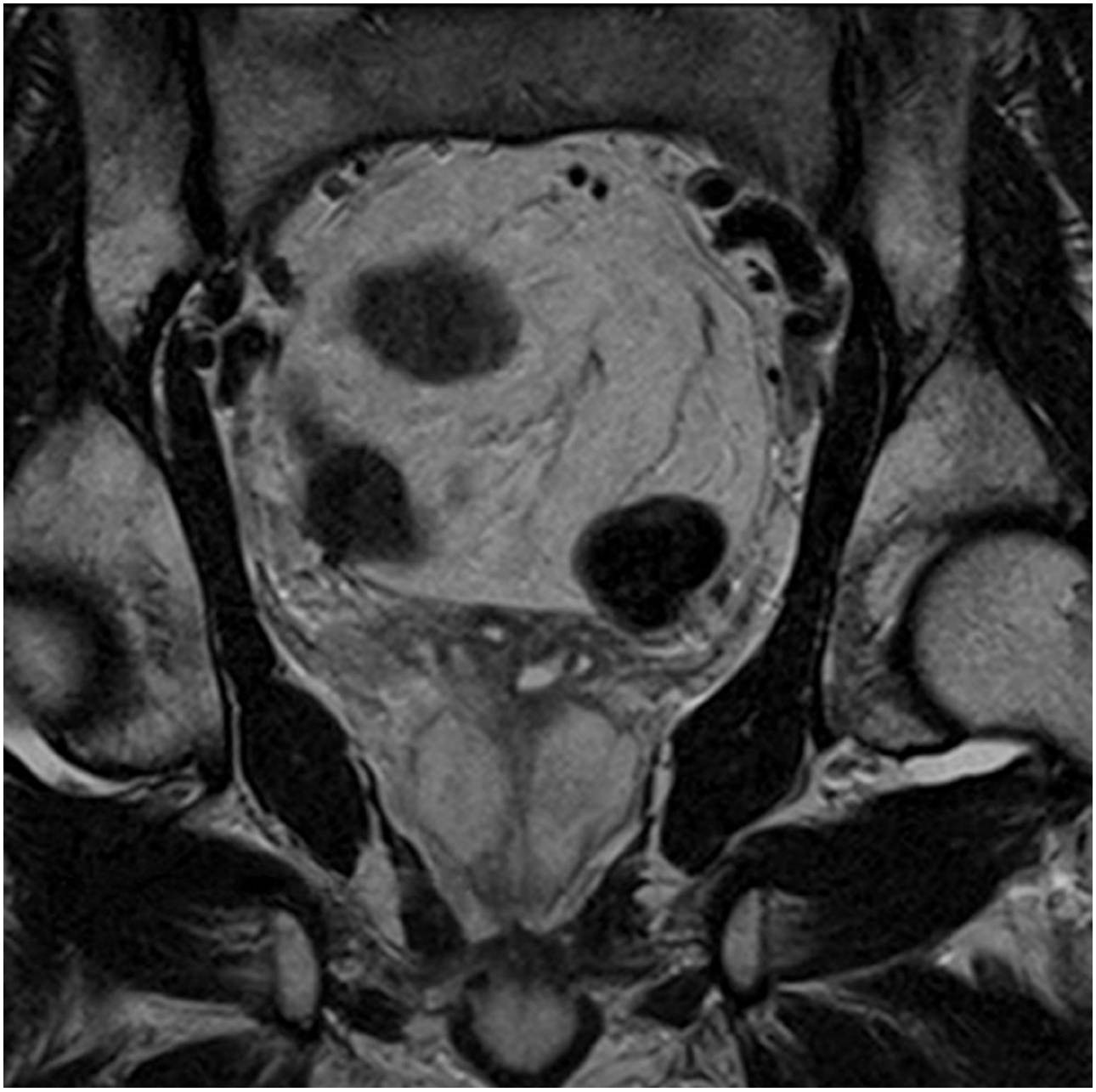
NPCA
National Prostate Cancer Audit

Annual Report 2020

Methodology supplement



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NPCA Annual Report 2020 – Methodology Supplement

