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Executive Summary

Introduction

There is widespread concern that the early detection of prostate cancer through screening programs has led to the overtreatment of localized disease.\textsuperscript{1-3} Approximately 87\% of all localized prostate cancer patients receive definitive treatment, including radical prostatectomy, radiation therapy, androgen deprivation therapy, or some combination.\textsuperscript{4,5} This occurs despite the high risk of treatment-related complications\textsuperscript{6,7} and the fact that the vast majority of prostate cancers do not cause death even when initial management is conservative.\textsuperscript{8} It is estimated that $1.32 billion could be saved annually in the U.S. by avoiding unnecessary treatment of men who will never die of their prostate cancer.\textsuperscript{9} Risk stratification using typical prognostic factors continues to leave physicians and patients with uncertainty about the aggressiveness of prostate cancer, resulting in underutilization of active surveillance (AS).\textsuperscript{10,11} Prolaris\textsuperscript{®} fills the need for a prognostic indicator that distinguishes between aggressive and indolent tumors more accurately than current clinical and pathologic features, enabling physicians to confidently tailor optimal treatment strategies for each patient.
The Prolaris Test

Prolaris is a prognostic test that directly measures tumor biology, in order to more precisely stratify patients with localized prostate cancer according to disease aggressiveness. The Prolaris test combines the RNA expression levels of 31 genes involved in cell cycle progression and 15 housekeeping genes to generate a Prolaris Score™, which has been proven in twelve published studies to be a powerful predictor of prostate cancer outcomes, providing information that is new and independent of standard clinicopathologic features, such as PSA and Gleason score. The patient’s 10-year prostate cancer-specific mortality is reported and shown graphically, compared to a cut-point which can be used to guide patient selection for active surveillance or definitive treatment. The Prolaris test report is used by the patient and physician as a decision support tool to make improved treatment choices based on the patient’s 10-year risk of dying from prostate cancer.

Intended Use Population

Prolaris is intended for men with biopsy-confirmed, localized prostate cancer, who have not received prior intervention. The assay is performed using tumor tissue from an existing biopsy sample.
The analytical validation studies for this test indicate that the Prolaris gene signature is robust and reproducible with a standard deviation of 0.1 units, representing only 1.6% of the range of scores seen in clinical validation studies for formalin-fixed paraffin-embedded prostate biopsy and radical prostatectomy (RP) samples.¹⁶,²⁴,²⁵


Myriad demonstrated analytic validity for Prolaris on formalin-fixed, paraffin-embedded (FFPE) prostate biopsy and RP samples. In a study across 7,525 samples, 99.8% of the biopsy and 100% of the RP samples produced sufficient RNA for testing.
In twelve published studies on more than 2,900 patients from multiple cohorts, using prostatectomy, transurethral resection of the prostate (TURP) and biopsy samples, Prolaris has been shown to be a strong predictor of oncologic outcomes and adds a substantial amount of independent prognostic information that is not captured by standard clinicopathologic features, such as PSA and Gleason score. Across all of these studies, the amount of prognostic information provided by Prolaris is consistent, indicating that there was not a cohort or sample bias in the studies.

Two of these validation studies were performed on diagnostic needle-biopsy samples from men with localized prostate cancer who were previously untreated, representing the current intended use population. In the first study, multivariate analysis demonstrated that the Prolaris Score was the dominant variable in predicting 10-year mortality from prostate cancer (HR=1.65, p=3x10^-5), adding prognostic information not captured by Gleason score or PSA level. In the second study, multivariate analysis
including CAPRA (a validated prediction model that incorporates age at diagnosis, PSA at diagnosis, Gleason score of the biopsy, clinical stage and percent of biopsy cores involved with cancer)\(^{26}\) demonstrated that the Prolaris Score was one of the strongest variables for predicting disease-specific mortality (HR=1.76, p<10\(^{-6}\)), and provided more independent prognostic information than any other variable. In both studies,\(^{12,13}\) hazard ratios were calculated for Prolaris and other available clinicopathologic variables in order to conduct the comparison; further, Prolaris was found to more than double the amount of prognostic information provided by PSA level and Gleason score when predicting death from disease (p=3.7x10\(^{-15}\)).\(^ {27}\) In the Prolaris test report, the final estimate of death from disease combines the Prolaris Score with CAPRA for the most predictive combination of all variables. This combination of the Prolaris Score with CAPRA, referred to as the CCR score, has a hazard ratio of 2.17 with p<10\(^{-20}\).\(^ {13}\)

