A PREDICTIVE MODEL FOR SURVIVAL IN METASTATIC CANCER PATIENTS ATTENDING AN OUT-PATIENT PALLIATIVE RADIOTHERAPY CLINIC

by

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A thesis submitted in conformity with the requirements
for the degree of MSc (Clinical Epidemiology),
Graduate Department of Health Administration,
University of Toronto

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MSc Thesis

A Predictive Model for Survival in Metastatic Cancer Patients Attending an Out-Patient Palliative Radiotherapy Clinic

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Abstract

A predictive model for survival in metastatic cancer patients attending an out-patient palliative radiotherapy clinic

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For the degree of MSc (Clinical Epidemiology), Graduate Department of Health Administration, University of Toronto, 2001

Aim:

To develop a predictive model for survival in a palliative radiotherapy clinic.

Methods and Materials:

Sixteen factors were analyzed prospectively by multi-variate regression.

Results:

Six prognostic factors - primary site, site of metastases, KPS, fatigue, appetite and shortness of breath - provided a survival prediction score (SPS). Patients were divided into 3 groups. Group A ($SPS \leq 13$) with survival probability at 3, 6, and 12 months of 83%, 70%, and 51% respectively; Group B ($SPS = 14 - 19$): 67%, 41%, and 20%; and Group C ($SPS = 20-32$): 36%, 18%, and 4%. Stratification was also performed by number of risk factors. Corresponding survival probabilities were: Group I (≤ 3 risk factors): 85%, 72%, and 52%; Group II (4 risk factors): 68%, 47%, and 24%; and Group III (≥ 5 factors): 46%, 24%, and 11%.

Conclusion:

The model appears promising but requires validation.

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Chapter 1: Introduction

When cancer advances to a stage that control or curative therapy is no longer an appropriate or desired treatment option, one of the issues addressed frequently by patients and families is estimating the remaining time of survival.

Unfortunately, studies have shown that it is difficult to estimate accurately the survival once the disease is progressive and uncontrollable.

The classification of patients with advanced cancer into groups with similar and predictable survival has the potential to lead to improvement in therapeutic and care strategies, and to minimize risks of undertreatment or overtreatment.

Rationale / Relevance

Predicting the life expectancy of terminally ill cancer patients is one of the most difficult and least welcomed tasks in the oncology and palliative care community. However, such an estimate is of vital importance for patients and their families to confront end-of-life issues and plan their remaining time together. Medical professionals and health care administrators also require such estimates to guide appropriate clinical decisions, plan supportive services and allocate resource utilization (1).

Physicians are often required to predict patient survival at times of referral to hospice programs and enrollment into clinical trials (2). However, clinicians are often overly optimistic in the survival prediction of terminally ill cancer patients (3, 4). A 1993 report from the U.S. National Hospice Organization showed that more than 50% of patients with end of life cancer were not given access to hospice programs (5) or were referred too late in the course of their illness to take full advantage of the available hospice services (6). Pessimistic prediction also happens but is less common (7).

This group of fragile patients is prone to sudden death from unexpected events such as infection and bleeding (8). Inaccurate prediction of survival often results in inadequate access to palliative care. Optimistic prediction may deter patients from being involved in palliative programs at an earlier stage. Patient preferences about the trade-off between the risks and benefits associated with treatment strategies are

often based on perceptions of prognosis. Inaccurate perceptions can lead to unrealistic expectations (2). Weeks and colleagues found that patients with optimistic prognostic misperceptions often request medical therapies that most physicians would consider futile. These same patients were 8.5 times as likely to favor receiving aggressive, life-extending medical care than were patients with more accurate estimates of their 6-month survival. More disturbingly, those with overly optimistic prognoses were more likely to die in hospital on mechanical ventilation than were those patients with more realistic estimates of their survival potential. The authors suggest that terminal cancer patients' optimistically miscalibrated prognostic estimates may lead them to choose highly aggressive, invasive and ultimately futile medical care rather than palliative care (9).

Other than the clinicians' impression, survival prediction can be made from clinical parameters, biochemical variables, or a combination of both. Studies employing performance status, patient symptomatology, quality of life measures and biochemical parameters have been performed to complement the clinicians' estimates (10-12).

Terminally ill cancer patients represent a heterogeneous group, ranging from ambulatory and independent to moribund and bed-bound. Constructing common prognostic predictors for such a diverse group poses challenges to investigators (13). Moreover, most of these studies are observational in nature and are based on small retrospective series, thus making comparisons across studies difficult.

Review of Literature

Two recent systematic reviews have been performed on the survival prediction of terminally ill cancer patients (14, 15), one of which (14) was performed as part of the preparation for this thesis.

The objectives of our review were to examine the predictive ability of prognostic factors and to determine the accuracy of physicians' estimates in predicting the survival of terminal cancer patients (14). A Medline search was conducted of articles in English published between 1966 and March 2000 concerning survival prediction of terminally ill cancer patients. The keywords used for the search included "forecasting/clinical prediction", "prognosis/prognostic factors", "survival" and "neoplasm metastasis". Additional articles were identified by performing searches in Cancerlit (1983 – March 2000), Embase (1991 – March 2000), Pubmed (1966 – March 2000), Cochrane and from the reference sections of the relevant articles and reviews.

Studies were included if they met the following criteria: a) patients aged 18 and above were included and b) the study included a range of histologies representative of those seen in hospices, palliative care programs and outpatient palliative oncology settings. Since it is not common practice to perform routine blood work in these patients, studies utilizing biochemical and molecular markers were generally excluded.

Articles on clinicians' prediction of survival and prognostic factors are all descriptive studies (category of evidence: III) (Appendix 1). However, if they represent well-designed cohort studies, especially from more than one center or research group, their levels of evidence become II – a (table 1). For studies testing prognostic factors, those that have adequate sample sizes to test for independent predictors (at least 10 outcome events per variable tested), and were subsequently validated, will constitute level II – a evidence (table 2).

Three hundred and eighty-one abstracts were found. Manual checking of abstracts was performed in order to select appropriate articles as outlined in the inclusion/exclusion criteria. Articles confined to one primary cancer site, or those utilizing biochemical and molecular studies were excluded. Twelve articles on clinicians' prediction and nineteen articles on prognostic factors were identified to examine these aspects of clinical prediction of survival in terminally ill cancer patients. Clinicians' prognostic accuracy was assessed by comparing patients' actual survival to the predicted survival. Results of the studies are summarized in table 1 (3, 4, 7, 16-24).

Clinicians' prediction of survival was based on the clinical experience of the physicians and the para-medical staff. The estimates of survival reported in table 1 were obtained from a diverse group of physicians and health care professionals.

In general, clinicians' overall survival estimates tended to be inaccurate in the optimistic direction in nine of the twelve studies (3, 4, 7, 16-19, 23, 24). The definition of 'optimistic error' varied among studies but it is clear that patients often do not live as long as their physicians predict.

Prognostic determinants for terminally ill cancer patients have been increasingly investigated in the last two decades. Nineteen articles were identified which examined the prognostic indicators of survival. They are listed in table 3 (7, 10, 11, 16, 18-20, 25-35).

To determine prognostic predictors, multivariate analysis is often employed following the evaluation of each variable that is statistically significant in univariate analysis. A large number of outcome events are needed if many variables are included in the analysis. In general, results of models having fewer than 10 outcome events per independent variable are thought to have questionable accuracy (36, 37) and the usual tests of statistical significance may be invalid. Several studies (11, 18, 29, 31, 32) suffer from this deficiency. As with all statistical models, the results of multivariate analyses require validation to protect against unrecognized problems and limitations (38). Common methods for validating models include 1) performing a test analysis on a sub-sample of patients followed by a subsequent validation analysis on the remaining patients; 2) repeating the analysis on an independent sample of patients; and 3) using the 'jackknife' or 'bootstrap' procedures (39) in which the same analysis is performed multiple times on a series of subsets from the

same data set in order to evaluate the stability of the predictive ability of the model. Only a few studies underwent such validation processes (20, 35, 40) (table 2).

Among all prognostic determinants, performance status appears to be an independent prognostic factor in at least 13 of the studies (7, 10, 16, 19, 20, 25-27, 29, 31, 33-35, 40). The Karnofsky Performance Scale (KPS) is the most widely used tool to quantify the functional status of cancer patients (41, 42). The KPS is an 11-point rating scale which ranges from normal functioning (100) to dead (0) (Appendix 2).

Yates and associates observed that KPS scores accurately predicted early deaths, but high initial KPS scores did not necessarily correlate with long survival (25). Mor et al further confirmed the direct relationship between KPS and survival ($p < 0.001$) and found that lower KPS levels were likely to represent a "death-imminent" status, suggesting a high specificity for lower KPS levels (26).

In light of the potential limitations of KPS, the assessment of clinical symptoms in combination with KPS and clinicians' prediction was employed in a large study by Reuben et al (10) to help improve the ability to predict survival. They used data from the National Hospice Study (NHS), a multicentre study that compared hospice and conventional terminal care in 40 hospices and 14 non-hospice medical care settings. Fourteen symptom-related items together with KPS were analyzed on a total of 1592 patients. They found that in addition to performance status, which was the most

statistically significant clinical factor in estimating survival time, five other symptoms also had independent prognostic values. These were shortness of breath, eating problems or anorexia, trouble swallowing, dry mouth and weight loss. The prevalence of these symptoms among patients with cancer of various primary and metastatic sites supports the concept of a common final clinical pathway in patients with advanced malignancies – the terminal cancer syndrome (10). This observation has also been reported by other investigators (27, 31). Prognostic indicators of survival in other studies are detailed in table 3 and in the following summary.

Summary of Current Literature

1. Functional or performance status was best correlated with the length of survival in 13 studies (7, 10, 16, 19, 20, 25-27, 29, 31, 33-35).
2. Anorexia, weight loss and dysphagia were the next strongest predictors for survival as demonstrated in 7 of the studies (10, 18, 20, 27, 34, 35, 40). These symptoms comprise part of the 'terminal cancer syndrome' as identified by Reuben et al (10).
3. Cognitive failure and confusion were associated with shorter life span in 3 studies (11, 18, 34). The site of the primary and extent of metastatic disease were predictive of survival in 2 studies (29, 32).
4. Clinicians' predictions tended to be overly optimistic (3, 4, 7, 16-19, 23, 24).

There is fair evidence (grade B) to support using performance status and clinical parameters together with clinicians' prediction to help survival prediction. However, there is weak evidence (grade D) to support that clinicians' prediction alone be employed for the prediction of survival (Appendix 1) and in fact they can be misleading.

Vigano et al performed a similar systematic review and concluded:

1. variables definitely associated with decreased survival were: low performance status, clinical estimation of survival, cognitive impairment, anorexia, dyspnoea, xerostomia, weight loss, and dysphagia;
2. variables possibly associated were: male gender, primary cancer site, pain, serum albumin, and tachycardia;
3. variables probably not associated were: increasing age, fever, marital status, nausea, and anaemia (15).

The two systematic reviews were on prognostic factors for survival in end-stage cancer patients, regardless of their original primaries. These prognostic factors were generally available in regular clinical practice (14, 15).

Most studies were in hospice settings and only one article was in a palliation setting employing radiation as a palliative modality. Grabowski et al in their article "Factors predictive of completion of treatment and survival after palliative radiation therapy" analyzed 12 variables in 97 patients undergoing palliative radiation and concluded that performance status, site of primary, and solitary vs. multiple metastases were predictors (29). However, Harrell et al have provided arguments that for regression modeling, the number of events (deaths) should be at least ten times the number of

potential prognostic parameters (i.e. degrees of freedom) that could be included in the model; otherwise, the model will have questionable accuracy and usual tests of statistical significance become invalid (36). Grabowski's model therefore suffered from 'overfitting'. Furthermore, there is no mention in their paper as to whether the results of the multivariate analysis have been validated for an independent group of patients to protect against unrecognized problems and limitations.

In summary, most studies are small, retrospective series with statistical errors and lack of validation. In particular, there is no existing well-developed and validated predictive model in the setting of an out-patient palliative radiotherapy clinic.

Approximately 50% of the work load in radiation oncology practice is symptom palliation. The choice of optimal radiotherapy dose fractionation is often based on the radiation oncologist's estimate of patients' survival. The objective of this thesis was to develop a predictive model for survival in an out-patient palliative radiotherapy clinic to assist with (1) prognosis, (2) therapeutic decision making, for example, end of life planning and radiotherapy dose fractionations, and (3) eligibility requirements for enrollment and stratification in clinical trials.

Chapter 2: Methods and Materials

At the Toronto-Sunnybrook Regional Cancer Centre, the Rapid Response Radiotherapy Program (RRRP), a pilot program in Ontario, was started in 1996 to provide timely palliative radiotherapy. The intent of the program was to provide quick access to radiotherapy to relieve suffering and improve quality of life in this group of patients with terminal cancer. Their care is shared with community care physicians who continue to provide the overall management of palliative care. Resources are mobilized so as to allow consultation and radiotherapy to occur on the same day to reduce unnecessary difficult trips for patients to cancer centers. The referrals are mainly from the oncologists and palliative care physicians in the Greater Toronto Area.

RRRP Database

A prospective database has been set up for patients referred for palliative radiotherapy at RRRP since January 1999 (Appendix 3). We accept referrals of new patients with metastatic cancer who have not seen previously a radiation oncologist at our centre. Other patients continue to receive care from their own radiation oncologists. The referral requires a pathological diagnosis of cancer and documentation of metastatic disease either by pathological confirmation, clinical examination or imaging studies. Patients were enrolled into the database if they were able to speak English, give verbal consent and complete symptom assessment. Patients were excluded from the database if they were confused,

refused, or were unable to complete the symptom assessment. Patients in the prospective database seen in the calendar year of 1999 served as a training set to develop the predictive model for survival. Ethical approval was obtained for this project.

During the initial consultation, patient demographics, cancer history, disease status and symptom profiles were collected. Patients were asked to rate their symptom distress using the modified Edmonton Symptom Assessment Scale (ESAS). This includes a total of 9 symptoms (pain, fatigue, nausea, depression, anxiety, drowsiness, appetite, sense of well-being and shortness of breath) using an 11 point categorical scale (0-10, 0 = lack of symptom, 10 = worst possible symptom). The equivalent total daily dose of oral morphine for initial analgesic consumption during the preceding 24 hours was recorded. Analgesic consumption at the first visit was classified as none, non-opioids, weak opioids (e.g. codeine) and strong opioids (e.g. morphine and hydromorphone).

Two health care professionals (a nurse and a radiation therapist) have been trained to collect the data including the modified Edmonton Symptom Assessment Scale scores. If one of them was absent from the clinic due to vacation, conference or sick leave, no collection of data in that particular clinic took place because of the heavy clinical workload. Data entry was performed by our research assistants using the Oracle Database System.

The survival status and the date of death or last follow-up of the patients in the prospective database were obtained from the Cancer Death Registry or by telephone calls to patients and their families.

Development of a Predictive Model

Item Generation

Based on the systematic review and clinical experience, information about the following factors was collected prospectively for this study.

1. Age at first consultation in the palliative radiotherapy clinic
2. Primary cancer site (breast, prostate, lung and others)
3. Sites of metastases (bone only vs others)
4. Weight loss
5. Karnofsky Performance Status (KPS)
6. Time from first diagnosis of cancer to first consultation in the palliative radiotherapy clinic (months)
7. Analgesic consumption within 24 hours prior to first consultation
8. Pain
9. Fatigue
10. Nausea
11. Depression
12. Anxiety
13. Drowsiness

- 14. Appetite
- 15. Sense of well-being
- 16. Shortness of breath

Continuous Versus Categorical Data

Although the handling of variables as continuous has the advantage of retaining all the information, it may not be clinically practical to physicians when the outcome is reported in terms of hazard ratio per unit increase which may be difficult to interpret. It may be easier to work with categorical variables. Categorization into several subgroups is preferable if one wants to retain more information. This would also allow some idea of how the risk varies across the range of values of the prognostic factor. The choice of the best cut-off for continuous characteristics is important. The median value or the quartiles of variable distribution are commonly used to divide patients into two or more subgroups if clear clinical-biological criteria are not available. However, it is not certain that this approach can identify the cutoff with the best discriminating capacity. Selecting a cut-off point to distinguish risk groups by computing a statistical significance level for all possible cut-off points and then selecting the one with the smallest significance level is another alternative.

Of the 16 potential prognostic factors (known as co-variates), we dichotomized the following:

- a) age at first consultation for palliative radiotherapy at the median age of 68 (> 68 vs ≤ 68)

- b) site of metastases (bone only vs others)
- c) weight loss ($\geq 10\%$ over 6 months vs $< 10\%$)
- d) Karnofsky Performance Status (KPS) (> 50 vs ≤ 50)
- e) time from first diagnosis of cancer to first consultation in the palliative radiotherapy clinic (> 12 months vs ≤ 12 months)

We categorized the remaining co-variables into 4 subgroups.

Primary cancer site had 4 subgroups: breast, prostate, lung, and others.

Analgesic consumption in the preceding 24 hours was categorized as:

- a) none
- b) non-opioids
- c) weak opioids (e.g. codeine)
- d) strong opioids (e.g. morphine and hydromorphone)

This grouping was common in palliative radiotherapy trials for bone metastases (43 – 51).

The severity of pain has been classified into none (0), mild (1 – 3), moderate (4 – 7), and severe (8 – 10) in the literature (43, 45 – 50, 52 - 55). In order to avoid different cut-off points for the 9 symptoms, we subdivided all the nine symptoms in ESAS into the same 4 subgroups. To test the robustness of this approach, we also analysed the data by using the following alternative cut-offs:

- (i) none (0), mild (1 - 4), moderate (5 - 7), and severe (8 - 10);
- (ii) none (0 - 1), mild (2 - 4), moderate (5 - 7), and severe (8 - 10).

Statistical Analysis

Primary Outcome

Time to death from all causes was taken as the primary outcome. Patients who were lost to follow-up were censored at their last clinic visit. Patients who were still alive at the time of reporting were censored on the date of the telephone interview which established their status. Survival times were measured from the date of first consultation at RRRP.

Handling of Missing Data

Patients who were included in the database were compared with those not included. The following characteristics that could be obtained from the electronic medical records at the cancer centre were used for the comparison:

1. Age at first visit
2. Gender
3. Primary cancer site
4. Overall survival

Among patients included in the database, any co-variables with at least 20% missing values were eliminated from the analysis following a recommendation by Stephen George in his paper "Identification and assessment of prognostic factors" (56). If the co-variate had less than 20% missing values, we estimated the missing value with the median of that co-variate (method 1). To test the robustness of method 1 we also employed the following methods:

Method 2: Discarding the subjects with the missing data.

Method 3: Matching other patients with similar co-variate characteristics (age at first visit, primary cancer site, site of metastases, weight loss, KPS, time from first diagnosis of cancer to first consultation at our clinic, and the analgesic consumption) and replacing the missing value with the mode of that co-variate .

Method 4: Assigning a random number generated by the computer to the missing value.

Minimum Subject Requirements

When separating the patients into prognostic subgroups on the basis of differences within a co-variate, for a co-variate to be potentially prognostic, one would expect a substantial difference in outcomes among the subgroups. A minimum number of subjects is required in each subgroup for comparisons to be meaningful (56). We required arbitrarily at least 15 subjects in each subgroup.

Item Reduction

The purposes of item reduction employing univariate and multivariate analyses are 3-fold:

1. To eliminate redundant or inappropriate items.
2. To reduce the model to a manageable and feasible number of items.
3. To create a sensible and valid prognostic model.

Model Selection

The prognostic factor analysis was based on utilizing the Cox proportional hazards model (57), which can be expressed as

$$h_i(t) = h_0(t) \times \exp(b_1x_{1i} + b_2x_{2i} + \dots + b_px_{pi})$$

where $h_i(t)$ represents the hazard, or the instantaneous risk of suffering the event of interest, of patient i at time t , conditional on having been followed event-free to time t ; $h_i(t)$ is a function of a patient's underlying hazard $h_0(t)$ and co-variables x_{ji} , whose corresponding regression coefficients are represented by b_j .

The strategy for model selection was based on the hierarchic principle involving nested models. The underlying idea is that the adequacy of the fit of 2 models can be compared if the 2 models are nested. That is, the co-variables in the first model are completely contained in the second model, which has 1 or more additional co-variables. These additional co-variables can be assessed for their association with outcome by comparing the $-2 \times \log$ (maximized likelihood function) ($-2LL$) for these 2 models. In general, the maximized likelihood function for a model is a joint probability function involving at least one unknown parameter, which when solved for by the method of maximum likelihood, maximizes the probability of observing the data actually observed. Therefore, this statistic measures the extent to which the data are fitted by the model. The difference in this statistic for the nested models (referred to as the likelihood ratio test) has, approximately, a chi-squared distribution under the null hypothesis that the regression coefficients of these co-variables are zero (i.e. these additional co-variables have no association with outcome). The

number of degrees of freedom for this chi-squared distribution is the difference in the number of parameters being fitted in the 2 models.

