DEMOS

THE COST OF BREAST CANCER
2025 UPDATE

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Supported by

BREAST CANCER NOW The research & support charity

SEPTEMBER 2025

Published by Demos September 2025

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ACKNOWLEDGEMENTS

Thanks to Breast Cancer Now for their generous support for this research project.

With special thanks to the team at Breast Cancer Now whose expert knowledge of breast cancer has been crucial to shaping the project from the outset and the report itself - Lucy Hocking, Emily Agius, Geraldine Byrne and Melanie Sturtevant.

Any errors remain the authors' responsibility.

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September 2025

ABOUT THIS REPORT

This report is part of an ongoing series of work by Demos making the case for a more preventative state - one that shifts from firefighting mode to catching problems earlier or, even better, preventing problems before they develop. We see a double dividend to taking a preventative approach - both in the scale of human suffering that can be avoided and in the spiralling cost of public services that can be reduced. We have been working with Breast Cancer Now since 2023 to model the impact of breast cancer and our analysis provides crucial evidence of the economic and wellbeing benefits of early diagnosis and treatment. In the context of the NHS 10 Year Plan for Health announcing a shift 'from disease cure to disease prevention' this paper comes at a timely juncture. It helps draw attention to the massive opportunity we have to reduce the impact of this devastating disease on our country.

As part of Demos' ongoing efforts to facilitate greater diversity, inclusion, equity and justice in all areas of our work, we assess and publish our approach to meeting our goals in each of our publications. In this piece of work we chose to focus two of the scenarios we tested on two groups who have traditionally experienced poorer outcomes when it comes to breast cancer - ethnic minority women and women who live in the most deprived areas of the country. Achieving parity in breast cancer outcomes between these groups and White, least deprived women is a matter of social justice. With our economic model and the release of this paper, we seek to shed a light on the health disparities that persist across the country and make the case that urgent action is needed to rectify them.

BACKGROUND

In January 2024, Demos published our first report on the Economic Cost of Breast Cancer, supported by Breast Cancer Now. The message of the paper was clear. That we have come a long way in breast cancer prevention, detection and treatment, but the challenge is far from over.

We created an economic model that was the first of its kind to evaluate the true costs of breast cancer to the UK economy. We used incidence data, and a calculation of the lifetime costs associated with a breast cancer diagnosis, to create a model that would show how much money this disease costs the UK economy every year. Our modelling included the costs of screening, NHS treatment and loss of productivity of both the patient and any carer they may have. We also calculated the wellbeing cost of breast cancer, by assigning a monetary value to the wellbeing impact felt by breast cancer patients and close relatives. Both economic costs and wellbeing costs were calculated using the methodology from the HMT Greenbook and supplementary guidance[1] (see Appendix: Methodology for more detail).

The model is designed to allow us to run policy scenarios through it, so we can understand and compare the economic and wellbeing impact of different interventions. In our 2024 report, we identified two key policies that would have a significant impact on improving breast cancer outcomes and saving lives: increasing screening uptake to 80% and investing in more cancer nurse specialists. The associated economic savings and wellbeing impact evidenced by our model helped make a compelling case for targeted investment. Galvanised by the evidence in our report, Breast Cancer Now has been working with governments and the NHS to seek ways to drive up screening uptake. And in February 2025, following Breast Cancer Now's #NoTimeToWaste campaign, NHS England launched its first-ever awareness campaign to highlight the benefits of screening and encourage more women to make the most of regular mammograms. The campaign was supported by Breast Cancer Now and highlighted how screening can detect breast cancers as early as possible, while providing reassurance and relief to millions of women who get the all-clear.

Supporting people affected by breast cancer back into the workplace was another key intervention area that our model identified as offering hundreds of millions of pounds in economic savings. Whilst policies to deliver return-to-work support are complex (more so than increasing screening, for example) our report clearly spelled out the economic benefit of doing so.

Two years on from the development of the model, the time has now come for an update.

The data that was fed into the first iteration was pre-Covid data from 2019. Since then, new datasets have been released that can be plugged into the model, bringing its calculations up

1 The Green Book: appraisal and evaluation in central government - GOV.UK, Green Book supplementary guidance: wellbeing - GOV.UK. This is the guidance used for policy analysis across the UK government, enabling officials to assess the social benefits when a new policy or change is proposed.

to date and increasing its robustness. Specifically, Cancer Registration Statistics[2] from the year 2022 were published in 2024/25 and have enabled us to generate a post-Covid model. This data includes annual incidence by stage and age, in each of the four nations of the UK.

