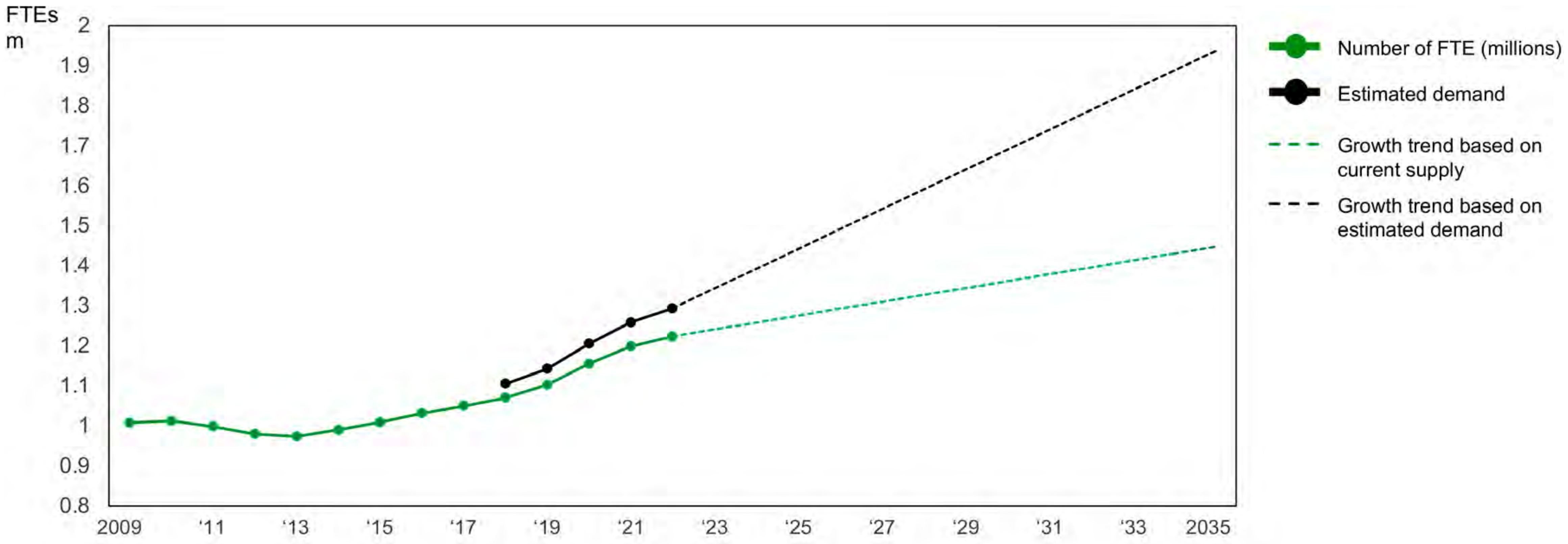
Workforce availability and workforce skillset

In the future we will need sufficient healthcare staffing in place so that people living with cancer receive the care that is right for them, and so that healthcare professionals have the capacity to do their job well and have the time to train in new skills to deliver care in the future.

The pipeline of healthcare professionals joining the workforce is lagging behind where it needs to be and at the current rate will not be able to meet the accelerating demand for 2035.

Today, workforce availability statistics present a gloomy picture. Demand forecasts are projected to outstrip supply across NHS staff (**Figure 31**), demonstrating the stark future challenge to delivering primary and secondary care, as well as through allied health professionals (AHPs).

Figure 31. Historical and future supply of and demand for NHS England staff, 2009-2035.



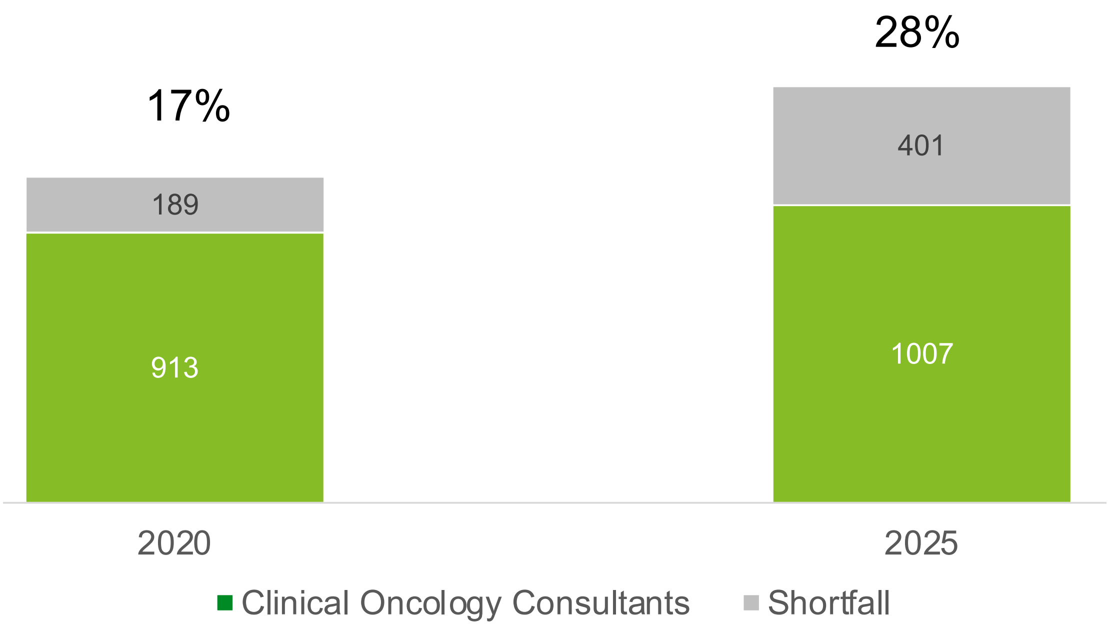
Source: NHS Digital, Nuffield Trust.[159,160]

There are shortages and challenges across nearly every element and role in the healthcare ecosystem and essentially every aspect of the profession will be impacted by future changes. However, for the purpose of this report, we shine a spotlight on particular roles such as clinical oncologists and specialist cancer nurses.

Specifically for cancer, there are projected shortages for clinical oncology consultants, with current cancer centre vacancies around eight per cent (as high as 12 per cent in Northern Ireland, versus six per cent, the lowest figure, in Scotland).[161] Opportunities for global recruitment of clinical oncology consultants are very limited, driving a future requirement to focus on UK training. There is an estimated 17 per cent shortfall currently, which could rise to 28 per cent by 2025 (**Figure 32**). These figures are particularly worrying in Wales where the clinical oncology consultant workforce is shrinking between minus two per cent and ten per cent (compared to growth of one per cent to three per cent in Scotland, three per cent in Northern Ireland, and between minus one per cent and six per cent, depending on the region within England).[162]

Figure 32. Current and projected shortfall in availability of clinical oncology Consultants, 2020-2025

Whole time equivalents

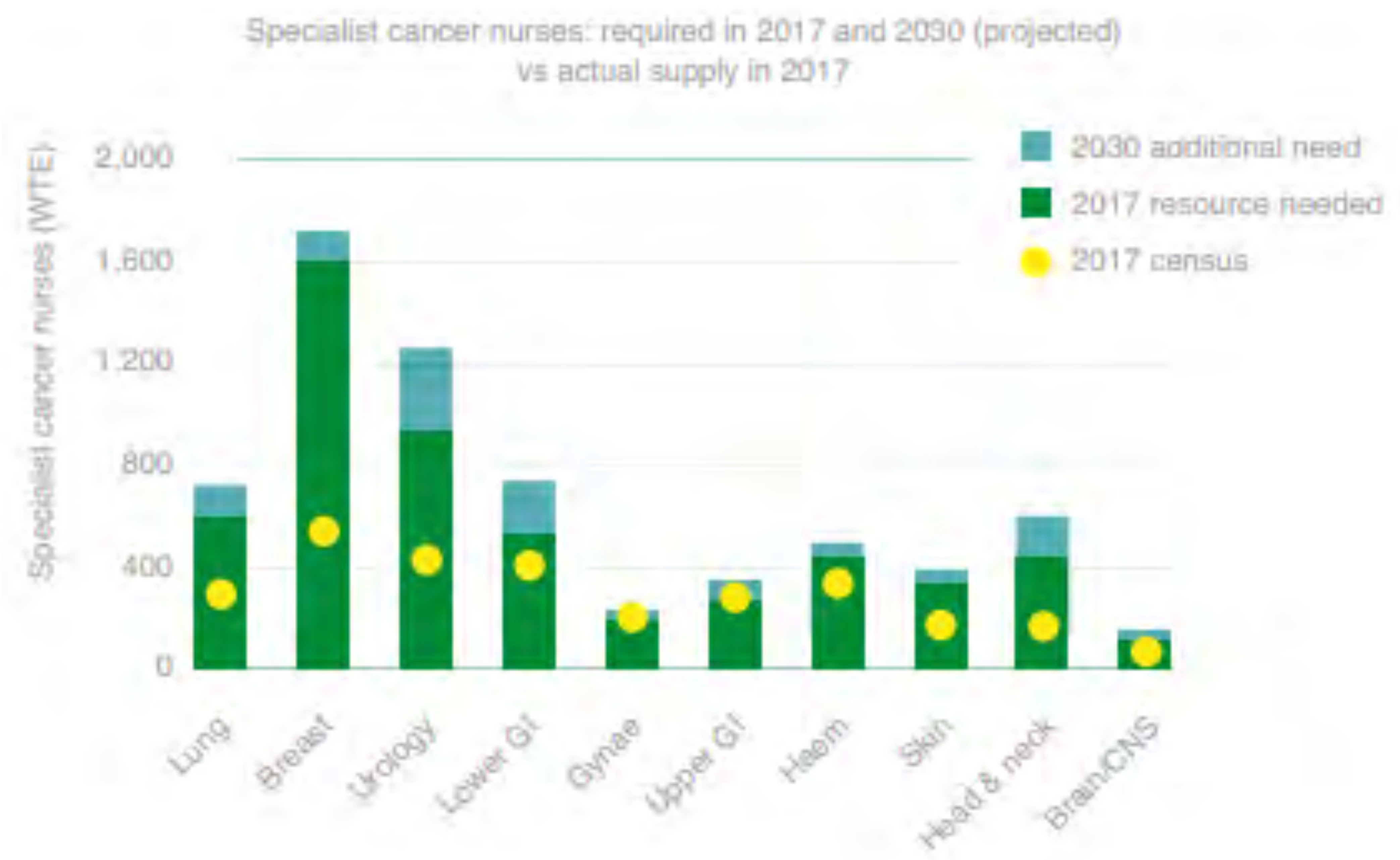


Source: RAR clinical oncology UK workforce census (2020)[163]

> There are shortages and challenges across nearly every element and role in the healthcare ecosystem and essentially every aspect of the profession will be impacted by future changes.

The projected shortfalls are even more stark for specialist cancer nurses (**Figure 33**). Record numbers of nurses are joining the UK nursing register but this is not enough to stem the shortfall as turnover is accelerating faster than new recruitment. One in nine nurses is exiting active service, and almost 30 per cent of cancer nurses are saying they are more likely to leave now than they were last year.[164,165] Among those who are staying, many are moving to other roles, leaving gaps to be filled.

Figure 33. Projected shortfall in availability of specialised nurses, 2017-2030.



Source: Addressing the Gap, Macmillan (2020).[166]

In England, Macmillan has estimated that over 3,000 additional specialist cancer nurses will be needed by 2030 to address the current shortfall.[167]

In Wales, certain sub-specialities are at particular risk with 74 per cent of breast and 50 per cent of gynaecology specialist cancer nurses over the age of 50, which means they are often within 10 years of retirement.[168]

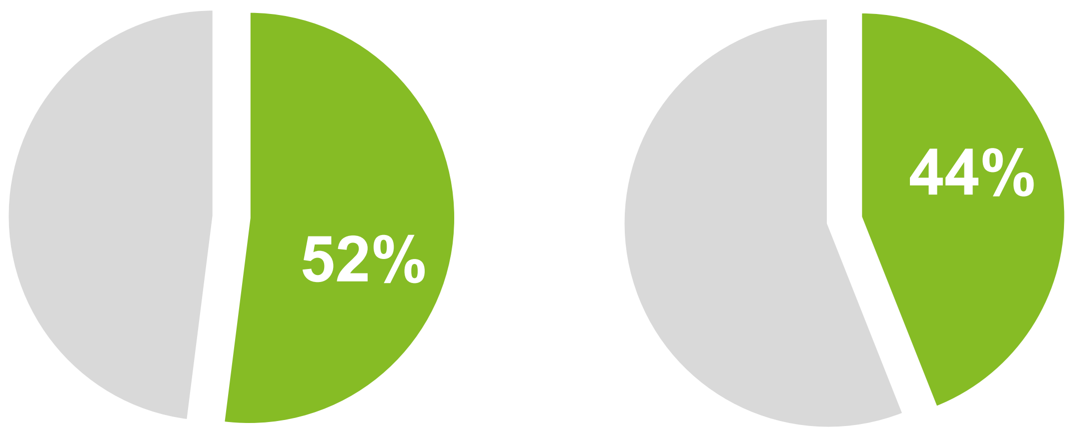
In Scotland, the trend of nurses leaving the NHS is at its highest level, both in absolute and relative terms, in the last 10 years.[169]

In Northern Ireland, this challenge is particularly acute due to capacity challenges in hospitals, where 83 per cent of nursing staff report the actual number of nursing staff on their last shift was not sufficient to meet people's needs safely and effectively.[170]

If capacity constraints are not addressed, the workload will impact the ability to improve care in the future

Clinical oncologists and specialist cancer nurses are reporting that workload is affecting healthcare professionals on a day-to-day basis and affecting the care quality cancer colleagues feel able to deliver (**Figure 34**). If capacity challenges do not improve, the impact on quality is at risk of substantially worsening in the next 10 years.

Figure 34. Reported impact of workload on care quality



Of cancer centre heads of service say workload is affecting quality of care[1]

Of cancer nurses say workload has a negative effect on care[2]

Source: 1 – RCR Clinical oncology UK workforce[171] 2 – Voices from the frontline (2019)[172]

Nurse Workload Experiences[173]

> 'In cancer care we're just always firefighting. We're never, ever looking ahead and saying 'yes, we're ready for that'
>
> **Lead Cancer Nurse**

> 'In the background I was also worrying about the cancer patients and them getting their diagnosis because everything just stopped. And I'm still worrying about that now, will we ever catch up? Will there be too many late diagnoses? We're going to be in for an explosion and how are we going to manage that?'
>
> **Macmillan Cancer Lead Nurse**

Robust long-term costed workforce plans are needed for each UK nation. Although work is underway in some nations, not all have published in-depth or up to date cancer strategies. The plans must address recruitment to ensure enough healthcare professionals are trained and join the cancer care workforce, and retention to ensure that professionals can continue to develop their career, in meaningful roles.

However, as cancer care becomes increasingly complex, and the number of people needing care increases, retention and recruitment alone will not be sufficient to address the gap – bold reinvention is required to transform models of care and roles. This will require the way cancer care is delivered in future to change. Clinical Nurse Specialists are at the heart of cancer care and must remain so, but given the shortage of specialist nurses, nurses will need a team of healthcare professionals around them who can support them in delivering for patients.

The workforce of the future also needs to be equipped with the skills to deliver a person-centred pathway, through formal education and sharing of best practices (addressed in detail in our Lived Experience section).

To address these significant challenges, we need to take action in four critical areas: **retention**, **recruitment**, **training**, and **reinvention**.

Retention: For consultant oncologists, attrition has been low over recent years at around four per cent. However, on average, 18 per cent of the workforce is expected to retire within five years (as high as 28-29 per cent in Northern Ireland and Wales). Full time clinical oncology consultants tend to retire approximately three years earlier than those on less than full time contracts, underlining the importance of flexible working to retain oncologists.[174]

For nurses, increasingly the trend is towards younger nurses leaving their roles – two thirds of those who left in 2021 in England were under 45 years of age, which is an increase of 26 percent on the previous year.[175] Other common reasons for leaving are retirement, and work-life balance (with almost four times more nurses citing this reason than 10 years ago).[176] With average nursing attrition rates during training at 24%, the number of nurses signing up for nursing degrees is often a misleading guide to the numbers joining the nursing workforce, particularly as attrition rates are increasing both during training and in the two years after qualification.[177] These statistics ultimately paint a picture of the cancer nursing workforce capacity being increasingly squeezed at both ends. Furthermore, nurses' pay has come into stark focus. Since 2010 nurses have had a real terms pay cut of 10 per cent, and their pay has not kept pace with overall public sector pay increases.[178]

Turnover levels in England are highest in community provider trusts, which deliver district nursing, community physiotherapy, and community rehabilitation services. This, coupled with the fact that 42 per cent of GPs are planning to quit the profession, and predictions that in 10 years' time one in four GP and general nursing posts will be vacant, highlights the need to create new models of care and new workforce sources for cancer care in the community.[179,180]

There is a need to retain valued colleagues within the health system, but healthcare professionals are under significant pressure from challenging workloads, driving them out of front-line practice. Working under huge stress during the pandemic and its aftermath has also impacted staff physical and mental health. Basic well-being initiatives have not gone far enough and are not being sustained.

Addressing these challenges requires joined-up thinking, as current workforce solutions are siloed between providers. Often a solution in one team, care setting, or region creates shortages elsewhere. International recruitment is increasingly relied upon but, in the context of global workforce shortages, impacts global health equity.

The systemic challenges with workforce affect all parts of the cancer pathway, but in particular block opportunities to realise the benefits of targeted screening programmes, access to timely diagnostics, and person-centred care.

KEY ACTIONS

Address staffing and pay challenges driving healthcare professionals out of the system.

Address root causes of poor well-being or feeling exhausted, undervalued, and under too much pressure.

Rethink how senior/experienced nurses and other healthcare professionals nearing retirement could be retained in supporting roles (e.g., clinical educator, mentor, coaching roles). For example: an opt-in programme in mid-career which provides complementary training throughout clinical career to prepare for a teaching role.

Recruitment: A systematic effort to attract, train and develop the careers of the UK cancer workforce is required to increase the inflow of qualified professionals into the system. This includes both specialists – including trainee medics and clinical nurse specialists, as well as generalists – including GPs, advanced nurse practitioners (ANPs) and district nurses, specialist and newly qualified AHPs, and care coordinators.

Health Education England's ACCEnD programme provides a framework comprising core capabilities in practice, a career pathway and an education framework for generalists and specialists working with people with cancer. It aims to become UK-wide in its application.[181] There is a near-term opportunity to work in a joined-up way to implement the ACCEnD Framework and inspire healthcare professionals to take up roles within cancer in the future. These may be new types of roles, which are limited in number or scope today or do not yet exist at all in the UK but will be required across the pathway in the future. For example:

- **Genetic counsellors** – to support people in understanding their hereditary cancer risk, communicate an increasingly complex set of information, support people as genetic testing becomes increasingly prevalent, with consequences for screening, treatment and shared decision-making.
- **Immunotherapists** – to support the increasing use of immunotherapies, and as therapy selection and personalisation becomes increasingly relevant.
- **CAR-T technicians** – new technologies require new sets of technician skills.
- **Specialists in robotic clinical documentation processing** – to support the use of robotic processing of clinical documentation to bolster efficiency in administrative tasks and ensure there is high-quality documentation for any clinical procedures.

> A systematic effort to attract, train and develop the careers of the UK cancer workforce is required to increase the inflow of qualified professionals into the system.

KEY ACTIONS

Publish and deliver a robust, long-term costed workforce strategy and workforce planning supported by clear data and funding from national to local level (from robust record-keeping and a joined-up IT system) on capacity, roles, and competencies (e.g., SACT trained).

Understand readiness of workforce to be upskilled, leveraging existing career development frameworks, including ACCEnD, from support worker, pre-registration through to registered, enhanced, advanced and then building advanced practitioner roles to support with the non-medical consultant pipeline.

Make Healthcare / Life Sciences careers and roles as attractive as possible. For example: embed Life Sciences careers' education within the curriculum, including alternative routes, e.g., apprenticeships.

Create roles & career paths for the new skills required for the future by providing options for training/re-training and career transition opportunities. For example: genetic counselling, immunotherapies, CAR-T technicians, robotic clinical documentation specialists.

Training: Cancer teams are becoming highly specialised in their own disease areas, reflecting an explosion in knowledge and constant therapeutic innovation. Our healthcare systems need to be able to continuously educate and upskill staff. However, increasing demands from workload, coupled with staffing shortages, mean that healthcare staff are constantly under pressure and do not have sufficient time built into their working days to upskill and gain new knowledge.

> "90 per cent of what we know about cancer was published in the last 5 years"
>
> **Larry Norton (Deputy physician-in-chief and Medical Director at Memorial Sloan Kettering Cancer Center, and former president of American Society of Clinical Oncology), October 2022**

Despite protected time for continuing professional development (CPD), one report found that today 64 per cent of cancer specialist nurses report they cannot access this protected time and 25 per cent have had to take annual leave to do so. Funding is also not always in place, with 43 per cent reporting a lack of funding as a barrier and one in five self-funding their CPD.[182] With care in acute and tertiary settings becoming increasingly complex and super-specialised, there is also an increasing requirement for generalists to take an even greater role in identifying signs and symptoms, fast-tracking diagnoses, taking the lead on lower complexity activities closer to home (under remote acute centre supervision), and coordinating multi-morbidities and holistic care within the community.

This means that generalists require increasing breadth and depth of knowledge in cancer. Workforce shortages currently challenging the NHS must be addressed as primary care in its current form does not have the capacity to take on additional responsibility.

