

The Prostate Cancer Outcomes Study: Fact Sheet

The Prostate Cancer Outcomes Study (PCOS) was initiated in 1994 by researchers at the National Cancer Institute (NCI) to look at the impact that treatments for primary prostate cancer have on the quality of life of patients. PCOS is a collaboration with six cancer registries that are part of NCI's Surveillance, Epidemiology, and End Results (SEER) Program. (The SEER Program was established by NCI in 1973 to collect cancer data on a routine basis from designated population-based cancer registries in various areas of the country.)

PCOS is the first systematic evaluation of health-related quality-of-life issues for prostate cancer patients conducted in diverse health care settings and provides a model for similar large follow-up studies with other cancers. It is expected that better knowledge of the effects of treatment will help patients, families, and clinicians make more informed choices about treatment alternatives. PCOS will also provide some of the most detailed data collected to date on the patterns of prostate cancer care.*

The results of PCOS will be published in various medical journals over the next few years. Those already published are listed at the end of this fact sheet.

Background

Prostate cancer is the single most common form of non-skin cancer in men in the United States. In the year 2003, an estimated 220,900 men will be diagnosed with prostate cancer, and some 28,900 will die of the disease. Prostate cancer exacts a particularly high toll on African-American men; mortality rates in African-American men are more than twice as high as rates in white men.

One of the problems facing prostate cancer patients is the uncertainty of many issues surrounding the management of the disease. It is not known, for instance, if the potential benefits of prostate cancer screening outweigh the risks, if surgery is better than radiation, or if treatment is better than no treatment in some cases.

Decisions about treatments are not easy to make. One problem is that it is difficult for a physician to predict whether a tumor will grow slowly with no health consequences to the patient, or will grow quickly and



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become life-threatening. Also, there are no randomized trials that compare the relative benefits of treating early stage patients with radiation therapy, radical prostatectomy (surgical removal of the entire prostate gland along with nearby tissues), or watchful waiting (following the patient closely and postponing aggressive therapy unless symptoms of the disease progress). About 80 percent of men diagnosed with prostate cancer have early stage disease.

In spite of all these uncertainties, it is known that certain treatments—radiation therapy, radical prostatectomy, or hormonal therapies—can have detrimental effects on urinary, bowel, and sexual functions. By collecting comprehensive data on the health outcomes of various treatments for prostate cancer, the PCOS will help patients, their families, and physicians make decisions about treatment options.

Patient Population

The Prostate Cancer Outcomes Study uses an already existing population from the NCI SEER tumor registry system. About 3,500 men from six NCI SEER cancer registries, including Connecticut, Utah, New Mexico, and the metropolitan areas of Atlanta, Ga., Los Angeles, Calif., and Seattle, Wash., are participating in the study. All of the men were diagnosed with primary invasive prostate cancer from Oct. 1, 1994, through Oct. 31, 1995; their tumors were biopsied.

Eighty-eight percent of the patients were diagnosed with clinically localized disease; 4 percent had evidence of cancer in other organs. Forty-two percent of the men were treated with radical prostatectomy, 24 percent with radiotherapy, 13 percent with hormonal therapy, and 22 percent were not treated.

One of the unique features of this study is that the participants represent a large community-based group of patients from diverse racial and ethnic backgrounds treated in a broad range of health care settings. In contrast, most previous studies lacked racial and ethnic diversity and were limited to a small number of men treated in large cancer centers or academic institutions.

Data Collection

A survey questionnaire was sent to patients at six, 12, 24, and 60 months after the initial diagnosis. The survey was designed to focus on quality-of-life issues—urinary, sexual, and bowel dysfunctions—known to be the most relevant to men with prostate cancer.

A unique aspect of the PCOS data collection was the extensive effort made to obtain information from medical records of the patients not routinely collected by SEER. These included specific diagnostic procedures, prostate-specific antigen (PSA) values, clinical stage and grade of tumor, details of treatments including specific hormonal therapies, and acute complications of therapies.

