

Using ProKnow to set up an inter Trust database of post implant dosimetry (PID) for I-125 implants

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What is ProKnow?

- ProKnow is **cloud-based** software that can be used to **audit the quality of radiotherapy plans** across multiple departments.
- ProKnow is available to all NHS England Trusts as part of a three year evaluation program by NHS England.
- Patient data in ProKnow is **effectively anonymised** (DICOM data is visible to everyone but only employees of the patient's Trust can see the patient name and ID)



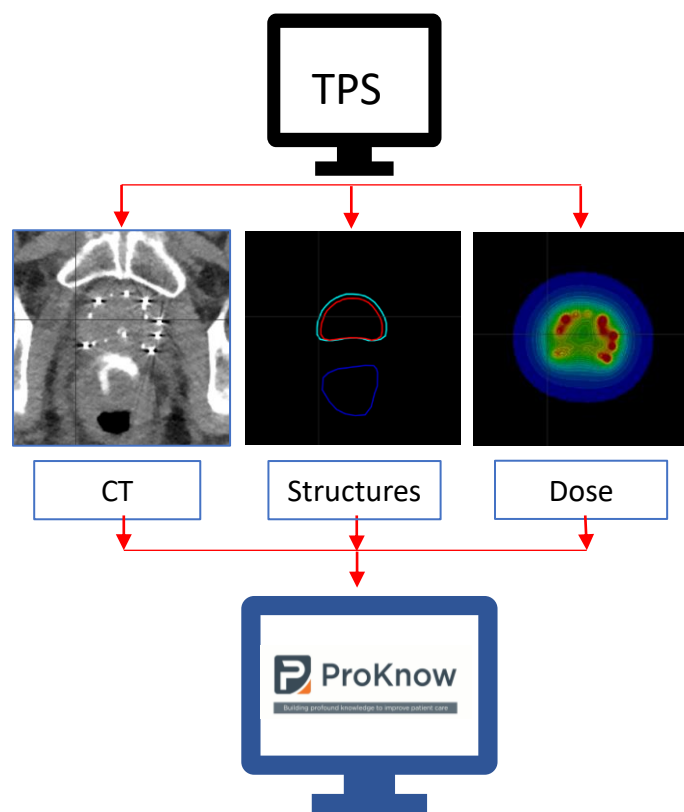
PID ProKnow Database - Aims

- **An inter-Trust collection of post implant LDR brachytherapy prostate patients has been set up in ProKnow to:**
 - Assess how dosimetry across multiple centres compares against 2012 RCR minimum guidelines.
 - Acquire insights into how different techniques could affect dosimetry.
 - Evaluate ProKnow for reporting post implant dosimetry.
- **Seven Trusts actively involved following interest at 2022 meeting and a flyer on the MedPhys mailbase.**
- **Additional Trusts within NHS England can join at any time!**

Quality assurance practice
guidelines for transperineal LDR
permanent seed brachytherapy
of prostate cancer

Method

- Exported DICOM data for **all monotherapy (145Gy) patients implanted in 2023.**



- Patients are added to an Organisation collection.

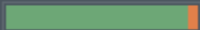
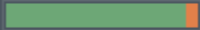
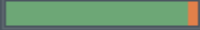





The screenshot shows a software interface for patient management. At the top, there is a dropdown menu for 'Organization' set to 'PROSTATE_LDR_POST_IM...'. Below this is a table with a 'Workspaces' section on the left and a 'Filter Patients' section on the right. The 'Workspaces' section lists various hospitals and their patient counts. The 'Filter Patients' section shows a search bar and the text 'Showing 34 patients'. The main table displays a list of patient records with columns for 'ID' and 'Name'.

Workspaces	Count	ID	Name
RGT - Cambridge University Hospitals	73		
RJ1 - Guy's And St Thomas	0		
RPY - Royal Marsden	34	<input type="checkbox"/>	649aea85f64010376daaf5f17abbf764 ANON-20VP-VAQN
RWH - East And North Hertfordshire	50	<input type="checkbox"/>	64c3b79766401a29b9bd014a6294e571 ANON-38MV-KF81
RWD - United Lincolnshire Hospitals	20	<input type="checkbox"/>	64bfe380d8401ad12f582e64615e0773 ANON-3B8J-YP1E
RR8 - Leeds Teaching Hospitals	0	<input type="checkbox"/>	6499a3a8d8801dec4f5b71ae4ac4c375 ANON-3QP4-YPVH
RBV - Christie	59	<input type="checkbox"/>	6499a2f04a00277457216b9796a5de70 ANON-4XT5-E8BB
RWF - Maidstone And Tunbridge Wells	114	<input type="checkbox"/>	6567554b9ec0285fec545db2cb09eaca ANON-51FY-RN2X
RHU - Portsmouth Hospitals	23	<input type="checkbox"/>	6569eaacbd402dbcd6dd161fb56a0499 ANON-5PYD-DQ8P
		<input type="checkbox"/>	649ae9c54600349c417ce75f2ea7e446 ANON-6JE4-2Z77
		<input type="checkbox"/>	64bfe3048b403a24ba5f58fe282b491c ANON-78JB-MQTR
		<input type="checkbox"/>	65ba52d65d80481f41355767381f4d72 ANON-90FM-2DAQ
		<input type="checkbox"/>	6499a3e7010050c1b5640340c4e858a3 ANON-A30V-AS03
		<input type="checkbox"/>	649ab3a169c0574c55181d134f9a753c ANON-AX65-A60X
		<input type="checkbox"/>	656755-117106776096-17-f-4698-1 ANON-6W6-CV74