The Prolaris active surveillance threshold was validated by Lin et al. using 10-year disease-specific mortality in an unselected, conservatively managed cohort. The threshold significantly dichotomized low- and high-risk disease (P = 1.2 × 10\(^{-5}\)) and there were no prostate cancer-specific deaths in men with scores below the threshold.\(^ {21}\)

This study addressed the need to predict outcome in patients diagnosed with prostate cancer by needle biopsy. Prolaris Scores were generated for 349 conservatively managed prostate cancer patients who were diagnosed by needle biopsy. The Prolaris Score correlated only weakly with standard clinicopathologic measures, indicating that it provided unique information. In a multivariate analysis, the Prolaris Score was the dominant variable in predicting 10-year mortality from prostate cancer (HR=1.65; \( p=2.6\times10^{-5} \)), adding prognostic information not captured by Gleason score or PSA level. For conservatively managed patients, the Prolaris Score was the strongest independent predictor of prostate cancer death.

The Prolaris Score, known as the CCP score, as a measure of the activity of the cell cycle progression genes, is the molecular component of Prolaris. The mortality risks predicted by CCP alone are different for the cohorts analyzed in Cuzick (2012) and Cuzick (2015) due to differences in the cohorts’ clinical characteristics. When Prolaris is used clinically, the CCP score is combined with clinical components in the form of the CAPRA score, to produce a CCR (“combined risk score”) which is used to accurately predict outcomes. Using this prespecified combination, the risk of outcomes predicted by Prolaris are similar for entirely separate cohorts. This can be visualized in Figure 2 of Cuzick (2015), which shows the risk curves by CCR for the two cohorts in Cuzick (2012) and Cuzick (2015) to be virtually identical, despite the cohorts being independent. This confirms the reproducibility of Prolaris’ prognostic accuracy and the ability of Prolaris to predict meaningful oncologic outcomes.

This study validated a combined clinical cell-cycle risk (CCR) score that incorporated prognostic molecular and clinical information to improve prostate cancer mortality (PCM) risk stratification over clinical features alone. After excluding high-risk men from the validation cohort, men with CCR scores below the threshold had a predicted mean 10-year PCM of 2.3%, and the threshold significantly dichotomized low- and high-risk disease (\( P = 0.020 \)). There were no prostate cancer-specific deaths in men with CCR scores below the threshold in either analysis. The proportion of men in the clinical testing cohort identified as candidates for AS was substantially higher using the threshold (68.8%) compared to clinicopathologic features alone (42.6%), while mean 10-year predicted PCM risks remained essentially identical (1.9% vs. 2.0%, respectively).

**Prolaris predictor of metastatic disease, with no difference in predictive performance between races or treatment groups.**

This study evaluated the utility of the Prolaris Score generated from diagnostic biopsy to predict metastatic disease in a large cohort of treated patients that is highly enriched with an African American patient population. Consistent with previous reports, the Prolaris Score was a strong predictor of metastatic disease. In this analysis, there was no evidence of an interaction between the Prolaris Score and either race or treatment (i.e., the Prolaris Score hazard ratio was not significantly different). Contrary to expectation, this study provides no evidence that African American men have more aggressive disease than non-African American men after accounting for all available molecular and clinicopathologic prognostic information.


**Prolaris predicts metastatic disease after both surgery and radiation.**

Prolaris provided independent prognostic information for predicting progression to metastatic disease after both surgery and radiation. Results demonstrate the potential use of Prolaris as a risk stratification tool in patients with newly-diagnosed prostate cancer.


**Prolaris predicts outcome after surgery.**

Prolaris was superior to the two IHC markers (PTEN and Ki-67) for predicting outcome in prostate cancer (PCa) after RP.


**Prolaris added significantly to prediction of BCR in multivariate analysis, both in overall cohort and subset of men meeting NCCN low-risk criteria.**

This study evaluated the prognostic utility of the Prolaris Score in men with National Comprehensive Cancer Network (NCCN)-defined low-risk prostate cancer (PCa) undergoing radical prostatectomy (RP) (N=236). In this cohort, the Prolaris Score improved clinical risk stratification of men who were at increased risk of biochemical recurrence (BCR), which suggests the Prolaris Score could improve the assessment of candidacy for active surveillance and guide optimum treatment selection in these patients with otherwise similar clinical characteristics.