Results/Publications

Using the medical records and surveys of the prostate cancer patients, the following PCOS analyses have been published, with the most recent studies listed first:

- **Five years after diagnosis with localized prostate cancer, men treated with radical prostatectomy continue to experience worse urinary incontinence than men treated with external beam radiotherapy. However, these two forms of treatment resulted in similar outcomes in regard to overall sexual function, mostly because of a continuing decline in erectile function among external beam radiotherapy patients between 2 and 5 years of post-treatment follow-up.**

This study is a 5-year follow-up to an earlier (2-year follow-up) study noted in one of the bullets below. A total of 1,187 men, age 55-74, who were part of the PCOS, filled out a survey five years after their diagnosis (901 men had radical prostatectomy and 286 had external beam radiotherapy). The two treatment groups were not statistically significantly different with respect to multiple clinical, demographic, and economic variables between the 2- and 5-year surveys. Overall sexual function declined to approximately the same level in those who had radical prostatectomy compared to those who had external beam radiotherapy. Erectile dysfunction was more prevalent in the radical prostatectomy group, however. Approximately 14 to 16 percent of radical prostatectomy patients and 4 percent of external beam radiotherapy patients were incontinent at 5 years. Bowel urgency and pain from hemorrhoids were more common in the external beam radiotherapy group than in the radical prostatectomy group.

Previous reports in the literature have not observed the larger decline in sexual function for external beam radiotherapy patients vs. radical prostatectomy patients. Much of the decline in overall sexual function can be attributed to the increased prevalence of impotence.

The authors note that treatment for clinically localized prostate cancer has changed since these patients were initially diagnosed from 1994-1995. Improvements in surgical and beam radiotherapy techniques and dissemination of newer treatments, such as brachytherapy and androgen deprivation therapy, may produce health outcomes different from those they observed.

Reference: Potosky AL, Davis WW, Hoffman RM, Stanford JL, Stephenson RA, Penson DF and Harlan LC. Five-Year Outcomes After Prostatectomy or Radiotherapy for Prostate Cancer: The Prostate Cancer Outcomes Study. J Natl Cancer Inst 2004;96.

- **The majority of men who receive active treatment for clinically localized prostate cancer are satisfied with their treatment decision. Following radical prostatectomy or androgen deprivation therapy (ADT), Hispanic men are less satisfied than non-Hispanic white men.**

Men with early-stage prostate cancer can choose aggressive treatment or conservative management. The authors evaluated 2,365 men with clinically localized prostate cancer, diagnosed between October 1994 and October

1995, who were available for 24 months of follow-up. Medical record review and patient-completed surveys measured treatment satisfaction and provided demographic, socioeconomic, and clinical data.

Overall, 59.2 percent of subjects were delighted or very pleased with their treatment selection. The perception of being cancer free (66.4 percent), maintaining urinary control (64.2 percent) and bowel control (60.5 percent) and normal erectile function (65.9 percent), having good general health (71.3 percent), and preserving social relationships (68.1 percent) were significantly associated with being satisfied with treatment choice. Men receiving no active treatment were less satisfied (50.5 percent) than actively treated men, and Hispanic men were less satisfied than non-Hispanic white men after undergoing radical prostatectomy (50.1 percent vs. 58.0 percent) or androgen deprivation (29.7 percent vs. 71.8 percent).

The majority of men were satisfied with their treatment selection for clinically localized prostate carcinoma. Receiving an active treatment, believing oneself to be free of cancer, avoiding treatment complications, and having good overall health and social support were positively associated with satisfaction.

Reference: Hoffman RM, Hunt WC, Gilliland FD, Stephenson RA, Potosky AL. Patient satisfaction with treatment decisions for clinically localized prostate carcinoma. Results from the Prostate Cancer Outcomes Study. Cancer April 1 2003;97(7):1653-62.

- **On average, men treated for prostate cancer can expect the same general quality of life two years after diagnosis regardless of their initial choice of treatment. Men who are more bothered by urination or impotence are more likely to report worse quality of life. Individual patients must weigh the unique and significant risks of urinary, bowel, and sexual dysfunction associated with the different prostate cancer treatments.**

The goal of this study was to determine the relationship between primary treatment, urinary dysfunction, sexual dysfunction, and general health-related quality of life (HRQOL) in prostate cancer. A baseline survey of men diagnosed with prostate cancer between 1994 and 1995 was completed by 2,306 men within six to 12 months of diagnosis. These men also completed a follow-up HRQOL survey two years after diagnosis. Statistical analyses were used to determine whether primary treatment, urinary dysfunction, and sexual dysfunction were associated with general HRQOL outcomes approximately two years after diagnosis, as measured by the Medical Outcomes Study 36-item Short Form Health Survey.

The authors found that primary treatment was not associated with two-year general quality of life outcomes in men with prostate cancer. Urinary function and bother were associated with worse general quality of life. Sexual function and bother were also associated with worse general quality of life, although the relationship was not as strong as with urinary dysfunction. This implies that future research should be directed toward finding ways to improve treatment-related outcomes or help patients better cope with their post-treatment urinary or sexual dysfunction.