Contents

Data receipt and processing

Routine data collection

In England, the National Prostate Cancer Audit (NPCA) works with the National Cancer Registration and Analysis Service (NCRAS), Public Health England, as a data collection partner. NCRAS collects patient-level data from all NHS acute providers using a range of national data-feeds. This includes the Cancer Outcomes and Services Dataset (COSD), which specifies the data items that need to be submitted. Data is submitted to the National Cancer Data Repository (NCDR) on a monthly basis via MDT (Multidisciplinary Team) electronic data collection systems. Clinical sign-off of data submitted to NCRAS is not mandated in England.

The NPCA's data collection partner in Wales is the Wales Cancer Network (WCN), Public Health Wales. The NPCA dataset (see below) is captured through a national system, Cancer Information System for Wales (CaNISC), after identification by hospital cancer services and uploaded via electronic MDT data collection systems. Prior to submission of NPCA data to the WCN, each patient record is validated (frequently by an MDT coordinator) and signed off by a designated clinician. Patient records are signed off when all key data items have been completed.

NPCA dataset

The National Prostate Cancer Audit utilises existing information from routine datasets on the diagnosis, management and treatment of every patient newly diagnosed with prostate cancer in England and Wales. Only COSD data items are collected for men newly diagnosed with prostate cancer from 1st April 2019 in England in the following categories of the NPCA Minimum dataset (MDS):

1. **All men newly diagnosed with prostate cancer** during the initial phase of management.
2. All patients who have **undergone radical prostatectomy**.

A summary of the COSD data items in the NPCA dataset collected for patients diagnosed between 1st April 2018 and 31st March 2019 can be found on the NPCA website.[1] These data are linked to other national datasets to provide extra information. In England, these supplementary datasets are Cancer Registry data, Hospital Episode Statistics (HES) data, the Office for National Statistics (ONS) dataset, the National Radiotherapy Dataset (RTDS) and the Systemic Anti-Cancer Dataset (SACT).

In Wales, the NPCA MDS is captured through CaNISC and linked to additional data items from the Patient Episode Database for Wales (PEDW), ONS and CaNISC. RTDS data are currently unavailable so the following additional category in the NPCA MDS dataset is collected:

3. **All men for whom external beam radiation therapy or brachytherapy is planned, with or without androgen deprivation therapy.**

CaNISC provides information regarding radiotherapy intent, site and dosing. The radiotherapy centres in Wales are currently implementing the collection of the RTDS, which will be available to the NPCA in the near future.

Patient-reported outcome and experience measures (PROMs/PREMs)

The NPCA Patient Survey was designed by the NPCA Project Team following review of current literature/guidelines and in consultation with clinical and patient representatives in the Audit's Clinical Reference Group. The questionnaire includes PROMs and PREMs including:

[1] https://www.npca.org.uk/resources/npca-minimum-dataset/

- Selected questions from the National Cancer Patient Experience Survey (NCPES) – a national survey commissioned by NHS England to determine patients' views of their experience of care.
- The Expanded Prostate Cancer Index Composite 26-item version (EPIC-26) –a validated instrument to measure prostate cancer related quality of life after radical treatments for prostate cancer including urinary, bowel and sexual functioning[2]

The survey cohort included men diagnosed between 1 April and 30 September 2018 who subsequently underwent radical prostatectomy or EBRT. The mechanism for data collection has been described previously.[3,4] In summary, further to identification of the patient cohort by the NPCA team, the NPCA data collection partners in England (NCRAS, PHE) and Wales (WCN, PHW) securely transferred the relevant identifiable patient data (name, address, date of birth, NHS number and NPCA identifier) to Quality Health, the NPCA's survey provider. Before sending out the surveys, Quality Health access NHS Digital's automated National Data Opt-out service and automated PDS/DBS service to remove men who had raised a type-II objection, to determine a current address and whether a patient had died. Questionnaires were mailed to the homes of all identified men ≥18 months after diagnosis. Two reminders were sent to non-responders with the final reminder ≤ 8 weeks after the first mail out.