Identify men most likely to benefit from radiation therapy.

This study evaluated the ability of the Prolaris Score to discriminate between the presence of systemic disease and local recurrence in patients with biochemical recurrence (BCR) after RP. The score proved a significant predictor of outcome in 47 patients over a median follow up time of 113 months (odds ratio 3.72; p=0.006). Consistent with previous results, this study supports the hypothesis that highly proliferative tumors are not easily identifiable based on standard clinicopathologic measures. The Prolaris Score may also be useful in predicting which tumors will respond to radiotherapy or other interventions after failing RP.


Guiding appropriate clinical care.

This study evaluated the prognostic utility of the Prolaris Score in three cohorts of men who had undergone RP, predicting patients who would have a favorable outcome following surgical therapy (N=283; N=176; N=123). Prolaris Scores were derived from simulated or diagnostic biopsy tissue and evaluated for association with BCR and metastatic disease. In all three cohorts, the Prolaris Score was associated with both BCR and metastatic disease. Combined analysis of all three cohorts (N=582) showed that the Prolaris Score was a strong predictor of BCR following RP in the multivariable analyses (HR=1.47; p=4.7x10^-5). The Prolaris Score was the strongest predictor of metastatic disease after adjusting for clinical variables (HR=4.19; p=8.2x10^-6). This study evaluated the association of Prolaris Score with BCR after surgery, but used only the amount of tumor tissue that is available in prostate needle biopsies in the analysis to generate the Prolaris Score. The similarities in the hazard ratios between this study and others suggests that the score derived from limited tissue in a needle biopsy is no less prognostic than the score derived after surgery. This suggests that the sampling bias inherent in needle biopsies has limited impact on the Prolaris Score's prognostic performance.
The purpose of this study was to validate the test in predicting BCR from a contemporary RP cohort. The Prolaris Score was assessed for independent prognostic utility beyond that of a standard clinicopathologic risk measure (the CAPRA-S score), and a score that combined the Prolaris and CAPRA-S scores was validated. Of 413 men in the cohort, 82 (19.9%) men experienced recurrence. The Prolaris Score proved to be the dominant variable in multivariate analysis for the prediction of BCR (HR=2.01; p=5.7x10^-5). Among patients in the study with low-risk Prolaris Scores, there was no recurrence of prostate cancer within the five-year study period. However, prostate cancer did recur in 50% of the patients with high-risk Prolaris Scores. The test was found to predict the risk of prostate cancer recurrence more accurately than did the current clinical parameters used in risk assessment.

This study describes the selection process for the genes that comprise the Prolaris Score, and the initial clinical validation in two patient cohorts. The Prolaris Score was derived retrospectively in one cohort of patients who had undergone RP (n=353) and in a second cohort of men with localized prostate cancer, diagnosed by use of a transurethral resection of the prostate (TURP), who were managed conservatively via a “watchful waiting” approach (n=337). In the RP cohort, the Prolaris Score was useful in multivariate analysis for predicting the primary endpoint of BCR. The hazard ratio (HR), reflecting the fold increase in risk for the defined endpoint with every one-point increase in Prolaris Score, was 1.77 (p=4.3x10^-6). The Prolaris Score and PSA concentration were the most important variables and were more significant than any other clinical variable. In the TURP cohort, the Prolaris Score was the most important variable in multivariate analysis for predicting the primary endpoint of time to death from prostate cancer.
The Prolaris Score provides significant prognostic information for death from prostate cancer. It was the strongest predictor of 10-year prostate cancer-specific mortality, as compared with other clinicopathologic measures, including Gleason score and PSA.

The Prolaris Score provides significant pre-treatment prognostic information that cannot be provided by clinical variables. This information is useful for determining which newly diagnosed men can be managed safely through conservative approaches such as AS.

