

# An updated prostate cancer staging nomogram (Partin tables)

*based on cases from 2006 to 2011*

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## INTRODUCTION

The 'Partin tables' use commonly available preoperative data – serum PSA level, clinical stage and biopsy Gleason score – to predict pathological stage at radical prostatectomy (RP). The original Partin tables used preoperative data from men who were treated between 1982 and 1991; so most were diagnosed in the pre-PSA era [ 1 ]. Updates to the Partin tables reflected the changing nature of prostate cancer.

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**What's known on the subject?** and What does the study add? Pathological stage after radical prostatectomy can be accurately predicted by serum prostate-specific antigen level, clinical stage and biopsy Gleason sum, the 'Partin tables'. Since the previous publication of the Partin tables, an updated Gleason scoring system has been established and incremental changes have occurred in the clinical characteristics of patients diagnosed with prostate cancer. The current analysis updates the Partin nomogram in a contemporary cohort of patients.

## OBJECTIVE

- To update the 2007 Partin tables in a contemporary patient population.

## PATIENTS AND METHODS

The study population consisted of 5,629 consecutive men who underwent RP and staging lymphadenectomy at the Johns Hopkins Hospital between January 1, 2006 and July 30, 2011 and met inclusion criteria.

- Polychotomous logistic regression analysis was used to predict the probability of each pathologic stage category: organ-confined disease (OC), extraprostatic extension (EPE), seminal vesicle involvement (SV +), or lymph node involvement (LN +) based on preoperative criteria.
- Preoperative variables included biopsy Gleason score (6, 3 + 4, 4 + 3, 8, and 9 – 10), serum PSA (0 – 2.5, 2.6 – 4.0, 4.1 – 6.0, 6.1 – 10.0, greater than 10.0 ng/mL), and clinical stage (T1c, T2c, and T2b/T2c).
- Bootstrap re-sampling with 1000 replications was performed to estimate 95% confidence intervals for predicted probabilities of each pathologic state.

## RESULTS

- The median PSA was 4.9 ng/mL, 63% had Gleason 6 disease, and 78% of men had T1c disease.
  - 73% of patients had OC disease, 23% had EPE, 3% had SV + but not LN +, and 1% had LN + disease. Compared to the previous Partin nomogram, there was no change in the distribution of pathologic state.
  - The risk of LN + disease was significantly higher for tumours with biopsy Gleason 9 – 10 than Gleason 8 (O.R. 3.2, 95% CI 1.3 – 7.6).
  - The c-indexes for EPE vs. OC, SV + vs. OC, and LN + vs. OC were 0.702, 0.853, and 0.917, respectively.
  - Men with biopsy Gleason 4 + 3 and Gleason 8 had similar predicted probabilities for all pathologic stages.
  - Most men presenting with Gleason 6 disease or Gleason 3 + 4 disease have < 2% risk of harbouring LN + disease and may have lymphadenectomy omitted at RP.
- CONCLUSIONS**

The distribution of pathologic stages did not change at our institution between 2000 – 2005 and 2006 – 2011.

- The updated Partin nomogram takes into account the updated Gleason scoring system and may be more accurate for contemporary patients diagnosed with prostate cancer.

KEYWORDS prostate cancer , prostatectomy , prostate specific antigen , nomograms , staging

Table 1 Characteristics of men undergoing radical prostatectomy at Johns Hopkins Hospital, 2006 – 2011 compared with the 2000 – 2005 cohort used in the 2007 publication

	Characteristic	Current cohort	2000 – 2005 cohort
<b>Age</b>	Mean ( SD )	58.5 (6.66)	57.4 (6.36)
	Median (range)	59 (34 – 77)	58 (34 – 77)
<b>Ethnicity, n (%)</b>	White	4579 (81) *	5081 (89)
	African-American	665 (12)	372 (7)
	Hispanic	113 (2)	56 (1)
	Asian	59 (1)	58 (1)
	Other	213 (4)	158 (3)
<b>PSA (ng/mL), n (%)</b>	0 – 2.5	518 (9)	452 (8)
	2.6 – 4.0	1161 (21)	946 (17)
	4.1 – 6.0	2266 (40)	1994 (35)
	6.1 – 10.0	1219 (22)	1671 (29)
	> 10.0	465 (8)	667 (12)
	Mean ( SD )	5.8 (4.35)	6.5 (4.56)
	Median (range)	4.9 (0.2 – 67.0)	5.5 (0.1 – 64.8)
<b>Biopsy Gleason score, n (%)</b>	6	3538 (63)	4402 (77)
	3 + 4	1268 (22)	816 (14)
	4 + 3	495 (9)	348 (6)
	8	218 (4)	64 (3) †
<b>Clinical stage, n (%)</b>	T1c	4380 (78)	4419 (77)
	T2a	897 (16)	998 (17)
	T2b	307 (5)	279 (5)
	T2c	45 (1)	34 (1)
<b>Prostatectomy Gleason Score, n (%)</b>	6	2834 (50)	3693 (64)
	3 + 4	1689 (30)	1304 (23)
	4 + 3	691 (12)	425 (7)
	8	204 (4)	308 (5) †
	9 – 10	211 (4)	
<b>Pathological stage, n (%)</b>	Organ confined	4082 (73)	4204 (73)
	Extraprostatic extension	1277 (23)	1276 (22)
	Seminal vesicle involvement	191 (3)	180 (3)
	Lymph node involvement	79 (1)	70 (1)

PSA, prostate-specific antigen. \* Number of patients (percentage). † Gleason score includes Gleason 8-10