Reference: Penson DF, Feng Z, Kuniyuki A, McClerran D, Albertsen PC, Deapen D, Gilliland F, Hoffman R, Stephenson RA, Potosky AL, Stanford JL. General quality of life 2 years following treatment for prostate cancer: what influences outcomes? Results from the Prostate Cancer Outcomes Study. J Clin Oncol 2003; 21: 1147-54.

- **Sexual function and some aspects of physical well-being are likely to be affected in the first year following androgen deprivation therapy.**

Many men diagnosed with clinically localized prostate cancer are initially treated conservatively, receiving neither surgery nor radiotherapy for the first year. In this study, 661 men who had been newly diagnosed with clinically localized prostate cancer were followed for up to one year. Eligible men received neither surgery nor radiotherapy within one year of initial diagnosis. Two hundred and forty-five study patients received androgen deprivation therapy (ADT) and the remaining 416 patients received no therapy.

Among men who were sexually potent before diagnosis, 80 percent of those on ADT reported being impotent after one year, compared with 30 percent of those receiving no treatment. Patients receiving ADT reported more physical discomfort one year after diagnosis than did men who had received no therapy. Patients on ADT also experienced a statistically significant decline in vitality, but not in physical function. However, patients receiving ADT were more likely to be satisfied with their treatment decision than those receiving no therapy.

ADT is a commonly used therapy for clinically localized prostate cancer. The authors conclude that men considering ADT as an initial treatment should be aware that sexual function and some aspects of physical well-being are likely to be affected in the first year following this treatment.

Reference: Potosky AL, Reeve BB, Clegg LX, Hoffman RM, Stephenson RA, Albertsen PC, Gilliland FD, Stanford JL. Quality of life following localized prostate cancer treated initially with androgen deprivation therapy or no therapy. J Natl Cancer Inst 2002 Mar 20; 94(6):430-7.

- **There is strong agreement between self-report surveys and medical records, especially for more invasive procedures such as prostatectomy or radiation.**

Medical records are generally accepted as the most accurate source of information documenting cancer treatments. However, as the health care system becomes more decentralized and more cancer care is delivered in outpatient settings, it is increasingly difficult and expensive to review records from the many surgeons and medical/radiation oncologists who administer cancer therapies in the community setting.

Using 1994-1995 data, the authors compared initial treatment for prostate cancer self-reported (from a mailed questionnaire or telephone/in-person interview) by 3,196 U.S. men participating in the Prostate Cancer Outcomes Study with information obtained from medical records. Agreement between self-reports and medical records varied by type of treatment. Generally, agreement was excellent for more invasive procedures such as prostatectomy or radiation (more than 80 percent), with decreasing agreement for hormone shots and pills (less than

70 percent). These results can serve as a useful guide to researchers contemplating the use of surveys as an alternative to medical record abstraction to ascertain treatment in studies of patient outcomes.

Reference: Clegg LX, Potosky AL, Harlan LC, Hankey BF, Hoffman RM, Stanford JL, Hamilton AS. Comparison of self-reported initial treatment with medical records: results from the Prostate Cancer Outcomes Study. Am J Epidemiol 2001; 154:582-7.

- **Sexual function is the most adversely affected following external-beam radiation therapy, with problems continuing to increase between 12 and 24 months post-radiation. Bowel function problems increased at six months but were partially resolved by 24 months.**

Earlier studies have reported adverse effects of radiation therapy on sexual, bowel, and urinary function. However, most of these studies were small and conducted in referral centers or academic institutions. In comparison, this study examined long-term complications of external-beam radiation therapy for prostate cancer among a large, random sample of men with clinically localized prostate cancer from six population-based cancer registries in the United States. The study population included 497 white, Hispanic, and African-American men with localized prostate cancer who were diagnosed between October 1, 1994, and October 31, 1995, and treated initially with external-beam radiotherapy. They were interviewed at regular intervals and medical records were reviewed.

The study authors found that sexual function was the most adversely affected quality-of-life domain, with problems continuing to increase between 12 and 24 months. A total of 43 percent of men who were potent before diagnosis became impotent after 24 months, while the urinary function score at this time was relatively unchanged. Bowel function problems increased at six months, but were somewhat better by 24 months.