De-identified survey response data was securely transferred to the NPCA team for linkage to de-identified patient-level clinical data and analyses.

Patient inclusion and data quality

Patients are eligible for inclusion in the prospective audit if they have newly diagnosed prostate cancer using the ICD-10 diagnostic code of "C61" (malignant neoplasm of the prostate). The data collection period reported includes men diagnosed between 1 April 2018 and the 31 March 2019 in England and Wales. This duration of follow-up allows an assessment of all short-term indicators (indicators 1-8 and 11-14: see Table 2).

Medium-term indicators (indicators 9 and 10) require longer follow-up (up to two years' post-treatment) so the diagnostic period is earlier. The reporting time period is therefore over a whole calendar year (1 January 2017 to 31 December 2017).

A patient is included in the prospective audit in England if he has a record of newly diagnosed prostate cancer in the English Cancer Registry. Patients newly diagnosed with prostate cancer are identified through the Cancer Registry and so 'per definition' we report case ascertainment at 100%.

A patient is included in the prospective audit in Wales if a completed NPCA record was submitted and the Wales Cancer Network (WCN) can assign that record to a diagnosing Health Board. The total expected number of cases was determined from the number of men newly diagnosed with prostate cancer in the Welsh Cancer Intelligence

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[2] The EPIC-26 produces a validated summary score for each domain that ranges from 0 to 100, with higher scores representing better function. The urinary incontinence domain, includes questions related to urinary frequency and leakage, the bowel function domain the bowel function domain assesses bowel frequency, urgency, bleeding and pain and sexual function domain asks questions related to the quality and frequency of erections.
Szymanski K, Wei, J et al. Development and validation of an abbreviated version of the expanded prostate cancer index composite instrument for measuring health-related quality of life among prostate cancer survivors. *Urology* (2010), 76, 1245-50.

[3] NPCA Annual Report 2016. Download from: https://www.npca.org.uk/reports/npca-annual-report-2016/

[4] Nossiter J, Sujenthiran A et al. Robot-assisted radical prostatectomy vs laparoscopic and open retropubic radical prostatectomy: functional outcomes 18 months after diagnosis from a national cohort study in England. *Br J Cancer* (2018); 118: 489-494

and Surveillance Unit (WCISU) in 2017. WCISU were not able to provide exact numbers for the time frame of NPCA data collection and so figures from 2017 were used as the closest approximation. As only data for men with an NPCA record is available for analysis, case ascertainment for the Health Boards in Wales is presented and defined as the proportion of the expected number of newly diagnosed men present in the WCISU dataset for whom an NPCA record was submitted which contained at least one NPCA tumour staging data item.

The completeness of four key data items (PSA, Gleason score, TNM and performance status) in England and Wales provides a marker of data quality (Table 1).

Table 1. Data completeness for selected data items for men newly diagnosed with prostate cancer in England and Wales over the period of 1 April 2018 and 31 March 2019.

Data variable	**England**		**Wales**	
	N	**%**	**N**	**%**
Diagnostic and staging variables				
No. of men with new diagnosis of prostate cancer	49,804 [CR]		2,776 [NPCA]	
Performance status completed	25,857 [COSD]	52%	2,776 [NPCA]	100%
Biopsy performed	21,815 [NPCA]	44%	2,775 [NPCA]	100%
PSA completed	33,671 [COSD]	68%	2,472 [NPCA]	89%
Gleason score completed	41,858 [CR]	84%	2,472 [NPCA]	89%
TNM completed	39,434 [CR]	79%	2,212 [NPCA]	80%

Acronyms: COSD = Cancer Outcome and Services Dataset; CR = Cancer Registry dataset; NPCA = National Prostate Cancer Audit dataset; PSA = Prostate Specific Antigen; TNM = Tumour, Nodes, Metastases Classification of Malignant Tumours.

