

Radiotherapy Protocol for the management of Prostate Cancer

This is radiotherapy protocol for the East Midlands RT Operational Delivery Network (ODN).

Tumour sites are: Prostate

Document revision History

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0.02	Aug 2023	Edited with KD
0.03	Oct 2023	Edited post M.S-Howell feedback
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1. Treatments to include

- Radical external beam Radiotherapy +/- hormone therapy
- Brachytherapy +/- EBRT +/- Hormones
- Palliative Radiotherapy

2. Indications for treatment

- Histological confirmation of tumour and/or MDT consensus.
- Staging should be offered to patients being considered for radical treatment i.e. good performance status, life expectancy of 10 years (utilising a suitable life expectancy calculator) or if symptomatic.
- Local staging of tumour with physical examination, multi parametric pelvic MRI and prostate biopsy is undertaken by the Urology team prior to referral.

Indications for treatment type:

Active Surveillance

Consider for asymptomatic men with Cambridge Prognostic Group (CPG) 1-3^[17]

Radical prostatectomy

Medically fit. Laparoscopic Prostatectomy may be offered to selected patients.

Radical external beam radiotherapy:

- Performance status 0 - 2, life expectancy ≥ 10 years, localised disease within the pelvis, no history of bowel or bladder disease, which may impair tolerance of radiotherapy.
- Neo-adjuvant or adjuvant hormone therapy is considered for all patients (except CPG 1 +/- CPG 2). This consists of monthly injections for 3 – 6 months (minimum 3) before Radiotherapy and then continues through the Radiotherapy treatment. For patients having long term hormone treatment aim to start after 4-6 months. On completion of Radiotherapy no further injections should be given for low or intermediate risk patients unless specified otherwise.
Option: minimal neo-adjuvant hormones (less than 4 weeks) followed by adjuvant hormones for 4 months
- Patients that satisfy the inclusion criteria for PACE-B^[9] could be considered for SBRT (36.25 in 5#) as per PACE protocol if the treating centre has participated in any PACE QA process.
nb. 73% of patients had fiducial markers inserted and 41% of patients were treated on cyberknife as part of trial
- For high risk patients (CPG 4 & 5)^[17] long term hormone treatment for 18 months - 3 years (+/- abiraterone when commissioned) should be considered if:
 - T3a or above
 - Gleason score > 8
 - PSA > 20
- Radiotherapy to prostate and seminal vesicles, as per CHiPP trial^[12] (and PACE- B pending commissioning).
- Rectal spacer may be offered to the patient, if available and clinically appropriate

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SPACEOAR/Rectal Spacer Criteria^[18]:

- Histologically proven prostate cancer
- Radiologically T1, T2 and anterior or lateral T3a , NO M0
- Prostate size up to 70 cc can consider up to 80 cc if patients is on LHRH agonist)
- IPSS 18 or below
- No anaesthetic contraindication

Exclusion criteria

- Active bleeding disorder or clinically significant coagulopathy
- Anticoagulants (discontinuation usually possible)
- Active inflammatory or infectious disease in the perineum or injection area (prostatitis, anorectal inflammatory disease with increased risk of ulceration, fistula or bleeding such as ulcerative colitis or Crohn's disease)
- Previous treatment of prostate with high risk of adhesions (high-intensity focused ultrasound, cryotherapy, radiotherapy)

Nodal Radiotherapy:

- Pelvic nodal radiotherapy can be considered for patients who do not meet CHiPP^[12] inclusion criteria or CPG3 and above using a hypo-fractionated regime (60Gy/20# to prostate, 44-47Gy to elective nodes with boost to 51-60Gy)
- (Clinician Discretion) **Gross nodes:** May be treated as high as clinically feasible up to a maximum of the dose being delivered to the prostate, whilst respecting OAR tolerances. Nodal volumes should be examined pre and post ADT, with the post ADT tumour volume serving as the high dose boost volume.^[14]
- Conventional fractionation (74Gy/37# to prostate, 55-60Gy to elective nodes with boost to 60-66Gy) remains an option
- PA nodes may be considered to be included in accordance to local clinical decisions and clinician discretion

Salvage RT:

- Salvage Radiotherapy can be considered for post prostatectomy patients with 3 consecutive PSA rises or PSA > 0.2ng/ml, after radical prostatectomy.^{[15][19]}
- Hypo-fractionated regime is recommended as per RCR recommendations.
- Adjuvant hormones can be offered.
- +/- ADT with anti-androgen or LHRH analogues between 6-24 months
- +/- pelvic nodes

Brachytherapy^[3] :

