

# PSA Screening (Prostate-Specific Antigen)

PSA is an enzyme produced by the prostate gland. Normally, very little PSA enters the blood. Therefore, high levels of PSA in the blood can be an indicator of prostate cancer.

However, other factors can lead to high levels of PSA including:

- BPH, noncancerous enlargement of prostate gland
- Prostatitis, inflammation of prostate gland
- Recent sexual intercourse
- Advanced age
- African-American or Asian race
- Recent biopsy of prostate gland
- Recent digital rectal exam

PSA in the blood may be bound (attached to proteins) or free (not bound). Men with prostate cancer have a high percentage of bound PSA and a low percentage of free PSA.

## Probability of detecting cancer by needle biopsy based on PSA and percentage of free PSA results\*

PSA (ng/mL)	Probability of Cancer, %
0 – 2	≈ 1
2 – 4 †	15
4 – 10	25

To further determine the probability of cancer when PSA is in the 4 – 10 range, evaluate the free PSA level. The higher the percent of free PSA, the lower the probability of cancer.

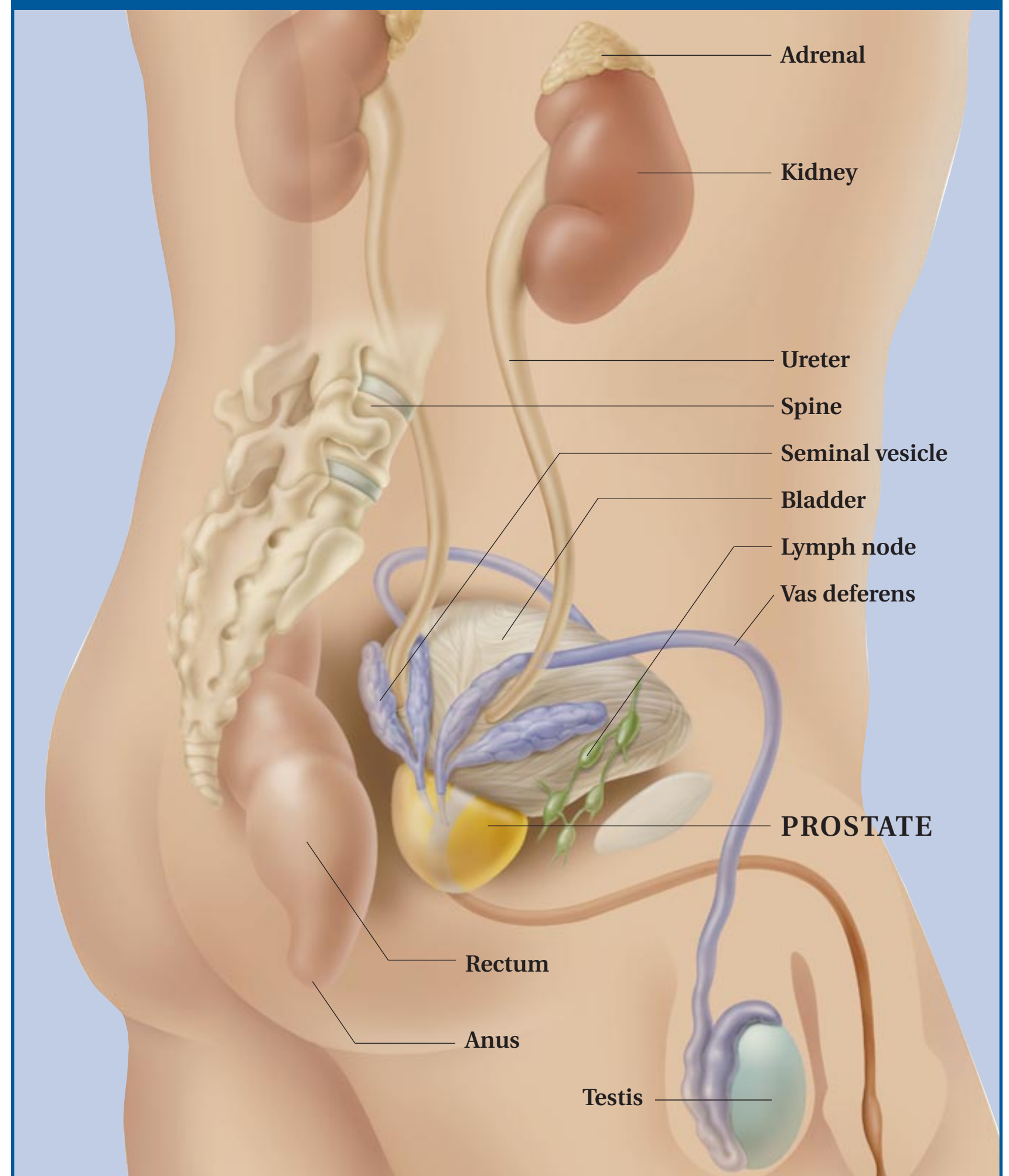
Free PSA %	Probability of Cancer, %
0 – 10	56
10 – 15	28
15 – 20	20
20 – 25	16
> 25	8

\* Data are for men with normal digital rectal examination results, regardless of patient age.