ProKnow Scorecard – computed metrics



ProKnow Scorecard – custom metrics

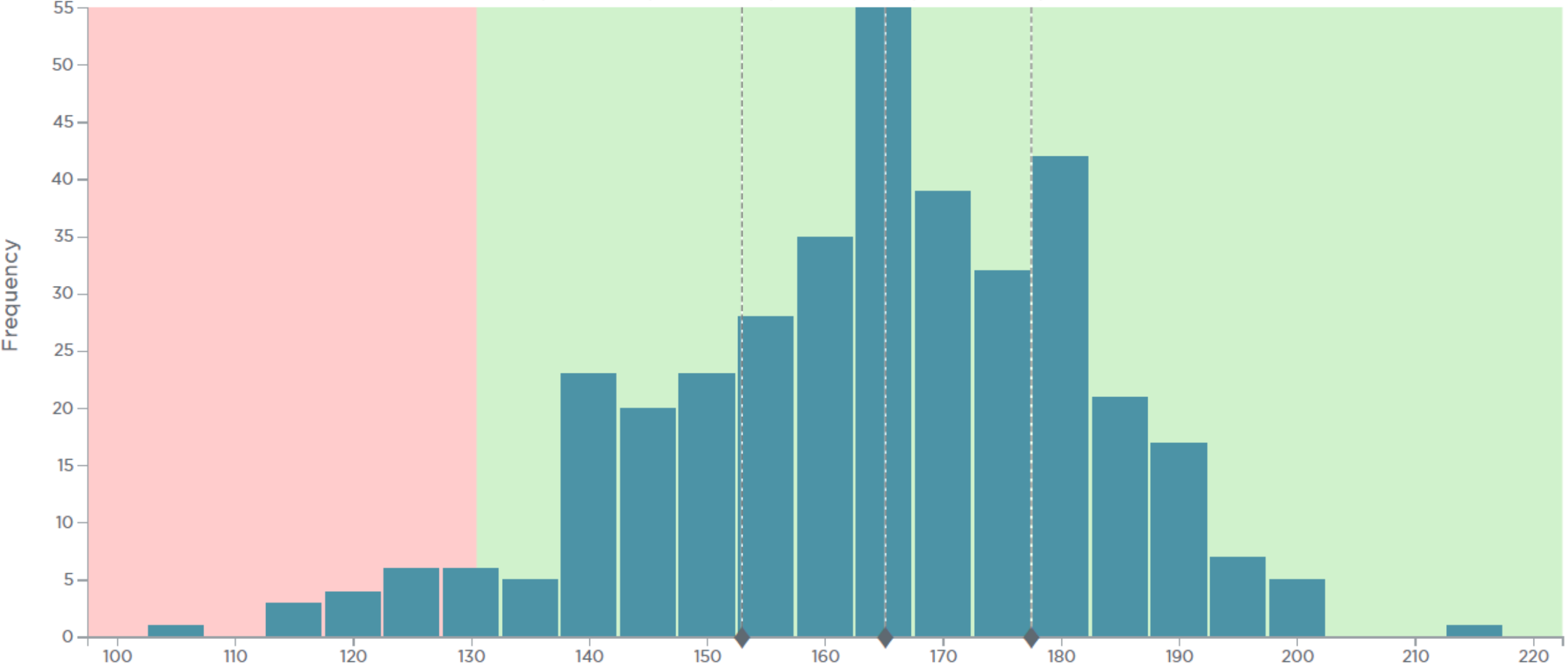
Custom Metrics			
	Metric	Status	Objectives
1	PID_Rectal_Spacer (Yes/No)		
2	PID_Imaging_Modality (CT/MRI/CT MRI Fused)		
3	PID_Technique (Fully Preplanned/Fully Intraoperative/Mixed)		
4	PID_Seed_Stranding (Fully Stranded/Fully Loose/Mixed)		
5	PID_TPS (Variseed/Oncentra Prostate)		
6	PID_Comment		
7	PID_ActivityPerUnitVolume_U/cc		0  3