Prolaris is the only test available currently that includes conservatively managed cohorts in its validation studies.
Clinical Utility and Impact of Prolaris on Patient Care

The Prolaris result directly impacts clinical management by providing physicians with an accurate measure of the indolence or aggressiveness of an individual’s prostate cancer and the chance of dying of prostate cancer within 10 years. Urologists use this information to guide initial treatment decisions, which may include active surveillance, prostatectomy, radiation therapy and/or hormone therapy, according to current guidelines.\textsuperscript{28,29}

Hu et al., an independent, non-industry funded study, reported that patients classified as low risk by a gene expression test – most often, Prolaris – were more likely to be managed by AS than those without testing, with an odds ratio of 1.84 (p=0.006).\textsuperscript{30} This finding demonstrates the clinical utility of Prolaris in confirming low-risk disease and increasing rates of AS, thus reducing overtreatment and its associated morbidities.
Another recent publication by Kaul et al. directly evaluated clinical outcomes with the use of Prolaris. Data showed 82.4% of men with low-risk prostate cancer, who also scored below the Prolaris active surveillance threshold, selected AS, compared to the national average of 42.1% for low-risk men selecting AS. The clinical outcome showed a low rate of progression of only 0.4% in the men who chose this pathway, confirming that active surveillance informed by a Prolaris result is safe.

Clinical outcomes were improved because there was a low rate of progression, and the increase in AS compared to usual care meant treatment-related morbidities were reduced or avoided. At 3 years, 70% of men who initially selected active surveillance remained on this treatment pathway, showing that this modality was durable when guided by Prolaris.
The Lin et al. study demonstrated that Prolaris improves outcomes by broadening the group of patients considered appropriate for active surveillance. In this study, only 42.6% of men met AS criteria based on clinicopathologic criteria alone; however, once the validated Prolaris active surveillance threshold was incorporated, this population increased to 68.8%. Of the men who did not qualify for AS based on clinicopathologic criteria alone, 52.2% scored below the Prolaris AS threshold indicating this treatment path was viable. This group would not have been considered for AS previously.

Two prospective, real-world clinical utility studies involving over 1,500 patients demonstrated the significant impact Prolaris has on the management of localized prostate cancer. Crawford et al. reported that 65% of patients had modifications to their planned treatment strategies after reviewing the Prolaris result, with a 50% reduction in surgical interventions and a 30% reduction in radiation treatment. Shore et al. reported that 48% of patients had a modification to their treatment approach after Prolaris, with a 34% reduction in radical prostatectomies and a 39% reduction in primary radiation.

The nature of prostate cancer (long natural history with 10-year mortality rate of less than 3.2%) precludes conducting a prospective trial in which patients are randomized with or without Prolaris and followed for 10-15 years to evaluate long-term outcomes. Prolaris has been shown to increase AS rates and reduce unnecessary interventional therapies. This results in a reduction of common therapy-related complications such as urinary incontinence, fecal incontinence and erectile dysfunction. Prolaris improves short-term outcomes by reducing treatment-related morbidity. The increase in AS rates associated with Prolaris has been shown to be safe and durable. By a chain-of-evidence argument, a reduction in interventional therapies is not expected to decrease survival, since randomized controlled studies have demonstrated that men with low-risk localized prostate cancer receive no overall survival benefit from prostatectomy or radiation, and that other major management options produce similar survival outcomes.
<table>
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<th>Citation</th>
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<td>Kaul S, et al. Clinical outcomes in men with prostate cancer who selected active surveillance using a clinical cell-cycle risk score. Per Med 2019 Nov; 16(6):491-9.</td>
<td>This study evaluated active surveillance (AS) selection, safety, and durability among men with low-risk prostate cancer assessed using the clinical cell cycle risk (CCR) score, a combined clinical and molecular score. Initial treatment selection (AS vs treatment) and duration of AS were evaluated for men with low-risk prostate cancer according to the CCR score and National Comprehensive Cancer Network (NCCN) guidelines. Results showed 82.4% (547/664) of men initially selected AS (median follow-up: 2.2 years), 0.4% (2/547) of whom experienced an adverse event. Two-thirds of patients remained on AS for more than 3 years; patient choice was the most common reason for leaving AS.</td>
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<td>Crawford ED, Scholz MC, Kar Aj, et al. Cell cycle progression score and treatment decisions in prostate cancer: results from an ongoing registry. Curr Med Res Opin 2014 Jun; 30(6):1025-31.</td>
<td>This study evaluated the impact of the Prolaris report on treatment recommendations made by physicians ordering the test commercially for patients in their practices. This study followed 331 untreated patient cases following diagnosis; the main endpoints of the study were “percentage change in treatment options selected,” and the “overall direction of change in the treatment burden before and after the test.” Physicians completed surveys regarding their treatment recommendations before and after receiving the test results and discussing them with patients. They also rated how Prolaris influenced their treatment decisions.</td>
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<td>Shore N, Kella N, Moran B, et al. Impact of the cell cycle progression test on physician and patient treatment selection for localized prostate cancer. J Urol 2016 March; 195:612-18.</td>
<td>This study added a necessary component – patient preference – to the design, representing the first large-scale prospective biomarker study to include both physician and patient consensus on prostate cancer treatment decisions. In a cohort of 1,206 patients, most of whom were initially categorized as AUA low (40.3%) or intermediate (42%) risk, the study surveyed physicians and patients during four sequential steps in the decision-making process: Prior to the Prolaris test, After return of Prolaris results, before consult between physician and patient regarding intended treatment, After return of Prolaris results and patient consult regarding intended treatment, After actual treatment (minimum three months of clinical follow-up). Results again showed a substantial impact of the Prolaris report on treatment decisions.</td>
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Patients classified as low risk by Prolaris are more likely to be managed by active surveillance (AS) than those without testing.