In updating the model, there is also an opportunity to run new policy scenarios through it, that speak to current challenges, such as health inequalities, and current opportunities, such as the potential role that AI can have in breast screening.

Our purpose in updating the model and publishing the results are consistent with our aims two years ago – we wish to shed light on the continuing hardship and preventable deaths that breast cancer causes and to point to where investment and targeted interventions will have the greatest impact. Through this updated work, we highlight once again the scale of the challenge we face in tackling this devastating disease and show what needs to be done to reduce suffering and save lives.

NEW CONTEXT

Since the first paper was published, we've entered the post-Covid era. Now that post-pandemic data is available, we can see how Covid exacerbated existing challenges around screening uptake as well as shaping today's challenges.

During the pandemic, breast screening rates fell further, and health services were stretched thin. This meant many breast cancers that developed in 2020–21 weren't picked up until later. As a result, 2022 saw a spike in diagnoses - many at a later stage. This pattern matches other research.[3]

We have also had a change in UK government, with a new Labour administration coming into power in July 2024.

The new Health and Social Care Secretary, Wes Streeting, came into post with strong words on the condition of the NHS and a stated mission to turn around its fortunes. In his assessment, the NHS stands 'broken, but not beaten', a position that laid the foundation for the publication of the NHS 10 Year Plan for Health[4] on 3rd July this year. The plan puts forward the 'three shifts' in healthcare delivery that it says will be necessary to improve outcomes. Of most relevance to this piece of work is the desire to move from a focus on disease cure to disease prevention and the transition from analogue to digital, which will involving utilising new technologies.

Demos welcomes this shift and has consistently called for greater investment in public health - focusing on prevention, earlier detection and diagnosis, and better access to support and care.

2 England: https://nhsd-ndrs.shinyapps.io/rcrd/ Wales: https://phw.nhs.wales/services-and-teams/welsh-cancer-intelligence-and-surveillance-unit-wcisu/cancer-reporting-tool-official-statistics/cancer-incidence/ Scotland: https://www.opendata.nhs.scot/dataset/annual-cancer-incidence Northern Ireland: https://www.qub.ac.uk/research-centres/nicr/FileStore/OfficialStatistics1993-2022/November24release/Female_breast_cancer_data_tables.xlsx

3 https://www.nature.com/articles/s41416-024-02703-w

4 https://www.england.nhs.uk/long-term-plan/#:~:text=The%2010%20Year%20Health%20Plan,on%20The%20National%20Archives%20website.

Indeed, in our first paper on the cost of breast cancer, we showed that investing in interventions that would help detect the disease sooner, reduce illness and prevent unnecessary deaths all had a significant cost benefit, saving public funds and reducing human misery.

In this update there is an opportunity to re-make our case for prevention and early detection, as well as focus attention on some of the key opportunities and challenges that remain in tackling the disease. With this in mind, alongside updating the previous screening scenario – achieving 80% screening uptake across the UK - we selected three new 'scenarios' to run through the updated model:

- The first was designed to look at the impact that rolling out AI tools might have, with a focus on their ability to improve diagnostics. Data on AI impact are limited, as its use, even in pilots and trials, is still in its infancy. We have therefore created a hypothetical scenario to show the kind of impact that AI might have, informed by what two early trials are indicating the improvement could be. The scenario uses a conservative uplift in diagnostic accuracy in breast screening and shows what this uplift could deliver in terms of economic and wellbeing outcomes.
- The second and third scenarios look at health inequalities and the impact that could be had if investment was made in levelling-up the differences between key groups that experience significant divergence in outcomes:
    - In one, we consider the impact of equalising the outcomes between ethnic minority and white women.
    - In the other, we look at the impact of equalising outcomes of people living in the most deprived and least deprived areas of the country.

RESULTS FROM THE 2025 MODEL

THE COST OF BREAST CANCER TO THE UK ECONOMY IS GREATER THAN WE THOUGHT

The updated model reveals that in 2025 the cost of breast cancer to the UK economy will be £3.2-3.5 billion.

Breast Cancer Now's vision is that by 2050, everyone diagnosed with breast cancer will live and live well. This means everyone having the best possible outcomes and equitable access to care and support. For this reason, this time round Demos has run the model up to 2050 to enable a longer line of sight into the projected costs. The model shows that if no mitigating actions or policy interventions are put in place, by 2050 we are looking at a yearly cost to the economy of £3.9-4.2 billion, in current prices.

