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Budget Impact Analysis of Risk-Stratified Prostate Cancer Screening in the UK using National Audit Data: A Budget Impact Analysis from the UK NHS Perspective (2017/18 Prices)

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Abstract: Objective: This study performs a budget impact analysis of a hypothetical risk-stratified prostate cancer (PCa) detection programme in the UK. To contextualise this economic case, the profound ethnic and socioeconomic disparities in care are identified in the latest National Prostate Cancer Audit (NPCA) data. Methods: A budget impact analysis was conducted from a UK National Health Service (NHS) perspective over a one-year period. A cohort representing the 55,241 men diagnosed with PCa in England in 2023 was modelled, with baseline stage distribution (TNM) sourced from the NPCA 2024 Report(National Prostate Cancer Audit, 2025a). First-year, stage-specific mean treatment costs (2017/18 GBP) were derived from a published UK health economic study. We quantified the net budget impact of a hypothetical 10% stage-shift from Stages T2, T3, and T4 to Stage T1 (Wills et al., 2023). Results: The NPCA data revealed for men with high-risk disease, Black men were substantially less likely to receive curative radical treatment than White men (67.8% vs. 81.6% for ages 60-69) (National Prostate Cancer Audit, 2025a). Our model projected that a 10% stage shift had a net initial cost saving of £1.72 million for this annual cohort. The long-term economic benefit overshadows this short-term saving. The model averted 331 metastatic cases, each associated with an estimated one-year NHS cost of £63,284–£216,118 (see Appendix C). Conclusion: A risk-stratified PCa detection strategy in the UK offers a rare "dual dividend": it provides a direct mechanism to address profound health inequities while simultaneously being projected to be cost-saving to the NHS, both immediately and in the long term. These findings provide a robust economic and ethical mandate for the UK National Screening Committee to recommend the implementation of such a strategy.

Keywords: Prostate Cancer, Health Economics, Screening, Ethnic Disparities, Health Policy, NHS, Cost-Benefit Analysis.

INTRODUCTION

The United Kingdom has no national screening program for prostate cancer (PCa) (Costello Medical, 2020). This policy stands in contrast to PCa being the most common cancer in men, accounting for 55,241 new cases in England in 2023 alone and over 12,000 deaths annually in the UK (National Prostate Cancer Audit, 2025a).

The core justification for this inaction has been the significant risk of overdiagnosis and subsequent over-treatment stemming from the imprecision of prostate-specific antigen (PSA) testing, which can lead to life-altering side effects for men with clinically insignificant disease after prostatectomy (Costello Medical, 2020).

While the concern over-treatment is valid, it has overshadowed a deepening crisis of inequality. The burden of PCa is not borne equally. The National Prostate Cancer Audit (NPCA) 2024 report confirms that across all age groups over 50, Black men have a significantly higher rate of diagnosis per 1,000 population compared to White and Asian men (National Prostate Cancer Audit, 2025a).

A clear socioeconomic gradient compounds this. The NPCA 2024 report reveals that men living in the most deprived areas are not only more likely to be diagnosed at a later stage, but are also less likely to receive curative-intent radical treatment for high-risk disease compared to men in the least deprived areas (National Prostate Cancer Audit, 2025a). For men from different ethnic and socioeconomic groups, these structural issues overlap with culturally specific barriers, including a lack of risk awareness, mistrust in healthcare providers, and negative healthcare experiences, which lead to late-stage presentation (Christie-de Jong et al., 2025).

The economic case for a targeted screening programme to address these disparities is complex. Analysis of recent NHS data reveals the initial cost structure: the first-year cost for palliative management of metastatic (Stage T4) disease is the lowest (£3,547), while the cost for curative-intent treatment is highest for localised disease at Stage T2 (£5,672) (Wills et al., 2024). This creates the challenging assumption that early detection via screening would increase costs. This paper challenges this view. This study, therefore, aims to quantify the immediate NHS budget impact of a clinically realistic stage-shift towards earlier diagnosis, providing an evidence-based challenge to the assumption that early detection must increase costs.

This analysis strictly evaluates the immediate budget impact on the NHS; it does not constitute a full cost-effectiveness analysis, which would require incorporating long-term outcomes and Quality-Adjusted Life Years (QALYs).

METHODS

Source Identification and Selection

This study employed a targeted literature review to identify primary data sources on the costs and ethnic disparities of PCa in the UK. We conducted targeted searches of the PubMed and Google Scholar databases for articles published between January 1, 2014, and July 1, 2025. This database search was supplemented by a manual review of key UK health data providers, most notably the NPCA, alongside the National Disease Registration Service (NDRS), the Office for National Statistics (ONS), and the National Institute for Health and Care Excellence (NICE). The full, detailed search strings used for each database are provided in Supplementary **Appendix D.**

Studies were assessed against the pre-defined inclusion and exclusion criteria detailed in **Table 1** below.

Table 1: Inclusion and Exclusion Criteria for the Targeted Literature Review.

Criteria	Inclusion Criteria	Exclusion Criteria
Population	Studies based on UK populations (England, Wales, Scotland, or Northern Ireland).	Studies based exclusively on non-UK populations
Content	Must contain primary, quantitative data on at least one of the following: PCa incidence/prevalence, ethnic or socioeconomic disparities, stage at diagnosis, or direct NHS costs.	Qualitative studies, editorials, commentaries, or review articles without extractable primary data. Economic studies not conducted from a UK NHS/PSS perspective.
Stratification	Data must be reported for the overall cohort, or be stratified by at least one of the following: PCa disease stage (TNM), risk group, or major UK ethnic group (e.g., White, Black, Asian).	Data not stratified by either of the required variables.
Language	Published in English.	Published in languages other than English.

Table 1: Inclusion and Exclusion Criteria for the Targeted Literature Review.

This table outlines the pre-defined criteria used to screen and select primary data sources for inclusion in the analysis. The criteria ensured that only UK-relevant, quantitative studies providing data on the key epidemiological and economic parameters of the model were included.

The selection of final sources was managed through a two-stage screening process. First, titles and abstracts were reviewed for relevance. Second, the full texts of the shortlisted documents were assessed against pre-defined inclusion criteria.

This selection process, detailed in **Figure 1**, was designed to identify the most current and authoritative UK data for each key model parameter. The targeted review identified a large pool of initial records. After screening, the full texts of relevant documents were assessed for methodological suitability and data currency. This resulted in the inclusion of 3 core data sources for the quantitative analysis: one national audit report providing epidemiological data, one peer-reviewed study providing cost data, and a second peer-reviewed study providing contextual data on ethnic disparities.