- Prostate brachytherapy allows radiation dose escalation beyond what would be achievable by EBRT. In addition, there are fewer issues with changes in prostate position during treatment delivery.
- Brachytherapy as monotherapy for low and intermediate risk patients with favorable features can be used as a single implant, most commonly with Iodine-125 (I125) seeds. For low dose rate (LDR) I-125 monotherapy the prescription dose to the CTV is 145 Gy.
- An alternative option is fractionated high dose rate (HDR) brachytherapy with a recommended dose of 27 Gy in 2 treatments 1-2 weeks apart
- For high risk patients LDR or HDR brachytherapy in combination with ADT and EBRT to the prostate or prostate and pelvic nodes is an effective treatment.
- Brachytherapy boost may be delivered before or after EBRT. Recommended fractionation schedule **for LDR boost is 110 Gy and for HDR boost it is 15Gy.**
- Recommended **EBRT schedules are 37Gy in 15 fractions** for prostate only RT. Most published series for brachytherapy and EBRT combinations have used 46Gy in 23 fractions for PNRT. For the discussion regarding the pelvic nodal dose, please refer to the discussion below.

Cross site referral

- **Brachytherapy for prostate cancer is not offered locally at all centres in the East Midlands.**
- **Eligible patients that wish to pursue this option may be offered this treatment by their consultant and referred to one of the regional providers delivering this service.**
- **An optional workflow is shown in [Appendix 4](#) to provide considerations for this process**

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3. Investigations Required

- Histological confirmation of malignancy
- PSA
- Diagnostic/staging imaging to include:
 - Bone Scan (if PSA >20 or T3 disease or CPG 3 or above)
 - Staging pelvic MRI
 - Consider CT chest/abdo/pelvis if PSA > 30
 - Consider choline/PSMA PET if concerns about metastases and other staging equivocal or PSA >50 (as per PEARLS) and other scans negative

Review of clinical history to include:

- Previous radiotherapy*
- History and examination, PS*

Special Circumstances to consider:

- Chronic conditions or disease that affects radiosensitivity*
- Ongoing medication that may affect response to radiotherapy*

4. Information given to patients

- General radiotherapy booklet
- Site specific treatment leaflet including long term side effects

5. Consent

- By IR(ME)R Practitioner at new patient / planning clinic
- By Entitled IR(ME)R Operator under delegated authority at new patient / planning clinic

6. Trials Open

- Consider current trials open in any of the radiotherapy centres in the East Midlands.
[\[EMRTN TRIALS TRACKER LINK\]](#)
- If a patient is being treated in a clinical trial then the Trial Protocol overrides the departmental protocol.

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7. Position and immobilization

All patients will be CT scanned as per local protocol and should consider including the following:

- Patients taking hormones therapy should be scanned accordingly to their ECAD
- Appropriate scan levels
 - Prostate only should include the whole pelvis up to the iliac crests and below the ischium.
 - Pelvic nodes should extend from L2/3 interspace and extend to down to the level of the lesser trochanter
- Suitable pelvic patient immobilisation should consider: Knee rest, foot stocks, head support and vacuum cushions if appropriate.
- Patients should be supine with appropriate bladder and rectum preparation as per local protocol.
- Laxatives and micro enemas to be used as per local protocol
- Use of IV contrast to aid delineation of pelvic vessels
- Following the CT scan, the size of the rectum is reviewed. If it is larger than local protocol requirements and cannot be rectified, the patient should be sent away with advice and return for a rescan
- If the patients bladder is also outside local protocol and unable to be rectified, the patient should be sent away with advice and return for a rescan
- Fiducial markers if available

8. Planning

Radical Treatment

- VMAT is the primary choice of planning technique for radical patients. Conformal Radiotherapy will be considered on a case by case basis.
 - Target coverage and OAR requirements, both objectives and mandatory constraints are documented on OAR Dose constraints table. Standard IMRT practice of editing lower dose levels off higher dose levels following contouring. Constraints applicable for edited volume only.
 - If a patient is being treated in a clinical trial, then the trial protocol overrides the departmental protocol.
 - If the treatment is off protocol, this should be noted and the correct local procedure for recording/authorising off protocol treatments should be followed.
 - There may be situations where individual anatomy and other special conditions require that the coverage of the PTV/CTV may need to be compromised or extended. In these cases the Practitioner is required to exercise his/her clinical judgment and to clearly indicate the clinical priorities to the treatment planning team
-
- **Patients above 75 can be offered 57Gy in 19# (non-inferior in CHHiP)^[12]**
 - **Prostate outlining to be completed accordingly with PACE^[9] / PEARLS^[6]**
 - **Prostate + Nodes outlining to take in to consideration of PACE-NODES^[9]**
 - **Prostate bed outlining to take in to consideration of RADICALSRT^[9]**
 - **CTV-PTV margins should also factor in local imaging capabilities and previous departmental audits.**
 - **Please see appendix 2 for PACE contouring guidelines^[9]**

Dose Prescriptions^[3]