Centre Summary

Centre	Planning System	Planning Technique	Stranding	Number of 2023 patients
Cambridge	Oncentra Prostate 4.2.3	Fully intraoperative	Fully Loose	73
Christie	Variseed 9.0	Fully pre planned	Fully stranded	59
Lincoln	Variseed 9.0	Intraoperative (pre-ordered peripherals)	Fully stranded	20
Maidstone	Variseed 9.0	Intraoperative (pre-ordered peripherals)	Fully stranded	114
Mount Vernon (E & N Herts)	Variseed 9.0	Intraoperative (pre-ordered peripherals)	Fully stranded	50
Portsmouth	Variseed 9.0	Intraoperative (pre-ordered peripherals)	Mixed	23
Royal Marsden	Oncentra Prostate 4.2.3	Intraoperative (pre-ordered peripherals)	Fully stranded	34
			TOTAL	373

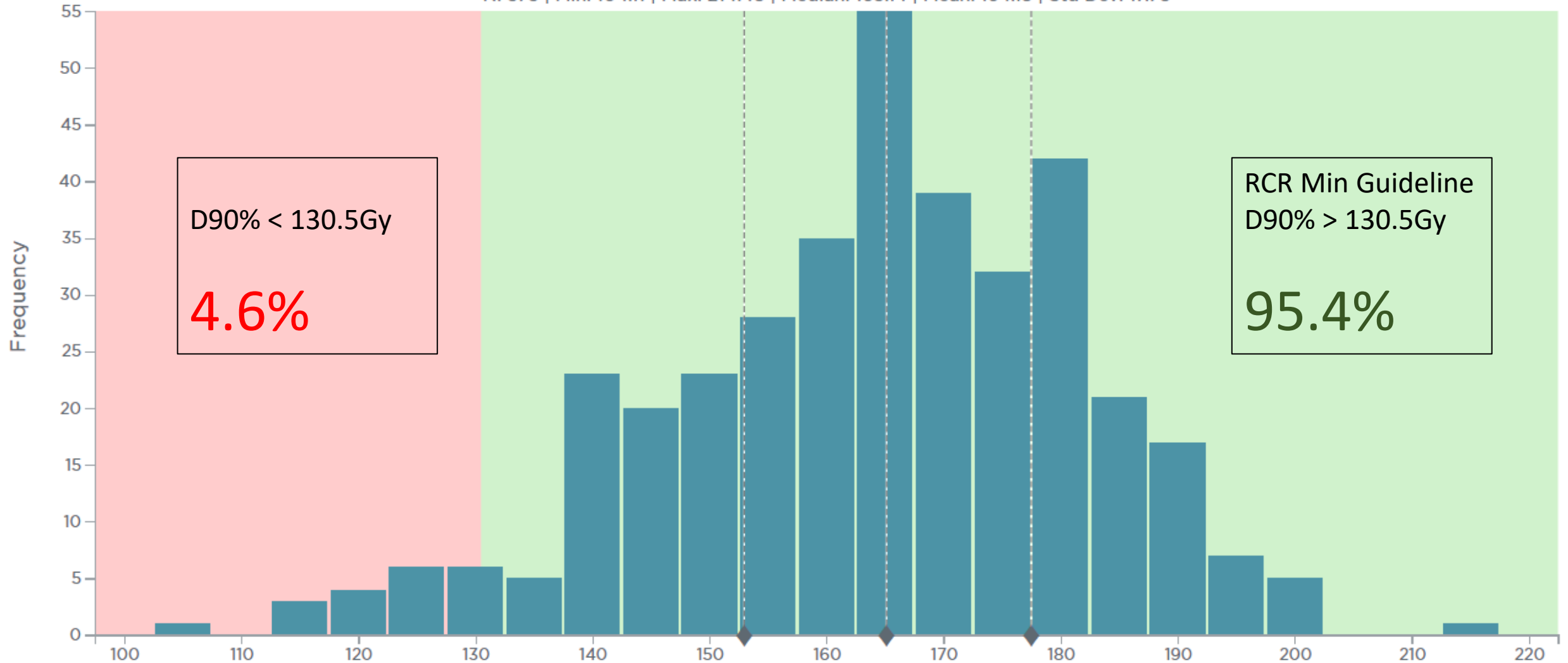
ProKnow: Prostate D90% results

Histogram of Dose (Gy) covering 90.00% of the Prostate
N: 373 | Min: 104.11 | Max: 214.48 | Median: 165.14 | Mean: 164.18 | Std Dev: 17.78