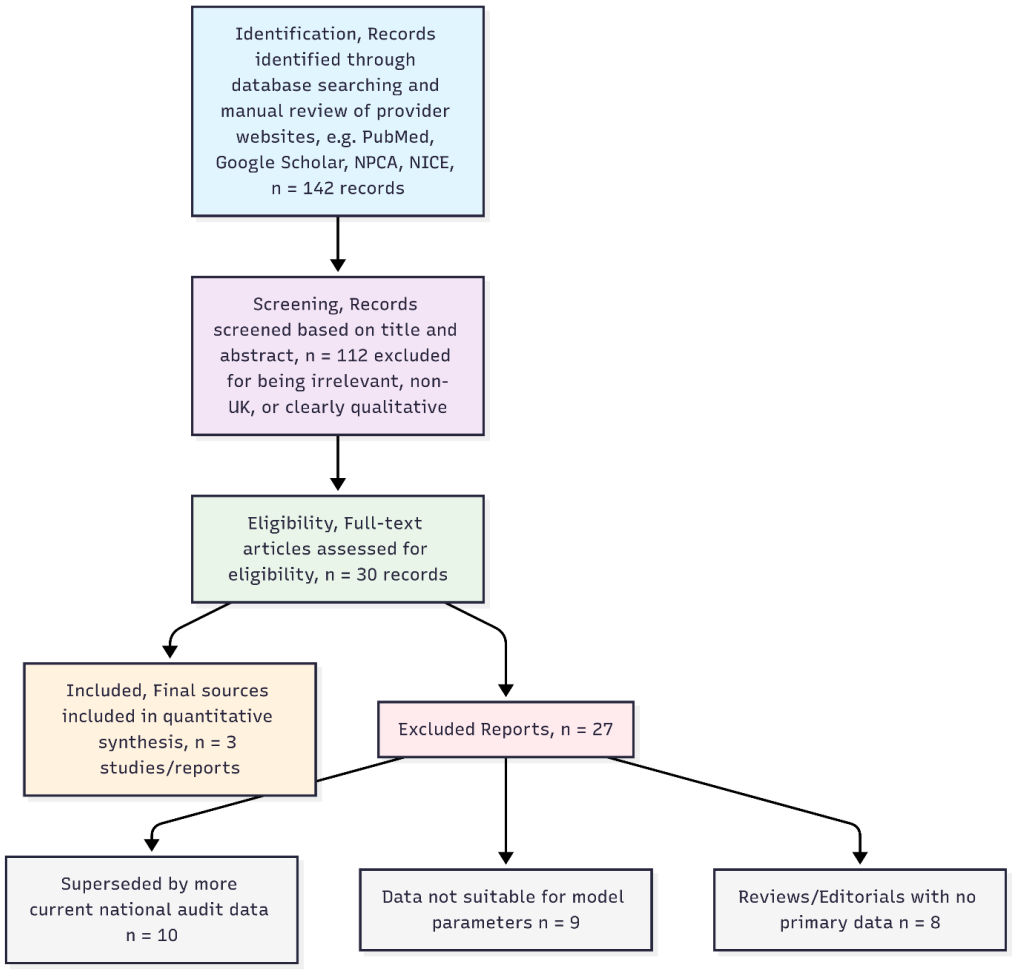

Figure 1: Flow diagram of the targeted literature review process

The diagram details the screening process used to identify the final data sources for the model. The process prioritised the most current and methodologically robust source for each key parameter, resulting in the exclusion of older reports or those superseded by more authoritative national audit data.

Data Extraction & Synthesis

A targeted data extraction was conducted to establish the key metrics for the socioeconomic analysis. To ensure analytical clarity, ethnic groups were defined according to the 2001 UK Census categories—White, Asian, and Black—which is the established NHS standard. The '**Mixed**' and '**Other**' census categories were excluded from this specific comparative analysis to ensure a clear interpretation of the results. This classification framework is based on the standard methodology for analysing UK primary care records (Andrews et al., 2024).

Key data for the model were sourced as follows:

- **National Incidence and Stage Distribution:** The total number of annual diagnoses (N=55,241 for England, 2023) and the definitive national distribution of cases by TNM stage at diagnosis were extracted from the National Prostate Cancer Audit (NPCA) State of the Nation Report 2024 and its supplementary appendix (National Prostate

Cancer Audit, 2025a, 2025b). This report was also the primary source for data on ethnic and socioeconomic disparities in diagnosis and treatment.

- **Initial Treatment Costs**: Stage-specific, first-year mean treatment costs per patient were extracted from Wills et al. (2024), a peer-reviewed health economic analysis of a UK patient cohort diagnosed between 2016-2018 (Wills et al., 2023).
- **Contextual Incidence Data:** Data on the one-year incidence of prostate cancer by ethnicity following a raised PSA test were sourced from Down et al. (2024) to provide a contemporary context on diagnostic yield in high-risk group (Down et al., 2024).

Data on initial treatment costs were derived from Wills et al. (2024), which analysed a patient cohort diagnosed between 2016 and 2018. While the source paper analysed multiple cancer types, only PCa specific data were extracted for this review. The "All Tumours" cost metric was selected as it provides the most accurate real-world expenditure per patient at each stage by averaging costs across all diagnosed patients, including those managed with non-intensive pathways such as active surveillance. This analysis focused specifically on the costs of the three primary treatment modalities: resection, radiotherapy, and Systemic Anti-Cancer Therapy (SACT). The different time windows across the datasets are acknowledged, but each source represents the most up-to-date and relevant data available for its specific metric) (Wills et al., 2024). To create the most clinically relevant and up-to-date baseline possible, we applied the contemporary stage-at-diagnosis distribution from the NPCA 2024 report to this established costing cohort (National Prostate Cancer Audit, 2025a).

All extracted data are presented in full in **Table 2.**

Table 2: Summary of Primary Data Sources.

Author, Year	Source Type	Key Data Provided for this Review
NPCA (2025) - Main Report (National Prostate Cancer Audit, 2025a)	National Clinical Audit Report	Primary Cohort Size: Total annual diagnoses for England in 2023 (N=55,241). Contextual data on national trends and key disparity findings.
National Prostate Cancer Audit (2025) – Appendix (National Prostate Cancer Audit, 2025b).	National Audit Data Appendix	Primary Model Structure: Definitive national distribution of cases by TNM stage at diagnosis (from Table S9), used to structure the model's baseline cohort.
Wills, L., et al. (2024) (Wills et al., 2024)	Peer-Reviewed Economic Analysis	Primary Economic Data: Stage-specific, first-year mean NHS treatment costs per patient.
Down, L., et al. (2024) (Down et al., 2024)	Peer-Reviewed Cohort Study	Contextual Disparity Data: PCa incidence rates by ethnicity following a raised PSA test, supporting the rationale for risk-stratified screening.

This table details the core sources used for the quantitative analysis. The model baseline was constructed by taking the total annual diagnoses from the NPCA Main Report and applying the national stage-at-diagnosis proportions found in the NPCA Appendix. Stage-

specific costs were sourced from a recent peer-reviewed economic study. Each source was selected for its currency and methodological authority to ensure the model's validity and relevance.

Data Analysis

The extracted data underwent a descriptive synthesis to characterise the baseline epidemiological and economic landscape. The model cohort was defined using the most recent available annual incidence data: the 55,241 men diagnosed with PCa in England in 2023, as reported by the National Prostate Cancer Audit (NPCA) (National Prostate Cancer Audit, 2025a). Statistical visualisations were generated using R (Version 4.3.2) with the ggplot2 and dplyr packages. Process PRISMA flow charts were created using mermaidchart.com.

The core of the analysis was a cost-scenario model designed to quantify the economic impact of improved early detection. The baseline scenario was constructed to reflect the most current national picture. Total annual initial treatment expenditure was calculated by applying the national stage-at-diagnosis distribution (from the NPCA 2024 Appendix) to the 2023 cohort of newly diagnosed patients (N=55,241, from the NPCA 2024 Main Report), and then multiplying the case numbers in each stage by the corresponding stage-specific mean cost per patient (from Wills et al., 2024) (National Prostate Cancer Audit, 2025a, 2025b; Wills et al., 2023). The model then simulated a hypothetical scenario reflecting the goal of an early detection screening programme: a 10% reduction in diagnoses at Stages T2, T3, and T4, with this volume of cases reallocated to Stage T1. The total cost for this hypothetical scenario was calculated using the adjusted case volumes, and the net budget impact was determined by subtracting the baseline total cost from the total cost of the hypothetical scenario. Cost data were digitised directly from the source publication using an automated chart data extraction tool to ensure accuracy (Wills et al., 2023).

Modelling Assumptions

The cost-scenario model was developed based on the following explicit assumptions:

- **Perspective**: The analysis was conducted from the perspective of the **UK National Health Service (NHS)**, focusing only on the direct costs of initial treatment.
- **Price Year**: All costs are expressed in **2017/2018 Great British Pounds (£)**, reflecting the price year used in the primary economic data source.
- **Discounting**: **Discounting was not applied**, as the model evaluates the immediate, first-year costs of an incident cohort and does not project costs or health outcomes over multiple years.
- **Handling of Missing Data**: The model uses the proportional stage distribution from the NPCA 2024 Appendix (for patients with a known T-stage). It is assumed that this distribution is representative of, and can be applied to, the entire 2023 annual cohort (N=55,241), including those for whom stage was not recorded in the audit data. Patients with an 'Unknown' stage in the source data were effectively distributed proportionally across the known stages (T1-T4).

- **Data Extraction and Rounding**: Cost data were extracted from the source publication's (Wills et al., 2024) figures using the WebPlotDigitizer tool. The extracted values were then **rounded to the nearest whole pound sterling (£)** for analysis.

Scope of Cost Analysis

It is critical to note that this budget impact analysis is not exhaustive. It focuses strictly on the initial, first-year direct costs of the three primary treatment modalities defined in the source data:

- Radical Prostatectomy (resection of the primary tumour)
- Radical Radiotherapy
- Systemic Anti-Cancer Therapy (SACT), which includes chemotherapy, targeted androgen deprivation therapy, and immunotherapy

Many significant real-world costs associated with a prostate cancer diagnosis are **explicitly excluded** from this model. These excluded costs include, but are not limited to: the entire diagnostic pathway (PSA testing, MRI, biopsies); hospital admissions not directly related to radical treatment; critical care; management of treatment-related adverse events; and all subsequent-line therapies for recurrent or progressive disease. Furthermore, the model omits all indirect and societal costs, such as lost patient productivity or the burden on informal caregivers (Wills et al., 2024).