Prostate only	60 Gy in 20# over 4 weeks (Grade A)
	57 Gy in 19# over 4 weeks (Grade A) (Age > 75) (In select cases according to clinician discretion) (Follow local protocol)
Brachytherapy boost	37.5 Gy in 15 fractions (prostate only) over 3 weeks before or after 15 Gy HDR brachytherapy boost (Grade A)
	46 Gy in 23 fractions (prostate and pelvic nodes) over 4.5 weeks followed by 15Gy HDR or 115 Gy LDR brachytherapy boost (Grade A)
Stereotactic radiotherapy (SBRT)	36.25 Gy in 5 fractions (Grade A) *Not routinely commissioned currently* Can only be offered as a part SBRT treatment
Prostate and pelvic lymph nodes	60 Gy in 20 fractions over 4 weeks 74 Gy in 37 Fractions over 7.5 weeks 78 Gy in 39 Fractions over 8 weeks (Follow local protocol)
Post-operative RT	66 Gy in 33 fractions over 6.5 weeks or 52.5 - 55 Gy in 20 fractions over 4 weeks (Grade C)

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- This protocol has referenced PEARLS^[9] for the delineation of Radiotherapy where the prostate is in-situ. Other protocols such as PACE^[9] with clinically acceptable guidance can also be considered.

Local protocols can be adapted to incorporate any of the clinically acceptable guidance protocols as per departmental preference

Target volumes of interest:

<u>CPG</u>		
<u>CPG</u>	<u>CPG 1-3</u>	<u>CPG 4-5</u>
<u>CTVp</u>	Prostate and proximal 1cm seminal vesicles + clinician may adjust for extent of seminal vesicle inclusion	As per CPG 1-3 + Clinician may extend up to include all of the seminal vesicles
<u>CTVpsv</u>	Prostate and proximal 2cm seminal vesicles + clinician may adjust for extent of seminal vesicle inclusion	Clinician discretion Consider: - Low risk of SV involvement: Prostate +2cm - High risk of SV involvement: include all SV within CTVp

<u>Prostate In-situ</u>				
Volume of interest		Prostate Only	Prostate + Pelvic Lymph Nodes	
		60Gy in 20#	60Gy in 20#	74Gy in 37#
CTV	CTVp	Refer to CPG table	Refer to CPG table	Refer to CPG table
	CTVpsv	Refer to CPG table	Refer to CPG table	Refer to CPG table
	CTVn		Prophylactic pelvic lymph nodes	Drawn as per Appendix 3 – Contouring CTVn
	CTVnb		Boost involved pelvic nodes	is any involved lymph node
PTV Planning margins are applied isotropically to the CTV	PTVp	<u>CTV-PTV margins dependent on:</u> - Local department audit - Immobilisation equipment - Imaging capabilities - Recommendation by department physics teams based on local audits		
	PTVpsv			
	PTVn (elective)			
	PTVnb			

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Post Prostatectomy			
Volume of interest		Prostate Bed	Prostate Bed + Nodes
Dose #	PTV (prostate bed)	o 52.5Gy in 20# o 66Gy in 33#	o 52.5-55Gy in 20# o 66Gy in 33#
	PTVn		44Gy- prophylactic pelvic lymph nodes
	PTVnb		51-60Gy- boost involved pelvic nodes
CTV (Whole prostate bed) Recommended contouring guidance notes: ESTRO ACROP guideline on prostate bed delineation ^[4] or RANZR guidelines ^[11] (Appendix 3)	[Prostate bed] Anterior	o Cranially, CTV should cover 1–2 cm of the posterior bladder wall or stop at the posterior margin of bladder wall o Caudally, stop at the posterior margin of the pubic bone up to half to two thirds of the symphysis pubis	
	[Prostate bed] Posterior	o Contour up to the anterior rectal wall o Cranially, up to the mesorectal fascia when visualized o Include the antero-lateral angles of the rectum and existing surgical clips	
	[Prostate bed] Lateral	o Contour up to the internal margins of the internal obturator muscles o CTV should not be extended latero-anteriorly toward the region of the obturator lymph o More caudally, the lateral borders are the internal margins of the internal obturator muscles or internal borders of the levator ani muscles	
	[Prostate bed] Superior	o Include region of both seminal vesicles with 3–5 mm “bridge” o If no seminal vesicles invasion, include the base (lower third) of the seminal vesicles bed (i.e., level of cut end of vas deferens) o If seminal vesicles invasion, include the entire seminal vesicle bed o Attempt to include existing surgical clips superiorly	
	[Prostate bed] Inferior	o 8–12 mm below the VUA o The VUA is defined as the slice below the last slice where fluid (urine) is seen o If VUA is not visible, use penile bulb as an anatomic landmark and contour to the slice right above the penile bulb	
	PTV Planning margins are applied isotropically to the CTV	CTV-PTV margins dependent on: - Local department audit - Immobilisation equipment - Imaging capabilities - Recommendation by department physics teams based on local audits	

