Patient and Tumour Characteristics Associated with Metastatic Prostate Cancer at Diagnosis in England

NPCA: Short Report 2022

Date of publication: 8th September 2022

The **National Prostate Cancer Audit** is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing, and National Voices. Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage, and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies. www.hqip.org.uk/national-programmes

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Executive summary

In this NPCA report we aim to identify which factors predispose men to present with metastatic versus non-metastatic disease at diagnosis. All 218,711 men diagnosed with prostate cancer in England between 1st January 2015 and 31st December 2019 were included in this analysis.

Among patients with a recorded metastatic status, 16.4% (30,007/182,833) had metastatic disease at diagnosis. Metastatic disease was more prevalent in older patients, patients living in more deprived areas and patients of White ethnicity. Differences were also found between geographic regions of England, with evidence of men in all regions being less likely to be diagnosed with metastatic disease than those in the North East and Yorkshire. Associations between patient characteristics and metastatic status remained statistically significant after adjustment for potential confounding.

Within this report, we have demonstrated that specific patient and tumour characteristics are associated with an increased likelihood of being diagnosed with metastatic prostate cancer at diagnosis. However, it is important to encourage all men, irrespective of these characteristics, to seek medical attention earlier in order to reduce the likelihood that the disease will be at an advanced stage at the time of diagnosis. This is in keeping with a key improvement goal of the NPCA, to reduce the proportion of men who have metastatic disease at the time of diagnosis, and the NHS Long Term Plan for cancer to improve outcomes for patients with this disease.

Key Messages

- Patients of older age (>80) and greater social deprivation are more likely to be diagnosed with metastatic disease at first presentation.
- There is variation between ethnic groups, with higher prevalence of primary metastatic disease among patients of White ethnicity.
- Variation is also observed in geographic region, with patients in the North East and Yorkshire NHS region being the most likely to have metastatic disease at diagnosis by comparison with any other NHS region.
- It is important to encourage all men to seek medical advice as soon as they notice symptoms.
- Further work needs to be done to address socio-economic, ethnic and geographical factors that may increase the likelihood of metastatic prostate cancer at diagnosis.

Introduction

The National Prostate Cancer Audit (NPCA) has reported the proportion of men who are found to have metastatic disease when they are first diagnosed over a period of 5 years. This short report seeks to identify what factors may increase the risk of patients having metastatic disease when they are first diagnosed. We explored the impact of age, ethnicity, deprivation, geography, performance status, co-morbidity, PSA and Gleason score on likelihood of diagnosis with metastatic disease.

One of the NHS Long Term Plan key objectives for cancer is that, by 2028, more cancers will be diagnosed at an earlier stage (i.e. stage 1 and 2) rather than a later or more advanced stage (i.e. stage 4 or metastatic) [1]. We have studied the characteristics of the groups of men who are more likely to have metastatic cancer when they are diagnosed, in order to pinpoint areas where these groups can be targeted to encourage earlier presentation and to prompt health care professionals to investigate such men promptly when they present with symptoms of prostate cancer.

We hope this information will better inform prostate cancer patients and healthcare professionals in order to continue to reduce the morbidity and death from this disease.

Methods

All men diagnosed with prostate cancer in England between 1st January 2015 and 31st December 2019 were included in this analysis. This cohort was used as the NPCA has access to gold standard cancer registry data for this time period and it represents a five year patient cohort from before the COVID – 19 pandemic. Data on socio-demographic and disease characteristics at diagnosis were provided by the National Disease Registration Service (NRDS). This report uses data that has been provided by patients and collected by the NHS as part of their care and support. The data are collated, maintained and quality assured by the National Disease Registration Service, which is part of NHS Digital[2]. The NPCA uses data from routine data sources in England which include the following:

- Cancer Registry data
- Cancer Outcomes and Services Dataset (COSD)
- Hospital Episode Statistics (HES)
- Office for National Statistics (ONS)
- Radiotherapy Data Set (RTDS)
- Systemic Anti-Cancer Therapy (SACT) database

Patients who presented with metastatic disease at the time of diagnosis were identified from recorded tumour (T), node (N), and metastasis (M) status. The metastasis (M) variable was used to identify the patients presenting with metastatic disease at diagnosis within the cohort. The patient medical and demographic characteristics included were age, deprivation (IMD deprivation score), ethnicity, geography (both by NHS region and Cancer Alliance), performance status and comorbidity score. The tumour characteristics were measured serum PSA and the historical Gleason score.