RESULTS

Study Selection

Following a two-stage screening process (Figure 1), three primary data sources were selected for the quantitative analysis, chosen for their authority, currency, and methodological suitability. These are summarised in Table 2.

The National Picture: Incidence and Treatment Disparities

The NPCA 2024 report confirms significant and persistent ethnic disparities in the incidence rate of prostate cancer in England. Across all age groups over 50, Black men have a substantially higher rate of diagnosis per 1,000 population compared to White and Asian men, as illustrated in **Figure 2**.

This higher diagnostic rate is supported by clinical data on PSA test performance, which shows that for a given raised PSA level, Black men have a significantly higher probability of being diagnosed with prostate cancer (24.7%) compared to White (19.8%) or South Asian (13.4%) men, as detailed in **Supplementary Figure S1** (Down et al., 2024). This disparity is most pronounced in the 70-74 age group, where the incidence rate for Black men (17.7 per 1,000) is more than double the rate observed in White men (6.8 per 1,000). The full data, averaged across the five deprivation quintiles presented in the NPCA report, are detailed in **Supplementary Table S1**. This elevated rate of diagnosis provides a clear, evidence-based rationale for focusing detection efforts on this high-risk population.

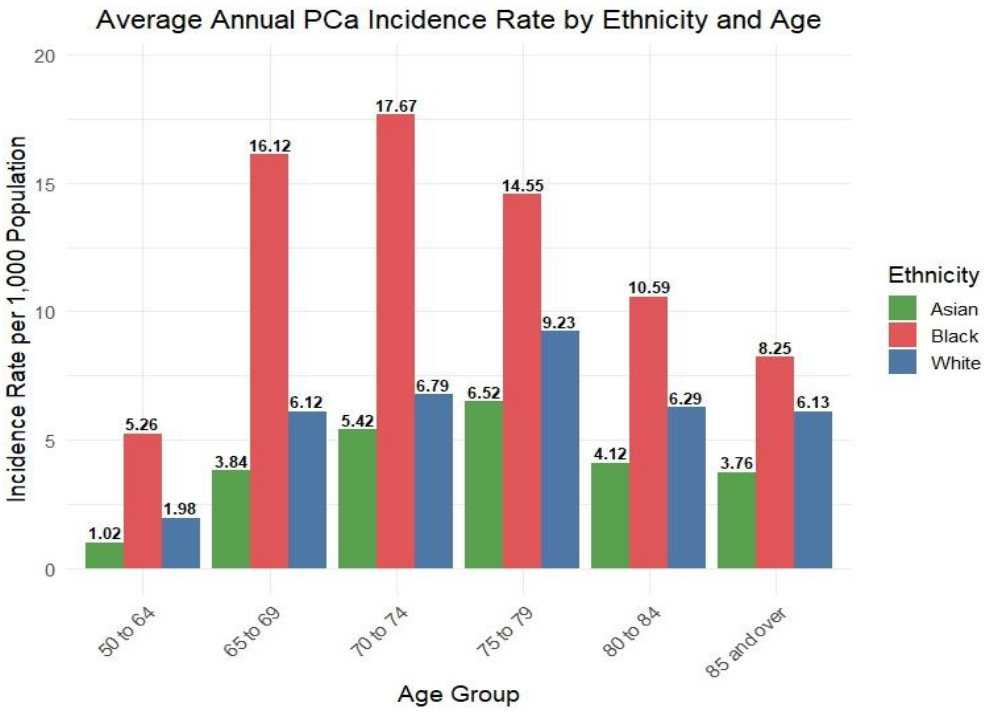

Figure 2: Average Annual Incidence Rate of Prostate Cancer by Ethnicity and Age Group

This figure illustrates the average annual incidence rate per 1,000 male population across all deprivation quintiles, showing a significantly higher rate for Black men compared to White and Asian men, particularly in older age groups. Data extracted from the NPCA State of the Nation Report 2024 (Figure 4) (National Prostate Cancer Audit, 2025a)

This higher rate of diagnosis in Black men is paradoxically compounded by a significant inequality in access to potentially curative treatment for the most serious, non-metastatic disease. As demonstrated in **Figure 3**, for men diagnosed with high-risk/locally advanced prostate cancer, Black men are consistently less likely to receive radical treatment (prostatectomy or radiotherapy) than their White counterparts across most of the curative age range. This treatment gap is most pronounced in men aged 60-69, where 81.6% of White men received radical treatment compared to only 67.8% of Black men, a statistically significant difference of nearly 14 percentage points (National Prostate Cancer Audit, 2025a). While this disparity narrows after the age of 75, it highlights a critical window where fit and eligible Black men appear to be undertreated compared to their White peers.

In addition to these ethnic disparities, the NPCA report reveals a clear socioeconomic gradient in the receipt of curative care. Specifically, for men aged 60 to 69 years with high-risk/locally advanced disease, there was a graded association between treatment and deprivation, with treatment rates decreasing from 83.2% (95% CI: 81.4% to 84.8%) in the least deprived areas to just 75.4% (95% CI: 72.8% to 77.8%) in the most deprived areas (National Prostate Cancer Audit, 2025a). Taken together, the national audit data establishes that a man's ethnicity and socioeconomic status are significant predictors of both his likelihood of being diagnosed and his probability of receiving potentially life-saving treatment, creating a compelling ethical mandate for a new, more just approach.

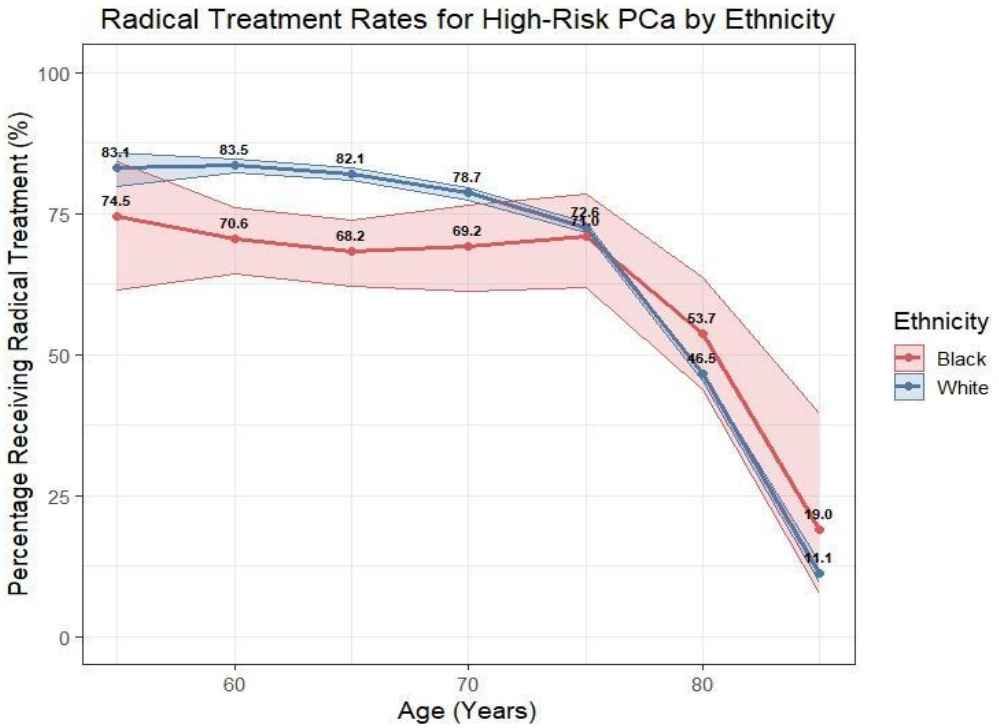

Figure 3: Disparity in Radical Treatment for High-Risk Disease by Ethnicity

This figure shows the percentage of men with high-risk/locally advanced prostate cancer receiving radical treatment, stratified by ethnicity and age. A persistent gap is evident, with Black men being less likely to receive curative-intent therapy than White men across most age groups. Solid lines represent the point estimate, and the surrounding shaded areas represent the 95% confidence intervals. Data extracted from the NPCA State of the Nation Report 2024 (Figure 8) (National Prostate Cancer Audit, 2025a)

Economic Analysis: Baseline Costs and Budget Impact

The economic analysis reveals a paradoxical cost structure for the initial treatment of prostate cancer, where expenditure is not directly correlated with disease severity. **Figure 4** illustrates this structure, showing the mean first-year NHS treatment cost per patient by stage at diagnosis, based on an analysis of a 2016-2018 patient cohort using 2017/2018 prices (Wills et al., 2023). Initial expenditure is highest for curative-intent pathways for localised disease, peaking at £5,672 for Stage T2, while the initial cost for palliative-intent management of metastatic (Stage T4) disease is the lowest at only £3,547. This low initial figure for metastatic disease is a statistical artefact of the one-year time horizon; it excludes the immense long-term expenditure on subsequent lines of therapy, which we estimated to be in the range of £63,284–£216,188 per patient **(see Appendix C)**.

