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?

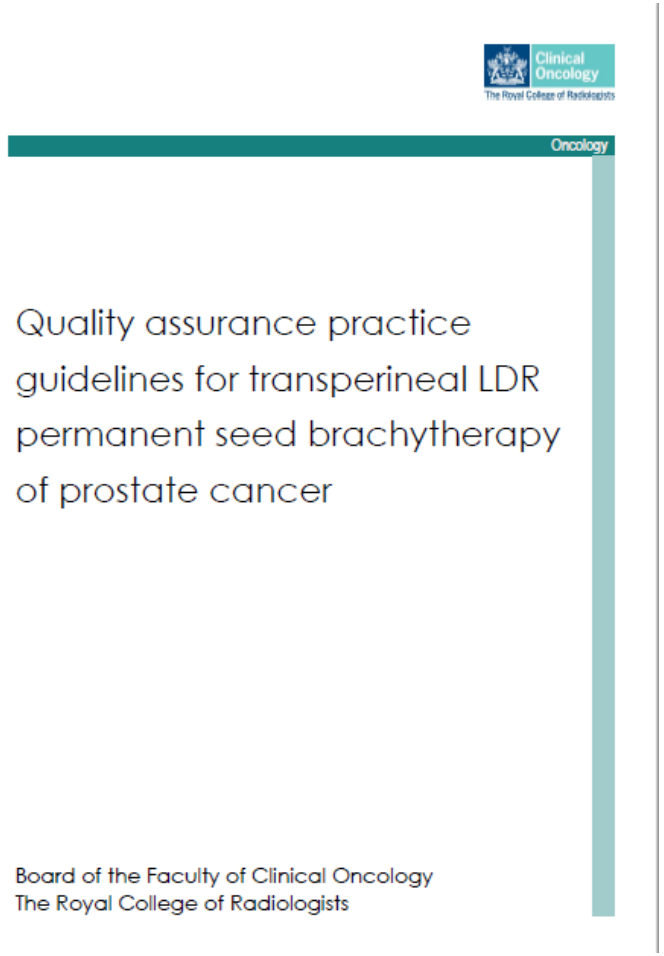
- ProKnow is **cloud-based** software that can be used to audit the quality of radiotherapy plans across multiple departments.
- ProKnow is available to all NHS England Trusts as part of a three year evaluation program by NHS England.
- Patient data in ProKnow is **effectively anonymised** (DICOM data 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.

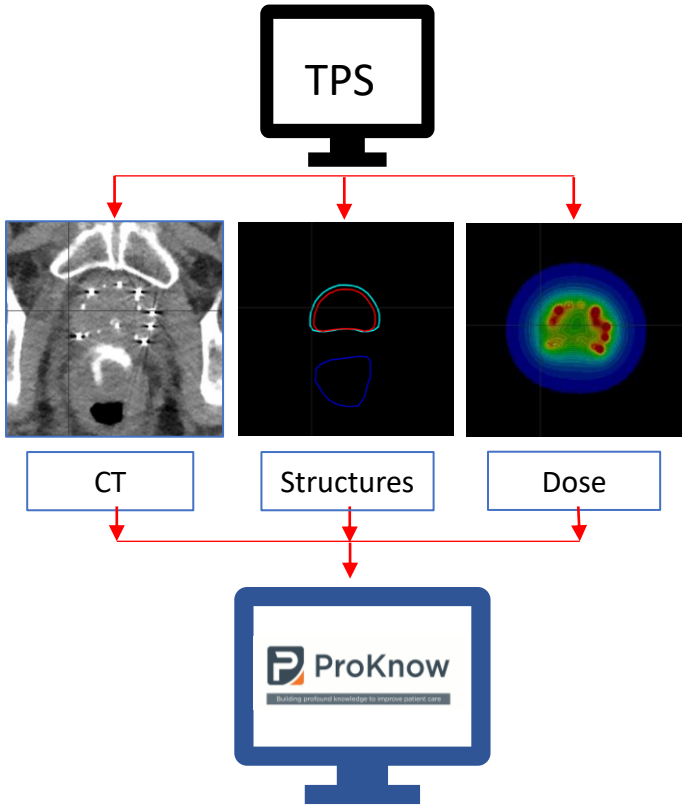
- **Seven Trusts actively involved following interest at 2022 meeting and a flyer on the MedPhys mailbase.**