Univariate Analysis

Each of the 16 co-variables was first examined individually for its association with outcome using Cox's proportional hazards model and the likelihood ratio test (see above). As each of the co-variables was defined as a categorical variable, one or more dummy variables (i.e. 0/1) were used in each case. In general, for k categories k-1 dummy variables are required. For example, for primary site each of the sites lung, prostate and others is explicitly defined by either a 1 (if patient belongs to that site) or 0 (patient does not belong to that site). Implicit in this is that the fourth primary site category (breast), is defined when each of the 3 indicator variables equals zero.

To protect against overfitting of the model, a rule of thumb suggested by Harrell et al. was incorporated; namely, the number of events (deaths) should exceed the number of potential co-variate degrees of freedom by a ratio of at least 10 (36). To this end and to adjust for multiple comparisons based on the multiple co-variables under consideration a significance level of 1% was chosen to guide decisions for co-variate inclusion in the subsequent multivariate analysis.

Univariate results were illustrated using Kaplan-Meier survival plots (58) and survival curves were compared using the log rank test or, if the co-variate was ordinal, the log rank test for trend (59).

Multivariate Analysis

Co-variables found to be statistically significant from the univariate analysis were then fitted jointly into a Cox model. In the presence of multiple co-variables, some might cease to be important. Each co-variate starting from the least statistically significant was dropped individually from the model and the $-2LL$'s from the nested models were compared with and without that co-variate. If the value of the difference in $-2LL$ was not increased significantly, the co-variate was discarded. Once a co-variate was dropped, the effect of omitting each of the remaining co-variables in turn was examined.

Co-variables from the univariate analysis, which were not statistically significant on their own, were at this point re-introduced into the model, one at a time. This acknowledges the possibility that in the presence of other co-variables these co-variables might show themselves to be statistically significant. This process may also result in co-variables found previously to be statistically significant losing their significance.

The above procedure avoids the use of a rigid significance level, so the multivariate analysis used a 10% level of significance to guide decisions about co-variate entry

or omission (60). The results of the multivariate analysis were summarized using P-values and 95% confidence intervals for co-variate hazard ratios (HR). A HR is a ratio of the risks for different subgroups of a co-variate. For example, for a binary co-variate such as gender where males are coded as 1 and females 0, a hazard ratio of 1.75 would imply that the risk of dying among males is 1.75 times higher than among females.

Risk Group Stratification:

1. Partial Score Method

This approach was employed in the studies of survival prediction by Italian and Japanese investigators (34,35). In order to obtain an easy-to-handle prognostic score for the prognostic factors retained in the final model, the value of each statistically significant regression co-efficient was divided by the smallest statistically significant regression co-efficient using a 10% level of significance and the results were rounded to the nearest integer, or to the nearest integer + 0.5. They were then multiplied by 2 to obtain whole numbers (partial scores). The survival prediction score (SPS) for a given patient was obtained by adding together his/her appropriate partial scores. Three risk groups with approximately equal numbers of patients in each group based on the SPS were modeled.

2. Number of Risk Factors Method

One method of risk group identification is based on the total number of risk factors a patient possesses. This approach was adopted in constructing the International Index for aggressive Non-Hodgkin's Lymphoma (61). The final prognostic co-variables from the multivariate analysis in general were classified as risk factors. For those co-variables with more than 2 subgroups, only those subgroups with a significant p value (<0.1) were classified as risk factors (table 11).

3. Prognostic Index /Nomogram Method

The third approach used to estimate prognosis in new subjects employed the prognostic index (PI) from a Cox regression model. The term in the Cox regression model by which the co-variables of the subject affect his/her hazard is $b_1x_{1i} + b_2x_{2i} + \dots + b_px_{pi}$. Denoting this expression PI, the Cox model equation simplifies to $\lambda(t, x) = \lambda_0(t)e^{PI}$.

Estimation of PI for a given subject was the first step in estimating the prognosis of that subject. The PI for a subject defined his/her place within the prognostic 'spectrum' defined by the model. The PI could be utilized further in the estimation of a survival curve, the probability of surviving for a given time and the median survival time for the subject.

From the Cox model, the cumulative survival probability $S(t, x)$ was estimated corresponding to any combination of the co-variables $x = x_1 \dots x_p$. From equation $\lambda(t, x) = -\log_e S(t, x)$, solving for $S(t, x)$ this became $S(t, x) = e^{-\lambda(t, x)}$. Following from the assumption of proportionality of the Cox model, $\lambda(t, x) = \lambda_o(t)e^{PI}$. Since $\lambda_o(t)$ was estimated in a Cox analysis for the whole range of time t from zero to the longest observation time, it was thus possible using these equations to estimate $\lambda(t, x)$ and then $S(t, x)$, which was the estimated survival curve corresponding to a given value of PI or a given combination of co-variables. For a subject having the co-variables giving a certain PI, the median survival time was estimated as the time t for which the estimated median survival curve $S(t, x)$ reached 0.5. This was repeated for the whole range of the possible PI values (62). This approach has been employed in the literature (63,64). The probabilities of survival at 3, 6, and 12 months and the median survival for the possible combinations of PI were computed in the nomogram.

Means for Studying Predictive Accuracy

Indices of predictive accuracy are useful for judging the clinical utility of a predictive model and for comparing the merits of competing predictive models. There are two major components of predictive accuracy: calibration (reliability) and discrimination.

Calibration refers to the amount of agreement between predicted and observed outcomes. For example, if the patients of a given risk group are predicted to have

an 80% chance of surviving at least 6 months, then 80% of such patients should survive at least 6 months if the model is reliable.

A list of survival probabilities was generated at all the event times for our 395 patients, based on the values of the selected co-variates in the final model for each patient. All patients were divided randomly into 8 groups (approximately 50 in each). The average predicted survival probability of patients against the actual fraction of patients surviving past 3, 6 and 12 months within each risk group was plotted.

Discrimination is the ability of a predictive model to discern patients having good outcomes from those having poor outcomes. A model predicting an 80% likelihood of living 6 months for everyone may have no discrimination ability.

Harrell et al proposed a general- purpose index of predictive discrimination called C for "concordance". The C index is the probability that for a randomly chosen pair of patients, the predicted and observed outcomes are concordant, i.e. the patient having the better outcome is the one having the better predicted outcome. A value of 0.5 indicates no predictive discrimination and a value of 1.0 indicates perfect separation of patients with different outcomes (65).

The p-value as a criterion to select statistically significant co-variates allows for the hypothesis of no effect in the given sample to be ruled out but is not a measure of clinical importance. Moreover, finding in a data-set statistically significant co-

variates does not necessarily mean that a lot is understood about prognosis. In linear regression, the proportion of variability in the outcome which is explained by a model is measured by the multiple correlation coefficient R^2 and therefore a greater predictive value can usually be assigned to a model with greater R^2 . An analogous measure for the predictive strength of a survival regression model in terms of the amount of explained variability is as follows. As the likelihood is a measure of the explained variation, the difference between the log-likelihood $LL(\hat{\beta})$ of the selected model and the log-likelihood of the model with no covariates $LL(0)$ can be transformed into a measure of the proportion of explained variation, as follows:

$$1 - \exp[-2(LL(\hat{\beta}) - LL(0))/N] \quad (N = \text{number of patients}) \quad (66).$$

Software Package

All analyses were carried out using SAS software (67).

Chapter 3: Results

Demographics

A total of 483 patients were seen in consultation at RRRP in 1999. Three hundred and ninety-five patients (82%) were included in the database that formed the training set for the predictive model for survival.

Patient characteristics are summarized in table 4. There were 198 male and 197 female patients. The median age was 68 years. Lung, breast, and prostate cancers were the most common primary sites. One third of our patients presented with more than 10% weight loss over the last 6 months.

One patient was lost to follow-up after the first visit and was censored at that time. The median survival of the 395 patients was 19.4 weeks (range 0 – 103 weeks). Three hundred and twenty-one patients had died and 74 remained alive at the time of reporting. The median follow-up of the surviving patients was 69 weeks and for the entire group, 18.7 weeks.

Eighty-eight patients were not included in the database. Of those, 73 patients had died and the median survival of this group was 15 weeks. When compared by age at first visit, gender, primary cancer site, status (alive or dead), and median survival, there were no statistically significant differences between patients included and not included in the database (table 5). The overall survival curves of the 2 groups are shown in figure 1.

Of those included in the database, seventy-six patients (19%) came from a hospital or hospice at the time of first consultation. Bone metastases were diagnosed in 70% of the patients and visceral metastases, 69%. One hundred and thirteen patients (29%) presented with bone metastases only. Seventy-two patients (18%) were referred because of brain metastases. Other events that stimulated referral were bleeding, shortness of breath, tumour mass, spinal cord compression or cauda equina syndrome.

Within 3 months prior to the first clinic visit, 109 (28%), 103 (26%) and 55 (14%) patients had received palliative chemotherapy, hormonal therapy and bisphosphonates respectively.

The distribution of analgesic consumption in the study cohort was none in 102 (26%), non-opioids in 44 (11%), weak opioids in 54 (14%) and strong opioids in 195 (49%). Their median total daily morphine equivalent was 20 mg (range 0 – 18000 mg). Their symptom distress according to the modified Edmonton Symptom Assessment Scale is listed in table 6. Fatigue was rated as the most severe symptom followed by appetite and poor sense of well-being. Three hundred and twenty eight (83%) patients were treated with palliative radiotherapy for symptom control.

Univariate analysis of effects of prognostic factors on survival

The frequency distributions of the 16 co-variables that were included are shown in figure 2. Data were complete for age, primary cancer site, site of metastases, weight loss, KPS, and analgesic consumption. None of the remaining 10 co-variables had more than 20% missing values and each subgroup formed by grouping values of each co-variate had more than 15 patients (table 7). There was no significant correlation among the 16 co-variables.

The missing values were replaced by the median in all analyses. The robustness of this method was tested by other methods and there was no change in the statistical significance, except for pain in method 3 ($p = 0.02$) (table 8). We analysed the data with our preferred cut-offs for the ESAS symptoms and the other two alternatives for the cut-offs as listed in the methods section. There was again no statistically significant difference. Based on the selection criteria of $p \leq 0.01$ for influence on survival from the univariate analysis, 12 of the 16 co-variables were chosen to enter the initial regression model. The 12 co-variables were primary cancer site, site of metastases, weight loss, KPS, time from first diagnosis of cancer to first consultation at RRRP, fatigue, nausea, depression, drowsiness, appetite, sense of well-being and shortness of breath. Their survival curves are shown in figures 3a-p. The total number of degrees of freedom on entry of selected co-variables into the regression model was 28 (table 9). Since there were 321 deaths in the database, the maximum allowed degrees of freedom was 32 in order to avoid overfitting according to Harrell's rule of thumb (36). The remaining four co-variables were not significant in

the univariate analysis. They were age at first visit, analgesic consumption within the last 24 hours of clinic visit, pain, and anxiety. They were, however, re-introduced at a later stage in the multivariate analysis as described earlier.

Multivariate analysis

The model generated from the regression analysis contained 6 significant co-variates: primary cancer site, site of metastases, KPS, fatigue, appetite, and shortness of breath (table 10). The overall p values for the co-variates and their hazard ratios are listed in table 10. The hazard ratio represents the ratio of the risks between that subgroup and the subgroup with the best outcome within that co-variate.

For the partial score method, the p value for each subgroup was calculated. The steps for calculating the partial scores were as follows (table 11):

1. Using a 10% level of significance, the value of each statistically significant regression co-efficient (β) was divided by the smallest statistically significant regression co-efficient (β of 0.26165 for shortness of breath score 1 – 3) among all regression co-efficients.
2. The result was rounded to the nearest integer, or to the nearest integer + 0.5.
3. It was then multiplied by 2 to obtain a whole number (partial score).
4. A zero was assigned to the partial score if $p > 0.1$.

The partial score approach could be used in this setting since all variables were categorical and represented by the same dummy variable system as described in the statistical section. Examples of using the partial score method were as follows. The regression co-efficient (β) for prostate was 0.66386 ($p = 0.0031$), when this was divided by the smallest significant β (0.26165), this yielded 2.5372. When rounded to the nearest integer, or to the nearest integer + 0.5, this became 2.5. This was then multiplied by 2 to give a partial score of 5 (whole number). Similarly, β for lung was 0.74021 ($p < 0.0001$), when this was divided by 0.26165, this yielded 2.82901. On rounding, this became 3.0. Again, this was multiplied by 2 to give a partial score of 6 (whole number). The p-values for fatigue score 1 – 3, appetite scores of 1 – 3 and 4 – 7 were > 0.1 , therefore the partial scores for these subgroups were assigned zero.

Our univariate analysis showed that the survival rate at 6 months was at 30% (standard error = 5.4%) for patients scoring 4 – 7 on the shortness of breath scale and 36% (standard error = 8.0%) for those scoring 8-10 respectively (table 7). This most likely stemmed from the small sample size in the subgroup of 8-10. The median survival of the 2 subgroups was the same (14 weeks). There was no reason to believe that patients in the subgroup 8-10 survived longer than the counterparts in the subgroup of 4-7. To maintain face validity, we assigned the same partial score of 4 to the subgroup of 8-10 as to the subgroup of 4-7.

Performance of the Model

The discrimination index of the model with the final 6 co-variates was greater than 0.7 (table 12). The calibration is shown in figure 4. The analogous R^2 of the model was 0.31.

Risk Group Stratification

1. Partial Score Method

The Survival Prediction Score (SPS) is defined as the sum of the partial scores for primary cancer site, site of metastases, KPS, fatigue, appetite and shortness of breath. The SPS ranged from 0 to 32. The frequency of the SPS is plotted in figure 5. Three risk groups based on the SPS were modeled. Using the SPS, 133/395 (34%) patients were classified in Group A when the SPS was 13 or less, 129/395 (33%) patients were in Group B when the SPS was 14-19, and 133/395 (34%) patients were in Group C when the SPS was 20 or more. Patients in Group A had a 3-month, 6-month, and 12-month survival estimate of 83%, 70%, and 51% respectively; patients in Group B, 67%, 41%, and 20% respectively; and patients in Group C, 36%, 18%, and 4% respectively ($p < 0.0001$) (table 13 and figure 7). Median survival and 95% confidence interval (95% CI) for each group were: Group A = 53 weeks (38 -70 weeks), Group B = 19 weeks (17 -26 weeks), Group C = 8 weeks (6 -10 weeks) ($p < 0.0001$).

Examples of using the SPS for specific patients are as follows: the SPS for a patient with breast cancer, bone metastases only, KPS = 70, fatigue score of 5, appetite

score of 4 and shortness of breath score of 3 was: $0 + 0 + 0 + 4 + 0 + 2 = 6$ (Group A). The SPS for a patient with prostate cancer, bone metastases only, KPS = 40, fatigue score of 9, appetite score of 6 and shortness of breath score of 2 was: $5 + 0 + 6 + 5 + 0 + 2 = 18$ (Group B). Another patient with lung cancer, both bone and visceral metastases, KPS = 30, fatigue score of 10, appetite score of 9 and shortness of breath score of 9, had a SPS of $6 + 6 + 6 + 5 + 4 + 4 = 31$ (Group C) (table 13).

Figure 6 demonstrates that patients classified in the three risk groups had a very different survival experience. It also shows the goodness of fit between the estimated survival curves from Cox's model and the actual outcome estimated by the Kaplan and Meier method.

2. Number of Risk Factors Method

The three groups were also stratified based on the total number of risk factors that patients possessed. For those co-variables with more than 2 subgroups, only those subgroups with a p value < 0.1 were classified as risk factors (table 11). They included:

- a) prostate, lung, and others for the primary cancer site;
- b) the subgroups of 4 – 7 and 8 – 10 for the fatigue;
- c) the subgroup of 8 – 10 for the appetite;

d) the subgroups of 1 – 3 and 4 – 7 for shortness of breath. To maintain face validity for reasons mentioned earlier, the subgroup of 8-10 was classified as a risk factor too.

The 6 risk factors were (1) non breast cancer patients, (2) patients with metastases in sites other than bone only, (3) $KPS \leq 50$, (4) fatigue score ≥ 4 , (5) appetite score of ≥ 8 and (6) shortness of breath ≥ 1 . The frequency distribution for total number of risk factors possessed by patients is listed in figure 7.

With this procedure, 98/395 (25%) patients were classified in Group I when they had 3 or less risk factors, 117/395 (30%) patients were in Group II when they had 4 risk factors, and 180/395 (46%) patients with 5 to 6 risk factors were in Group III.

Patients in Group I had a 3, 6, and 12 month survival of 85%, 72%, and 52% respectively; patients in Group II, 68%, 47%, and 24% respectively; and patients in Group III, 46%, 24%, and 11% respectively ($p < 0.0001$) (table 14 and figure 8).

Median survival and 95% confidence interval (95% CI) for each group were: Group I = 62 weeks (41 – 70 weeks), Group II = 24 weeks (18 – 29 weeks), and Group III = 11 weeks (9 – 14 weeks) ($p < 0.0001$) (table 14).

Examples of using the number of risk factors for the same set of patients are as follows: the number of risk factors for a breast cancer patient with bone only metastases, $KPS = 70$, fatigue score of 5, appetite score of 4 and shortness of breath score of 3 was 2 (Group I). The number of risk factors for the prostate cancer

patient with bone only metastases, KPS = 40, fatigue score of 9, appetite score of 6 and shortness of breath score of 2 was 4 (Group II). Similarly, the patient with lung cancer, both bone and visceral metastases, KPS = 30, fatigue score of 10, appetite score of 9 and shortness of breath score of 9 had 6 risk factors (Group III) (table 14).

3. Prognostic Index/ Nomogram Method

From the six significant co-variables in the final model, KPS (> 50 vs ≤ 50); primary cancer site (breast, prostate, lung, others), site of metastases (bone only vs others), appetite score (0, 1-3, 4-7, 8-10), fatigue score (0, 1-3, 4-7, 8-10), and shortness of breath score (0, 1-3, 4-7, 8-10), there were 1024 possible combinations for PI (i.e. $2 \times 4 \times 2 \times 4 \times 4 \times 4$). The predicted survival probabilities at 3, 6, and 12 months of the possible 1024 scenarios are listed in appendix 4. Three selected examples are shown in table 15. Again, for the breast cancer patient (bone only metastases, KPS = 70, fatigue score of 5, appetite score of 4 and shortness of breath score of 3) (i.e. scenario 42), her survival probabilities at 3, 6, and 12 months were 90% (95% CI, 85 – 94%) , 81% (73 – 89%), and 66% (55 – 79%) respectively with a median survival of 93 weeks. For the prostate cancer patient (bone only metastases, KPS = 40, fatigue score of 9, appetite score of 6 and shortness of breath score of 2) (i.e. scenario 686), his survival probabilities were 60% (46 – 79%), 37% (23 – 62%), and 15% (6 – 40%) respectively with a median survival of 18 weeks (95% CI; 9 – 27 weeks). Similarly for the lung cancer patient (both bone and visceral metastases, KPS = 30, fatigue score of 10, appetite score of 9 and shortness of breath score of

9) (i.e. scenario 896), the survival probabilities were 13% (5 – 33%), 2% (0 – 11%), and 0% (0 – 2%) respectively with a median survival of 5 weeks (95% CI; 3 – 7 weeks).

Chapter 4: Discussion

Many treatment goals and decisions are dependent on how advanced the cancer is. For patients presenting with the early stages of cancer, treatment is aimed at cure, remission, or control of the disease. As the illness progresses and the patient's condition deteriorates, the burden of treatments may begin to outweigh their benefits. Others may present with metastatic disease at initial diagnosis. When cure or remission is not possible, treatment goals may change appropriately from prolonging life to controlling symptoms and improving the quality of life. The transition from traditional to palliative care can be very difficult in caring for patients with advanced cancer. The determination of the prognosis and life expectancy is critical to the discussion of care for patients with terminal disease.

It is difficult to determine prognoses, as patients with advanced cancer may develop an acute illness (e.g. pulmonary embolus, sepsis) resulting in unexpected death. On the other hand, studies have shown that most patients who enroll in a hospice do so late in the course of their disease, when they may not benefit from all the services the hospice has to offer (5, 6, 68, 69). Moreover, a shortened length of stay in a hospice has been associated with increased suicidal ideation experienced by patients (70), as well as more difficult bereavement for caregivers (71). These studies emphasize the importance of continued research in this area to predict survival more accurately in patients near the end of life.

To date, assessing life expectancy for patients with advanced cancer has been relatively inaccurate. Studies have attempted to identify specific prognostic factors for patients near the end of life. However, most of them are small retrospective studies and suffer from statistical flaws. We attempted to analyze the potential prognostic factors collected prospectively in this group of patients with sound statistical methodology.

Statistical vs Judgemental Approaches

The selection of multiple potential prognostic factors for a prognostic model and the approach to reducing them to a manageable and feasible number can be dictated by empirical data or based on clinical judgement. These are called respectively the statistical and the judgemental approaches.

The statistical approach uses large databases to identify co-variables which are correlated with an outcome of interest. Although these statistical approaches are mostly empirically based, they all include some elements of judgment. Overt judgements are eliminated by the statistical process but subtle judgements are imbedded in the process.

The judgemental approach is used either when no empirical data are available; when the goal is to develop a measure of a clinical concept such as disease activity or disease severity where there is no gold standard; or when by the time the data

are collected the clinical environment may have changed to the point that any prediction derived from these data may be outmoded.