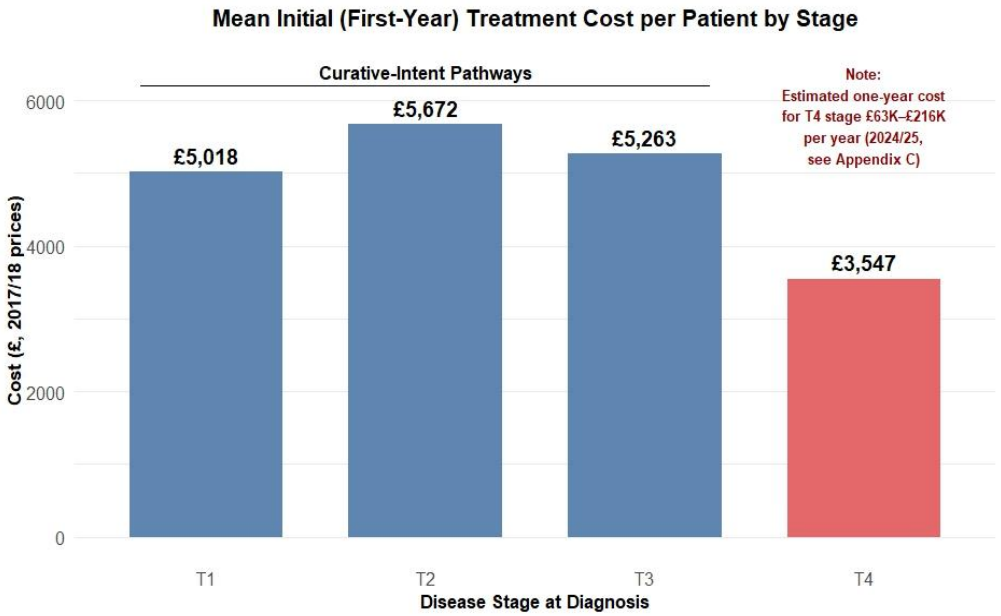

Figure 4: Mean Initial (First-Year) NHS Treatment Cost per Patient by Stage of Disease.

The figure displays the mean per-patient expenditure in the first year following a prostate cancer diagnosis, based on an analysis of a 2016-2018 patient cohort using 2017/2018 NHS prices. The costs shown are for the "All Tumours" metric, representing average across all patients in each stage, including those on non-intensive pathways (e.g., active surveillance). These costs are derived from the three primary treatment modalities: radical prostatectomy, radical radiotherapy, and initial systemic anti-cancer therapy (SACT). The structure highlights the misleadingly low initial cost for metastatic disease (Stage T4), which only captures initial palliative measures and not the immense lifetime costs of subsequent therapies (estimated at £63,284–£216,188; (see Appendix C). (Wills et al., 2024).

To quantify the budget impact of improved early detection, we modelled the economic consequences of a hypothetical 10% stage-shift towards earlier diagnosis; the results are detailed in **Table 3**. The baseline scenario, which projects a total initial expenditure of £297.2 million for the 2023 annual cohort, was calculated by applying the national stage distribution from the NPCA 2024 report to the cohort, as detailed in **Supplementary Table S2**. The hypothetical scenario, which models a 10% shift of cases from Stages T2-T4 into Stage T1, resulted in a projected total expenditure of £295.5 million; the full calculations and resulting change in case distribution are presented in **Supplementary Table S3**, respectively.

As shown by the difference between these two scenarios, the analysis projects a net initial cost saving of £1.72 million to the NHS for a single annual cohort of patients. This net saving occurs because the cost reduction from shifting a large volume of patients out of the most expensive initial treatment pathway (Stage T2) is greater than the costs incurred from shifting patients away from the initially cheaper metastatic pathway (Stage T4).

Table 3: Summary of the Budget Impact Analysis.

Scenario Analysis	Stage 1 Cases	Stage 2 Cases	Stage 3 Cases	Stage 4 Cases	Total Estimated Cost
Baseline	5524	25963	20992	3,314	£297,218,677
Hypothetical (10% Shift)	10,551	23,367	18,893	2,983	£295,493,943
Difference (Net Impact)	+5,027	-2,596	-2,099	-331	-£1,724,734 (Net Saving)

This table compares the baseline cost of initial prostate cancer treatment for the 2023 annual cohort of newly diagnosed patients (N=55,241) against a hypothetical scenario. The baseline case distribution by stage is derived from the NPCA 2024 report. The hypothetical scenario models a 10% shift in diagnoses from Stages T2-T4 to Stage T1. The final row quantifies the net budget impact, revealing a projected initial cost saving of over £1.7 million to the NHS. (Wills et al., 2024).

DISCUSSION

Summary of Key Findings

This literature review and budget analysis provide a definitive quantification of the profound inequities in UK prostate cancer care by integrating findings from the latest NPCA report. There are two fundamental and unacceptable disparities: firstly, Black men have a significantly higher incidence rate of diagnosis (Figure 2), and secondly, both Black men and men from more deprived areas are notably less likely to receive potentially curative radical treatment for high-risk, non-metastatic disease (Figure 3). These findings, drawn directly from the UK's national clinical audit, establish an urgent ethical imperative to redesign the current approach to PCa detection.

Our economic analysis provides a compelling financial rationale that aligns with this ethical imperative. Our budget impact model demonstrates that, contrary to common policy assumptions, a programme that achieves a modest 10% stage-shift towards earlier diagnosis is projected to yield a net initial saving of £1.72 million for a single annual patient cohort **(Table 3)**. This result reframes the policy debate, suggesting that a risk-stratified detection programme is not a costly investment, but an opportunity for immediate budgetary efficiency.

This immediate, first-year saving, whilst modest, represents only a fraction of the true economic value of early detection. The initial £3,547 first-year cost for metastatic disease, as shown in **Figure 4**, is a misleading statistical representation that conceals the substantial downstream expenditure on long-term patient management. As detailed in **Appendix C**, the full direct lifetime cost to the NHS of managing a patient who progresses to metastatic PCa is estimated to be in the range of £63,284 to £216,118. As will be discussed, the prevention of even a small number of these metastatic cases unlocks savings

on a scale relevant to national research budgets, making the case for a new strategy overwhelming from both a clinical and fiscal perspective.

Policy Implications in the Context of the National Research Strategy

The merging of these findings; an underserved high-risk population, a clear treatment gap, and a cost-saving intervention, creates a compelling case for policy action. This presents a "dual dividend" scenario for policymakers, where the ethically correct course of action of implementing a programme to address the disparities highlighted by the NPCA is also the most prudent for the NHS. Critically, this reframes the debate. A risk-stratified detection programme no longer needs to be justified as a long-term investment with future, discounted health gains; our analysis demonstrates its value as an immediate and efficient use of NHS resources.

To fully appreciate the strategic implications of this efficiency, the model's findings must be placed within the context of the UK's national health research funding landscape. At the time of this paper, the most up-to-date UK Health Research Analysis 2022 reports that of a £2.79 billion total annual health research expenditure, cancer and neoplasms represent the second-highest funded category, commanding £469.3 million (16.8%) of the national budget (UK Clinical Research Collaboration, 2024). Viewed against this setting, the projected £1.72 million initial saving from our model, while positive, is a relatively modest sum. However, the true economic power is revealed when considering the long-term impact: by averting just the 331 cases of T4 PCa disease projected in our conservative 10% stage-shift scenario and applying the upper-bound lifetime cost of £216,188 per case, the potential long-term saving is approximately £71.6 million. This potential saving is equivalent to over 15% of the UK's entire annual cancer and neoplasm research budget, demonstrating that an effective early detection strategy functions not merely as a clinical intervention, but as an influential national economic instrument.