Deprivation was measured using the five-point index of multiple deprivation (IMD) which is a measure of relative deprivation used to rank neighbourhoods across England. A patient's

IMD score (from IMD 1 to IMD 5) was based on where a patient was living at the time of diagnosis. Ethnicity was recorded using the categories of the 2001 census and grouped further due to small numbers. The final categories were: White, Mixed, Asian/Asian British, Black/Black British, Other.

Performance status was measured according to the Eastern Cooperative Oncology Group six-point scale [3] and comorbidity used the Charlson score [4] from Hospital Episode Statistics (HES) data from the year preceding diagnosis.

The geographical regions were defined by NHS region and Cancer Alliance. There are seven distinct regions in England, categorised by NHS England, responsible for all NHS organisations in their region [5]. For this analysis, regions are ordered by number of prostate cancer patients within each region, with South East being the baseline. There are a total of 21 Cancer Alliances in England, with each NHS region responsible for between two and four Cancer Alliances [6] (Figure 1).

All characteristics were compared in a descriptive manner between the metastatic and non-metastatic groups. A multivariate logistic regression model was then used to analyse associations between patient characteristics and metastatic status, adjusted for the potential confounding effects of age, deprivation, ethnicity, geographical region and co-morbidity score. For each characteristic, the statistical significance of its association with metastatic status was evaluated using a likelihood ratio test to compare nested logistic regression models. Performance status, PSA at diagnosis and Gleason score were omitted from multivariate models due to large amounts of missing data.

Results

A total of 218,711 patients were diagnosed with prostate cancer between January 2015 and December 2019 in England. Metastatic status at diagnosis was unknown for 35,878/218,711 (16.4%) patients. Among patients with recorded metastatic status, 16.4% (30,007/182,833) had metastatic disease at diagnosis, which was the population cohort of interest.

Metastatic disease was more likely to be diagnosed in older patients, particularly among those aged 80 years of age or over. 38.4% (10,497/27,354) of patients diagnosed with prostate cancer aged 80 years or over had metastatic disease at diagnosis (Table 1). Patients living in areas of high socio-economic deprivation were also more likely to present with metastatic disease, an increasing trend being observed from 14.8% in the least deprived areas to 19.2% in the most deprived areas.

Variation was also observed between ethnic groups, with metastatic disease at diagnosis being more likely among patients of White ethnicity (16.9% in White men, 13.2% in Asian men, and 11.7% in Black men). Differences were also found between geographic regions of England, the highest being the North East & Yorkshire NHS region (20.5%) and the lowest being London (12.5%). Poorer performance status, a greater number of comorbidities and less favourable tumour characteristics (a higher serum PSA at diagnosis or Gleason score) were also strongly associated with metastatic disease at diagnosis.

Associations between patient characteristics and metastatic status remained statistically significant after adjustment for potential confounding (Table 2). Patients aged 80 or over were almost 6 times more likely to be diagnosed with metastatic disease than patients aged

under 60 (OR=5.75, 95%CI 5.44 to 6.09). Patients living in the most deprived areas were 29% more likely to be diagnosed with metastatic disease than those in the least deprived (OR=1.29, 95% CI 1.23 to 1.35). Compared with White ethnic groups, men of Black or Asian ethnicity were both significantly less likely to be diagnosed with metastatic disease (Black men: OR=0.83, 95%CI 0.76 to 0.91; Asian men: OR=0.74, 95%CI 0.66 to 0.83).

Men with two or more comorbidities were more likely to present with metastatic disease at diagnosis (OR=2.74, 95% CI 2.63 to 2.85). Geographic region also remained a significant factor after adjustment for age, ethnicity and deprivation, with evidence for men in all regions being less likely to be diagnosed with metastatic disease than those in the North East and Yorkshire. Those in the London NHS region were the least likely to have metastatic disease at diagnosis (OR=0.87, 95% CI 0.83 to 0.92).

Performance status, PSA at diagnosis and Gleason score were not included in the multivariate model due to large amounts of missing data for these variables. In our univariate models, however, significant associations were found between metastasis at diagnosis and each of these factors.