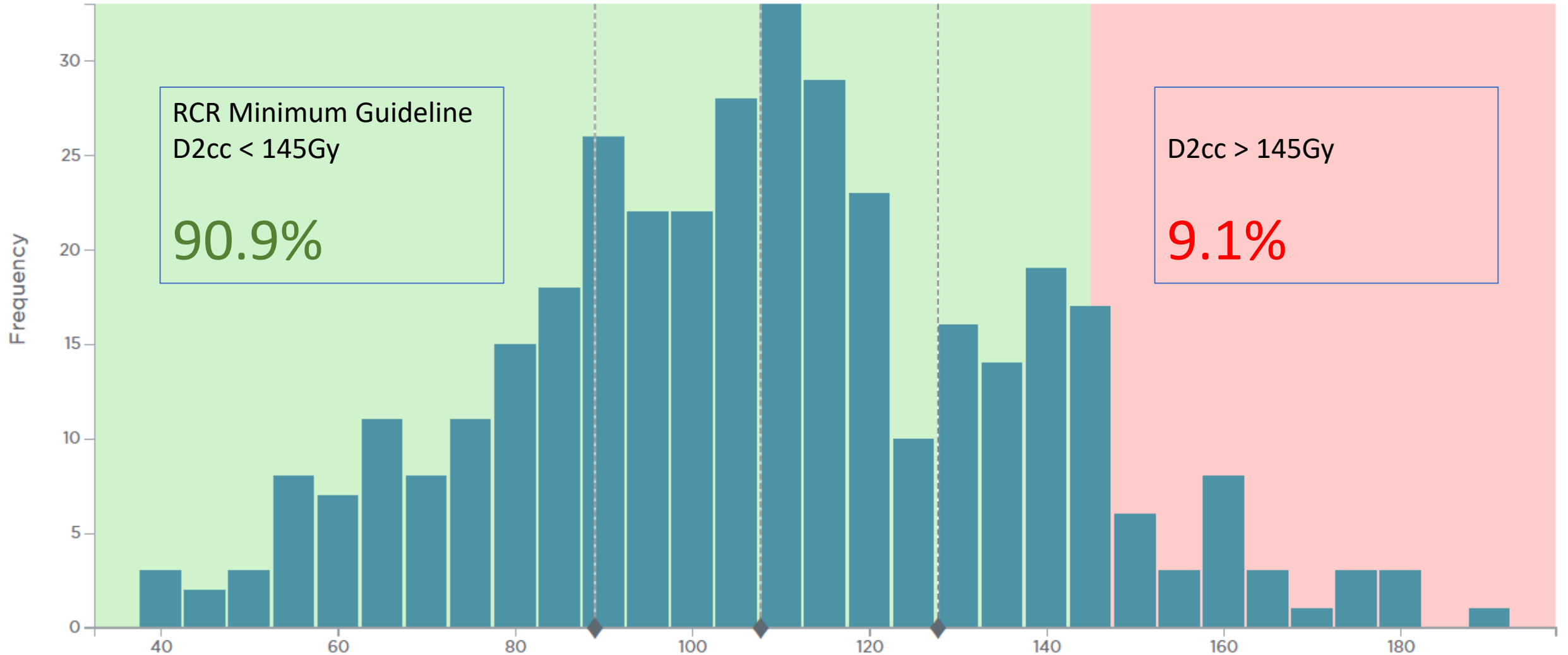
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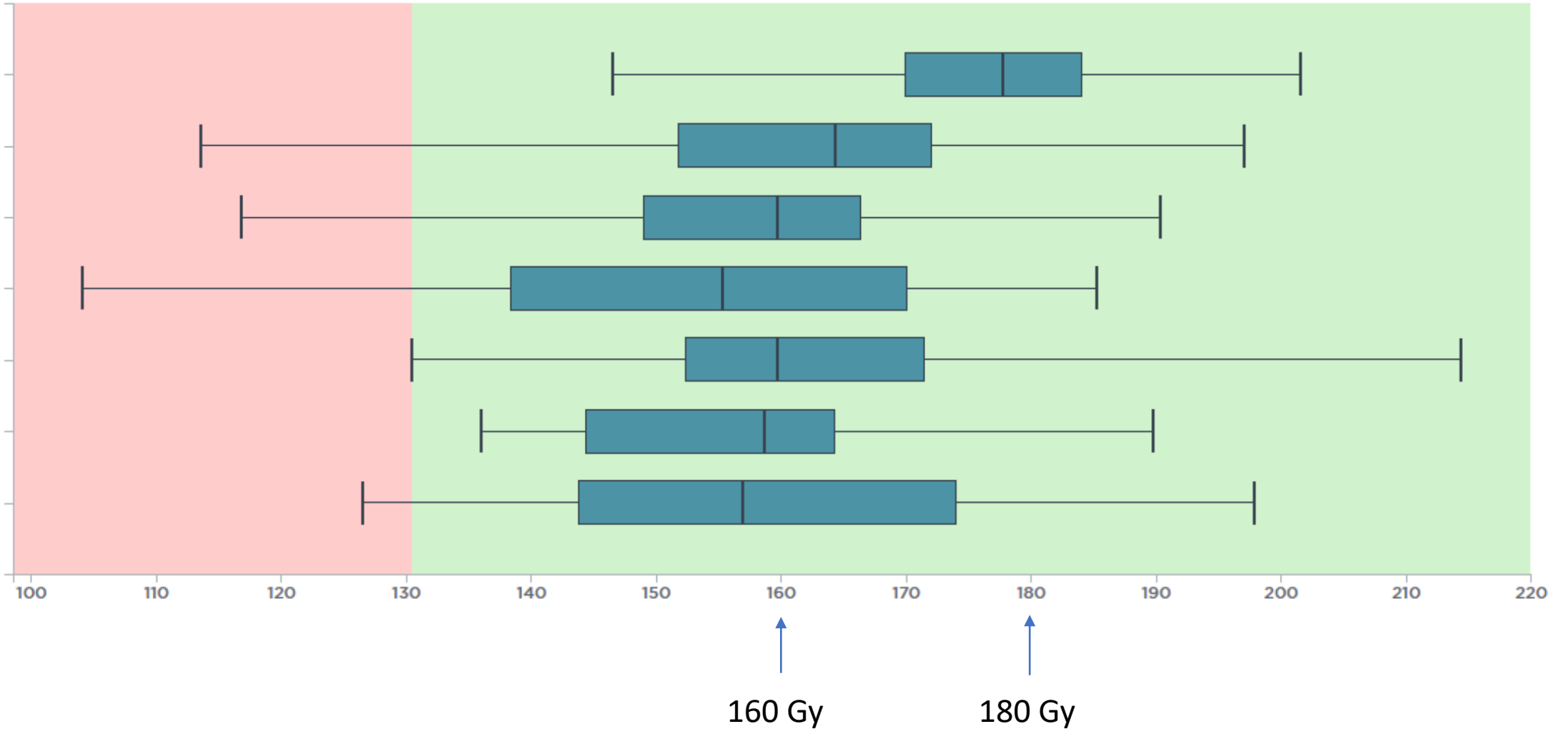
ProKnow: Rectum D2cc results