Methods of choosing and weighing candidate items to describe a clinical judgement include tradition, conventional wisdom, personal experience or consensus as a guide to what is important. Both the Apgar score (72, 73) and the Glasgow Coma Scale (74, 75) are 2 examples of the judgemental approach. In 1953, Virginia Apgar proposed the Apgar Score as a means of evaluating the physical condition of infants shortly after delivery. Each of the five easily identifiable characteristics – heart rate, respiratory effort, muscle tone, reflex irritability, and colour – was assessed and assigned a value of 0 – 2. The total score is the sum of the five components (72). The Glasgow Coma Scale was developed by Teasdale and Jennett. It is composed of independent observations of three aspects of behavior: eye opening (on a scale of 1 – 4), the best motor responsiveness (1 – 6), and the best verbal responsiveness (1 – 5), which, when summed, yield an overall numerical rating between 3 and 15 (74, 75).

Since the clinicians' estimate of survival of patients with metastatic cancer is often incorrect and there has been only one article from the radiation oncology setting to guide the judgemental approach, we preferred to employ the statistical approach in our model.

Choice of Measurement Tool

The Edmonton Symptom Assessment Scale (ESAS) was designed by Bruera and associates. It consists of nine 100mm visual analog scales (VAS) for pain, activity, nausea, depression, anxiety, drowsiness, appetite, sense of well being and shortness of breath (0 = lack of symptom, 100 = worst possible symptom). It is a simple and useful method for the assessment of patients receiving palliative care, and can be applied repeatedly to a very ill population (76). The ESAS was slightly modified by Philip et al for the Australian population in their longitudinal study (77). The variable 'weakness' was substituted for 'activity' as performance status was reported regularly, and a measurement of pain relief was added. These authors concluded that the modified ESAS had satisfactory face, construct and criterion validity as well as repeatability when compared with both the Rotterdam Symptom Checklist and the Brief Pain Inventory (BPI).

Chang and associates noted that the ESAS distress score correlated most closely with the physical symptom subscales of the Functional Assessment of Cancer Therapy (FACT) and the Memorial Symptom Assessment Scale (MSAS) as well as with KPS (78). The ESAS individual item and summary scores showed good internal consistency and correlated appropriately with corresponding measures from the FACT and MSAS instruments. Individual items between the instruments correlated well. Pain ratings in the ESAS, MSAS, and FACT correlated best with the "worst-pain" item of the Brief Pain Inventory (BPI). These authors confirmed that ESAS was a valid instrument.

Paice and Cohen examined the validity of a verbally administered 0 - 10 numeric (pain intensity) rating scale with the VAS using convergence methods. The correlation between the two was strong and statistically significant ($r = 0.847$, $p < 0.001$), supporting the validity of the former. They concluded that the verbally administered 0 - 10 numeric rating scale provides a useful alternative to the VAS, particularly as more contact with patients is established via telephone (79).

We have therefore further modified the ESAS to an 11- point categorical scale (0-10, 0 = lack of symptom, 10 = worst possible symptom) to facilitate a subsequent telephone follow-up. Since the ESAS has been used extensively as a measurement tool in palliative care services, our use of the modified ESAS allows us to compare symptoms of patients across studies.

Choice of Co-Variates in Item Generation

Performance status, and symptoms comprising part of the 'terminal cancer syndrome' as identified by Reuben et al (10) were most predictive of survival in the literature. We have therefore included weight loss, KPS, and the symptoms in the ESAS in the item generation phase of our study. The usual cut-off for weight loss in the literature is 10% over the last 6 months. Since the majority of our patients were referred for palliation of bone pain, we included both the severity of pain and analgesic consumption as potential prognostic factors.

Initially high KPS scores do not necessarily result in longer survival because scores frequently drop precipitously. In contrast, very low scores (10 – 20) are associated with death within 3 months. Most of our patients were ambulatory. In view of the KPS distribution in our study population, we have arbitrarily divided our patients into $KPS \leq 50$ (KPS 50 = requiring considerable assistance from others and frequent medical care) and $KPS > 50$ (KPS 60 = requiring occasional assistance from others but able to care for most needs).

From clinical experience in the clinic, patients with breast and prostate cancers survive longer in general when compared with those suffering from lung cancer; and patients with bone only metastases live longer than patients with visceral metastases. These observations explain the rationale for including the primary cancer site and site of metastasis in the univariate analysis. Primary cancer site was further categorized into 4 subgroups because patients with primaries of lung, breast, and prostate comprised the majority of the referrals.

The duration between first diagnosis of cancer and diagnosis of metastatic disease may reflect the aggressiveness of the disease. The time of first diagnosis of cancer could be accurately obtained from the pathology report or from the history. Since it was difficult to ascertain the date of diagnosis of first metastasis, we chose the time from first diagnosis of cancer to first consultation in the palliative radiotherapy clinic as a 'surrogate'. Based on the distribution of such time, we chose 12 months as the cut-off.

The age of the patient may influence not only our recommendation of the treatment options, but also our prediction of their remaining lifespan. Since increasing age is probably not associated with decreased survival in a hospice setting (15), categorizing age into several subgroups is not necessary.

It is not common practice to perform routine blood work in patients attending outpatient palliative radiotherapy clinics. We have not included any biochemical nor molecular markers in our prospective database. Moreover, the clinicians' prediction is often incorrect in the optimistic direction. Furthermore, the prediction of the clinician is likely to depend on experience and training and is poorly reproducible, and therefore we did not include this variable.

Difference in Median Survival and KPS

Since most of the studies which used prognostic factors to predict survival were performed in hospices and palliative care programs, the reported median survival was usually no longer than 12 weeks (15). To date, one of the better palliative prognostic predictions for the staging of terminally ill cancer patients was developed by a group of Italian clinicians. They employed a training set of 519 patients, with subsequent successful validation in their testing set of 451 patients, to develop their model. The median survival of the 2 sets of patients was 32 and 33 days respectively. They therefore reported the results with reference to 30-day survival probability (35, 40).

Patients attending out-patient palliative radiotherapy clinics represent a less advanced group when compared with those in hospices. The median survival of our 395 patients was 136 days (19.4 weeks). Grabowski et al reported a median survival of 4 months in 97 patients who underwent radiation treatment for metastatic cancers. Because of the longer median survival, they reported the prognostic predictors at 2, 4, 8, and 16 months (29). In the present study we have chosen to evaluate survival at 3, 6 and 12 months.

Karnofsky Performance Status has been regarded as the most important predictor for survival. Patients attending the palliative radiotherapy clinics had better KPS scores when compared with those in the hospices (table 16). One therefore needs to exercise caution in comparing the patient populations and extrapolating the prognostic predictors from hospice settings to out-patient palliative radiotherapy clinics or vice versa.

Prognostic Factors

We identified primary cancer site, site of metastases, KPS, fatigue, appetite, and shortness of breath as significant prognostic factors in the model generated from multivariate regression analysis. In previous studies of patients in their last months of survival, the site of the primary and extent of metastatic disease were predictive of survival in only 2 of 19 studies (29, 32). Most studies of advanced terminally ill cancer patients such as in hospice facilities suggest the survival of those patients is

not significantly correlated to primary cancer site, initial extent of disease at presentation, and current sites of metastases. Patients attending radiotherapy clinics are mostly ambulatory, representing a less advanced group of patients.

Performance status has shown the best correlation with the length of survival in the literature (7, 10, 16, 19, 20, 25-27, 29, 31, 33-35). Symptoms comprising part of the 'terminal cancer syndrome' identified by Reuben et al were strong predictors of poor survival, including appetite and shortness of breath (10). The significant predictors in our model were consistent with the above observation and also in keeping with those identified in the systematic review by Vigano et al (table 17) (15). Weight loss, however, was not statistically significant in our multivariate analysis, although the appetite score 8 – 10 was a significant predictor.

Llobera and colleagues identified the presence of asthenia as a major predictor of short survival (80). Asthenia is a Greek word meaning without strength. It has been defined as 'profound tiredness occurring after usual or minimal effort, accompanied by an unpleasant anticipatory sensation of generalized weakness'. It is a devastating symptom for which few effective treatments exist (81). Vigano et al reported anorexia and fatigue to be the symptoms given the highest scores for distress among terminal cancer patients. Anorexia, asthenia, and weight loss are the hallmark of cancer cachexia (82). In our population, fatigue, appetite, and poor sense of well-being received the highest scores for the symptom distress using the

modified ESAS (table 6). Fatigue was an independent predictor of survival in our model.

Based on the final model, we generated 3 risk groups with different levels of survival using 3 different methods: (1) partial score method, (2) number of risk factors method, and (3) prognostic index /nomogram method. The first and third methods took into account the different prognostic weightings whereas the second assumed equal weighting among the 6 prognostic factors. However, the nomogram requires a table and/or calculator, and is less appealing to daily practice. The former 2 methods can be condensed in pocket-size tables for easy reference (tables 18 and 19). The nomogram permits the assignment of a survival probability to each case without calculation. Alternatively the nomogram results can be readily retrieved in a palm pilot program. Nevertheless, the partial score method is preferable because of its inclusion of the prognostic weightings of the predictors and easy applicability.

Potential Limitations

Our study has several limitations. We have not included all of our patients in the year 1999. The model was developed from mentally competent English speaking patients. There may be potential important prognostic factors that have been omitted in the item generation phase of our study. Our dichotomizing some co-variables and categorizing the others into subgroups may not identify the cutoffs with the best discriminating capacity. As mentioned earlier, the sample size was small for the subgroup of patients with shortness of breath scores of 8 – 10.

Coates and associates reported that the global scale and the scales of physical, role, emotional, cognitive and social function in the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 Quality of Life (QL) Scores were each significantly predictive of subsequent survival duration in univariate analyses. Single-item QL scores for overall physical condition and overall quality of life, and the global and social functioning scales remained independently prognostic after allowing for performance status and age, and, among solid tumor patients, metastatic site (83).

The prognostic value of patient-rated performance status has been assessed (84 – 87). Loprinzi et al asked 1115 patients with advanced lung or colorectal cancer to rate their KPS and the Eastern Cooperative Oncology Group (ECOG) performance status and answer questions about their nutritional status before receiving chemotherapy (84). Physicians also rated the patients' performance status. In a Cox multivariate analysis, both the physician-judged and patient-judged performance status were independent significant predictors of survival. Physicians tended to give a higher rating of performance status than did the patients themselves. In addition, patient's own rating on nutritional factors such as appetite and food intake was a significant independent predictor for survival.

Some investigators have reported that non-clinical attributes of patients, such as religion (88, 89) and social support (90), affect survival of patients. Cancer patients

suffer from a number of psychosocial problems related to the progression of their disease as well as medical interventions. Anxiety and depression are very common problems among them. Psychotherapy, both group and individual, has been shown to be effective in improving quality of life, and in some cases, there is evidence of extended survival time (91 – 93). Moreover, Phillips and King studied whether persons were able to prolong life until they had reached a symbolically meaningful event. They showed that Jewish mortality fell sharply below the expected level just before Passover and rose by an equal amount above expected immediately afterwards. In contrast, non-Jewish control groups showed no significant fluctuation of mortality around Passover. They concluded that some Jews were briefly able to prolong life until after the Jewish holiday. They suggested that symbolic meaningful events in the patient's life and culture may have a pronounced short-term impact on mortality (94). Others have found that psychosocial factors are not associated with survival in terminally ill hospice patients (10, 95).

Future Work

The final model based on simple clinical co-variates proved to be statistically significant in a multivariate analysis. It does not require any invasive investigations including blood sampling, or any assistance from experienced physicians. The present study stresses the importance of patient's subjective symptoms. Three approaches were employed in risk group stratification. The model appears promising in this population (training set). Although the calibration and discrimination of our predictive model from the training set was satisfactory, the

analogous R^2 was 0.31. Most of the investigators do not report the R^2 result of their predictive model in the literature, therefore it is difficult to interpret the actual correlation of the analogous R^2 with the predictive ability of the model in the subsequent validation sets. Personal communication with statistician colleagues indicates that most of the predictive models reported in the literature have R^2 less than 0.4. Nevertheless, our current models from the training set will need to be validated in an independent series (testing test). Work is in progress to validate the model in the prospective database of year 2000. If the model is successfully validated in the testing test, it needs to be externally validated in similar settings in other cancer centres. Other future projects would include the comparison of predictive ability between the partial score method and number of risk factor methods, and comparison of the current model with that derived from recursive partitioning.

Potential Use of the Validated Model

The model would facilitate the decision to shift from cure to care and the subsequent enrollment of the patient in a hospice program (for example, patients in Groups C or III would be most eligible for hospice admissions). Counselling with the patients and families on expected survival can be guided by the model. This would help the patients to have realistic expectations to guide their planning of end-of life issues and treatment expectations.

Patients could be classified into prognostically homogeneous subgroups for clinical trials, thereby ensuring that important prognostic factors are well balanced between treatment groups. Patients with advanced solid tumors may be included in phase I clinical trials. In such studies, the benefit expected is generally lower than the likelihood of toxicity and may even be non-existent if the patient's life expectancy is too short. It would thus be of crucial importance to select patients for phase I studies that have a fair chance of somewhat longer survival and adequate tolerance in order to assess longer term toxicity (96, 97). Patients in Groups C or III have less than three months of life expectancy and, as they would not be assessable for the toxicity, they should not be treated in a phase I clinical trial. In contrast, patients in Groups A or I would have a life expectancy of more than six months and might experience the therapeutic benefit of a phase I clinical trial, whatever the possible toxicity.

The same consideration applies to the radiotherapy trials of bone metastases. Price et al reported a prospective randomized trial of single and multifraction radiotherapy schedules in the treatment of painful bony metastases. Compliance with the follow up was limited due to early death of the patients. Thirty percent of the study patients died within three months of randomization (52). This threatened the validity of the study conclusion. Patients in Groups C or III with median survivals of 8 and 11 weeks respectively may not be ideal candidates for future bone metastases trials.

Palliative radiation therapy plays a crucial role in maintaining quality of life for many advanced cancer patients. For those predicted to have brief survival (e.g. patients in Groups C or III), protracted radiation schedules are a burden for the patient notwithstanding the health economic issues this raises (98). Patients in this category might be more appropriately treated with single fractionation for bone metastases, and perhaps with steroid and supportive care only in patients with brain metastases in view of the questionable effectiveness of whole brain radiotherapy in patients with brief survival. Certain groups of patients may be expected to have prolonged survival. Patients in Groups A or I would be examples. In these cases, the use of more conventional fraction size and longer overall treatment time may be warranted (99), considering the potential long-term morbidity associated with a rapid fractionation scheme (29).

Application of the Future Validated Model

Research aimed at identifying prognostic factors of survival in advanced cancer patients is not only delicate but also risky. The probabilistic nature of the model acquired has to be emphasized and the use of the model requires great caution in the individual case. The survival prediction can be given only in terms of a probability (100).

The model should not delay patient access to palliative and supportive care services at an early phase in the illness when such intervention would be appropriate in meeting patient / families expectations and needs.

Guidelines have been suggested for evaluation of the methods used and of the findings from the studies on the prognostic factors. Readers should ask the following questions before they apply the model to their practice (101):

1. Epidemiological validity

- a) whether the sample of patients was representative and well-defined at a similar point in the course of the disease
- b) whether follow-up was sufficiently long and complete
- c) whether the outcome criteria used were objective and unbiased
- d) whether there was adjustment for important prognostic factors

2. Biostatistical consistency

- a) the likelihood of the outcome event(s) in a specific period of time
- b) the precision of the estimates of the likelihood

3. Clinical applicability

- a) whether the study patients were similar to one's own
- b) whether the results will lead directly to selecting or avoiding therapy
- c) whether the results are useful for reassuring or counselling patients

Studies involving multiple centers may offer the best chance of developing an accurate predictive model for survival in palliative setting (13). Future research should focus on KPS, terminal cancer syndrome, and should perhaps incorporate psychosocial correlates while avoiding routine blood work. A bedside model, the Apgar Score, has been established for prognostic determination of beginning of life

(72). A similar system applied judiciously would be of equal value at life's end and may assist in dealing with the difficult question of "how long do I have to live?" (31).

Table 1
Studies of Clinicians' Prognostic Accuracy

Author	Number of Patients	Median Estimated Survival	Median Survival	Estimated Survival/ Actual Survival	Optimistic Error	Level Of Evidence
³ Parkes, 1972	168	4.5 wk	2.5 wk	1.8	87%	III
¹⁶ Evans, 1985	42	-	-	3.17	37%	III
⁴ Heyse-Moore, 1987	50	8 wk	2 wk	4	88%	III
¹⁷ Forster, 1988	108	7 wk	3.5 wk	2	17%	III
⁷ Addington-Hall, 1990	1128	—	17.5 wk	—	12 %	III
¹⁸ Bruera, 1992	47	—	4 wk (mean)	—	56%	III
¹⁹ Maltoni, 1994	100	6 wk	5 wk	1.2	63%	III
²⁰ Maltoni, 1995	530	—	4.6 wk	CPS-- an independent prognostic predictor	—	II-a
²¹ Mackillop, 1997	39	—	—	1.15	—	III
²² Oxenham, 1998	30	—	2.4 wk	Inaccurate prediction	—	III
²³ Vigano, 1999	210	15.3 wk	14.2 wk	1.08	52%	II-a
²⁴ Christakis 2000	468	18 wk	3.4 wk	5.3	63%	II-a

CPS – Clinician's Prediction of Survival

The definition of optimistic error varied from studies to studies

Table 2
Analysis of Literature on Prognostic Indicators of Survival

Author	Number of Variables tested in univariate analysis	Prospective Validation	Level of Evidence
²⁵ Yates, 1980	N/A	N/A ^b	III
²⁶ Mor, 1983	N/A	N/A ^b	III
¹⁶ Evans, 1985	N/A	N/A ^b	III
¹⁰ Reuben, 1988	15	N	III
⁷ Addington-Hall, 1990	N/A	N	III
²⁷ Schonwetter, 1990	N/A	N	III
²⁸ Ventafridda, 1990	N/A	N	III
¹⁸ Bruera, 1992	14	N	III
²⁹ Grabowski, 1992	12	N	III
³⁰ Tsamandouraki, 1992	N/A	N	III
³¹ Rosenthal, 1993	19	N	III
³² Hardy, 1994	11	N	III
¹⁹ Maltoni, 1994	N/A	N/A ^b	III
³³ Allard, 1995	N/A	N	III
²⁰ Maltoni, 1995	23	Y ^c	II-a
¹¹ Tamburini, 1996	> 41	N	III
³⁴ Morita, 1999	22	N ^d	III
³⁵ Pirovano, 1999	36	Y	II-a

N/A- not available

Y-Yes N-no

b - subsequently validated in other studies

c - subsequently validated in later series

d - both training and testing sets described in the paper

Table 3
Prognostic Indicators of Survival

Author	Number of Patients	Prognostic Factors
²⁵ Yates, 1980	104	Low KPS scores accurately predicted early death but high initial KPS scores did not necessarily predict long survival.
²⁶ Mor, 1983	685	Direct relationship between KPS and survival
¹⁶ Evans, 1985	42	KPS correlated better with actual survival than did the clinical predictions
¹⁰ Reuben, 1988	1592	KPS, dry mouth, shortness of breath, problems eating, recent weight loss, and trouble swallowing
⁷ Addington-Hall, 1990	230	Spitzer Quality of Life Index Score – patients with a low score were more likely to die within 6 months than those with higher scores, but scores on the Index were not strong predictors of 6 month survival in individual patients.
²⁷ Schonwetter, 1990	172	Dressing ability, pulse rate, level of appetite, and transferring ability.
²⁸ Ventafridda, 1990	120	Appearance of unendurable symptoms and aggravation of previously controllable symptoms.
¹⁸ Bruera, 1992	47	Dysphagia, cognitive failure, and weight loss
²⁹ Grabowski, 1992	97	KPS, site of primary disease, and solitary site of metastases.
³⁰ Tsamandouraki, 1992	202	Home care less effective compared to hospital care
³¹ Rosenthal, 1993	148	Performance Status, admission at first referral to palliative care service, hyperbilirubinemia ($\geq 19 \mu\text{mol / L}$), and hypotension (systolic blood pressure $< 90 \text{ mmHg}$)
³² Hardy, 1994	107	In-patient until death, lung primary, intervention, dyspnea, and decubitus ulcers
¹⁹ Maltoni, 1994	100	KPS
³³ Allard, 1995	1081	Performance Status
²⁰ Maltoni, 1995	530	Clinical Prediction of Survival, anorexia, dysphagia, palliative steroid treatment, KPS, and hospitalization
¹¹ Tamburini, 1996	115	Confusion, cognitive status and global health status.
³⁴ Morita, 1999	245	Poor performance status, appetite loss, edema, dyspnea at rest, and delirium.
³⁵ Pirovano 1999	519	Dyspnea, anorexia, KPS, clinical prediction, total white blood count, and lymphocyte percentage.
⁴⁰ Maltoni 1999	451	

Ref 35 was the training set and ref 40 was the validation set

Table 4
Patient Characteristics in the database (n = 395)

Gender:

Male	198 (50%)
Female	197 (50%)

Age (Years):

Median	68 years
Range	31 – 93 years

Primary Cancer Site:

Lung	143 (36%)
Breast	80 (20%)
Prostate	56 (14%)
Gastrointestinal	42 (11%)
Unknown	38 (10%)
Others	36 (9%)