Adding in the data for 2022 has allowed us to review what had been projected figures for 2024 in our previous paper. Our estimated costs and actual costs were broadly in line (demonstrating the robustness of our model) but did result in increases in some areas and therefore the total figure. Whereas, in our original projections we estimated that for the year 2024 the cost to the economy would be in the region of £2.6-2.8 billion, the actual cost that year in the updated model is estimated as having been £3.2-3.4 billion.

The reason for the increase in costs is two-fold.

The most important change is that the incidence of breast cancer in the UK was higher in 2022 than had been forecast. Using Cancer Research UK Projections data, the original model forecast cancer incidence for 2022 in England as 49,048. The actual number of diagnoses in 2022 ended up being 50,977, which represents a 4% increase on the forecast figure. As mentioned above, this is because during the height of the pandemic the screening programme was paused for a time, resulting in fewer diagnoses being made during that time. When diagnostics services were back up and running again, there was a large number of delayed diagnoses that we can see presenting in the 2022 data.

The other important part of the story is that some of these delayed diagnoses were catching breast cancer in later stages than the model had previously forecast, leading to poorer survival rates and higher costs as a result of higher additional deaths. This is because those people diagnosed in 2022 were more likely to have been living with undiagnosed breast cancer during the pandemic. This has been the subject of several research studies and is a recognised result of the pandemic across many different cancers.[5] For example, Stage 1 figures were 2% lower than expected whilst Stages 2, 3, and 4 were each 3-4% higher. According to NHS cancer survival data, when breast cancer is picked up at Stage 1, 98% of people survive for 5 years or more. When it's picked up at Stage 4, that drops to only 27%.

We also saw a notable increase in breast cancers recorded as 'Stage Unknown' at diagnosis. In England these 'Stage Unknown' diagnoses are 15% higher than previously forecast and overall, across the four nations, are 23% higher than forecast. When we look at the survival rates associated with 'Stage Unknown' diagnoses, we can see this label is usually indicative of the disease sitting between Stage 3 and Stage 4. So, seeing a significant (and unexpected) increase of these diagnoses has had an impact on the actual costs and additional deaths (please see Appendix: Methodology for further detail on this).

WELLBEING COSTS ARE ALSO GREATER THAN THE ORIGINAL VERSION OF THE MODEL FORECAST

Our wellbeing costs are a monetary value ascribed to the extensive emotional turmoil experienced by breast cancer patients, their family and friends. In the original version of the model, wellbeing costs for 2024 were projected to be a massive £17.5 billion. Now, with new data inputted, we have revised the actual 2024 figure upwards to £19.9 billion. The wellbeing cost increase here is also accounted for in the higher-than-expected incidence of the disease and the higher proportion of diagnoses in the later stages.

The updated model shows that in 2025 the wellbeing figure for the year stands at £20.2 billion. By 2050, without any action, the projected annual figure representing wellbeing costs is estimated to climb to £24.5 billion, in current prices.

Both the economic and wellbeing costs of breast cancer that our work has revealed help to underline the importance of a continued focus and investment in earlier detection and diagnosis of breast cancer, the illness it can cause and the early death it can lead to.

INCREASING SCREENING UPTAKE REMAINS KEY TO REDUCING MORTALITY FROM BREAST CANCER, AND THERE ARE EARLY INDICATIONS THAT AI DIAGNOSTICS COULD DRIVE FURTHER IMPROVEMENTS

In our first paper, we looked at the difference that raising the national screening uptake to 80% could make – a level that we considered achievable given it is the NHS's own target. This time, we looked again at the average screening uptake from across the UK, which the latest published data puts at 70.05%. Increasing this screening uptake by just under ten percentage points now sets out an economic saving in today's figures of between £158-185 million in 2025. The corresponding wellbeing saving now stands at £1.6 billion. For these reasons, achieving an 80% screening uptake should remain a key priority for the NHS. It is worth noting that in England and Wales especially, there is a greater uphill struggle - the latest data available show England has a screening uptake of 70% and Wales 69.5%, both notably lower than the uptake in either Scotland (75.9%) or Northern Ireland (74%).

5 https://news.cancerresearchuk.org/2022/12/20/early-cancer-diagnosis-and-covid-19-unpicking-the-impact-of-the-pandemic/#:~:text=Known%20unknowns,pandemic%20has%20affected%20early%20diagnosis.