Despite the side effects, satisfaction with therapy was high, with more than two-thirds of the men reporting satisfaction with their treatment and that they would make the same decision again. These results are representative of men in community practice settings and may be of assistance to men and to clinicians when making treatment decisions.

Reference: Hamilton AS, Stanford JL, Gilliland FD, et al. Health outcomes after external-beam radiation therapy for clinically localized prostate cancer: results from the Prostate Cancer Outcomes Study. J Clin Oncol 2001; 19(9): 2517-26.

- **Men diagnosed with prostate cancer should be better informed of the risks and benefits of all treatment options.**

Because of the lack of results from randomized clinical trials comparing the efficacy of aggressive therapies with that of more conservative therapies for clinically localized prostate cancer, men and their physicians may select treatments based on other criteria. The authors of this study examined the association of sociodemographic and

clinical characteristics with four management options: radical prostatectomy, radiation therapy, hormonal therapy, and watchful waiting.

Three thousand seventy-three patients with clinically localized prostate cancer received the following treatments: radical prostatectomy (47.6 percent), radiation therapy (23.4 percent), hormonal therapy (10.5 percent), or watchful waiting (18.5 percent). Men age 75 or older more often received conservative treatment—hormonal therapy alone or watchful waiting—than aggressive treatment—radical prostatectomy or radiation therapy. (Almost 58 percent of men ages 75 to 79 and 82.1 percent of men age 80 and older received conservative treatment.) In men younger than 60 years, use of aggressive treatment was similar by race/ethnicity (85.5 percent for white men, 88.1 percent for African-American men, and 85.3 percent for Hispanic men). However, among men 60 years old and older, African-American men underwent aggressive treatment less often than did white men or Hispanic men. The association of nonclinical factors with treatment suggests that, in the absence of definitive information regarding treatment effectiveness, men diagnosed with prostate cancer should be better informed of the risks and benefits of all treatment options.

Reference: Harlan LC, Potosky A, Gilliland FD, Hoffman R, Albertsen PC, Hamilton AS, Eley JW, Stanford JL, Stephenson RA. Factors associated with initial therapy for clinically localized prostate cancer: Prostate Cancer Outcomes Study. J Natl Cancer Inst 2001 Dec 19;93(24): 1864-71.

- **Traditional socioeconomic, clinical, and pathologic factors can explain why Hispanic men are more likely to be diagnosed with clinically advanced-stage prostate cancer than non-Hispanic whites. By contrast, these factors do not fully explain the increased rate for African-American men.**

A group of 3,173 men diagnosed with prostate cancer between October 1, 1994, and October 31, 1995, was analyzed. Medical record abstracts and self-administered survey questionnaires were used to obtain information regarding race/ethnicity, age, marital status, insurance status, educational level, household income, employment status, comorbidity, urinary function, prostate-specific antigen level, tumor grade, and clinical stage.

Clinically advanced-stage prostate cancers were detected more frequently in African-American men (12.3 percent) and Hispanic men (10.5 percent) than in non-Hispanic white men (6.3 percent). Socioeconomic, clinical, and pathologic factors each accounted for about 15 percent of the increased risk. After further statistical analyses adjusting for these factors, the risk remained significantly increased for African-Americans, but not for Hispanics—meaning that those factors can explain the increased risk in Hispanics but not in African-Americans.

Reference: Hoffman RM, Gilliland FD, Eley JW, Harlan LC, Stephenson RA, Stanford JL, Albertsen PC, Hunt WC, Potosky AL. Factors associated with racial and ethnic differences in presenting with advanced stage prostate cancer: results from The Prostate Cancer Outcomes Study. J Natl Cancer Inst 2001;93(5):388-95.

- **Most hormone-related health outcomes are similar after surgical vs. medical hormone therapy. The stage at diagnosis has little effect on outcome.**

This study of health outcomes included 431 men newly diagnosed with all stages of prostate cancer who received primary androgen deprivation (AD) therapy but no other treatments within 12 months of initial diagnosis. Comparisons were statistically adjusted for patient sociodemographic and clinical characteristics, timing of therapy, and use of combination androgen therapy.

More than half of the patients receiving primary AD therapy had been initially diagnosed with clinically localized prostate cancer. Among these patients, almost two-thirds had a high risk that their prostate cancer would progress. Sexual function outcomes were similar by treatment group both before and after the men received AD therapy. Men who received luteinizing hormone-releasing hormone (LHRH) therapy reported more breast swelling than did patients who underwent orchiectomy (surgery to remove one or both testicles) (24.9 percent vs. 9.7 percent). LHRH patients reported more physical discomfort and worry because of cancer or its treatment than did orchiectomy patients. LHRH patients assessed their overall health as fair or poor more frequently than did orchiectomy patients (35.4 percent vs. 28.1 percent) and also were less likely to consider themselves free of prostate cancer after treatment.