When Prolaris is used, more men qualify for and also choose AS compared to usual decision making and care provided without Prolaris, reducing even more treatment-related morbidities.

Prolaris provides meaningful information to prompt behavior change regarding intended therapy options in a substantial number of cases.

Prolaris stratifies risk for physicians and patients beyond that assigned by clinicopathologic features alone.

Active surveillance informed by Prolaris is safe.
Medicare Coverage and Societal Guidelines

Prolaris received a favorable technical assessment by MolDX, resulting in a positive Local Coverage Determination for Medicare beneficiaries with NCCN very low-, low-, and favorable intermediate-risk prostate cancer. NCCN prostate cancer treatment guidelines recommend consideration of molecular testing, such as Prolaris, of a patient’s tumor post-biopsy when prostate cancer presents as low- or favorable intermediate-risk and life expectancy is greater than or equal to 10 years. The American Academy of Clinical Urologists (AACU) released a position statement on genomic testing in prostate cancer that has been endorsed by the Large Urology Group Practice Association (LUGPA). The AACU references the NCCN practice guidelines for prostate cancer and states that it “support[s] the use of tissue-based molecular testing as a component of risk stratification in prostate cancer treatment decision making.”

between January 2013 and January 2019 and made recommendations regarding the clinical use and indications of certain prostate cancer biomarkers. Specifically, the Panel stated that molecular biomarkers improve risk stratification and patient management. ASCO endorses their use in situations where the results may affect a clinical decision. 


In October 2015, Prolaris received a favorable technical assessment from Palmetto GBA MolDx, indicating that it meets Medicare reasonable and necessary criteria. Palmetto GBA was the first CMS carrier to require examination of all evidence of clinical validity and clinical utility for a diagnostic test as criteria for CMS coverage and reimbursement. The favorable assessment for Prolaris resulted in the award of Medicare coverage for NCCN “low” and “very low” risk patients. In July 2017, a second favorable assessment for Prolaris resulted in the award of Medicare coverage for NCCN “favorable intermediate” patients.

NCCN clarified its suggested endpoints for molecular prostate cancer prognostic utility to include disease-specific mortality, biochemical recurrence and metastasis after treatment. Prolaris has been validated across all of these endpoints. NCCN also added a selection of favorable intermediate-risk patients as candidates for AS in its Clinical Practice Guidelines. Prolaris has been validated across all risk categories, including unfavorable intermediate and favorable intermediate risk with proven utility.

The treatment algorithm for intermediate risk patients includes footnote “n” on page PROS-4 stating that men with “favorable intermediate-risk prostate cancer (predominant Gleason grade 3 [i.e., Gleason score 3+4=7], and percentage of positive biopsy cores <50 percent, and no more than one NCCN intermediate risk factor) can be considered for active surveillance.”

NCCN also encourages the use of molecular assays to help reduce overtreatment by increasing AS, when appropriate. The NCCN guidelines list Prolaris for the initial clinical assessment of prostate cancer, regardless of risk category, in men who are symptomatic or who have life expectancy of greater than five years.

Of the prognostic tests with a NCCN recommendation, only Prolaris has been studied extensively and validated in all risk categories of both treated and conservatively managed patients.

American Society of Clinical Oncology (ASCO)

Molecular biomarkers improve risk stratification and patient management. ASCO endorses their use when the assay results are likely to affect a clinical decision.