To investigate the robustness of the association with geographic region the percentage of men diagnosed with metastatic disease was also calculated at the level of NHS cancer alliance. The results were broadly consistent across cancer alliances within each NHS region (Figure 1).

Discussion

This report has utilised data collected by the NPCA to identify characteristics of the patients presenting with metastatic disease at diagnosis in England between 2015 and 2019. There are striking findings, particularly for deprivation, region of residence and ethnicity.

Regarding deprivation, those living in the most deprived areas of England have a 29% greater chance of being diagnosed with metastatic disease at diagnosis, after adjusting for age, ethnicity, co-morbidity score and region. This outcome is similar to previous work by Dasgupta et al[7] which identified that men with prostate cancer living in socioeconomically disadvantaged areas generally had more advanced spread of disease at diagnosis and a consequently poorer survival. Other work on socio-economic inequalities in cancer care performed by Rachet et al[8] demonstrated that survival for patients in the most deprived group was significantly lower than among the least deprived patients for most cancers in both sexes.

More needs to be done to address the disparity between more deprived and less deprived areas of the country in relation to metastatic prostate cancer. A review into cancer survivorship by Dean et al [9] found that social determinants such as poverty, lack of education, lack of social support, and social isolation are important factors in cancer survival. To address these social determinants and minimise cancer inequalities, more effective interventions are needed, that consider the environmental and social contexts in which prostate cancer patients live. Better access to healthcare, together with clear communication and education around early detection and treatment of prostate cancer, is required.

Access to the most effective healthcare may also be related to the finding that the individual NHS region in England was an important determinant of metastatic status at diagnosis.

Patients in the North East and Yorkshire region had the highest rate, a finding that may be attributable to access to cancer specialist services in more rural parts of the country [10]. Socioeconomic disparities between the North and South of England are longstanding and this is another example which supports the need for increased investment in the more deprived areas of the country. There needs to be an emphasis on local NHS community services and education to minimise these inequalities. It is important to note that the data relating to incidence of metastasis by geography is sensitive to the degree of PSA testing within each NHS region. There is a possibility that there is more 'over-diagnosis' in London which therefore lowers the apparent incidence of metastasis inappropriately. Further work is required on patterns of metastatic diagnoses by region, and how this relates to access to initial investigations for a suspected cancer and cancer specialist centres.

This study also assessed the impact of ethnicity on the likelihood of being diagnosed with metastatic disease at presentation. Our report revealed a higher prevalence of metastatic disease among patients of White ethnicity, which is in contrast to previous work by Polednak et al [11]. This study was set in Connecticut, USA in the early 1990s and found that the proportion of prostate cancers diagnosed at the metastatic stage was significantly higher in Black patients than in White patients. A further study by Jack et al [12] set in South East England in 2010, found that Black men had a similar or slightly higher incidence of metastatic disease at diagnosis compared to patients of other ethnicities (23% compared to 22% in White men and 19% in Indian/Pakistani men). Our results show a different trend: the highest rate of metastatic prostate cancer at presentation is in the White ethnic group, around 5% more than Black men and it is not currently clear why our results differ from previous studies. Interestingly, in our previous short report exploring the determinants of variation in the management of high-risk/locally advanced prostate cancer[13], we found that Black men were at a higher risk of potential 'under treatment' of locally advanced disease.

Our results show that having more co-morbidities is associated with a greater likelihood of being diagnosed with metastatic disease at presentation. Research by Renzi et al [14] suggests that co-morbidities can affect the stage of cancer at diagnosis and that this can vary depending on the nature of the co-morbidities and how they bring patients into contact with healthcare services. For example, pre-existing pulmonary, cardiovascular, neurological and psychiatric conditions are all associated with a more advanced stage of cancer at diagnosis compared to hypertension, which can be associated with an earlier stage of cancer at diagnosis. More work into identifying specific co-morbidities that may be more prevalent in prostate cancer patients would help to understand this relationship further.

One of the main aims of the NHS Long Term Plan for cancer is that by 2028, more cancers will be diagnosed at an earlier stage rather than at a later, more advanced stage. Once prostate cancer becomes metastatic it is not curable due to distant spread of cancer cells [15]. Until recently, metastatic prostate cancer has principally been treated using androgen deprivation therapy (ADT) to slow disease progression, but this treatment approach will fail in the majority, resulting in the emergence of disease that is resistant to hormone deprivation (known as castrate resistant disease). This occurs after approximately 9 months in men undergoing standard ADT [16] and in approximately 18 months in men having a modern-day standard of care approach using combined androgen therapy [17, 18] or ADT combined with Docetaxel [19, 20].