- **Additional Trusts within NHS England can join at any time!**

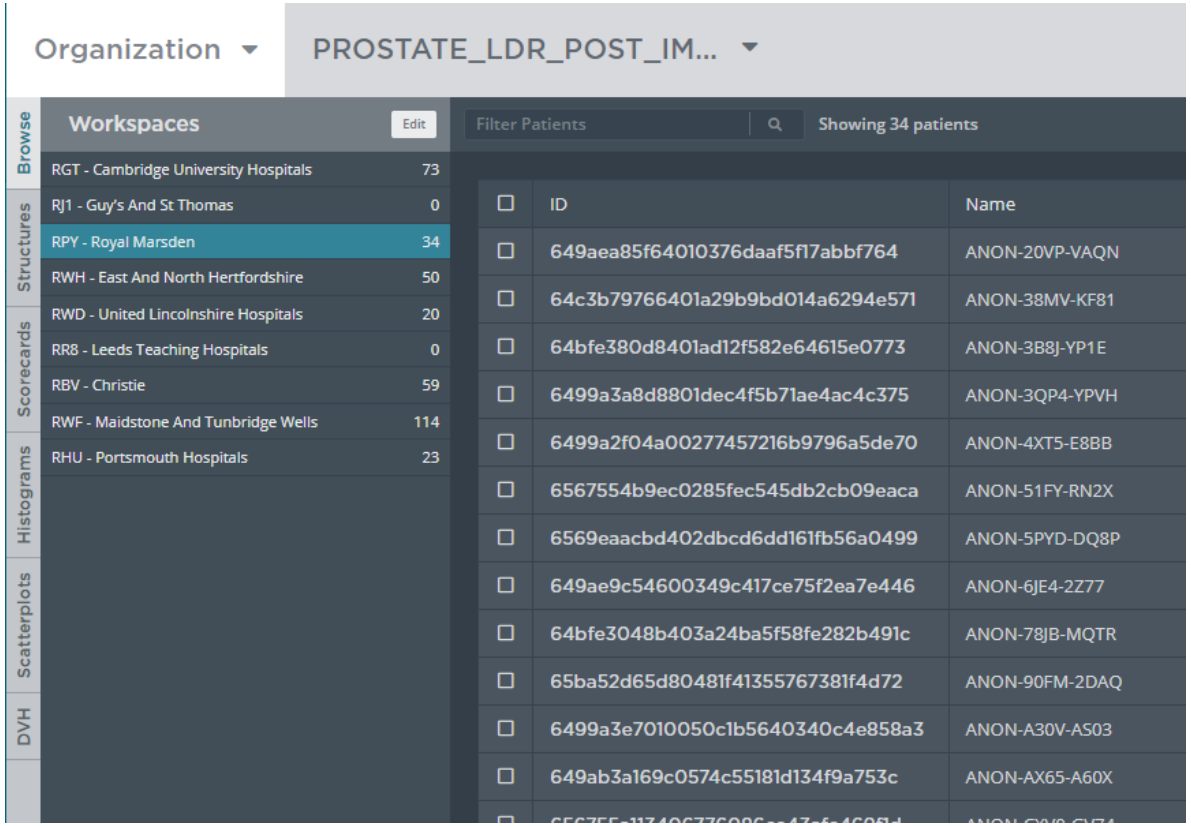


Method

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



- Patients are added to an Organisation collection.