Beyond the compelling financial case, the value of shifting diagnoses to an earlier stage is also realised in the preservation of patient quality of life. Erectile dysfunction (ED) is one of the most significant and distressing complications following radical prostatectomy, and while reported rates vary, high-quality studies consistently conclude that prevalence is high, with some citing rates of up to 85% (Emanu et al., 2017). To mitigate this, penile rehabilitation is now a standard-of-care practice, where programs instructing men to achieve medically-assisted erections can significantly improve recovery rates to between 52-67%, compared to only 20% in men who do not utilise rehabilitation (Emanu et al., 2017). Diagnosing prostate cancer when it is localised (Stages T1-T2) increases the eligibility for advanced, nerve-sparing surgical techniques and highly conformal radiotherapy, which are designed to minimise the risk of life-altering side effects such as long-term sexual dysfunction and incontinence (Kumar et al., 2020). However, another significant barrier remains in that many men avoid seeking or complying with ED treatments due to factors such as shame, distress, and a perceived loss of masculinity (Emanu et al., 2017).

A strategy that facilitates earlier diagnosis is therefore not just about extending life, but about providing the best possible opportunity to preserve the functions central to a man's identity and well-being by enabling access to advanced, nerve-sparing techniques. Furthermore, the substantial long-term savings unlocked by preventing metastatic disease,

equivalent to over 10% of the UK's annual cancer research budget and could be strategically reinvested into psychosocial and rehabilitative research to improve treatment uptake and long-term functional outcomes for survivors. This represents the true, holistic value of early detection, a value that can only be fully captured in a formal cost-effectiveness analysis through the measurement of Quality-Adjusted Life Years (QALYs).

A Proposed Implementation Strategy

Realising the dual dividends of economic savings and improved patient outcomes requires a modern, comprehensive, and evidence-based strategy that moves beyond the historical debate over indiscriminate PSA testing. We propose a multi-faceted, three-part approach designed to maximise the benefits of early detection while actively mitigating the known harms of over-diagnosis and over-treatment, as outlined in **Supplementary Figure S2**.

1. **Targeted and Universal Education:** The strategy must begin with proactive, culturally competent outreach to overcome significant barriers to presentation. Qualitative UK research confirms that for Black men, these barriers include "a lack of risk awareness, mistrust in healthcare providers, and negative healthcare experiences" which directly lead to delayed diagnosis (Christie-de Jong et al., 2025). An educated and engaged population is therefore the foundation upon which any effective risk-stratification programme must be built.
2. **Systematic Risk Stratification and PSA Testing:** Once a man presents, the assessment must move beyond a simple PSA test. The implementation of validated, multi-variable risk tools like QCancer® is essential, as they integrate key parameters, including age, ethnicity, and family history, to provide a more holistic risk score (Bychkovsky et al., 2022; Chiang et al., 2015). Based on this initial assessment, a prostate-specific antigen (PSA) blood test should be performed. While the PSA test alone has limitations, its power is greatly enhanced when the result is interpreted in the context of an individual's baseline risk profile. A PSA level above an age-specific threshold should not trigger an immediate biopsy, but should act as the primary trigger for referral into the advanced diagnostic pathway. This combined approach is strongly supported by the NPCA 2024 report, which definitively shows that factors beyond age, especially Black ethnicity, are associated with a dramatically higher incidence rate **(Figure 2)** (National Prostate Cancer Audit, 2025a). For individuals with a significant family history, this should be augmented by referral for genetic counselling and testing for high-penetrance variants like BRCA2, which can increase lifetime prostate cancer risk by up to 25% (Cheng et al., 2025).
3. **Advanced Diagnostics and Appropriate Pathway Allocation:** Men with a raised PSA and stratified as high-risk must enter a modern diagnostic pathway that strictly adheres to NICE guidelines, which mandate the use of multi-parametric MRI (mpMRI) prior to biopsy (National Institute for Health and Care Excellence, 2019). This "diagnose before you biopsy" standard is the key clinical tool to reduce the overdiagnosis of insignificant cancers. Following diagnosis, pathway allocation must be equally rigorous. For men with high-risk disease, this means timely access to curative treatment to address the disparities seen in **Figure 3**. For the large proportion of men diagnosed with low-risk disease, Active Surveillance (AS) must be

the default management strategy, a position directly advocated by the NPCA to mitigate the harms of overtreatment (National Prostate Cancer Audit, 2025a).This strategy changes the idea of "cost" to being about smart resource use. It moves resources from just handling urgent crises to preventing them, supporting both economic and ethical goals for a fair and sustainable healthcare system.

Limitations

The findings of this study should be interpreted in the context of several important limitations inherent in its design. These limitations mean that our model almost certainly underestimates the true economic benefits of the proposed strategy. A budget impact analysis, our model is an intentional simplification focused only on the direct, first-year costs of initial treatment. It deliberately excludes several major cost categories, including all costs associated with the screening and diagnostic pathway itself, the costs of subsequent-line therapies for recurrent disease, and all indirect and societal costs, such as lost patient productivity and the burden on informal caregivers. Consequently, the projected £1.72 million net saving should be interpreted as a minimum baseline figure; a full societal-perspective analysis would likely reveal a substantially larger economic benefit.

The targeted literature review methodology, while appropriate for this focused policy analysis, is not as comprehensive as a full systematic review and may have missed relevant studies. Furthermore, the primary cost data from Wills et al. (2024) reflect treatment patterns from a 2016–2018 patient cohort. While this is the most robust, recent source available, these costs do not capture the impact of newer, more expensive therapeutic advances (such as second-generation hormonal agents or radioligands) being used earlier in the treatment pathway, which could alter the cost differential between stages. The epidemiological data, while being the most authoritative available, is subject to the limitations of all national audit data, particularly regarding data completeness. For instance, the NPCA 2024 report noted that TNM staging was only 73% complete for the English cohort, which necessitated the assumption that the known stage distribution was representative of the entire cohort (National Prostate Cancer Audit, 2025a).

A significant limitation of this analysis, which strongly suggests our findings are conservative, is the model's explicit exclusion of all long-term costs for managing metastatic disease. While this is a standard and necessary constraint of a one-year budget impact analysis, it means the model does not capture the primary economic driver for an early detection policy. By capturing only the initial £3,547 cost for a Stage T4 patient, our model omits the subsequent lifetime pathway cost of £150,000 to £350,000 required to manage that same patient once their disease progresses. Therefore, because the model excludes implementation costs, uses historic cost data, and, most importantly, omits the long-term costs of metastatic disease, the true net economic benefit of a successful early detection programme is likely to be substantially greater than the £1.72 million saving projected here.

Future Research

This budget impact analysis provides the foundational economic rationale for a new national strategy. The essential next step is to build upon this work by developing a full cost-effectiveness analysis (CEA), as required for formal consideration by the UK's National

Institute for Health and Care Excellence (NICE) and the UK National Screening Committee (NSC) (National Institute for Health and Care Excellence, 2022).

This requires a comprehensive research programme with three core components:

1. **A Lifetime State-Transition Model:** In accordance with NICE methodological standards, a formal health economic model, such as a Markov model, must be developed to capture lifetime costs and outcomes(National Institute for Health and Care Excellence, 2022). This model would need to be populated with robust transition probabilities between health states (e.g., localised disease, recurrence, metastatic disease). Crucially, these probabilities can now be informed by mature data from landmark UK trials such as the ProtecT trial, which has followed men for a median of 15 years and provides real-world data on disease progression under different management strategies(Hamdy et al., 2025).
2. **Costing the Intervention Pathway:** A detailed micro-costing study of the proposed risk-stratified screening pathway is required. This evidence gap is currently being addressed by primary ongoing UK research, such as the TRANSFORM trial. This trial is prospectively evaluating different screening strategies (including PSA-based vs. MRI-based) and will provide the essential real-world cost data for implementing risk tools, MRI screening, and subsequent biopsies in a UK setting (UCL Comprehensive Clinical Trials Unit & Prostate Cancer UK, 2023).
3. **Quantifying Health-Related Quality of Life (HRQoL):** To capture the full value of preserving functional outcomes, the analysis must incorporate Quality-Adjusted Life Years (QALYs). This requires UK-specific utility values for prostate cancer health states. While generic EQ-5D data exists from trials like ProtecT, future work should aim to use more sensitive, cancer-specific instruments and discrete choice experiments to accurately quantify patient preferences regarding the trade-offs between survival and the avoidance of life-altering side effects like erectile dysfunction and incontinence (Noble et al., 2020; Yu et al., 2017).