Histogram of Dose (Gy) covering 2.00cc of the Rectum
N: 373 | Min: 39.85 | Max: 187.54 | Median: 107.75 | Mean: 107.86 | Std Dev: 28.55



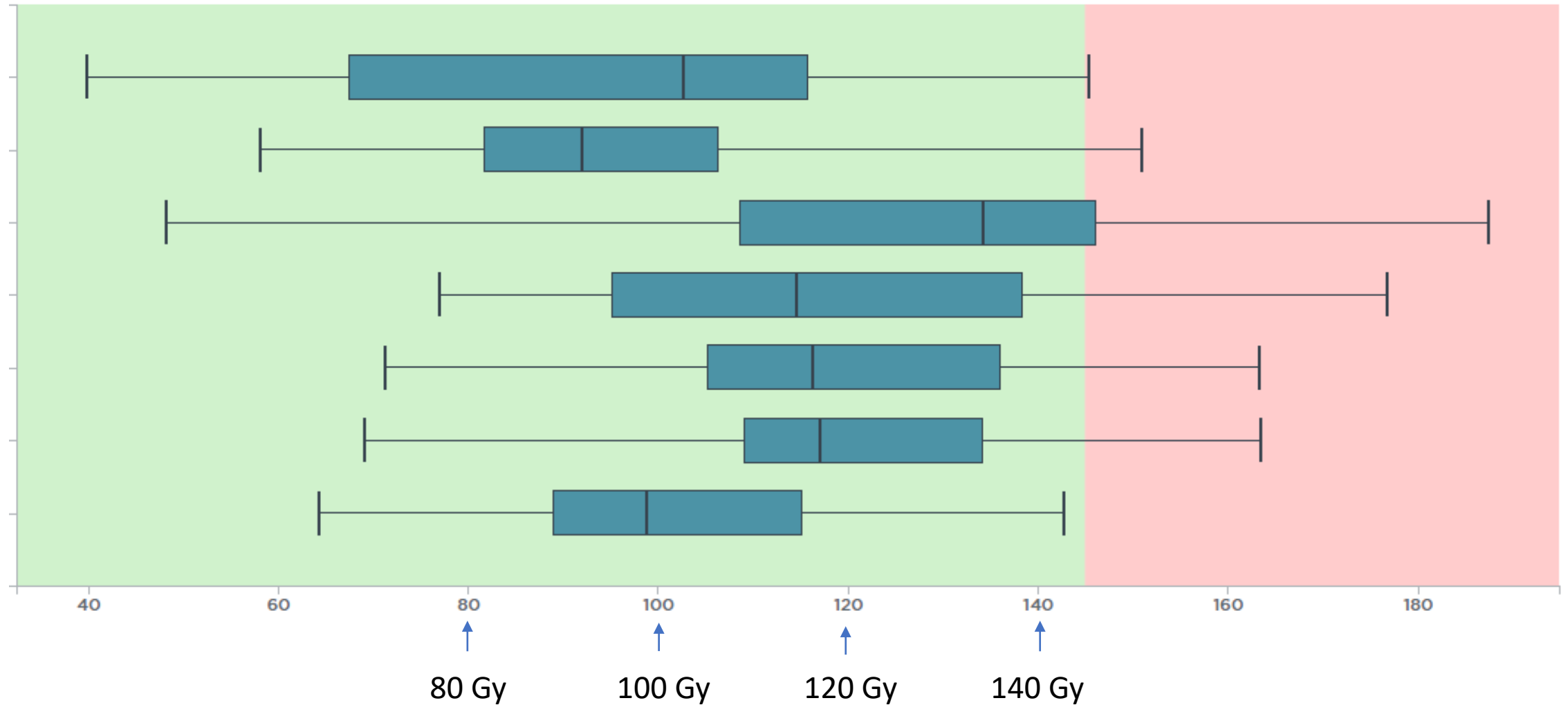
Analysis by Centres - D90% Prostate

Boxplot of Dose (Gy) covering 90.00% of the Prostate for Workspace



Analysis by Centres - D2cc Rectum

Boxplot of Dose (Gy) covering 2.00cc of the Rectum for Workspace



Data Summary of Results

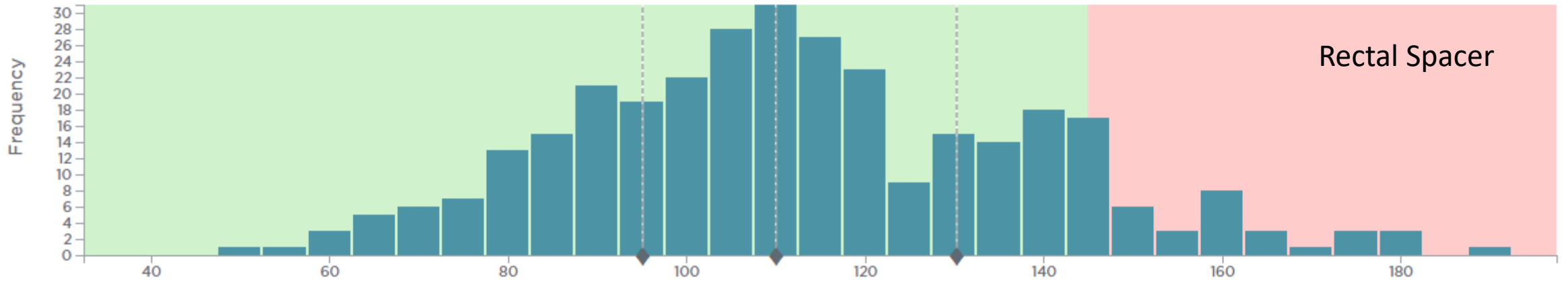
	Compliance with RCR Min guideline	Median (all centres)	Range of Median between centres
D90% prostate	95.4%	165 Gy	155 – 178 Gy
V100% prostate	98.9%	95.8%	93 – 99 %
V150% prostate	-	59.2%	57 - 64 %
D2cc Rectum	90.9%	108Gy	92 - 134 Gy

Why is this useful?

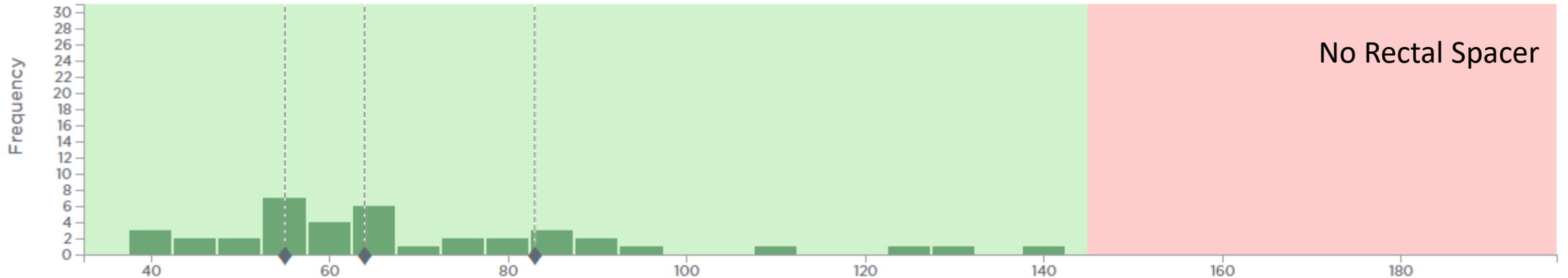
- Outliers in the data provide a catalyst for discussing techniques between groups and foster collaboration.
- Group will meet regularly to discuss implementation and results.
- Centres that treat small number of patients per year find it helpful to compare their results with larger patient cohorts.
- Potential to look for correlations between treatment technique and dosimetry

