

Can LDR brachytherapy be considered as a treatment option for patients with prostate cancer with intermediate or high risk features?

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LDR Brachytherapy for Prostate Cancer:

- Is a form of radiotherapy which involves placing radioactive sources directly into a tumour or in the surrounding tissue^{1,2}
- Is a **curative treatment** option for men with prostate cancer who have **low and intermediate risk features**^{1,2,3}
- Can be used as a monotherapy or in combination with other therapies^{1,2}
- Can be performed as a same day surgical procedure, reducing costs and reducing the length of patient stay^{1,2}



Who is LDR brachytherapy recommended for?

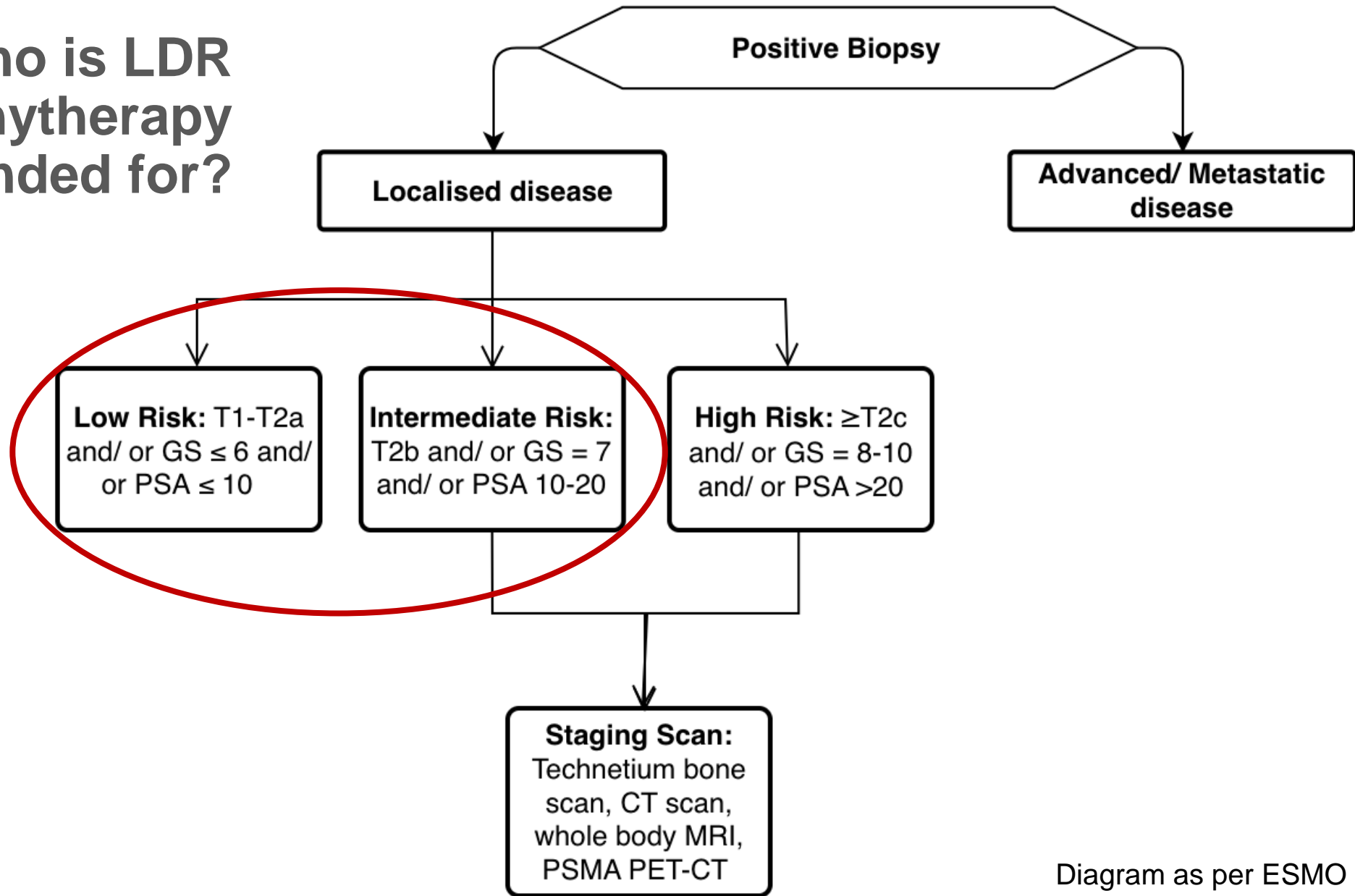
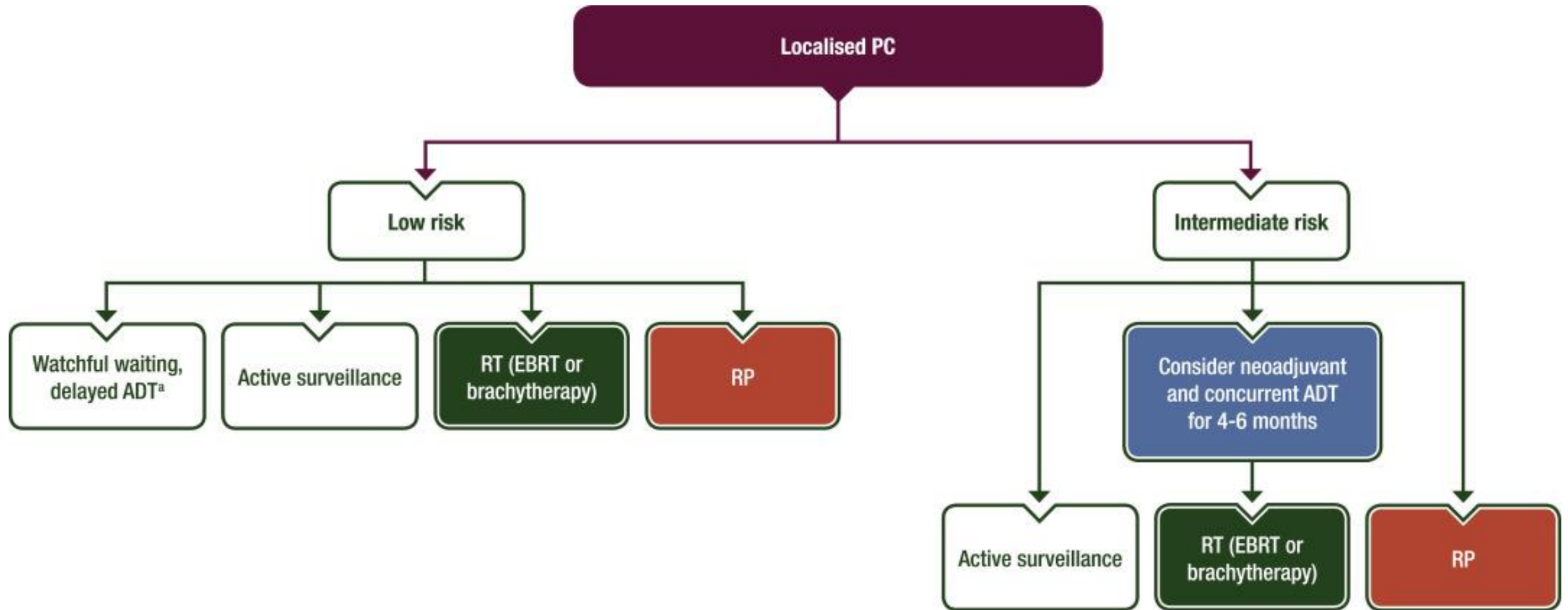
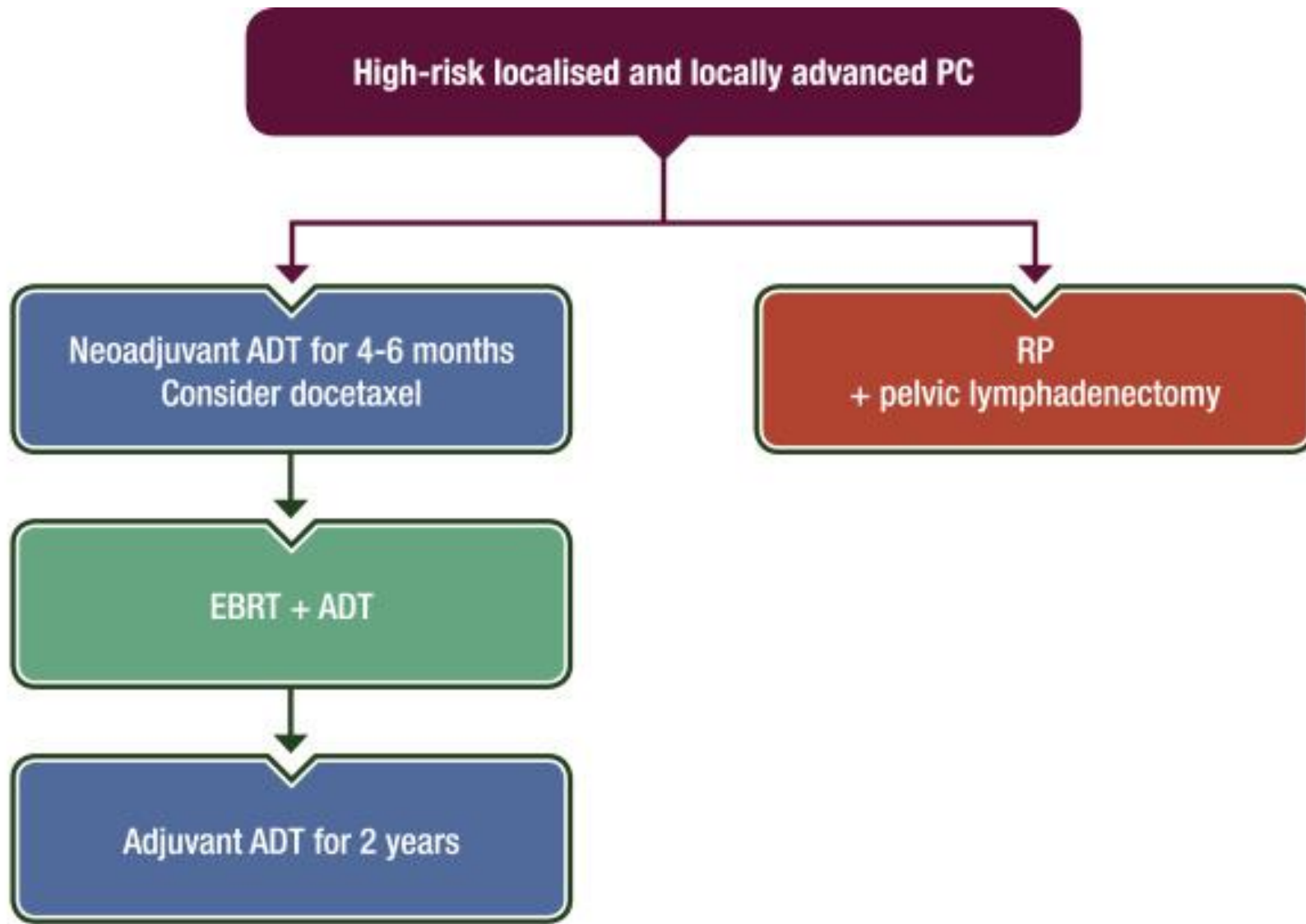