There have been recent advances in the treatment of metastatic hormone sensitive and castration resistant prostate cancer including chemotherapy (e.g. Docetaxel and

Cabazitaxel) and anti-androgen treatment (Enzalutamide, Abriaterone acetate and Apalutamide) which have led to drastic improvements in overall survival for metastatic prostate cancer patients [19, 20]. It is important to identify patients with metastatic disease in order to commence these novel treatments as soon as possible.

The limitations within this study include the missing data particularly regarding Gleason score, PSA at diagnosis, performance status and ethnicity. There were 1,652 men (5.5%) with a diagnosis of metastatic disease who did not have their ethnicity recorded. These data are unlikely to be missing due to the patient metastatic status, but if that were the case the association between ethnicity and being diagnosed with metastatic disease might change. However, we do not believe any change would be of sufficient magnitude to negate the differences we have found. There might be differences in the likelihood of patients having their ethnicity recorded depending on their ethnic group. This means that the association between ethnicity and metastatic status might be impacted, especially given the smaller number of patients who are from ethnic minorities (excluding White minorities) compared to White patients. This highlights the need for better data reporting, to ensure that we have the opportunity to better understand any potential inequalities.

The missing data for Gleason score may be attributable to the patients presenting with metastatic disease at diagnosis being generally older and not always having a biopsy to confirm the grade of the cancer cell in the presence of obvious metastatic disease seen radiologically and with high prostate cancer markers. The patients presenting without metastatic disease at diagnosis had fewer missing data for Gleason score. The PSA at diagnosis data is the PSA test performed closest to the time of diagnosis in secondary care as the NPCA do not have information on primary care PSA testing.

The metastatic status was ‘unknown’ for 35,878 patients and therefore these patients were not included in our analysis for this report. We only analysed the patients for whom we had a confirmed metastatic status. The reason for patients having an ‘unknown’ metastatic status could be ‘low risk’ or ‘early stage’ prostate cancer patients not requiring scans or further staging investigations to assess for metastases. We explored this in more detail and found that within the population of patients of ‘unknown’ metastatic status, 17,334 (48%) had a recorded T stage of 1 or 2, which is usually consistent with ‘low risk’ or ‘early stage’ disease.

In order to lower the proportion of men diagnosed with metastatic disease, greater awareness is required regarding which patient groups present with more advanced disease at diagnosis. From the patient perspective, although older men may have more comorbidities that may bring them into contact with healthcare services more often, they should also be made aware of the symptoms potentially associated with prostate cancer, so that they present to their GP as soon as these are noticed.

From a health services point of view, healthcare professionals involved in the identification and diagnosis of prostate cancer in the community should be alerted to these patterns of presentation of this common cancer. The discrepancy across regions should also be further examined to determine whether there are organisational aspects of the service that could be adjusted to bring men to the attention of specialists at an earlier stage of their disease.

Conclusion

Within this report, we have demonstrated that specific patient and tumour characteristics are associated with an increased likelihood of presenting with metastatic prostate cancer at diagnosis. Access to healthcare together with clear communication and education around early detection and treatment of prostate cancer are required to help reduce any disparities. However, it is important to encourage all men, irrespective of these characteristics, to seek medical attention earlier if they experience symptoms of prostate cancer in order to reduce the likelihood that the disease will be at an advanced stage at the time of diagnosis. This is in keeping with the NHS Long Term Plan for cancer and the long-term aim of the NPCA, to improve outcomes for patients with this disease.

Patient Summary

The National Prostate Cancer Audit has reported the proportion of men with prostate cancer who are found to have metastatic disease (cancer that has spread to other parts of the body) when they are first diagnosed over a period of 5 years. This short report seeks to identify what factors may increase the risk of patients having metastatic disease when they are first diagnosed. We explored the impact of age, ethnicity, deprivation, geography, performance status, co-morbidity, PSA and Gleason score on likelihood of diagnosis with metastatic disease.

This report identifies all men diagnosed with prostate cancer in England between 1st January 2015 and 31st December 2019 (218,711 patients), finding that 16%, of those with a record of their stage of disease, are patients presenting with metastatic disease at diagnosis. Metastatic disease was more common in older patients, particularly among those aged 80 years or over (38%).