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9. Organs at risk

Organ dose constraints should be guided by national and international guidelines *SBRT –Not routinely commissioned. Please reference PACE^[9] protocol for dose volume constraints *
The following organs at risk (OAR) must be delineated by the radiographer /dosimetrist /physicist /consultant: Rectum – outline as a whole organ from recto-sigmoid to ano-rectal junction Bladder – outline as the whole organ Femoral Heads (excluding neck of femur) (Small) Bowel: mandatory for IMRT treatments which include pelvic nodes - Outlined as small bowel and large bowel down to the rectum - Consider outlining only up to 2cm above the superior extent of edge of PTV (as per PACE-NODES^[16]) Penile Bulb (optional)

Additional OAR (As required for designated treatment)			
OAR	Dose constraints (Gy)	Optimal	Mandatory
Bowel ^[9]	40	17cc	70cc
	48	0.5cc	6cc
	52	0cc	0cc
Penile Bulb ^[9]	22	<50%	-
	48	10%	-
Femoral Heads ^[9]	40	-	50%
Duodenum ^[6]	46	-	4cm ³
	51	-	0.5cm ³
Left Kidney ^[6]	18Gy	-	25%
Right Kidney ^[6]	18Gy	-	25%
Spinal Cord ^[6]	-	-	Dmax <36Gy

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- ❖ This protocol has referenced PACE^[9], Radicals-RT^[15], CHHiP^[12], PIVOTAL^[13] and PIVOTALBOOST^[10] for the dose volume constraints of OAR. There are several other protocols (e.g. PEARLS) with clinically acceptable dose volume constraint guidance.

Local protocols can be adapted to incorporate any of the clinically acceptable guidance protocols as per departmental preference

Prostate and Sv's

60Gy /20#	Based on: PACE ^[9]		
Dose-volume constraints			
OAR	Dose constraints (Gy)	Optimal	Mandatory
Rectum	24	70%	80%
	32	51%	65%
	40	38%	50%
	48	27%	35%
	52	-	30%
	56	-	15%
	60	1%	3%
Bladder	40	-	50 %
	48	-	25%
	60	15%	5%
Bowel	40	17cc	70cc
	48	0.5cc	6cc
	52	0cc	0cc
Penile Bulb	22	<50%	-
	48	10%	-

74Gy /37#	Based on: CHHiP ^[12]		
Dose-volume constraints			
OAR	Dose constraints (Gy)	Optimal	Mandatory
Rectum	30	41%	80%
	40	54%	65%
	50	68%	50%
	60	81%	35%
	65	88%	30%
	70	95%	15%
	74	100%	3%
Bladder	50	68	50 %
	60	81	25%
	74	100	5%
Bowel	50	68	17cc
Urethral Bulb	50	68	50%
	60	81	10%

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Prostate Bed

<u>52.5Gy /20#</u>	Based on: RADICALS-RT ^[15]		
Dose-volume constraints			
OAR	Dose constraints (Gy)	Optimal	Mandatory
Rectum	24	-	<80%
	32	-	<70%
	40	-	<60%
	48	-	<50%
	52.5	-	<30%
Bladder	40	-	<80%
	48	-	<50%

<u>66Gy /33#</u>	Based on: RADICALS-RT ^[15]		
Dose-volume constraints			
OAR	Dose constraints (Gy)	Optimal	Mandatory
Rectum	30	-	<80%
	40	-	<70%
	50	-	<60%
	50	-	<50%
	66	-	<30%
Bladder	50	-	<80%
	60	-	<50%

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Prostate and Pelvic Lymph Nodes

60Gy /20#	Based on: PIVOTALBOOST ^[10]		
Dose-volume constraints			
OAR	Dose constraints (Gy)	Optimal	Mandatory
Rectum	24	80%	80%
	32	65%	65%
	40	50%	60%
	48	35%	50%
	52	-	30%
	56	-	15%
	60	3%	5%
Bladder	40	50%	-
	48	25%	50%
	60	5%	35%
Bowel	36	78cc	158cc
	40	17cc	70cc
	44	14cc	28cc
	48	0.5cc	6cc
	52	0cc	0cc
Penile Bulb	40	<50%	-
	48	10%	-

<u>74Gy /37#</u>	Based on: PIVOTAL ^[13]		
Dose-volume constraints			
OAR	Dose constraints (Gy)	Optimal	Mandatory
Rectum	30	80%	-
	40	65%	-
	50	50%	60%
	60	35%	50%
	65	30%	30%
	70	15%	15%
	75	3%	5%
Bladder	50	50%	-
	60	25%	-
	65	-	50 %
	70	5%	35%
Bowel	45	78cc	158cc
	50	17cc	110cc
	55	14cc	28cc
	60	0.5cc	6cc
	65	0cc	0cc

10. Palliative Intent

- There may be options to treat extra-pelvic disease e.g. resection of liver or lung metastases, SABR. Patients with locally advanced disease, but are unfit for Chemo-Radiotherapy, or have metastatic disease, may be considered for palliative radiotherapy.