In addition, new training needs are emerging to support the future skills required:

Type of training	Specialists	Generalists	Rationale
Cancer basics	✗	✓	To ensure that all healthcare professionals interacting with people with cancer have a basic understanding and knowledge of cancer and can support those with multi-morbidities.
New interventions	✓	✓	For **specialists**: to become qualified experts to deliver a broad range of interventions, including prehabilitation and rehabilitation. For **generalists**: to take on new roles in the future (e.g., providing less complex treatments).
Holistic, person-centred care	✓	✓	To support the whole person, at whatever stage a person living with cancer presents, whether for a short or longer time.

Note: ✗ = Indicates training needs are not required/will not be required of that particular role, ✓ = Indicates that the type of training up-take is required of the aforementioned role

In addition to training, there needs to be a strong focus on addressing practical constraints which prevent learnings from training being applied in day-to-day practice. For example, moving person-centred care to become an integral part of clinical practice and creating the capacity and protected time to deliver interventions is critically needed; and improvements in knowledge transfer to stem the loss of senior, specialist knowledge as professionals retire at a faster rate than can be replaced. These new needs, together with the realities of the workforce, require a reinvention of roles to enable acute and tertiary settings to increasingly focus on super-specialised care.

KEY ACTIONS

Continuing to invest in acute and tertiary specialist centres to develop world-leading regional centres of excellence which diffuse skills, and support training in the community/other settings for local healthcare professionals to develop new skills.

Help facilitate access to appropriate levels of cancer training for specific roles across the four UK nations, including generalist roles.

For example:

- Coordinating rapid access to diagnostics
- Delivering at-home or closer to home infusion
- Providing holistic support to people living with cancer as a long-term condition
- Use of remote monitoring as a tool.

Reinvention: Reinvention of roles and ways of working across the pathway is required for the future.

As targeted screening increases and new non-invasive tests become standard, roles such as genetic counsellors will need to be scaled up to meet demand. Looking to a future where staff shortages have been redressed, pharmacists, GPs and screening teams will be increasingly called upon to support people in understanding their genetic and modifiable risk factors, as well as the implications of screening.

The role of the pharmacist, in particular, is likely to continue growing in the provision of healthcare services, and there is evidence that people's trust in pharmacists with their personal health information has grown over the years. A YouGov survey conducted in May 2018 of just over 2,000 people showed that 41 per cent of respondents would be willing to share their anonymised personal health information with a pharmacist.[183] When the same question was asked of over 2,000 people in December 2022 during this research, the number rose to 48 per cent. We expect this increasing trend to continue.

When going for tests, increasing numbers of people will experience rapid access to diagnostics delivered in the community and greater private sector involvement. Current roles will need upskilling to deliver personalised care at the time of diagnostics.

In addition, new types of roles to support the development of community hubs need to be created, for example specialist nurse-led clinics, or new roles such as physicians associates which can help clinicians deliver their case load. For example, in the South East, NHS England has begun to roll out the physician associate role to deliver medical care as an integral part of the multi-professional team working with a dedicated consultant supervisor. The role is already supporting the cancer pathway for specialties such as urology, colorectal and breast, with physician associates complementing the staffing structure by explaining treatments to patients, scanning test results, and developing management plans, in addition to carrying out follow-up administrative tasks.[184]

Together with these new roles, new career paths for non-clinicians – for example, administrators who are already deeply involved in and knowledgeable about the cancer pathway – to be appropriately trained and take a greater role with new competencies could create new sources of workforce. In our December 2022 survey, with over 2,000 participants, we found that 79 per cent of people are happy to receive information and support for their condition from a healthcare professional who is not a doctor if they are qualified to support them.

Navigation through the healthcare system, which is already complex, will become increasingly so and an increasing number of people living with cancer will spend a larger amount of time being treated and followed up in the community, rather than at the hospital. Together with increased burdens on GPs from ageing populations, multi-morbidities and increasing turnover, there is a requirement for new roles in the community, which focus on care navigation, managing raid access to diagnostics, and coordination of the holistic needs of people living with cancer, as well as triaging and escalating queries to clinical teams.

Clinical nurse specialists (CNSs) have long been at the heart of cancer care – and a key point of contact, expertise, and support from the perspective of a person living with cancer. But in recent years the role of key worker to people being treated for cancer has also been taken on by allied health professionals (AHPs), as well as CNSs, in order to increase the bandwidth of teams supporting people living with cancer. As the shortage of specialist cancer nurses becomes increasingly acute, nurses will be critical to play the unique and valuable roles which only a CNS can, bolstered by support from other healthcare professionals. Transformation of care should focus on elevating the capabilities of nurses and tie in with efforts to increase retention to transform the roles which senior nurses can take on as they come towards retirement.

Ongoing supervision of care, including greater numbers of people surviving cancer or experiencing remissions, will create new needs for generalists in the community to have more in-depth knowledge of cancer (for example, Advanced Nurse Practitioners) and act as a point of contact for advanced queries and knowledge dissemination within their local neighbourhood.

Increasing numbers of people dying at home and with cancer as a multi-morbidity – rather than a cause of death – will create new palliative care needs. At the same time, the existing specialist palliative care workforce will be increasingly focused on the most complex cases, creating a need to add roles locally, shape models of care to ensure people's wishes are carried out, and upskill to address the greater complexity of individuals dying at home – if this is their choice.

The use of digital tools and advanced analytics will become commonplace. There is a need to simplify these tools for use in busy clinical practice, and also to upskill and support staff, patients and the informal carers using them. Ultimately, providing such tools in the hands of the workforce, will address existing risks, whilst helping to ensure that new biases are not introduced.

KEY ACTIONS

Use technology and automation to assist skilled staff and improve efficiencies and refocus towards face-to-face care delivery (e.g., AI for prescription screening automation and voice-activated note-taking.)

Create new sources of workforce by creating vocational career paths for non-clinical staff to train, or for generalist clinicians to specialise and provide enhanced support in the community, to reduce pressure on existing roles. For example: radiographer assistant (e.g., the radiographer workforce reform programme (WRAP)), physician associate, community pharmacists.

Create career paths and build fully funded advanced practice roles to support non-clinical staff. For example: to be able to further support care and coordination.

Develop and retain exceptional clinical leaders who are able to transform services and deliver new models of care and elevate leadership capabilities across the workforce and act as role models for more junior staff.

We need to make some bold changes to ensure there is sufficient capacity to deliver and that healthcare professionals have the new skills required for the future

To deliver these complex changes – while simultaneously addressing current challenges – will require the development and deployment of exceptional clinical and non-clinical leaders who are able to transform services at a system and local level and elevate leadership capabilities across the workforce.

> Increasing numbers of people dying at home and with cancer as a multi-morbidity – rather than a cause of death – will create new palliative care needs.

Policy and external landscape

Future ambition for factors relating to policy and external landscape

Prioritisation of cancer in policy (including funding of cancer care)

- Cancer **will remain highly prioritised in policy & funding**.
- Governments, policy-makers and regulators will **measure and align policy to what matters most to people living with cancer**, including outcomes, experience, and quality of life.
- As science advances and new innovative therapies and diagnostics come to market, and the prevalence of cancer increases, so will costs. The **funding envelope will grow** in response and **future investment will match future needs**, supporting the workforce.

Collaboration between public, independent and voluntary sector healthcare organisations

- **Increased integration** of services across sectors within the healthcare landscape will enable **improved navigation** of the cancer pathway.
- The trend will continue towards a more **integrated public and independent healthcare model** – independent healthcare will increasingly provide screening, diagnostics, data, and digital health solutions.
- **Demand for** Voluntary, Community and Social Enterprise **(VCSE) will increase to enhance care** and support for people with cancer. VCSE will continue to play a vital role in enabling and empowering people from all communities to have their voices heard.

Prioritisation of cancer in policy (including funding of cancer care)

Cancer is currently a policy priority but will come under pressure in the future as funding needs increase substantially

The aggregate cost of cancer care has increased over the years, due to the increasing number of people requiring treatment, the number of people needing chronic treatment for cancer as they live longer with the disease, and the arrival of new innovative therapies and diagnostics. It is crucial that future investment matches future need, and the funding envelope will need to grow to respond to these needs.

It is also important the allocation of future funding is on a needs' basis – – for example, offering multi-year funding that can create an equilibrium, bringing greater health outcomes for areas of deprivation, and allocating funding in a way which improves health equity.

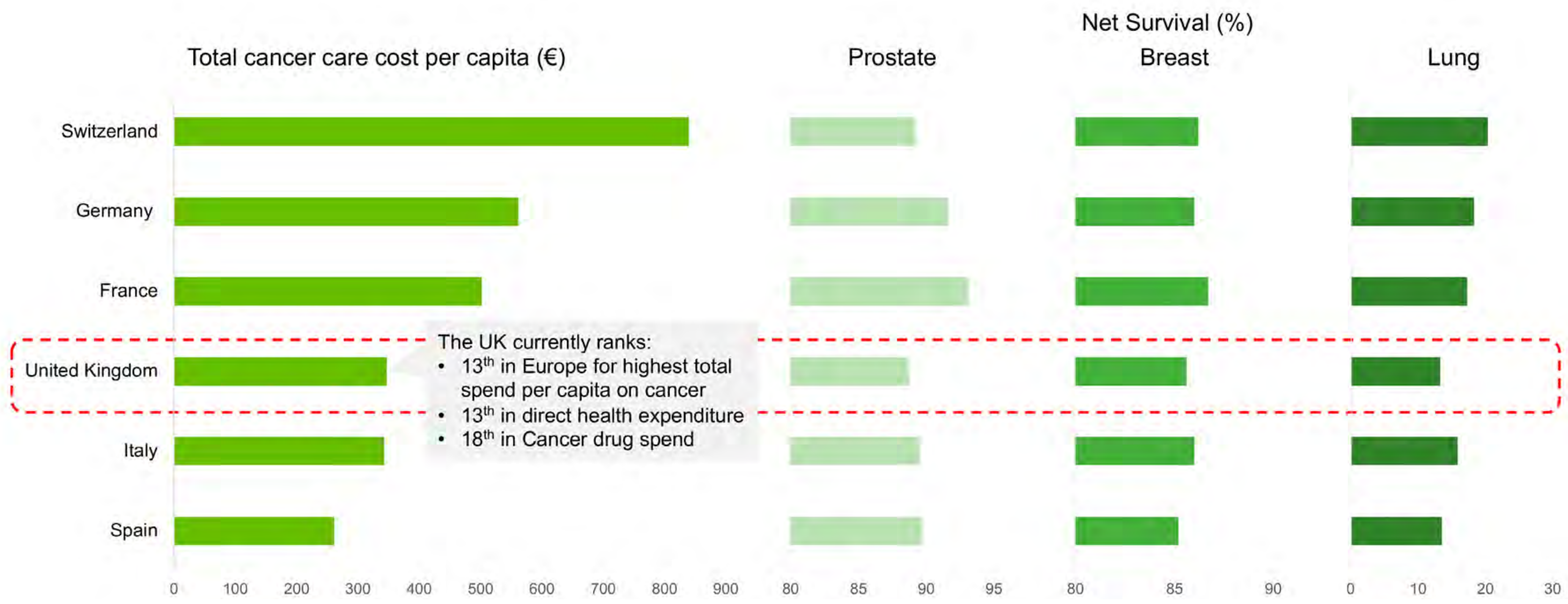
Figure 35 shows that current investment in the UK remains lower than other in other comparable EU economies (such as Germany), despite a steady increase in the Cancer Drug Fund budget in recent years (**Figure 36**).

The UK is also lagging behind the best OECD countries on a number of health measures, including overall health and cancer funding, cancer mortality, and the availability and use of diagnostic imaging technologies (computed tomography – – CT, magnetic resonance imaging (MRI) and positron emission tomography (PET) scanners).[185,186,187] This creates a greater case for ensuring that policy is sustainable and positions the UK to grow its cancer competencies and secure its position as a leader in cancer care – not just in scientific innovation.

It is also important that the allocation of future funding is on a needs' basis – for example, offering multi-year funding that can create an equilibrium, bringing improved health outcomes in areas of deprivation and allocating funding in a way that improves health equity.

> It is crucial that future investment matches future need, and the funding envelope will need to grow to respond to these needs.

Figure 35. Total healthcare cost of cancer per capita (direct and indirect costs) and net survival outcomes (NS%) for prevalent cancers.

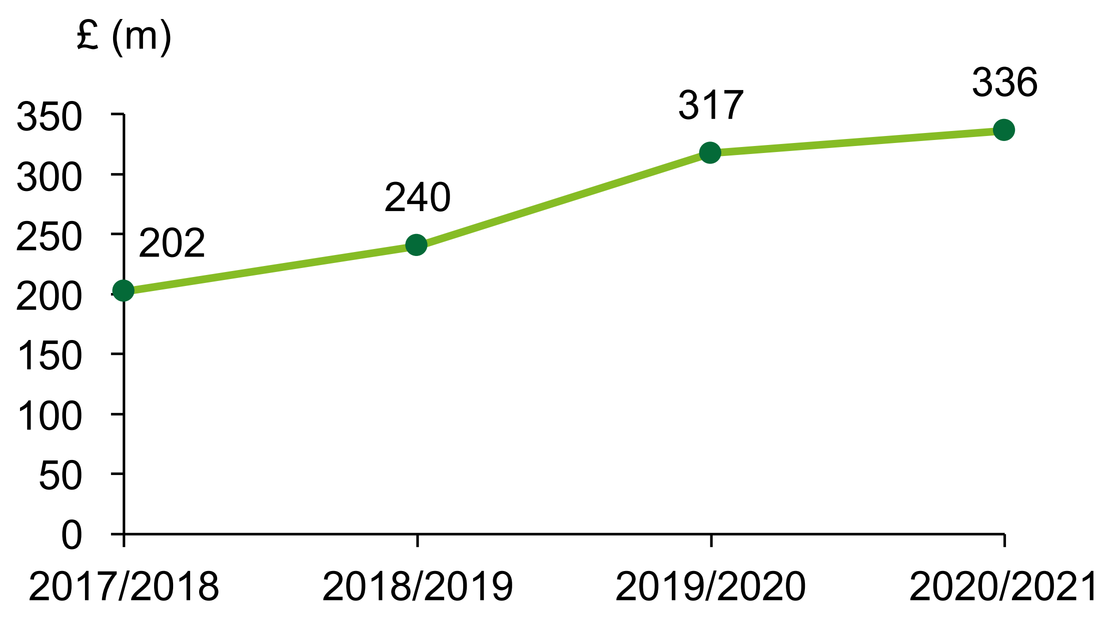


The UK currently ranks:
- 13th in Europe for highest total spend per capita on cancer
- 13th in direct health expenditure
- 18th in Cancer drug spend

Source: Deloitte analysis; Total cancer care cost per capita – European Journal of Cancer (2018).[188] Net Survival (%) – Lancet (2018).[189]

> Fragility in political systems and healthcare organisations could lead to future system failures which expose people with cancer to greater risks of poor experiences and outcomes.

Figure 36. Cancer drugs fund spend over time



Source: NHS England, CDF Spend (2017-21).[190]

Although cancer has been a strong focus for policy in recent years, in the context of the social, political, and economic challenges the UK is currently facing, the vision for the future is dependent on long-term commitment to funding for cancer, driven by an ongoing momentum that allows cancer care opportunities to be realised in policy.

Across the UK dealing with the cost-of-living crisis is likely to maintain a key focus of policy in coming years. Pushing forward the 2035 vision for cancer care by policy-makers will be necessary for future reform.

Specifically in Northern Ireland, the lack of a functioning executive is adding to the challenge of ensuring the future prioritisation of cancer in policy and funding to match future needs.

It is important to cocreate policy and prioritise collaboration with people living with cancer and those closest to them

Fragility in political systems and healthcare organisations could lead to future system failures which expose people with cancer to greater risks of poor experiences and outcomes. Governments need to be encouraged to measure what matters most to people living with cancer, including outcomes, experience, and quality of life. Such endeavours will provide the required support for cancer policy and funding, providing the necessary foundations to revolutionise the cancer care pathway, in turn, optimising the patient experience for those living with Cancer.

Feedback loops and measurement frameworks need to be developed to help drive change for people living with cancer and their loved ones and hold policy-makers accountable. In this way the crucial elements of care can be prioritised, based on lived experience and the priorities of people with cancer.

As the use of data grows, policy needs to support data-sharing and push forward an interoperability agenda

The amount of data generated by cancer care is growing exponentially – a single tumour in clinical trials can generate up to two to four terabytes of data (see: Data and digitalisation of healthcare section), yet it is reported that up to 97 per cent of healthcare data remains unused.[191,192] Robust policies on data-sharing will be required to address the root causes for public mistrust.

Although many systems are available, there is still a lack of integration and data silos persist across healthcare systems. This means that when a person living with cancer moves between different care settings there is a lack of central visibility over the care delivered and medications administered, leading to confusion and potential safety issues.

To move forward, policy needs to focus on investing in building the proper infrastructure to support increased use of data in the healthcare system. The UK has developed a National Data Strategy. The data market in the UK (i.e., money made from products or services derived from digitised data) is the highest in Europe. UK tech grew dramatically in 2019, with the UK securing 33 per cent of European tech investment.[193] However, large-scale investment is required to offer the level of interoperability and integration the healthcare system needs.

KEY ACTIONS

Deliver national long-term costed cancer strategy in all UK nations, underpinned by adequate funding

Cocreate policy with people living with cancer to give them a seat at the table and influence.

Create multi-year funding commitments for initiatives and resourcing, to ensure that initiatives are embedded and can continue beyond pilot stages.

Solve issues of data-sharing between all healthcare professionals involved in the person living with cancer care to ensure seamless transfer of data between care settings and healthcare professionals.

Use real-world evidence to create a learning system which allows clinicians to leverage the latest evidence and learn what works best. This could take the form of a Health Care Professional portal that supports clinical decision-making through insights based on the patient's health information.

Collaboration between public, independent and voluntary sector healthcare organisations

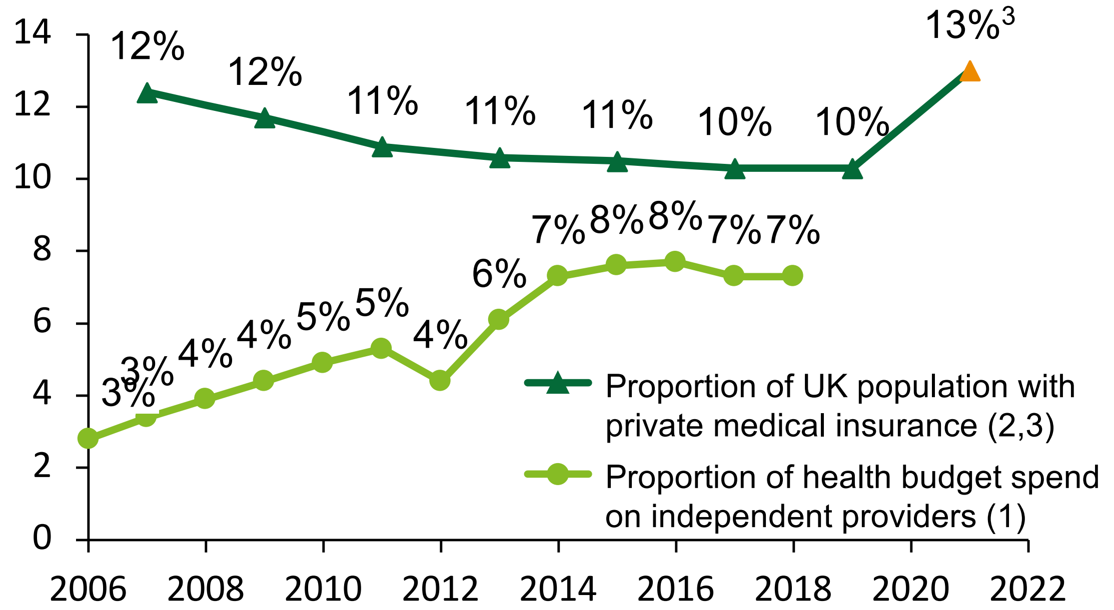
The independent and voluntary sector already plays a significant role both within and in addition to public NHS provision of cancer care – – from academic, private, and voluntary organisations on the front line of care delivery and the provision of new diagnostic and treatments innovation, to other private companies within the cancer care landscape, supporting people with and beyond their treatments, for example, R&D, diagnostics, digital health, and data providers.

Growing role for the independent sector in cancer care provision

People are increasingly involved in their health as consumers, and engaging with health solutions provided by private companies as well as the NHS. Since the pandemic there has been a surge in private medical insurance (PMI) sales, reversing a gradual long-term declining trend. A 2021 survey reveals that 13 cent of the UK population claim to belong to the PMI scheme, an increase of three per cent since 2019 (**Figure 37**).[194]

At the same time there has been an increasing proportion of NHS health budget spent with independent providers to deliver NHS care. In 2019, 7.3 per cent of the total health budget was estimated to be spent on independent providers, and the overall spend continued to rise to £10bn in 2021 due to the pandemic. After the COVID-19 pandemic, the NHS is more reliant than ever on the independent sector to support with clearing the backlog of diagnostics and elective care. This needs to be supported by adequate workforce levels – and all providers are drawing from the same workforce pool.[195]

Figure 37. Private healthcare spend and utilisation.