Treatment technique - D2cc and Rectal spacer

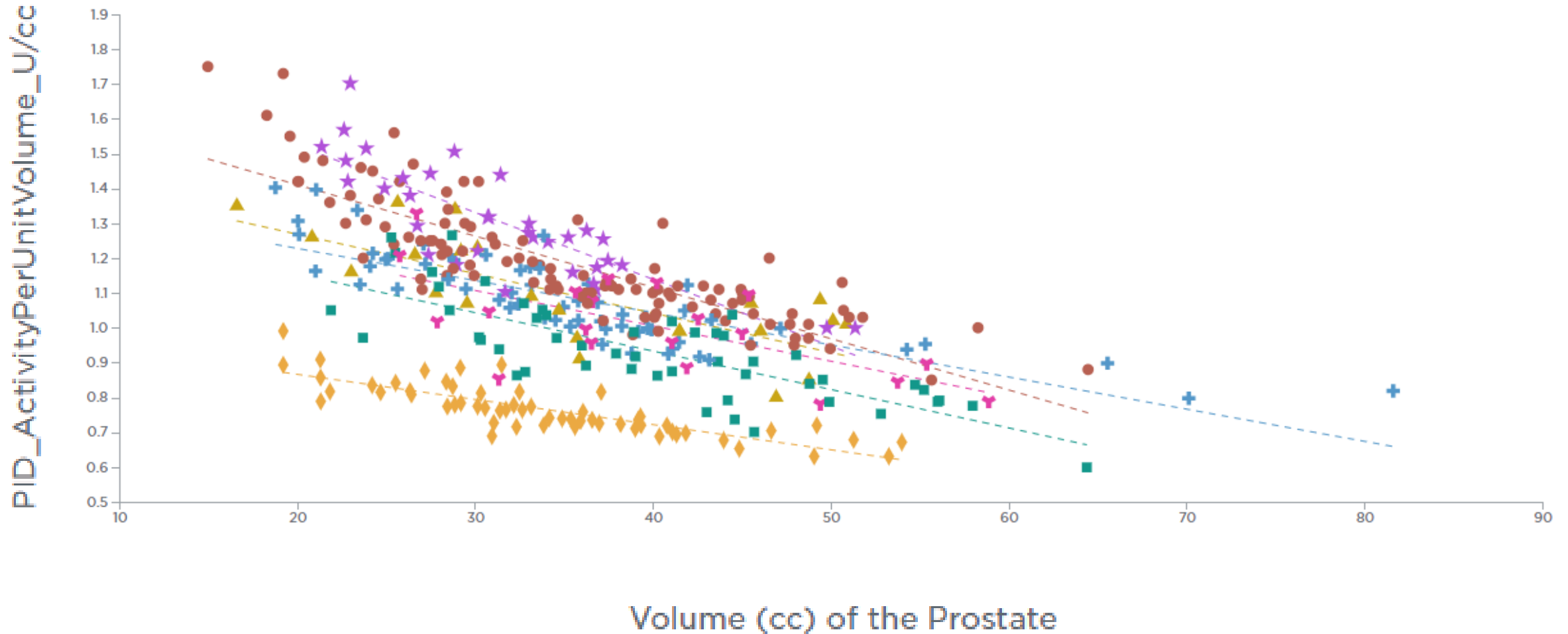
Histogram of Dose (Gy) covering 2.00cc of the Rectum for PID_Rectal_Spacer (Yes/No) = No
N: 323 | Min: 48.22 | Max: 187.54 | Median: 110.06 | Mean: 112.90 | Std Dev: 25.77