The authors concluded that most endocrine (hormone)-related health outcomes are similar after surgical vs. medical primary hormonal therapy. The stage at diagnosis had little effect on outcomes. These results provide representative information comparing surgical and medical AD therapy that may be used by physicians and patients to inform treatment decisions.

Reference: Potosky AL, Knopf K, Clegg LX, Albertsen PC, Stanford JL, Hamilton AS, Gilliland FD, Eley JW, Stephenson RA, Hoffman RM. Quality-of-life outcomes after primary androgen deprivation therapy: results from the Prostate Cancer Outcomes Study. J Clin Oncol 2001;19:3750-7.

- **Men recently diagnosed with prostate cancer report few disease-related problems before diagnosis, and a high percentage of men recall this accurately six months later.**

In this study, the authors attempted to increase understanding of how accurate information about baseline health status is when it is collected six months later.

One hundred and thirty-three men diagnosed with prostate cancer completed a questionnaire shortly after diagnosis, asking about pre-diagnostic urinary, sexual, and bowel function. They were surveyed again using the same items six months later and asked to recall their pre-diagnostic function. Reports of pre-diagnostic function obtained at baseline and at six months were compared. Over 70 percent of the men reported pre-diagnostic functioning at the highest level on 12 of 17 survey items. For each of these items, recall at six months was identical to the baseline survey response for 69 percent or more of the men.

The study's data provide no convincing evidence that recall differs by treatment. Overall, the study shows that there is reasonably high agreement between baseline and six-month estimates of pre-diagnostic function. The authors also found that there was a reasonably high agreement between measures of change that were noted by a physician as they were discovered (prospective) vs. measures of change that were recalled by looking back in time (retrospective) over six months. These findings establish the basis for the use of retrospective estimates in the main PCOS study to assess changes in urinary, bowel, and sexual function.

Reference: Legler J, Potosky AL, Gilliland FD, Eley JW, Stanford JL. Validation study of retrospective recall of disease-targeted function: results from the Prostate Cancer Outcomes Study. Med Care 2000; 38(8):847-57.

- **Men with clinically localized prostate cancer who are treated with radical prostatectomy are more likely to experience urinary and sexual dysfunction than those treated with external beam radiation therapy. Bowel dysfunction, on the other hand, is more common among men receiving external radiation therapy.**

Of the 1,591 men ages 55 to 74 who were treated for localized prostate cancer and followed for two years, those receiving radical prostatectomy (1,156) reported more urinary incontinence (9.6 percent vs. 3.5 percent), and were more bothered by incontinence (11.2 percent vs. 2.3 percent) than men receiving radiotherapy (435). More men treated with prostatectomy also reported being impotent (79.6 percent vs. 62.5 percent), and among men ages 55 to 59 years, the prostatectomy patients were more bothered by their loss of sexual function than were the radiotherapy patients (59.4 percent vs. 25.3 percent). In general, men in the radical prostatectomy group recovered some urinary and sexual function during the second year after treatment, while men in the radiotherapy group remained the same or became slightly worse.

Two years after treatment, men receiving radiotherapy reported more diarrhea (37.2 percent vs. 20.9 percent) and bowel urgency (35.7 percent vs. 14.5 percent) than did men receiving radical prostatectomy. In general, prostatectomy had very little effect on bowel function while radiotherapy patients experienced a decline in bowel function within the first four months of receiving treatment and recovered some function over the two years.

No clear difference in emotional and mental health or overall physical health status was seen between the two groups.

Reference: Potosky AL, Legler J, Albertsen PC, Stanford JL, Gilliland FD, Hamilton AS, et al. Health outcomes after radical prostatectomy or radiotherapy for clinically localized prostate cancer: Results from the Prostate Cancer Outcomes Study (PCOS). J Natl Cancer Inst 2000; 92: 1582-1592.

- **Radical prostatectomy causes significant sexual dysfunction and some decline in urinary function.**

At 18 months or more after surgery, at least 8.4 percent of the patients were incontinent (lost urinary control) and at least 59.9 percent were impotent (unable to achieve an erection sufficient for sexual intercourse). At 24

months, 8.7 percent of men were bothered by the lack of urinary control; 41.9 percent reported that sexual function was a moderate-to-big problem. Nevertheless, most men were satisfied with their treatment choice.