Diagram as per ESMO guidelines³



Localised prostate cancer treatment algorithm³



Localised prostate cancer treatment algorithm³



What has changed since the guidelines for who should receive LDR brachytherapy:

Staging has become more accurate

- In the last 10 years a staging prostate MRI has become standard
- More sensitive for T staging than a urologist's clinical examination
 - It is particularly useful for identifying:
 - **Early** extracapsular spread
 - **Anterior** extracapsular spread
 - Seminal Vesicle invasion⁴

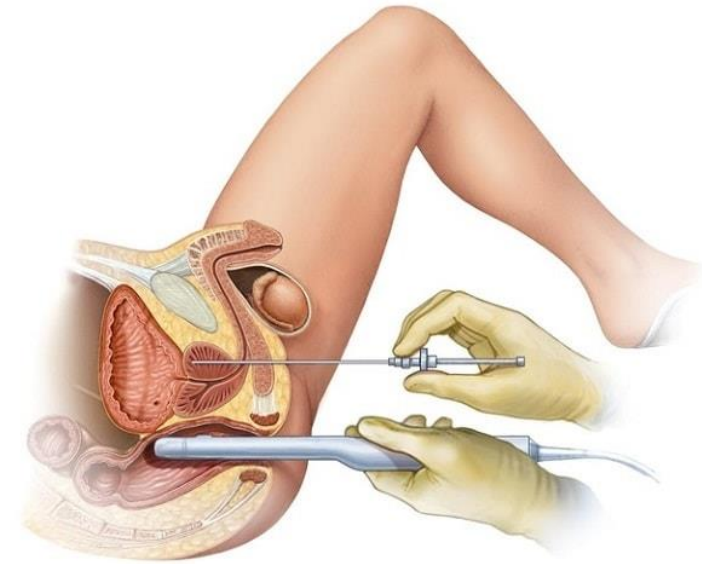
What has changed since the guidelines for who should receive LDR brachytherapy:

Biopsy

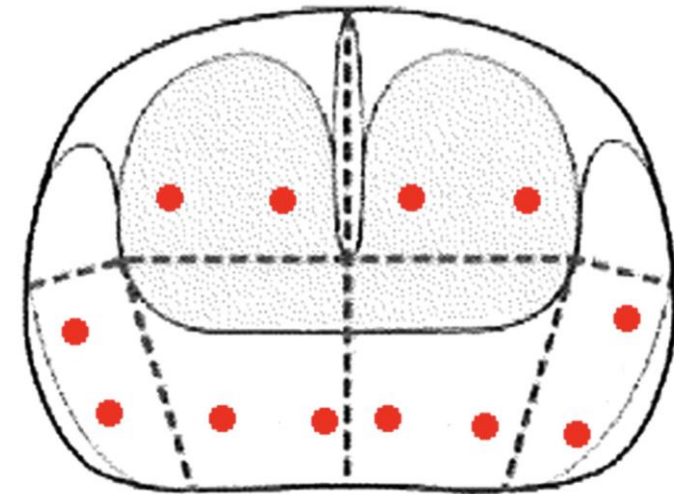
- In the past TRUS biopsy - biopsies across the prostate¹

Now

- Template biopsies - ~20-60 biopsies and suspicious areas on MRI can be targeted⁴



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What has changed since the guidelines for who should receive LDR brachytherapy:

PSA

- No significant change

Purpose of audit:

- Most patients (>90%) treated have low or low-intermediate risk prostate cancer
- At Poole General Hospital a subset of patients with high or high-intermediate risk features have also been treated
- Study: This was a **retrospective analysis** aimed to see whether patients with one or more intermediate or high risk features (IHRF) could still respond well to low dose rate (LDR) brachytherapy



If LDR brachytherapy is successful it could be used for a wider variety of patients:

- Some patients are not suitable for EBRT or do not want it
- Inflammatory bowel disease
- Pelvic kidneys make external beam radiotherapy challenging
- Decreased risk of secondary malignancies compared to EBRT



Methods

- The study reviewed 63 patients who underwent LDR brachytherapy between February 6, 2011, and December 21, 2017
 - 3 patients were excluded from the analysis
- All patients had at least one intermediate/high-risk feature (IHRF):
 - Stage T3a prostate cancer, Gleason Score (GS) $\geq 7(4+3)$, or PSA > 15

Who is LDR brachytherapy recommended for?