Weight Loss:

(≥ 10% over the last 6 months)	132 (33%)
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Karnofsky Performance Score:

10 – 20	2 (0.5%)
30 – 40	44 (11%)
50 – 60	163 (41%)
70 – 80	167 (42%)
90 – 100	19 (5%)

Median	60
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Range	10 – 100
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Table 5
Comparison of patients included (n = 395) and not included (n = 88) in the database

	Included	Not included	P-Value
Age at First Visit (Years)			0.7
26 – 35	2 (1%)	0 (0%)	
36 – 45	16 (4%)	5 (6%)	
46 – 55	41 (10%)	14 (16%)	
56 – 65	94 (24%)	15 (17%)	
66 – 75	148 (37%)	31 (35%)	
76 – 85	87 (22%)	19 (22%)	
≥ 86	7 (2%)	4 (5%)	
median	68	68	
range	31 – 93	39 – 90	
Gender			0.9
male	198 (50%)	45 (51%)	
female	197 (50%)	43 (49%)	
Primary Cancer Site			0.6
Lung	143 (36%)	29 (33%)	
Breast	80 (20%)	19 (22%)	
Prostate	56 (14%)	9 (10%)	
Gastrointestinal	42 (11%)	9 (10%)	
Others	74 (19%)	22 (25%)	
Status			0.3
Dead	321 (81%)	73 (83%)	
Alive	74 (19%)	15 (17%)	
Median Survival	19.4 weeks	15 weeks	
Survival Rate at 6 months	43%	35%	

Table 6
Symptom Distress according to the
Modified Edmonton Symptom Assessment Scale (n = 395)

	Median
Pain	3
Fatigue	5
Nausea	0
Depression	2
Anxiety	2
Drowsiness	3
Appetite	4
Sense of well-being	4
Shortness of breath	1

0=lack of symptom 10=worst possible symptom

Range of 9 symptoms = 0 – 10

Table 7
Univariate Survival Analysis

	Co-variates	Subgroups	Number of Patients	Missing Values (%)	Survival at 6 months (%)	Median Survival (weeks)	^a Log-Rank P-Value
1	Age at 1 st visit	≤ 68 years	207	0 (0%)	47	21	0.18
		> 68 years	188		39	19	
2	Primary Cancer Site	Lung	143	0 (0%)	34	16	< 0.0001
		Breast	80		65	52	
		Prostate	56		60	39	
		Others	116		31	14	
3	Site of Metastases	bone only	113	0 (0%)	55	29	< 0.0001
		others	282		38	16	
4	Weight loss (≥ 10% over last 6 months)	Yes	132	0 (0%)	30	14	< 0.0001
		No	263		49	26	
5	KPS	> 50	278	0 (0%)	52	27	< 0.0001
		≤ 50	117		20	8	
6	Time from 1 st diagnosis of cancer to 1 st consultation	> 12 months	202	2 (0.5%)	51	26	< 0.0001
		≤ 12 months	191		33	15	
7	Analgesic consumption within last 24 hours of 1 st consultation	none	102	0 (0%)	53	30	0.25
		non-opioids	44		36	19	
		weak opioids	54		50	26	
		strong opioids	195		37	17	
8	Pain	0	87	22 (6%)	45	20	0.1
		1 – 3	126		49	25	
		4 – 7	111		34	16	
		8 – 10	49		47	21	
9	Fatigue	0	26	34 (9%)	64	63	< 0.0001
		1 – 3	87		60	35	
		4 – 7	165		39	19	
		8 – 10	83		32	13	
10	Nausea	0	200	27 (7%)	48	24	0.0004
		1 – 3	111		44	19	
		4 – 7	41		37	19	
		8 – 10	16		6	10	
11	Depression	0	92	53 (13%)	49	24	0.004
		1 – 3	149		49	25	
		4 – 7	82		41	20	
		8 – 10	19		16	8	

Table 7
Univariate Survival Analysis

	Co-variables	Subgroups	Number of Patients	Missing Values (%)	Survival at 6 months (%)	Median Survival (weeks)	^a Log-Rank P-Value
12	Anxiety	0	72	52 (13%)	50	24	0.5
		1 – 3	143		46	19	
		4 – 7	95		41	19	
		8 – 10	33		40	16	
13	Drowsiness	0	71	36 (9%)	64	36	< 0.0001
		1 – 3	137		50	24	
		4 – 7	112		33	17	
		8 – 10	39		18	8	
14	Appetite	0	73	29 (7%)	54	33	< 0.0001
		1 – 3	102		50	24	
		4 – 7	128		45	18	
		8 – 10	63		19	11	
15	Sense of well-being	0	16	58 (15%)	69	56	< 0.0001
		1 – 3	130		52	27	
		4 – 7	151		39	18	
		8 – 10	40		29	14	
16	Shortness of breath	0	131	28 (7%)	58	34	< 0.0001
		1 – 3	126		39	18	
		4 – 7	74		30	14	
		8 – 10	36		36	14	

a-(method 1)—replacing the missing value with the median of that co-variate.

Table 8
Log-Rank P- Value for the inclusion of the missing data in the Univariate Survival Analyses using different methods

Co-variables	Method 1	Method 2	Method 3	Method 4
Time from 1 st diagnosis of cancer to 1 st consultation	< 0.0001	0.0001	0.0003	< 0.0001
Pain	0.1	0.07	0.02	0.1
Fatigue	< 0.0001	< 0.0001	< 0.0001	0.0001
Nausea	0.0004	0.0002	0.0002	0.04
Depression	0.004	0.001	0.0004	0.007
Anxiety	0.5	0.4	0.5	0.3
Drowsiness	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Appetite	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sense of well-being	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Shortness of breath	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Method 1: replacing the missing data with the median

Method 2: discarding the missing data

Method 3: matching other co-variables and replacing the missing data with the mode

Method 4: replacing the missing data with a random number

Table 9
Total number of degrees of freedom from entry of the 12 co-variables into the regression model

Co-Variates	Degrees of Freedom
Primary Cancer Site	3
Site of Metastases	1
Weight Loss	1
KPS	1
Time from 1 st diagnosis of cancer to 1 st consultation in clinic	1
Fatigue	3
Nausea	3
Depression	3
Drowsiness	3
Appetite	3
Sense of well-being	3
Shortness of breath	3
Total of 12 Co-Variates	28

For example, the number of degrees of freedom for the co-variate fatigue (subdivided into 4 subgroups: 0, 1-3, 4-7, and 8-10) is 3. According to Harrell's 10:1 rule of thumb, the maximum allowed degrees of freedoms for 321 deaths is 32.

Table 10
Co-variables that were retained in the multivariate analysis as prognostic for survival with their p-values and hazard ratios

	P-Value	Hazard ratio (95% CI)
PRIMARY CANCER SITE	<0.0001	
BREAST		1.00
PROSTATE		1.94 (1.25- 3.01)
LUNG		2.10 (1.48- 2.96)
OTHERS		2.49 (1.75- 3.50)
SITE OF METASTASES	<0.0001	
BONE METASTASES ONLY		1.00
OTHERS		2.07 (1.54- 2.78)
KPS	<0.0001	
>50		1.00
≤50		2.10 (1.64- 2.69)
ESAS FATIGUE SCORE	0.005	
0		1.00
1-3		1.26 (0.71- 2.21)
4-7		1.66 (0.96- 2.86)
8-10		1.84 (1.02- 3.32)
ESAS APPETITE SCORE	0.009	
0		1.00
1-3		1.00 (0.69- 1.43)
4-7		1.00 (0.71- 1.42)
8-10		1.78 (1.15- 2.68)
ESAS SHORTNESS OF BREATH SCORE	0.04	
0		1.00
1-3		1.30 (0.97- 1.74)
4-7		1.67 (1.18- 2.35)
8-10		1.33 (0.85- 2.08)

Table 11
Maximum likelihood estimates of regression co-efficients (β), their standard errors (SE), pertinent Wald's Statistics (Z), P-Values, and Partial Scores for the co-variables that were retained in the multivariate analysis as prognostic for survival

	β	SE (β)	Z	P-Value	Partial Score
PRIMARY CANCER SITE					
BREAST	0.00000				$0.0 \times 2 = 0$
PROSTATE	0.66386	0.22408	8.7773	0.0031	$2.5 \times 2 = 5$
LUNG	0.74021	0.17609	17.6693	<0.0001	$3.0 \times 2 = 6$
OTHERS	0.91170	0.18015	25.6124	<0.0001	$3.5 \times 2 = 7$
SITE OF METASTASES					
BONE METASTASES ONLY	0.00000				$0.0 \times 2 = 0$
OTHERS	0.72670	0.15089	23.1940	<0.0001	$3.0 \times 2 = 6$
KPS					
>50	0.00000				$0.0 \times 2 = 0$
≤ 50	0.74292	0.12556	35.0069	<0.0001	$3.0 \times 2 = 6$
ESAS FATIGUE SCORE					
0	0.00000				$0.0 \times 2 = 0$
1-3	0.22765	0.28846	0.6228	0.4300	$0.0 \times 2 = 0$
4-7	0.50443	0.27867	3.2765	0.0703	$2.0 \times 4 = 4$
8-10	0.61133	0.30030	4.1443	0.0418	$2.5 \times 2 = 5$
ESAS APPETITE SCORE					
0	0.00000				$0.0 \times 2 = 0$
1-3	-0.00546	0.18637	0.0009	0.9766	$0.0 \times 2 = 0$
4-7	0.00342	0.17695	0.0004	0.9846	$0.0 \times 2 = 0$
8-10	0.56256	0.21631	6.7639	0.0093	$2.0 \times 2 = 4$
ESAS SHORTNESS OF BREATH SCORE					
0	0.00000				$0.0 \times 2 = 0$
1-3	0.26165	0.14915	3.0774	0.0794	$1.0 \times 2 = 2$
4-7	0.51255	0.17514	8.5640	0.0034	$2.0 \times 2 = 4$
8-10	0.28496	0.22822	1.5590	0.2118	$0.0 \times 2 = 0^a$

Pertinent Wald's statistics (Z) is defined as the square of the ratio ($\beta / SE(\beta)$)

Steps in obtaining the partial score

1. Using a 10% level of significance, the value of each statistically significant regression co-efficient was divided by the smallest statistically significant regression co-efficient (β of 0.26165 for shortness of breath score 1 – 3) among all regression co-efficients
2. The result was rounded to the nearest integer, or to the nearest integer + 0.5
3. It was then multiplied by 2 to obtain whole number (partial score)
4. A zero was assigned to partial score if $p > 0.1$

^a To maintain face validity, a partial score of 4 was assigned to shortness of breath 8 – 10 (see text).

Table 12
Discrimination (C Index) of the Final Model

Time	C Index
3 months	0.73
6 months	0.75
1 year	0.81

C index of 1 = perfect discrimination and C index of 0.5 indicates a model with no discriminative ability at all.

Table 13
Risk Groups Based on the Survival Prediction Scores (SPS)

Risk Groups (SPS)	N	Survival at 3 months (%) (95% C.I.)	Survival at 6 months (%) (95 % C.I.)	Survival at 12 months (%) (95 % C.I.)	Median survival in weeks (95% C.I.)	P-value
A (0 – 13)	133	83 (77 – 90)	70 (62 – 78)	51 (42 – 60)	53 (38 – 70)	< 0.0001
B (14 –19)	129	67 (59 – 76)	41 (33 – 50)	20 (13 – 27)	19 (17 – 26)	
C (20 –32)	133	36 (28 – 44)	18 (11 – 24)	4 (1 – 7)	8 (6 – 10)	

N – number of patients

Table 14
Risk Groups Based on the Total Number of Risk Factors Method

Risk Groups (Total number of risk factors)	N	Survival at 3 months (%) (95% C.I.)	Survival at 6 months (%) (95% C.I.)	Survival at 12 months (%) (95 % C.I.)	Median survival in weeks (95% C.I.)	P-value
I (0 – 3)	98	85 (78 – 92)	72 (63 – 81)	52 (42 – 63)	62 (41 – 70)	< 0.0001
II (4)	117	68 (60 – 77)	47 (38 – 57)	24 (16 – 32)	24 (18 – 29)	
III (5 – 6)	180	46 (38 – 53)	24 (18 – 31)	11 (6 – 16)	11 (9 – 14)	

N – number of patients

Table 15
Prognostic Index/ Nomogram: Predicted Survival Probability (3 selected examples)

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
42	>50	Breast	Bone Only	4-7	4-7	1-3	0.90 (0.85-0.94)	0.81 (0.73-0.89)	0.66 (0.55-0.79)	93 (51-)
686	≤50	Prostate	Bone Only	4-7	8-10	1-3	0.60 (0.46-0.79)	0.37 (0.23-0.62)	0.15 (0.06-0.40)	18 (9-27)
896	≤50	Lung	Others	8-10	8-10	8-10	0.13 (0.05-0.33)	0.02 (0.00-0.11)	0.00 (0.00-0.02)	5 (3-7)

Blank in median survival = not yet achieved

Table 16
Distribution of KPS in Reported Series

	KPS				
	10 – 20	30 – 40	50 – 60	70 – 80	90 – 100
³⁵ Pirovano (training set) (n = 519)	54 (10.4%)	217 (41.8%)	248 (47.8%) ^a		
⁴⁰ Maltoni (testing set) (n = 451)	51 (11.3%)	260 (57.6%)	140 (31.0%) ^a		
²⁹ Grabowski (n = 97)	5 (5%)	21 (21%)	54 (56%)	17 (17%)	0 (0%)
Chow (n = 395)	2 (0.5%)	44 (1%)	163 (41%)	167 (42%)	19 (5%)

^a KPS ≥ 50

Patients in hospice settings (Pirovano and Maltoni series) had lower KPS than those attending out-patient radiotherapy clinics (Grabowski and Chow series).

Table 17
Levels of Statistical Significance Reported for the Co-Variates
in Terminally Ill Cancer Patients in the Systematic Review by Vigano et al (15)

Co-variate	Not statistically significant in the univariate analysis (UA)	Statistically significant in UA, not significant in multi-variate analysis (MA)	Statistically significant in MA	Number of positive studies / total number evaluated	Total number of patients evaluated
Low KPS		11, 18, 19 ^a , 26 ^a , 27, 102 ^a	10 ^b , 20, 31 ^b , 33 ^b , 35 ^b , 41 ^b , 103	13 / 13	6424
Primary cancer site ^c	4, 10, 20, 31, 34, 102	11 ^a , 33 ^a , 103	32	4 / 9	4025
Anorexia	18	11, 27	10 ^b , 20, 27, 34, 35 ^b	7 / 8	3430
Dyspnea	18		4, 10 ^b , 20, 32, 34, 35 ^b	6 / 7	3258

The numbers indicated under the second, third and fourth rows are reference numbers

significance at $p \leq 0.05$, if not otherwise specified

a – significance not tested / reported for MA

b – level of significance not reported for UA

c – lung primary in references 32, 33, and 103

gastrointestinal primary in reference 11

Table 18
Pocket Reference Table for
Survival Prediction Score (SPS)

	Partial Score
1. Primary cancer site	
Breast	0
Prostate	5
Lung	6
others	7
2. Site of metastases	
Bone only	0
Others	6
3. KPS	
> 50	0
≤ 50	6
4. Fatigue score	
0 – 3	0
4 – 7	4
8 – 10	5
5. Appetite score	
0 – 7	0
8 – 10	4
6. Shortness of breath score	
0	0
1 – 3	2
4 – 10	4

SPS = Sum of partial scores of the above 6 groups

Risk Group (SPS)	Survival at 3 months (%) (95% CI)	Survival at 6 months (%) (95% CI)	Survival at 12 months (%) (95% CI)	Median survival (weeks) (95% CI)
A (0 – 13)	83 (77 – 90)	70 (62 – 78)	51 (42 – 60)	53 (38 – 70)
B (14 – 19)	67 (59 – 76)	41 (33 – 50)	20 (13 – 27)	19 (17 – 26)
C (20 – 32)	36 (28 – 44)	18 (11 – 24)	4 (1 – 7)	8 (6 – 10)

Table 19
Pocket Reference Table for
Number of Risk Factors

6 Risk Factors

- non breast cancer patients
- sites of metastases other than bone only
- KPS $\leq$ 50
- fatigue score 4 – 10
- appetite score 8 – 10
- shortness of breath score 1 – 10

Risk Group (no of risk factors)	Survival at 3 months (%) (95% CI)	Survival at 6 months (%) (95% CI)	Survival at 12 months (%) (95% CI)	Median survival (weeks) (95% CI)
I (0 – 3)	85 (78 – 92)	72 (63 – 81)	52 (42 – 63)	62 (41 – 70)
II (4)	68 (60 – 77)	47 (38 – 57)	24 (16 – 32)	24 (18 – 29)
III (5 – 6)	46 (38 – 53)	24 (18 – 31)	11 (6 – 16)	11 (9 – 14)

Figure 1
Overall Survival for all patients included and not included in the database

Figure 2
Frequency Distribution of the 16 Potential Prognostic Factors That Were Included in the Model

Figure 2
Frequency Distribution of the 16 Potential Prognostic Factors That Were Included in the Model

Figure 3a-p
Survival Curves of the 16 Potential Prognostic Factors

Figure 3a

Overall Survival as a
Function of Age

Figure 3b

Overall Survival as a Function of Primary
Cancer Site

Figure 3c

Overall Survival as a Function of Site of
Metastases

Figure 3d

Overall Survival as a Function of Weight
Loss

Figure 3a-p Survival Curves of the 16 Potential Prognostic Factors

Figure 3e

Overall Survival as a
Function of KPS

Figure 3f

Overall Survival as a Function of Time From
First Diagnosis of Cancer to First Consultation

Figure 3g

Overall Survival as a Function of Analgesic
Consumption

Figure 3h

Overall Survival as a
Function of Pain

Figure 3a-p Survival Curves of the 16 Potential Prognostic Factors

Figure 3i

Overall Survival as a Function
of Fatigue

Figure 3j

Overall Survival as a
Function of Nausea

Figure 3k

Overall Survival as a Function
of Depression

Figure 3l

Overall Survival as a Function of
Anxiety

Figure 3a-p
Survival Curves of the 16 Potential Prognostic Factors

Figure 3m

Overall Survival as a Function of
Drowsiness

Figure 3n

Overall Survival as a Function
of Appetite

Figure 3o

Overall Survival as a Function of Sense of
Well-Being

Figure 3p

Overall Survival as Function of Shortness
of Breath

Figure 4
Calibration of the Model

The average predicted survival probability of patients against the actual fraction of patients surviving past 3, 6, and 12 months was plotted

Figure 5
Frequency Distribution of Survival Prediction Score (SPS) (n=395)

Survival Prediction Score (SPS) = Primary Cancer Site Partial Score + Site of Metastases Partial Score + KPS Partial Score + Fatigue Partial Score + Appetite Partial Score + Shortness of Breath Partial Score

Figure 6
Risk group stratification by partial score method

SPS = Survival Prediction Scores

Survival experience of the three groups of patients identified by the SPS. Average estimated survival probabilities from Cox's model (dotted lines) and the actual outcome estimated by the Kaplan-Meier method (bold lines).

Figure 7
Frequency Distribution of Number of Risk Factors Patients Possessed (n=395)

Figure 8
Risk group stratification by number of risk factors

Survival experience of the three groups of patients identified by the number of risk factors. Average estimated survival probabilities from Cox's model (dotted lines) and the actual outcome estimated by the Kaplan-Meier method (bold lines).