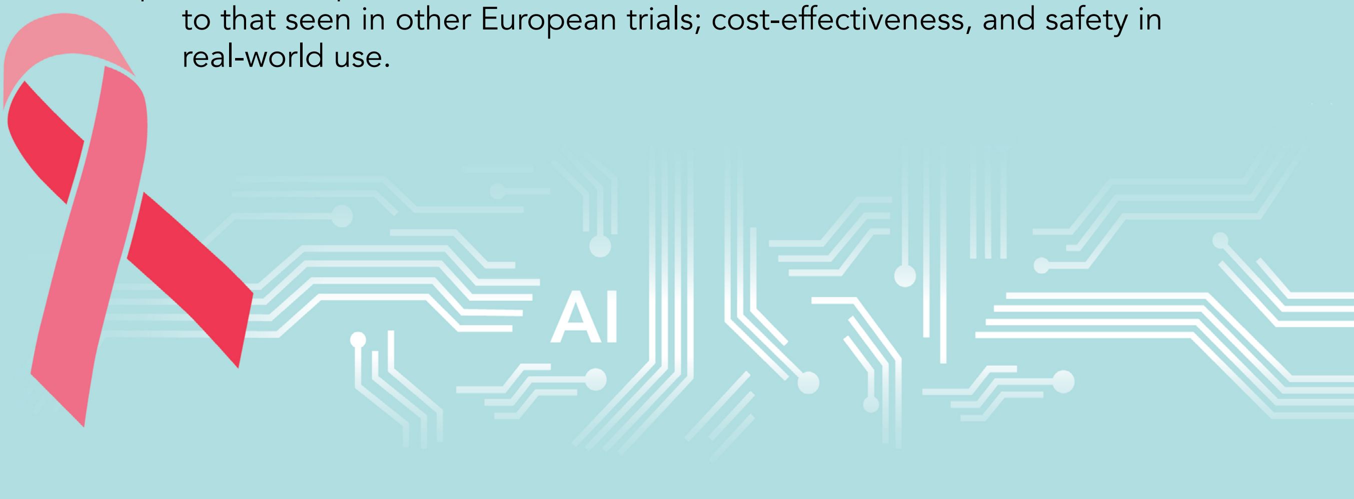
THERE ARE EARLY SIGNS THAT AI WILL BE ABLE TO DELIVER MORE IMPROVEMENTS IN SCREENING

The evidence for the extent to which AI capabilities can improve cancer detection rates is admittedly patchy, given we are still in the early days of trialling and evaluation. We would expect that as more clinical trials start reporting on their results, the true potential of AI will be clearer and our ability to calculate the economic and wellbeing impact will grow. We are hopeful the EDITH trial (Early Detection using Information Technology in Health) will provide evidence of the impact of using AI in detection in a UK context. This trial was announced[6] in February 2025 and will see 700,000 women around the UK, in 30 sites, taking part.

However, even at this time, we have been able to draw on studies in Germany[7] and Sweden[8] that show a modest improvement in early-stage detection rates and a reduction in false negatives when AI is used as part of the diagnosis toolkit. In these studies, women were randomly allocated to AI-supported screening (intervention group) or standard double reading without AI (control group). In the intervention group the second read of the radiographer is substituted out for the AI to read the screen and categorise on the same basis the human radiographer would.

We used this evidence to create a hypothetical scenario, similar to the trials, in which women screened using AI, alongside a radiographer, improves the detection rate and the profile of stage diagnoses shifts away from Stages 3 and 4 to Stages 1 and 2. If these improvements result in one less death per 1000 - which remains a conservative estimate based on the data currently available[9] - then as well as the human benefit, the potential saving to the UK economy stands in the region of £212-274 million in 2025 alone and £2 billion in wellbeing savings in the same year.

Improving screening uptake to the NHS's national target of 80% could save an estimated £158-185 million in economic savings and £1.6 billion in wellbeing savings in 2025. Using the hypothetical scenario, if AI diagnostics were introduced alongside this improvement, it could save an additional £145-226 million beyond the benefit of screening uptake alone - provided ongoing trials in the UK confirm similar effectiveness to that seen in other European trials; cost-effectiveness, and safety in real-world use.



6 https://www.gov.uk/government/news/world-leading-ai-trial-to-tackle-breast-cancer-launched
7 https://www.thelancet.com/journals/landig/article/PIIS2589-7500(22)00070-X/fulltext
8 https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(23)00298-X/abstract
9 Evidence (https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61611-0/abstract) shows that the national screening programme in the UK results in one life saved for every 180 women screened. Therefore, assuming a 1 in 1,000 saving from AI is conservative.