A Call for a Standardised National Dataset

To support both the implementation of a new strategy and all future evaluation, this analysis highlights the urgent need for a single, standardised national dataset for prostate cancer. This echoes the NPCA's own recommendation to improve data completeness (National Prostate Cancer Audit, 2025a). Such a dataset must mandate the complete and accurate collection of a minimum set of variables for every man diagnosed, including: definitive TNM stage and Gleason score at diagnosis; full treatment pathway details; ethnicity coding aligned to national standards; and linked patient-reported outcome measures (PROMs). A high-quality national dataset is the fundamental infrastructure required to monitor performance, drive quality improvement, and ensure equitable, high-value care for all men.

CONCLUSION

The long-standing justification for inaction on a UK prostate cancer detection programme has been the valid clinical concern over PSA-driven over-diagnosis and the assumed high initial cost. This analysis does not dismiss the former concern, but, using the UK's own

national audit data, it decisively refutes the latter. We demonstrate that a modern, risk-stratified approach, which actively mitigates the harms of overdiagnosis and is not a costly investment, is projected to be immediately cost-saving to the NHS.

The evidence presented leads to an unequivocal conclusion: addressing the profound ethnic and socioeconomic disparities in prostate cancer outcomes is not only a moral imperative but also a fiscally prudent strategy. Our model projects an initial, short-term saving of £1.72 million for a single year's patient cohort, a figure that is dwarfed by the potential long-term savings from averting metastatic disease, where the lifetime management cost can escalate from a conservative **£63,284** to over **£216,188** per patient in one year. These figures provide the necessary economic context for the UK National Screening Committee and NICE to re-evaluate the value proposition of a risk-stratified approach to prostate cancer detection.

This analysis provides the definitive justification to move forward. The debate should no longer be *if* we should act, but *how* we can rapidly implement an equitable, risk-stratified detection programme for prostate cancer. The return on this strategy will be measured not just in millions of pounds saved, but in generations of men granted both a better chance at a longer life and a better quality of that life.

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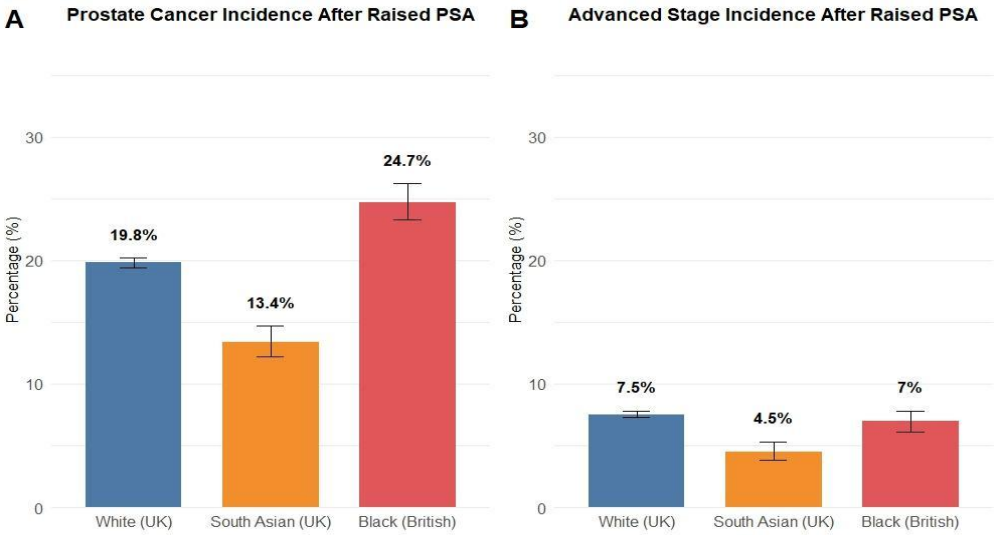
APPENDICES

Appendix A: Supplementary Figures

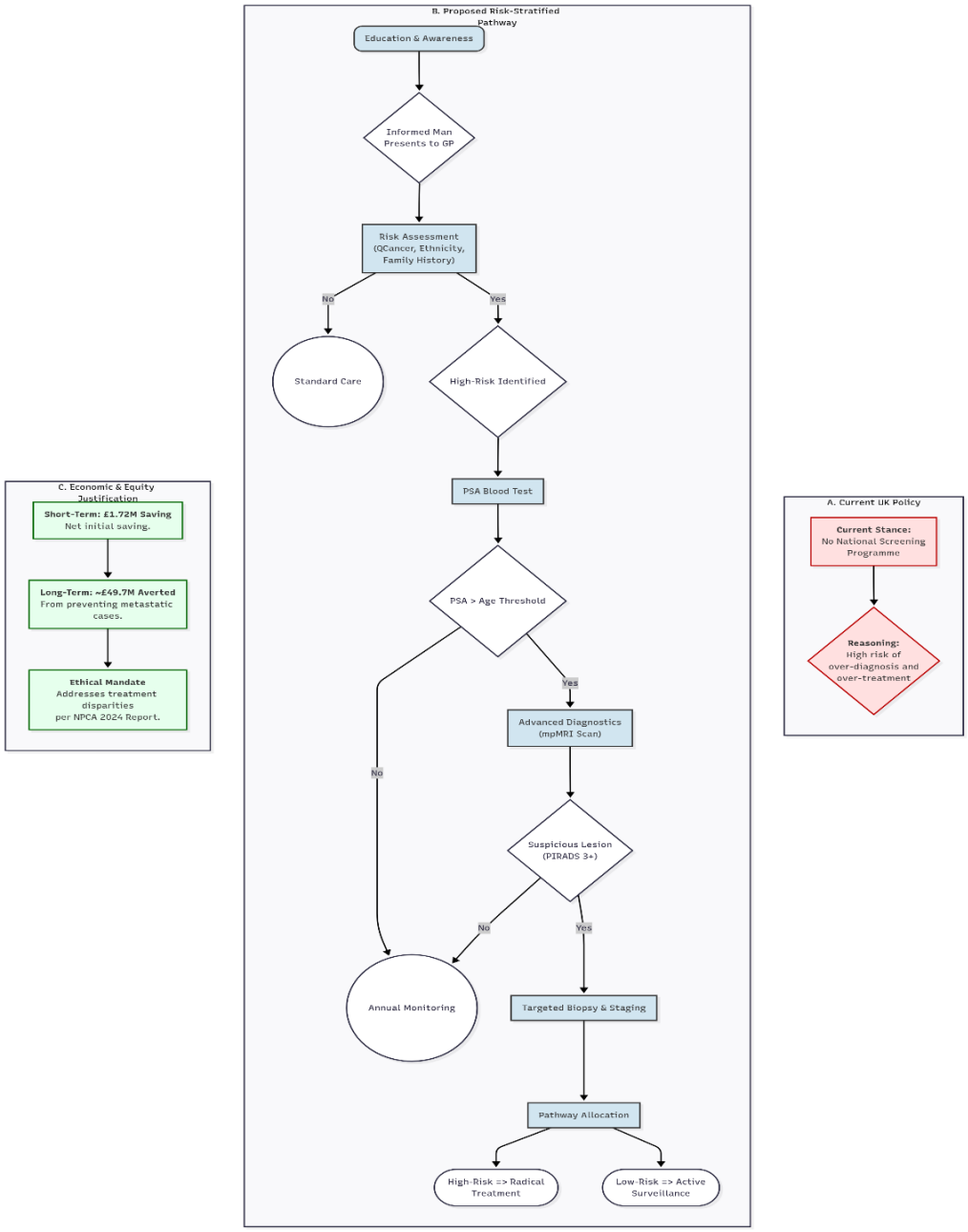
Supplementary Figure S1: One-Year Prostate Cancer Incidence Following a Raised PSA Test, by Ethnic Group.



Supplementary Figure S1: One-Year Prostate Cancer Incidence Following a Raised PSA Test, by Ethnic Group.