Appendix 1
Classification Schemes (ref 104)

Category of Evidence

Ia-evidence for meta-analysis of randomised controlled trials

Ib- evidence from at least one randomised controlled trial

IIa- evidence from at least one controlled study without randomization

IIb- evidence from at least one other type of quasi-experimental study

III- evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case control studies

IV- evidence from expert committee reports or opinions or clinical experience of respected authorities or both

Strength of Recommendation

A- directly based on category I evidence

B- directly based on category II evidence or extrapolated recommendation from category I evidence

C- directly based on category III evidence or extrapolated recommendation from category I or II evidence

D- directly based on category IV evidence or extrapolated recommendation from category I, II or III evidence

Appendix 2
Karnofsky Performance Status Index

Index	Specific Criteria
100	Normal, no complaints, no evidence of disease
90	Able to carry on normal activity, minor signs of symptoms of disease
80	Normal activity with effort, some signs or symptoms of disease
70	Cares for self, unable to carry on normal activity or to do work
60	Requires occasional assistance from others but able to care for most needs
50	Requires considerable assistance from others and frequent medical care
40	Disabled, requires special care and assistance
30	Severely disabled, hospitalization indicated, death not imminent
20	Very sick, hospitalization necessary, active supportive treatment necessary
10	Moribund
0	Dead

Appendix 3 RRRP Database

RRRP and BMC 1st Consultation and Assessment

B#: _____ Date of Birth: ____/____/____ Patient Name: _____
DD MM YYYY

Gender: ☐ Male ☐ Female Weight: _____ kg

Clinic: ☐ RRRP ☐ BMC (Complete Orthopedic Assessment)

Date Seen: ____/____/____ Staff Radiation Oncologist: _____
DD MM YYYY

Patient coming by ambulance? ☐ No ☐ Yes

From: ☐ Home ☐ Hospital/Hospice ☐ Other: _____

Referring Physician: _____ Date of Referral: ____/____/____
DD MM YYYY

Reasons for referral (Check as many as apply):

☐ Bone mets	☐ Mass
☐ Bone pain	☐ Brain mets
☐ Other pain	☐ Cord compression
☐ Bleeding	☐ Cauda equina syndrome
☐ Shortness of breath	☐ SVCO symptoms
☐ High risk for path. Fracture	☐ Unknown
☐ Pathologic fracture	☐ Other: _____

Disease History

Primary Cancer Site (Check only one):

☐ Breast	☐ Renal Cell/ Kidney
☐ Prostate	☐ Endometrium
☐ Lung	☐ Ovarian
☐ Head & Neck	☐ Colorectal
☐ Bladder	☐ Anal Canal
☐ Esophagus	☐ Multiple Myeloma
☐ Pancreas	☐ Unknown
☐ Stomach/ Gastric	☐ Other: _____

Date of 1st Diagnosis of Malignancy: ____/____/____
(Date of Bx if available) DD MM YYYY

Pathology:

☐ Adeno ca	☐ Unknown
☐ Squamous cell	☐ Other: _____
☐ Multiple myeloma	

Metastases:

Site	None	Unknown	Single	Multiple	Date of Dx (mm-yyyy)
Brain					
Liver					
Bone					
Lymph nodes					
Lung					
Soft tissue					

Palliative Treatments within past 3 months:

Chemo: ☐ No ☐ Yes ☐ Unknown
Hormones: ☐ No ☐ Yes ☐ Unknown
Bisphosphonates: ☐ No ☐ Yes ☐ Unknown

Radiation: ☐ No ☐ Yes (Complete Details Below) ☐ Unknown

Site	Dose/Fractionation	Start date (dd-mm-yyyy)	Stop date (dd-mm-yyyy)

Surgery: ☐ No ☐ Yes (Complete Details Below) ☐ Unknown

Site	Procedure	Date (dd-mm-yyyy)

Patient Assessment:

Completed by: _____ With: ☐ Patient ☐ Family ☐ RN ☐ Other: _____

Weight loss $\geq$ 10% in the past 6 months: ☐ No ☐ Yes ☐ Unknown

Karnofsky Performance Status: _____

Analgesic Intake (Previous 24 Hours & Changes During Visit):

Drug	R/ B	Dosage	Mode	Frequency	Total Dose	Morphine Equivalent	Date (dd-mm-yyyy)	
							Start	Stop

Other Medications (Previous 24 Hours & Changes During Visit):

Drug	Dosage	Mode	Frequency	Date (dd-mm-yyyy)	
				Start	Stop

Site Specific Pain Scores:

Site: _____

0	1	2	3	4	5	6	7	8	9	10
No pain										Worst possible pain

Site: _____

0	1	2	3	4	5	6	7	8	9	10
No pain										Worst possible pain

Site: _____

0	1	2	3	4	5	6	7	8	9	10
No pain										Worst possible pain

Global Scores:

0	1	2	3	4	5	6	7	8	9	10
No pain										Worst possible pain

0	1	2	3	4	5	6	7	8	9	10
Not tired										Worst possible tiredness

0	1	2	3	4	5	6	7	8	9	10
No nausea										Worst possible nausea

0	1	2	3	4	5	6	7	8	9	10
Not depressed										Worst possible depression

0	1	2	3	4	5	6	7	8	9	10
Not anxious										Worst possible anxiety

0	1	2	3	4	5	6	7	8	9	10
Not drowsy										Worst possible drowsiness

0	1	2	3	4	5	6	7	8	9	10
Best possible appetite										No appetite

0	1	2	3	4	5	6	7	8	9	10
Best sense of well being										Worst possible sense of well being

0	1	2	3	4	5	6	7	8	9	10
No shortness Of breath										Worst possible shortness of breath

Other: _____

0	1	2	3	4	5	6	7	8	9	10
Best possible										Worst possible

Other: _____

0	1	2	3	4	5	6	7	8	9	10
Best possible										Worst possible

Main Reason For Visit (Decided By Radiation Oncologist):

☐ Bone Pain → Please indicate if ☐ Neuropathic ☐ Incidental ☐ Mechanical

☐ Other Pain

☐ Cauda Equina Syndrome

☐ Cord Compression

☐ Shortness of breath

☐ Bleeding

☐ SVCO Symptoms

☐ Brain Mets

☐ Mass

☐ Other: _____

Radiation Oncologist's estimate of patient's survival (confidential): _____ weeks or _____ months

Participation in current Clinical Trials at TSRCC?: ☐ No ☐ Yes

If yes, please state protocol: _____

Recommendations**Referral to Other Services:**

☐ Orthopedics (Other than BMC)

☐ Neurosurgery

☐ Medical Oncology

☐ None

☐ Pain Clinic

☐ Other: _____

☐ Psychosocial

Treatments Recommended:**RRRP**

Site	RT (Yes/No)	If "Yes", Dose/Fractionation	Start Date (dd-mm-yyyy)	If "No", Reason

BMC

Site #1	Treatment	Procedure or Dose/Fractionation	Date (dd-mm-yyyy)	Reason (If applicable)
	☐ Surgery	Procedure: _____ _____		☐ RT Max reached ☐ Other: _____ _____
	☐ Radiotherapy	Dose/Fractionation: _____ _____		☐ Disease too extensive ☐ Pt refused surgery ☐ Pt not fit for surgery ☐ Low risk ☐ Other: _____ _____
	☐ Other	☐ Bracing ☐ Other: _____ _____		

Site #2	Treatment	Procedure or Dose/Fractionation	Date (dd-mm-yyyy)	Reason (If applicable)
	☐ ₁ Surgery	Procedure: _____ _____		☐ ₁ RT Max reached ☐ ₂ Other: _____ _____
	☐ ₂ Radiotherapy	Dose/Fractionation: _____ _____		☐ ₁ Disease too extensive ☐ ₂ Pt refused surgery ☐ ₃ Pt not fit for surgery ☐ ₄ Low risk ☐ ₅ Other: _____ _____
	☐ ₃ Other	☐ ₁ Bracing ☐ ₂ Other: _____ _____		

Follow-up Arrangements:

☐ Referring Physicians

2 BMC → **1** Phone **2** Clinic Date: ____ / ____ / ____
 DD MM YYYY

3 ☐ RRRP → 1 ☐ Phone 2 ☐ Clinic Date: / /
DD MM YYYY

☐ Orthopedic Clinic (Other than BMC)

5 ☐ Other: _____

Comments:

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
1	>50	Breast	Bone Only	0	0	0	0.95 (0.92-0.98)	0.90 (0.85-0.97)	0.83 (0.73-0.94)	
2	>50	Breast	Bone Only	0	0	1-3	0.94 (0.89-0.98)	0.88 (0.80-0.96)	0.78 (0.65-0.93)	
3	>50	Breast	Bone Only	0	0	4-7	0.92 (0.86-0.98)	0.85 (0.75-0.96)	0.73 (0.58-0.92)	
4	>50	Breast	Bone Only	0	0	8-10	0.93 (0.88-0.99)	0.88 (0.79-0.97)	0.77 (0.63-0.95)	
5	>50	Breast	Bone Only	0	1-3	0	0.94 (0.91-0.97)	0.88 (0.83-0.94)	0.79 (0.70-0.89)	
6	>50	Breast	Bone Only	0	1-3	1-3	0.92 (0.88-0.96)	0.85 (0.78-0.93)	0.73 (0.62-0.86)	
7	>50	Breast	Bone Only	0	1-3	4-7	0.90 (0.84-0.96)	0.81 (0.72-0.91)	0.67 (0.53-0.84)	
8	>50	Breast	Bone Only	0	1-3	8-10	0.92 (0.87-0.97)	0.85 (0.76-0.94)	0.73 (0.59-0.89)	
9	>50	Breast	Bone Only	0	4-7	0	0.92 (0.88-0.96)	0.85 (0.77-0.93)	0.73 (0.62-0.86)	
10	>50	Breast	Bone Only	0	4-7	1-3	0.90 (0.84-0.95)	0.81 (0.72-0.90)	0.66 (0.54-0.82)	
11	>50	Breast	Bone Only	0	4-7	4-7	0.87 (0.80-0.94)	0.76 (0.65-0.89)	0.59 (0.44-0.79)	70 (29-)
12	>50	Breast	Bone Only	0	4-7	8-10	0.89 (0.83-0.96)	0.80 (0.70-0.92)	0.66 (0.50-0.86)	93 (30-)
13	>50	Breast	Bone Only	0	8-10	0	0.91 (0.86-0.96)	0.83 (0.75-0.92)	0.70 (0.58-0.85)	
14	>50	Breast	Bone Only	0	8-10	1-3	0.88 (0.82-0.95)	0.79 (0.69-0.90)	0.63 (0.49-0.81)	83 (35-)
15	>50	Breast	Bone Only	0	8-10	4-7	0.85 (0.78-0.94)	0.73 (0.61-0.88)	0.55 (0.39-0.78)	62 (25-)
16	>50	Breast	Bone Only	0	8-10	8-10	0.88 (0.81-0.96)	0.78 (0.67-0.91)	0.62 (0.47-0.83)	83 (28-)
17	>50	Breast	Bone Only	1-3	0	0	0.95 (0.92-0.98)	0.91 (0.85-0.97)	0.83 (0.73-0.94)	
18	>50	Breast	Bone Only	1-3	0	1-3	0.94 (0.89-0.98)	0.88 (0.80-0.96)	0.78 (0.66-0.92)	
19	>50	Breast	Bone Only	1-3	0	4-7	0.92 (0.86-0.98)	0.85 (0.75-0.95)	0.73 (0.58-0.91)	
20	>50	Breast	Bone Only	1-3	0	8-10	0.93 (0.89-0.99)	0.88 (0.79-0.97)	0.78 (0.64-0.94)	
21	>50	Breast	Bone Only	1-3	1-3	0	0.94 (0.91-0.97)	0.88 (0.83-0.94)	0.79 (0.70-0.89)	
22	>50	Breast	Bone Only	1-3	1-3	1-3	0.92 (0.88-0.96)	0.85 (0.78-0.92)	0.73 (0.63-0.85)	
23	>50	Breast	Bone Only	1-3	1-3	4-7	0.90 (0.85-0.95)	0.81 (0.73-0.91)	0.67 (0.55-0.82)	
24	>50	Breast	Bone Only	1-3	1-3	8-10	0.92 (0.87-0.97)	0.85 (0.77-0.94)	0.73 (0.60-0.88)	
25	>50	Breast	Bone Only	1-3	4-7	0	0.92 (0.88-0.96)	0.85 (0.78-0.92)	0.73 (0.62-0.85)	
26	>50	Breast	Bone Only	1-3	4-7	1-3	0.90 (0.85-0.94)	0.81 (0.73-0.89)	0.66 (0.55-0.80)	
27	>50	Breast	Bone Only	1-3	4-7	4-7	0.87 (0.81-0.93)	0.76 (0.66-0.87)	0.59 (0.46-0.76)	70 (34-)
28	>50	Breast	Bone Only	1-3	4-7	8-10	0.89 (0.83-0.96)	0.80 (0.70-0.91)	0.66 (0.51-0.84)	93 (35-)
29	>50	Breast	Bone Only	1-3	8-10	0	0.91 (0.86-0.96)	0.83 (0.75-0.92)	0.70 (0.58-0.86)	
30	>50	Breast	Bone Only	1-3	8-10	1-3	0.88 (0.83-0.95)	0.79 (0.69-0.89)	0.63 (0.50-0.80)	83 (36-)
31	>50	Breast	Bone Only	1-3	8-10	4-7	0.85 (0.78-0.93)	0.74 (0.62-0.87)	0.56 (0.41-0.76)	62 (27-)
32	>50	Breast	Bone Only	1-3	8-10	8-10	0.88 (0.82-0.95)	0.78 (0.68-0.91)	0.63 (0.48-0.82)	83 (30-)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
33	>50	Breast	Bone Only	4-7	0	0	0.95 (0.92-0.98)	0.90 (0.84-0.97)	0.82 (0.72-0.94)	
34	>50	Breast	Bone Only	4-7	0	1-3	0.94 (0.89-0.98)	0.88 (0.80-0.96)	0.78 (0.66-0.92)	
35	>50	Breast	Bone Only	4-7	0	4-7	0.92 (0.86-0.98)	0.85 (0.75-0.95)	0.72 (0.58-0.91)	
36	>50	Breast	Bone Only	4-7	0	8-10	0.93 (0.88-0.99)	0.87 (0.79-0.97)	0.77 (0.64-0.94)	
37	>50	Breast	Bone Only	4-7	1-3	0	0.94 (0.91-0.97)	0.88 (0.83-0.94)	0.79 (0.70-0.88)	
38	>50	Breast	Bone Only	4-7	1-3	1-3	0.92 (0.88-0.96)	0.85 (0.78-0.92)	0.73 (0.63-0.85)	
39	>50	Breast	Bone Only	4-7	1-3	4-7	0.90 (0.85-0.95)	0.81 (0.73-0.90)	0.67 (0.55-0.82)	
40	>50	Breast	Bone Only	4-7	1-3	8-10	0.92 (0.87-0.97)	0.85 (0.77-0.93)	0.72 (0.60-0.87)	
41	>50	Breast	Bone Only	4-7	4-7	0	0.92 (0.88-0.96)	0.85 (0.78-0.92)	0.73 (0.62-0.85)	
42	>50	Breast	Bone Only	4-7	4-7	1-3	0.90 (0.85-0.94)	0.81 (0.73-0.89)	0.66 (0.55-0.79)	93 (51-)
43	>50	Breast	Bone Only	4-7	4-7	4-7	0.87 (0.81-0.93)	0.76 (0.66-0.87)	0.59 (0.46-0.75)	70 (34-)
44	>50	Breast	Bone Only	4-7	4-7	8-10	0.89 (0.83-0.95)	0.80 (0.70-0.91)	0.65 (0.51-0.83)	93 (36-)
45	>50	Breast	Bone Only	4-7	8-10	0	0.91 (0.86-0.96)	0.83 (0.75-0.92)	0.70 (0.58-0.84)	
46	>50	Breast	Bone Only	4-7	8-10	1-3	0.88 (0.83-0.94)	0.79 (0.70-0.88)	0.63 (0.51-0.78)	83 (40-)
47	>50	Breast	Bone Only	4-7	8-10	4-7	0.85 (0.79-0.93)	0.73 (0.63-0.86)	0.55 (0.41-0.74)	62 (29-)
48	>50	Breast	Bone Only	4-7	8-10	8-10	0.88 (0.82-0.95)	0.78 (0.68-0.90)	0.62 (0.48-0.81)	83 (34-)
49	>50	Breast	Bone Only	8-10	0	0	0.91 (0.86-0.98)	0.84 (0.74-0.95)	0.71 (0.56-0.90)	
50	>50	Breast	Bone Only	8-10	0	1-3	0.89 (0.82-0.97)	0.80 (0.67-0.94)	0.65 (0.47-0.88)	88 (22-)
51	>50	Breast	Bone Only	8-10	0	4-7	0.86 (0.77-0.96)	0.75 (0.60-0.92)	0.57 (0.38-0.86)	63 (17-)
52	>50	Breast	Bone Only	8-10	0	8-10	0.89 (0.81-0.98)	0.79 (0.66-0.95)	0.64 (0.45-0.91)	84 (16-)
53	>50	Breast	Bone Only	8-10	1-3	0	0.89 (0.84-0.95)	0.80 (0.71-0.91)	0.65 (0.52-0.83)	93 (36-)
54	>50	Breast	Bone Only	8-10	1-3	1-3	0.86 (0.80-0.94)	0.75 (0.64-0.88)	0.58 (0.43-0.78)	66 (29-)
55	>50	Breast	Bone Only	8-10	1-3	4-7	0.83 (0.74-0.92)	0.69 (0.56-0.85)	0.49 (0.34-0.72)	52 (20-84)
56	>50	Breast	Bone Only	8-10	1-3	8-10	0.86 (0.78-0.95)	0.75 (0.62-0.90)	0.57 (0.40-0.81)	63 (23-)
57	>50	Breast	Bone Only	8-10	4-7	0	0.86 (0.79-0.94)	0.75 (0.64-0.88)	0.57 (0.42-0.77)	63 (28-)
58	>50	Breast	Bone Only	8-10	4-7	1-3	0.82 (0.75-0.91)	0.68 (0.57-0.83)	0.48 (0.34-0.70)	50 (23-80)
59	>50	Breast	Bone Only	8-10	4-7	4-7	0.78 (0.68-0.89)	0.61 (0.48-0.79)	0.39 (0.24-0.64)	36 (17-61)
60	>50	Breast	Bone Only	8-10	4-7	8-10	0.82 (0.73-0.93)	0.68 (0.54-0.86)	0.48 (0.30-0.75)	49 (18-83)
61	>50	Breast	Bone Only	8-10	8-10	0	0.85 (0.77-0.93)	0.72 (0.61-0.86)	0.54 (0.39-0.75)	60 (26-)
62	>50	Breast	Bone Only	8-10	8-10	1-3	0.81 (0.72-0.90)	0.66 (0.53-0.81)	0.45 (0.30-0.66)	41 (20-70)
63	>50	Breast	Bone Only	8-10	8-10	4-7	0.76 (0.66-0.87)	0.58 (0.44-0.76)	0.35 (0.21-0.59)	34 (16-52)
64	>50	Breast	Bone Only	8-10	8-10	8-10	0.80 (0.71-0.91)	0.65 (0.51-0.82)	0.44 (0.28-0.69)	41 (19-70)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
65	>50	Breast	Others	0	0	0	0.90 (0.84-0.96)	0.81 (0.71-0.92)	0.67 (0.53-0.86)	
66	>50	Breast	Others	0	0	1-3	0.87 (0.79-0.96)	0.76 (0.64-0.92)	0.60 (0.42-0.84)	71 (21-)
67	>50	Breast	Others	0	0	4-7	0.84 (0.74-0.95)	0.71 (0.56-0.90)	0.52 (0.33-0.81)	55 (16-)
68	>50	Breast	Others	0	0	8-10	0.87 (0.78-0.97)	0.76 (0.62-0.93)	0.59 (0.40-0.87)	70 (16-)
69	>50	Breast	Others	0	1-3	0	0.88 (0.82-0.93)	0.77 (0.68-0.87)	0.61 (0.48-0.76)	75 (36-)
70	>50	Breast	Others	0	1-3	1-3	0.84 (0.77-0.92)	0.71 (0.60-0.85)	0.52 (0.38-0.72)	59 (27-93)
71	>50	Breast	Others	0	1-3	4-7	0.80 (0.71-0.90)	0.65 (0.52-0.81)	0.43 (0.28-0.67)	40 (19-69)
72	>50	Breast	Others	0	1-3	8-10	0.84 (0.75-0.93)	0.71 (0.58-0.87)	0.52 (0.35-0.76)	55 (20-93)
73	>50	Breast	Others	0	4-7	0	0.84 (0.77-0.92)	0.71 (0.60-0.84)	0.52 (0.38-0.71)	55 (27-84)
74	>50	Breast	Others	0	4-7	1-3	0.80 (0.71-0.89)	0.64 (0.51-0.80)	0.43 (0.28-0.64)	39 (20-63)
75	>50	Breast	Others	0	4-7	4-7	0.75 (0.64-0.87)	0.56 (0.42-0.76)	0.33 (0.19-0.59)	31 (14-51)
76	>50	Breast	Others	0	4-7	8-10	0.79 (0.69-0.91)	0.63 (0.48-0.83)	0.42 (0.25-0.70)	38 (15-69)
77	>50	Breast	Others	0	8-10	0	0.82 (0.74-0.91)	0.68 (0.56-0.83)	0.48 (0.34-0.69)	50 (23-80)
78	>50	Breast	Others	0	8-10	1-3	0.78 (0.68-0.88)	0.61 (0.47-0.78)	0.39 (0.24-0.62)	35 (18-60)
79	>50	Breast	Others	0	8-10	4-7	0.72 (0.61-0.86)	0.53 (0.38-0.74)	0.29 (0.16-0.56)	27 (13-41)
80	>50	Breast	Others	0	8-10	8-10	0.77 (0.66-0.90)	0.60 (0.45-0.80)	0.38 (0.22-0.65)	35 (15-61)
81	>50	Breast	Others	1-3	0	0	0.90 (0.84-0.96)	0.81 (0.72-0.92)	0.67 (0.53-0.85)	
82	>50	Breast	Others	1-3	0	1-3	0.87 (0.80-0.95)	0.76 (0.65-0.91)	0.60 (0.44-0.82)	72 (26-)
83	>50	Breast	Others	1-3	0	4-7	0.84 (0.75-0.94)	0.71 (0.57-0.89)	0.52 (0.34-0.79)	55 (19-)
84	>50	Breast	Others	1-3	0	8-10	0.87 (0.78-0.96)	0.76 (0.62-0.93)	0.59 (0.41-0.86)	70 (19-)
85	>50	Breast	Others	1-3	1-3	0	0.88 (0.82-0.93)	0.77 (0.68-0.87)	0.61 (0.49-0.76)	80 (39-)
86	>50	Breast	Others	1-3	1-3	1-3	0.84 (0.78-0.91)	0.71 (0.61-0.83)	0.53 (0.40-0.69)	59 (30-84)
87	>50	Breast	Others	1-3	1-3	4-7	0.80 (0.72-0.89)	0.65 (0.53-0.80)	0.44 (0.30-0.64)	41 (21-63)
88	>50	Breast	Others	1-3	1-3	8-10	0.84 (0.76-0.93)	0.71 (0.59-0.86)	0.52 (0.36-0.74)	55 (24-93)
89	>50	Breast	Others	1-3	4-7	0	0.84 (0.77-0.91)	0.71 (0.61-0.83)	0.52 (0.39-0.70)	58 (29-84)
90	>50	Breast	Others	1-3	4-7	1-3	0.80 (0.72-0.88)	0.64 (0.53-0.77)	0.43 (0.30-0.60)	39 (23-62)
91	>50	Breast	Others	1-3	4-7	4-7	0.75 (0.65-0.85)	0.57 (0.44-0.73)	0.34 (0.21-0.54)	31 (17-48)
92	>50	Breast	Others	1-3	4-7	8-10	0.79 (0.70-0.90)	0.63 (0.50-0.81)	0.42 (0.26-0.66)	39 (18-63)
93	>50	Breast	Others	1-3	8-10	0	0.82 (0.74-0.91)	0.68 (0.56-0.83)	0.48 (0.34-0.69)	50 (23-80)
94	>50	Breast	Others	1-3	8-10	1-3	0.78 (0.69-0.88)	0.61 (0.49-0.77)	0.39 (0.25-0.59)	35 (19-58)
95	>50	Breast	Others	1-3	8-10	4-7	0.72 (0.61-0.85)	0.53 (0.39-0.72)	0.30 (0.17-0.53)	28 (14-41)
96	>50	Breast	Others	1-3	8-10	8-10	0.77 (0.67-0.89)	0.60 (0.46-0.79)	0.38 (0.23-0.63)	35 (16-60)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
97	>50	Breast	Others	4-7	0	0	0.90 (0.84-0.96)	0.81 (0.71-0.92)	0.67 (0.53-0.86)	
98	>50	Breast	Others	4-7	0	1-3	0.87 (0.80-0.95)	0.76 (0.64-0.91)	0.60 (0.43-0.83)	71 (25-)
99	>50	Breast	Others	4-7	0	4-7	0.84 (0.74-0.94)	0.71 (0.56-0.89)	0.51 (0.33-0.79)	54 (18-)
100	>50	Breast	Others	4-7	0	8-10	0.87 (0.78-0.96)	0.76 (0.62-0.93)	0.59 (0.40-0.86)	70 (19-)
101	>50	Breast	Others	4-7	1-3	0	0.87 (0.82-0.93)	0.77 (0.69-0.86)	0.61 (0.49-0.75)	75 (39-)
102	>50	Breast	Others	4-7	1-3	1-3	0.84 (0.78-0.91)	0.71 (0.62-0.82)	0.52 (0.40-0.68)	58 (30-83)
103	>50	Breast	Others	4-7	1-3	4-7	0.80 (0.72-0.89)	0.65 (0.53-0.79)	0.43 (0.30-0.63)	40 (21-62)
104	>50	Breast	Others	4-7	1-3	8-10	0.84 (0.76-0.92)	0.71 (0.59-0.85)	0.51 (0.36-0.73)	54 (25-88)
105	>50	Breast	Others	4-7	4-7	0	0.84 (0.77-0.91)	0.71 (0.61-0.82)	0.52 (0.39-0.68)	55 (30-83)
106	>50	Breast	Others	4-7	4-7	1-3	0.80 (0.73-0.87)	0.64 (0.54-0.76)	0.42 (0.31-0.58)	39 (25-60)
107	>50	Breast	Others	4-7	4-7	4-7	0.74 (0.66-0.85)	0.56 (0.44-0.72)	0.33 (0.21-0.52)	31 (18-47)
108	>50	Breast	Others	4-7	4-7	8-10	0.79 (0.70-0.90)	0.63 (0.50-0.80)	0.42 (0.27-0.65)	38 (19-62)
109	>50	Breast	Others	4-7	8-10	0	0.82 (0.75-0.90)	0.68 (0.57-0.81)	0.48 (0.35-0.66)	49 (26-72)
110	>50	Breast	Others	4-7	8-10	1-3	0.77 (0.70-0.86)	0.61 (0.49-0.75)	0.39 (0.26-0.56)	35 (20-53)
111	>50	Breast	Others	4-7	8-10	4-7	0.72 (0.62-0.83)	0.53 (0.40-0.70)	0.29 (0.17-0.50)	27 (15-39)
112	>50	Breast	Others	4-7	8-10	8-10	0.77 (0.68-0.88)	0.60 (0.47-0.77)	0.38 (0.24-0.60)	35 (19-59)
113	>50	Breast	Others	8-10	0	0	0.83 (0.73-0.94)	0.69 (0.54-0.89)	0.50 (0.31-0.79)	52 (16-93)
114	>50	Breast	Others	8-10	0	1-3	0.79 (0.66-0.93)	0.62 (0.45-0.87)	0.40 (0.22-0.76)	38 (12-70)
115	>50	Breast	Others	8-10	0	4-7	0.73 (0.59-0.91)	0.54 (0.36-0.83)	0.31 (0.14-0.70)	29 (9-53)
116	>50	Breast	Others	8-10	0	8-10	0.78 (0.65-0.94)	0.62 (0.43-0.89)	0.40 (0.20-0.80)	36 (9-70)
117	>50	Breast	Others	8-10	1-3	0	0.79 (0.70-0.90)	0.63 (0.50-0.81)	0.42 (0.26-0.66)	38 (18-63)
118	>50	Breast	Others	8-10	1-3	1-3	0.74 (0.63-0.87)	0.55 (0.40-0.76)	0.32 (0.18-0.58)	30 (14-49)
119	>50	Breast	Others	8-10	1-3	4-7	0.68 (0.55-0.83)	0.47 (0.31-0.70)	0.23 (0.11-0.50)	22 (11-35)
120	>50	Breast	Others	8-10	1-3	8-10	0.73 (0.61-0.88)	0.54 (0.38-0.78)	0.31 (0.16-0.62)	29 (12-50)
121	>50	Breast	Others	8-10	4-7	0	0.73 (0.62-0.86)	0.55 (0.40-0.75)	0.32 (0.17-0.57)	29 (14-48)
122	>50	Breast	Others	8-10	4-7	1-3	0.67 (0.55-0.82)	0.46 (0.31-0.67)	0.22 (0.11-0.46)	21 (12-34)
123	>50	Breast	Others	8-10	4-7	4-7	0.60 (0.46-0.77)	0.37 (0.22-0.60)	0.15 (0.06-0.38)	17 (9-26)
124	>50	Breast	Others	8-10	4-7	8-10	0.66 (0.52-0.84)	0.45 (0.28-0.71)	0.22 (0.09-0.52)	21 (10-35)
125	>50	Breast	Others	8-10	8-10	0	0.71 (0.60-0.84)	0.51 (0.37-0.71)	0.28 (0.15-0.52)	26 (14-39)
126	>50	Breast	Others	8-10	8-10	1-3	0.64 (0.52-0.79)	0.42 (0.28-0.62)	0.19 (0.09-0.40)	19 (11-30)
127	>50	Breast	Others	8-10	8-10	4-7	0.56 (0.43-0.73)	0.33 (0.20-0.54)	0.12 (0.04-0.31)	16 (9-23)
128	>50	Breast	Others	8-10	8-10	8-10	0.63 (0.50-0.80)	0.41 (0.26-0.64)	0.18 (0.08-0.43)	19 (11-31)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
129	>50	Prostate	Bone Only	0	0	0	0.91 (0.85-0.96)	0.82 (0.73-0.93)	0.69 (0.55-0.87)	
130	>50	Prostate	Bone Only	0	0	1-3	0.88 (0.80-0.96)	0.78 (0.65-0.92)	0.62 (0.44-0.86)	80 (22-)
131	>50	Prostate	Bone Only	0	0	4-7	0.85 (0.75-0.95)	0.72 (0.57-0.91)	0.54 (0.35-0.83)	60 (16-)
132	>50	Prostate	Bone Only	0	0	8-10	0.88 (0.79-0.97)	0.77 (0.63-0.95)	0.61 (0.41-0.90)	80 (16-)
133	>50	Prostate	Bone Only	0	1-3	0	0.88 (0.83-0.94)	0.78 (0.70-0.87)	0.63 (0.51-0.77)	83 (41-)
134	>50	Prostate	Bone Only	0	1-3	1-3	0.85 (0.78-0.92)	0.73 (0.62-0.85)	0.54 (0.40-0.73)	61 (29-)
135	>50	Prostate	Bone Only	0	1-3	4-7	0.81 (0.73-0.91)	0.66 (0.54-0.82)	0.46 (0.31-0.68)	44 (20-71)
136	>50	Prostate	Bone Only	0	1-3	8-10	0.85 (0.76-0.94)	0.72 (0.59-0.88)	0.54 (0.37-0.78)	60 (20-)
137	>50	Prostate	Bone Only	0	4-7	0	0.85 (0.79-0.91)	0.72 (0.63-0.83)	0.54 (0.41-0.70)	60 (31-88)
138	>50	Prostate	Bone Only	0	4-7	1-3	0.81 (0.73-0.89)	0.66 (0.54-0.80)	0.45 (0.31-0.64)	41 (22-66)
139	>50	Prostate	Bone Only	0	4-7	4-7	0.76 (0.66-0.87)	0.58 (0.45-0.76)	0.36 (0.21-0.59)	34 (16-52)
140	>50	Prostate	Bone Only	0	4-7	8-10	0.80 (0.70-0.92)	0.65 (0.50-0.84)	0.44 (0.27-0.72)	41 (16-72)
141	>50	Prostate	Bone Only	0	8-10	0	0.83 (0.76-0.91)	0.70 (0.58-0.84)	0.50 (0.36-0.70)	52 (25-83)
142	>50	Prostate	Bone Only	0	8-10	1-3	0.79 (0.69-0.89)	0.63 (0.49-0.80)	0.41 (0.26-0.65)	38 (19-62)
143	>50	Prostate	Bone Only	0	8-10	4-7	0.74 (0.62-0.87)	0.55 (0.40-0.76)	0.32 (0.17-0.59)	29 (13-49)
144	>50	Prostate	Bone Only	0	8-10	8-10	0.78 (0.67-0.91)	0.62 (0.46-0.83)	0.40 (0.23-0.69)	37 (14-63)
145	>50	Prostate	Bone Only	1-3	0	0	0.91 (0.85-0.97)	0.82 (0.73-0.93)	0.69 (0.54-0.87)	
146	>50	Prostate	Bone Only	1-3	0	1-3	0.88 (0.80-0.96)	0.78 (0.65-0.92)	0.62 (0.45-0.85)	80 (24-)
147	>50	Prostate	Bone Only	1-3	0	4-7	0.85 (0.75-0.95)	0.72 (0.58-0.91)	0.54 (0.35-0.83)	60 (17-)
148	>50	Prostate	Bone Only	1-3	0	8-10	0.88 (0.79-0.97)	0.77 (0.63-0.94)	0.61 (0.42-0.89)	80 (16-)
149	>50	Prostate	Bone Only	1-3	1-3	0	0.88 (0.83-0.94)	0.78 (0.70-0.88)	0.63 (0.50-0.78)	83 (38-)
150	>50	Prostate	Bone Only	1-3	1-3	1-3	0.85 (0.78-0.92)	0.73 (0.63-0.85)	0.55 (0.41-0.73)	62 (30-)
151	>50	Prostate	Bone Only	1-3	1-3	4-7	0.81 (0.73-0.91)	0.67 (0.54-0.82)	0.46 (0.31-0.68)	45 (20-71)
152	>50	Prostate	Bone Only	1-3	1-3	8-10	0.85 (0.77-0.94)	0.72 (0.60-0.88)	0.54 (0.37-0.78)	60 (21-)
153	>50	Prostate	Bone Only	1-3	4-7	0	0.85 (0.78-0.92)	0.73 (0.63-0.84)	0.54 (0.41-0.71)	61 (31-93)
154	>50	Prostate	Bone Only	1-3	4-7	1-3	0.81 (0.73-0.89)	0.66 (0.55-0.79)	0.45 (0.32-0.63)	41 (25-63)
155	>50	Prostate	Bone Only	1-3	4-7	4-7	0.76 (0.67-0.87)	0.59 (0.46-0.75)	0.36 (0.22-0.57)	34 (18-52)
156	>50	Prostate	Bone Only	1-3	4-7	8-10	0.80 (0.71-0.91)	0.65 (0.51-0.83)	0.44 (0.28-0.70)	41 (18-71)
157	>50	Prostate	Bone Only	1-3	8-10	0	0.83 (0.75-0.92)	0.70 (0.58-0.85)	0.50 (0.35-0.72)	53 (23-84)
158	>50	Prostate	Bone Only	1-3	8-10	1-3	0.79 (0.70-0.89)	0.63 (0.50-0.80)	0.41 (0.26-0.64)	38 (19-62)
159	>50	Prostate	Bone Only	1-3	8-10	4-7	0.74 (0.62-0.87)	0.55 (0.40-0.76)	0.32 (0.17-0.58)	30 (14-49)
160	>50	Prostate	Bone Only	1-3	8-10	8-10	0.78 (0.68-0.91)	0.62 (0.47-0.83)	0.40 (0.24-0.69)	37 (15-63)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
161	>50	Prostate	Bone Only	4-7	0	0	0.90 (0.84-0.97)	0.82 (0.72-0.94)	0.69 (0.54-0.88)	
162	>50	Prostate	Bone Only	4-7	0	1-3	0.88 (0.80-0.96)	0.78 (0.65-0.93)	0.61 (0.44-0.86)	80 (21-)
163	>50	Prostate	Bone Only	4-7	0	4-7	0.85 (0.75-0.96)	0.72 (0.57-0.91)	0.54 (0.34-0.84)	60 (15-)
164	>50	Prostate	Bone Only	4-7	0	8-10	0.88 (0.79-0.97)	0.77 (0.63-0.95)	0.61 (0.41-0.90)	75 (14-)
165	>50	Prostate	Bone Only	4-7	1-3	0	0.88 (0.83-0.94)	0.78 (0.69-0.88)	0.63 (0.50-0.78)	83 (39-)
166	>50	Prostate	Bone Only	4-7	1-3	1-3	0.85 (0.78-0.92)	0.73 (0.62-0.85)	0.54 (0.41-0.72)	61 (29-)
167	>50	Prostate	Bone Only	4-7	1-3	4-7	0.81 (0.73-0.91)	0.66 (0.54-0.82)	0.46 (0.31-0.68)	44 (20-71)
168	>50	Prostate	Bone Only	4-7	1-3	8-10	0.85 (0.76-0.94)	0.72 (0.59-0.88)	0.54 (0.37-0.78)	60 (21-)
169	>50	Prostate	Bone Only	4-7	4-7	0	0.85 (0.78-0.92)	0.72 (0.63-0.84)	0.54 (0.41-0.70)	60 (31-93)
170	>50	Prostate	Bone Only	4-7	4-7	1-3	0.81 (0.73-0.89)	0.66 (0.55-0.78)	0.45 (0.32-0.62)	41 (25-63)
171	>50	Prostate	Bone Only	4-7	4-7	4-7	0.76 (0.66-0.87)	0.58 (0.45-0.75)	0.36 (0.22-0.57)	34 (18-52)
172	>50	Prostate	Bone Only	4-7	4-7	8-10	0.80 (0.70-0.91)	0.65 (0.51-0.83)	0.44 (0.28-0.70)	41 (18-70)
173	>50	Prostate	Bone Only	4-7	8-10	0	0.83 (0.75-0.92)	0.70 (0.58-0.84)	0.50 (0.36-0.71)	52 (25-83)
174	>50	Prostate	Bone Only	4-7	8-10	1-3	0.79 (0.70-0.89)	0.63 (0.50-0.79)	0.41 (0.27-0.63)	38 (19-62)
175	>50	Prostate	Bone Only	4-7	8-10	4-7	0.74 (0.63-0.86)	0.55 (0.40-0.75)	0.32 (0.18-0.57)	29 (14-48)
176	>50	Prostate	Bone Only	4-7	8-10	8-10	0.78 (0.68-0.90)	0.62 (0.47-0.82)	0.40 (0.24-0.67)	36 (15-62)
177	>50	Prostate	Bone Only	8-10	0	0	0.84 (0.74-0.95)	0.71 (0.56-0.90)	0.52 (0.33-0.82)	58 (16-)
178	>50	Prostate	Bone Only	8-10	0	1-3	0.80 (0.67-0.94)	0.64 (0.46-0.89)	0.43 (0.23-0.79)	39 (11-80)
179	>50	Prostate	Bone Only	8-10	0	4-7	0.75 (0.60-0.93)	0.56 (0.37-0.86)	0.34 (0.15-0.74)	31 (9-60)
180	>50	Prostate	Bone Only	8-10	0	8-10	0.79 (0.66-0.96)	0.63 (0.44-0.92)	0.42 (0.21-0.84)	39 (8-80)
181	>50	Prostate	Bone Only	8-10	1-3	0	0.80 (0.71-0.91)	0.65 (0.52-0.82)	0.44 (0.28-0.68)	41 (19-70)
182	>50	Prostate	Bone Only	8-10	1-3	1-3	0.75 (0.64-0.88)	0.57 (0.42-0.78)	0.34 (0.19-0.61)	31 (14-52)
183	>50	Prostate	Bone Only	8-10	1-3	4-7	0.69 (0.57-0.85)	0.49 (0.33-0.72)	0.25 (0.12-0.54)	25 (12-38)
184	>50	Prostate	Bone Only	8-10	1-3	8-10	0.75 (0.62-0.90)	0.56 (0.39-0.81)	0.34 (0.17-0.67)	31 (12-54)
185	>50	Prostate	Bone Only	8-10	4-7	0	0.75 (0.65-0.87)	0.57 (0.43-0.75)	0.34 (0.20-0.58)	31 (15-51)
186	>50	Prostate	Bone Only	8-10	4-7	1-3	0.69 (0.57-0.83)	0.48 (0.34-0.68)	0.24 (0.12-0.48)	24 (13-36)
187	>50	Prostate	Bone Only	8-10	4-7	4-7	0.62 (0.48-0.79)	0.39 (0.24-0.62)	0.16 (0.07-0.40)	19 (10-28)
188	>50	Prostate	Bone Only	8-10	4-7	8-10	0.68 (0.54-0.86)	0.47 (0.30-0.74)	0.24 (0.10-0.56)	23 (10-38)
189	>50	Prostate	Bone Only	8-10	8-10	0	0.72 (0.61-0.86)	0.53 (0.39-0.73)	0.30 (0.16-0.55)	28 (14-44)
190	>50	Prostate	Bone Only	8-10	8-10	1-3	0.66 (0.53-0.81)	0.44 (0.29-0.66)	0.21 (0.10-0.45)	20 (11-33)
191	>50	Prostate	Bone Only	8-10	8-10	4-7	0.58 (0.44-0.77)	0.35 (0.21-0.59)	0.13 (0.05-0.36)	16 (9-26)
192	>50	Prostate	Bone Only	8-10	8-10	8-10	0.65 (0.51-0.83)	0.43 (0.27-0.69)	0.20 (0.08-0.50)	20 (10-34)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