Patients living in more socioeconomically deprived areas were also more likely to present with metastatic disease (19% in the most deprived compared to 15% in the least deprived areas). 17% of White patients presented with metastatic disease at diagnosis compared to 13% of Asian patients and 12% of Black patients. Differences were also found between geographic regions of England, from 20% in the North East & Yorkshire NHS region to 13% in London.

These findings highlight the importance of raising public awareness of the symptoms of early prostate cancer (please see NHS webpage describing the common symptoms of prostate cancer at https://www.nhs.uk/conditions/prostate-cancer/symptoms/). They should also prompt health care professionals to be particularly aware of the groups of men who are more likely to have metastatic cancer when they are diagnosed, and to investigate such men promptly when they present with symptoms of prostate cancer.

Tables and Figures

Table 1: Characteristics of prostate cancer patients (Jan 2015 – Dec 2019)

	Metastatic at diagnosis	Non-metastatic at diagnosis	Unknown
Total patients (2015-2019)	30,007 (16.4%)	152,826 (83.6%)	35,878
2015	5,771 (17.3%)	27,529 (82.7%)	7,529
2016	6,040 (17.5%)	28,508 (82.5%)	6,309
2017	6,287 (17.8%)	29,141 (82.3%)	5,718
2018	6,323 (14.7%)	36,620 (85.3%)	6,396
2019	5,586 (15.3%)	31,028 (84.7%)	9,926
Patient characteristics			
Age			
<60	1,844 (7.9%)	21,402 (92.1%)	4,089
60-69	6,517 (10.7%)	54,682 (89.4%)	9,214
70-79	11,149 (15.7%)	59,885 (84.3%)	11,509
≥80	10,497 (38.4%)	16,857 (61.6%)	11,066
missing	0	0	0
Index of Multiple Deprivation (IMD)			
1-least deprived	6,631 (14.8%)	38,062 (85.2%)	9,547
2	6,922 (15.5%)	37,624 (84.5%)	8,443
3	6,405 (16.7%)	32,029 (83.3%)	7,435
4	5,331 (17.4%)	25,299 (82.6%)	6,037
5-most deprived	4,718 (19.2%)	19,812 (80.8%)	4,416
missing	0	0	0
Ethnicity			
White	26,780 (16.9%)	131,823 (83.1%)	29,628
Mixed	104 (13.0%)	696 (87.0%)	136
Asian/Asian British	413 (13.2%)	2,727 (86.9%)	720
Black/Black British	732 (11.7%)	5,528 (88.3%)	1,067
Other	326 (14.5%)	1,923 (85.5%)	412
missing	1,652 (14.0%)	10,129 (86.0%)	3,915
Geography: NHS region			
South East	5,293 (14.7%)	30,821 (85.3%)	7,633
Midlands	5,515 (17.8%)	25,510 (82.2%)	6,723
North East and Yorkshire	5,741 (20.1%)	22,851 (79.9%)	4,884
East of England	3,690 (15.6%)	20,035 (84.4%)	4,782
London	2,787 (12.5%)	19,581 (87.5%)	5,262
North West	3,738 (17.1%)	18,076 (82.9%)	2,676
South West	3,138 (16.8%)	15,579 (83.2%)	2,392
missing	105 (22.0%)	373 (78.0%)	1,526
Performance status			
0	7,005 (9.8%)	64,522 (90.2%)	5,953
1-2	6,773 (24.6%)	20,729 (75.4%)	2,850
≥3	1,002 (57.3%)	746 (42.7%)	312
missing	15,227 (18.6%)	66,829 (81.4%)	26,763
Charlson comorbidity score			
0	18,816 (13.4%)	121,680 (86.6%)	25,417
1	6,061 (21.3%)	22,356 (78.7%)	6,305
≥2	5,130 (36.9%)	8,790 (63.2%)	4,156
missing	0	0	0
Tumour characteristics			
PSA at diagnosis			
<10	1,258 (2.2%)	55,024 (97.8%)	7,344
10-20	1,515 (5.6%)	25,755 (94.4%)	2,744
>20	15,289 (40.4%)	22,600 (59.7%)	3,797
missing	11,945 (19.5%)	49,447 (80.5%)	21,993