Source: Deloitte Analysis; Is the NHS being privatised? The BMJ (2019)[196]; Population covered by health insurance UK, Statista (2019)[197]; Health Insurance statistics, Finder (2021)[198]

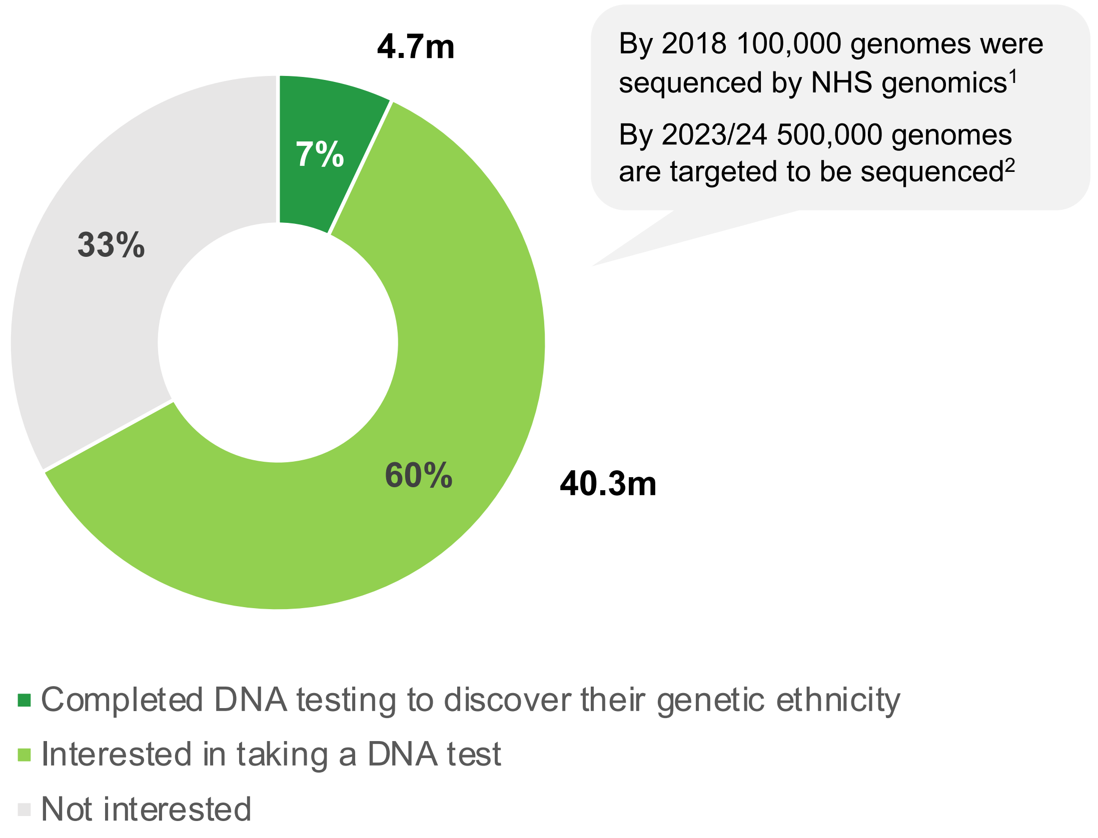
In the future, this shift towards a more integrated healthcare model between the public and independent sectors is expected to continue as independent healthcare will increasingly provide screening, diagnostics, data, and digital health solutions.

This trend towards increasing use of the independent sector brings challenges in equity of access for those who cannot pay or – in the case of NHS-funded care – cannot navigate an increasingly complex system. To deliver a step change for the future, collaboration between the NHS and other organisations needs to be stronger, delivering a joined-up experience for people living with cancer across the system, including data-sharing.

> For example, in **England** independent sector providers delivered 5.2 per cent of NHS-funded elective services in 2020-21, striking growth compared to just 0.02 per cent in 2003-04.[199]

The public is increasingly choosing to use private providers of health technology, genomics, and health data. Direct-to-consumer genetic testing is also becoming an increasingly mainstream concept, with seven per cent of the population having discovered their genetic ethnicity through DNA testing (**Figure 38**) and an additional 60 per cent of the population interested in taking a test. This trend could create higher awareness of risk profiles. However, it also risks creating a two-tiered system due to the requirement to pay privately or undergo a postcode lottery of private provision or funding of these services.

Figure 38. UK population which has already discovered their genetic identity and those interested (April 2019).



By 2018 100,000 genomes were sequenced by NHS genomics[1]

By 2023/24 500,000 genomes are targeted to be sequenced[2]

Source: 1 – DHSC 100,000 Genomes Project (2018)[201]; Genome UK: 2021 to 2022 implementation plan (2021)[202]

In the future there will be a need to engage with increasing numbers of providers throughout the cancer pathway, from genomic sequencing providers in cancer diagnosis (e.g., primary care diagnostics), and access to novel next-generation therapies offered by specialist providers, through to the provision of specialist palliative care.

The role of the voluntary sector will continue to be vital

Collaboration is also increasingly needed with the voluntary sector, which is providing services to support people living with cancer during and beyond treatment. To deliver on this, funding models may need to change for voluntary sector services to secure long-term sustainability. Currently, there is a lack of centralised visibility within the NHS as to what services are provided by voluntary sector organisations and where they can support people living with cancer (e.g., a cancer care coordinator that can help navigating the pathway).

In future Voluntary, Community and Social Enterprise (VCSE) will be increasingly called upon to enhance care and support for people with cancer, but the way in which this role is delivered may change. VCSE will continue to play a vital role in enabling and empowering people from all communities to have their voices heard. Increased integration of services across sectors within the healthcare landscape will enable improved navigation of the cancer pathway.

KEY ACTIONS

Enable cocreation of integrated ways of working across the system by giving a seat at the table (beyond consultation) to the public, independent, and voluntary sector.

As we prepare for future needs, it is important to continue to push for the investment required to deliver outcomes which maintain the UK's position and push forward towards a leadership position in cancer outcomes and experience, as well as in technology and research, and to drive greater collaboration with independent and voluntary organisations as they play a greater role in people's care.

Health equity

Future ambition for factors relating to health equity

Health equity

- **Equity will be at the core of cancer care** and both cultural and system **progress will be made to deliver parity in outcomes and experience**.
- Cancer care will be redesigned to **understand and address current health inequalities** and address the root causes of inequity.
- **The health system will be on alert for new health inequalities resulting** from advances in cancer technology and care, such as understanding new and complex diagnostics and treatments (e.g., genomics) and new types of digital exclusion (e.g., AI bias).

Health equity needs to be at the core of cancer care

In this report we use the terms 'health equity' and 'health inequality'. Health inequalities are differences in health across the population, and between different groups in society, that are systematic, unfair, and avoidable (e.g., access to healthcare by socioeconomic status, age, ethnicity, geography).[203,204,205] Health equity is the way these differences manifest in health outcomes and the healthcare experiences that different groups receive. To achieve health equity it is important to go beyond thinking about equal access and focus on and address the different needs a group may have or barriers they face. Different interventions or resource allocation may be required. This is embodied by NHS England's goal for tackling health inequalities – providing exceptional quality healthcare for all through equitable access, excellent experience, and optimal outcomes.[206]

There is a risk health equity could worsen

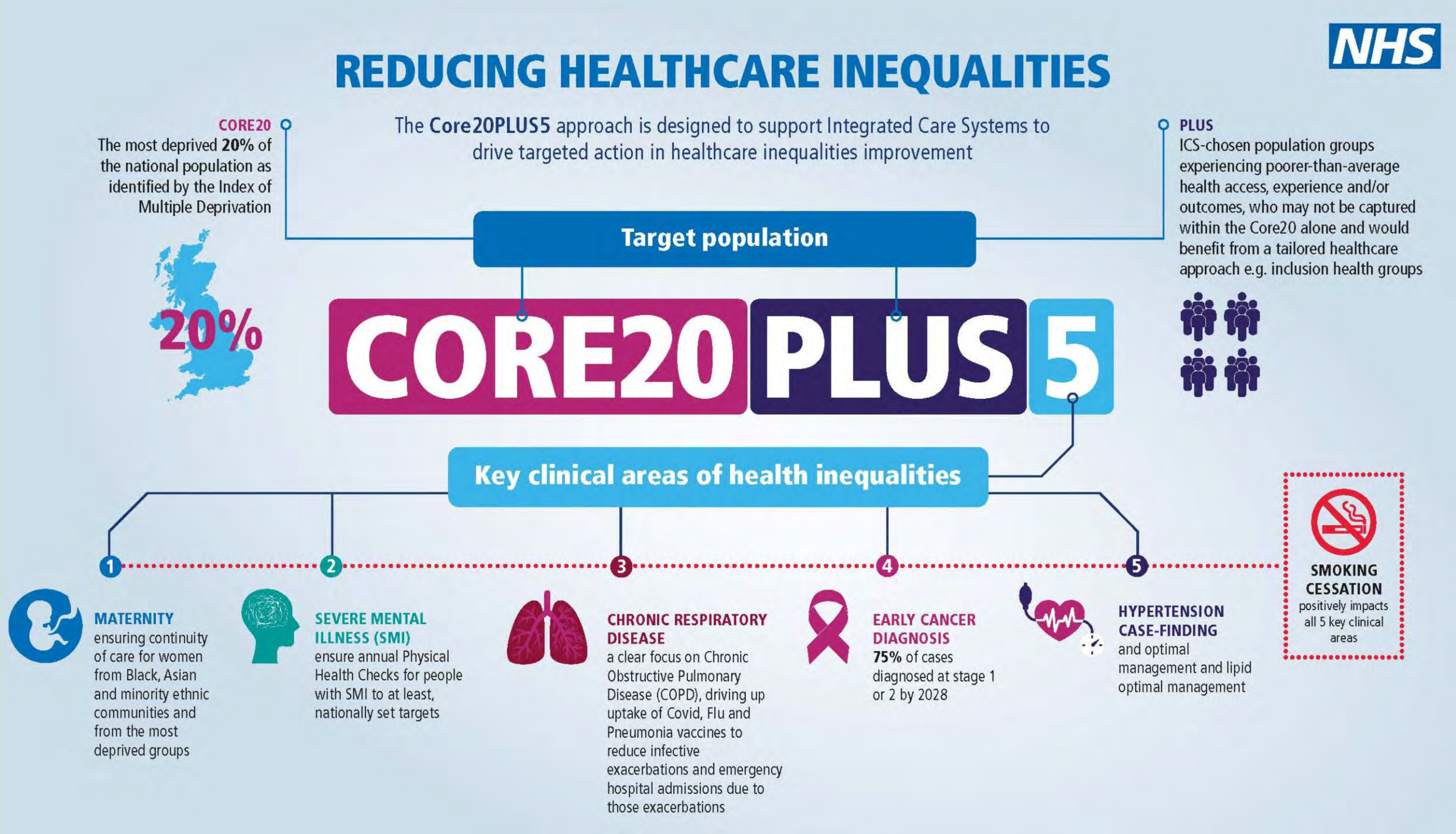
Across the UK the health equity gap is growing and new types of health inequalities will emerge in the future, requiring a multifaceted approach to drive towards the goal of achieving equity in health. The statistics are stark, showing a disparity in health equity across the care pathway, and the need for action. A major analysis conducted by The Health Foundation's REAL Centre highlighted the gaps in health equity overall from socioeconomic status, ethnic diversity, geography, and age. For example, looking at socioeconomics and age, a 60-year old woman in the poorest area of England has diagnosed illness equivalent to that of a 76-year old woman in the wealthiest area and will spend over two years more of her life in ill health.[207] These findings are relevant across devolved nations. For example, in Scotland in 2020 the absolute gap (between most and least deprived areas) in cancer deaths was the highest it has been since 2015.[208] Across the UK there is acknowledgment that multi-level action is needed to address health inequalities.

> To achieve health equity it is important to go beyond thinking about equal access and focus on and address the different needs a group may have or barriers they face.

Actions to tackle health inequalities across the UK

In England, the Core20PLUS5 approach has been developed to give focus, traction and enable measurable impact in tackling the reduction of health inequalities at a national and targeted ICS level in England, with early cancer diagnosis, and smoking cessation key focus areas of the initiative.[209]

Figure 39. Core20PLUS5 Infographic – adults



The **Core20PLUS5** approach is designed to support Integrated Care Systems to drive targeted action in healthcare inequalities improvement

CORE20
The most deprived **20%** of the national population as identified by the Index of Multiple Deprivation

PLUS
ICS-chosen population groups experiencing poorer-than-average health access, experience and/or outcomes, who may not be captured within the Core20 alone and would benefit from a tailored healthcare approach e.g. inclusion health groups

1. MATERNITY ensuring continuity of care for women from Black, Asian and minority ethnic communities and from the most deprived groups
2. SEVERE MENTAL ILLNESS (SMI) ensure annual Physical Health Checks for people with SMI to at least, nationally set targets
3. CHRONIC RESPIRATORY DISEASE a clear focus on Chronic Obstructive Pulmonary Disease (COPD), driving up uptake of Covid, Flu and Pneumonia vaccines to reduce infective exacerbations and emergency hospital admissions due to those exacerbations
4. EARLY CANCER DIAGNOSIS **75%** of cases diagnosed at stage 1 or 2 by 2028
5. HYPERTENSION CASE-FINDING and optimal management and lipid optimal management

SMOKING CESSATION positively impacts all 5 key clinical areas

Source: NHS England[210]

In Wales addressing health inequalities is a key priority for the Welsh Government, with a need to shift investment to prevention, and find sustainable solutions to address root causes. Cancer Research Wales has prioritised cancer inequalities and funding programmes to address the limited success of conventional awareness campaigns that often miss the targeted group.[211]

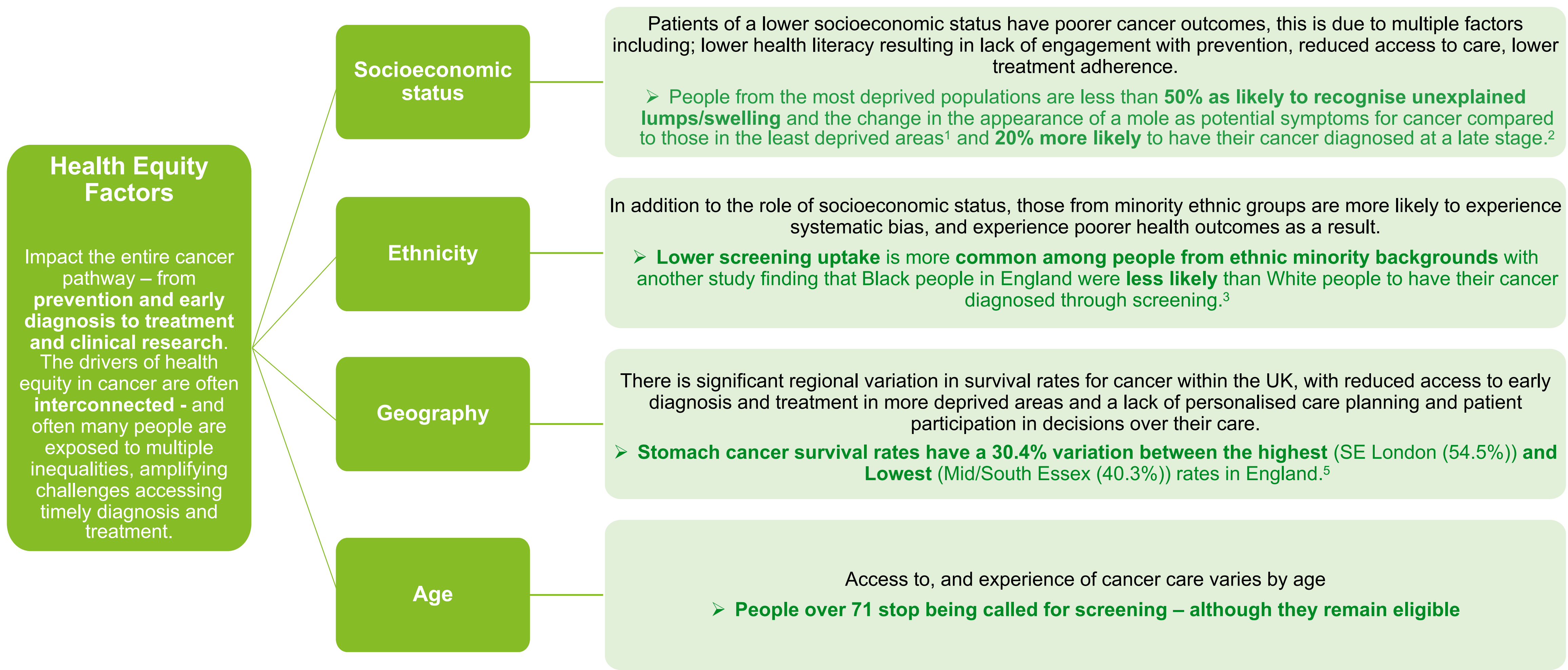
In Scotland the Triple AAAQ (accessible, available, appropriate, high quality) Framework contains the standards that healthcare should aim to deliver to reduce health inequalities.[212]

In Northern Ireland 'Making Life Better' is a whole system framework for public health, created to provide traction in policy and actions to improve health and reduce health inequalities.[213]

In the next sections we focus on some of the factors impacting health equity – specifically in cancer access, experience, and outcomes now and in the future. Despite overall improvement seen over the years in cancer treatment and outcomes, access to cancer treatment and care across the UK is still not delivering equitable healthcare. Our survey found that 18 per cent of respondents do not find it easy to speak about their personal characteristics, cultural needs and beliefs when accessing healthcare services. Eleven per cent of survey participants also say they experience barriers in accessing healthcare services due to their personal characteristics, cultural needs, or beliefs. Healthcare systems across the UK recognise this issue and have published their intentions to tackle and improve health equity.[214,215,216,217] There is strong evidence of the link between worse outcomes and experience, correlated with socioeconomic status, ethnicity, geography, and age (**Figure 40**). These are not the only health equity factors impacting access to cancer care, but the supporting data is easiest to capture and evidence.

> Despite overall improvement seen over the years in cancer treatment and outcomes, access to cancer treatment and care across the UK is still not delivering equitable healthcare.

Figure 40. Health equity factors impacting access to cancer care.



Health Equity Factors

Impact the entire cancer pathway – from **prevention and early diagnosis to treatment and clinical research**. The drivers of health equity in cancer are often **interconnected -** and often many people are exposed to multiple inequalities, amplifying challenges accessing timely diagnosis and treatment.

Socioeconomic status

Patients of a lower socioeconomic status have poorer cancer outcomes, this is due to multiple factors including; lower health literacy resulting in lack of engagement with prevention, reduced access to care, lower treatment adherence.

- People from the most deprived populations are less than **50% as likely to recognise unexplained lumps/swelling** and the change in the appearance of a mole as potential symptoms for cancer compared to those in the least deprived areas[1] and **20% more likely** to have their cancer diagnosed at a late stage.[2]

Ethnicity

In addition to the role of socioeconomic status, those from minority ethnic groups are more likely to experience systematic bias, and experience poorer health outcomes as a result.

- **Lower screening uptake** is more **common among people from ethnic minority backgrounds** with another study finding that Black people in England were **less likely** than White people to have their cancer diagnosed through screening.[3]

Geography

There is significant regional variation in survival rates for cancer within the UK, with reduced access to early diagnosis and treatment in more deprived areas and a lack of personalised care planning and patient participation in decisions over their care.

- **Stomach cancer survival rates have a 30.4% variation between the highest** (SE London (54.5%)) **and Lowest** (Mid/South Essex (40.3%)) rates in England.[5]

Age

Access to, and experience of cancer care varies by age

- **People over 71 stop being called for screening – although they remain eligible**

Source: Deloitte analysis; 1 – Cancer Research UK[218]; 2 – Annals of Oncology (2013)[219]; 3 – Cancer Research UK[220]; 4 – ONS; 5 – CancerData[222]

There is a risk that factors impacting health equity could worsen in coming years. In the near term the economic environment could be a factor: during recessions there is a significant impact on the social determinants of health.[223] In the longer term disparities may widen because of new sources of inequality which are likely to emerge with advances in technology, treatments, and the changing nature of clinical care.

Across all the factors discussed in this report, improvements in cancer care that require patients to have self-efficacy are most likely to accrue to those with privilege, and who are educated, informed and literate about health, and have the means to act for themselves and the people that matter to them.