Preparation for analysis

The NPCA Project Team, based at the Clinical Effectiveness Unit (CEU)[5] receives the national data from the NCRAS and WCN starting in May each year, with the aim of receiving final datasets by the end of June in the year of publication of the annual report (NB: final datasets were received mid-July in 2020). A series of steps are performed to prepare the complex and large datasets for analysis.

[5] The CEU is an academic collaboration between The Royal College of Surgeons of England and the London School of Hygiene and Tropical Medicine, and undertakes national clinical audits and research. Since its inception in 1998, the CEU has become a national centre of expertise in methods, organisation, and logistics of large-scale studies of the quality of surgical care.

Specifically, using specialised statistical software[6], the project team:

- Clean the datasets received
- Checking the datasets for discrepancies
- Data augmentation (combining multiple sources of information)

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Merge the relevant datasets.

This involves restructuring the English and Welsh datasets so that they have the same format and can be analysed simultaneously.

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Where necessary, derive new information (data items) by combining different data items.

For example, the risk score and the Charlson comorbidity index are calculated using patient diagnosis information in HES and PEDW.

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Conduct analyses and present audit results.

In aggregated tables and graphs for annual reports and other outputs (such as peer reviewed articles and papers).

Definition of variables

Comorbidity and socioeconomic status

The presence of comorbidities is not captured within a single data item by the national registration services. The NPCA team therefore uses the Royal College of Surgeons of England (RCS) modified Charlson Comorbidity Index (CCI)[7] to describe these.

The CCI is a commonly used scoring system for medical comorbidities. It consists of a grouped score that is calculated based on the absence (0) and presence (≥1) of 14 pre-specified medical conditions (Appendix 1). The CCI was calculated using information on secondary diagnoses (ICD-10 codes) in the hospital admission data (HES/PEDW) recorded within the 12-month period prior to a patient's diagnosis.

The Index of Multiple Deprivation (IMD) was used to categorise patients into five socioeconomic groups (1=least deprived; 5=most deprived) based on the small areas in which they lived (LSOAs, containing ~1500 people). The five categories were fifths of the national IMD ranking of these areas.

[6] Stata® is a statistical package for data analysis, data management, and graphics (https://www.stata.com/)

[7] Armitage JN, van der Meulen JH, Royal College of Surgeons Co-morbidity Consensus G. Identifying co-morbidity in surgical patients using administrative data with the Royal College of Surgeons Charlson Score. *Br J Surg.* 2010;97(5):772-81.

Disease status and risk stratification

In England, men were assigned to a prostate cancer risk according to a modified D'Amico classification, which is a three-tiered disease status category, assigned according to their TNM stage, Gleason score and PSA, using an algorithm previously developed by the NPCA.[8] TNM and Gleason score are received from the Cancer Registry. PSA is collected from the COSD dataset as is not routinely collected within the Cancer Registry.

In Wales, cancer stage was defined using "T category (pre-treatment)", "N category (pre-treatment)" and "M category (pre- treatment)". Where pre-treatment information was missing for T or N, the corresponding pathological staging items were used if available. All men were assigned to a disease status category in the same way as the English men. All data items were collected as part of the NPCA dataset in Wales.

Treatment allocation

A patient was considered to have undergone radical prostate cancer therapy if he was identified as having received a radical prostatectomy, radical external beam radiotherapy or brachytherapy within 12 months of his diagnosis date.

Radical prostatectomy

HES and PEDW records, for England and Wales respectively, were used to identify patients who had undergone a radical prostatectomy using the OPCS-4 procedure code "M61". Where information on radical prostatectomy was missing in the PEDW data for Wales, this information was added from the NPCA dataset.

