Decades from now, when we fully understand the biologic basis for the clinical heterogeneity of prostate cancer, we will think of the current era as the Golden Age of Prostate Nomograms. Driven by the paucity of randomized data to guide treatment decisions, particularly in localized disease, nomograms have proliferated. Currently, there are more than 40 published prostate cancer nomograms to help with multiple decisions, from the risk of prostate cancer to survival after the development of metastatic, castration-independent disease.\(^1\) We eagerly await the publication of a nomogram of nomograms that would be able to predict all prostate cancer outcomes from a few pieces of clinical data and the point totals from all the current nomograms.

To this expanding literature, two new prostate cancer nomograms are added: Walz and colleagues’ nomogram for 10-year life expectancy for men with localized prostate cancer and Nam and colleagues’s nomogram for prostate cancer risk assessment.\(^2,3\) Both studies represent high-quality research and are welcome additions to the literature. For the non-nomogram aficionados, however, these contributions highlight a problem that grows with each new nomogram: How do we decide which (if any) to use in clinical practice? Which nomograms should be taped to the workroom wall for easy access in a busy clinic? We believe that a simple scorecard with each new nomogram can help separate the contenders for workroom status versus those relegated to the filing cabinet. This scorecard consists of four simple questions: Is the question relevant to my practice? Is the patient population relevant to my practice? Is the nomogram simple and useable? Has the nomogram been validated?

In the study of life expectancy in prostate cancer patients who are candidates for local therapy by Waltz et al, data from the comprehensive Quebec Health Plan database were used to identify men with the diagnosis of prostate cancer who had been treated with either radical prostatectomy, radiation therapy, or both during an 11-year period (all diagnosed during the prostate specific antigen [PSA] era). In order to exclude the effect of prostate cancer death from calculations of overall mortality, they excluded all men who had received any secondary therapy for prostate cancer, including any type of castration. This resulted in a sizable cohort of men (9,131), for whom they were able to calculate the Charlson Comorbidity Index, which predicts survival based on existing comorbidities, as well as overall (presumably nonprostate cancer specific) survival.\(^4\) The investigators developed a nomogram predictive of survival, which includes age, Charlson Comorbidity Index, and type of local therapy planned (radiation or surgery), and demonstrated an 85% accuracy in their split-sample validation cohort.

Turning to our back of the envelope criteria, this question is clearly relevant to clinicians who take care of patients with localized prostate cancer, where there is accumulating evidence that many patients with low risk features are overtreated.\(^5\) The patient population is germane to community-based Canadian practices, although more information would have been helpful with regard to the racial and ethnic background of the subjects studied. It is important to note that this study excludes all patients who required a secondary therapy for prostate cancer. As many patients who require a secondary prostate cancer treatment do not die of prostate cancer, and several important comorbidities may also be associated with the risk of high-grade prostate cancer (eg, obesity), this nomogram is most, if not exclusively, relevant to patients who present with low-risk localized disease.\(^6\) Despite its virtues, we did not find the nomogram clinically easy to use. First, it requires a working knowledge of the Charlson Comorbidity Index, which adds to the number of tools that need to be easily accessible to the clinician. Secondly, the nomogram’s predicted 10-year life expectancy requires that patients be divided into prostatectomy candidates or external-beam radiation therapy candidates. Many men are candidates for both forms of therapy. Moreover, this division is tautological, in that comorbidities and life expectancy are usually part of the decision as to which therapy the patient is a candidate for in the first place, so the nomogram tells us what is already known. It would have been useful if the authors had examined in detail the attributable risk for outcome based on the local therapy choice. In terms of validation, this nomogram is only validated with an internal sample, although it was compared with (and found superior to) another similar model.

The nomogram from Nam and colleagues evaluates a different question—the risk of having prostate cancer in patients undergoing PSA screening. The investigators evaluated a population of 2,700 men referred to academic centers in Toronto with a PSA ≥ 4.0 ng/mL or an abnormal digital rectal exam (DRE) for prostate biopsies together with a population of male volunteers who underwent a prostate biopsy despite a normal (< 4.0 ng/mL) PSA (408 men). In this total population of 3,108 men, 42% were found to have prostate cancer; 24% of the normal male volunteers (PSA,
< 4.0 ng/mL) and 45% of the men with for cause biopsies. Overall, 11% of the men had Gleason score 8, 9, or 10 cancers. From this data, the investigators constructed a nomogram to predict both the probability of any prostate cancer as well as the probability of high-grade (Gleason score 7 to 10) cancer using a panel of variables including age, ethnicity, family history, benign prostatic hypertrophy symptom score, PSA, percentage of free PSA, and DRE. The area under the curve (AUC), a measure of the performance of the nomogram as measured by the receiver operating characteristic (ROC) curve, was 0.74 for predicting any prostate cancer, and 0.77 for predicting high-grade cancer. The model performed slightly better than total PSA and DRE alone; interestingly, removing PSA and DRE from the model had less of an effect on the AUC than did removing all the other variables.

This nomogram performs reasonably well on our back of the envelope test. It is clearly both a relevant and an extremely important question for the group of patients with a PSA lower than 4.0 ng/dL who might not normally undergo a prostate biopsy. The population consists of patients seen in academic centers, with relatively few nonwhites. The nomogram itself is complex, with seven variables, but all the variables are readily obtainable in a urologic oncology practice. Prediction of both any cancer and high-grade prostate cancer is an important attribute. Unfortunately, the validation is only internal. In our opinion, the most relevant and clinically useful aspect of this nomogram is its ability to predict high-grade cancers in men with a PSA lower than 4.0 ng/dL, which is a truly critical issue. We would strongly suggest an external validation within a community-based cohort with many normal PSA biopsies, as in the control arm of the Prostate Cancer Prevention Study (PCPT). The PCPT investigators developed a risk calculator from this large randomized trial that incorporates some of the same variables as Nam et al, but did not consider free PSA or benign prostatic hypertrophy symptom scores, with an AUC of 0.70 for the ROC curve in the original cohort and 0.65 in the independent validation cohort. Comparing these two modern calculators/nomograms to one another (and to age-adjusted PSA cutoffs) would be valuable.

Both of these studies are potentially helpful additions to the growing number of prostate cancer nomograms that are posted on the walls of clinic workrooms. The life expectancy nomogram, while of potential great utility, has several methodological flaws and is not yet ready to be implemented in the clinic. The risk of prostate cancer nomogram, while having significant clinical promise, particularly in the normal PSA population, still needs to be externally validated and compared with the PCPT calculator and age-adjusted PSA cutoffs.

There are many critical unanswered questions in the management of prostate cancer. Our ability to answer these questions with appropriately designed prospective clinical trials has been slow at best. Until our understanding of the heterogeneity of prostate cancer expands greatly, there will be a role for nomograms to help make these difficult decisions. However, no nomogram will ever take the place of good clinical judgment and the well-informed patient.

**AUTHORS’ DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**

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**AUTHOR CONTRIBUTIONS**

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**REFERENCES**


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