TAKING STEPS TO RECTIFY HEALTH INEQUALITIES EXPERIENCED BY ETHNIC MINORITIES HAS THE POTENTIAL TO SIGNIFICANTLY REDUCE THE IMPACT OF THE DISEASE IN THE UK

The data on ethnicity and breast cancer is complex, and in many instances extremely limited, meaning we are often unable to report on the experience of specific ethnic minority groups. We do know, however, that the experience of breast cancer – the screening, the stage of diagnosis and the outcome – can vary between different ethnic minority groups.

For instance, we know that women with an ethnic minority background[10] have a much higher risk of later stage cancer at diagnosis. 13% of White women are diagnosed with Stage 3 or 4 breast cancer in England, for Black Caribbean women this figure stands at 22%. For Black African women it's 25%. This contributes to poorer survival outcomes; Black women in England aged 15-64 years have lower survival compared to White women, at three-years (85% vs. 91%). South Asian women in this age bracket also have lower survival compared to White women at three-years (89% vs 91%).

There are significant disparities in the route to diagnosis. 34% of referrals for White women come through screening, compared to just 23% for Black women. This is likely to contribute to the higher proportion of ethnic minority women being diagnosed at later stages, often through emergency presentations, where the cancer is more advanced.[11]

The overall picture is further complicated by the fact that some ethnic groups show a genetic predisposition towards certain types of breast cancer – Black African women for example are almost three times more likely to be diagnosed with oestrogen receptor-negative breast cancer and have a higher incidence of triple-negative breast cancer which poses a challenge for treatment. Another challenge with this area of analysis is that ethnicity might not be the only driving factor between all the differences we can see between White and ethnic minority groups. For example, there may be a correlation between ethnicity and socio-economic factors such as geographic location and income level which we cannot remove from the data.

Despite those complicating factors, for the purposes of the model we have assumed that policies designed to equalise the stage profiles of diagnoses between ethnic minority and White women would lead to higher survival rates. This would save around 2,000 lives a year and equate to wellbeing savings of £1.6 billion in 2025. Reducing inequalities in breast cancer care and outcomes for people from ethnic minority backgrounds could deliver an economic benefit of £180-250 million in 2025.

This scenario highlights the shocking disparity of outcomes between ethnic minority and White women and the scale of the opportunity in closing that gap. Further research is required to identify the best policies for achieving this aim as they are likely to cover multiple policy areas.

IMPROVING BREAST CANCER OUTCOMES FOR PEOPLE LIVING IN THE MOST DEPRIVED PARTS OF THE COUNTRY IS ANOTHER AREA WHERE THERE ARE HUGE OPPORTUNITIES TO REDUCE ILLNESS, DEATH AND LOSS TO THE UK ECONOMY

There are unacceptable health inequalities and breast cancer outcomes between people living in the most and least deprived communities in the UK. We know that cancer death rates are almost 60% higher in the UK's most deprived areas[12]. The reasons for this are complex and

10 R. H. Jack, E. A. Davies and H. Møller , "Jack RH, Davies EA, Møller H. British Journal of Cancer, vol. 100, no. 3, pp. 1532-1827, 2009.
11 https://www.pfizer.co.uk/files/Pfizer-White-Paper-ENGLAND-2024.pdf
12 https://www.cancerresearchuk.org/sites/default/files/cancer_in_the_uk_2025_socioeconomic_deprivation.pdf?_gl=1*1ccztsh*_gcl_au*NDcwMDI2NTIwLjE3NDgzNjIxMjc.*_ga*NTk3MjQ1MjU2LjE3NDgzNjIxMjc.*_ga_58736Z2GNN*czE3NTU1MTQwODkkbzIyJGcwJHQxNzU1NTE0MDg5JGo2MCRsMCRoMA..

multifaceted, including increased environmental and lifestyle related risk factors as well as lower screening uptake and later stage diagnosis. Looking at the survival data, we see that those women in the most deprived group are 3.8% less likely than the national average to reach that five-year survival milestone. Those in the least deprived group are 2.6% more likely than the national average to survive for 5 years after diagnosis.

These numbers can feel abstract. But what they amount to is a difference of thousands of lives needlessly lost due to unacceptable differences in health outcomes for people living at different levels of deprivation across the UK.