Radical radiotherapy

For England, the RTDS data-item "treatment modality" was used to identify men who received external beam radiotherapy and/or brachytherapy. Men receiving radiotherapy for metastases or radiotherapy with palliative intent were excluded. Men were assigned to a standard fractionated or hypofractionated regimen (with or without a brachytherapy boost – both low dose rate and high dose rate) based on the doses documented in the RTDS. HES and PEDW records were also used to identify brachytherapy patients using OPCS-4 procedure codes ("M706" + "X653" + "Y363 / M706 + "X653/ M712" +"X653"). In England, the data-item "radiotherapy treatment region" was used to determine whether men had irradiation of their prostate plus pelvic lymph nodes or just to the prostate and seminal vesicles.

For Wales, CaNISC was used in a similar way to the RTDS to identify men receiving curative radiotherapy and to exclude those receiving palliative radiotherapy. Comparable data were not available with regard to radiotherapy dosing or treatment region in Wales and so no reporting was possible for the actual receipt of prostate plus pelvic lymph node irradiation, hypofractionation or use of a brachytherapy boost.

Chemotherapy

SACT was used to identify the men receiving docetaxel and was only available for English men. Docetaxel is a chemotherapeutic treatment which was new to the NICE 2019 prostate cancer guidelines and according to those guidelines, should be 'offered' to men with metastatic disease who are fit enough to receive chemotherapy.

NPCA performance indicators

The Annual Report focuses on 14 performance indicators which are itemised in **Table 2**

[8] NPCA Annual Report 2016. Download from: https://www.npca.org.uk/reports/npca-annual-report-2016/

Table 2. NPCA Performance Indicators.

Performance indicator		Description
Disease presentation		
1	Proportion of men diagnosed with metastatic disease (presented at the level of the SMDT).	This *process* indicator provides information on the potential late diagnosis of prostate cancer.
Treatment allocation		
2	Proportion of men with low-risk localised prostate cancer undergoing radical prostate cancer therapy (presented at the level of the SMDT).	This *process* indicator provides information about the potential "over-treatment" of men with low-risk prostate cancer.
3	Proportion of men with high-risk/locally advanced disease receiving radical prostate cancer therapy (presented at the level of the SMDT).	This *process* indicator provides information about potential "under-treatment" of men with high-risk/locally advanced disease.
4	Proportion of men with metastatic disease receiving docetaxel in combination with standard ADT (presented at the level of the SMDT).	This *process* indicator provides information about the use of docetaxel as primary treatment for men with metastatic disease.
Radiotherapy regimen allocation		
5	Proportion of men with high-risk/locally advanced disease receiving prostate and pelvic lymph node irradiation (presented at the level of the radiotherapy centre).	This *process* indicator provides information about the extent of irradiation used for patients with high-risk or locally advanced disease using data from the RTDS.
Patient experience of care		
6	Proportion of patients who were given the name of a clinical nurse specialist (presented at the level of the SMDT).	These *process* indicators provide information on key aspects of a man's experience of care following a prostate cancer diagnosis and were derived from selected NCPES questions in the NPCA patient survey.
7	Proportion of patients rating their overall care as at least 8 out of 10 (presented at the level of the SMDT).	
Outcomes of treatment: short-term		
8	Proportion of patients who had an emergency readmission within 90 days of radical prostate cancer surgery (presented at the level of the surgery centre).	This *outcome* indicator may reflect that patients experienced a complication related to radical prostate cancer surgery after discharge from hospital.
Outcomes of treatment: medium-term		
9	Proportion of patients experiencing at least one genitourinary (GU) complication requiring a procedural/surgical intervention within 2 years of radical prostatectomy (presented at the level of the surgical centre).	This *outcome* indicator may reflect the quality of the surgical procedure received.
10	Proportion of patients receiving a procedure of the large bowel and a diagnosis indicating radiation toxicity (gastrointestinal (GI) complication) up to 2 years following radical prostate radiotherapy (presented at the level of the radiotherapy centre).	This *outcome* indicator may reflect the quality of the radiotherapy interventions received.
Outcomes of treatment: patient-reported		
11	Mean urinary incontinence score after radical prostatectomy (presented at the level of the surgery centre).	These *performance* indicators present the validated summary score for each EPIC-26 domain, which ranges from 0 to 100 with higher scores representing better function.
12	Mean sexual function score after radical prostatectomy (presented at the level of the surgery centre).	
13	Mean bowel function score after radical radiotherapy (presented at the level of the radiotherapy centre).	
14	Mean sexual function score after radical radiotherapy (presented at the level of the radiotherapy centre).	