ProKnow Scorecard – computed metrics

ProKnow Scorecard – custom metrics

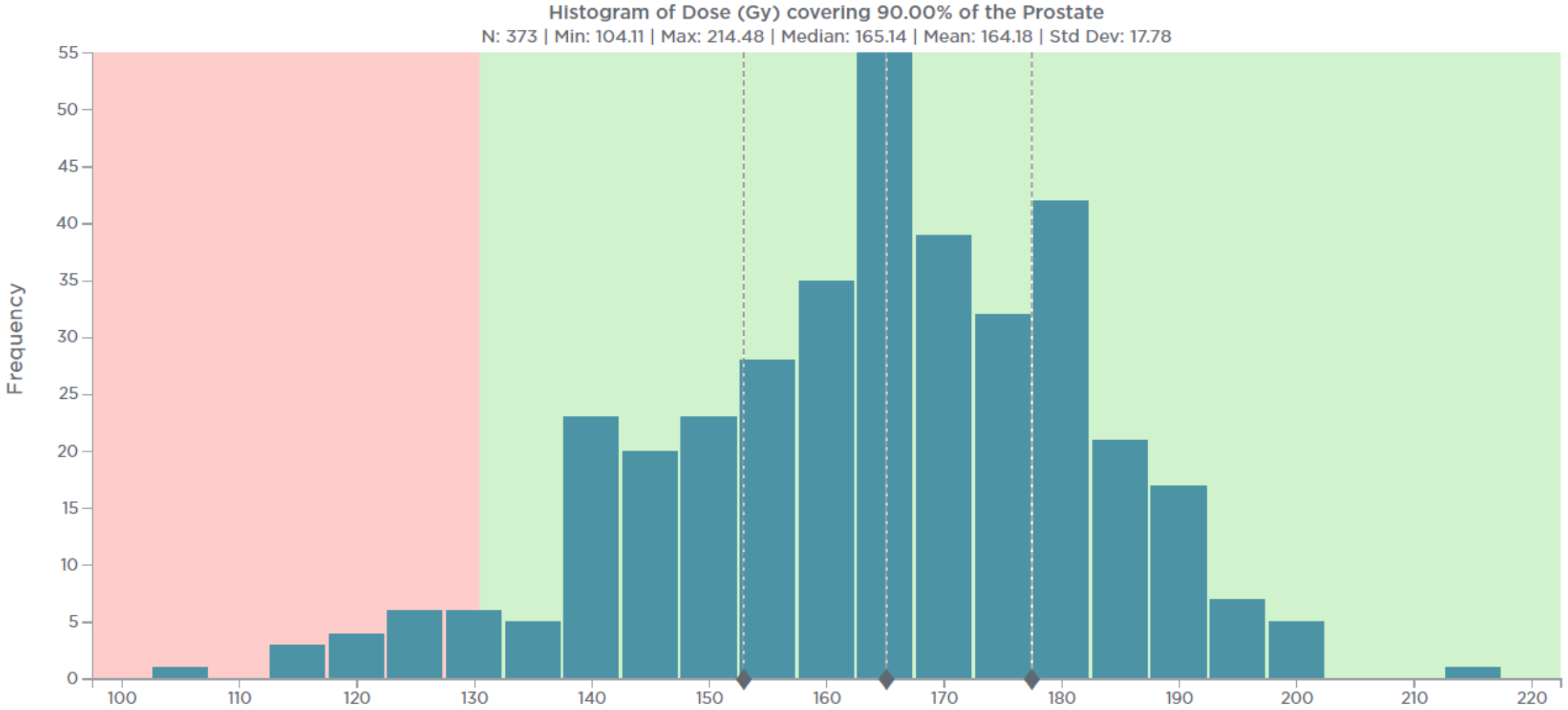
Custom Metrics

	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

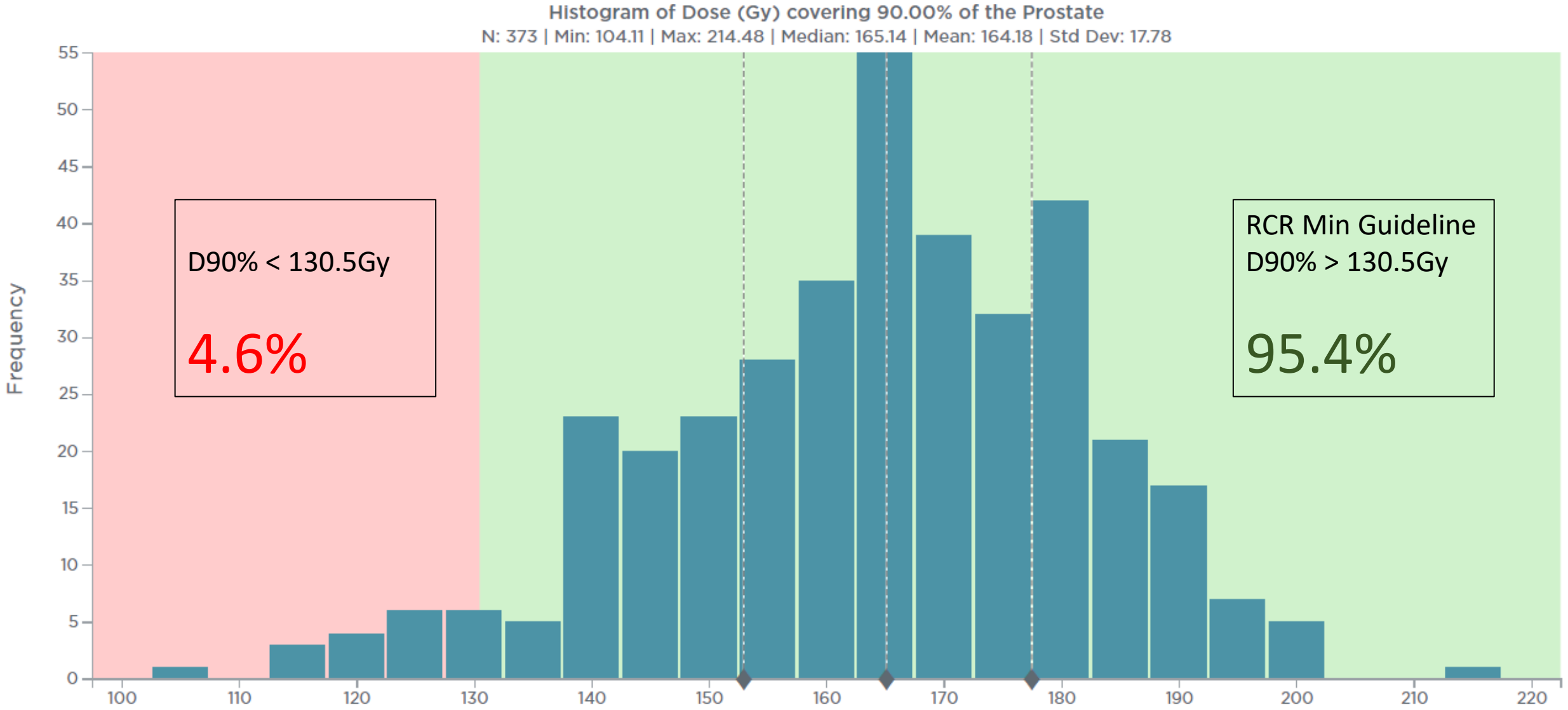
Centre Summary