This figure shows the one-year incidence of (A) any prostate cancer and (B) advanced-stage prostate cancer among UK men following a raised Prostate-Specific Antigen (PSA) test. The data demonstrate that for a given PSA level, Black men have a significantly higher probability of being diagnosed with both any cancer and advanced-stage cancer compared to White and South Asian men. This provides clinical evidence supporting the higher population-level incidence rates observed in this group. Error bars represent 95% confidence intervals. **Data sourced from Down et al. (2024)** (Down et al., 2024)**.**

Supplementary Figure S2: Schematic Overview of the Proposed Risk-Stratified Pathway and its Justification.



Supplementary Figure S2: Schematic Overview of the Proposed Risk-Stratified Pathway and its Justification.

This flowchart provides a visual summary of the paper's central argument, presented in three parts:

(A) Current UK Policy: Outlines the current national stance of no population screening for prostate cancer and the primary reasoning based on the harms of over-diagnosis from universal, non-targeted PSA testing.

(B) Proposed Risk-Stratified Pathway:* Details the proposed evidence-based, multi-step pathway. This patient journey begins with Education to encourage presentation, followed by Systematic Risk Assessment in primary care (including PSA testing), referral to Advanced

Diagnostics (mpMRI) for high-risk individuals, and finally, Appropriate Pathway Allocation to either radical treatment or active surveillance post-diagnosis.

(C) Economic & Equity Justification: Summarises the key findings from this paper that underpin the rationale for the new pathway. This includes the projected short-term budgetary savings, the immense long-term cost aversion from preventing metastatic disease, and the ethical mandate to address the treatment inequities identified in the NPCA 2024 Report.

Appendix B: Supplementary Tables

Supplementary Table S1: Annual Prostate Cancer Incidence Rate per 1,000 Male Population by Ethnicity, Age Group, and Index of Multiple Deprivation (IMD) Quintile.

Ethnicity	Age Group	Deprivation Quintile	Incidence Rate Per 1000	CI Lower	CI Upper
White	50 to 64	1	1.78	1.78	1.78
White	50 to 64	2	1.93	1.93	1.93
White	50 to 64	3	2.07	2.07	2.07
White	50 to 64	4	2.07	2.07	2.07
White	50 to 64	5	2.07	2.07	2.07
White	65 to 69	1	5.30	4.96	5.44
White	65 to 69	2	5.97	5.73	6.21
White	65 to 69	3	6.31	6.02	6.50
White	65 to 69	4	6.45	6.16	6.60
White	65 to 69	5	6.55	6.31	6.74
White	70 to 74	1	6.21	5.87	6.36
White	70 to 74	2	6.79	6.50	6.98
White	70 to 74	3	6.74	6.45	6.98
White	70 to 74	4	6.98	6.79	7.17
White	70 to 74	5	7.22	6.98	7.37
White	75 to 79	1	8.19	7.90	8.52
White	75 to 79	2	9.05	8.72	9.34
White	75 to 79	3	9.29	9.00	9.53
White	75 to 79	4	9.73	9.44	10.02
White	75 to 79	5	9.87	9.53	10.16
White	80 to 84	1	6.02	5.63	6.31
White	80 to 84	2	6.36	5.97	6.55
White	80 to 84	3	6.31	5.97	6.50
White	80 to 84	4	6.50	6.26	6.74
White	80 to 84	5	6.26	5.97	6.50

White	85 and over	1	5.68	5.30	6.07
White	85 and over	2	5.97	5.68	6.26
White	85 and over	3	6.26	5.97	6.60
White	85 and over	4	6.40	6.12	6.65
White	85 and over	5	6.36	6.02	6.55
Black	50 to 64	1	4.91	4.62	5.20
Black	50 to 64	2	5.78	5.30	6.07
Black	50 to 64	3	5.30	4.82	5.68
Black	50 to 64	4	5.68	5.06	6.40
Black	50 to 64	5	4.62	4.04	5.25
Black	65 to 69	1	18.01	16.37	19.74
Black	65 to 69	2	16.66	15.07	18.25
Black	65 to 69	3	15.41	13.39	17.58
Black	65 to 69	4	13.96	11.32	17.05
Black	65 to 69	5	16.57	13.34	20.37
Black	70 to 74	1	18.01	15.70	20.47
Black	70 to 74	2	17.09	14.93	19.50
Black	70 to 74	3	15.79	13.00	19.07
Black	70 to 74	4	17.62	13.63	22.58
Black	70 to 74	5	19.84	15.07	25.91
Black	75 to 79	1	12.57	10.50	14.98
Black	75 to 79	2	13.34	11.12	15.89
Black	75 to 79	3	12.04	9.34	15.26
Black	75 to 79	4	14.06	10.26	19.17
Black	75 to 79	5	20.75	15.26	28.07
Black	80 to 84	1	9.73	7.99	11.70
Black	80 to 84	2	9.49	7.75	11.51
Black	80 to 84	3	10.35	8.04	13.29
Black	80 to 84	4	11.85	8.28	16.61
Black	80 to 84	5	11.56	7.51	17.58
Black	85 and	1	8.76	6.98	10.83

	over				
Black	85 and over	2	10.74	8.52	13.10
Black	85 and over	3	6.84	4.67	9.78
Black	85 and over	4	9.29	5.78	14.74
Black	85 and over	5	5.63	2.79	11.03
Asian	50 to 64	1	0.87	0.67	0.96
Asian	50 to 64	2	1.11	0.91	1.16
Asian	50 to 64	3	1.06	0.91	1.25
Asian	50 to 64	4	0.96	0.82	1.11
Asian	50 to 64	5	1.11	0.96	1.25
Asian	65 to 69	1	3.03	2.55	3.47
Asian	65 to 69	2	3.66	3.18	4.24
Asian	65 to 69	3	4.62	4.00	5.30
Asian	65 to 69	4	3.66	3.03	4.48
Asian	65 to 69	5	4.24	3.52	5.06
Asian	70 to 74	1	4.86	4.14	5.68
Asian	70 to 74	2	5.25	4.53	6.07
Asian	70 to 74	3	5.49	4.62	6.40
Asian	70 to 74	4	5.25	4.33	6.36
Asian	70 to 74	5	6.26	5.25	7.32
Asian	75 to 79	1	4.14	3.23	5.10
Asian	75 to 79	2	5.92	4.91	6.98
Asian	75 to 79	3	7.17	6.02	8.52
Asian	75 to 79	4	7.08	5.68	8.57
Asian	75 to 79	5	8.28	6.84	9.82
Asian	80 to 84	1	3.03	2.22	3.90
Asian	80 to 84	2	3.95	3.13	5.06
Asian	80 to 84	3	4.19	3.18	5.35
Asian	80 to 84	4	4.33	3.23	5.73
Asian	80 to 84	5	5.10	3.90	6.65
Asian	85 and over	1	4.62	3.56	5.97

Asian	85 and over	2	3.85	2.89	5.20
Asian	85 and over	3	3.27	2.36	4.67
Asian	85 and over	4	4.04	2.79	5.87
Asian	85 and over	5	2.99	1.93	4.62

Supplementary Table S1: Detailed Annual Incidence Rate Data.

This table provides the full, disaggregated data for annual prostate cancer incidence per 1,000 male population, stratified by ethnicity, age group, and Index of Multiple Deprivation (IMD) quintile (where IMD 1 is the most deprived and IMD 5 is the least deprived). These data were extracted from the NPCA 2024 Report and form the basis for the average incidence rates visualised in Figure 2 of the main manuscript. (National Prostate Cancer Audit, 2025a)

Supplementary Table S2: Detailed Baseline Scenario Cost Calculation for the 2023 Annual Cohort (N=55,241).

Stage	Case Numbers per Stage	Total Mean Cost per Stage per Case (Continuous, GBP £)	Cohort Cost per Stage (Continuous, GBP £)
T1	5524	5,018	27,719,934
T2	25963	5,672	147,263,667
T3	20991	5,263	110,478,686
T4	3314	3,547	11,756,390

Supplementary Table S2: Detailed Baseline Scenario Cost Calculation for the 2023 Annual Cohort (N=55,241).

This table details the calculation of the total initial (first-year) NHS treatment cost for the baseline scenario. The model cohort (N=55,241) represents the total number of men diagnosed with prostate cancer in England in 2023 (Source: NPCA 2024 Main Report) (National Prostate Cancer Audit, 2025a). The proportional distribution of cases by TNM stage (Column B) is derived from the national data for 2021 (Source: NPCA 2024 Appendix, Table S9). The stage-specific mean cost per case (Column D) is from a 2016-2018 patient cohort, expressed in 2017/18 prices (Source: Wills et al., 2024) (Wills et al., 2023).