- **High-risk localised disease, unsuitable for longer-course fractionation and hormone sensitive disease with low metastatic burden^[2] :**

Dose Fractionations

- 55–60Gy in 20# over 4 weeks (Grade A)
- 30–36Gy in 6# over 6 weeks (Grade A)

Definition of low metastatic burden^[1]

- No visceral metastases
- 3 or fewer bony metastases confined to pelvis and spine

Where chemotherapy is given

- Treatment should ideally start 6 weeks after
- Within the first year on hormones.
- Consider lifelong hormones

Planning considerations

- Posterior margin may be reduced for rectal sparing
- Consider planning constraints and treatment imaging as for per radical regime and the below table:

	36Gy in 6#	55Gy in 20#	Max Volume
Rectal Dose Volume Constraints	33.3Gy	52.5Gy	50%
	27.8Gy	43.5Gy	60%
	16.7Gy	26.1Gy	80%
Bladder Dose Volume Constraints	33.3Gy	52.5Gy	25%
	27.8Gy	43.5Gy	50%

- **Castration-resistant disease with local progression and/or symptoms^[2]:**

Dose Fractionations

- 30-36Gy in 5-6# once weekly
- 30Gy in 10# over 2 weeks
- 20Gy in 5# over 1 week
- 21Gy in 3# over 1 week (alternate days)
- 8-10Gy in 1#
- Conformal Radiotherapy is common for the planning technique of palliative patients with symptomatic and/or locally progressed, castration-resistant disease. However IMRT/VMAT Radiotherapy can be considered where it is justifiably, patient appropriate and also in circumstances where constraints/targets cannot be achieved through conformal Radiotherapy.

11. Treatment

- Final pre-treatment, Physics and 1st day checks should be carried out as per local protocol.
- These should ideally cover or take into account the following:
 - Monitoring and managing Radiotherapy delays to ensure patients start treatment according to national guidelines
 - Checking plan approval status and parameters as per local protocol
 - All prior preparatory and required patient information is available
 - Imaging requirements for the planned treatment are adequate according to patient plan and local protocol
 - Any prior In vivo dosimetry has been performed as per local protocol.
- During treatment:
 - Any other monitoring as specified in the local protocol should be performed e.g. dietician review, weight checks, weekly blood counts.
 - On treatment imaging as per local protocols; **For all radical urology patients it is recommended to use IGRT utilising online CBCT, unless otherwise contraindicated.**
- For gaps in treatment follow local policy
- On treatment and follow up reviews as per local protocols.

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12. Late effects

Late effects will have been discussed as part of the initial discussions and counselling by the treating clinician and is dependent on the radiotherapy target volumes.

- Erectile dysfunction-can be supported by referral to Erectile Dysfunction Clinic
- Infertility
- Leg or groin lymphedema -depending on whether pelvic nodes are covered and if a pelvic nodal dissection has been completed
- Change in bladder or bowel habit/capacity
- Rectal bleeding requiring surgical investigation/intervention(in region of <5%)
- Pelvic bone thinning, insufficiency fractures or avascular necrosis is rare
- Bladder or bowel incontinence is rare
- Possible small, long-term increase in risk of rectal cancer is rare(<1%)

13. Peer Review

- Peer Review will enable clinicians to provide high quality treatments despite potentially limited referrals. Documenting peer review is essential as per RCR peer review 2nd Edition^[7]
- In order to meet the RCR standards the review will cover patient selection, prescription and target / OAR delineation. For some cases it may be necessary to review the final treatment plan also.
- The reviewee must provide the reviewer with all relevant clinical information to peer review, which may include demographics, diagnosis and details of proposed treatment. Any relevant clinical tests or images must also be provided (see Table 1 above).
- Responsibility for the patient will remain with the clinician under whom the patient receives their care. If a peer review does not occur, whatever the reason may be, it is that clinician's responsibility to address this.