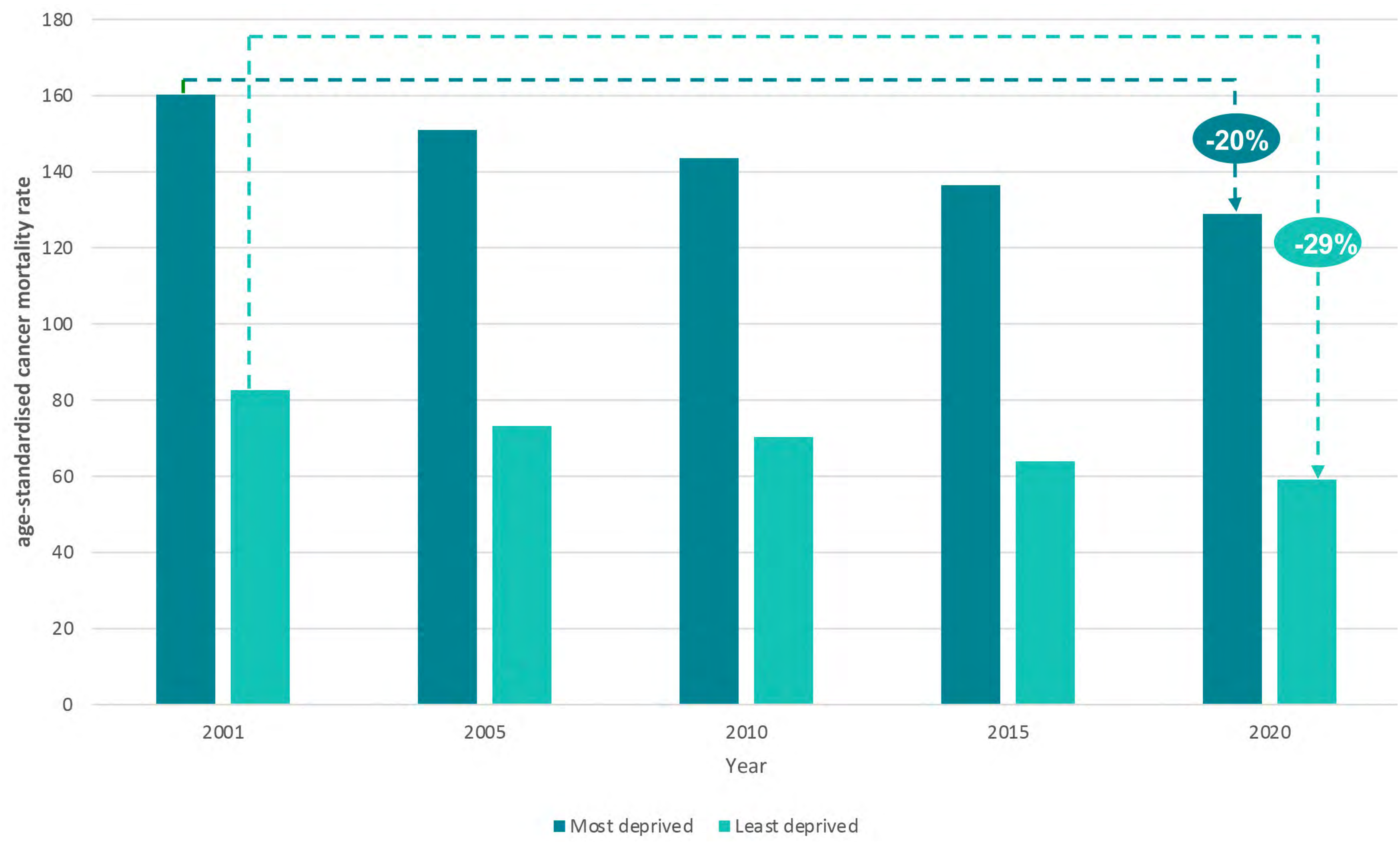
Socioeconomic status

Socioeconomic deprivation is a major factor to be addressed to deliver equity in cancer outcomes, with evidence showing higher incidence rates, higher risk, less awareness of symptoms, poorer care experiences and worse outcomes among the most deprived populations.[224] People from more deprived communities are screened less, more likely to be diagnosed at a later stage and 50 per cent more likely to be diagnosed through emergency routes like A&E when looking at all cancers together.[225] The most deprived populations also present higher rates of smoking, the biggest cause of cancer in the UK.[226] Despite the overall decrease in cancer mortality rates, mortality remains significantly higher amongst the most deprived over the years (**Figure 41**) – the gap in cancer mortality rates between the least and the most deprived has worsened. In the context of the current economic climate there is a significant risk that health equity could continue to worsen. People living with cancer, and particularly those whose health prevents them from working, face additional financial burdens and anxieties.

KEY ACTION

Act now to understand and mitigate the impact of the rising cost of living on access to health services and cancer outcomes.

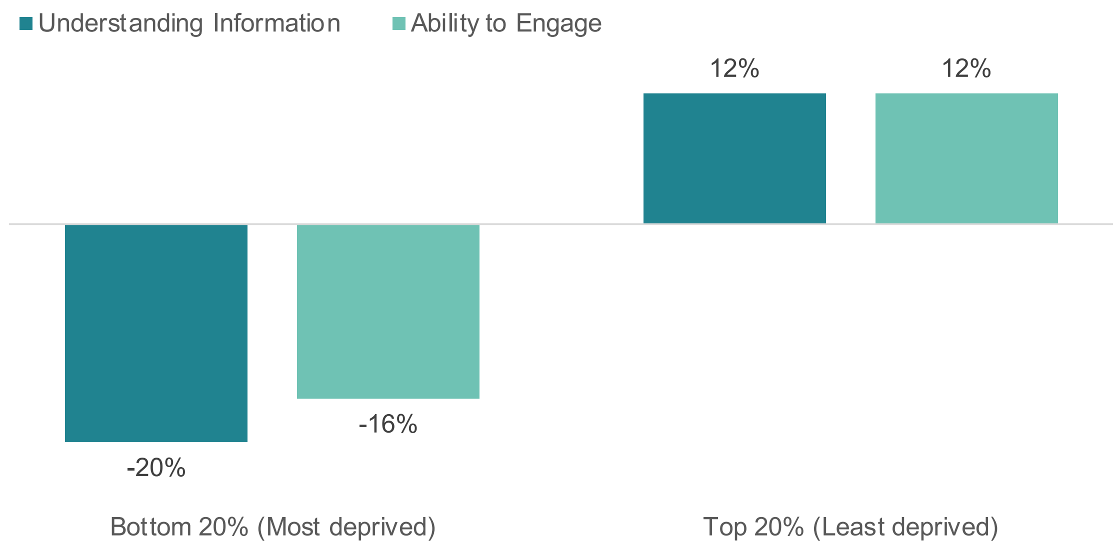
Figure 41. Percentage change in age-standardised cancer mortality rate (per 100,000 people) by deprivation in England and Wales, 2001-2020.



Source: Deloitte analysis; ONS.[227,228]

The way the health system presents information today means that people from the most deprived 20 per cent are more likely to report difficulty in understanding and engaging with health information (**Figure 42**). However, even those who have access to information and understand their choices may not be able to act on that information if they are unable to afford a healthy diet and exercise, or face mental and physical health challenges.

Figure 42. Impact of deprivation on health literacy and engagement – difficulty understanding and engaging with health information (versus mean scores).



Source: BMC Public Health (2022).[229]

Nuances identified within the devolved nations:

In Scotland 52 per cent of eligible adults in the most deprived areas take part in bowel screening, which is much lower than the 73 per cent of people who take part in the least deprived areas.[230]

In Northern Ireland around three in ten adults in the most deprived communities smoked in 2020, compared with one in ten people who smoke in the least deprived communities.[231]

In Wales breast cancer screening was detecting proportionally fewer women from socially deprived communities, and social deprivation is associated with higher incidence of disease and lower overall survival.[232]

In future socioeconomic status will still impact health equity. As new options become available, such as increased access to precision treatments and increased use of tailored genetic risk profiles, there is an opportunity for the system to decrease the burden on people living with cancer. Those who have the privilege of good health literacy and education, or strongest local support from health providers are likely to benefit the most. For everyone to benefit, increasingly complex information needs to be demystified, and both education and clear communication increased, enabling everyone to participate fully in shared decision-making.

Improvements in unhealthy and modifiable behaviours are also more likely to continue to occur in the most privileged socio-economic groups who often have the highest education and health literacy levels and means to act. However, evidence of a decline in smoking and alcohol consumption among young people in the most deprived quintiles is grounds for optimism.[233]

Ethnic diversity

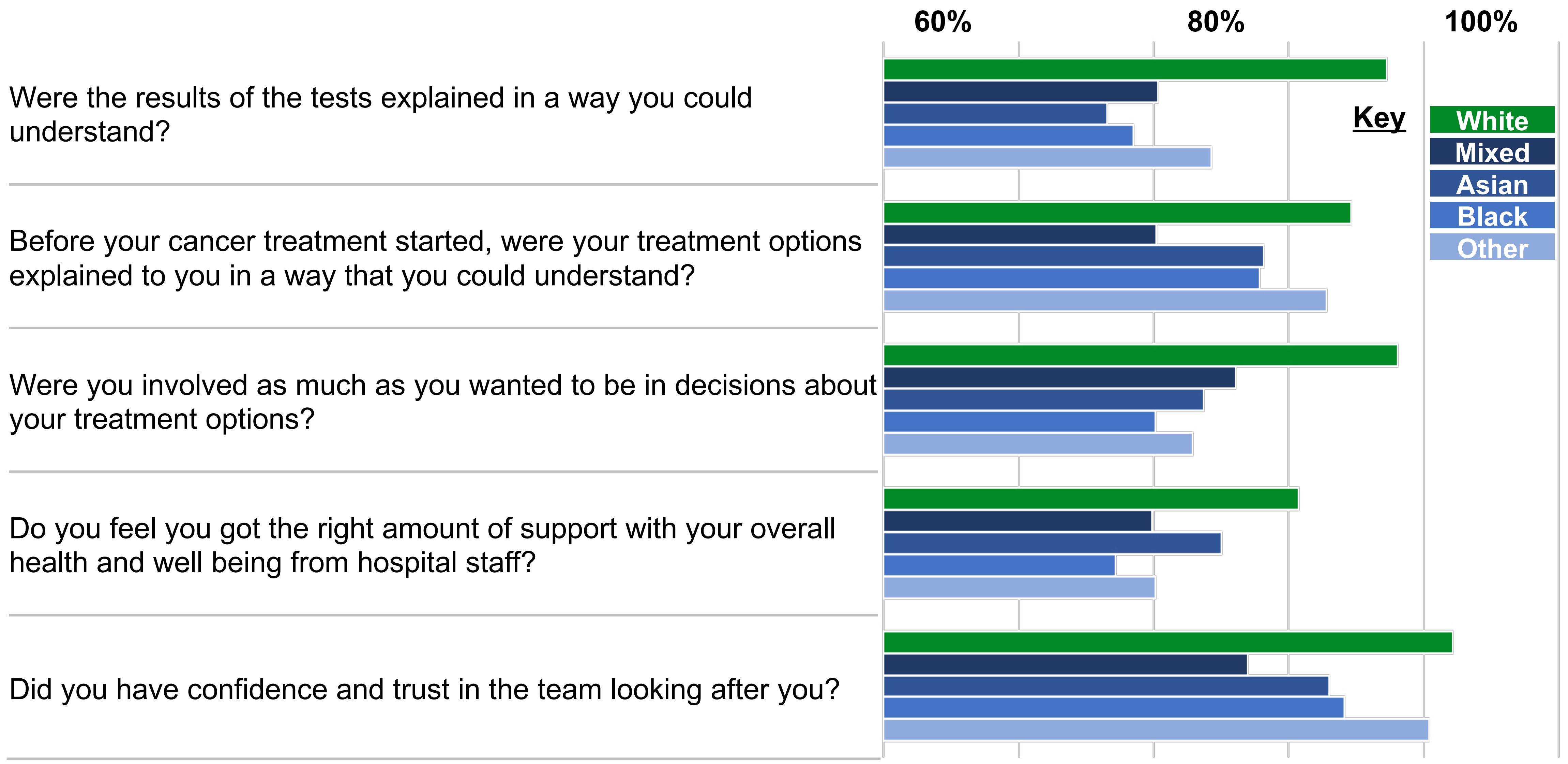
Recent data shows that while people from White ethnic groups are more likely to have cancer generally, people from non-White minority ethnic groups have higher age-standardised incidences of several cancer types. Black people in England are almost three times (110-190 per cent) more likely to have myeloma and several gastrointestinal cancers. Black men are also twice as likely to have prostate cancer, and 130 per cent more likely to have Hodgkin's Lymphoma, which is also 12 per cent more likely in people of Asian ethnicity. Asian people are also 140 per cent more likely to have thyroid cancer.[234]

Despite being less likely to have cancer overall, evidence shows non-White people living with cancer often have worse experiences and outcomes (**Figure 43**). Evidence shows that Black people in England are less likely to have their cancer diagnosed through screening and are more likely to visit their GP to present symptoms three or more times before receiving a referral, compared to White people.[235] Asian and Black women with breast cancer, and Black men with prostate cancer, have worse survival than other ethnic groups, and are also less likely to report a positive experience of care, including primary care and cancer care.[236]

Given that the demographic make-up of the UK will become more diverse, with an estimated 15 per cent of people in ethnically diverse groups (40 per cent of those in London alone) by 2030, delivering health equity between ethnically diverse groups must be a priority, as discrimination will affect an even greater number of people in the coming decade.[237]

Figure 43. People living with experiences of cancer care, by ethnicity.

Percentage of people answering 'Yes completely'/'Yes definitely'.



Source: National Cancer Patient Experience Survey (2021).[238]

A lack of up-to-date, accurate and detailed data relating to the prevalence and experiences of cancer in ethnically diverse groups hinders progress in tackling health equity.[239] There is also significant intersectionality with ethnicity, geography, and socioeconomic deprivation, with people living with cancer from ethnically diverse groups often living in more deprived areas and concentrated in urban areas.[240]

In addition, clinical trials, which are critical in the process of developing new treatments, have historically underrepresented people from Black and ethnic minority communities, creating racial and ethnic biases. Addressing discrimination to ensure that clinical trials are representative of ethnic diversity can help improve the quality, validity, and generalisability of research findings for new treatments. Clinical trials might also provide the only, and potentially the best, treatment option for some patients. Active inclusion of people living with cancer from ethnically diverse groups in clinical trials, by addressing barriers such as mistrust and cultural and language barriers, will be vital to improving health equity.

KEY ACTION

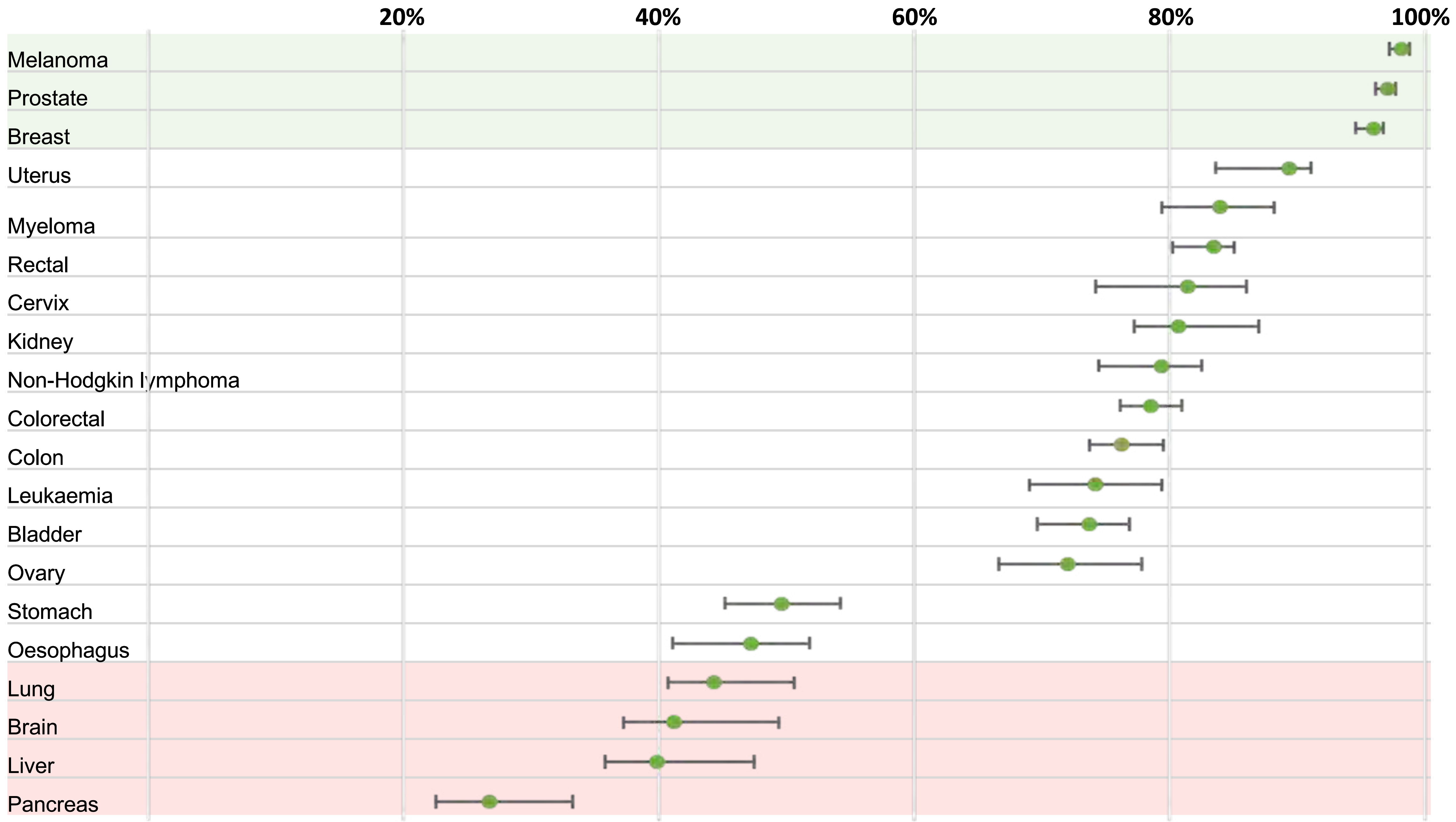
Understand barriers and improve access to clinical trials and develop alternative delivery models to deliver the science to the person in the most accessible as well as convenient location for them (e.g., diagnostic hubs, mobile units, providing transport to services, digital screening).

To deliver health equity in the future, we must see more specific, localised and culturally relevant approaches to tackling the multi-faceted root-causes of discrimination and health inequalities.

Geography

Geographic disparities in access to care services are experienced more by those who live in rural areas, further from specialist centres. Disparities are worse in areas of higher need that also have poorer access to services. Centralisation of specialist centres has meant that some groups of patients travel even longer distances to access treatment, which can improve outcomes for those who are able to travel but has a negative impact on those who are not. Data shows that survival rates vary not only by the cancer type, but also the area in which the person is treated. For example, stomach cancer survival rates have a 30.4 per cent variation between the highest (54.2 per cent in North Central London) and lowest (45.2 per cent in Kent and Medway) rates in England (**Figure 44**).

Figure 44. Variation in 1-year survival rates (age-standardised), as a proxy for late presentation, based on geographical areas in England, 2015-2019.



Source: Deloitte Analysis; NHS Digital.[245]

The trend towards centralisation of specialist care services will mean the most complex specialist care (as well as clinical trials) in the future will be most likely easily accessible by those who live nearby (normally in dense urban areas), and do not have to travel significant distances. As pressures on the NHS increase, there is a risk that quality of care becomes a postcode lottery unless the reinvention in generalist care required to support these trends can be deployed consistently across the UK. Access to care will need to be delivered with health equity at the core, designed access to facilities, capacity, and expertise in mind, to ensure it's not limited to people with the self-efficacy, means and ability to travel.

Where access to care relies on partnership with independent sector providers – particularly in provision of diagnostics – services depend on a concentration of population which makes these services viable and profitable. This creates a two-tier system of waiting times to access healthcare services. The availability of independent sector provision varies significantly across the four nations – with the majority of services concentrated in England. As collaboration with the independent sector increases this can create further disparity between England, Scotland, Wales, and Northern Ireland's provision.

Finally, the trends towards increased use of digital tools relies on underlying infrastructure and widespread connectivity, but in many places in the UK there are still areas with poor communication coverage. These areas must be addressed to ensure there is a robust digital infrastructure across regions to provide equitable access to care.

Age

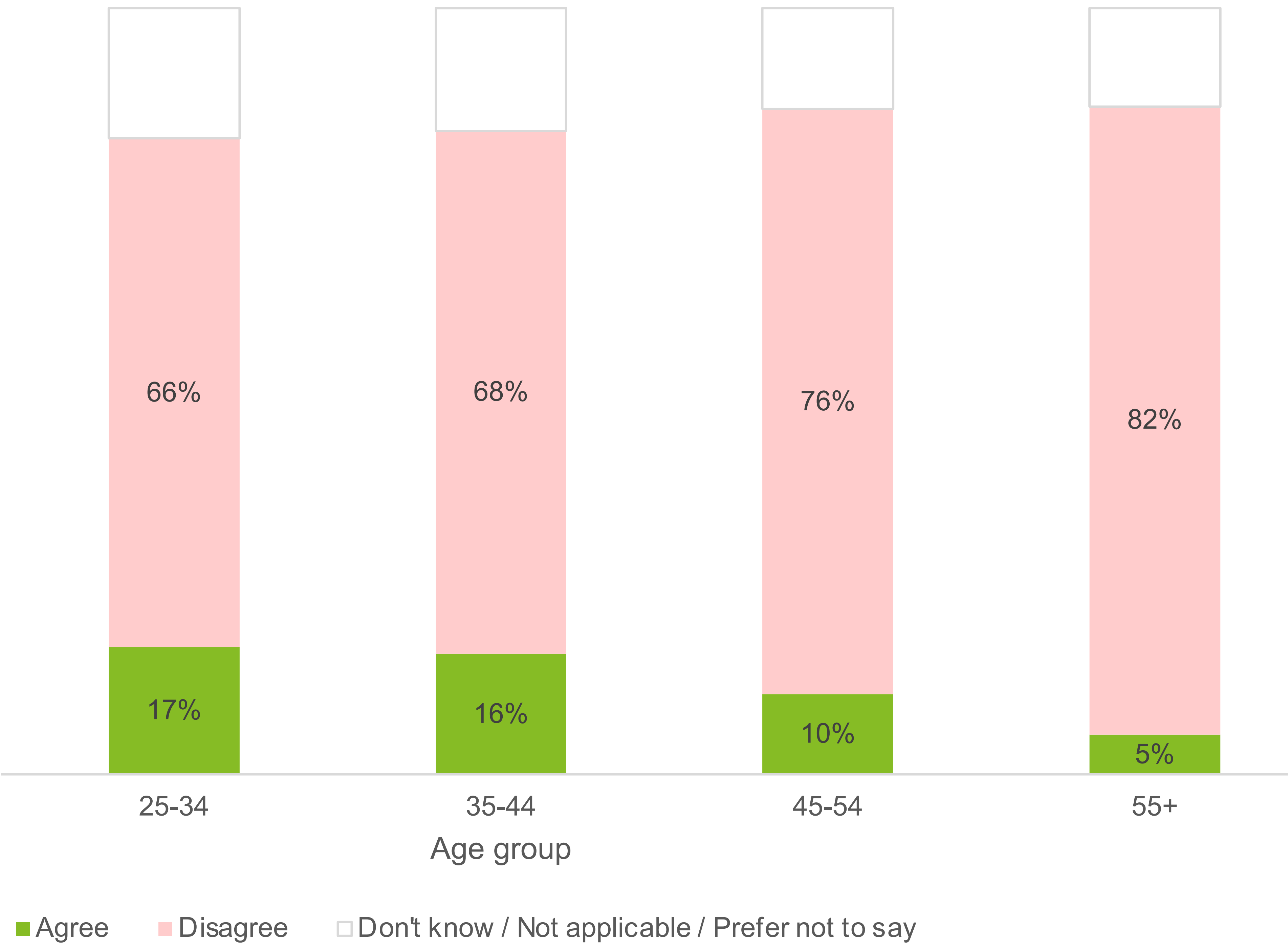
Diagnosing people with cancer as they get older becomes more challenging as they often live with co-morbidities which might mask their symptoms. In addition, screening for some cancers stops after a certain age. Across the UK bowel cancer screening stops being offered to people over the age of 74, breast cancer screening over the age of 70, and cervical screening over 64 years of age.[246] After no longer being called for cancer screening, people might believe they are no longer at risk of developing cancer and not check for symptoms themselves. Older people also tend to be offered less radical treatment options and, while that might be sensible in certain situations where people are frail or dealing with other serious conditions, it might not always the best course of action.