Histogram of Dose (Gy) covering 2.00cc of the Rectum for PID_Rectal_Spacer (Yes/No) = Yes
N: 39 | Min: 39.85 | Max: 137.84 | Median: 63.99 | Mean: 70.29 | Std Dev: 23.52



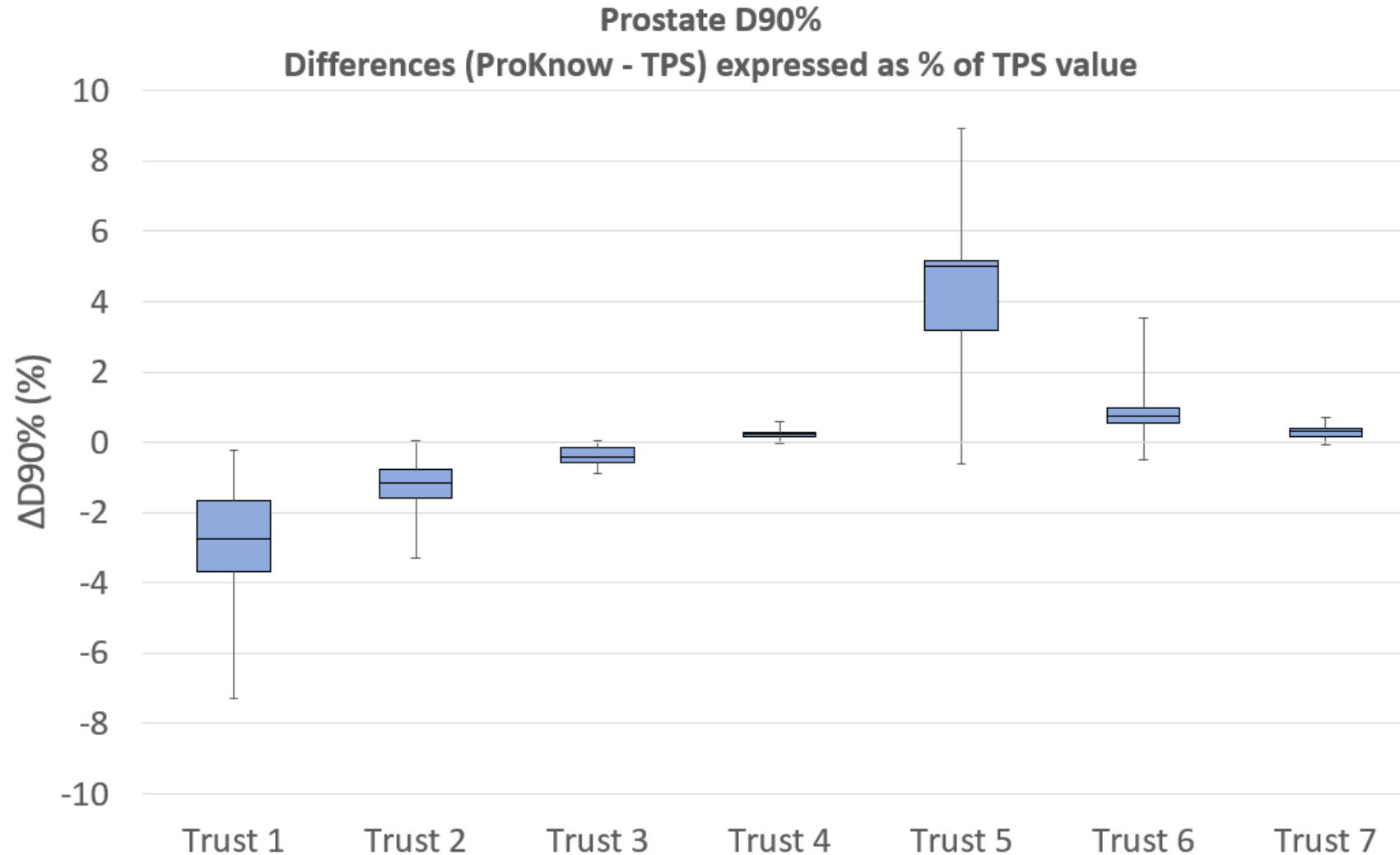
Volume of prostate and total activity per unit volume – analysis by centres