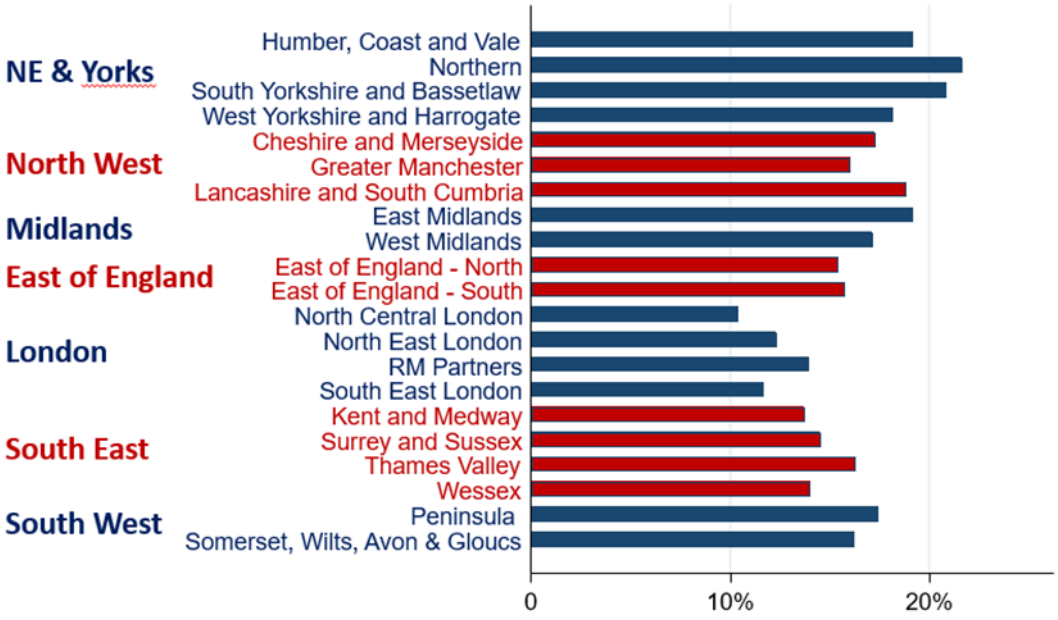
Gleason			
≤6	199 (0.6%)	31,548 (99.4%)	9,648
7	2,619 (3.4%)	74,469 (96.6%)	10,584
≥8	12,144 (26.2%)	34,159 (73.8%)	4,333
missing	15,045 (54.3%)	12,650 (45.7%)	11,313

Table 2: Multivariate regression by age, Index of Multiple Deprivation (IMD), ethnicity, geography and co-morbidity score of patients presenting with metastatic disease at diagnosis

* Performance status, PSA at diagnosis and Gleason score were not included in the multivariate model due to large amounts of missing data for these variables.

	OR	95% CI	p-value
Age			
<60	1.0		<0.001
60-69	1.26	1.19 – 1.34	
70-79	1.84	1.74 – 1.94	
≥80	5.75	5.44 – 6.09	
Index of Multiple Deprivation (IMD)			
1	1.0		<0.001
2	1.02	0.98 – 1.06	
3	1.13	1.09 – 1.18	
4	1.20	1.15 – 1.25	
5	1.29	1.23 – 1.35	
Ethnicity			
White	1.0		<0.001
Mixed	0.91	0.73 – 1.13	
Asian/Asian British	0.74	0.66 – 0.83	
Black/Black British	0.83	0.76 – 0.91	
Other	1.08	0.95 – 1.22	
Geography: NHS region			
South East	1.0		<0.001
Midlands	1.19	1.13 – 1.24	
North East & Yorkshire	1.36	1.30 – 1.42	
East of England	1.02	0.97 – 1.07	
London	0.87	0.83 – 0.92	
North West	1.08	1.03 – 1.13	
South West	1.08	1.03 – 1.14	
Charlson comorbidity score			
0	1.0		<0.001
1	1.53	1.48 – 1.59	
≥2	2.74	2.63 – 2.85	

Figure 1: Percentage of patients with metastasis at diagnosis, by cancer alliance within NHS region



Acknowledgements

Data for this report is based on patient-level information collected by the NHS, as part of the care and support of cancer patients. The data is collated, maintained and quality assured by the National Disease Registration Service, which is part of NHS Digital.