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**

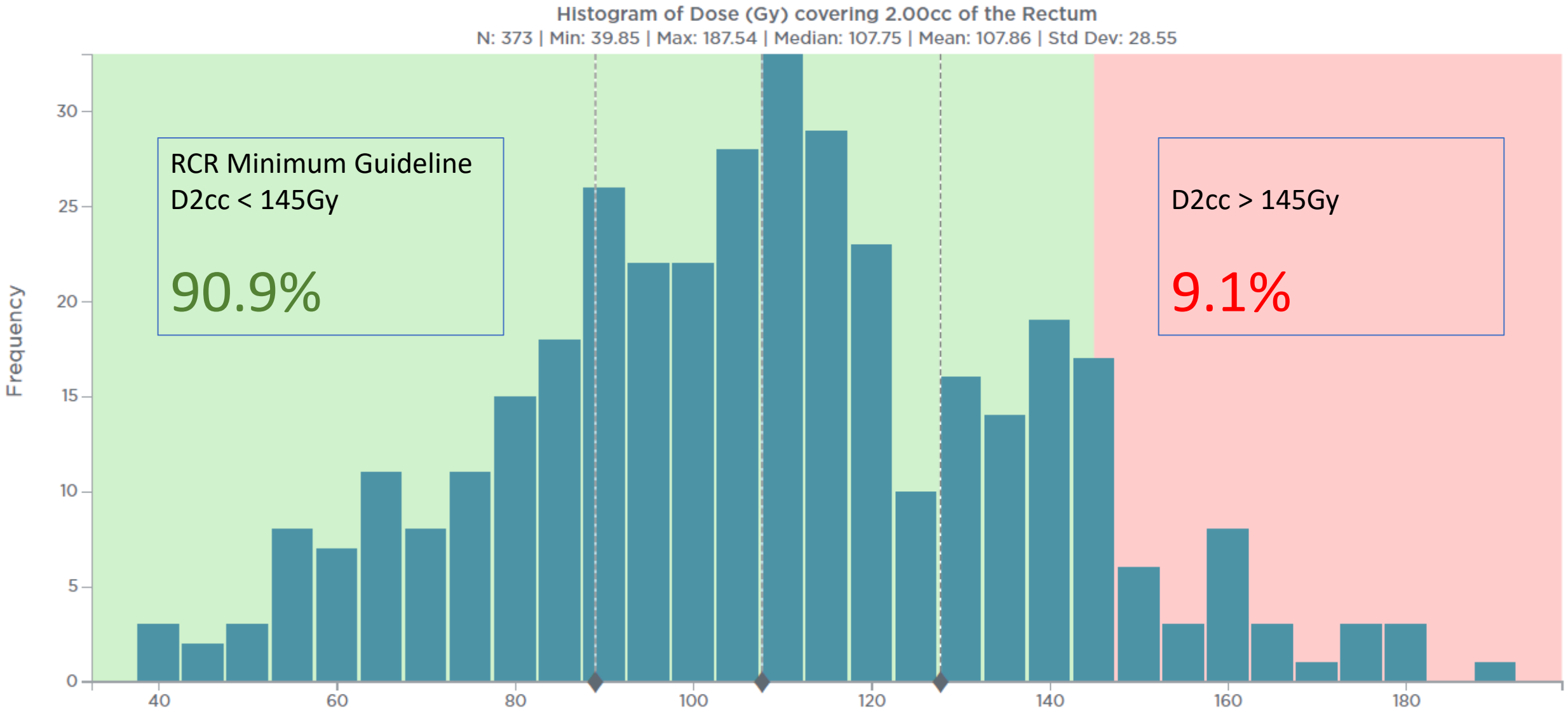
ProKnow: Prostate D90% results



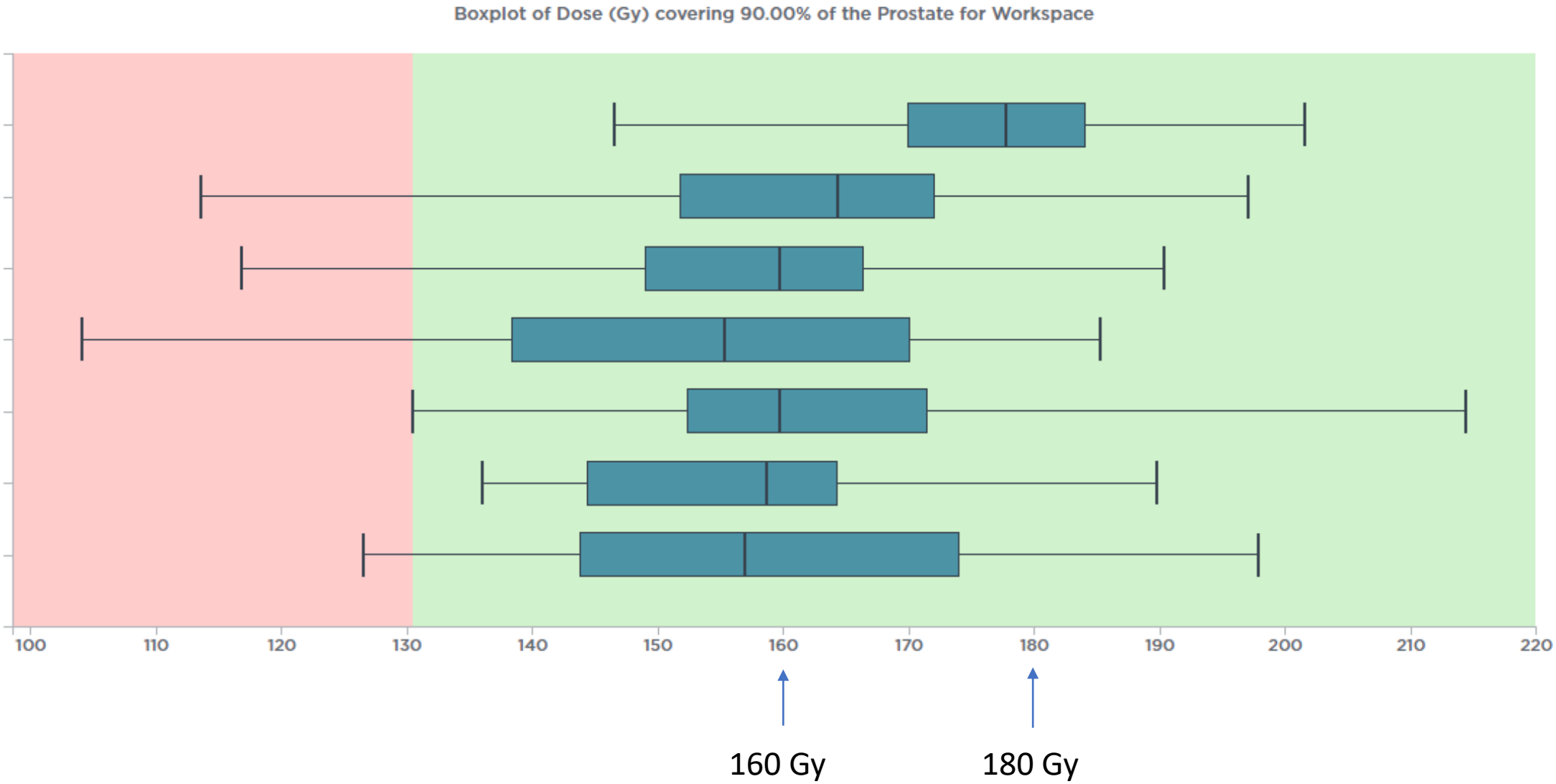
ProKnow: Prostate D90% results



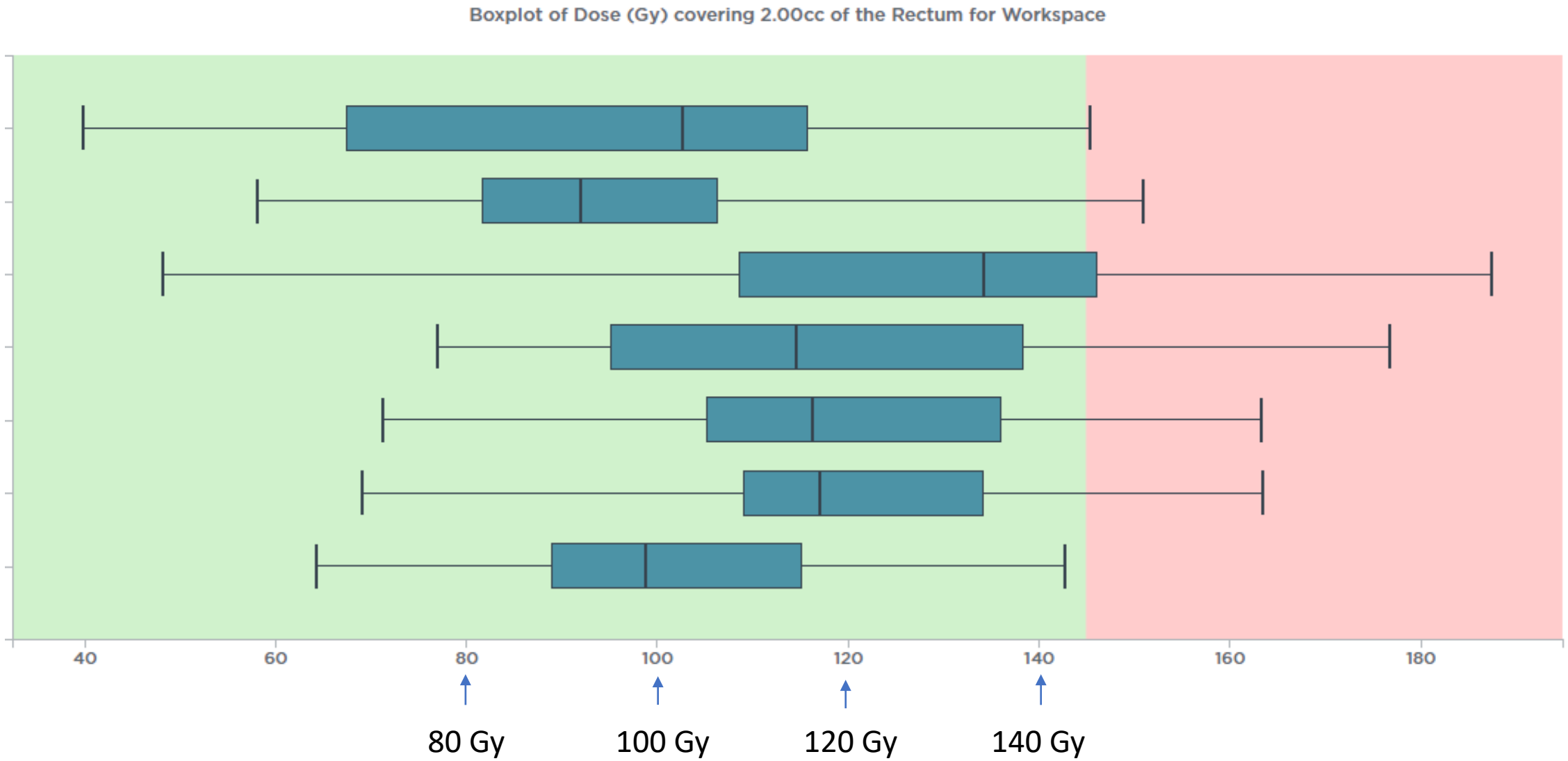