The following performance indicators are used for the identification of potential outliers in the NPCA Outlier Policy for 2020:

<u>Performance indicator 8:</u> Proportion of patients who had an emergency readmission within 90 days of radical prostate cancer surgery (presented at the level of the surgery centre).

This indicator was derived from linkage with HES/PEDW admissions for men undergoing radical prostatectomy between 1 April 2018 and 31 March 2019. To create a variable for those patients who had an emergency readmission within 90 days of a radical prostatectomy: we identify those patients who had a radical prostatectomy, calculate the difference in days between the given discharge date after prostatectomy and any readmission date, and find those patients with a code indicating an emergency readmission (see Appendix 2) which is recorded within 90 days of discharge.

<u>Performance indicator 9:</u> Proportion of patients experiencing at least one genitourinary (GU) complication requiring a procedural/surgical intervention within 2 years of radical prostatectomy (presented at the level of the surgical centre).

This indicator includes men undergoing a radical prostatectomy between 1 January 2017 and 31 December 2017. It was derived using a coding-framework based on OPCS-4 procedure codes to capture genitourinary complications that required an intervention (see Appendix 3).[9] These included complications of the urinary tract as opposed to those related to sexual dysfunction. Men with an associated diagnosis of bladder cancer (ICD-10 "C67" code) or who received post-operative radiotherapy were excluded.

<u>Performance indicator 10:</u> Proportion of patients receiving a procedure of the large bowel and a diagnosis indicating radiation toxicity (gastrointestinal (GI) complication) up to 2 years following radical prostate radiotherapy (presented at the level of the radiotherapy centre).

This indicator includes men undergoing radical radiotherapy between 1 January 2017 and 31 December 2017 and assesses the percentage of men at each radiotherapy centre who experienced at least one gastro-intestinal (GI) complication within 2 years of their radiotherapy, using procedure (OPCS-4) and diagnostic codes (ICD-10) derived from patient-level linked administrative hospital data (see Appendix 4). A toxicity event requires evidence of both a diagnostic endoscopic procedure (e.g. colonoscopy or sigmoidoscopy) in addition to a diagnostic code consistent with radiation toxicity equivalent to Grade 2 toxicity or above according to the National Cancer Institute Common Toxicity Criteria for Adverse Events (CTCAE). These indicators have been validated and used to compare the effectiveness of different treatment modalities and processes of care in prostate cancer radiotherapy.[10] Men with an associated diagnosis of bladder cancer, those who received additional brachytherapy and those who had received a radical prostatectomy prior to radiotherapy were excluded.

[9] More detail about the development of this indicator can be found here: Sujenthiran A, Charman S, Parry M et al. Quantifying severe urinary complications after radical prostatectomy: the development and validation of a surgical performance indicator using hospital administrative data. *BJU int* (2017); 120:219-225

[10] More detail about this indicator can be found here: Sujenthiran A, Parry M, Nossiter J et al. Comparison of Treatment-Related Toxicity With Hypofractionated or Conventionally Fractionated Radiation Therapy for Prostate Cancer: A National Population-Based Study. *Clin Oncol.* (2020); 32(8): 501-508; Parry M, Nossiter J, Sujenthiran A et al. Impact of high-dose rate and low-dose rate brachytherapy boost on toxicity, functional and cancer outcomes in patients receiving external beam radiation therapy for prostate cancer: a national population-based study. *Int J Radiat Oncol Biol Phys* (2020); S0360-3016(20)34545-4

The full process of outlier communications is found in the NPCA Outlier Policy[11].