193	>50	Prostate	Others	0	0	0	0.81 (0.72-0.93)	0.67 (0.52-0.86)	0.46 (0.29-0.74)	47 (17-80)
194	>50	Prostate	Others	0	0	1-3	0.77 (0.63-0.92)	0.59 (0.41-0.85)	0.37 (0.19-0.73)	34 (11-62)
195	>50	Prostate	Others	0	0	4-7	0.71 (0.55-0.91)	0.51 (0.32-0.82)	0.28 (0.11-0.68)	26 (8-49)
196	>50	Prostate	Others	0	0	8-10	0.76 (0.61-0.94)	0.59 (0.39-0.89)	0.36 (0.16-0.79)	34 (8-62)
197	>50	Prostate	Others	0	1-3	0	0.77 (0.68-0.87)	0.60 (0.48-0.76)	0.38 (0.25-0.58)	35 (19-55)
198	>50	Prostate	Others	0	1-3	1-3	0.71 (0.60-0.85)	0.52 (0.37-0.73)	0.28 (0.15-0.54)	27 (13-41)
199	>50	Prostate	Others	0	1-3	4-7	0.65 (0.51-0.82)	0.43 (0.27-0.68)	0.20 (0.08-0.47)	20 (10-34)
200	>50	Prostate	Others	0	1-3	8-10	0.71 (0.57-0.88)	0.51 (0.34-0.77)	0.28 (0.13-0.61)	26 (11-44)
201	>50	Prostate	Others	0	4-7	0	0.71 (0.61-0.83)	0.51 (0.38-0.69)	0.28 (0.16-0.49)	26 (14-38)
202	>50	Prostate	Others	0	4-7	1-3	0.64 (0.52-0.80)	0.42 (0.28-0.64)	0.19 (0.09-0.42)	19 (11-30)
203	>50	Prostate	Others	0	4-7	4-7	0.57 (0.42-0.76)	0.33 (0.19-0.58)	0.12 (0.04-0.35)	16 (8-25)
204	>50	Prostate	Others	0	4-7	8-10	0.64 (0.48-0.84)	0.41 (0.24-0.71)	0.18 (0.07-0.51)	19 (8-34)
205	>50	Prostate	Others	0	8-10	0	0.68 (0.57-0.83)	0.48 (0.33-0.68)	0.24 (0.12-0.48)	23 (13-35)
206	>50	Prostate	Others	0	8-10	1-3	0.61 (0.47-0.79)	0.38 (0.23-0.63)	0.16 (0.06-0.41)	19 (9-29)
207	>50	Prostate	Others	0	8-10	4-7	0.53 (0.37-0.75)	0.29 (0.15-0.57)	0.09 (0.03-0.34)	14 (7-21)
208	>50	Prostate	Others	0	8-10	8-10	0.60 (0.44-0.82)	0.37 (0.21-0.67)	0.15 (0.05-0.46)	18 (8-29)
209	>50	Prostate	Others	1-3	0	0	0.81 (0.71-0.93)	0.67 (0.52-0.86)	0.46 (0.29-0.75)	47 (16-83)
210	>50	Prostate	Others	1-3	0	1-3	0.77 (0.64-0.92)	0.59 (0.42-0.84)	0.37 (0.19-0.72)	35 (11-62)
211	>50	Prostate	Others	1-3	0	4-7	0.71 (0.56-0.90)	0.51 (0.32-0.81)	0.28 (0.12-0.67)	26 (9-48)
212	>50	Prostate	Others	1-3	0	8-10	0.76 (0.62-0.94)	0.59 (0.39-0.88)	0.36 (0.17-0.78)	34 (8-62)
213	>50	Prostate	Others	1-3	1-3	0	0.77 (0.68-0.88)	0.60 (0.47-0.77)	0.38 (0.24-0.60)	35 (19-59)
214	>50	Prostate	Others	1-3	1-3	1-3	0.72 (0.60-0.85)	0.52 (0.38-0.72)	0.29 (0.16-0.52)	27 (14-40)
215	>50	Prostate	Others	1-3	1-3	4-7	0.65 (0.52-0.82)	0.43 (0.28-0.66)	0.20 (0.09-0.45)	20 (11-33)
216	>50	Prostate	Others	1-3	1-3	8-10	0.71 (0.58-0.88)	0.51 (0.34-0.76)	0.28 (0.13-0.59)	26 (11-44)
217	>50	Prostate	Others	1-3	4-7	0	0.71 (0.61-0.84)	0.51 (0.38-0.70)	0.28 (0.16-0.49)	27 (14-39)
218	>50	Prostate	Others	1-3	4-7	1-3	0.64 (0.53-0.79)	0.42 (0.29-0.62)	0.19 (0.09-0.39)	20 (12-30)
219	>50	Prostate	Others	1-3	4-7	4-7	0.57 (0.43-0.75)	0.33 (0.20-0.56)	0.12 (0.04-0.32)	16 (9-24)
220	>50	Prostate	Others	1-3	4-7	8-10	0.64 (0.49-0.83)	0.41 (0.25-0.69)	0.18 (0.07-0.48)	19 (9-33)
221	>50	Prostate	Others	1-3	8-10	0	0.69 (0.56-0.84)	0.48 (0.32-0.70)	0.24 (0.12-0.50)	24 (12-36)
222	>50	Prostate	Others	1-3	8-10	1-3	0.61 (0.47-0.79)	0.38 (0.23-0.63)	0.16 (0.06-0.40)	19 (9-28)
223	>50	Prostate	Others	1-3	8-10	4-7	0.53 (0.38-0.75)	0.29 (0.15-0.56)	0.09 (0.03-0.33)	14 (7-21)
224	>50	Prostate	Others	1-3	8-10	8-10	0.60 (0.45-0.82)	0.37 (0.21-0.66)	0.15 (0.05-0.45)	18 (8-29)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
225	>50	Prostate	Others	4-7	0	0	0.81 (0.71-0.93)	0.67 (0.51-0.87)	0.46 (0.28-0.76)	45 (15-83)
226	>50	Prostate	Others	4-7	0	1-3	0.76 (0.63-0.92)	0.59 (0.41-0.85)	0.37 (0.18-0.73)	34 (11-62)
227	>50	Prostate	Others	4-7	0	4-7	0.71 (0.55-0.91)	0.51 (0.31-0.82)	0.27 (0.11-0.68)	26 (8-49)
228	>50	Prostate	Others	4-7	0	8-10	0.76 (0.61-0.94)	0.58 (0.38-0.89)	0.36 (0.16-0.79)	34 (8-62)
229	>50	Prostate	Others	4-7	1-3	0	0.77 (0.68-0.88)	0.60 (0.47-0.77)	0.38 (0.24-0.59)	35 (19-58)
230	>50	Prostate	Others	4-7	1-3	1-3	0.71 (0.60-0.85)	0.52 (0.37-0.72)	0.28 (0.15-0.52)	27 (14-40)
231	>50	Prostate	Others	4-7	1-3	4-7	0.65 (0.52-0.81)	0.43 (0.28-0.66)	0.20 (0.09-0.45)	20 (11-33)
232	>50	Prostate	Others	4-7	1-3	8-10	0.71 (0.57-0.87)	0.51 (0.34-0.76)	0.27 (0.13-0.59)	26 (11-44)
233	>50	Prostate	Others	4-7	4-7	0	0.71 (0.61-0.83)	0.51 (0.38-0.69)	0.28 (0.16-0.48)	26 (14-38)
234	>50	Prostate	Others	4-7	4-7	1-3	0.64 (0.53-0.78)	0.42 (0.29-0.61)	0.19 (0.09-0.38)	19 (12-29)
235	>50	Prostate	Others	4-7	4-7	4-7	0.56 (0.43-0.74)	0.33 (0.19-0.55)	0.12 (0.04-0.31)	16 (9-24)
236	>50	Prostate	Others	4-7	4-7	8-10	0.63 (0.49-0.83)	0.41 (0.25-0.68)	0.18 (0.07-0.47)	19 (9-33)
237	>50	Prostate	Others	4-7	8-10	0	0.68 (0.56-0.83)	0.47 (0.33-0.68)	0.24 (0.12-0.48)	23 (12-35)
238	>50	Prostate	Others	4-7	8-10	1-3	0.61 (0.48-0.78)	0.38 (0.24-0.61)	0.16 (0.07-0.38)	18 (10-27)
239	>50	Prostate	Others	4-7	8-10	4-7	0.53 (0.38-0.73)	0.29 (0.15-0.54)	0.09 (0.03-0.30)	14 (7-20)
240	>50	Prostate	Others	4-7	8-10	8-10	0.60 (0.45-0.80)	0.37 (0.21-0.64)	0.15 (0.05-0.43)	18 (8-28)
241	>50	Prostate	Others	8-10	0	0	0.70 (0.54-0.90)	0.49 (0.30-0.81)	0.26 (0.10-0.66)	25 (8-44)
242	>50	Prostate	Others	8-10	0	1-3	0.62 (0.44-0.89)	0.40 (0.20-0.79)	0.17 (0.05-0.63)	19 (6-35)
243	>50	Prostate	Others	8-10	0	4-7	0.55 (0.35-0.86)	0.31 (0.13-0.74)	0.10 (0.02-0.56)	15 (5-26)
244	>50	Prostate	Others	8-10	0	8-10	0.62 (0.42-0.91)	0.39 (0.18-0.84)	0.17 (0.04-0.71)	19 (4-35)
245	>50	Prostate	Others	8-10	1-3	0	0.63 (0.49-0.82)	0.41 (0.25-0.67)	0.18 (0.07-0.47)	19 (9-32)
246	>50	Prostate	Others	8-10	1-3	1-3	0.55 (0.39-0.78)	0.32 (0.16-0.61)	0.11 (0.03-0.39)	15 (7-24)
247	>50	Prostate	Others	8-10	1-3	4-7	0.47 (0.30-0.73)	0.23 (0.10-0.53)	0.06 (0.01-0.30)	12 (6-19)
248	>50	Prostate	Others	8-10	1-3	8-10	0.55 (0.37-0.81)	0.31 (0.14-0.66)	0.10 (0.02-0.45)	15 (6-26)
249	>50	Prostate	Others	8-10	4-7	0	0.55 (0.40-0.75)	0.31 (0.17-0.57)	0.11 (0.03-0.34)	15 (8-23)
250	>50	Prostate	Others	8-10	4-7	1-3	0.46 (0.31-0.69)	0.22 (0.10-0.48)	0.05 (0.01-0.25)	12 (6-18)
251	>50	Prostate	Others	8-10	4-7	4-7	0.37 (0.22-0.62)	0.14 (0.05-0.39)	0.02 (0.00-0.17)	9 (5-14)
252	>50	Prostate	Others	8-10	4-7	8-10	0.45 (0.27-0.74)	0.21 (0.08-0.55)	0.05 (0.01-0.33)	12 (5-19)
253	>50	Prostate	Others	8-10	8-10	0	0.51 (0.36-0.73)	0.27 (0.14-0.53)	0.08 (0.02-0.30)	14 (7-20)
254	>50	Prostate	Others	8-10	8-10	1-3	0.42 (0.27-0.66)	0.18 (0.08-0.44)	0.04 (0.01-0.21)	11 (6-16)
255	>50	Prostate	Others	8-10	8-10	4-7	0.33 (0.18-0.58)	0.11 (0.04-0.35)	0.02 (0.00-0.13)	8 (4-13)
256	>50	Prostate	Others	8-10	8-10	8-10	0.41 (0.25-0.69)	0.18 (0.07-0.48)	0.04 (0.01-0.24)	11 (5-16)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
257	>50	Lung	Bone Only	0	0	0	0.90 (0.84-0.96)	0.81 (0.71-0.93)	0.67 (0.52-0.86)	
258	>50	Lung	Bone Only	0	0	1-3	0.87 (0.79-0.96)	0.76 (0.63-0.92)	0.59 (0.42-0.84)	70 (20-)
259	>50	Lung	Bone Only	0	0	4-7	0.84 (0.74-0.95)	0.70 (0.55-0.90)	0.51 (0.32-0.81)	53 (15-)
260	>50	Lung	Bone Only	0	0	8-10	0.87 (0.78-0.97)	0.76 (0.61-0.94)	0.59 (0.39-0.88)	70 (15-)
261	>50	Lung	Bone Only	0	1-3	0	0.87 (0.82-0.93)	0.77 (0.68-0.87)	0.60 (0.47-0.77)	75 (35-)
262	>50	Lung	Bone Only	0	1-3	1-3	0.84 (0.77-0.92)	0.71 (0.60-0.84)	0.52 (0.38-0.72)	55 (26-88)
263	>50	Lung	Bone Only	0	1-3	4-7	0.80 (0.71-0.90)	0.64 (0.51-0.81)	0.43 (0.28-0.66)	40 (19-66)
264	>50	Lung	Bone Only	0	1-3	8-10	0.84 (0.75-0.93)	0.70 (0.57-0.87)	0.51 (0.34-0.76)	53 (20-93)
265	>50	Lung	Bone Only	0	4-7	0	0.84 (0.77-0.91)	0.71 (0.60-0.83)	0.51 (0.38-0.70)	54 (27-84)
266	>50	Lung	Bone Only	0	4-7	1-3	0.79 (0.71-0.88)	0.64 (0.52-0.78)	0.42 (0.28-0.62)	39 (20-62)
267	>50	Lung	Bone Only	0	4-7	4-7	0.74 (0.64-0.86)	0.56 (0.42-0.74)	0.33 (0.19-0.56)	30 (15-49)
268	>50	Lung	Bone Only	0	4-7	8-10	0.79 (0.69-0.91)	0.63 (0.48-0.82)	0.41 (0.25-0.69)	38 (16-63)
269	>50	Lung	Bone Only	0	8-10	0	0.82 (0.74-0.91)	0.68 (0.55-0.83)	0.48 (0.32-0.71)	49 (20-80)
270	>50	Lung	Bone Only	0	8-10	1-3	0.77 (0.67-0.89)	0.60 (0.46-0.79)	0.38 (0.23-0.63)	35 (16-60)
271	>50	Lung	Bone Only	0	8-10	4-7	0.72 (0.60-0.86)	0.52 (0.37-0.74)	0.29 (0.15-0.57)	27 (13-41)
272	>50	Lung	Bone Only	0	8-10	8-10	0.77 (0.66-0.90)	0.60 (0.44-0.81)	0.37 (0.21-0.66)	35 (14-60)
273	>50	Lung	Bone Only	1-3	0	0	0.90 (0.84-0.97)	0.81 (0.71-0.93)	0.67 (0.52-0.87)	
274	>50	Lung	Bone Only	1-3	0	1-3	0.87 (0.79-0.96)	0.76 (0.64-0.91)	0.59 (0.42-0.84)	71 (21-)
275	>50	Lung	Bone Only	1-3	0	4-7	0.84 (0.74-0.95)	0.71 (0.56-0.89)	0.51 (0.33-0.80)	54 (16-)
276	>50	Lung	Bone Only	1-3	0	8-10	0.87 (0.78-0.97)	0.76 (0.62-0.93)	0.59 (0.40-0.87)	70 (16-)
277	>50	Lung	Bone Only	1-3	1-3	0	0.87 (0.82-0.94)	0.77 (0.67-0.88)	0.60 (0.47-0.78)	75 (35-)
278	>50	Lung	Bone Only	1-3	1-3	1-3	0.84 (0.77-0.91)	0.71 (0.60-0.84)	0.52 (0.38-0.70)	58 (28-88)
279	>50	Lung	Bone Only	1-3	1-3	4-7	0.80 (0.71-0.89)	0.64 (0.52-0.80)	0.43 (0.29-0.65)	40 (20-63)
280	>50	Lung	Bone Only	1-3	1-3	8-10	0.84 (0.75-0.93)	0.71 (0.58-0.86)	0.51 (0.35-0.75)	54 (21-93)
281	>50	Lung	Bone Only	1-3	4-7	0	0.84 (0.77-0.91)	0.71 (0.60-0.83)	0.52 (0.38-0.70)	55 (27-84)
282	>50	Lung	Bone Only	1-3	4-7	1-3	0.79 (0.72-0.88)	0.64 (0.53-0.77)	0.42 (0.30-0.60)	39 (23-61)
283	>50	Lung	Bone Only	1-3	4-7	4-7	0.74 (0.65-0.85)	0.56 (0.44-0.72)	0.33 (0.20-0.54)	30 (17-47)
284	>50	Lung	Bone Only	1-3	4-7	8-10	0.79 (0.69-0.90)	0.63 (0.49-0.81)	0.41 (0.26-0.66)	38 (18-62)
285	>50	Lung	Bone Only	1-3	8-10	0	0.82 (0.73-0.92)	0.68 (0.55-0.84)	0.48 (0.32-0.72)	49 (19-83)
286	>50	Lung	Bone Only	1-3	8-10	1-3	0.77 (0.68-0.88)	0.61 (0.47-0.78)	0.38 (0.24-0.62)	35 (17-59)
287	>50	Lung	Bone Only	1-3	8-10	4-7	0.72 (0.60-0.86)	0.53 (0.37-0.74)	0.29 (0.15-0.55)	27 (13-41)
288	>50	Lung	Bone Only	1-3	8-10	8-10	0.77 (0.66-0.90)	0.60 (0.45-0.80)	0.37 (0.22-0.65)	35 (15-61)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
289	>50	Lung	Bone Only	4-7	0	0	0.90 (0.83-0.97)	0.81 (0.70-0.94)	0.67 (0.51-0.88)	
290	>50	Lung	Bone Only	4-7	0	1-3	0.87 (0.79-0.96)	0.76 (0.63-0.92)	0.59 (0.41-0.85)	70 (20-)
291	>50	Lung	Bone Only	4-7	0	4-7	0.84 (0.73-0.95)	0.70 (0.55-0.90)	0.51 (0.32-0.82)	53 (15-)
292	>50	Lung	Bone Only	4-7	0	8-10	0.87 (0.77-0.97)	0.76 (0.61-0.94)	0.58 (0.39-0.88)	70 (15-)
293	>50	Lung	Bone Only	4-7	1-3	0	0.87 (0.81-0.94)	0.77 (0.67-0.88)	0.60 (0.47-0.77)	72 (35-)
294	>50	Lung	Bone Only	4-7	1-3	1-3	0.84 (0.77-0.91)	0.71 (0.60-0.84)	0.52 (0.38-0.70)	55 (27-84)
295	>50	Lung	Bone Only	4-7	1-3	4-7	0.80 (0.71-0.89)	0.64 (0.52-0.80)	0.43 (0.28-0.65)	40 (20-63)
296	>50	Lung	Bone Only	4-7	1-3	8-10	0.84 (0.75-0.93)	0.70 (0.57-0.86)	0.51 (0.35-0.75)	53 (20-93)
297	>50	Lung	Bone Only	4-7	4-7	0	0.84 (0.77-0.91)	0.71 (0.60-0.83)	0.51 (0.38-0.70)	54 (27-84)
298	>50	Lung	Bone Only	4-7	4-7	1-3	0.79 (0.72-0.87)	0.64 (0.53-0.76)	0.42 (0.30-0.59)	39 (23-60)
299	>50	Lung	Bone Only	4-7	4-7	4-7	0.74 (0.65-0.85)	0.56 (0.43-0.72)	0.33 (0.20-0.53)	30 (16-45)
300	>50	Lung	Bone Only	4-7	4-7	8-10	0.79 (0.69-0.90)	0.63 (0.49-0.81)	0.41 (0.26-0.66)	38 (18-62)
301	>50	Lung	Bone Only	4-7	8-10	0	0.82 (0.73-0.91)	0.68 (0.55-0.84)	0.48 (0.32-0.71)	49 (20-80)
302	>50	Lung	Bone Only	4-7	8-10	1-3	0.77 (0.68-0.88)	0.60 (0.47-0.77)	0.38 (0.24-0.60)	35 (18-59)
303	>50	Lung	Bone Only	4-7	8-10	4-7	0.72 (0.60-0.85)	0.52 (0.38-0.72)	0.29 (0.15-0.54)	27 (14-41)
304	>50	Lung	Bone Only	4-7	8-10	8-10	0.77 (0.66-0.89)	0.60 (0.45-0.79)	0.37 (0.22-0.64)	35 (15-59)
305	>50	Lung	Bone Only	8-10	0	0	0.83 (0.73-0.94)	0.69 (0.54-0.89)	0.49 (0.30-0.80)	52 (14-93)
306	>50	Lung	Bone Only	8-10	0	1-3	0.78 (0.66-0.93)	0.62 (0.44-0.87)	0.40 (0.21-0.76)	36 (11-70)
307	>50	Lung	Bone Only	8-10	0	4-7	0.73 (0.58-0.91)	0.54 (0.35-0.83)	0.31 (0.13-0.70)	29 (9-52)
308	>50	Lung	Bone Only	8-10	0	8-10	0.78 (0.64-0.94)	0.61 (0.42-0.89)	0.39 (0.19-0.80)	36 (9-70)
309	>50	Lung	Bone Only	8-10	1-3	0	0.79 (0.69-0.90)	0.63 (0.49-0.81)	0.41 (0.26-0.66)	38 (17-63)
310	>50	Lung	Bone Only	8-10	1-3	1-3	0.73 (0.62-0.87)	0.55 (0.40-0.75)	0.32 (0.17-0.58)	29 (14-48)
311	>50	Lung	Bone Only	8-10	1-3	4-7	0.67 (0.55-0.83)	0.46 (0.31-0.69)	0.23 (0.11-0.49)	22 (11-35)
312	>50	Lung	Bone Only	8-10	1-3	8-10	0.73 (0.60-0.88)	0.54 (0.38-0.78)	0.31 (0.15-0.62)	29 (12-49)
313	>50	Lung	Bone Only	8-10	4-7	0	0.73 (0.62-0.86)	0.54 (0.40-0.74)	0.31 (0.17-0.56)	29 (14-45)
314	>50	Lung	Bone Only	8-10	4-7	1-3	0.67 (0.55-0.80)	0.45 (0.32-0.65)	0.22 (0.11-0.44)	21 (13-33)
315	>50	Lung	Bone Only	8-10	4-7	4-7	0.59 (0.47-0.76)	0.36 (0.23-0.57)	0.14 (0.06-0.35)	17 (10-26)
316	>50	Lung	Bone Only	8-10	4-7	8-10	0.66 (0.52-0.83)	0.44 (0.28-0.69)	0.21 (0.09-0.50)	20 (10-35)
317	>50	Lung	Bone Only	8-10	8-10	0	0.71 (0.59-0.85)	0.51 (0.36-0.72)	0.27 (0.14-0.54)	26 (13-39)
318	>50	Lung	Bone Only	8-10	8-10	1-3	0.64 (0.51-0.79)	0.41 (0.27-0.63)	0.18 (0.08-0.41)	19 (11-30)
319	>50	Lung	Bone Only	8-10	8-10	4-7	0.56 (0.42-0.74)	0.32 (0.19-0.55)	0.11 (0.04-0.32)	15 (9-22)
320	>50	Lung	Bone Only	8-10	8-10	8-10	0.63 (0.49-0.80)	0.40 (0.25-0.65)	0.18 (0.07-0.44)	19 (10-30)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
321	>50	Lung	Others	0	0	0	0.80 (0.70-0.91)	0.65 (0.51-0.83)	0.43 (0.27-0.69)	40 (18-70)
322	>50	Lung	Others	0	0	1-3	0.75 (0.63-0.90)	0.57 (0.40-0.81)	0.34 (0.17-0.66)	31 (12-54)
323	>50	Lung	Others	0	0	4-7	0.69 (0.54-0.87)	0.48 (0.31-0.76)	0.25 (0.10-0.60)	24 (9-39)
324	>50	Lung	Others	0	0	8-10	0.74 (0.60-0.92)	0.56 (0.38-0.84)	0.33 (0.15-0.71)	30 (10-58)
325	>50	Lung	Others	0	1-3	0	0.76 (0.67-0.85)	0.58 (0.47-0.72)	0.35 (0.23-0.53)	33 (19-49)
326	>50	Lung	Others	0	1-3	1-3	0.70 (0.59-0.82)	0.49 (0.36-0.67)	0.26 (0.14-0.46)	25 (14-35)
327	>50	Lung	Others	0	1-3	4-7	0.63 (0.51-0.77)	0.40 (0.27-0.60)	0.17 (0.08-0.38)	19 (11-28)
328	>50	Lung	Others	0	1-3	8-10	0.69 (0.57-0.84)	0.48 (0.33-0.70)	0.25 (0.12-0.51)	24 (12-37)
329	>50	Lung	Others	0	4-7	0	0.69 (0.60-0.80)	0.49 (0.37-0.64)	0.25 (0.15-0.42)	25 (15-35)
330	>50	Lung	Others	0	4-7	1-3	0.62 (0.51-0.75)	0.39 (0.28-0.56)	0.17 (0.08-0.33)	19 (12-27)
331	>50	Lung	Others	0	4-7	4-7	0.54 (0.42-0.70)	0.30 (0.18-0.49)	0.10 (0.04-0.26)	14 (9-20)
332	>50	Lung	Others	0	4-7	8-10	0.61 (0.48-0.79)	0.38 (0.24-0.62)	0.16 (0.06-0.40)	19 (10-28)
333	>50	Lung	Others	0	8-10	0	0.66 (0.55-0.80)	0.45 (0.32-0.64)	0.22 (0.11-0.42)	21 (13-32)
334	>50	Lung	Others	0	8-10	1-3	0.59 (0.46-0.75)	0.35 (0.22-0.56)	0.14 (0.06-0.33)	16 (10-25)
335	>50	Lung	Others	0	8-10	4-7	0.50 (0.37-0.69)	0.26 (0.14-0.48)	0.08 (0.02-0.25)	13 (8-19)
336	>50	Lung	Others	0	8-10	8-10	0.58 (0.44-0.76)	0.34 (0.20-0.59)	0.13 (0.05-0.36)	16 (9-26)
337	>50	Lung	Others	1-3	0	0	0.80 (0.70-0.91)	0.65 (0.51-0.83)	0.44 (0.27-0.70)	41 (17-70)
338	>50	Lung	Others	1-3	0	1-3	0.75 (0.63-0.89)	0.57 (0.41-0.80)	0.34 (0.18-0.64)	31 (13-53)
339	>50	Lung	Others	1-3	0	4-7	0.69 (0.55-0.87)	0.49 (0.31-0.75)	0.25 (0.11-0.58)	25 (10-39)
340	>50	Lung	Others	1-3	0	8-10	0.75 (0.61-0.91)	0.56 (0.38-0.83)	0.33 (0.16-0.69)	31 (11-58)
341	>50	Lung	Others	1-3	1-3	0	0.76 (0.67-0.85)	0.58 (0.46-0.73)	0.35 (0.23-0.54)	33 (19-49)
342	>50	Lung	Others	1-3	1-3	1-3	0.70 (0.60-0.81)	0.49 (0.38-0.65)	0.26 (0.15-0.43)	25 (15-35)
343	>50	Lung	Others	1-3	1-3	4-7	0.63 (0.52-0.76)	0.40 (0.28-0.58)	0.18 (0.09-0.35)	19 (12-27)
344	>50	Lung	Others	1-3	1-3	8-10	0.69 (0.57-0.83)	0.49 (0.34-0.69)	0.25 (0.13-0.49)	25 (13-36)
345	>50	Lung	Others	1-3	4-7	0	0.69 (0.60-0.80)	0.49 (0.37-0.64)	0.25 (0.15-0.42)	25 (15-35)
346	>50	Lung	Others	1-3	4-7	1-3	0.62 (0.53-0.72)	0.39 (0.30-0.53)	0.17 (0.10-0.29)	19 (13-26)
347	>50	Lung	Others	1-3	4-7	4-7	0.54 (0.44-0.67)	0.30 (0.20-0.45)	0.10 (0.05-0.22)	14 (10-19)
348	>50	Lung	Others	1-3	4-7	8-10	0.61 (0.49-0.77)	0.39 (0.25-0.59)	0.16 (0.07-0.37)	19 (11-27)
349	>50	Lung	Others	1-3	8-10	0	0.67 (0.55-0.81)	0.45 (0.31-0.65)	0.22 (0.11-0.44)	21 (12-33)
350	>50	Lung	Others	1-3	8-10	1-3	0.59 (0.47-0.74)	0.35 (0.23-0.55)	0.14 (0.06-0.31)	17 (10-24)
351	>50	Lung	Others	1-3	8-10	4-7	0.51 (0.38-0.68)	0.26 (0.15-0.47)	0.08 (0.03-0.23)	13 (8-19)
352	>50	Lung	Others	1-3	8-10	8-10	0.58 (0.45-0.76)	0.35 (0.21-0.57)	0.13 (0.05-0.34)	16 (9-25)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
353	>50	Lung	Others	4-7	0	0	0.80 (0.70-0.92)	0.65 (0.50-0.84)	0.43 (0.26-0.71)	40 (16-71)
354	>50	Lung	Others	4-7	0	1-3	0.75 (0.62-0.90)	0.57 (0.40-0.80)	0.34 (0.17-0.66)	31 (12-54)
355	>50	Lung	Others	4-7	0	4-7	0.69 (0.54-0.87)	0.48 (0.31-0.76)	0.25 (0.10-0.59)	24 (9-39)
356	>50	Lung	Others	4-7	0	8-10	0.74 (0.60-0.92)	0.56 (0.37-0.84)	0.33 (0.15-0.71)	30 (10-58)
357	>50	Lung	Others	4-7	1-3	0	0.76 (0.67-0.85)	0.58 (0.46-0.72)	0.35 (0.23-0.53)	33 (19-49)
358	>50	Lung	Others	4-7	1-3	1-3	0.69 (0.60-0.80)	0.49 (0.37-0.65)	0.26 (0.15-0.43)	25 (15-35)
359	>50	Lung	Others	4-7	1-3	4-7	0.63 (0.52-0.76)	0.40 (0.28-0.58)	0.17 (0.09-0.35)	19 (12-27)
360	>50	Lung	Others	4-7	1-3	8-10	0.69 (0.57-0.83)	0.48 (0.34-0.69)	0.25 (0.13-0.49)	24 (13-36)
361	>50	Lung	Others	4-7	4-7	0	0.69 (0.60-0.79)	0.49 (0.37-0.63)	0.25 (0.15-0.41)	25 (15-34)
362	>50	Lung	Others	4-7	4-7	1-3	0.62 (0.53-0.72)	0.39 (0.30-0.52)	0.17 (0.10-0.28)	19 (13-26)
363	>50	Lung	Others	4-7	4-7	4-7	0.54 (0.44-0.67)	0.30 (0.20-0.45)	0.10 (0.05-0.22)	14 (10-19)
364	>50	Lung	Others	4-7	4-7	8-10	0.61 (0.49-0.77)	0.38 (0.25-0.59)	0.16 (0.07-0.36)	19 (11-27)
365	>50	Lung	Others	4-7	8-10	0	0.66 (0.55-0.79)	0.45 (0.32-0.63)	0.21 (0.11-0.41)	20 (13-31)
366	>50	Lung	Others	4-7	8-10	1-3	0.59 (0.48-0.72)	0.35 (0.24-0.52)	0.14 (0.06-0.29)	16 (11-23)
367	>50	Lung	Others	4-7	8-10	4-7	0.50 (0.38-0.66)	0.26 (0.15-0.44)	0.08 (0.03-0.21)	13 (8-19)
368	>50	Lung	Others	4-7	8-10	8-10	0.58 (0.45-0.74)	0.34 (0.21-0.55)	0.13 (0.05-0.32)	16 (9-24)
369	>50	Lung	Others	8-10	0	0	0.68 (0.53-0.87)	0.47 (0.29-0.75)	0.23 (0.09-0.58)	22 (9-38)
370	>50	Lung	Others	8-10	0	1-3	0.60 (0.43-0.84)	0.37 (0.19-0.71)	0.15 (0.04-0.52)	18 (6-30)
371	>50	Lung	Others	8-10	0	4-7	0.52 (0.34-0.80)	0.28 (0.12-0.64)	0.09 (0.02-0.43)	14 (6-23)
372	>50	Lung	Others	8-10	0	8-10	0.59 (0.41-0.86)	0.36 (0.18-0.75)	0.14 (0.04-0.58)	17 (6-30)
373	>50	Lung	Others	8-10	1-3	0	0.61 (0.48-0.78)	0.38 (0.24-0.61)	0.16 (0.07-0.39)	19 (10-28)
374	>50	Lung	Others	8-10	1-3	1-3	0.53 (0.39-0.72)	0.29 (0.16-0.52)	0.09 (0.03-0.29)	14 (8-20)
375	>50	Lung	Others	8-10	1-3	4-7	0.44 (0.30-0.65)	0.20 (0.10-0.42)	0.05 (0.01-0.20)	11 (6-16)
376	>50	Lung	Others	8-10	1-3	8-10	0.52 (0.37-0.74)	0.28 (0.14-0.55)	0.09 (0.02-0.33)	14 (7-20)
377	>50	Lung	Others	8-10	4-7	0	0.52 (0.39-0.70)	0.28 (0.16-0.49)	0.09 (0.03-0.26)	14 (8-19)
378	>50	Lung	Others	8-10	4-7	1-3	0.43 (0.31-0.60)	0.19 (0.10-0.37)	0.04 (0.01-0.15)	11 (7-15)
379	>50	Lung	Others	8-10	4-7	4-7	0.34 (0.22-0.52)	0.12 (0.05-0.28)	0.02 (0.00-0.09)	9 (6-12)
380	>50	Lung	Others	8-10	4-7	8-10	0.42 (0.28-0.65)	0.19 (0.08-0.43)	0.04 (0.01-0.20)	11 (6-16)
381	>50	Lung	Others	8-10	8-10	0	0.49 (0.35-0.67)	0.24 (0.13-0.46)	0.07 (0.02-0.23)	13 (7-19)
382	>50	Lung	Others	8-10	8-10	1-3	0.39 (0.27-0.58)	0.16 (0.08-0.34)	0.03 (0.01-0.13)	10 (6-14)
383	>50	Lung	Others	8-10	8-10	4-7	0.30 (0.19-0.48)	0.10 (0.04-0.24)	0.01 (0.00-0.07)	8 (5-11)
384	>50	Lung	Others	8-10	8-10	8-10	0.38 (0.25-0.59)	0.15 (0.07-0.35)	0.03 (0.01-0.14)	10 (6-14)