ProKnow: Rectum D2cc results



Analysis by Centres - D90% Prostate



Analysis by Centres - D2cc Rectum



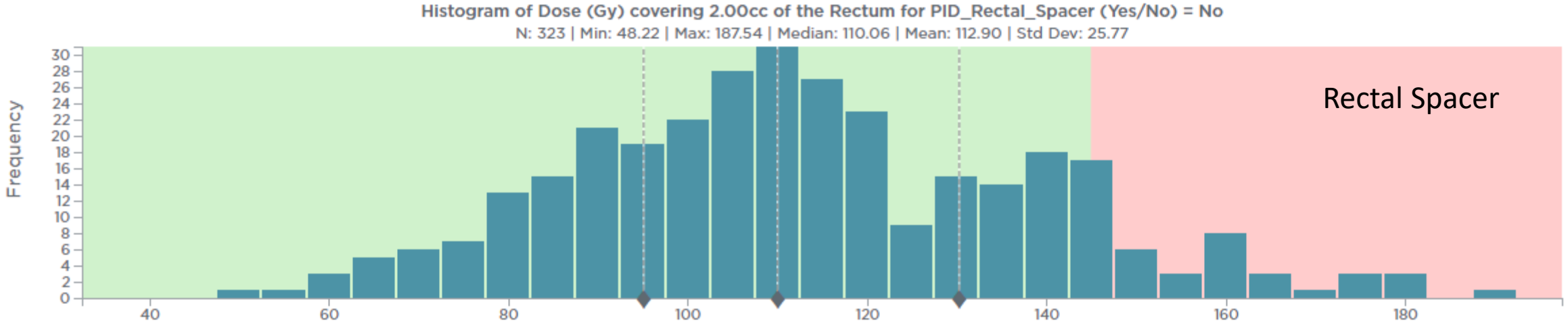
Data Summary of Results

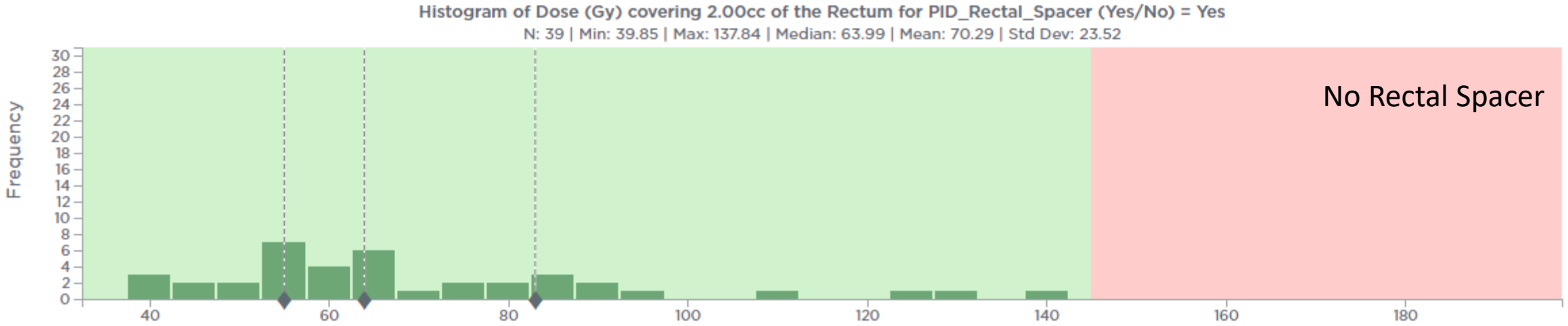
	Compliance with RCR Min guideline	Median (all centres)	Range of Median between centres
D90% prostate	95.4%	165 Gy	155 – 178 Gy
V100% prostate	98.9%	95.8%	93 – 99 %
V150% prostate	-	59.2%	57 - 64 %
D2cc Rectum	90.9%	108Gy	92 - 134 Gy

Why is this useful?