Reference: Stanford JL, Ziding F, Hamilton AS, et al. Urinary and sexual function after radical prostatectomy for clinically localized prostate cancer. JAMA 2000;283:354-360.

- **A small percentage of newly diagnosed prostate cancer cases show evidence of metastases with imaging techniques—bone scans, computerized tomography (CT), and magnetic resonance imaging (MRI).**

Less than 5 percent of the imaging studies done for newly diagnosed prostate cancer patients showed evidence of metastases. Specifically, less than 5 percent of men with PSAs between four and 20 showed positive bone scans and less than 2 percent of men with Gleason scores of six or less had positive scans. However, for men with serum PSA levels greater than 50ng/mL and Gleason scores ranging from eight to 10, the imaging studies were positive in over 60 percent of the cases.

Reports show that physicians order bone scans for approximately two-thirds of all new patients and CT exams for about one-third of new patients. The low positive yields led the authors to question the cost-effectiveness of ordering imaging for the majority of men with newly diagnosed prostate cancer.

Reference: Albertsen PC. The positive yield of imaging studies in the evaluation of men with newly diagnosed prostate cancer: a population based analysis. J Urology 2000;163:1138-1143.

- **Three factors were found to be the best predictors of the spread of the disease outside the prostate: PSA levels, Gleason score, and age.**

The authors were looking for clinical information that could predict the spread of prostate cancer outside the capsule that encases the prostate gland (extracapsular extension**) in men who were diagnosed with localized prostate cancer (by biopsy) and treated by radical prostatectomy; 1,395 men participated in this study.

The researchers found that the strongest predictors of metastasis were high level of PSA, high Gleason score***, and age greater than 70. They reported that men older than 70 with PSAs greater than 20ng/mL, and a Gleason score of eight to 10, had an 85 percent chance of having cancer outside the prostate gland. In contrast, men younger than 50 with PSAs less than 4ng/mL, and a Gleason score less than seven, had a 24 percent chance of having cancer outside the prostate gland. PSA was the strongest single predictor. Ethnicity and region of the country were not useful for predicting metastases.

Because only about half of the men with clinically localized disease undergoing radical prostatectomy had extracapsular extension, many patients may be subjected to the risks and complications of surgery without having a

realistic possibility of cure. They also pointed out that physicians may need to reconsider the widely held view that Gleason score is the most important clinical indicator of prognosis.

Reference: Gilliland FD, Hoffman RM, Hamilton A, et al. Predicting extracapsular extension of prostate cancer in men treated with radical prostatectomy: results from the population based prostate cancer outcomes study. J Urology 1999;162:1341-1345.

On-Going Studies

Several ongoing analyses are examining:

- The effects of treatments on disease-specific function and quality of life five years after diagnosis.
- The use of complementary and alternative therapies among survivors of prostate cancer.
- The risk of recurrence and use of secondary therapies for prostate cancer.
- Treatments used for sexual dysfunction after therapy for localized disease.

* A more detailed description of PCOS is available in the following publication: Potosky AL, Harlan LC, Stanford JL, et al. Prostate Cancer Practice Patterns and Quality of Life: the Prostate Cancer Outcomes Study. *J Natl Cancer Inst* 1999;91:1719-1724.

** Extracapsular extension is defined as stage T3 or T4 tumor, positive regional lymph nodes, and tumor at the margin of the excised tumor or metastases.

*** The Gleason score is a method of grading the degree of differentiation of a tumor. If a cancer is poorly differentiated (looks like an immature cell), it is likely to be more aggressive; a well differentiated cell looks more similar to a normal cell and is usually less aggressive. The Gleason grade for each reading can range from one to five, with one being the most well differentiated and five being the most poorly differentiated. A pathologist will look at the two most poorly differentiated parts of the tumor and grade them. The Gleason score is the sum of the two grades, and so can range from two to 10. The higher the score, the poorer the prognosis.

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Related NCI materials and Web pages:

- *Treatment Choices for Men With Early-Stage Prostate Cancer*
(<http://www.cancer.gov/cancertopics/prostate-cancer-treatment-choices>)
- *What You Need To Know About™ Prostate Cancer*
(<http://www.cancer.gov/cancertopics/wyntk/prostate>)
- Prostate Cancer Home Page
(<http://www.cancer.gov/cancertopics/types/prostate>)

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