What are the caveats?

- Comparisons between centres with ProKnow are complicated by:
 - (i) variation in contouring between clinicians.
 - (ii) difference in TPS systems used to calculate the dose cube.
- ProKnow has its own DVH calculation algorithm and recalculates the dose-volume parameters based on the imported dose cube and structures.

ProKnow vs TPS dose-volume calculations



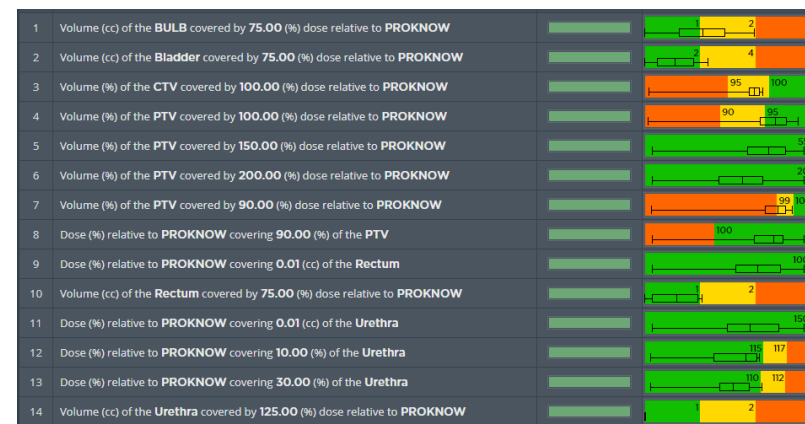
What are the caveats – Further Work

- We can use ProKnow to share anonymised datasets from different Trusts.
- This will allow us to compare TPS calculations for the same data set.
- It will also allow different clinicians to contour the same dataset.

Coming soon!

Is anyone interested in setting up a similar group for HDR Prostate?

Aim to include monotherapy and boost (combined with EBRT). Can accommodate various dose/fractionations.



Initially we would aim to meet more frequently to set up, then once running could move to 6 monthly review meetings to compare and discuss data (potentially merge with the LDR group even? Many centres will be in both groups).

Please contact katie.mchugh6@nhs.net to express interest.

(and start adding your plans to Proknow in a local workspace if you know how – it will save you doing it later!)

Would you like to join?

- Please contact:
 - d.emmens@nhs.net - LDR Prostate
 - katie.mchugh6@nhs.net - HDR Prostate
- Any Trust within NHS England who has access to ProKnow can join.
- 2024 LDR collections have been created.
- Happy to provide live demos of ProKnow over MS Teams and documentation.
- Regular meetings



Thank you and Acknowledgements

- **Cambridge:** Diane Whitney, Liam Stubbington, Samuel Hunt, Andrew Hoole
- **Maidstone:** Laura Gandon
- **Royal Marsden:** Orla Byrne, David Inchley, Daniel Brench, Hannah Eyles
- **Mount Vernon:** Gerry Lowe, Kerstin Akem
- **Lincoln:** Victoria Longden
- **Christie:** Laura Lane, James Cummings, Claudia Hill
- **Portsmouth:** Polak Wojciech, Sarah Wilby, Inna O’Hea, Keri Haselip
- And Katie McHugh from Southend (formerly at Cambridge)