For this scenario, we looked at the screening and survival rates for people in the highest and lowest scoring areas in the Indices of Multiple Deprivation[13]. The Index of Multiple Deprivation (IMD) ranks every small area in England from 1 (most deprived area) to 32,844 (least deprived area). These small areas are a statistical geography called Lower-layer Super Output Areas. The IMD combines information from seven domains, including income deprivation, employment deprivation, crime and education deprivation, to produce an overall relative measure of deprivation. Those in quintile 1 (IMD1) represent the 20% most deprived areas. It includes places like Tendring in Essex and neighbourhoods in Blackpool and Liverpool[14]. Those in quintile 5 (IMD5) represent the 20% least deprived areas and include places such as Richmond and Kingston in Greater London[15].

What we can see is that screening uptake, and overall cancer detection rates (including those detected through routes other than screening) are much higher in the least deprived areas compared to the most deprived. For example, in the least deprived areas, incidence rates are 10.29% above the national average, whereas in the most deprived areas, incidence rates are 9.09% lower than the national average. This pattern doesn't suggest more disease in less deprived areas, but rather exposes an inequality in detection, with more cases being identified where screening uptake is higher, and people being put on treatment pathways sooner.

Reducing these inequalities would have a huge impact on mortality rates, with a corresponding uplift in wellbeing measures. If the health outcomes of those in the most deprived group were levelled up to be the same as those in the least deprived group, around 3,200 lives would be saved per year and the wellbeing saving would be £4.1 billion in 2025. As if that wasn't reason enough to take action, the economic benefit would also be significant: £327-389 million a year saved in this scenario[16].

These two scenarios focussing on levelling up health inequalities seen between the lowest and highest deprived areas of the UK and different ethnic groups, show the massive impact that targeting resources and efforts could have. There is likely to be some overlap between the groups – but we can see how improvements in screening rates, survival rates and care could make a large impact for ethnic minority women in highly deprived areas of the UK.

13 https://assets.publishing.service.gov.uk/media/5dfb3d7ce5274a3432700cf3/IoD2019_FAQ_v4.pdf

14 https://assets.publishing.service.gov.uk/media/5d8e26f6ed915d5570c6cc55/IoD2019_Statistical_Release.pdf

15 https://trustforlondon.org.uk/data/index-multiple-deprivation-2019-rebased-london/#:~:text=Neighbourhoods%20in%20the%20very%20centre,of%20Deprivation's%20seven%20domains%20below.

16 It is worth clarifying that it is not possible to get an accurate figure of the total savings available from equalising health outcomes, by adding together the cost savings that the 'ethnic minority health inequalities scenario' and 'areas of deprivation health inequalities scenario' each provide. This is because there would be overlap between these two groups in the population i.e. some people will be both of an ethnic minority background and also living in a deprived area.

CONCLUSION

The economic model we have created has huge value in helping us understand the ongoing impact of breast cancer on the UK today and in future years. The wellbeing costs enable us to measure the human impact of the disease and to see where we are making, or failing to make, progress that alleviates human suffering. The economic cost savings we can calculate using the model tell another vitally important story - they show the economic value of investing in early detection and preventative healthcare and help us understand where that money is best spent.

With annual costs running to £3.2-3.5 billion, the economic impact of breast cancer is significant. The wellbeing costs are even bigger, coming in at £19.9 billion a year. If no mitigating actions or policy interventions are put in place, the cost to the economy is expected to be £3.9-4.2 billion by 2050, in current prices.

The other thing that the updated model has shown is the rise in the incidence of breast cancer in 2022, which can be attributed to delayed diagnoses in the wake of the Covid-lockdowns. One surprising thing we saw in the data is the increase in cancers being recorded as being at an 'Unknown' stage. It is not clear what is behind this increase, but it is certainly something that warrants further investigation, given that it hampers efforts like ours to build an accurate picture of breast cancer in the UK.

Early detection of breast cancer is often at the heart of measures proven to have real impact on reducing morbidity and mortality. Pushing up screening uptake combined with new AI technologies to improve accurate diagnoses of the disease has the potential to save thousands of lives. We look forward to seeing the results of the EDITH trial to gain a better understanding of the true impact that AI could have.

Our work also starkly shows what a difference could be made by a focus on driving up outcomes for ethnic minority and low-income groups. The disparity in survival rates between different demographic groups is unacceptable and the uplift in wellbeing savings we would see from targeted policies goes to demonstrate what the ultimate prize would be - a reduction in the suffering and early deaths of thousands of people. Putting a monetary savings figure on all of this helps frame the challenge in a different light and makes a strong case for investment in early detection and preventative measures.

There is still much work to be done. This paper helps to underline the importance of that work and provide a steer on where the focus should be.