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14. [Glossary](#)

<u>Abbreviation</u>	<u>Definition</u>
#	Fraction (i.e. Fractions of treatment)
3DCT	Three dimensional computed tomography (standard CT scan)
CBCT	Cone Beam computed tomography
CPG	Cambridge Prognostic Group
ChemoRT	Chemotherapy with Radiotherapy
CT	Computed tomography
CTV	Clinical target volume
EMRTN	East Midlands Radiotherapy Network
GTV	Gross tumour volume
Gy	Gray (unit of measure for radiation dose)
ICRU	International commission on radiation units and measurements
IMRT	Intensity modulated radiotherapy
ITV	Internal target volume
IR(ME)R	Ionising Radiation (Medical Exposure) Regulations
ADT	Androgen deprivation therapy
MDT	Multi-disciplinary team
MRI	Magnetic resonance imaging
LHRH	Luteinising Hormone Releasing Hormone
NOG	Network oversight group
LDR	Low dose rate - (Brachytherapy)
HDR	High dose rate - (Brachytherapy)
OAR	Organs at risk
PSA	Prostate specific antigen
PET (PET-CT)	Positron emission tomography (Positron emission tomography – computed tomography)
PSMA PET	Prostate specific membrane antigen, positron emission tomography
PNRT	Prostate nodal Radiotherapy
PRV	Planning organ at risk volume
PS	Performance status
PTV	Planning target volume
RCR	Royal college of radiologists
RT	Radiotherapy
SABR	Stereotactic ablative Radiotherapy
SBRT	Stereotactic Body Radiotherapy
SV	Seminal Vesicles
U+E	Urea and electrolytes
VMAT	Volumetric modulated arc therapy
PACE	International randomised study of prostatectomy vs stereotactic body radiotherapy (SBRT) and conventional radiotherapy vs SBRT for organ-confined prostate cancer
PEARLS	Trial of Primary radiotherapy for Androgen sensitive prostate cancer patients with Lymph nodeS
PIVOTAL	Trial of Prostate and pelvic versus prostate Alone radiotherapy treatment volumes using high dose IMRT for locally advanced prostate cancer
PIVOTALBOOST	Trial of prostate and pelvis versus prostate alone radiotherapy with or without prostate boost
CHHiP	Conventional or hypofractionated high dose intensity modulated radiotherapy for prostate cancer

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Appendix 1^[8]Cambridge prognostic group scoringCPG Calculator- <https://cambridgeprognosticgroup.com/index.php>

Cambridge Prognostic Group (CPG)	Criteria
1	Gleason score 6 (Grade Group 1) AND PSA < 10 ng/ml AND Stage T1–T2
2	Gleason score 3 + 4 = 7 (Grade Group 2) OR PSA 10–20 ng/ml AND Stage T1–T2
3	Gleason score 3 + 4 = 7 (Grade Group 2) AND PSA 10–20 ng/ml AND Stage T1–T2 OR Gleason 4 + 3 = 7 (Grade Group 3) AND Stage T1–T2
4	Any one of Gleason score 8 (Grade Group 4) OR PSA > 20 ng/ml OR Stage T3
5	Any combination of Gleason score 8 (Grade Group 4), PSA > 20 ng/ml or Stage T3 OR Any Gleason score 9–10 (Grade Group 5) OR Any Stage T4

Criteria of the new Cambridge Prognostic Groups for non-metastatic prostate cancer.

[Appendix 2](#) ^[9]

[FIG 1](#) ^[9]