† Normal PSA values may be less for younger men.

Source: JAMA 1998; 279: 1542-1547. Reprinted with permission.

# Male Genitourinary System



# Whitmore-Jewett and TNM Staging Systems

Whitmore-Jewett and TNM are staging systems to assess how far the cancer has progressed. The Whitmore-Jewett system uses a letter from A to D to identify the stages. The TNM system evaluates the primary tumor (T), lymph nodes (N), and distant metastases (M).

## Whitmore-Jewett

### Stage A

Microscopic cancer confined to the prostate and too small to be felt by digital rectal exam.

- A1 Cancer well differentiated and confined to one site.
- A2 Cancer moderately or poorly differentiated or present in more than one site.



### Stage B

Cancer large enough to be felt on DRE.

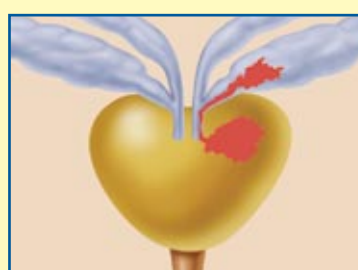
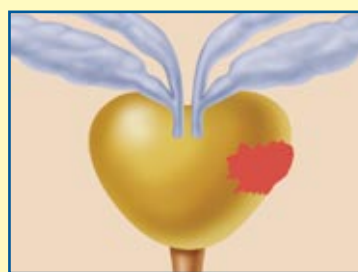
- B1 Small nodule on one lobe of prostate.
- B2 Large nodule, several small nodules, or a nodule containing poorly differentiated cells.



### Stage C

A large cancer involving nearly the entire gland.

- C1 Cancer may have spread a small distance beyond the gland.
- C2 Cancer has invaded the neighboring tissue.



### Stage D

Widespread (metastatic) cancer.

- D1 Cancer in pelvic lymph nodes.
- D2 Cancer in bone or other organs.



## TNM (Tumor, Node, Metastases)

### Primary Tumor

- TX** Primary tumor cannot be assessed
- T0** No evidence of primary tumor
- T1** Tumor not palpable nor visible by imaging
- T1a** Tumor incidental histologic finding in 5% or less of tissue resected
- T1b** Tumor incidental histologic finding in more than 5% of tissue resected
- T1c** Tumor identified by needle biopsy (e.g. because of elevated PSA)

- T2** Tumor confined within prostate\*
- T2a** Tumor involves one lobe

- T2b** Tumor involves both lobes

\* **Note:** Tumor found in one or both lobes by needle biopsy, but not palpable or reliably visible by imaging, is classified as T1c.

- T3** Tumor extends through capsule\*\*
- T3a** Tumor extends on one or both sides
- T3b** Tumor invades seminal vesicle

\*\* **Note:** Invasion into the prostatic apex or into (but not beyond) the prostatic capsule is not classified as T3, but as T2.

- T4** Tumor is fixed or invades adjacent structures other than seminal vesicles: bladder neck, external sphincter, rectum, levator muscles, and/or pelvic wall

### Regional Lymph Nodes (N)

- NX** Regional lymph nodes cannot be assessed
- N0** No regional lymph node metastasis
- N1** Metastasis in regional lymph node(s)

### Metastases (M)

- MX** Distant metastasis cannot be assessed
- M0** No distant metastasis
- M1** Distant metastasis
- M1a** Nonregional lymph node(s)
- M1b** Bone(s)
- M1c** Other site(s)

# Gleason Grading System

The Gleason Grading System is used to evaluate or “grade” prostate cancer cells obtained by needle biopsy. The cells are assigned a number between 1 and 5 — nearly normal cells are Grade 1 and the most abnormal are Grade 5. Then the scores of the two most common cell patterns are added together. Gleason scores range from 2 to 10. The higher the grade, the more aggressive the cancer.

	<b>1</b> Simple round glands, closely packed in rounded masses with well-defined edges.
	<b>2</b> Simple round glands, loosely packed in vague, rounded masses with loosely defined edges.
	<b>3A</b> Medium-sized single glands of irregular shape and irregular spacing with ill-defined infiltrating edges.
	<b>3B</b> Very similar to 3A, but small to very small glands which must not form significant chains or cords.
	<b>3C</b> Papillary and cribriform epithelium in smooth, rounded cylinders and masses; no necrosis.
	<b>4A</b> Small, medium, or large glands fused into cords, chains, or ragged, infiltrating masses.
	<b>4B</b> Very similar to 4A, but with many large clear cells, sometimes resembling “hypernephroma.”
	<b>5A</b> No glandular differentiation, solid sheets, cords, single cells, or solid nests of tumor with central necrosis.
	<b>5B</b> Anaplastic adenocarcinoma in ragged sheets.