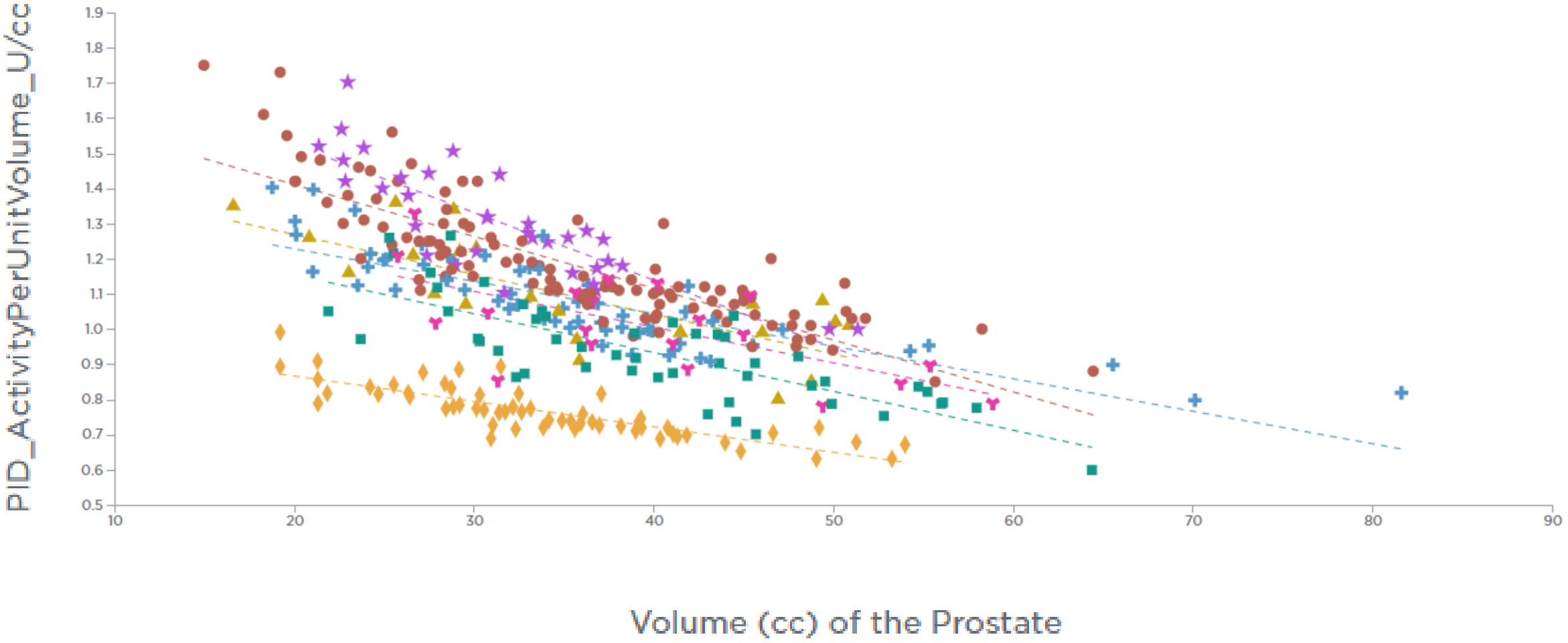
- Outliers in the data provide a catalyst for discussing techniques between groups and foster collaboration.
- Group will meet regularly to discuss implementation and results.
- Centres that treat small number of patients per year find it helpful to compare their results with larger patient cohorts.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

Treatment technique - D2cc and Rectal spacer





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



What are the caveats?