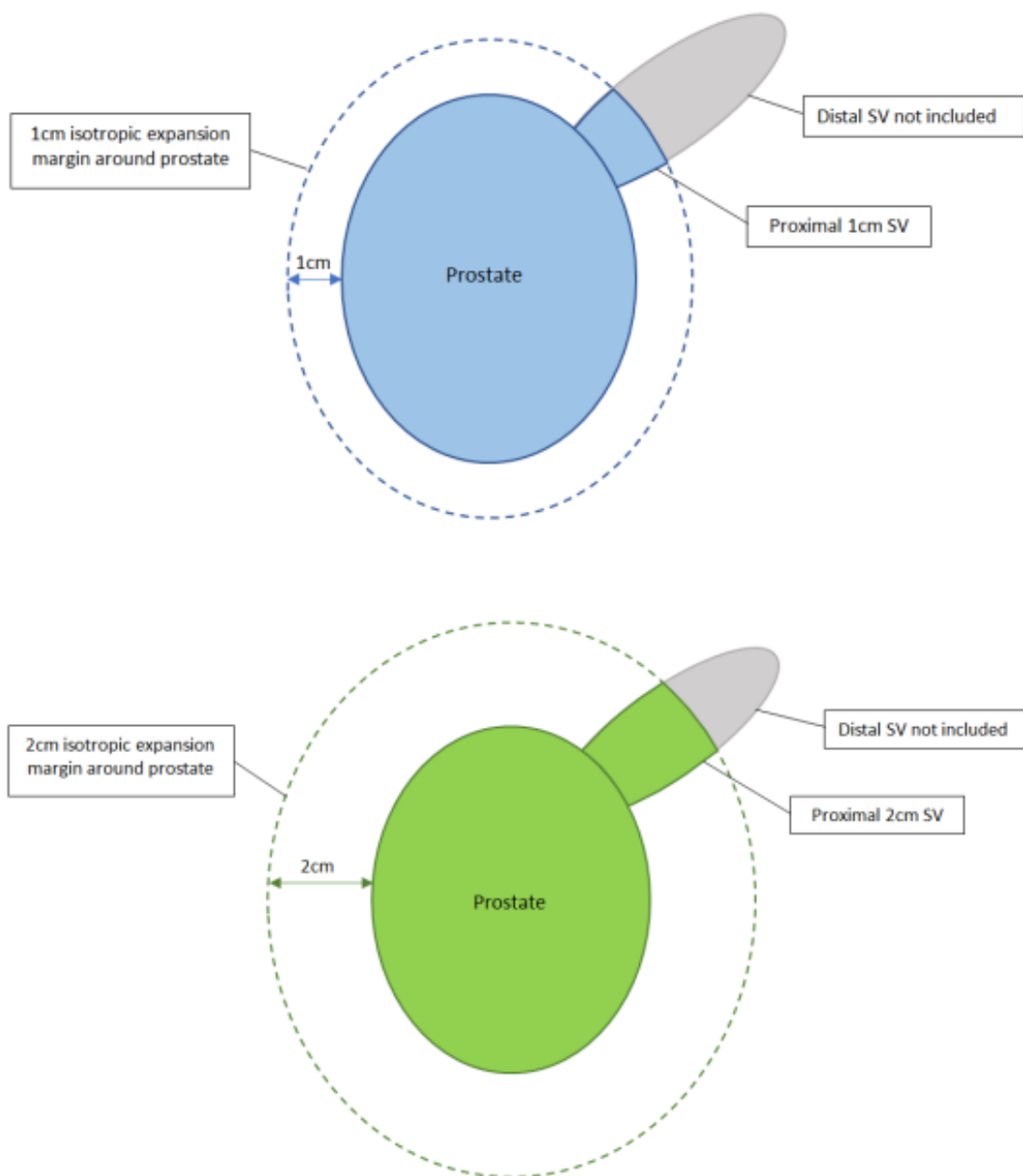


Figure 1. (a) Proximal 1 cm (for CTVpsv) and (b) Proximal 2 cm (for CTVsv) of Seminal Vesicles

First contour prostate and create 1 cm and 2 cm rings by isotropic expansion of the prostate (Figure 2).

Fig 2 ^[9]

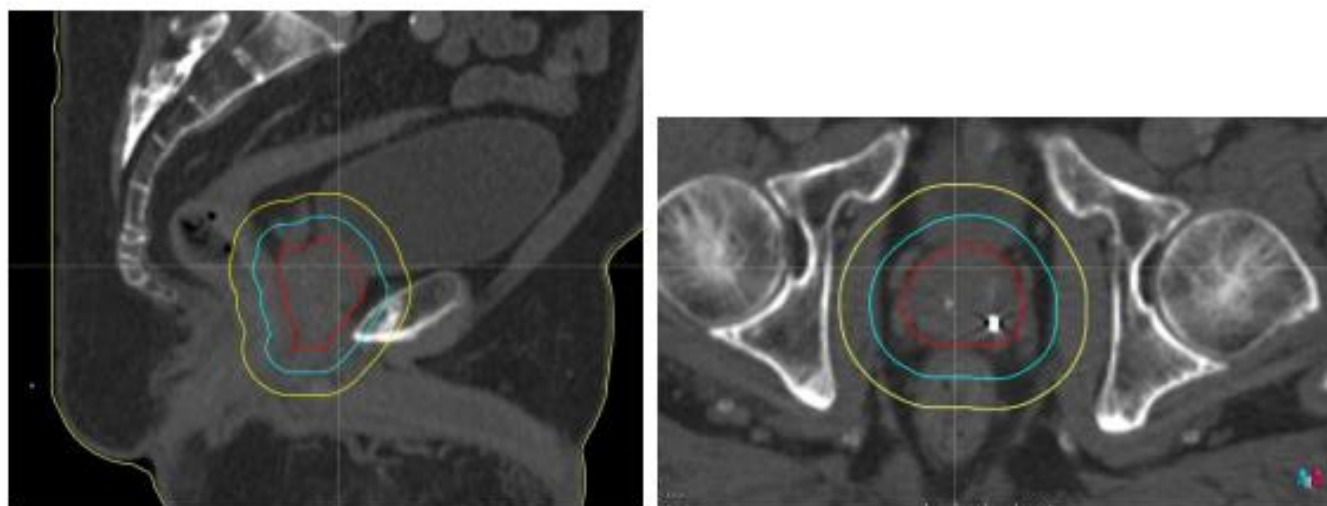


Figure 2. Sagittal (left) and axial (right) images of prostate (red) expanded by 1 cm (cyan) and 2 cm (yellow) to create isotropic rings.

