

**Epstein's Criteria** for Not-Aggressive (Insignificant) Cancers

Developed before prostate MRI

- > PSA  $\leq$  10    PSA density  $\leq$  0.15
- > Biopsy Cores – Fewer than 3 positives cores  
Each core less than 50 % cancer per core
- > Gleason Grade 6
- > No Gleason grade 4 or 5
- > Cancer confined inside prostate
- > Cancer nodule volume  $<$  0.2 cc

**Risk Of Prostate Cancer Causing Illness****Low risk**Not-Aggressive, MRI score 1-2, Gleason 6, nodule volume  $\leq$  0.2 cc, confined inside prostate**Moderate risk**In-Between, MRI score 3, biopsy tissue Gleason 7 (3+4), volume  $\leq$  0.5 cc, confined inside prostate**High risk**Aggressive, MRI score 4-5, Gleason 7(4+3) 8,9,10 volume  $\geq$  0.5 cc, may involve capsule, neurovascular bundle, spread locally, adjacent, seminal vesicles, nodes or bones**References**

1. D'Amico, A.V. et al. Biochemical Outcome After Radical Prostatectomy, External Beam Radiation Therapy, or Interstitial Radiation Therapy for Clinically Localized Prostate Cancer, JAMA, September 16 1998, vol. 280, no. 11, p.969-973.
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3. Villiers, A. et al. MRI in Addition To or As a Substitute for Prostate Biopsy: The Clinicians Point of View. Diagnostic and Interventional Imaging (2012) 93, 262-264.
4. Wein, A. J. et al., Campbell-Walsh Urology 11<sup>th</sup> Edition (2016) Elsevier, chap. XIV.

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# Prostate Cancer MRI

## Accurate Diagnosis and Treatment

# Classifying Prostate Cancer



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**PSA to Prostate MRI**

for patients and curious doctors

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# Prostate Cancers

## Not-Aggressive In-Between Aggressive

indolent, insignificant, low risk  
low grade, non invasive

biologically active, significant, high risk  
high grade, invasive

### Most Prostate Cancers are Not-Aggressive

- > Common, very slow growing, causes no illness or symptoms
- > PSA slow progression, PSA density less than 0.10
- > Men with **Not-Aggressive** cancers die from other illnesses
- > Most are biopsy Gleason grade 6
- > **Not visualized on MRI**

### In-Between

- > Rate of cancer growth varies
- > PSA rates of progression varies
- > PSA density 0.10-0.15
- > Biopsy Gleason 7 (3+4) small volumes
- > Sometimes visible on MRI (cancer nodule less than 0.2 cc)

### Some Prostate Cancers are Aggressive

- > Less frequent, grow faster, can cause serious illness and death
- > PSA rapid progression, PSA density greater than 0.15
- > Cancer nodule(s) **visualized on MRI**
- > Biopsy Gleason grades 7 (4+3), 8, 9, 10

### PSA

#### For Diagnosis

no assigned normal limits

- 4 ng/ml upper limit of normal incorrect
- The higher the PSA value the greater likelihood of cancer
- Less than 4 ng/ml Aggressive cancers can be present
- Over 4 ng/ml mostly BPH caused
- PSA Density, PSA Progression **better** cancer predictors

#### After treatment

PSA is a sensitive, reliable biomarker for monitoring

## Criteria and Classifications

### Prostate MRI

**Identifies:** Cancer nodule (s), location and volume

**Predicts:** Likelihood of Cancer, 3 parameters Score (T2w, DWI/ADC, DCE)

1. Highly likely **no** cancer
2. Likely **no** cancer
3. Unsure
4. Likely cancer
5. Highly likely cancer

### Local cancer staging:

- 1 > Cancer nodule confined **inside** the prostate
- 2 > Cancer nodule involves prostate capsule
- 3 > Limited local cancer **spread** - adjacent, seminal vesicles
- 4 > Cancer **spread** involves bladder, rectum, nodes, bones

### Gleason grade (potential for causing illness)

The grade defines the biologic potential of prostate cancer cells to grow, spread and cause illness. Determined from pathologist microscopic examination of prostate tissue.

- Grade 6** Not-Aggressive (no potential)  
**7** Moderately Aggressive (low to moderate potential)  
**8,9,10** Aggressive (high potential)

### TNM Staging

Developed before prostate MRI

Describes the size of the prostate cancer, where it has spread

#### T Digital Rectal Exam (DRE) finger exam of prostate

- T1 cancer cannot be felt  
T2 cancer nodule confined to the prostate gland  
T3,T4 cancer nodule has grown outside the prostate

#### N Cancer spread to lymph nodes

- N1 a small cancer in a lymph node  
N2 a medium cancer in one node or several small cancers in several lymph nodes  
N3 a large cancer in one or more lymph nodes

#### M Cancer spread beyond lymph nodes

- M1a adjacent to the nodes  
M1b into the bones  
M1c to other parts of the body

### D'Amico Risk Classification

Developed before prostate MRI

	Low risk (favourable)	Intermediate risk	High risk (unfavourable)
PSA	< 10 ng/mL	10-20 ng/mL	> 20 ng/mL
TNM stage	T1-T2	T2	T3
Gleason Score	6	7	8, 9, 10