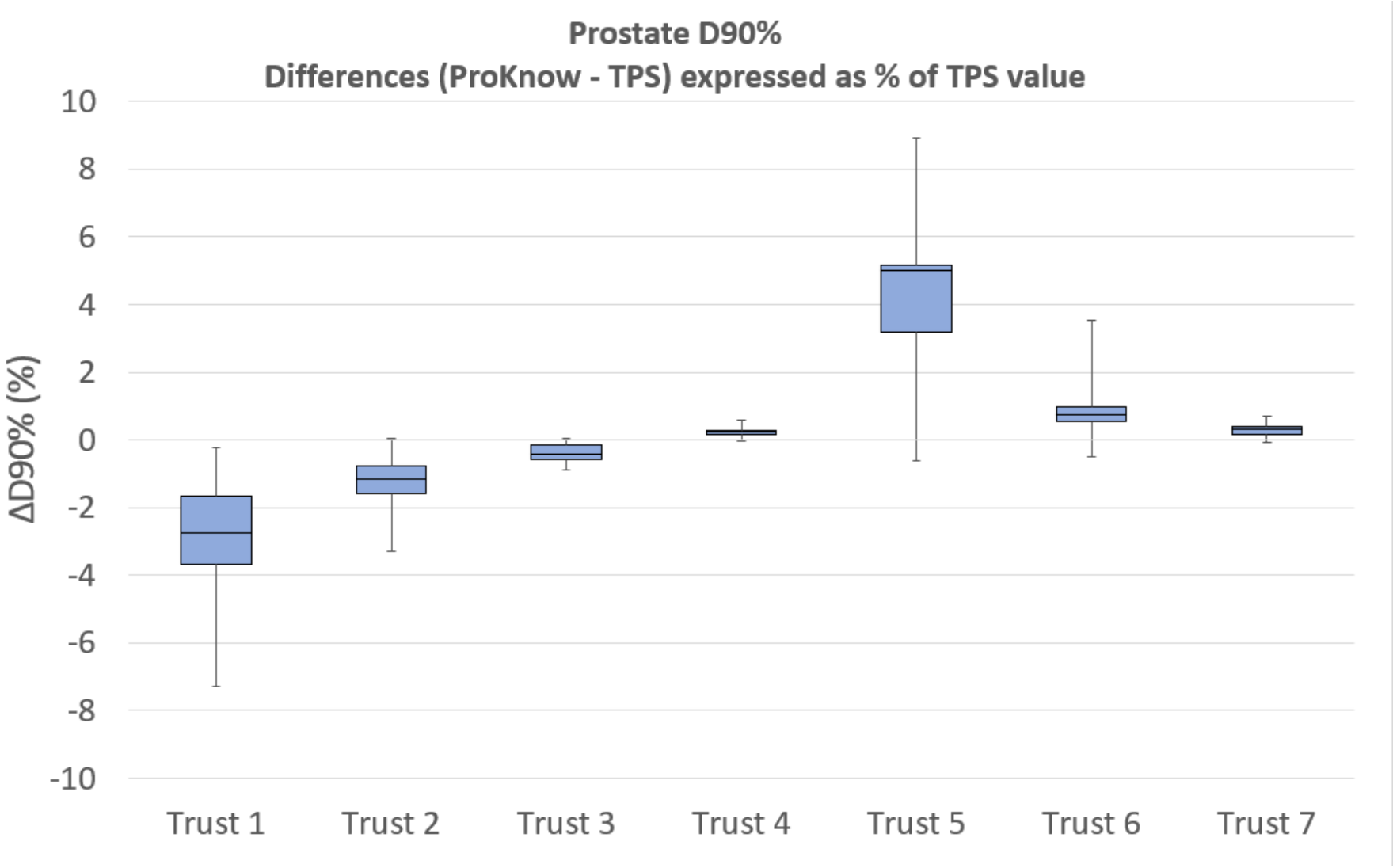
- Comparisons between centres with ProKnow are complicated by:

  (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.

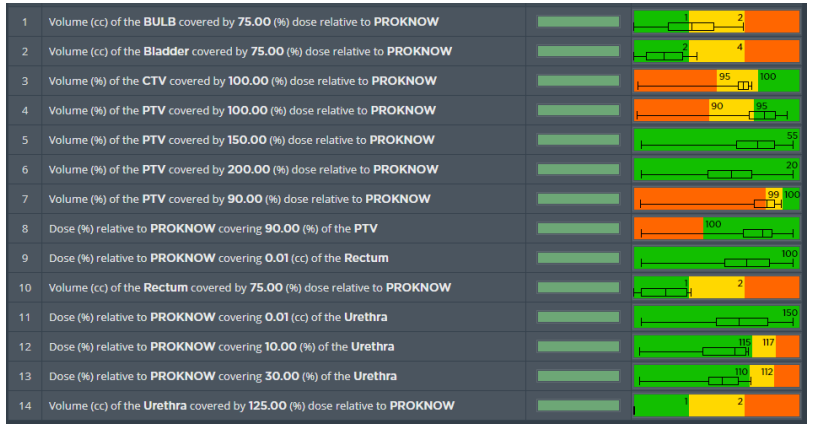
ProKnow vs TPS dose-volume calculations



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!



1	Volume (cc) of the **BULB** covered by **75.00** (%) dose relative to **PROKNOW**
2	Volume (cc) of the **Bladder** covered by **75.00** (%) dose relative to **PROKNOW**
3	Volume (%) of the **CTV** covered by **100.00** (%) dose relative to **PROKNOW**
4	Volume (%) of the **PTV** covered by **100.00** (%) dose relative to **PROKNOW**
5	Volume (%) of the **PTV** covered by **150.00** (%) dose relative to **PROKNOW**
6	Volume (%) of the **PTV** covered by **200.00** (%) dose relative to **PROKNOW**
7	Volume (%) of the **PTV** covered by **90.00** (%) dose relative to **PROKNOW**
8	Dose (%) relative to **PROKNOW** covering **90.00** (%) of the **PTV**
9	Dose (%) relative to **PROKNOW** covering **0.01** (cc) of the **Rectum**
10	Volume (cc) of the **Rectum** covered by **75.00** (%) dose relative to **PROKNOW**
11	Dose (%) relative to **PROKNOW** covering **0.01** (cc) of the **Urethra**
12	Dose (%) relative to **PROKNOW** covering **10.00** (%) of the **Urethra**
13	Dose (%) relative to **PROKNOW** covering **30.00** (%) of the **Urethra**
14	Volume (cc) of the **Urethra** covered by **125.00** (%) dose relative to **PROKNOW**

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)