We believe digital exclusion in older people will reduce in the future, as many older people will increasingly be using digital tools at similar rates to younger generations. As people live longer with cancer and multiple health conditions, they will feel more empowered to take control of their cancer care and engage with healthcare professionals through a variety of digital tools.

Our survey also showed that younger people are experiencing barriers to accessing NHS care because of their personal characteristics, cultural needs or beliefs compared with older groups (**Figure 45**). Planning for inclusive care delivery will need to engage with different age groups differently to address the varying needs across generations.

Figure 45. Public opinion on access to healthcare services.

Q: Do you agree with the following statement? I experience barriers to accessing NHS care because of my personal characteristics, cultural needs, or beliefs.



Note: survey conducted between the 13th and the 14th of December, 2022 with a sample size of 2,055 participants across the UK nations.
Source: Macmillan & Deloitte Health Awareness Post-COVID YouGov survey 2022.

Intersectional characteristics creating barriers and access challenges

The characteristics highlighted above are not the only relevant factors – they are some of the most well documented and evidenced. Health equity needs to be achieved for many other groups including women, those with physical and learning disabilities, people with comorbidities and mental health conditions, those who face religious, cultural or language barriers, and sexual and gender minorities, among others.

Cancer care needs to be flexible and the system able to identify and accommodate the specific needs groups and individuals have. System factors such as workforce capacity, capabilities, and performance targets can impede the flexibility and time needed to address specific needs. For example:

- Extra time to adequately prepare people with learning disabilities for procedures and support in decision-making
- Advice on ability to fast e.g., during Ramadan[247]
- Providing LGBT+ friendly healthcare services, relevant advice on eligibility as well as sensitive invitations to screening, and encouraging gender minorities to disclose all relevant information[248]
- And, in Jen's story below, breaking down language barriers by providing clear communication and support in navigating care.

Jen's story

After being diagnosed with breast cancer, Jen was asked to have three biopsies over a three-month period to determine the exact location of the suspected tumour before her operation. Jen declined the third biopsy because in her case it provided limited additional information for decision-making and her priority was to start treatment as soon as possible. During this time her tumour increased in size by 8mm.

English is Jen's second language. In her experience most healthcare professionals used complex medical jargon, but some did make an effort to simplify the language they were using. Without these professionals helping her, it would have been challenging for Jen to communicate and to understand and make decisions about her treatment and care even though Jen has a nursing background.

Jen has now set up a small charity to support people in her community who are diagnosed with cancer to understand and navigate the system. Jen supports and interprets for cancer patients who speak her first language face to face and over the phone during appointments, to help them communicate with their healthcare team and feel confident to make decisions.

Opportunities to democratise access to care and improve health equity

Our ambition for cancer care in 2035 requires equitable access to cancer care across the pathway and the healthcare system to improve outcomes for all. In the future we want to see more effective engagement with different communities and all populations having equitable access to screening, diagnosis, and treatment options with parity of outcomes and experience. We need to go beyond equality in resource allocation, investing additional resource and support to deliver equity in outcomes.

Importantly, new health inequalities may arise in the future, such as from advances in technology and increased complexity of cancer care pathways, understanding genomic risk, access to healthcare at work or private diagnostics, and potential for digital exclusion to reduce some people's access. Redesigning care services that ensure equity must not only consider and address current sources of health inequalities, but also those that might arise or be exacerbated in coming years.

Case examples

Technology and innovation driven by science

Early diagnosis (including targeted screening)	*The majority of cancers will be diagnosed early due to a transformation and expansion of screening programmes, use of proactive targeting and innovative diagnostics.*
Direct cancer advice hotline Local Hospital Trust and Macmillan funded a direct cancer advice line to provide people who have concerns about signs of cancer advice and expedite further appropriate investigation.	**New ways to diagnose early cancer** Cell free DNA technologies being trailed in UK's NHS-Galleri Trial to screen for early cancer in adults.
Local initiatives Local initiatives to recruit & retain staff, using senior staff in innovative roles	**Scottish Capsule Programme (SCOTCAP)** National redesign of outpatient gastroenterology services to scale-up of Colon Capsule Endoscopy as a GI Diagnostic Test, enabling early screening.
New and precision treatment	*New science and breakthroughs will allow all cancers to be targeted using precision medicine. People will live longer after treatment and have lower treatment toxicity.*
Education & role development (Canada) New therapeutics in clinic integrated into practice with education and new HCP role development.	**Liquid biopsy in lung cancer** Less invasive testing [at earlier stage?] of people with suspected lung cancer (UK).
Virtual tumour boards Virtual genomic tumour boards to gather expertise across international boundaries.	
Data and digitalisation of healthcare	*Improved use of digital solutions and secure data sharing across health and care settings and real time analytics will enable more timely treatment and personalised decisions for better predictions and better outcomes.*
Digital tools Macmillan piloted PROMS monitoring with new digital tools and apps to improve mental health and sleep.	**A digital system for BRCA testing** A digital decision support tool to help people reach an informed decision around BRCA testing.
Data sharing Co-operation between citizens, clinical and commercial partners to share data within electronic health records for research.	

Lived experience

People's understanding and awareness of cancer risks and symptoms

Rising awareness of genetics and changing health attitudes means that the general public is more aware of cancer risk factors and more likely to attend screening tests.

Outreach projects
Macmillan partnered with barber shops as safe places to talk about cancer – to increase awareness in diverse communities.4

Education & testing
Roll out of information, education and testing for high risk groups e.g. BRCA testing pilots.

Knowledge of cancer
USA school curriculum broadened to include cancer, increasing citizens' knowledge.

Person centred care (including wellbeing)

A focus on person-centred care and the use of digital tools to access holistic care at scale will increase equitable access to a personalised care experience.

Navigation projects
Delivering personalised care and support for patients undergoing assessment, supports bridge between GP referral and CNSs.18

Coordinated datasets
Coordinated datasets across borders enable people living with cancer to identify the best treatment choices.19

Co-design of patient apps
Guy's and St Thomas' NHS Foundation Trust co-design of patient held apps to allow people to access the information about care when they need it.

Dundee Health and Social Care Partnership
The Dundee Health and Social Care Partnership and Macmillan partnered to provide practical, personal and emotional support to people living with cancer, their carers and families to discuss how they feel, get help with money and with housing worries or help at home.

Living with and beyond cancer (including with multiple health conditions) and end of life care

Primary and secondary care will be coordinated to provide support for both physical and mental health when living with and beyond cancer and at end of life, supported by multidisciplinary ways of working.

Prehab4Cancer & Recovery Programme
Multidisciplinary approaches to deliver prehabilitation.

Data Linkages
Scotland linking separate routinely collected datasets to evaluate treatment outcomes.2

Advanced Specialist Practitioner
In response to an ageing population and increase in need for palliative care, the ASP role was designed, promoting individualised care and education of care home staff.

Location of care

Primary and secondary care will be coordinated to provide support for both physical and mental health when living with and beyond cancer and at end of life, supported by multidisciplinary ways of working.

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Workforce

Workforce availability	*Increased recruitment, retention, and reinvention of roles will address shortages, and meet the changing workforce needs.*
Role of AI/ML in wider roles Global efforts to use technology and AI to reduce the need for workforce, examples in radiology.[29]	**New workforce models** New workforce roles developing including physician associates, Care Navigators and apprenticeships.
Local initiatives Local initiatives to recruit & retain staff, using senior staff in innovative roles.	
Workforce skillset	*Increased collaboration across workforce and care settings, support to develop new skills, equip generalists with cancer competencies.*
Flexible ways of working Macmillan professionals have developed multiple flexible ways of working. Examples include AHP/CNS led neuro-oncology, an ACP in cancer undertaking wide range of work across primary care.	**Aspirant Cancer Career and Education Development Programme (ACCEND)** Developing accessible modular training programs with accreditation. ACCEND is an initiative to develop a career pathway, identify core capabilities and an education framework.
Tracking the workforce Global efforts to develop workforce registries for comprehensive planning.	

Policy and external environment

Prioritisation of cancer in policy (including funding of cancer care)

Cancer remains highly prioritised in policy, and policymakers will measure what matters to people living with cancer. As new innovative therapies and diagnostics come to market, the funding envelope will grow to match future needs.

Coordination & integration
Multi-professional, multi-organisation coordination across integrated budgets.

Prioritisation of Health Policy
Across Europe continued pressure to keep cancer at forefront of health policy.

Collaboration between public, independent and voluntary sector healthcare organisations

There will be a greater role for the independent and Voluntary, Community and Social Enterprise sectors, with increased collaboration with the NHS to improve pathway navigation and provide a seamless experience.

Cancer Support Lincolnshire
Local teams collaborating with over 1000 community assets into a local directory that can help support people living with cancer.

Cancer nursing across boundaries
Clinical nurse specialists working across geographic and primary and secondary care boundaries.

Macmillan End of Life Care Programme with the London Ambulance service Macmillan partnering with ambulance services to improve end-of-life care.

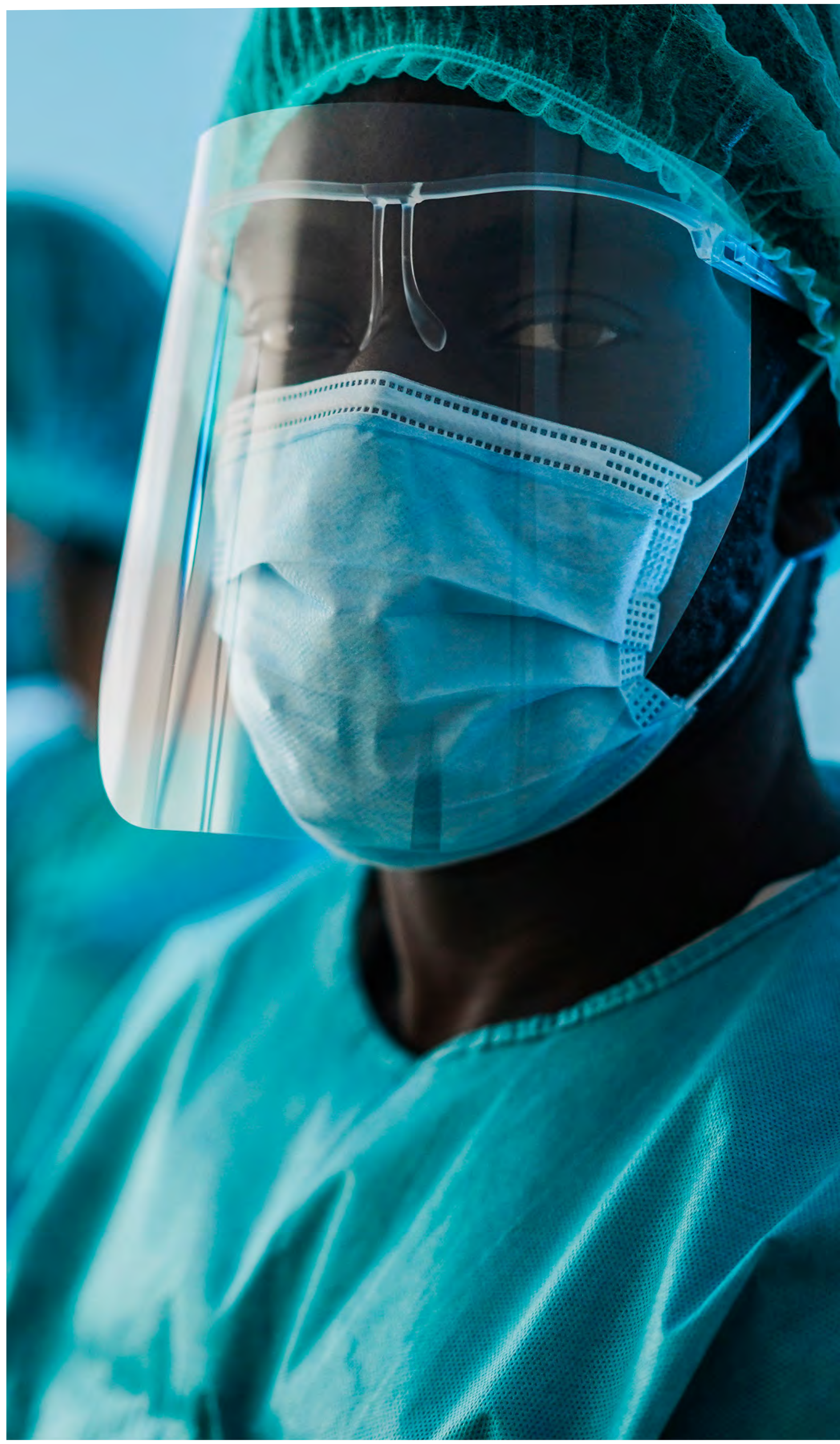
Health Inequities

Addressing health inequities will be prioritised in public health solutions and in designing cancer care, to address social determinants of health. The health system will be on alert to tackle new health inequities, enabling equitable access and outcomes.

Multidisciplinary clinics
Multidisciplinary approaches to managing frailty to deliver optimum outcomes for older people with cancer such as the Macmillan supported GOLD clinic at Guys and St. Thomas Hospitals.

System-wide initiatives
Co-ordinated system-wide approaches with targeted objectives to reverse inequity. E.g. The NHS CORE20Plus5 initiative has chosen early cancer diagnosis as an area for multi-agency approaches to improve equity with co-ordinated initiatives across the most deprived 20% of the population including ethnic minorities.

Advocacy groups
Support groups providing advocacy, for example, HOME.



The actions required to make progress

The emerging science and technology have the potential to transform the lives of people living with cancer and cancer care in the UK, but system stakeholders highlighted in our workshops that we are not going to reach our future of cancer healthcare goals unless actions are taken by all stakeholders including government, the NHS, public health, industry and third sector organisations working together.

During our work, we have had inspiring conversations with colleagues across the system about what could be possible for 2035 and the current challenges we need to collectively overcome to deliver the best possible outcomes for people living with cancer in the future.

To deliver the best possible future for people living with cancer, the actions recommended by system stakeholders fall into 3 categories

Act now to deliver

Fundamentals to get right

Go further faster

Designing for the future

Present | **Near future** | **Future**

For each section we have highlighted priority actions recommended by ecosystem stakeholders throughout the report. However, our research has led to a wider group of key actions to take forward.

Make the most of innovative scientific and technological advances

Scientific advancements are providing significant optimism for the future, but such innovations need to be implemented at scale to realise our vision for the future of cancer care.

Health system stakeholders recommended the following actions:

	New techniques for diagnosis and treatment	Ways to access innovative treatments and technology (including funding)
Go further faster	**Enable genomic sequencing to be performed, processed, and analysed systematically and in time for the MDT meeting and treatment planning.** **Increase access to precision cancer treatments.** **Ensure universal access to radiotherapy** (adequate equipment replacement, training and upskilling, access to proton beam, address current geographic inequalities in SBRT).	**Put in place value-based payments for treatments** (precision medicine and next generation cancer therapies), **diagnostics, and devices**, using what matters most to people living with cancer as the currency (Survival, Quality of Life, and PROMS). **Ensure value-based payments take into account the delivery / preparation / optimisation for treatment and ongoing support needs** (workforce, resource etc.) **Create frameworks that enable the system to adopt new service improvement technologies at pace.** Apply lessons learned from rapid adoption of technology during the pandemic. **Ensure an infrastructure is in place and systems are integrated to sustain the adoption of technology and innovation.**
Designing for the future	**Prioritise and ramp up adoption of liquid biopsies**, as the sensitivity of such tests is increased and can allow for earlier diagnosis, revolutionising how we find and treat cancer. **Use cancer genetic fingerprints as common practice** to better understand how the disease has developed, its potential behaviour and what treatment options could be more effective. **Scale up the use of technologies such as artificial intelligence (AI) and robotics in an equitable way** to reduce healthcare workforce workloads and complement what clinicians can do by alleviating key pressure points (e.g., clinical notes processing, image processing for cancer screening and diagnosis, supporting with key decision-making). **Provide access at scale for cancer vaccines to treat cancer, when supported by science**. For example: recent breakthroughs have fuelled optimism to believe mRNA cancer vaccines might be within our grasp in the next 10 to 15 years.	**Set up adequate funding streams (through government and private funding), to maximise investment in new technologies for diagnostics** to keep up with the advancements in multi-cancer liquid biopsies, genetics (including pharmacogenetics) and genomics, radiology, image processing, and AI/ML that will support healthcare professionals in the delivery of screening. **Support Life Sciences companies thinking about holistic implications of intervention on the system** (e.g., capacity, workforce).

Improve navigation in the cancer pathway

As people live longer with cancer in an increasingly complex system, the future vision relies upon an upskilled workforce to enable a personalised experience for the person living with cancer and their family throughout the pathway and if end of life care is needed.

Health system stakeholders recommended the following actions:

	Provide personalised care coordination in an increasingly complex healthcare system	Increase holistic support (including well-being and mental health)	Equip healthcare workforce with the skills required to improve the experience of people living with cancer and their families
Fundamentals to get right	**Ensure every person living with cancer has a care plan and a cancer key worker** – CNS or other HCP – who can support them and be a first point of contact.	**Raise awareness of social networks for health** to compliantly and securely connect people living with cancer with similar experiences seeking advice and support.	**Ensure foundations in cancer care included as a core component of undergraduate and postgraduate training for all healthcare professionals.** **Recognise and embed cultural competencies in training for healthcare professionals** to drive the quality of experience for people living with cancer and their families. For example: different cultures, ethnicities, backgrounds.
Go further faster	As a number of different care coordination models are under pilot but there is no consensus on the best model to roll out, **build consensus on the right model of care coordination to:** • Ensure the needs of a person living with cancer are identified and taken into consideration throughout the pathway and beyond • Provide additional capacity to the key worker, and triage non-clinical queries, navigation & support • Provide a new career path for trained non-clinical staff as care coordinators. **Complement the coordinator role with a digital front door** which signposts the person to the correct resources in an increasingly complex system (e.g., via NHS App, collaboration with third sector).	**Ensure holistic care is embedded as a core part of the pathway.** With needs identified by people's electronic Holistic Needs Assessment (eHNA). **The full breadth of services are available and easily accessible.** Including complementary support commissioned or provided by the third sector.	**Additional training on person-centred care for health professionals that come into contact with people with cancer in their day-to-day practice** (including AHPs*, and wider workforce outside healthcare). For example: this could include prehabilitation, rehabilitation and holistic support, tailored to different regional needs. **Increase resource to deliver changing models of end-of-life care in the future.** Funding, facilities, and training to support a generalist response to changing demands on the community, and increased specialist palliative care focusing on the most complex cases.
Designing for the future	**Extend this support to people with a family history of cancer** – provide genetic counselling and support with decisions and next steps, communicated with sensitivity.		**Explore additional routes and mechanisms into diagnostics to alleviate pressure on primary care** (e.g., first contact practitioners for triage, self-referral for certain concerns) and reduce barriers in accessing diagnostics.

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*Art therapists, Dietitians, Drama therapists, Music therapists, Podiatrists, Occupational therapists, Operating department practitioners, Orthoptists, Osteopaths, Paramedics, Physiotherapists, Prosthetists and orthotists, Radiographers, Speech, and language therapists

Building our workforce for the future

The vision for the future is dependent on a strong workforce plan, supported by investment, recruitment, and retention. In parallel reinvention is needed to create the skilled workforce of the future.

Health system stakeholders recommended the following actions:

	Recruitment	Retention	Reinvention
Fundamentals to get right	**Publish and deliver a robust, long-term costed workforce strategy and workforce planning supported by clear data and funding from national to local level** (from robust record keeping and a joined-up IT system) on capacity, roles, and competencies (e.g., SACT trained).	**Address staffing and pay challenges** pushing healthcare professionals out of the system. And reduce movement between regions due to pay inequalities. **Address root causes of poor well-being** or feeling exhausted, feeling undervalued, and being under too much pressure.	**Continue to invest in acute and tertiary specialist centres to develop world-leading regional centres of excellence which diffuse skills**, and support training in community / other settings for local healthcare professionals to develop new skills. **Ensure estates, technology and infrastructure are keeping up with the new future – creating safe spaces and environments** (e.g., for sensitive conversations).
Go further faster	**Remove barriers for healthcare professionals and others who want to train and practice in non-urban areas**, such as increasing the number of university places or apprenticeships and providing incentives to train and work in more rural areas. **Make Healthcare / Life Sciences careers and roles as attractive as possible.**For example: embed Life Sciences careers education within the curriculum, including alternative routes e.g., apprenticeships.	**Understand readiness of workforce to be upskilled, leveraging existing career development frameworks**, including ACCEnD, from support worker, pre-registration through to registered, enhanced, advanced and then building advanced practitioner roles to support with the non-medical consultant pipeline **Develop models for ways of working to make roles more rewarding** in the short term to improve retention in the longer term (e.g., case mix and work environment).	**Provide the right environment to allow healthcare professionals to demonstrate their competencies.** **Help facilitate access to appropriate levels of cancer training for specific roles across the four UK nations including generalist roles.** For example: • Coordinating rapid access to diagnostics • Delivering at-home or closer to home infusion • Providing holistic support to people living with cancer as a long-term condition • Use of remote monitoring as a tool. **Use technology and automation to assist skilled staff and improve efficiencies** and re-focus towards face-to-face care delivery (e.g., AI for prescription screening automation, voice-activated note-taking.
Designing for the future	**Create roles & career paths for the new skills required for the future** by providing options for training/re-training and career transition opportunities. For example: genetic counselling, immunotherapies, CAR-T technicians, robotic clinical documentation specialists.	**Rethink how senior / experienced nurses and other healthcare professionals nearing retirement could be retained in supporting roles (e.g., clinical educator, mentor, coaching roles).** For example: an opt-in programme mid-career which provides complementary training throughout the clinical career to prepare for the teaching role. **Understand what is important to younger generations of healthcare professionals and implement changes to ways of working.** For example: flexible working for better work-life balance.	**Create new sources of workforce by creating accredited and non-accredited vocational career paths for non-clinical staff to train, or for generalist clinicians to specialise and provide enhanced support in the community, to reduce pressure on existing roles.** For example: radiographer assistant (e.g., the radiographer workforce reform programme (WRAP)), physician associate, community pharmacists. **Create career paths and build advanced practice roles for supporting non-clinical staff.** For example: to be able to further support care and coordination. **Develop and retain exceptional clinical leaders who can transform services and deliver new models of care and elevate leadership capabilities across the workforce and act as role models for junior staff.**

Strengthen policy and collaboration

In the context of the social, political, and economic challenges, the vision for the future is dependent on long-term commitment to funding for cancer, driven by an ongoing momentum to prioritise cancer in policy.