APPENDIX
METHODOLOGY

METHODOLOGY OF THE INCIDENCE-BASED ECONOMIC COST MODEL

This model uses breast cancer incidence data from each UK nation, broken down by stage and age. All costs are driven by the volume of patients diagnosed at various stages of breast cancer in each year. Incidence costs are defined as the costs of delivering care to a homogeneous cohort of patients fixed in the year of their diagnosis and followed up for a number of years. In every year following the diagnosis, incidence costs include only patients who survive the previous year. We use the Cancer Research UK projection for breast cancer incidence into future years.

We modelled the identified economic costs and wellbeing costs where data is available. Where it is not, robust assumptions are evidence-based and use the latest research. The model enables variables to be altered to show the impacts of different assumptions and sensitivity analysis tests the analysis for robustness. The cost model uses the most recent academic research and government data on which to base modelling and provide robust estimates. The methodology follows HM Treasury Green Book and The Aqua Book standards for analysis and modelling.

Economic costs include:

- Screening costs
- NHS Treatment costs
- Out-of-pocket personal costs
- Productivity loss of patients (illness and mortality)
- Cost of informal care (productivity loss and value of care)

Wellbeing costs cover:

- Patients' illness
- Patients' mortality
- Carers
- Partners
- Children

For further detail on the Original Model see the Technical Appendices A and B in the first report.

The Updated Model in 2025

This iteration of the model moves the baseline from 2019 to 2022/23; using the latest published screening and incidence data for the four nations as of August 2025. The model has also been run forward to 2050 to provide a longer time horizon.

We have updated all variables for current price terms (in 2025 prices), including NHS costs, wages and labour market statistics for lost productivity. Some data and forecasts are higher than previous data, and higher than expected. For example, average wages have increased slightly above what was forecast, so we see a corresponding increase in lost productivity across the board.

SCENARIOS

1. Screening rates increased to 80%

As per the previous report we updated the scenario using the latest screening rates and calculating the net cost-saving of raising all nations rates to 80%. These savings are 'net' as some costs associated with higher incidence increase (such as NHS treatment costs and screening costs) whereas savings come from stage profile shifts towards earlier stages and so better survival rates. Results for the four nations are different as they have different population sizes and different starting points, as is seen in the following table:

NATION	LATEST SCREENING RATE (% PUBLISHED AT AUG 25)	ECONOMIC SAVING (£MN)	WELLBEING SAVING (£MN)
England	70.0	133-155	1,339
Wales	69.5	8-9	78
Scotland	75.9	14-16	136
Northern Ireland	74.0	4	35
UK	**70.05**	**158-185**	**1,588**

2. AI-assisted screening

Artificial Intelligence (AI) is being used in many areas of health care - especially in diagnostics and imaging. In the area of breast cancer, the software is taught to read mammograms by technicians inputting information from hundreds of thousands to millions of mammograms. The AI software creates a mathematical representation of what a normal mammogram looks like and what a mammogram with cancer looks like. The AI system checks each image against the standards to distinguish what's normal from what's not. As the program is exposed to more images of mammograms, it can learn over time (called machine learning) and improve accuracy. From early studies and trials there is some evidence that AI can improve detection of breast cancer and reduce false-negatives.

A study published[17] in *The Lancet Oncology* describes how researchers used AI to help screen mammograms of more than 80,000 women in Sweden. Half of these women had their mammogram read by AI before it was looked at by a radiologist, while the other half had theirs read by two radiologists, as is the usual procedure. The study revealed that the AI group had

17 https://pubmed.ncbi.nlm.nih.gov/37541274/

20% more cancers detected than the radiologist-only group. Another study[18] in Germany used AI to look at nearly 1.2 million mammograms found that having a radiologist and AI system working together was 2.6% better at detecting breast cancer than a radiologist alone.

The strengths and limitations of the current diagnostic landscape of breast cancer are explored in a paper[19] examining its applications, challenges, and prospects. This review aims to shed light on the immense potential of AI and the trajectory it sets for breast cancer diagnosis and treatment in the future.

To generate a hypothetical scenario whereby we can see the cost saving impact potential of AI we have used the evidence (from the 'Marmot Review')[20] that breast cancer screening itself prevents one death per 180 women screened. We do not currently have data showing the impact of AI in the UK healthcare setting in the same way, so have used the available studies that say there is a 2.6 - 20% improvement in detection rates when AI is used. Based on this range we have suggested a conservative assumption based on a 10% improvement on detection rates that equates to a result that for every 1000 women screened using AI, alongside a radiographer, the detection rate improves by resulting in one less death. The stage profile shifts to have slightly more Stage 1 and Stage 2 diagnoses with corresponding fewer Stage 3 and Stage 4 diagnoses, and as a result survival rates improve accordingly.