Statistical analyses

All statistical analyses were performed using Stata version 15.1.

Most results in the Annual Report are descriptive. The results of categorical data items are reported as percentages (%). The denominator of these proportions is, in most cases, the number of patients for whom the value of the data item was not missing. Results are typically grouped by Trust/Health Board (for Wales) or by specialist MDT (SMDT).

Adjusted outcomes

Multivariable logistic regression was carried out for performance indicators 2 and 3 and 5-10, and multivariable linear regression for performance indicators 11-14. Centres which performed less than 10 procedures per year were excluded.

The analyses for indicators 2 and 3 were adjusted for patient age and comorbidity, and additionally for socio-economic status for indicators 5-7. Risk group was also included in the adjustment model for all treatment and patient-reported outcomes (performance indicators 8-14).

Funnel plots and outlier identification

Funnel plots are used to make comparisons, and graphically display variation, between Trusts/Health Boards or between specialist MDTs. The plots are generated by plotting the rate for each Trust/Health Board/SMDT against the total number of patients used to estimate the rate. The 'target' is specified as the average rate across all Trusts/Health Boards/SMDTs.

The funnel plots generated for the performance indicators use control limits defining differences corresponding to two standard deviations (inner limits) and three standard deviations (outer limits) from the national average. These limits get wider where hospitals have a lower volume of patients and narrower where there is higher volume, reflecting the increased variability in results when there are fewer patients per hospital.

Funnel plots are displayed in the Annual Report for process measures and patient-reported measures across the country (performance indicators 1-7 and 11-14).

For the adjusted treatment-related outcomes (performance indicators 8-10), surgical and radiotherapy treatment centres outside the inner or outer funnel limits (*alerts* and *alarms*, respectively) were considered as potential outliers and were contacted, where necessary, according to the NPCA Outlier Policy.[12]

[11] https://www.npca.org.uk/resources/npca-outlier-policy-2020/

[12] https://www.npca.org.uk/resources/npca-outlier-policy-2020/

Appendix 1: Charlson Comorbidity Index

Pre-specified conditions included in the assignment of Charlson Comorbidity Index score

Conditions			
Myocardial infarction	Dementia	Diabetes mellitus	Metastatic solid tumour
Congestive cardiac failure	Chronic pulmonary disease	Hemiplegia or paraplegia	AIDS/HIV infection
Peripheral vascular disease	Rheumatological disease	Renal disease	
Cerebrovascular disease	Liver disease	Any malignancy	

Appendix 2: Coding for emergency readmissions

Performance indicator 8: Proportion of patients who had an emergency readmission within 90 days of radical prostate cancer surgery (presented at the level of the surgery centre).

Patients are coded as having an emergency readmission if:

- they were readmitted between 1 and 90 days since discharge following radical prostatectomy
- they have an "admimeth" code starting with a “2” indicating emergency admission, as shown below (from the HES data dictionary[13])

Emergency Admission, when admission is unpredictable and at short notice because of clinical need:
21 = Accident and emergency or dental casualty department of the Health Care Provider
22 = General Practitioner: after a request for immediate admission has been made direct to a Hospital Provider, i.e. not through a Bed bureau, by a General Practitioner: or deputy
23 = Bed bureau
24 = Consultant Clinic, of this or another Health Care Provider
25 = Admission via Mental Health Crisis Resolution Team (available from 2013/14)
2A = Accident and Emergency Department of another provider where the patient had not been admitted (available from 2013/14)
2B = Transfer of an admitted patient from another Hospital Provider in an emergency (available from 2013/14)
2C = Baby born at home as intended (available from 2013/14)
2D = Other emergency admission (available from 2013/14)
28 = Other means, examples are: - Admitted from the Accident and Emergency Department of another provider where they had not been admitted - Transfer of an admitted patient from another Hospital Provider in an emergency