Health system stakeholders recommended the following actions:

	Funding and investment need to match future needs	Policy needs to allow the opportunity of cancer care to be realised	Enable data-sharing across all healthcare professionals involved in care to reduce the burden on people living with cancer to re-share their data and story
Fundamentals to get right	**Deliver national long-term costed cancer strategy in all UK nations underpinned by adequate funding .** **Allocate resource to areas where the impact will be the greatest** using innovative funding models.	**Improve demand signalling mechanisms (e.g., cancer types, treatment demand) so policy can be focused on critical areas, enabled by proactive and timely response:** • Ensure data is gathered constantly and automatically flag to policy-makers. • Target investment and workforce planning.	**Solve issues of data-sharing between all healthcare professionals involved in the care of the person living with cancer** to ensure seamless transfer of data between care settings and healthcare professionals.
Go further faster	**Create multi-year funding commitments** for initiatives and resourcing, to ensure that initiatives are embedded and can continue beyond pilot stages.	**Co-create policy with people living with cancer to give them a seat at the table and influence.** **Develop a measurement framework and feedback loops** for people living with cancer and their families to help drive change based on their priorities and hold policy-makers accountable. **Enable cocreation of integrated ways of working across the system** by giving a seat at the table (beyond consultation) to public, independent, and voluntary sector.	**Build trust in the healthcare system and solve information governance challenges to strengthen public confidence in data-sharing.** Address root causes for mistrust in public sector data sharing. For example: demonstrate to clinicians and citizens that data can fulfil its promise. **Learn from specific groups that have a higher willingness to share data, replicating and scaling proof cases** (e.g., lessons learned from glioblastoma patients' willingness to share data).
Designing for the future	**Cancer spending needs to enable us to deliver the outcomes of comparable European countries** (e.g., France and Germany).		**Use real-world evidence to create a learning system** which allows clinicians to leverage the latest evidence and learn what will work best. This could take the form of an HCP portal that supports clinical decision-making through insights based on the patient's health information.

Improve equity in access and outcomes across the system

In a changing society there is a need to focus on delivering health equity through access to screening diagnostics and treatments, parity of person-centred experience and equal outcomes. Identifying and addressing both existing and new root causes of inequality will be critical.

Health system stakeholders recommended the following actions:

	Identify and address existing and new root causes, to deliver health equity in cancer	Equal access to screening, diagnostics, and care
Fundamentals to get right	**Act on what we understand:** **Understand the root causes to address health equity in cancer and take action within affected communities.** For example: work with local and marginalised communities, building on the NHS England's Core20PLUS5 initiatives, and those prioritised in the devolved nations. **Act now to understand and mitigate the impact of rising cost of living on access to health services and cancer outcomes.**	**Increase shared decision-making and education to enable people to feel empowered participating in decisions about their care plan.** For example, understanding complex topics like genomics. **Understand barriers and improve access to clinical trials and develop alternative delivery models to deliver the science to the person in the most accessible and convenient location for them** (e.g., diagnostic hubs, mobile units, providing transport to services, digital screening).
Go further faster	**Act on what we don't currently understand:** Improve data and use analytics and innovative technologies to **identify lesser explored / acknowledged reasons for lack of equity** in cancer access, experience, and outcomes and **measure impact of actions taken to address them** **Address underlying biases in analytical models and genomic databases, which can negatively affect equity in cancer diagnostics, treatment, or outcomes.** For example: create ethics boards to review.	**Educate school children about self-care, health, genomics as part of their curriculum and, for example, social media** (through credible sources), **and drive potential halo effect in older generations.** **Reduce barriers to non-invasive screening methods that can be delivered and performed at home** (e.g., FIT and HPV home test kits), removing geographical and practical barriers impacting uptake. **Use affordable, simple to use digital tools to support remote self-monitoring (report and monitor their symptoms) in people's own home** and deliver in an equitable way. This will help limit follow-up appointments, reduce travel to specialist centres, improve care experience. **Strike the balance between face-to-face and virtual care delivery**, ensuring that digital solutions complement but do not replace physical appointments.
Designing for the future	**Act on both existing and health equity barriers that are expected to arise:** As a result of: • **Increasing use of digital tools and remote monitoring**. Digital literacy, access to infrastructure/ connectivity, and empowerment/confidence to self-management of follow up care and flag needs for additional care to their cancer care team. • **Increasing quantity of complex treatment information, and expectation of joint decision-making** between people living with cancer and healthcare professionals. **Create national ambition / local plan and engage partners in initiatives to improve health equity in cancer** (e.g., engage local community leaders and health partners in initiatives to create relevant actions and accountability).	**Consider the level of trust required to deliver on opportunities for diagnostics and treatments and take action to address the sources of mistrust in the system.** For example: communication from healthcare professionals within communities with greatest levels of mistrust.

Priorities for action to realise the future of cancer care

As we look ahead, Macmillan calls on colleagues across the health system to plan ahead and take action.

During our work, we have had inspiring conversations with colleagues across the system about what could be possible for 2035 and the current challenges we need to collectively overcome to deliver the best possible outcomes for people living with cancer in the future.

This report is a call to action to professionals working in cancer at all levels, leaders across the healthcare system, including policy-makers and commissioners, and other organisations to think through what it will take within their organisation – and in collaboration with others – to deliver on these actions and best support people with cancer and healthcare professionals in the future, so that we can co-design cancer services which are fit for the future.

As Macmillan take these findings forward, we will convene conversations about how we can ensure these actions are implemented to:

- Deliver on the optimistic promise of innovations in science and technology, and ensure this can be delivered into care pathways
- Place person-centred care at the heart of the cancer pathways – going beyond treatment and ensuring that people’s holistic needs are supported
- Continue to push for the enabling investment required, and collaboration with independent and voluntary organisations as they play a greater role
- Address workforce challenges – including recruitment, retention, and reinvention of workforce models – especially the increasingly critical role of generalists
- Deliver health equity, through prevention and increased understanding of both existing and future health inequalities which may emerge as a result of the way care evolves in the future.

In addition to this work, Macmillan have gathered numerous best practices, and innovative practice cases which will be published separately to support the delivery of these actions.

The progress of the last 15 years gives us an anchor to believe in a better future for cancer care – despite huge current challenges – and take the actions required to improve the care pathway for people living with cancer.

Acknowledgements

We would like to express our sincere thanks to all the contributors to this important work who have given their time freely and for the expertise they have brought to it.

This includes people with lived experience of cancer from the Cancer Voices Community and form the Northern Ireland Cancer Experience Panel.

It also includes individuals from a broad range of organisations and professional groups across the UK, listed below.

All Ireland Institute of Hospice and Palliative Care
Aneurin Bevan University Health Board
Antrim Area Hospital
Association of British Health Tech Industries
Association of Palliative Medicine
Beatson West of Scotland Cancer Centre
Belfast Health and Social Care Trust
Big Health
British Association of Surgical Oncology
British Oncology Pharmacy Association
Bupa
Cancer Research UK
Cardiff and Vale University Health Board
Clinical Oncology Journal
Congenica
Department of Health Northern Ireland
Genesis Cancer Care
Genomics England
Genomics Medicine Service Alliance
Hannover Communications
Health and Social Care Alliance Scotland
Health Education and Improvement Wales
Health Education England
Hywel Dda University Health Board
Illumina
Imperial College Healthcare
Kent and Medway Cancer Alliance
Lancashire Teaching Hospitals NHS Foundation Trust
Lewis Pharmacy
Lloyds Pharmacy
London Ambulance Service NHS Trust
Mid and South Essex Integrated Care System
National Oncology Trainees Group (NOTCH)
NHS Accelerated Access Collaborative
NHS Dumfries and Galloway
NHS Education for Scotland
NHS England
NHS Grampian
NHS Lothian
NHS Northern Ireland
NHS Providers
NHS Scotland
NHS Wales
NHS Wales Health Collaborative
Norfolk and Norwich University Hospital
North West Cancer Centre
Optum
Picker Institute Europe
Public Health Agency
Queens University Belfast
Reimagining Health- REFORM
Roche
Royal College of Nursing
Royal College of Physicians
Royal College of Radiologists
Scottish Cancer Taskforce
Scottish Government
Scottish Partnership for Palliative Care
Scottish Primary Care Cancer Group
Sheffield Hallam University
South Eastern Health and Social Care Trust
St Georges University Hospitals NHS Foundation Trust
Step Pharma
The Christie NHS Foundation Trust
The Health Foundation
The King’s Fund
The Northern Ireland Cancer Centre
The Royal Marsden
Thermo Fisher Scientific
UK Acute Oncology Society
UK Oncology Nursing Society
University Hospital Southampton NHS Foundation Trust
University Hospitals Sussex NHS Foundation Trust
University of Glasgow
Vine Health
Western Health and Social Care Trust

Glossary

Advanced Nurse Practitioners (ANPs)	Highly skilled nurses who can: take a comprehensive patient history, carry out physical examinations and use their expert knowledge/clinical judgment to identify the potential diagnosis.
Advanced Therapy Medicinal Products (ATMP)	Innovative therapies that encompass gene therapy, somatic cell therapy, and tissue-engineered products. These therapies are expected to bring important health benefits to patients.
Allied Health Professionals (AHPs)	Employees that work in the healthcare field but aren't physicians, nurses, or dentists. They make up the rest of healthcare staffs that perform important duties like health administration, technical support, diagnostics, and rehabilitation.
Artificial intelligence (AI)	The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
Aspirant Cancer Career and Education Development (ACCEND) programme	A cancer career and education development programme that supports aspirant cancer nurses and allied health professionals towards increasing their knowledge, skills, and capability. This will increase and improve the supply of the cancer health care professional workforce in the future.
Bioinformatics	The highly interdisciplinary science focused on storing, retrieving, and analysing large amounts of biological information. The field involves many different types of specialists, including biologists, molecular life scientists, computer scientists and mathematicians.
Breast Cancer Gene (BRCA)	A BRCA mutation is a mutation in either of the BRCA1 and BRCA2 genes, which are tumour suppressor genes.
Cancer Drug Fund (CDF)	Introduced in England in 2011. It was established to provide a means by which National Health Service (NHS) patients in England could get cancer drugs rejected by National Institute for Health and Care Excellence because they were not cost effective.
Care pathway	A multidisciplinary healthcare management tool based on healthcare plans for a specific group of patients with a predictable clinical course, involving different tasks or interventions by the professionals involved in the patient care.
Cell free DNA (cfDNA)	Can be used to describe various forms of DNA freely circulating in the bloodstream, including circulating tumour DNA (ctDNA), cell-free mitochondrial DNA (ccf mtDNA), and cell-free foetal DNA (cffDNA). Testing for cfDNA is a laboratory method that involves analysing free (i.e., non-cellular) DNA contained within a biological sample, most often to look for genomic variants associated with a hereditary or genetic disorder.
Cellular/genetic engineering	A field that attempts to control cell function through chemical, mechanical, electrical, or genetic engineering of cells.
Chimeric antigen receptor T cells (CAR-T)	A treatment that uses the patient's own T-cells to kill cancer cells. CAR T-cell therapy gives T-cells the right receptors to bind to cancer cells so that the immune system can destroy them.
Clinical outcomes	Physical and mental health outcomes of treatment.
Cluster medicine	A greater-than-expected number of cancer cases that occur within a group of people in a geographic area over a period of time.
Continuing professional development (CPD)	A commitment to ongoing lifelong learning. CPD encourages looking forward and identifying opportunities to learn something new, refresh existing knowledge, improve skills, or simply keep up to date with the latest developments within a particular profession or industry.
Digital exclusion	A section of the population has continuing unequal access/capacity/understanding of how to use Information and Communications Technologies (ICT) that are essential to fully participate in society which can lead to potential shortfalls in health information/access/care.
Digitisation	The process of changing data into a digital form that can be easily read and processed by a computer, referring to digitisation of patient records.
electronic Holistic Needs Assessment (eHNA)	A web-based means of providing a Holistic Needs Assessment (HNA) in a way that's simple and secure. All you'll need is a digital device, such as a smartphone, tablet, or computer with a web browser.
electronic prescriptions and medicines administration (ePMA)	The utilisation of electronic systems to facilitate and enhance communication of a prescription or medication order, aiding the choice, administration, and supply of a medicine through information and decision support and providing a robust audit trail for the entire process.
Experience of cancer care	Lived experience of cancer care by people living with cancer.
Faecal Immunochemical Test (FIT) – home test	A screening test for colon cancer. It tests for hidden blood in the stool, which can be an early sign of cancer. FIT only detects human blood from the lower intestines. Medicines and food do not interfere with the test. It tends to be more accurate and have fewer false positive results than other tests.
General Practitioners (GPs)	A doctor based in the community who treats patients with minor or chronic illnesses and refers those with serious conditions to a hospital.

Genomic Sequencing	Process by which the sequence of nucleotide bases is determined for individual genes or even entire genomes. Computer programmes are used to identify base sequences by looking for sequences such as known genes.
Healthcare Professional (HCP)	A medical practitioner, dental practitioner, pharmacist, clinical psychologist, nurse, midwife, medical assistant, physiotherapist, occupational therapist and other allied healthcare professionals and any other person involved in the giving of medical, health, dental, pharmaceutical and any other healthcare services under the jurisdiction of the Ministry of Health.
Health equity	Health equity is the way health inequalities manifest in the health outcomes and experiences that different groups receive. In order to achieve health equity, it is important to go beyond thinking about equal access and focus on and address the different needs a group may have or barriers they face. For example, different interventions or resource allocation may be required.
Health inequality	Health inequalities are differences in health across the population and between different groups in society that are systematic, unfair, and avoidable (e.g., access to health by socioeconomic status, age, ethnicity, geography).
Holistic Needs Assessment (HNA)	The process of gathering and discussing information with the patient and/or carer /supporter to develop an understanding of what the person living with and beyond cancer knows, understands, and needs.
Hormone replacement therapy (HRT)	A treatment to relieve symptoms of the menopause. It replaces hormones that are at a lower level as you approach the menopause.
Immunotherapies	A type of biological therapy that helps the immune system fight cancer. Biological therapy is a type of treatment that uses substances made from living organisms to treat cancer.
Improving the Cancer Journey (ICJ)	A one-stop-shop service to coordinate support, whether physical, emotional, practical, or financial. The service is a partnership between East Dunbartonshire Health and Social Care Partnership, Macmillan Cancer Support and NHS Greater Glasgow & Clyde. The ICJ service can provide support over the telephone, video calls and by meeting face to face at local venues and other outreach locations.
Innovation boards	Work with the innovation community to bring together a diverse group of people with lived experience of cancer. You will share your views, skills, and ideas to help discover, test, and develop new cancer innovations. This could include new services in hospitals or the community, new technologies to help people get support at home or new devices to support earlier diagnosis.
Integrated Care System (ICS)	Partnerships that bring together the health and care organisations in a particular local area to improve population health and healthcare, tackle unequal outcomes and access, enhance productivity and value for money and help the NHS to support broader social and economic development.
Liquid biopsies	A test that enables the diagnosis or analysis of tumours using only a blood or fluid sample rather than a solid tissue biopsy.
Machine Learning (ML)	A programme able to learn from experience—i.e., to modify its execution based on newly acquired information.
Messenger ribonucleic acid (mRNA) cancer vaccines	mRNA vaccines use a single-stranded molecule of RNA that corresponds to the genetic sequence of a gene to express full-length antigens and induce immune response.
Multidisciplinary teams (MDTs)	A group of professionals from one or more clinical disciplines who together make decisions regarding recommended treatment of individual patients. Multidisciplinary teams often specialise in certain conditions, such as cancer.
Multiple morbidities	The concept of living with two or more long-term/chronic illnesses.
Office for National Statistics (ONS)	The executive office of the UK Statistics Authority, a non-ministerial department which reports directly to the UK Parliament.
Oral Contraceptive Pill (OCP)	Pills taken by mouth to help prevent pregnancy.
Overall quality of life	Holistic perspective on quality of life perceived by people living with cancer.
Pathway	All the stages a patient experiences in the management of their cancer.
Prostate Specific Antigen (PSA) test	A blood test used to screen for prostate cancer. The test can find aggressive prostate cancer that needs treatment but can also find slow-growing cancer that may never cause symptoms or shorten life.
Patient Reported Outcome Measures (PROMS)	Measures a patient’s health status or health-related quality of life, allowing for health status information to be collected from patients before and after an intervention through completion of a questionnaire.
Precision oncology	The molecular profiling of tumours to identify targetable alterations, which is rapidly developing into part of mainstream clinical practice.

Radiographer Workforce Reform (WRAP) programme	A programme funded by Macmillan and Health Education England supporting the society of radiographers.
Realistic Medicine	Realistic Medicine is an approach to healthcare that aims to put the patient at the centre of decisions made about their care. Shared decision-making and a personalised approach to care are key elements of practising Realistic Medicine. It also aims to reduce harm, waste, and unwarranted variation, while acknowledging and managing the inherent risks associated with all healthcare, and championing innovation and improvement.
Self-efficacy	An individual's belief in their capacity to act in the ways necessary to reach specific goals.
Siloed working	Working in a sort of bubble – alone or as part of an insular team or department.
Stereotactic body radiation therapy (SBRT)	A treatment for cancer involving radioactive energy to destroy cancer cells. It is typically used to treat small, early-stage, non-small cell lung tumours.
Systemic Anti-Cancer Therapy (SACT)	A collective term to describe the growing number of differing therapies used in malignancy to achieve palliation. Improving symptoms, quality of life (QOL) and where possible length of life are the goals of these treatments. This includes anti-cancer drug treatments such as chemotherapy and immunotherapy.
Stereotactic body radiotherapy (SBRT)	A type of radiation therapy in which special equipment is used to precisely deliver a dose of radiation to a tumour. The aim of SBRT is to employ the highest possible dose of radiation to kill cancer while minimising damage to surrounding tissues and organs. SBRT is used to treat non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC) and certain types of cancer that have spread (metastasized) to the lungs or other parts of the body.
Telehealth services	Services that use video calls and other technologies to help you see your doctor or other health care provider from home instead of at a medical facility.
Transforming Cancer Care (TCC) programme	Launched in August 2019, TCC builds on the success of both the Transforming Care After Treatment and the Improving the Cancer Journey programmes. TCC will bring both programmes together with the overall aim being to ensure that people in Scotland diagnosed with cancer are prepared for and supported to live with the consequences of the diagnosis and its treatment.
Transforming Care After Treatment (TCAT)	Delivered in partnership with the People Affected by Cancer, Scottish Government, Regional Cancer Networks, NHS Boards, Local Authorities, and the Voluntary Sector from 2013 – 2018. The aim of the programme was to facilitate the development and implementation of future models of care that: enable people to play a more active role in managing their own care; provide more tailored services to the needs and preferences of people affected by cancer; and give more support in dealing with the physical, emotional, and financial consequences of cancer treatment.
Value-based payments	The level of payment a provider receives is tied to cost and quality targets, which may be developed and imposed by government agencies or other healthcare providers.
Voluntary Community and Social Enterprise (VCSE)	A non-governmental organisation that is value-driven and which principally reinvests its surpluses to further social, environmental, or cultural objectives.