After contouring the whole SV, the proximal 1 cm of SV is added to the prostate volume to form CTVpsv. The SV at 1-2 cm is coloured green, and the entire proximal 2 cm of SV will be added to the prostate volume to form CTVsv. See Figure 3.

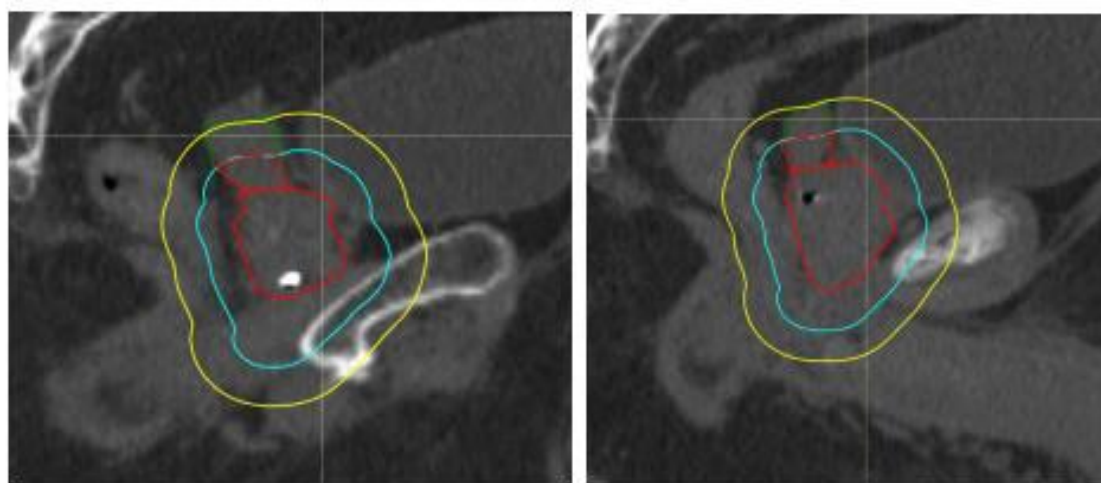


Figure 3. Sagittal images showing proximal 1 cm of SV (red) and the SV at 1-2 cm (green).

Appendix 3- Contouring CTVn ^[13]

1. After outlining the OARs, the pelvic blood vessels should be outlined beginning at the junction of L5 and S1 as illustrated on the sagittal view below:



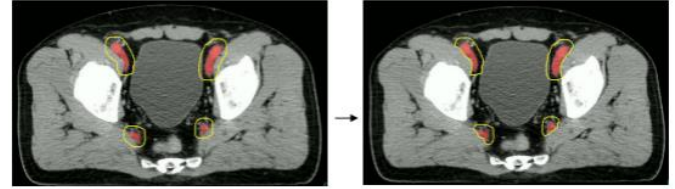
2. Axial views:



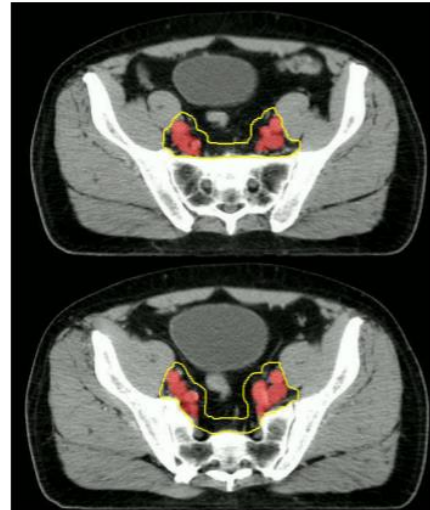
3. Add a 7mm margin radially (excluding the bowel OAR):



4. Manually edit to exclude muscle and bone:



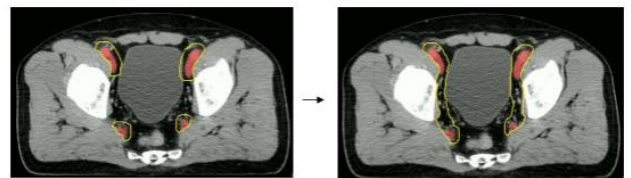
5. Using 12mm 'rollerball' draw along the anterior surface of the bony sacrum to draw presacral nodal region between L5/S1 interspace (superiorly) and bottom of S3 segment (inferiorly).



Edit to ensure entire width of sacrum included



6. Connect internal to external nodal volumes using 18 mm channel:



7. From the level of the top of the heads of the femur the blood vessels leave the pelvis and the CTV LN should be continued by outlining the obturator region, extending inferiorly to 1cm above the pubic symphysis:



Appendix 4- (Optional) Regional cross site brachytherapy referral process