Covered by Medicare.

Prognostic information independent of NCCN risk groups.

Expert Panel endorses prostate cancer biomarkers.
Summary and Health Economics

Physicians use the Prolaris test for men with localized prostate cancer to add precision to their clinical risk assessment. The unique information provided by Prolaris drives optimal treatment decisions, by identifying patients who can safely choose active surveillance and thereby reduce morbidities associated with unneeded interventions.30-33 This net reduction in unnecessary therapies produces an overall cost savings to the healthcare system.42


Potential cost savings to payers.

- Modeling shows that Prolaris can reduce costs by up to $2,850 per patient tested over 10 years, after accounting for test cost. These cost savings include low, intermediate and high risk men in the analysis.

- For a health plan with 10 million members, this translates to savings of more than $16 million, with two-thirds of those savings realized in the first year following diagnosis and testing.

- Additional cost savings would be realized over the longer term based on reduced progression to metastatic disease.

- When only low and intermediate risk men are included in the analysis, per patient savings in the initial year of diagnosis and treatment equals $7,510.
Supporting Publications


In patients with clinical favorable risk of cancer, GEC testing significantly increased the use of AS.

Observational study wherein patients diagnosed with localized prostate cancer were tracked through the Michigan Urological Surgery Improvement Collaborative registry. The utilization and results of three tissue-based gene expression classifiers (GECs) (Decipher Prostate Biopsy, Oncotype DX Prostate, and Prolaris) were prospectively collected. Practice patterns, predictors of GEC use, and effect of GEC results on disease management were investigated.

The rate of GEC use in individual practices ranged from 0% to 93%, and patients undergoing GEC testing were more likely to have a lower prostate-specific antigen level, lower Gleason score, lower clinical T stage, and fewer positive cores (all P < .05). Among patients with clinical favorable risk of cancer, the rate of active surveillance differed significantly among patients with a GEC result above the threshold (46.2%), those with a GEC result below the threshold (75.9%), and those who did not undergo GEC (57.9%; P < .001 for comparison of the three groups).

In patients with clinical favorable risk of cancer, GEC testing significantly increased the use of AS.
Radical prostatectomy does not significantly reduce mortality.

The PIVOT study, a randomized prospective study launched in the mid-1990s, compared long-term outcomes in men treated with RP with those followed through observation. A cohort of 731 men (mean age = 67 years) was followed for nearly 20 years. In this cohort, 40% had low-risk, 34% intermediate-risk and 21% high-risk prostate cancer. The primary outcome measured was mortality from all causes, and the secondary outcome measured was prostate cancer-specific mortality.

- RP was not associated with significantly lower all-cause or prostate cancer mortality than observation through nearly 20 years of follow-up among men with localized prostate cancer.
- Surgery may have been associated with lower all-cause mortality than observation among men with intermediate-risk disease but not among those with low-risk disease or high-risk disease, although the differences remained nonsignificant.
- Men in the study did report adverse events as a result of RP surgery: 17.1 percent reported urinary incontinence, 81.1 percent reported erectile dysfunction, and 12.2 percent reported bowel dysfunction.
- Furthermore, 21 percent of the patients who underwent surgery reported perioperative complications within 30 days after the procedure.

Active surveillance of prostate cancer does not increase death rate.

ProtecT examined 10-year outcomes in 1,643 men diagnosed with clinically localized prostate cancer between 1999 and 2009 using PSA testing and other clinical measures. These men (median age 62 years) were randomized into three clinical management groups: active monitoring (545 men), surgery (553) and radiotherapy (545).

- At a median of 10 years follow-up, prostate cancer mortality was low regardless of treatment type with no significant difference in mortality among the three groups.
- Disease progression and metastasis events did occur more frequently in the active-monitoring group as compared with the other two groups. This result highlights the need for improved risk discrimination at diagnosis (i.e., some men on AS would have benefited from treatment).
- Almost half (44%) of the men in the active-monitoring group received no further intervention during the 10-year follow-up period and thus avoided treatment side effects. For those who did ultimately pursue intervention, the change of management might have occurred for reasons other than disease progression.


This study compared functional outcomes and adverse effects associated with radical prostatectomy (RP), external beam radiation therapy (EBRT), and active surveillance. In this cohort of men with localized prostate cancer, RP was associated with a greater decrease in sexual function and urinary incontinence than either EBRT or active surveillance after 3 years and was associated with fewer urinary irritative symptoms than active surveillance.