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References

1. Ryan, Joal. 2022. A nostalgic look back at the hottest tech the year the first iPhone appeared. https://www.cnet.com/pictures/nostalgic-look-back-hottest-tech-year-first-iphone-appeared/
2. Cancer Research UK. 2022. Breast cancer mortality statistics. https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/mortality#heading-Two
3. Grisham, Julie. 2020. A decade of progress in cancer care, and what's next. https://www.mskcc.org/news/decade-progress-cancer-care-and-what-s-next
4. Arruebo, M et al. 2011. Assessment of the evolution of cancer treatment therapies. https://pubmed.ncbi.nlm.nih.gov/24212956/
5. Lei, J. et al. 2020. HPV Vaccination and the Risk of Invasive Cervical Cancer. https://pubmed.ncbi.nlm.nih.gov/32997908/
6. White, R. et al. 2021. Treatable but not curable cancer in England: a retrospective cohort study using cancer registry data and linked data sets. https://bmjopen.bmj.com/content/bmjopen/11/1/e040808.full.pdf
7. Office for National Statistics. 2021. Overview of the UK population: January 2021. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/january2021
8. Office for National Statistics. 2017. Overview of the UK population: July 2017. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/july2017
9. Office for National Statistics. 2015. Overview of the UK population: November 2015. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/2015-11-05
10. National Institute for Health and Care Research. 2018. Multi-morbidity predicted to increase in the UK over the next 20 years. https://evidence.nihr.ac.uk/alert/multi-morbidity-predicted-to-increase-in-the-uk-over-the-next-20-years/
11. Weight, NHS Digital. 2019. http://healthsurvey.hscic.gov.uk/data-visualisation/data-visualisation/explore-the-trends/weight.aspx
12. ONS, GOV UK. 2020. Smoking prevalence in the UK and the impact of data collection changes: 2020.
13. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/drugusealcoholandsmoking/bulletins/smokingprevalenceintheukandtheimpactofdatacollectionchanges/2020
14. Cancer Research UK. Projections of incidence for common cancers. https://www.cancerresearchuk.org/health-professional/cancer-statistics/incidence/common-cancers-compared#heading-Four
15. Northern Ireland Cancer Registry. 2019. All Cancers Excl. NMSC. https://www.qub.ac.uk/research-centres/nicr/CancerInformation/official-statistics/BySite/All-Cancers-excl-non-malignant-melanoma-skin/
16. Public Health Wales. 2022. Cancer Mortality in Wales, 2002-2021. https://phw.nhs.wales/services-and-teams/welsh-cancer-intelligence-and-surveillance-unit-wcisu/cancer-mortality-in-wales-2002-2021/
17. Public Health Scotland. 2021. Cancer Mortality. https://www.opendata.nhs.scot/dataset/cancer-mortality
18. National Disease Registration Service. 2022. Cancer Data. https://www.cancerdata.nhs.uk/incidence_and_mortality
19. National Cancer Patient Experience Survey. 2021. 2018 Trust reports and data tables. https://www.ncpes.co.uk/2018-trust-reports/
20. National Cancer Patient Experience Survey. 2021. 2018 Trust reports and data tables. https://www.ncpes.co.uk/2018-trust-reports/
21. The Cancer Survival Group, London School of Hygiene & Tropical Medicine. Trends and inequalities in cancer survival. https://csg.lshtm.ac.uk/research/themes/trends-and-inequalities/
22. NHS England. 2023/24 priorities and operational planning guidance https://www.england.nhs.uk/publication/2023-24-priorities-and-operational-planning-guidance/
23. Macmillan. Cancer Plan – Call for Evidence: Macmillan submission https://www.macmillan.org.uk/dfsmedia/1a6f23537f7f4519bb0cf14c45b2a629/7146-10061/ten-year-cancer-plan-call-for-evidence
24. Northern Health and Social Care Trust. Accessed Jan 2023. http://www.northerntrust.hscni.net/about-the-trust/trust-overview-2/health-and-social-care-in-northern-ireland/.
25. Whitaker, K. 2019. Earlier diagnosis: the importance of cancer symptoms. https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(19)30658-8/fulltext
26. NHS England. 2022. Screening and earlier diagnosis https://www.england.nhs.uk/cancer/early-diagnosis/screening-and-earlier-diagnosis/
27. NHS England. 2022. Screening and earlier diagnosis https://www.england.nhs.uk/cancer/early-diagnosis/screening-and-earlier-diagnosis/
28. Cancer Research UK. 2022. Early diagnosis initiative. https://www.cancerresearchuk.org/health-professional/diagnosis/early-diagnosis-initiative
29. Scottish Government. 2018. Detect Cancer Early. https://www.gov.scot/news/detect-cancer-early/
30. Northern Ireland Cancer Network. 2022. New Northern Ireland Cancer Early Diagnosis Campaign 'Spot Cancer Early' launches. https://nican.hscni.net/2022/09/07/cancer-early-diagnosis-campaign/#:~:text=New%20Northern%20Ireland%20Cancer%20Early%20Diagnosis%20Campaign%20%E2%80%98Spot,of%20cancer%20in%20an%20appropriate%20and%20timely%20manner%2C
31. NHS Digital. 2022. Are we 'Clear on Cancer'? https://digital.nhs.uk/blog/data-points-blog/2022/are-we-clear-on-cancer
32. NHS England. 2019. NHS Long Term Plan ambitions for cancer. https://www.england.nhs.uk/cancer/strategy/
33. NHS Scotland. 2023. Earlier Cancer Diagnosis https://www.nhscfsd.co.uk/our-work/earlier-cancer-diagnosis/
34. Public Health Scotland. 2021. Cancer staging data using 2018 to 2020 DCE data – the impact of COVID-19. https://publichealthscotland.scot/publications/cancer-staging-data-using-2018-to-2020-dce-data-the-impact-of-covid-19/cancer-staging-data-using-2018-to-2020-dce-data-the-impact-of-covid-19/
35. Queen's University Belfast. Lung cancer incidence and survival statistics for Northern Ireland 1993-2020. 2022. https://www.qub.ac.uk/News/Allnews/2022/LUNGCANCERINCIDENCEANDSURVIVALSTATISTICSFORNORTHERNIRELAND1993-2020.html
36. NHS England. 2022. Screening and earlier diagnosis https://www.england.nhs.uk/cancer/early-diagnosis/screening-and-earlier-diagnosis/

BACK < CONTENTS > NEXT

37. NHS Digital. 2021. Cancer services profile, 2021 annual update. https://digital.nhs.uk/data-and-information/publications/statistical/cancer-services-profiles/2021-annual-update
38. The University of Surrey. 2022. Majority of patients with bowel cancer diagnosed outside of screening programmes. https://www.surrey.ac.uk/news/majority-patients-bowel-cancer-diagnosed-outside-screening-programmes
39. Mallorie, S. 2022. Cancer screening: the urgent shouldn’t crowd out the important. https://www.kingsfund.org.uk/blog/2022/09/cancer-screening-urgent-shouldnt-crowd-out-important
40. The Health Foundation. 2016. Faecal immunochemical test (FIT) for bowel cancer detection. https://navigator.health.org.uk/theme/faecal-immunochemical-test-fit-bowel-cancer-detection
41. Cancer Research UK.2022. Health inequalities: breaking down barriers to cancer screening. https://news.cancerresearchuk.org/2022/09/23/health-inequalities-breaking-down-barriers-to-cancer-screening/
42. Cancer Research UK. 2022. What is cancer screening? https://www.cancerresearchuk.org/about-cancer/cancer-symptoms/spot-cancer-early/screening/what-is-cancer-screening
43. Public Health England. 2020. National Disease Registration Service: Case-mix adjusted percentage of cancers diagnosed at stages 1 and 2 in England, by Clinical Commissioning Group. https://www.gov.uk/government/statistics/case-mix-adjusted-percentage-cancers-diagnosed-at-stages-1-and-2-by-ccg-in-england/national-disease-registration-service-case-mix-adjusted-percentage-of-cancers-diagnosed-at-stages-1-and-2-in-england-by-clinical-commissioning-group#summary
44. NHS Digital. 2022. Routes to diagnosis, 2018. https://digital.nhs.uk/data-and-information/publications/statistical/routes-to-diagnosis/2018
45. Public Health England. 2022. Cancer services. https://fingertips.phe.org.uk/profile/cancerservices/data#page/1/gid/1938133365/ati/15/iid/336/age/27/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1
46. NHS Digital. 2022. NHS breast screening programme, England 2020-21. https://digital.nhs.uk/data-and-information/publications/statistical/breast-screening-programme/england---2020-21
47. NHS Digital. 2021. Cervical Screening Programme, England – 2020-21 [NS]. https://digital.nhs.uk/data-and-information/publications/statistical/cervical-screening-annual/england--2020-2021
48. NHS Digital. 2022. Routes to diagnosis, 2018. https://digital.nhs.uk/data-and-information/publications/statistical/routes-to-diagnosis/2018
49. Electronic Risk Assessment for Cancer. 2022. The ERICA trial. https://www.theericatrial.co.uk/coming-soon/
50. Cancer Research UK.2022. Health inequalities: breaking down barriers to cancer screening. https://news.cancerresearchuk.org/2022/09/23/health-inequalities-breaking-down-barriers-to-cancer-screening/
51. NHS National Services Scotland. 2018. Detect Cancer Early Staging Data. https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-08-13/2019-08-13-DetectCancerEarly-Report.pdf
52. Cancer Data. 2021. Staging data in England. https://www.cancerdata.nhs.uk/stage_at_diagnosis
53. Marlow, L. A. V, et al. 2022. Multi-cancer early detection tests for cancer screening: a behavioural science perspective. https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(22)00161-9/fulltext
54. Nogrady, B. 2020. How cancer genomics is transforming diagnosis and treatment https://www.nature.com/articles/d41586-020-00845-4
55. Psomagen. 2022. Next-Generation Sequencing in Cancer Diagnostics https://www.psomagen.com/blog/role-of-next-generation-sequencing-in-cancer-diagnostics
56. Martins, I et al. 2021. Liquid Biopsies: Applications for Cancer Diagnosis and Monitoring https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7997281/
57. NHS Galleri Trial. 2021. Detecting cancer early. https://www.nhs-galleri.org/
58. NHS Digital. 2020. Cervical Screening Programme, England – 2019-20 [NS]. https://digital.nhs.uk/data-and-information/publications/statistical/cervical-screening-annual/england---2019-20
59. NHS Digital. 2021. Breast Screening Programme, England 2019-20. https://digital.nhs.uk/data-and-information/publications/statistical/breast-screening-programme/england---2019-20
60. Cancer Research UK. 2015. Bowel Cancer Screening Coverage and Uptake. https://www.cancerresearchuk.org/sites/default/files/cstream-node/screen_bowel_cov_upt.pdf
61. Young, B & Robb, K. 2021. Understanding patient factors to increase uptake of cancer screening: a review. https://pubmed.ncbi.nlm.nih.gov/34378403/
62. NHS England. 2022. Army of volunteers join NHS trial to spot deadly cancers. https://www.england.nhs.uk/2022/07/army-of-volunteers-join-nhs-trial-to-spot-deadly-cancers/
63. Macmillan Cancer Support. 2022. What’s new in cancer?: Cell-free DNA and liquid biopsies. https://www.macmillan.org.uk/healthcare-professionals/news-and-resources/blogs/whats-new-in-cancer-cfdna-liquid-biopsy
64. Check 4 Cancer. 2022. Prostate Cancer Screening Test. https://www.check4cancer.com/private-cancer-tests/prostate-cancer
65. Wild, S. 2021. HPV home testing kits – all you need to know. https://www.bupa.co.uk/newsroom/ourviews/hpv-home-testing-kits
66. NHS. 2021. Bowel cancer screening. https://www.nhs.uk/conditions/bowel-cancer-screening/
67. NHS. 2021. Bowel cancer screening. https://www.nhs.uk/conditions/bowel-cancer-screening/
68. NHS England. 2021. NHS gives women Human Papillomavirus Virus (HPV) home testing kits to cut cancer deaths. https://www.england.nhs.uk/2021/02/nhs-gives-women-hpv-home-testing-kits-to-cut-cancer-deaths/
69. Robinson, J. 2016. Bringing the pregnancy test home from the hospital. https://www.researchgate.net/publication/308947082_Bringing_the_pregnancy_test_home_from_the_hospital
70. Capua, M. 2020. Pregnancy testing through the ages. https://www.aacc.org/cln/cln-industry-insights/2020/pregnancy-testing-through-the-ages
71. SH:24. 2022. Pregnancy testing. https://sh24.org.uk/pregnancy/pregnancy-testing
72. NHS England. 2019. Report of the independent review of adult screening programmes in England. https://www.england.nhs.uk/wp-content/uploads/2019/02/report-of-the-independent-review-of-adult-screening-programme-in-england.pdf
73. Esfahani, K. et al. 2020. A review of cancer immunotherapy: from the past, to the present, to the future. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7194005/

74. Elbanna, M. et al. 2021. Clinical and Preclinical Outcomes of Combining Targeted Therapy With Radiotherapy. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8558533/
75. Fritah, H. et al. 2022. The current clinical landscape of personalized cancer vaccines. https://www.cancertreatmentreviews.com/article/S0305-7372(22)00047-0/fulltext
76. Saes-Ibañez, A R. et al. 2022. Landscape of cancer cell therapies: trends and real-world data. https://www.nature.com/articles/d41573-022-00095-1
77. BioNTech. 2022. Breakthrough technologies across four different drug classes to revolutionize medicine. https://www.biontech.com/int/en/home/pipeline-and-products/pipeline.html
78. Leibig, C. et al 2022. Combining the strengths of radiologists and AI for breast cancer screening: a retrospective analysis. https://www.thelancet.com/journals/landig/article/PIIS2589-7500(22)00070-X/fulltext
79. Graf, J. et al. 2022. Implementation of an Electronic Patient-Reported Outcome App for Health-Related Quality of Life in Breast Cancer Patients: Evaluation and Acceptability Analysis in a Two-Center Prospective Trial. https://www.jmir.org/2022/2/e16128/
80. Zahiri, M. et al. 2019. Using wearables to screen motor performance deterioration because of cancer and Chemotherapy-Induced Peripheral Neuropathy (CIPN) in adults – Toward an early diagnosis of CIPN. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6639160/
81. Groninger, H. et al. 2022. Virtual reality for management of cancer pain: Study rationale and design. https://pubmed.ncbi.nlm.nih.gov/35128143/
82. Yu, Z. et al. 2021. The role of the bacterial microbiome in the treatment of cancer. https://bmccancer.biomedcentral.com/articles/10.1186/s12885-021-08664-0
83. Helmink, B. et al. 2019. The microbiome, cancer, and cancer therapy. https://www.nature.com/articles/s41591-019-0377-7
84. Global Data Intelligence Center Database (November 2022)
85. European Medicines Agency. 2022. Keytruda. https://www.ema.europa.eu/en/medicines/human/EPAR/keytruda
86. National Library of Medicine. 2022. Clinicaltrials.gov. https://beta.clinicaltrials.gov/
87. University of Cambridge. 2022. Largest study of whole genome sequencing data reveals new clues to causes of cancer. https://www.cam.ac.uk/research/news/largest-study-of-whole-genome-sequencing-data-reveals-new-clues-to-causes-of-cancer
88. Raza, S. 2021. Minding the genomic data gap: COVID-19, genomics and health inequalities. https://www.adalovelaceinstitute.org/blog/data-gap-covid-19-genomics-health-inequalities/
89. National Institute for Health and Care Research. 2020. Improving inclusion of under-served groups in clinical research: Guidance from INCLUDE project. https://www.nihr.ac.uk/documents/improving-inclusion-of-under-served-groups-in-clinical-research-guidance-from-include-project/25435
90. Bode, M & Dong, Z. 2018. Recent advances in precision oncology research. https://www.nature.com/articles/s41698-018-0055-0
91. Sample, I. 2022. Vaccines to treat cancer possible by 2030, say BioNTech founders. https://www.theguardian.com/society/2022/oct/16/vaccines-to-treat-cancer-possible-by-2030-say-biontech-founders
92. Beaton, L. et al. 2019. How rapid advances in imaging are defining the future of precision radiation oncology. https://www.nature.com/articles/s41416-019-0412-y
93. Fleming, N. 2022. How radiotherapy became a lifesaver – from X-rays to the proton beam. https://news.cancerresearchuk.org/2022/07/08/how-radiotherapy-became-a-lifesaver-from-x-rays-to-the-proton-beam/
94. National Cancer Institute. 2020. Radiopharmaceuticals: Radiation Therapy Enters the Molecular Age. https://www.cancer.gov/news-events/cancer-currents-blog/2020/radiopharmaceuticals-cancer-radiation-therapy
95. Sgouros, G. et al. 2020. Radiopharmaceutical therapy in cancer: clinical advances and challenges. https://www.nature.com/articles/s41573-020-0073-9
96. Andras, I. et al. 2019. Artificial intelligence and robotics: a combination that is changing the operating room. https://pubmed.ncbi.nlm.nih.gov/31776737/
97. Quero, G. et al. 2022. Artificial Intelligence in Colorectal Cancer Surgery: Present and Future Perspectives. https://pubmed.ncbi.nlm.nih.gov/35954466/
98. Shreve, J. et al. 2022. Artificial Intelligence in Oncology: Current Capabilities, Future Opportunities, and Ethical Considerations. https://ascopubs.org/doi/full/10.1200/EDBK_350652
99. Burati, M. et al. 2022. Artificial intelligence as a future in cancer surgery. https://www.wjgnet.com/2644-3228/full/v3/i1/11.htm
100. Deloitte Interviews, 2022
101. https://www.iqvia.com/-/media/iqvia/pdfs/institute-reports/digital-health-trends-2021/iqvia-institute-digital-health-trends-2021.pdf?&&_=1669373736720
102. IQVIA. 2021. Digital health trends 2021. https://www.iqvia.com/-/media/iqvia/pdfs/institute-reports/digital-health-trends-2021/iqvia-institute-digital-health-trends-2021.pdf?&&_=1669373736720
103. RBCCM. 2022. The healthcare data explosion. https://www.rbccm.com/en/gib/healthcare/episode/the_healthcare_data_explosion
104. Barker, A & Lee, J. 2022. Translating "Big Data" in Oncology for Clinical Benefit: Progress or Paralysis. https://aacrjournals.org/cancerres/article/82/11/2072/699100/Translating-Big-Data-in-Oncology-for-Clinical
105. World Economic Forum. 2019. 4 ways data is improving healthcare. https://www.weforum.org/agenda/2019/12/four-ways-data-is-improving-healthcare
106. RBCCM. 2022. The healthcare data explosion. https://www.rbccm.com/en/gib/healthcare/episode/the_healthcare_data_explosion
107. Nesta. 2022. Px healthcare. https://www.nesta.org.uk/feature/healthier-lives-data-fund-meet-grantees/px-healthcare-developing-owise-prostate-cancer-give-patients-more-insight-and-control-during-and-after-their-treatment/
108. The King's Fund. 2022. Interoperability is more than technology. https://www.kingsfund.org.uk/publications/digital-interoperability-technology
109. Horton, T. et al. 2022. The Plan for Digital Health and Social Care: what will be needed to deliver on its ambitions? https://www.health.org.uk/news-and-comment/blogs/the-plan-for-digital-health-and-social-care-what-will-be-needed-to-deliver
110. Department of Health and Social Care. 2020. £16 million to introduce digital prescribing in hospitals. https://www.gov.uk/government/news/16-million-to-introduce-digital-prescribing-in-hospitals

111. Department of Health and Social Care. 2020. £16 million to introduce digital prescribing in hospitals. https://www.gov.uk/government/news/16-million-to-introduce-digital-prescribing-in-hospitals
112. Medscape UK. 2022. Summarising clinical guidelines for primary and secondary care. https://www.guidelines.co.uk/news/are-electronic-prescribing-and-medicines-administration-systems-safe/456803.article
113. Health Education England. 2022. The Topol review. https://topol.hee.nhs.uk/
114. The King's Fund. Digital health care: our position. https://www.kingsfund.org.uk/projects/positions/digital-health-care
115. Office for National Statistics. 2019. Exploring the UK's digital divide. https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04
116. Office for National Statistics. 2019. Exploring the UK's digital divide. https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04
117. Gov.uk. 2021. Centre for data ethics and innovation public attitudes to data and AI tracker survey. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092140/Public_Attitudes_to_Data_and_AI_-_Tracker_Survey.pdf
118. Gov.uk. 2021. Infographic report final. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1114937/CDEI_Infographic_Report_final.pdf
119. Gov.uk. 2021. Infographic report final. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1114937/CDEI_Infographic_Report_final.pdf
120. Botham, J. et al. 2021. Patient and public understanding of the concept of 'personalised medicine' in relation to cancer treatment: a systematic review. https://www.rcpjournals.org/content/futurehosp/8/3/e703/tab-figures-data
121. Botham, J. et al. 2021. Patient and public understanding of the concept of 'personalised medicine' in relation to cancer treatment: a systematic review. https://www.rcpjournals.org/content/futurehosp/8/3/e703/tab-figures-data
122. Prostate Cancer UK. 2014. Public awareness study. https://prostatecanceruk.org/about-us/projects-and-policies/public-awareness-study
123. World Cancer Research Fund International. 2022. Global cancer data by country. https://www.wcrf.org/cancer-trends/global-cancer-data-by-country/
124. Cancer Data. 2022. Staging data in England. https://www.cancerdata.nhs.uk/stage_at_diagnosis
125. The Health Foundation. 2022. Public health grant What it is and why greater investment is needed. https://www.health.org.uk/news-and-comment/charts-and-infographics/public-health-grant-what-it-is-and-why-greater-investment-is-needed
126. Royal Pharmaceutical Society. 2020. Utilising community pharmacists to support people with cancer. https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Policy/00207%20001a%202001%20Cancer%20Paper%20WEB.pdf
127. [Macmillan, Lived Experience Survey, June '22]
128. Macmillan – The lived experiences of people living with cancer (June, 2022)
129. Source: Macmillan – The lived experiences of people living with cancer (June, 2022): Have you had any concerns about any of the following issues in the last few weeks, which were caused or have been made worse by your experience of cancer? [Score 2-5 on five point scale]
130. Base: All people living with cancer; Jun-22 (2050)
131. By Your Side. 2022. https://www.byyourside.co.uk/
132. Gorin, S. S. et al. 2017. Cancer Care Coordination: a Systematic Review and Meta-Analysis of Over 30 Years of Empirical Studies. https://pubmed.ncbi.nlm.nih.gov/28685390/
133. Social prescribing for people with cancer. https://learning.guyscanceracademy.co.uk/social-prescribing/#/
134. SSPC. 2016. Managing Multimorbidity. http://www.sspc.ac.uk/media/media_484729_en.pdf
135. Hardeep Aiden. 2018. Multimorbidity: Understanding the challenge. https://www.richmondgroupofcharities.org.uk/sites/default/files/multimorbidity_-_understanding_the_challenge.pdf
136. Cancer Research UK. 2022. Cancer statistics for the UK. https://www.cancerresearchuk.org/health-professional/cancer-statistics-for-the-uk
137. Juliana Berk-Krauss, et al. 2020. New Systematic Therapies and Trends in Cutaneous Melanoma Deaths Among US Whites, 1986-2016.
138. Cancer Research UK. 2022. Cancer survival statistics for all cancers combined. https://www.cancerresearchuk.org/health-professional/cancer-statistics/survival/all-cancers-combined#heading-Zero
139. Sue Ryder. 2022. It's time to end the hospice funding crisis. https://www.sueryder.org/news/hospice-funding-crisis
140. Marie Curie. 2022. The better end of life programme. https://www.mariecurie.org.uk/policy/better-end-life-report
141. Kings Fund. 2021. Invisible deaths: understanding why deaths at home increased during the Covid-19 pandemic. https://www.kingsfund.org.uk/blog/2021/06/understanding-why-deaths-home-increased-covid-19-pandemic
142. Macmillan Cancer Support. 2017. The final injustice. https://www.macmillan.org.uk/_images/MAC16904-end-of-life-policy-report_tcm9-321025.pdf
143. Nuffield Trust. 2022. End of life care. https://www.nuffieldtrust.org.uk/resource/end-of-life-care
144. Higginson, I. J. et al. 2017. Social and clinical determinants of preferences and their achievement at the end of life: prospective cohort study of older adults receiving palliative care in three countries. https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-017-0648-4
145. Marie Curie. 2021. Public attitudes to death and dying in the UK. https://www.mariecurie.org.uk/globalassets/media/documents/policy/public-attitudes-to-death-and-dying-report-final.pdf
146. Aggarwal, A. et al. 2022. Health service planning to assess the expected impact of centralising specialist cancer services on travel times, equity, and outcomes: a national population-based modelling study. https://www.thelancet.com/action/showPdf?pii=S1470-2045%2822%2900398-9
147. Chemist and Druggist. 2020. News Article. https://www.chemistanddruggist.co.uk/CD006359/Lloydspharmacy-collaborates-with-NHS-trust-on-mobile-cancer-unit
148. Aggarwal, A. et al. 2017. Effect of patient choice and hospital competition on service configuration and technology adoption within cancer surgery: a national, population-based study. https://www.thelancet.com/action/showPdf?pii=S1470-2045%2817%2930572-7