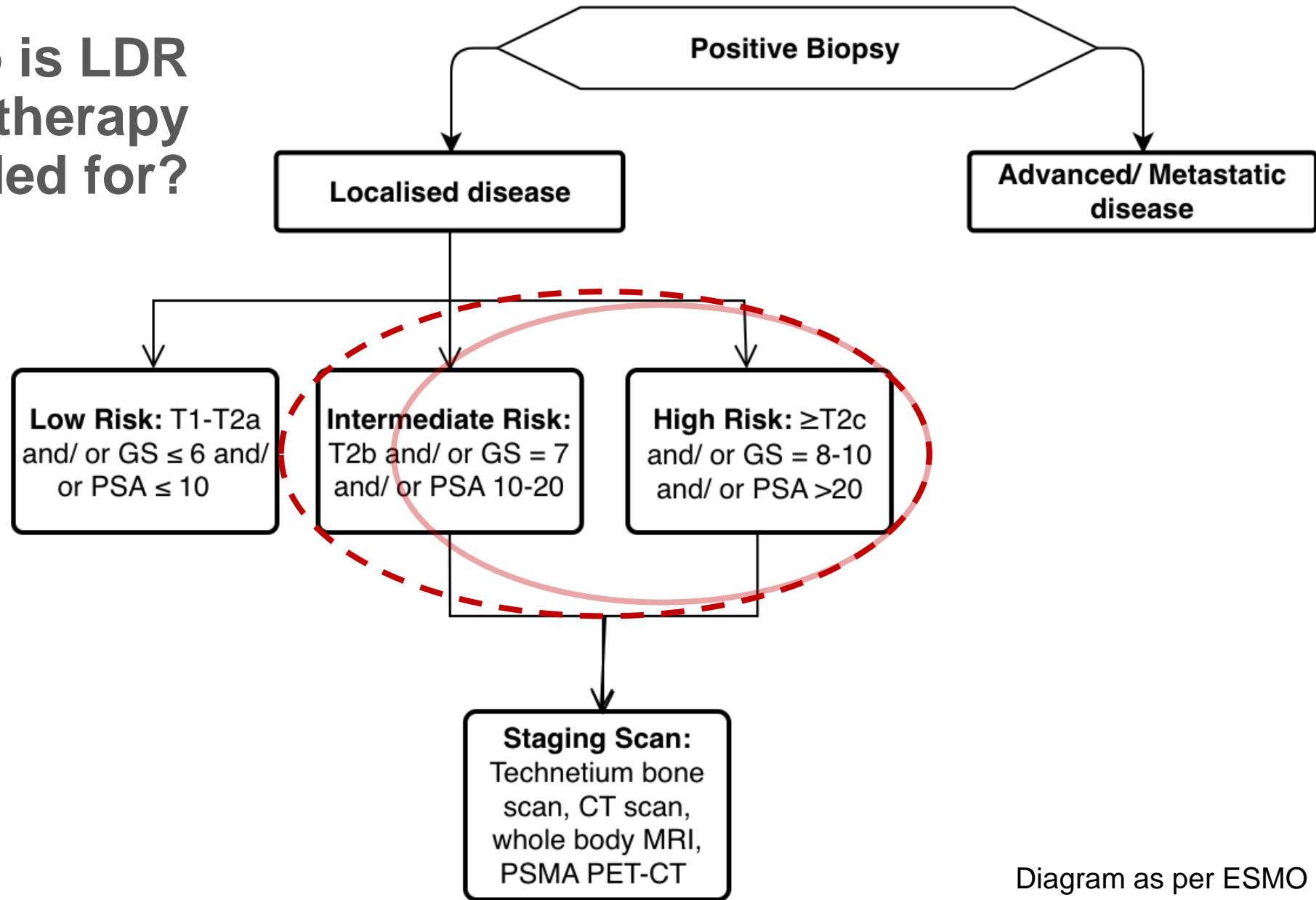
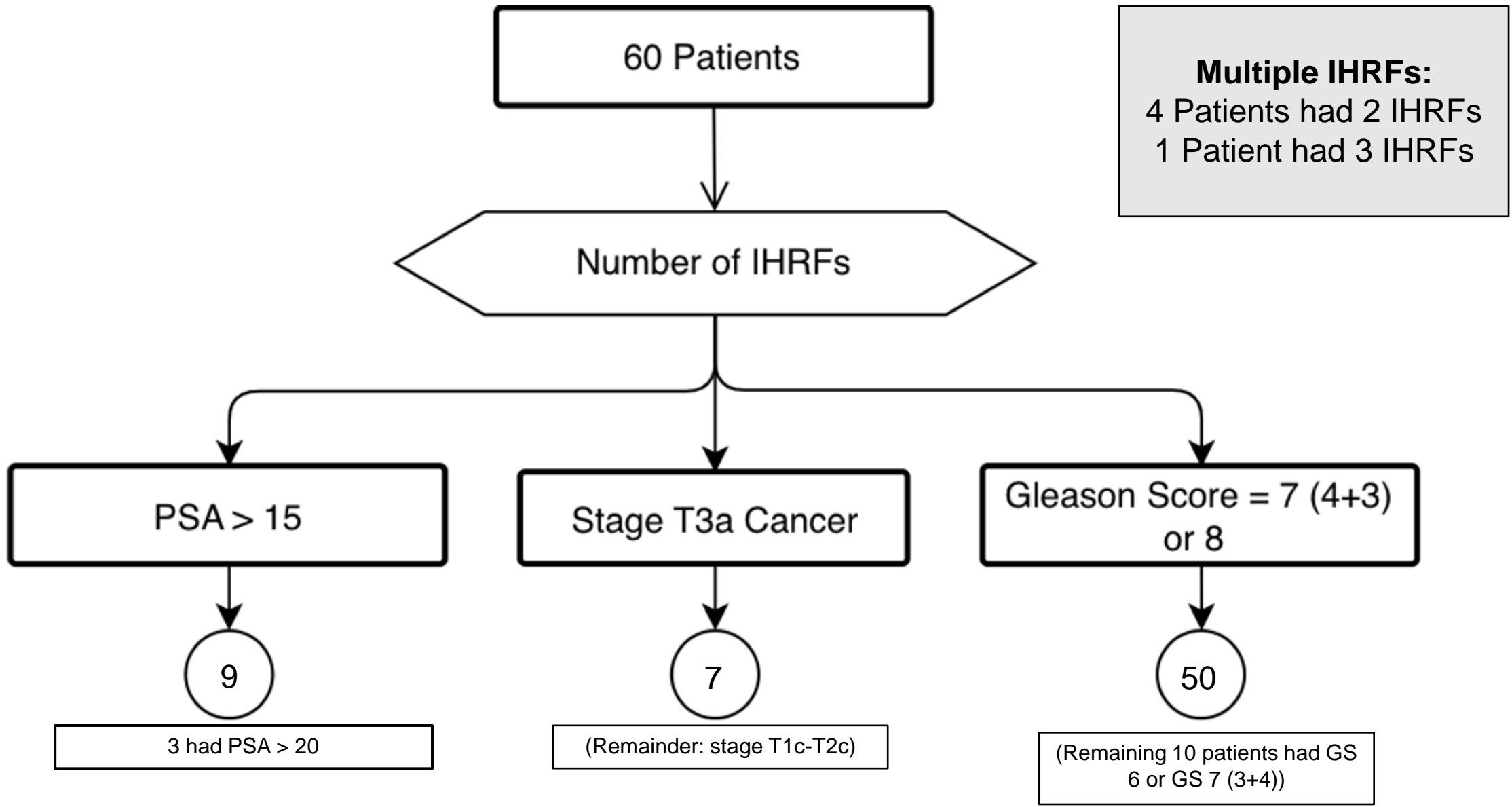


Diagram as per ESMO guidelines³

Methods

- Final follow up data was collected between July - December 2023
- Minimum follow up for PSA values was 50 months in those that didn't relapse
- Minimum survival follow up was 65 months