Patients on AS experience fewer disruptive side effects.

Article discusses differences in quality of life associated with radical prostatectomy (RP), external beam radiotherapy (EBRT), brachytherapy, and active surveillance (AS) after treatment for prostate cancer. In this population-based, prospective cohort of 1141 men diagnosed from January 2011 through June 2013, RP was associated with worse sexual dysfunction and urinary incontinence compared with AS, EBRT and brachytherapy with worse short-term urinary obstruction and irritation, and EBRT with worse short-term bowel symptoms.


Active surveillance an option for low-risk men.

This study followed men with favorable-risk prostate cancer through a prospective study of AS (n=1,298 men, median age 66 years; AS involved a semiannual PSA measurement, digital rectal examination and an annual prostate biopsy). Primary outcomes measured were overall, cancer-specific and metastasis-free survival. Secondary outcomes were cumulative incidence of tumor reclassification and curative intervention. The median follow-up time for these 1,298 men was five years, though some were followed for up to 18 years. The study showed:

- Survival rates of 93% overall, 99% cancer-specific and 99.4% metastasis-free at 15 years.
- Median treatment-free survival of 8.5 years, with factors associated with reclassification being older age, PSA score, and greater number of biopsy cores.
Urinary, sexual, and bowel function and quality of life better on AS.

Patient-reported outcomes over 6 years after treatment assignment in the ProtecT trial on the effects of treatments on urinary, sexual, and bowel function and specific and general aspects of quality of life. Validated measures were completed regularly by the participants to assess these outcomes. Generally, in the active-monitoring group, sexual (including erectile) function, urinary continence and function, and bowel function were affected much less than in the treatment groups.

Better sexual and urinary health for those in AS.

In this study, the authors compared longitudinal health-related quality-of-life (HRQoL) in a prospective, racially diverse, and contemporary cohort of patients who underwent radical prostatectomy (RP) or active surveillance (AS) for low-risk PCa. No differences in mental health outcomes were observed, but urinary and sexual HRQoL were worse for patients who underwent RP compared with those who underwent AS for up to 3 years.

Avoiding unnecessary treatments reduces associated side effects.

This study compared sexual function among men with low-risk prostate cancer who chose AS with those who received RT, RP or both. Patient follow-up at six months and 12-18 months post diagnosis showed significantly less impact of disease and treatment choice on sexual function in men managed through AS (comprised of PSA screen, digital rectal exam, repeat biopsies). This study found that men with localized cancer on AS were more sexually active than men who had undergone interventional treatment; in men who were not sexually active, the causes were less often attributable to erectile dysfunction.

Treatment outcomes affecting long-term urinary, bowel, and sexual function.

For the patient, improved functional outcomes add great value to a risk-appropriate selection of conservative disease management when appropriate. Sexual, urinary and bowel dysfunction are well-established and significant functional side effects of RP and RT. A long-term study following 1,655 men who had undergone these interventional treatments showed significant functional declines after up to 15 years post-diagnosis.
Test Report

The Prolaris test report gives quick, easily absorbed and actionable information that can assist in decision-making and patient counseling. The test report provides the clinician with:

1) **The Prolaris Score™**: Reported from 1 to 10 (technical range), representing the average expression of 31 CCP genes. Each 1-unit increase in the Prolaris Score represents an approximate doubling of risk. Higher Prolaris Scores represent more aggressive cancers.

2) **NCCN Risk Analysis**: The report displays how the patient’s Prolaris Score compares to that of other tested patients within the same NCCN risk category. Each block of the graph’s bar represents one unit of the Prolaris Score with the grey box centered at the median of Prolaris Scores for patients in this category.

3) **Mortality Risk**: The U.S. Distribution Percentile indicates where the patient’s Prolaris Score falls (percentile) within a U.S. distribution of Prolaris Scores of patients in the same NCCN risk category.

4) **Active Surveillance (AS) Threshold**: A zone from 0 to 3.2%, representing the percent risk of 10-year disease specific mortality without interventional treatment. Patients who fall below the 3.2% threshold are recommended eligible for AS.

5) **Metastasis Risk**: Predicts the 10-year risk of metastases in men treated for prostate cancer.22
References


27. Data on file at Myriad Genetic Laboratories.