Glossary

Androgen Deprivation Therapy (ADT)
Androgen deprivation therapy is a hormone therapy used to control prostate cancer and delay or manage any symptoms arising from it. Testosterone makes prostate cancer cells grow faster and this therapy works by either stopping the body from making the hormone testosterone, or by stopping testosterone reaching the prostate cancer cells. By doing this the cancer will usually shrink, wherever it is in the body. Androgen deprivation therapy can be used when prostate cancer cells have already spread to distant sites but it can also be used with other treatments, such as radiotherapy, to make them more effective.

British Association of Urological Surgeons (BAUS)
Professional association for urological surgeons. Registered charity no: 1127044.

British Uro-oncology Group (BUG)
Professional association for clinical and medical oncologists specialising in the field of urology. Registered charity no: 1116828.

Castrate Resistant Prostate Cancer
Prostate cancer that keeps growing even when the amount of circulating testosterone in the body is reduced to levels commensurate with castration.

Gleason Score
The Gleason score is a measure assigned by a pathologist to determine how aggressive an individual's prostate cancer is when the prostate cancer tissue is examined using a microscope. It is made up of two separate scores between 3 and 5 which are then added together to make a final score graded between 6 and ten. Along with PSA and TNM, the Gleason score can be used to predict how a prostate cancer might behave in the future. This process is used for risk stratification, i.e. to help to predict how a specific cancer might progress and/or respond to treatment.

Healthcare Quality Improvement Partnership (HQIP)
The Healthcare Quality Improvement Partnership (HQIP) aims to promote quality improvement in patient outcomes and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices.

Index of Multiple Deprivation (IMD)
The English Indices of Deprivation (ID) are a useful tool for targeting services to help tackle deprivation. They provide a means of identifying the most and least deprived areas in England and to compare whether one area is more deprived than another.

Localised Disease
When cancer is confined within the anatomical boundaries of the prostate.

Locally Advanced Disease
When cancer has spread outside the anatomical boundaries of the prostate (T3 or T4) but is still contained within the prostate gland's pelvic location. This may be associated with spread to lymph nodes within the pelvis (N+).

Metastatic Disease
When cancer has spread from its initial site of development in the prostate (the primary site) to distant sites of the body (the metastatic site(s)). These sites are mainly in the bones and lymph nodes in the first instance.

National Cancer Registration and Analytical Service (NCRAS)
A national body which collects, analyses and reports on cancer data for the NHS population in England.

Odds Ratio (OR)
A measure of association between an exposure and an outcome. The OR represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure.

Performance Status (WHO/ECOG)
The World Health Organisation (WHO)/Eastern Cooperative Oncology Group (ECOG) performance status indicator is a measure of how disease(s) impacts a patient's ability to manage on a daily basis.

Prostate Specific Antigen (PSA)
A protein produced by the cells of the prostate gland. A high PSA may indicate prostate cancer or prostate cancer recurrence but it also may indicate benign conditions such as an enlarged prostate or infection.

P-value
A number, calculated from a statistical test, that describes how likely you are to have found a particular set of observations if the null hypothesis were true. P-values are used in hypothesis testing to help decide whether to reject the null hypothesis.

Royal College of Surgeons of England (RCS)
An independent professional body committed to enabling surgeons to achieve and maintain the highest standards of surgical practice and patient care. As part of this it supports audit and the evaluation of clinical effectiveness of surgery.

Staging/stage
The anatomical extent of a cancer. This determines whether a cancer is confined within its primary site (localised disease) or whether it has spread to other areas of the body (metastatic spread). It is usually denoted by the TNM staging process where "T" represents the local stage, "N" the presence of lymph node involvement and "M" represents the presence of metastatic disease.
T1 means the cancer is too small to be seen on a scan, T2 means the cancer is completely inside the prostate gland, T3 means the cancer has broken through the capsule (covering) of the prostate gland and T4 means the cancer has spread into other body organs nearby, such as the back passage, bladder, or the pelvic wall. N0 means that the nearby lymph nodes do not contain cancer cells and N1 means there are cancer cells in lymph nodes near the prostate. M0 means the cancer has not spread to other parts of the body and M1 means the cancer has spread to other parts of the body outside the pelvis.

95% confidence interval
A range of values that you can be 95% certain contains the true mean of the population.

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