[13] http://content.digital.nhs.uk/media/23711/Admitted-Patient-Care/pdf/Admitted_Patient_Care_.pdf

Appendix 3: Coding for genitourinary complications

Performance indicator 9: Proportion of patients experiencing at least one genitourinary (GU) complication requiring a procedural/surgical intervention within 2 years of radical prostatectomy (presented at the level of the surgical centre).

Patients are coded as having a genitourinary complication if:

- they had a radical prostatectomy between 1 January 2017 and 31 December 2017
- they had not had radical radiotherapy
- they do not have a record of bladder cancer
- they have a record of one of the following OPCS-4 procedure codes

OPCS-4 Procedure Code and Definition	
M444	Endoscopic removal of blood clot from bladder
M448-9	Other specified/unspecified other therapeutic endoscopic operations on bladder
M455	Diagnostic endoscopic examination of bladder using rigid cystoscope
M458-9	Other specified/unspecified diagnostic endoscopic examination of bladder
M471	Urethral irrigation of bladder
M478-9	Other specified/unspecified urethral catheterisation of bladder
M481	Suprapubic aspiration of bladder
M512	Endoscopic suspension of neck of bladder
M642	Implantation of artificial urinary sphincter into outlet of male bladder
M643	Insertion of prosthetic collar around outlet of male bladder
M646	Reconstruction of neck of male bladder NEC
M648-9	Other specified/unspecified other open operations on outlet of male bladder
M651-5,8-9	Endoscopic resection of prostate/outlet of male bladder
M662	Endoscopic incision of outlet of male bladder NEC
M668-9	Other specified/unspecified other therapeutic endoscopic operations on outlet of male bladder
M679	Unspecified other therapeutic endoscopic operations on prostate
M763	Optical urethrotomy
M764	Endoscopic dilation of urethra
M768-9	Other specified/unspecified therapeutic endoscopic operations on urethra
M792	Dilation of urethra NEC
M793	Calibration of urethra
M794	Internal urethrotomy NEC

Appendix 4: Coding for gastrointestinal complications

<u>Performance indicator 10:</u> Proportion of patients receiving a procedure of the large bowel and a diagnosis indicating radiation toxicity (gastrointestinal (GI) complication) up to 2 years following radical prostate radiotherapy (presented at the level of the radiotherapy centre).

Patients are coded as having a gastrointestinal complication if:

- they had a radical radiotherapy between 1 January 2017 and 31 December 2017
- they had not had radical prostatectomy
- they had not had additional brachytherapy
- they do not have a record of bladder cancer
- they have a record of one of the following OPCS-4 procedure or OCD-10 diagnosis codes

OPCS-4 Procedure Code and Definition	
H201-4,H206,H208-9,H212,H221, H228-9	Endoscopy of colon
H231-6,H238-9,H242,H248-9,H251,H258-9	Sigmoidoscopy of lower bowel
H261-9,H271,H279,H281,H288-9	Sigmoidoscopy of sigmoid colon
H541	Anorectal stretch
H564	Excision of anal fissure
H626	Proctoscopy
M372	Repair of vesicocolic fistula
M375	Repair of fistula of bladder NEC
ICD-10 Diagnosis Code and Definition	
K520	Gastroenteritis and colitis due to radiation
K528-9	Other specified/unspecified noninfective gastroenteritis and colitis
K603-4	Anal/rectal fistula
K624-6	Stenosis/haemorrhage/ulcer of anus and rectum
K627	Radiation proctitis
K628-9	Other specified/unspecified disease of rectum and anus
K632	Intestinal fistula
N321	Vesicointestinal fistula