3. Health inequalities: Ethnicity

For this scenario we used the model to equalise the diagnosis rates (through screening and other means) and the stage profiles of diagnoses, and so corresponding survival rates, between ethnic minority and White women. This meant that incidence increased by 9% to equate the proportions of each ethnic minority to the White incidence rate. To reflect the stage diagnoses rates of the White population we move many of these, and existing, cases to be diagnosed at an earlier stage.

There are many endogenous variables present which may mean this scenario is not purely representing ethnicity. Correlations between poverty/deprivation, geographic factors and other health issues and the risk of breast cancer mean that some elements of other factors, which we are unable to correct for, are present. Similarly, we know that some groups of women may be more likely to have genetic or other factors which mean they are more likely, or less likely, to have certain breast cancer diagnoses. We are not able to account for these in the model.

4. Health inequalities: Multiple Deprivation

In this scenario we consider inequalities in terms of geography and specifically people living in different levels of deprivation. Reducing these inequalities would have a huge impact on mortality rates, with a corresponding uplift in wellbeing measures.

Screening uptake, and overall cancer detection rates (including those detected not through screening) are much higher in the least deprived areas compared to the most deprived. For example, in the least deprived areas, incidence rates are 10.29% above the national average, whereas in the most deprived areas, incidence rates are 9.09% lower than the national average. This, coupled with lower survival rates for those in more deprived areas because of later stage diagnoses, means there are many women being diagnosed late in these more deprived areas.

For this scenario we equated the incidence rates, survival rates and corresponding stage at diagnoses profiles of the highest 20% of deprived areas with the 20% least deprived. Of this,

18 https://www.thelancet.com/journals/landig/article/PIIS2589-7500(22)00070-X/fulltext#gr2
19 https://pmc.ncbi.nlm.nih.gov/articles/PMC10625863/
20 https://pmc.ncbi.nlm.nih.gov/articles/PMC3693450/

owing to the high difference in survival rates, 80% of the cost saving is mortality impact. The table below shows differences between quintiles of IMD for incidence rate, survival rate with the range from IMD1 to IMD5 and the difference to the average:

IMD ENGLAND	RATE PER POPULATION (2022)	% DIFFERENCE TO AVERAGE (IMD3)	SURVIVAL RATES (%, 5-YR, TO 2020)	% DIFFERENCE TO AVERAGE (IMD3)
1 - most deprived	159.1	-9.09%	82.7	-3.84%
2	168.2	-3.89%	84.4	-1.86%
3	173	-1.14%	86.2	0.23%
4	178	1.71%	87.0	1.16%
5 - least deprived	193	10.29%	88.2	2.56%
Range	**33.9**	**19.37%**	**5.5**	**6.40%**

DETAILED RESULTS FROM THE UPDATED MODEL AUGUST 2025

Economic costs broken down (2025 prices)

CATEGORY	2025 (£MNS)	2050 (£MNS)
Patients and Carers	25	25
NHS Treatment and Screening Costs	973	1,165
Patient Productivity Loss	2,233	2,663
Carer Productivity Loss	22-267	318
[Productivity Loss unpaid work]	[951-1,171]	[1,134-1,396]
Total [Excl unpaid work]:	**3,252 - 3,497**	**3,879-4,171**

Economic costs broken down by nation of UK

NATION	2025 (£MNS)	2050 (£MNS)
England	2,740-2,947	3,268-3,514
Wales	160-173	191-206
Scotland	279-300	332-357
NI	73-78	88-93
Total UK:	**3,252 - 3,497**	**3,879-4,171**

Wellbeing costs broken down

CATEGORY	2025 (£MNS)	2050 (£MNS)
Patients Illness	6,776	8,209
Patient Mortality	12,588	15,249
Carers	22	26
Partners	793	960
Children	15	18
Total [Excl unpaid work]:	**20,193**	**24,463**

Wellbeing costs broken down by nation of UK

NATION	2025 (£MNS)	2050 (£MNS)
England	17,042	20,645
Wales	984	1,193
Scotland	1,733	2,099
NI	434	526
Total UK:	**20,193**	**24,463**

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PUBLISHED BY DEMOS SEPTEMBER 2025

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