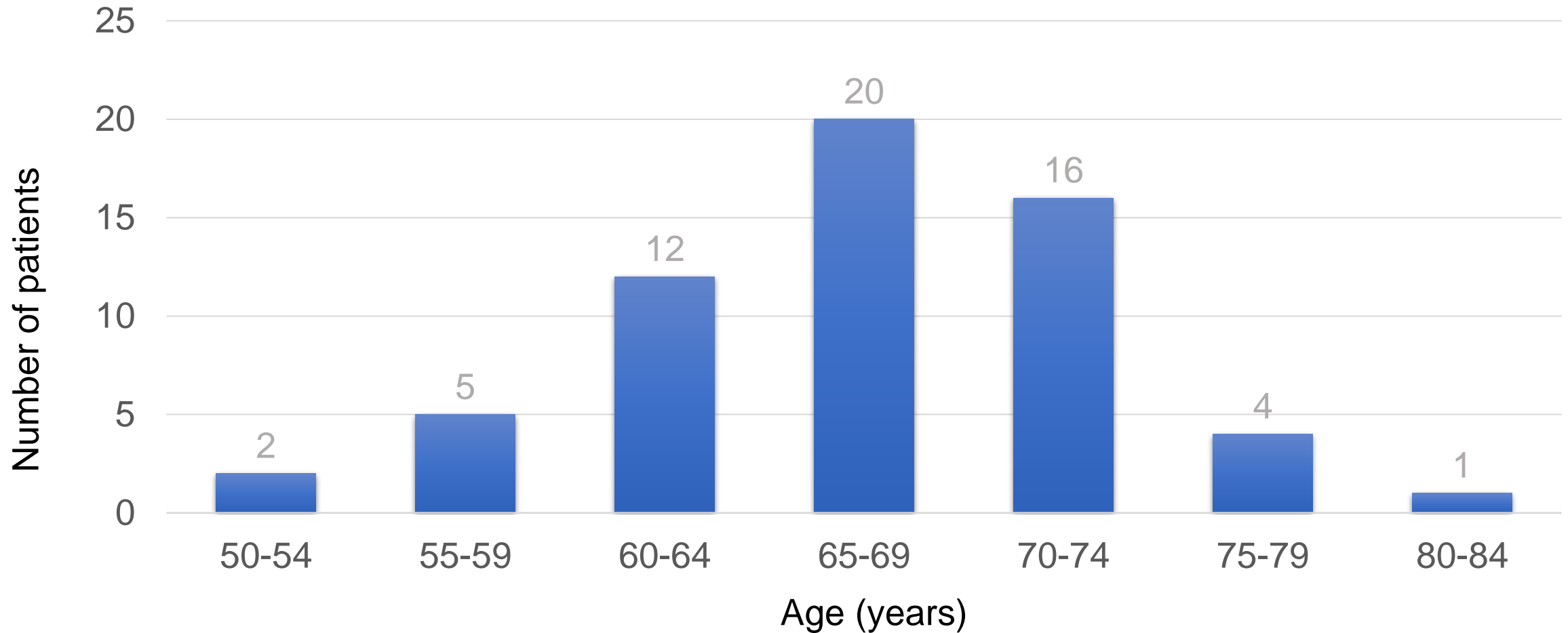




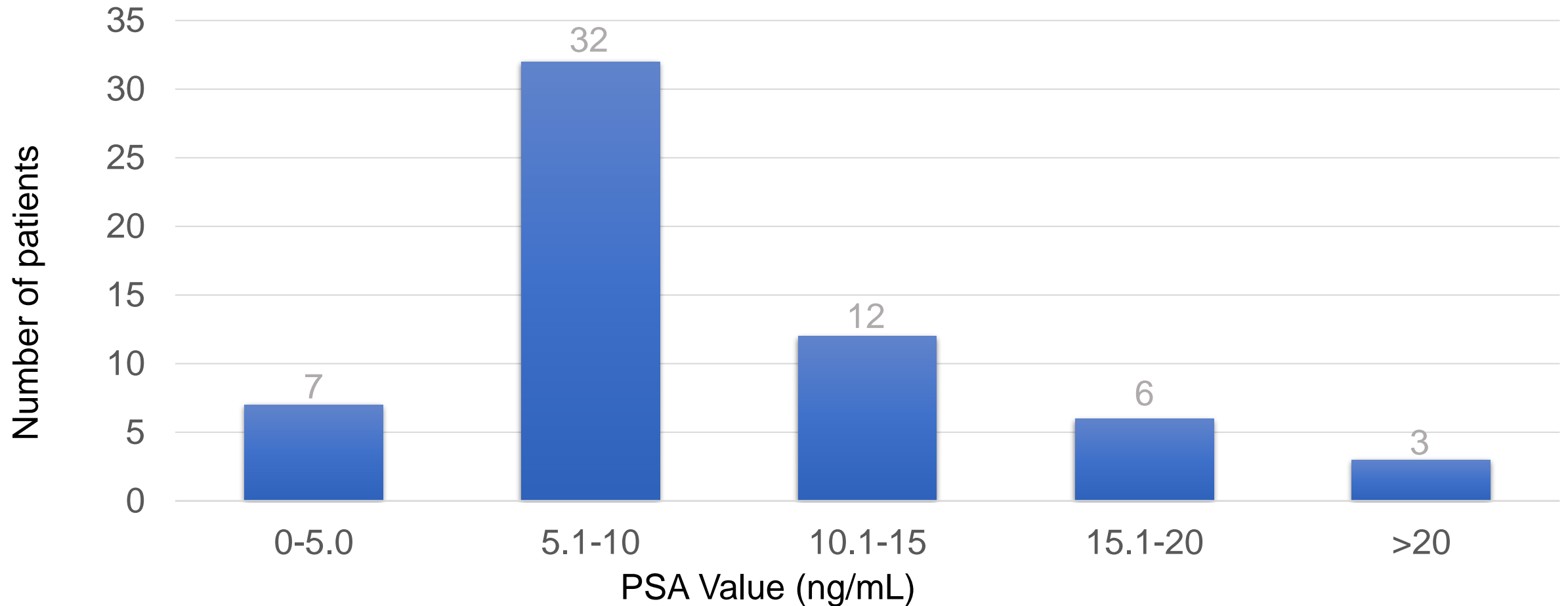
Demographic table

	Value
Age at implant	Min: 52
	Mean (2 SF): 67
	Max: 83
PSA	Min: 0.6
	Mean: 9.8
	Max: 30.7
Gleason Score	Min: Gleason 6
	Mode: Gleason 7 (4+3)
	Max: Gleason 8
Stage	Min: T1c
	Mode: T2c
	Max: T3a

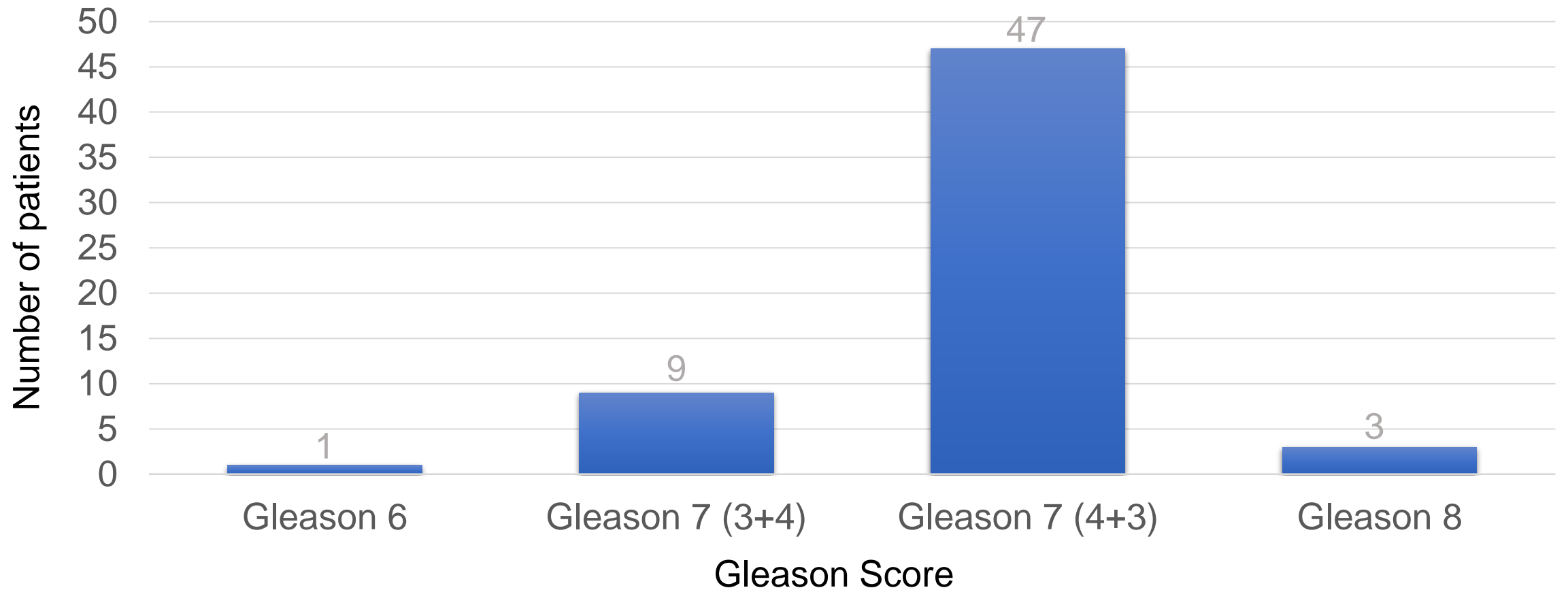
Age of Patients in Study:



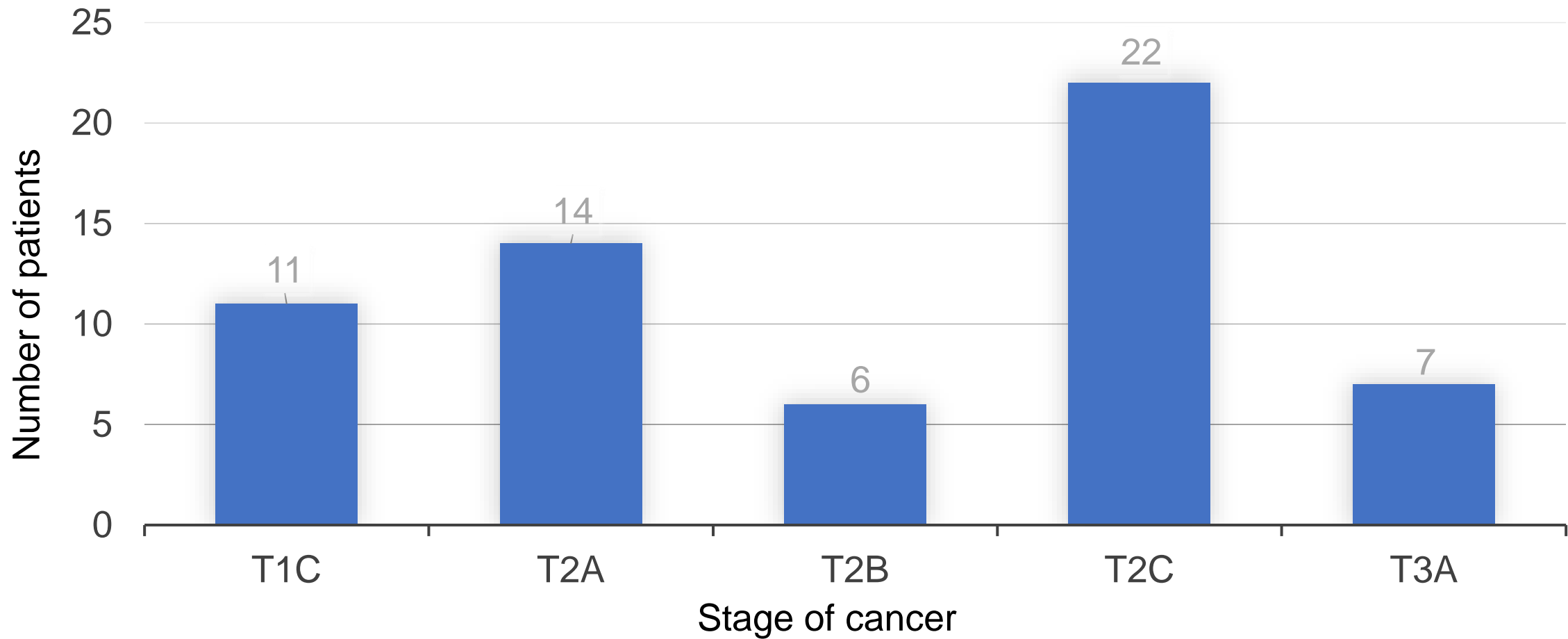
PSA Values at Implantation:



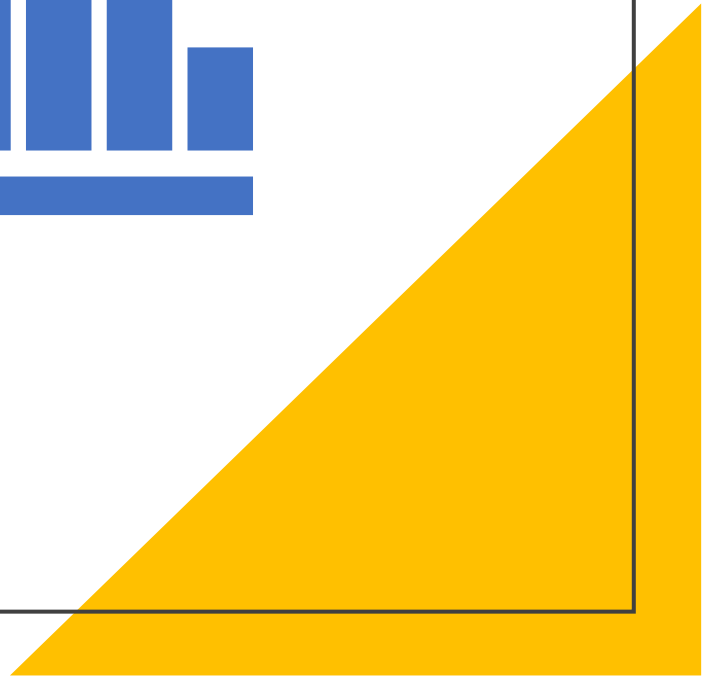
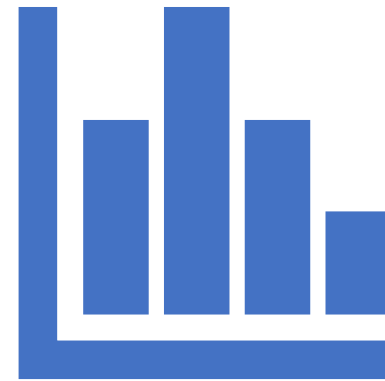
Gleason Score:



Stage of Cancer

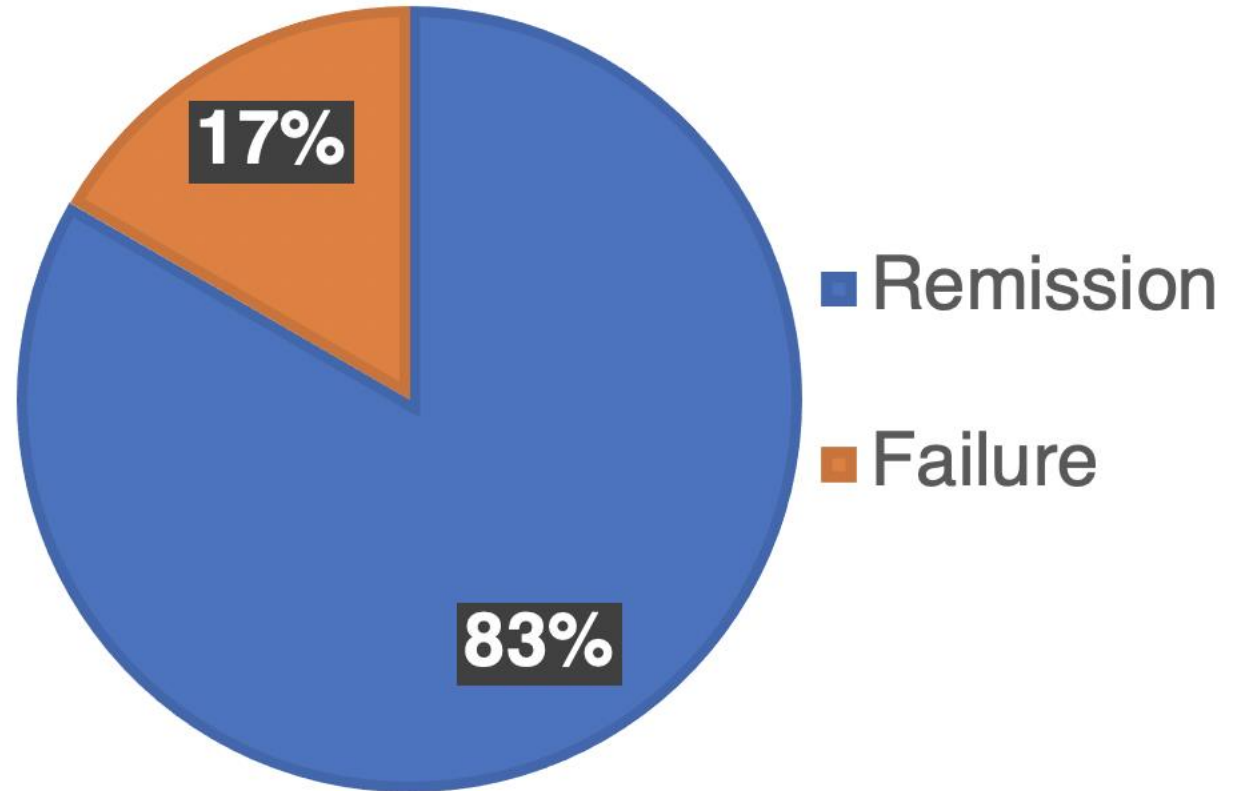


Results

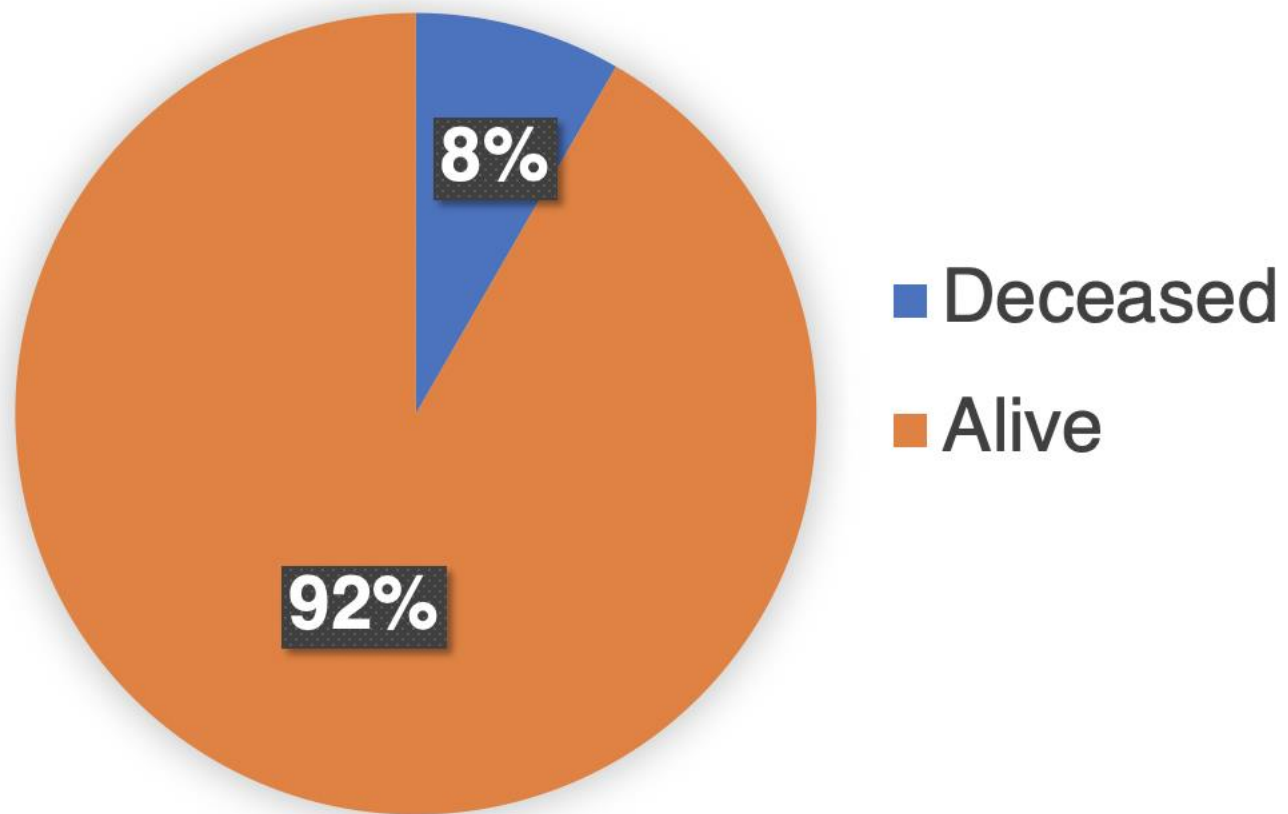


83% (50/60) of patients had biochemical relapse-free survival

Biochemical Relapse-Free Survival

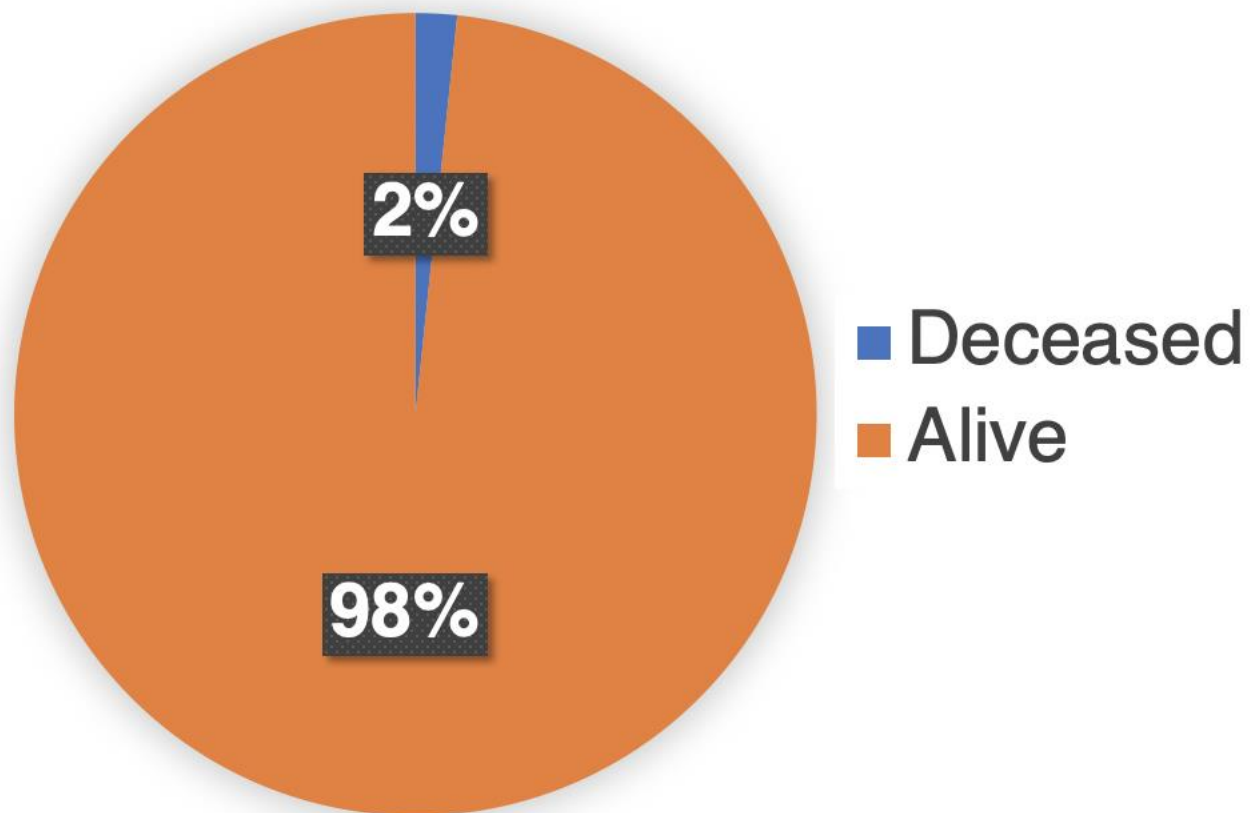


Overall Survival



Only 1 of the 60 patients died due to their prostate cancer

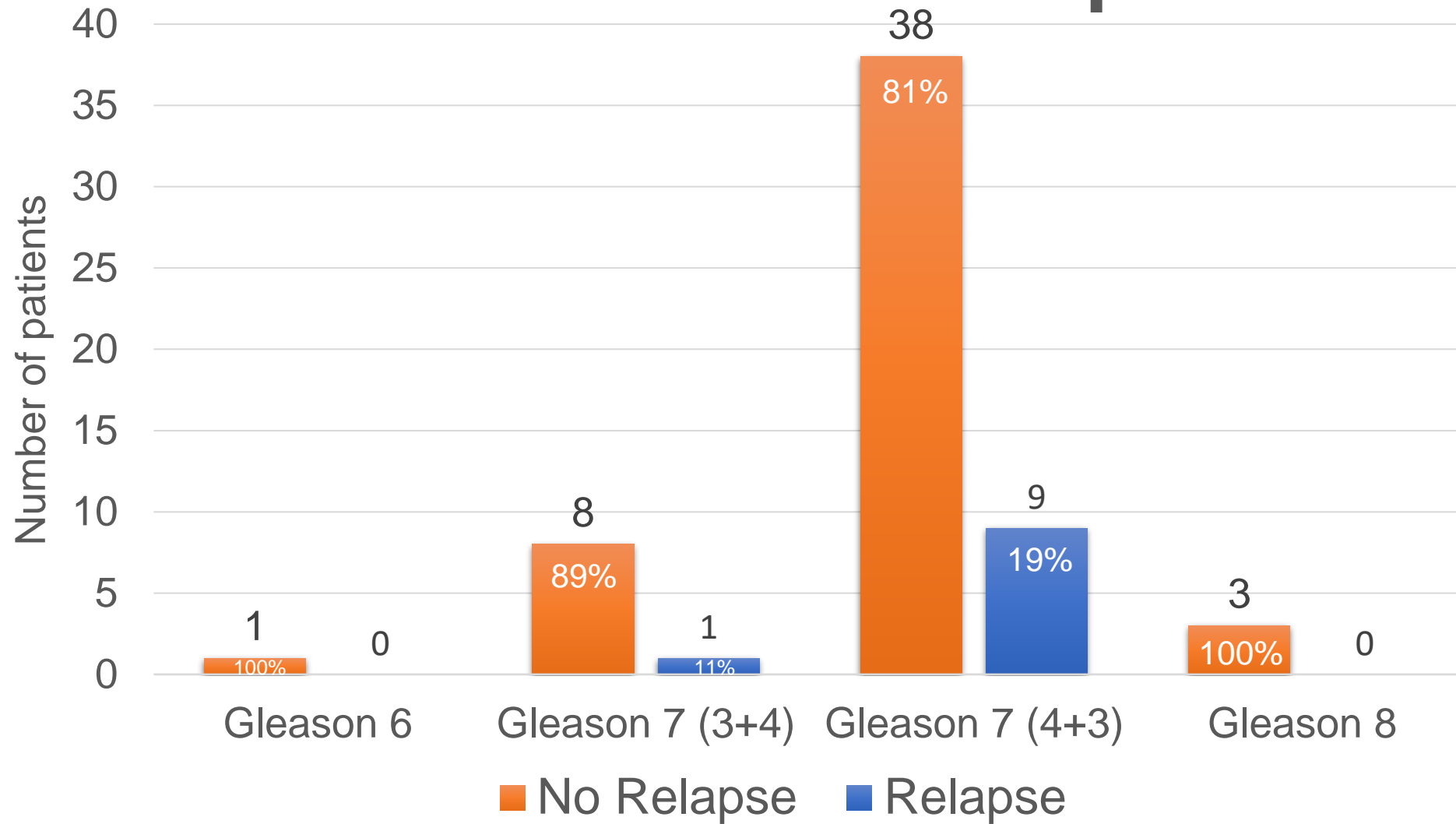
Prostate Cancer-Specific Survival



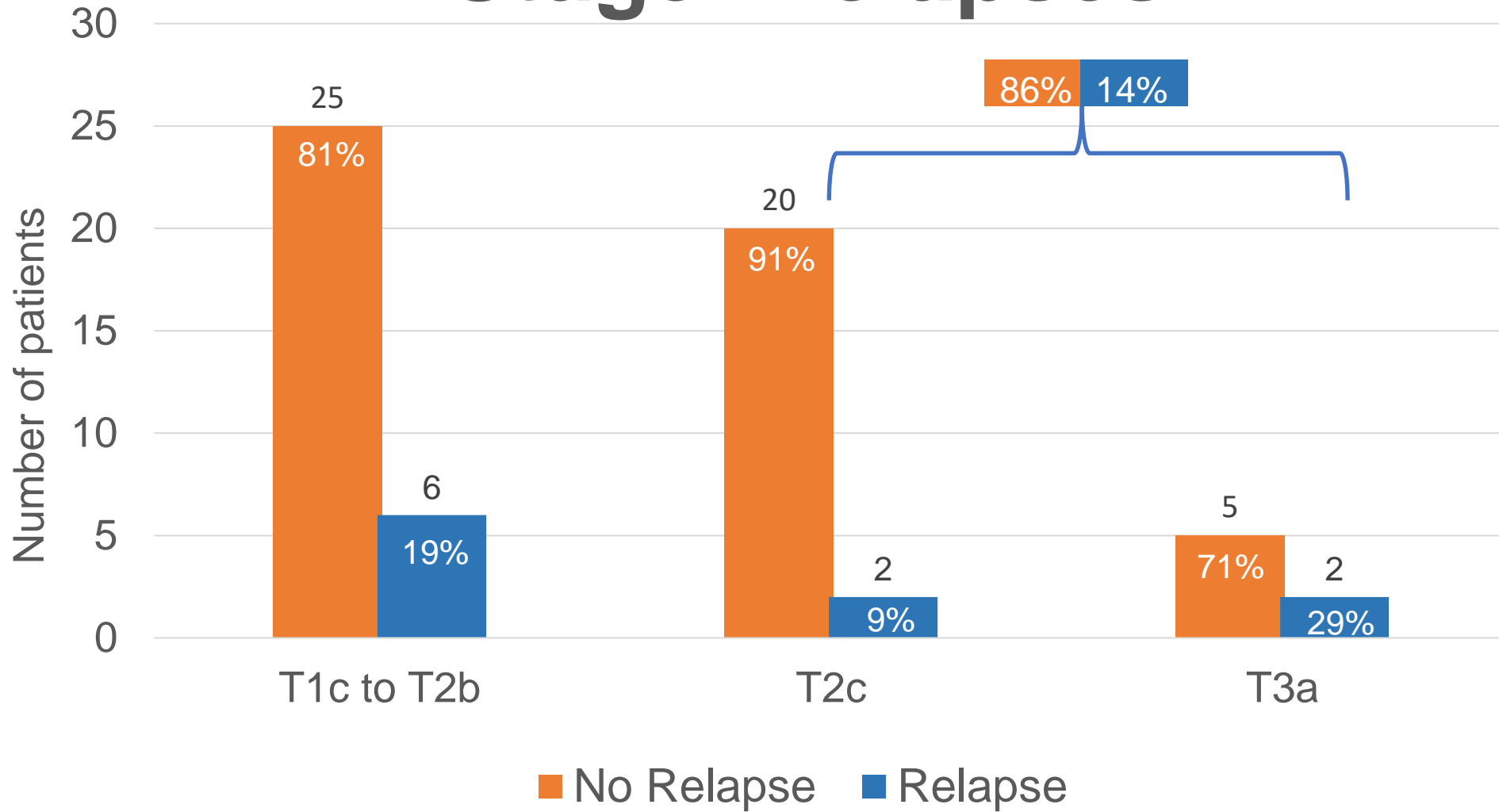
Division of IHRFs in Relapse Group

No of IHRFs	Gleason Score	Stage	PSA	Survival
1	Gleason 7 (4+3)	T2c	5.0	Yes
1	Gleason 7 (4+3)	T2a	6.9	Yes
1	Gleason 7 (4+3)	T1c	8.0	No (Died of prostate cancer)
1	Gleason 7 (4+3)	T1c	8.3	Yes
1	Gleason 7 (4+3)	T2a	9.0	Yes
1	Gleason 7 (4+3)	T2a	10.2	Yes
2	Gleason 7 (4+3)	T3a	8.8	No (Died of other causes)
2	Gleason 7 (3+4)	T2b	16.2	Yes
2	Gleason 7 (4+3)	T2c	26.0	Yes
3	Gleason 7 (4+3)	T3a	30.7	Yes