149. NHS England. 2022. NHS expands lifesaving home testing kits for bowel cancer. https://www.england.nhs.uk/2022/08/nhs-expands-lifesaving-home-testing-kits-for-bowel-cancer/
150. The Christie NHS foundation trust. 2021. New cancer treatments offered at home from one of Europe's largest cancer centres. https://www.christie.nhs.uk/about-us/news-at-the-christie/latest-news-stories/new-cancer-treatments-offered-at-home-from-one-of-europe-s-largest-cancer-centres
151. NHS England. 2019. NHS to rollout lung cancer scanning trucks across the country. https://www.england.nhs.uk/2019/02/lung-trucks/
152. The Royal Marsden NHS foundation Trust. 2022. Mobile chemotherapy unit. https://www.royalmarsden.nhs.uk/our-consultants-units-and-wards/royal-marsden-sutton-surrey/mobile-chemotherapy-unit
153. NHS England. 2022. What is a virtual ward? https://www.england.nhs.uk/virtual-wards/what-is-a-virtual-ward/
154. The London Press. 2022. Finchley hospital community diagnostic centre celebrates 50,000 patient milestone. https://thelondonpress.uk/2022/08/27/finchley-hospital-community-diagnostic-centre-celebrates-50000-patient-milestone/
155. NHS England. 2022. Delivery plan for tackling the COVID-19 backlog of elective care. https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2022/02/C1466-delivery-plan-for-tackling-the-covid-19-backlog-of-elective-care.pdf
156. Crosbie, P & Landers, D. 2022. Access and inclusion: can we move cancer services closer to home? https://blog.policy.manchester.ac.uk/posts/2022/08/access-and-inclusion-can-we-move-cancer-services-closer-to-home/
157. Aggarwal, A. et al. 2022. Health service planning to assess the expected impact of centralising specialist cancer services on travel times, equity, and outcomes: a national population-based modelling study. https://www.thelancet.com/action/showPdf?pii=S1470-2045%2822%2900398-9
158. Aggarwal, A. et al. 2017. Effect of patient choice and hospital competition on service configuration and technology adoption within cancer surgery: a national, population-based study. https://www.thelancet.com/action/showPdf?pii=S1470-2045%2817%2930572-7
159. NHS Digital. 2022. NHS Workforce Statistics – July 2022 (Including selected provisional statistics for August 2022). https://digital.nhs.uk/data-and-information/publications/statistical/nhs-workforce-statistics/july-2022
160. Nuffield Trust. 2019. Closing the gap. https://www.nuffieldtrust.org.uk/files/2019-03/1553101044_heaj6918-workforce-briefing-190320-web.pdf
161. The Royal College of Radiologists. 2020. UK workforce census report 2020. https://www.rcr.ac.uk/system/files/publication/field_publication_files/clinical-oncology-uk-workforce-census-2020-report.pdf
162. The Royal College of Radiologists. 2020. UK workforce census report 2020. https://www.rcr.ac.uk/system/files/publication/field_publication_files/clinical-oncology-uk-workforce-census-2020-report.pdf
163. The Royal College of Radiologists. 2020. UK workforce census report 2020. https://www.rcr.ac.uk/system/files/publication/field_publication_files/clinical-oncology-uk-workforce-census-2020-report.pdf
164. Nuffield Trust. 2022. Peak leaving? A spotlight on nurse leaver rates in the UK. https://www.nuffieldtrust.org.uk/resource/peak-leaving-a-spotlight-on-nurse-leaver-rates-in-the-uk
165. Macmillan Cancer Support. 2021. Cancer nursing on the line: why we need urgent investment across the UK. https://www.macmillan.org.uk/dfsmedia/1a6f23537f7f4519bb0cf14c45b2a629/4323-10061/cancer-nursing-on-the-line-why-we-need-urgent-investment-in-the-uk
166. Macmillan Cancer Support. 2020. Addressing the gap. https://www.macmillan.org.uk/_images/addressing-the-gap-report_tcm9-358808.pdf
167. Popplestone, C. 2022. 'The shortage of cancer nurses cannot continue to be ignored'. https://www.nursingtimes.net/opinion/the-shortage-of-cancer-nurses-cannot-continue-to-be-ignored-15-03-2022/
168. Macmillan Cancer Support. 2021. Cancer nursing on the line: why we need urgent investment across the UK. https://www.macmillan.org.uk/dfsmedia/1a6f23537f7f4519bb0cf14c45b2a629/4323-10061/cancer-nursing-on-the-line-why-we-need-urgent-investment-in-the-uk
169. Palmer, B & Rolewicz, L. 2022. Peak leaving? A spotlight on nurse leaver rates in the UK. https://www.nuffieldtrust.org.uk/resource/peak-leaving-a-spotlight-on-nurse-leaver-rates-in-the-uk
170. RCN Northern Ireland. 2022. Northern Ireland fair pay and safe staffing campaign | Royal College of Nursing. https://www.rcn.org.uk/northernireland/Get-Involved/Northern-Ireland-fair-pay-and-safe-staffing-campaign
171. The Royal College of Radiologists. 2020. UK workforce census report 2020. https://www.rcr.ac.uk/system/files/publication/field_publication_files/clinical-oncology-uk-workforce-census-2020-report.pdf
172. Macmillan Cancer Support. 2022. Voices from the frontline: challenges facing cancer clinical nurse specialists right now. https://www.macmillan.org.uk/_images/voices-from-the-frontline-september-2019_tcm9-355168.pdf
173. UK Parliament. 2020. Written evidence submitted by Macmillan Cancer Support. https://committees.parliament.uk/writtenevidence/11112/html/
174. The Royal College of Radiologists. 2020. UK workforce census report 2020. https://www.rcr.ac.uk/system/files/publication/field_publication_files/clinical-oncology-uk-workforce-census-2020-report.pdf
175. The Kings Fund. 2022. The NHS nursing workforce – have the floodgates opened? https://www.kingsfund.org.uk/blog/2022/10/nhs-nursing-workforce
176. Nuffield Trust. 2022. Peak leaving? A spotlight on nurse leaver rates in the UK. https://www.nuffieldtrust.org.uk/resource/peak-leaving-a-spotlight-on-nurse-leaver-rates-in-the-uk
177. How many nursing students are leaving or suspending their degrees before graduation? 2019 https://www.health.org.uk/news-and-comment/charts-and-infographics/how-many-nursing-students-are-leaving-or-suspending-their-degrees
178. Reuben, A & Gilder, L. 2022. Does the average nurse earn £34,000 a year? https://www.bbc.co.uk/news/63587909
179. BMJ. 2022. Almost 19 000 GPs will leave in next five years without urgent action, RCGP warns. https://www.bmj.com/content/377/bmj.o1535.full
180. The Health Foundation. 2022. A quarter of GP and general practice nursing posts could be vacant in 10 years. https://www.health.org.uk/news-and-comment/news/a-quarter-of-gp-and-general-practice-nursing-posts-could-be-vacant-in-10-years
181. Aspirant Cancer Career and Education Development programme | Health Education England hee.nhs.uk

182. Macmillan Cancer Support. 2021. Cancer nursing on the line: why we need urgent investment across the UK. https://www.macmillan.org.uk/dfsmedia/1a6f23537f7f4519bb0cf14c45b2a629/4323-10061/cancer-nursing-on-the-line-why-we-need-urgent-investment-in-the-uk

183. YouGov and Imperial College. 2018. https://docs.cdn.yougov.com/p19r12b6s7/Imperial%20College%20London%20%28WISH%20Health%20Survey%29%20UK.pdf

184. NHS – Health Education England South East. Case Study – The use of the Physician Associate role in cancer sites in the South East. https://wessex.hee.nhs.uk/wider-workforce/cancer/11-cancer-and-diagnostics-careers-a-helpful-resource-guide/04-case-study-the-use-of-the-physician-associate-role-in-cancer-sites-in-the-south-east/

185. Health at a Glance 2021. 2021. Health at a Glance 2021. https://www.oecd-ilibrary.org/docserver/6cfe5309-en.pdf?expires=1671121611&id=id&accname=guest&checksum=F341135AC6909621A132A0C2BAA75617

186. Health at a Glance 2021. 2021. Health at a Glance 2021. https://www.oecd-ilibrary.org/docserver/6cfe5309-en.pdf?expires=1671121611&id=id&accname=guest&checksum=F341135AC6909621A132A0C2BAA75617

187. ONS, 2021, How does UK healthcare spending compare with other countries? https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthcaresystem/articles/howdoesukhealthcarespendingcomparewithothercountries/2019-08-29

188. Hofmarcher, T. et al. 2020. The cost of cancer in Europe 2018. https://www.ejcancer.com/article/S0959-8049(20)30026-5/fulltext

189. Lancet. 2018. Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. https://europepmc.org/article/PMC/5879496#S14

190. NHS England. 2021. Cancer Drugs Fund (CDF) activity update. https://www.england.nhs.uk/publication/cancer-drugs-fund-cdf-activity-update/

191. Barker, A & Lee, J. 2022. Translating "Big Data" in Oncology for Clinical Benefit: Progress or Paralysis. https://aacrjournals.org/cancerres/article/82/11/2072/699100/Translating-Big-Data-in-Oncology-for-Clinical

192. World Economic Forum. 2019. 4 ways data is improving healthcare. https://www.weforum.org/agenda/2019/12/four-ways-data-is-improving-healthcare

193. Department for Digital, Cultural, Media & Sport. 2022. National Data Strategy. https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy

194. Is the NHS being privatised? The BMJ (2019) Population covered by health insurance UK, Statista (2019), Health Insurance statistics, Finder (2021)

195. BMJ. 2019.Is the NHS being privatised? https://www.bmj.com/content/367/bmj.l6376

196. BMJ. 2019. Is the NHS being privatised? https://www.bmj.com/content/367/bmj.l6376

197. Statista. 2022. Percentage of population covered by public or private health insurance in the United Kingdom from 2000 to 2019. https://www.statista.com/statistics/683451/population-covered-by-public-or-private-health-insurance-in-united-kingdom/

198. Butler, D. 2021. Health insurance statistics. https://www.finder.com/uk/health-insurance-statistics

199. British Medical Association. 2022. Outsourced: the role of the independent sector in the NHS. https://www.bma.org.uk/media/5378/bma-nhs-outsourcing-report-march-2022.pdf

200. PR Newswire. 2019. 'Instafam': Ancestry Reveals Boom in DNA Testing as Brits Hunt for Real Connections. https://www.prnewswire.co.uk/news-releases/-instafam-ancestry-reveals-boom-in-dna-testing-as-brits-hunt-for-real-connections-842510678.html.

201. Department of Health and Social Care. 2018. 100,000 whole genomes sequenced in the NHS. https://www.gov.uk/government/news/100000-whole-genomes-sequenced-in-the-nhs

202. Gov.uk. 2021. Genome UK: 2021 to 2022 implementation pla. https://www.gov.uk/government/publications/genome-uk-2021-to-2022-implementation-plan)

203. NICE and Health Inequalities. 2022. https://www.nice.org.uk/about/what-we-do/nice-and-health-inequalities

204. NHS Scotland Health Inequalities. 2015. https://www.healthscotland.scot/media/1086/health-inequalities-what-are-they-how-do-we-reduce-them-mar16.pdf

205. Community Development & Health Network – Health Inequalities NI. 2021. https://www.cdhn.org/health-inequalities#:~:text=Health%20Inequalities%20are%20the%20unfair,of%20people%20in%20our%20society.

206. NHS England. 2021. Help us to shape CORE20Plus5. https://www.england.nhs.uk/blog/help-us-to-shape-core20plus5-nhs-england-and-nhs-improvements-approach-to-tackling-health-inequalities/

207. The Health Foundation. 2022. Quantifying health inequalities in England. 2022. https://www.health.org.uk/news-and-comment/charts-and-infographics/quantifying-health-inequalities

208. Scottish Government. 2022. Health inequalities statistics released. https://www.gov.scot/news/health-inequalities-statistics-released-7/

209. NHS. 2021. Core20PLUS5. https://www.england.nhs.uk/wp-content/uploads/2021/11/core20plus5-online-engage-survey-supporting-document-v1.pdf

210. NHS England. Core20Plus5 (adults) – an approach to reducing healthcare inequalities. https://www.england.nhs.uk/about/equality/equality-hub/national-healthcare-inequalities-improvement-programme/core20plus5/

211. NHS Confed. 2021. Making the difference: Tackling health inequalities in Wales. https://www.nhsconfed.org/system/files/2021-05/Making%20the%20difference%20-%20April%202021.pdf

212. Public Health Scotland. 2021. The right to health. https://www.healthscotland.scot/health-inequalities/the-right-to-health/overview-of-the-right-to-health

213. Department of Health. 2021. Making Life Better. https://www.health-ni.gov.uk/topics/health-policy/making-life-better

214. NHS. 2019. The NHS long term plan. https://www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf

215. Scottish Government. 2020. Beating Cancer: Ambition and Action (2016) update: achievements, new action and testing change. https://www.gov.scot/publications/beating-cancer-ambition-action-2016-update-achievements-new-action-testing-change/

216. Welsh Government. 2022. The quality statement for cancer. https://www.gov.wales/quality-statement-cancer-html

217. Department of Health NI. 2022. Health Minister publishes new 10 year Cancer Strategy. https://www.health-ni.gov.uk/news/health-minister-publishes-new-10-year-cancer-strategy

218. Cancer Research UK. 2020. UK health inequalities: 20,000 more cancer cases a year in the most deprived areas. https://news.cancerresearchuk.org/2020/09/30/uk-health-inequalities-20000-more-cancer-cases-a-year-in-the-most-deprived-areas/

219. Lyratzopoulos, G. et al. 2013. Socio-demographic inequalities in stage of cancer diagnosis: evidence from patients with female breast, lung, colon, rectal, prostate, renal, bladder, melanoma, ovarian and endometrial cancer. https://www.annalsofoncology.org/article/S0923-7534(19)37148-0/fulltext

220. Cancer Research UK. 2022. Health inequalities: breaking down barriers to cancer screening. https://news.cancerresearchuk.org/2022/09/23/health-inequalities-breaking-down-barriers-to-cancer-screening/

221. Office for National Statistics. 2018. Likelihood of smoking four times higher in England's most deprived areas than least deprived. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/drugusealcoholandsmoking/articles/likelihoodofsmokingfourtimeshigherinenglandsmostdeprivedareasthanleastdeprived/2018-03-14

222. Cancer Data. 2022. https://www.cancerdata.nhs.uk/

223. UCL Institute of Health Equity. 2012. The impact of the economic downturn and policy changes on health inequalities in London. https://www.instituteofhealthequity.org/resources-reports/the-impact-of-the-economic-downturn-and-policy-changes-on-health-inequalities-in-london/the-impact-of-economic-downturn.pdf

224. Cancer Research UK. 2020. Cancer in the UK 2020: Socio-economic deprivation. https://www.cancerresearchuk.org/sites/default/files/cancer_inequalities_in_the_uk.pdf

225. Cancer Research UK. 2022. Health inequalities: "We have a moral duty to reduce them". https://news.cancerresearchuk.org/2022/02/15/health-inequalities-we-have-a-moral-duty-to-reduce-them/

226. Brown, K. et al. 2018. The fraction of cancer attributable to modifiable risk factors in England, Wales, Scotland, Northern Ireland, and the United Kingdom in 2015. https://www.nature.com/articles/s41416-018-0029-6

227. Office for National Statistics. 2022. Socioeconomic inequalities in avoidable mortality in Wales: 2020. https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/socioeconomicinequalitiesinavoidablemortalityinwales/2020

228. Office for National Statistics. 2022. Socioeconomic inequalities in avoidable mortality in England: 2020. https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/socioeconomicinequalitiesinavoidablemortalityinengland/2020

229. Simpson, R. et al. 2020. Health literacy levels of British adults: a cross-sectional survey using two domains of the Health Literacy Questionnaire (HLQ). https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09727-w

230. Cancer Research UK. 2022. Health inequalities: "We have a moral duty to reduce them". https://news.cancerresearchuk.org/2022/02/15/health-inequalities-we-have-a-moral-duty-to-reduce-them/

231. Cancer Research UK. 2022. Health inequalities: "We have a moral duty to reduce them". https://news.cancerresearchuk.org/2022/02/15/health-inequalities-we-have-a-moral-duty-to-reduce-them/

232. Boyce, K. et al. 2018. Inequalities in health? An update on the effect of social deprivation for patients with breast cancer in South East Wales. https://pubmed.ncbi.nlm.nih.gov/29936016/

233. Greater Manchester Integrated Care Partnership. 2022. Manchester volunteers return to help NHS trial new cancer screening test. https://gmintegratedcare.org.uk/health-news/manchester-volunteers-return-to-help-nhs-trial-new-cancer-screening-test/

234. Delon, C. et al. 2022. Differences in cancer incidence by broad ethnic group in England, 2013–2017. https://www.nature.com/articles/s41416-022-01718-5

235. Cancer Research UK.2022. Health inequalities: breaking down barriers to cancer screening. https://news.cancerresearchuk.org/2022/09/23/health-inequalities-breaking-down-barriers-to-cancer-screening/

236. Martins, T. et al. 2022. Ethnic inequalities in routes to diagnosis of cancer: a population-based UK cohort study. https://www.nature.com/articles/s41416-022-01847-x

237. Kings Fund. 2012. Demography: Future trends. https://www.kingsfund.org.uk/projects/time-think-differently/trends-demography

238. National Cancer Patient Experience Survey. 2021. 2021 National reports and data tables. https://www.ncpes.co.uk/2021-national-results/

239. Race Equality Foundation. 2018. Cancer and Black and minority ethnic communities. https://raceequalityfoundation.org.uk/health-and-care/cancer-and-black-and-minority-ethnic-communities/

240. Gov.uk. 2011. UK population by ethnicity. https://www.ethnicity-facts-figures.service.gov.uk/uk-population-by-ethnicity

241. Clinical Trials Arena. 2021. Clinical trials and the ongoing battle with racial bias. https://www.clinicaltrialsarena.com/comment/clinical-trials-ongoing-battle-racial-bias/

242. Smart, A. 2021. Engaging patients from minority ethnic groups with clinical trials for blood cancer. https://media.bloodcancer.org.uk/documents/Clinical_Trials_in_Ethnic_Minorities_Report.pdf

243. Murage, P. 2016. Geographical disparities in access to cancer management and treatment services in England. https://www.sciencedirect.com/science/article/abs/pii/S135382921630140X?via%3Dihub

244. Office for National Statistics. 2019. Geographic patterns of cancer survival in England: adults diagnosed 2012 to 2016 and followed up to 2017. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/geographicpatternsofcancersurvivalinengland/adultsdiagnosed2012to2016andfollowedupto2017

245. NHS Digital. 2022. Cancer Survival in England, cancers diagnosed 2015 to 2019, followed up to 2020. https://digital.nhs.uk/data-and-information/publications/statistical/cancer-survival-in-england/cancers-diagnosed-2015-to-2019-followed-up-to-2020

246. Cancer Research UK. 2022. What is cancer screening? https://www.cancerresearchuk.org/about-cancer/cancer-symptoms/spot-cancer-early/screening/what-is-cancer-screening

247. Bragazzi, N. et al. 2016. Ramadan Fasting and Patients with Cancer: State-of-the-Art and Future Prospects. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4748028/

248. National LGBT Cancer Information. 2022. Anal Cancer, HIV and Gay/Bisexual Men. https://cancer-network.org/cancer-information/gay-men-and-cancer/anal-cancer-hiv-and-gaybisexual-men/

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