Supplementary Table S3: Detailed Hypothetical Scenario Cost Calculation (with 10% Stage-Shift).

(A) Cancer Stage (TNM)	(B) Baseline Cases	(C) Change in Cases (10% Shift)	(D) Hypothetical Cases *(B + C)*	(E) Mean Cost per Case (£)	(F) Total Estimated Cost per Stage (£) *(D x E)*	(G) % of Total Hypothetical Cost
T1	5,524	+5,027	10,551	5,018	52,945,074	17.9%

T2	25,963	-2,596	23,367	5,672	132,537,301	44.9%
T3	20,992	-2,099	18,893	5,263	99,430,817	33.6%
T4	3,314	-331	2,983	3,547	10,580,751	3.6%
Total	55,241	0	55,241	-	295,493,943	100.0%

Supplementary Table S3: Detailed Hypothetical Scenario Cost Calculation.

This table details the calculation of the total initial NHS treatment cost for the hypothetical scenario. The scenario models a 10% reduction in the number of cases diagnosed at Stages T2, T3, and T4, with that total volume of cases (5,027) being reallocated to Stage T1. The same stage-specific mean costs per case as the baseline scenario are applied to these adjusted case volumes (Column D) to calculate the new total expenditure.

Appendix C: Verification and Breakdown of Metastatic Prostate Cancer Lifetime Costs

The budget impact model in this paper uses first-year treatment costs from Wills et al. (2024), where the initial cost for metastatic (Stage T4) disease is only £3,547 (2017/18 prices) (Wills et al., 2023). This figure, however, is a profound underestimation of the true financial burden of advanced prostate cancer. This appendix provides a detailed, evidence-based estimated breakdown of the full, one-year costs for a patient with metastatic castration-resistant prostate cancer (mCRPC) to demonstrate the actual economic value of early detection.

The mCRPC treatment pathway involves multiple lines of therapy with several drug options at each stage. For the purposes of this analysis, a representative, commonly used agent was selected for each line to provide a transparent and conservative cost estimate. It is important to note that the drug acquisition costs sourced from the British National Formulary (BNF) do not include the significant additional NHS costs of drug administration, monitoring, or the management of adverse events. Furthermore, this estimate does not include the substantial cost of managing skeletal-related events (SREs), a common and costly complication known to affect over 42% of men with metastatic prostate cancer (Parry et al., 2019). All costs are presented from a 2024 and 2025 perspective, making them relevant to current healthcare budgeting.

Cost Inflation Methodology: Where historical costs are used (e.g., for end-of-life care), they have been inflated to 2024 prices using the latest NHS Cost Inflation Index (NHSCII) for NHS Providers (Pay and Prices), as published in the PSSRU "Unit Costs of Health and Social Care 2024" report (Jones et al., 2024).

The two costing scenarios are designed to model the spectrum of possible treatment journeys for a patient with mCRPC. The **Conservative Estimate** represents a common and realistic pathway. It includes the costs of first-line therapy (e.g., Abiraterone), second-line chemotherapy (Docetaxel), and continuous supportive and end-of-life care. Crucially, it excludes third- and fourth-line treatments, reflecting the clinical reality that many patients become too frail to tolerate further aggressive chemotherapy as their disease progresses.

In contrast, the **Upper-End Estimate** models a more comprehensive but less common scenario. This pathway assumes the patient remains fit enough to receive all four available lines of therapy sequentially, including high-cost third-line chemotherapy (Cabazitaxel) and fourth-line radioligand therapy (Lutetium-177). This estimate therefore captures the maximum potential direct cost to the NHS for a patient who is able to access every available treatment.

This has led to the conservative one-year cost being £63,284 and the upper-end estimate being £216,188 for additional management of mCRPC.

Table C1: Estimated One Year Direct NHS Cost Breakdown for a UK mCRPC Patient Pathway

Pathway Phase	Component	Description & Rationale	Unit Cost (£, source year prices)	Units per Patient in one year	Calculated Cost per Patient in one year (£, year, prices)
1st Line mCRPC1(British National Formulary (BNF) & National Institute for Health and Care Excellence (NICE BNFonline), 2025a)	Drug	Abiraterone	£2,735 / cycle (2025)	13 cycles	£35,555 (2025)
2nd Line mCRPC (British National Formulary (BNF) & National Institute for Health and Care Excellence (NICE BNFonline), 2025c)	Chemo	Docetaxel	£1,069.50 / vial (2025)	8 cycles*	£8,556 (2025)
3rd Line mCRPC (British National Formulary (BNF) & National Institute for Health and Care Excellence (NICE BNFonline), 2025b)	Drug	Cabazitaxel	£2,772 / vial (2025)	10 cycles*	£27,720 (2025)
4th Line mCRPC (National Institute for Health and Care Excellence (NICE), 2023)	Radioligand	Lutetium-177 vipivotide tetraxetan course,	£20,000/ cycle (2023)	6 cycles	£125,184 (2024 inflated)
End of Life (Round et al., 2015)	Terminal & Hospice Care	Enhanced community, hospice, and hospital care	£14,859 (2014)	1 patient	£19,173 (2024 inflated)

Table C1: Estimated Lifetime Direct NHS Cost Breakdown for a UK mCRPC Patient Pathway This table details a conservative, source-verified calculation of the direct drug acquisition and end-of-life care costs for a typical mCRPC patient pathway. Drug costs are sourced from the British National Formulary (BNF) at current (2025) prices. Historical and non-current costs have been inflated to 2024 prices using the NHSCII for comparability.

Notes on Estimates and Excluded Costs:

- This calculation is highly conservative. It excludes significant real-world costs, including:
- Administration & Monitoring: All costs for drug administration (e.g., chemotherapy day-case admissions), outpatient appointments, and monitoring scans.
    - Adverse Event Management: The costs of managing treatment side effects.

- Skeletal-Related Events (SREs): The substantial costs of managing SREs (e.g., spinal cord compression, palliative radiotherapy), which affect over 42% of this patient population.
- PSMA-PET Imaging: The cost of imaging required to determine eligibility for lutetium-177.
  *One vial is assumed to be used in one cycle

Appendix D: Database Search Strategies

This appendix provides the search strategies used for the targeted literature review described in Section 2.1.

PubMed Search Strategy

The following string was used to search the PubMed database for articles published between January 1, 2014, and July 31, 2024.

("Prostatic Neoplasms"[Mesh] OR "Prostate Cancer"[tiab])

AND

("Economics, Medical"[Mesh] OR "Costs and Cost Analysis"[Mesh] OR "Cost-Benefit Analysis"[Mesh] OR "cost effectiveness"[tiab] OR "budget impact"[tiab] OR "economic burden"[tiab] OR "health expenditure"[tiab])

AND

("Healthcare Disparities"[Mesh] OR "Continental Population Groups"[Mesh] OR "ethnic groups"[tiab] OR "ethnicity"[tiab] OR "disparities"[tiab] OR "inequalities"[tiab] OR "Black"[tiab] OR "African"[tiab] OR "Caribbean"[tiab] OR "Asian"[tiab] OR "South Asian"[tiab])

AND

("United Kingdom"[Mesh] OR "England"[tiab] OR "Wales"[tiab] OR "Scotland"[tiab] OR "Northern Ireland"[tiab] OR "UK"[tiab] OR "NHS"[tiab])

AND

("2014/01/01"[Date - Publication] : "2024/07/31"[Date - Publication])

Google Scholar Search Strategy

Simplified keyword-based searches were used for Google Scholar, with results filtered for the 2014–2024 publication period. The first 200 results for each string, sorted by relevance, were screened. Example strings included:

- ("prostate cancer" AND "cost" AND "UK" AND "ethnicity")
- ("prostate cancer" AND "budget impact" AND "NHS" AND "disparities")
- ("prostate cancer" AND "economic" AND "Black British" OR "South Asian")

Grey Literature Search

In addition to database searches, a manual review of the following UK health data provider and policy body websites was conducted to identify relevant national reports, guidelines, and audit data:

- National Prostate Cancer Audit (NPCA)
- National Institute for Health and Care Excellence (NICE)
- NHS England
- National Disease Registration Service (NDRS)
- Cancer Research UK (CRUK)