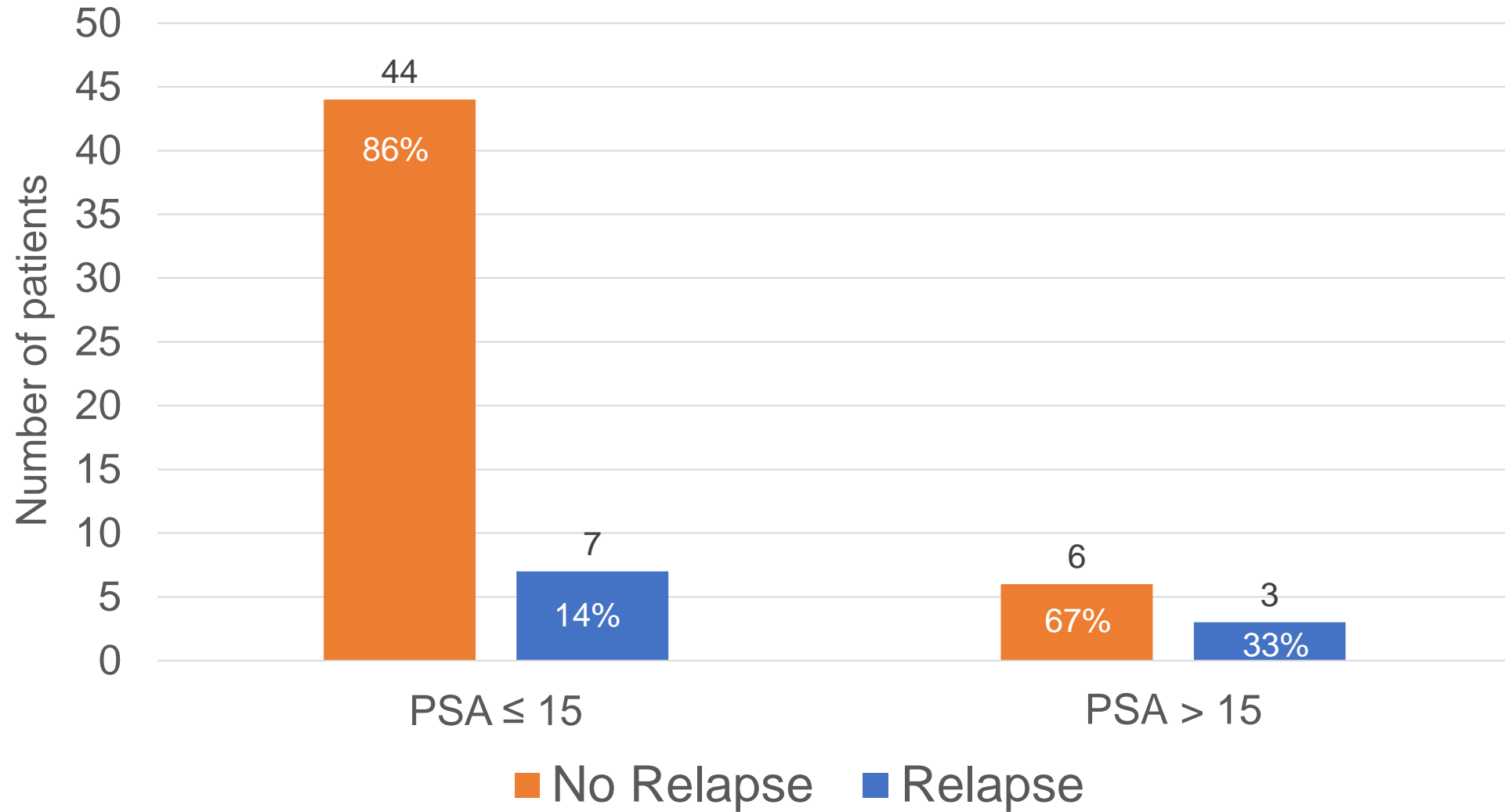
Gleason Score: Relapses



Stage: Relapses



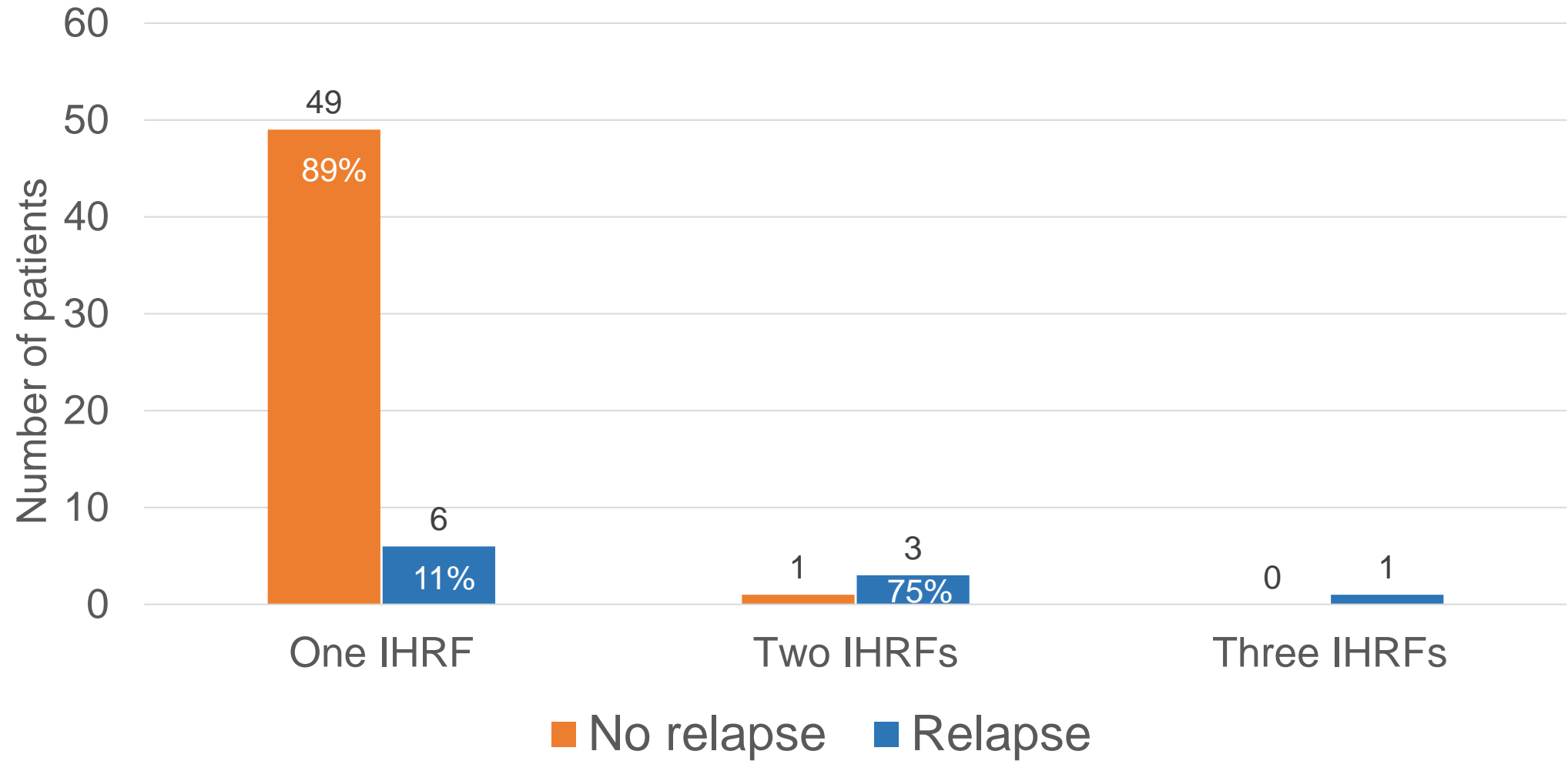
PSA: Relapses



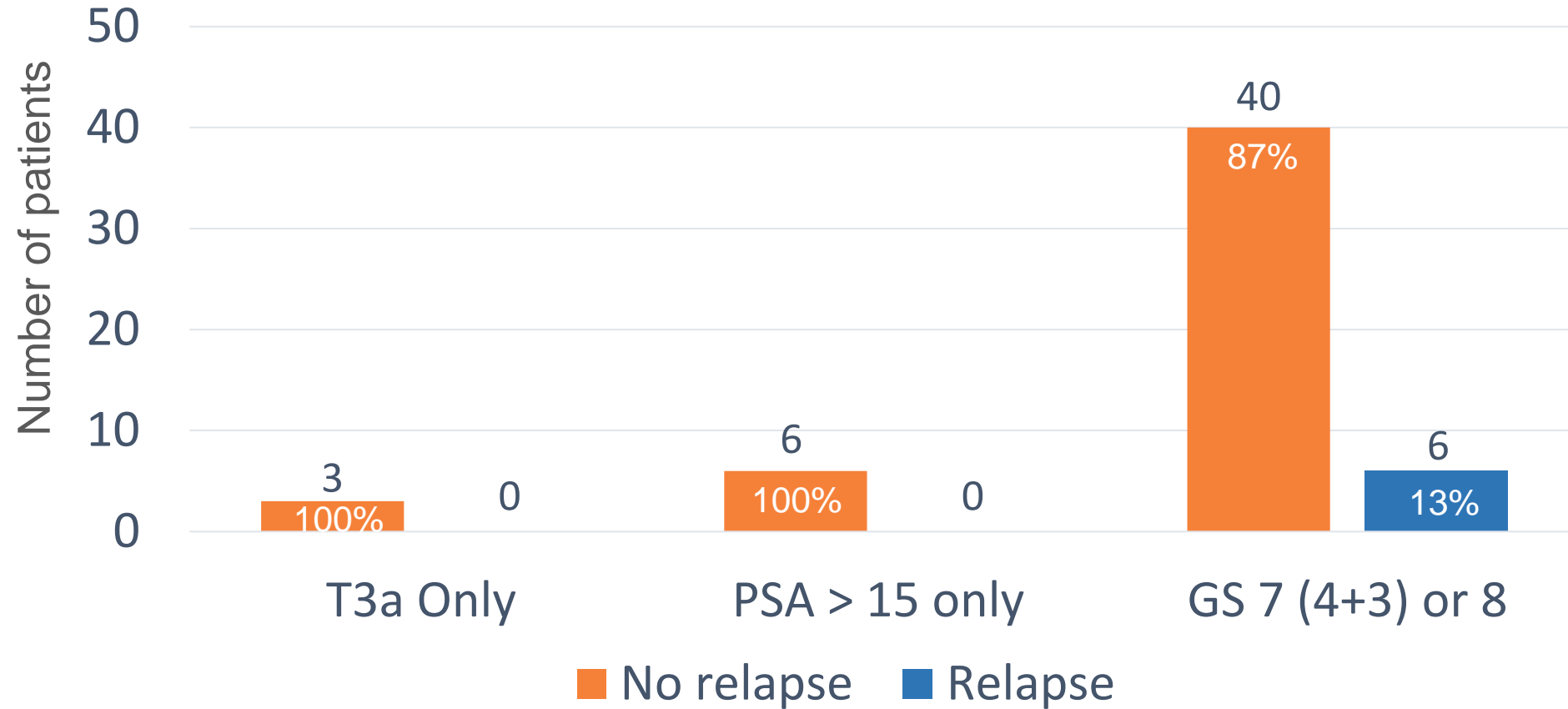
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Number of IHRFs



Relapse in patients with one IHRF only



Conclusion

- Our findings suggests that LDR brachytherapy can be considered as a treatment option for patients with prostate cancer with certain intermediate or high-risk features
- This may be particularly useful for patients unsuitable for surgery or external beam radiotherapy
- The majority of patients with IHRFs who were treated with LDR brachytherapy as a monotherapy had good long-term outcomes.
 - Further research is needed to see if patients with multiple IHRFs are suitable for LDR monotherapy
- A larger study or systematic review would be needed to confirm these findings



References:

1. Stish BJ, Davis BJ, Mynderse LA, McLaren RH, Deufel CL, Choo R. Low dose rate prostate brachytherapy [Internet]. Translational andrology and urology; 2018 [cited 2024 Apr]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6043740/>
2. Chargari C;Deutsch E;Blanchard P;Gouy S;Martelli H;Guérin F;Dumas I;Bossi A;Morice P;Viswanathan AN;Haie-Meder C; C, Deutsch E, Blanchard P. Brachytherapy: An overview for clinicians [Internet]. CA: A cancer journal for clinicians; 2019 [cited 2024 Apr]. Available from: <https://pubmed.ncbi.nlm.nih.gov/31361333/>
3. Parker C, Castro E, Fizazi K et al. Prostate cancer: ESMO clinical practice guidelines [Internet]. ESMO Guidelines Committee; 2020 [cited 2024 Apr]. Available from: [https://www.annalsofoncology.org/article/S0923-7534\(20\)39898-7/fulltext](https://www.annalsofoncology.org/article/S0923-7534(20)39898-7/fulltext)
4. Caglic I, Kovac V, Barrett T. Multiparametric MRI - local staging of prostate cancer and beyond [Internet]. Radiology and oncology; 2019 [cited 2024 Apr]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6572496/#:~:text=MpMRI%20is%20the%20recommended%20modality,site%20and%20extent%20of%20disease.>



Questions?