Appendix 4
Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
385	>50	Others	Bone Only	0	0	0	0.88 (0.81-0.95)	0.78 (0.67-0.90)	0.62 (0.47-0.82)	80 (29-)
386	>50	Others	Bone Only	0	0	1-3	0.85 (0.76-0.95)	0.72 (0.58-0.90)	0.54 (0.36-0.81)	60 (19-)
387	>50	Others	Bone Only	0	0	4-7	0.81 (0.70-0.94)	0.66 (0.49-0.88)	0.45 (0.26-0.78)	41 (13-83)
388	>50	Others	Bone Only	0	0	8-10	0.84 (0.74-0.96)	0.72 (0.56-0.92)	0.53 (0.33-0.86)	59 (13-)
389	>50	Others	Bone Only	0	1-3	0	0.85 (0.79-0.92)	0.73 (0.63-0.84)	0.55 (0.42-0.72)	62 (31-)
390	>50	Others	Bone Only	0	1-3	1-3	0.81 (0.73-0.90)	0.67 (0.54-0.82)	0.46 (0.31-0.68)	45 (20-71)
391	>50	Others	Bone Only	0	1-3	4-7	0.77 (0.66-0.89)	0.59 (0.45-0.79)	0.37 (0.21-0.63)	34 (15-58)
392	>50	Others	Bone Only	0	1-3	8-10	0.81 (0.71-0.92)	0.66 (0.51-0.85)	0.45 (0.28-0.73)	41 (16-80)
393	>50	Others	Bone Only	0	4-7	0	0.81 (0.73-0.89)	0.66 (0.55-0.79)	0.45 (0.32-0.64)	44 (24-69)
394	>50	Others	Bone Only	0	4-7	1-3	0.76 (0.67-0.86)	0.58 (0.46-0.75)	0.36 (0.22-0.57)	34 (18-52)
395	>50	Others	Bone Only	0	4-7	4-7	0.70 (0.58-0.84)	0.50 (0.35-0.71)	0.27 (0.14-0.52)	26 (13-39)
396	>50	Others	Bone Only	0	4-7	8-10	0.75 (0.64-0.90)	0.58 (0.41-0.80)	0.35 (0.19-0.66)	33 (13-58)
397	>50	Others	Bone Only	0	8-10	0	0.79 (0.70-0.89)	0.63 (0.50-0.79)	0.41 (0.27-0.64)	38 (19-62)
398	>50	Others	Bone Only	0	8-10	1-3	0.74 (0.63-0.87)	0.55 (0.40-0.75)	0.32 (0.18-0.57)	30 (14-48)
399	>50	Others	Bone Only	0	8-10	4-7	0.68 (0.54-0.84)	0.46 (0.30-0.71)	0.23 (0.10-0.52)	22 (11-36)
400	>50	Others	Bone Only	0	8-10	8-10	0.73 (0.60-0.88)	0.54 (0.38-0.78)	0.31 (0.15-0.62)	29 (12-50)
401	>50	Others	Bone Only	1-3	0	0	0.88 (0.81-0.95)	0.78 (0.67-0.91)	0.62 (0.47-0.83)	83 (29-)
402	>50	Others	Bone Only	1-3	0	1-3	0.85 (0.76-0.94)	0.72 (0.59-0.89)	0.54 (0.36-0.80)	60 (19-)
403	>50	Others	Bone Only	1-3	0	4-7	0.81 (0.70-0.94)	0.66 (0.50-0.87)	0.45 (0.27-0.77)	44 (14-83)
404	>50	Others	Bone Only	1-3	0	8-10	0.84 (0.74-0.96)	0.72 (0.56-0.92)	0.53 (0.33-0.85)	59 (14-)
405	>50	Others	Bone Only	1-3	1-3	0	0.85 (0.79-0.92)	0.73 (0.63-0.85)	0.55 (0.42-0.73)	62 (30-)
406	>50	Others	Bone Only	1-3	1-3	1-3	0.81 (0.73-0.90)	0.67 (0.55-0.81)	0.46 (0.32-0.66)	45 (22-70)
407	>50	Others	Bone Only	1-3	1-3	4-7	0.77 (0.67-0.88)	0.59 (0.45-0.78)	0.37 (0.22-0.61)	35 (16-58)
408	>50	Others	Bone Only	1-3	1-3	8-10	0.81 (0.71-0.92)	0.66 (0.52-0.84)	0.45 (0.28-0.72)	44 (18-75)
409	>50	Others	Bone Only	1-3	4-7	0	0.81 (0.74-0.89)	0.66 (0.55-0.80)	0.46 (0.32-0.64)	44 (24-69)
410	>50	Others	Bone Only	1-3	4-7	1-3	0.76 (0.68-0.85)	0.59 (0.47-0.73)	0.36 (0.24-0.54)	34 (19-51)
411	>50	Others	Bone Only	1-3	4-7	4-7	0.70 (0.60-0.83)	0.50 (0.37-0.69)	0.27 (0.15-0.49)	26 (14-38)
412	>50	Others	Bone Only	1-3	4-7	8-10	0.76 (0.64-0.89)	0.58 (0.43-0.79)	0.35 (0.20-0.63)	33 (14-54)
413	>50	Others	Bone Only	1-3	8-10	0	0.79 (0.70-0.90)	0.63 (0.50-0.81)	0.42 (0.26-0.66)	38 (19-62)
414	>50	Others	Bone Only	1-3	8-10	1-3	0.74 (0.63-0.86)	0.55 (0.41-0.74)	0.32 (0.18-0.56)	30 (14-48)
415	>50	Others	Bone Only	1-3	8-10	4-7	0.68 (0.55-0.84)	0.47 (0.31-0.70)	0.23 (0.11-0.50)	22 (11-35)
416	>50	Others	Bone Only	1-3	8-10	8-10	0.73 (0.61-0.86)	0.54 (0.38-0.78)	0.31 (0.16-0.61)	29 (13-50)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
417	>50	Others	Bone Only	4-7	0	0	0.88 (0.81-0.95)	0.78 (0.67-0.91)	0.62 (0.46-0.83)	80 (28-)
418	>50	Others	Bone Only	4-7	0	1-3	0.85 (0.76-0.95)	0.72 (0.58-0.89)	0.54 (0.36-0.80)	60 (19-)
419	>50	Others	Bone Only	4-7	0	4-7	0.81 (0.70-0.94)	0.66 (0.49-0.88)	0.45 (0.26-0.77)	41 (14-83)
420	>50	Others	Bone Only	4-7	0	8-10	0.84 (0.74-0.96)	0.72 (0.56-0.92)	0.53 (0.33-0.85)	59 (14-)
421	>50	Others	Bone Only	4-7	1-3	0	0.85 (0.79-0.92)	0.73 (0.63-0.84)	0.55 (0.42-0.72)	62 (31-93)
422	>50	Others	Bone Only	4-7	1-3	1-3	0.81 (0.74-0.89)	0.66 (0.55-0.80)	0.46 (0.32-0.65)	44 (23-70)
423	>50	Others	Bone Only	4-7	1-3	4-7	0.76 (0.67-0.88)	0.59 (0.46-0.77)	0.37 (0.22-0.60)	34 (17-54)
424	>50	Others	Bone Only	4-7	1-3	8-10	0.81 (0.71-0.92)	0.66 (0.52-0.84)	0.45 (0.29-0.71)	41 (18-72)
425	>50	Others	Bone Only	4-7	4-7	0	0.81 (0.74-0.89)	0.66 (0.56-0.78)	0.45 (0.33-0.62)	44 (26-63)
426	>50	Others	Bone Only	4-7	4-7	1-3	0.76 (0.68-0.85)	0.58 (0.48-0.72)	0.36 (0.24-0.52)	34 (19-49)
427	>50	Others	Bone Only	4-7	4-7	4-7	0.70 (0.60-0.82)	0.50 (0.37-0.68)	0.27 (0.15-0.47)	26 (14-38)
428	>50	Others	Bone Only	4-7	4-7	8-10	0.75 (0.65-0.88)	0.58 (0.43-0.78)	0.35 (0.20-0.61)	33 (14-53)
429	>50	Others	Bone Only	4-7	8-10	0	0.79 (0.70-0.89)	0.63 (0.51-0.79)	0.41 (0.27-0.63)	38 (19-62)
430	>50	Others	Bone Only	4-7	8-10	1-3	0.74 (0.64-0.85)	0.55 (0.42-0.72)	0.32 (0.19-0.53)	29 (16-44)
431	>50	Others	Bone Only	4-7	8-10	4-7	0.67 (0.55-0.82)	0.46 (0.32-0.68)	0.23 (0.11-0.47)	22 (12-35)
432	>50	Others	Bone Only	4-7	8-10	8-10	0.73 (0.61-0.87)	0.54 (0.39-0.75)	0.31 (0.16-0.58)	29 (13-48)
433	>50	Others	Bone Only	8-10	0	0	0.80 (0.69-0.93)	0.65 (0.49-0.86)	0.43 (0.25-0.74)	40 (14-75)
434	>50	Others	Bone Only	8-10	0	1-3	0.75 (0.61-0.91)	0.57 (0.38-0.83)	0.34 (0.16-0.71)	31 (10-59)
435	>50	Others	Bone Only	8-10	0	4-7	0.69 (0.53-0.89)	0.48 (0.29-0.80)	0.25 (0.09-0.65)	24 (8-41)
436	>50	Others	Bone Only	8-10	0	8-10	0.74 (0.59-0.93)	0.56 (0.36-0.87)	0.33 (0.14-0.76)	30 (8-60)
437	>50	Others	Bone Only	8-10	1-3	0	0.75 (0.65-0.87)	0.58 (0.44-0.76)	0.35 (0.20-0.60)	33 (15-52)
438	>50	Others	Bone Only	8-10	1-3	1-3	0.69 (0.57-0.84)	0.49 (0.34-0.71)	0.25 (0.13-0.52)	25 (12-38)
439	>50	Others	Bone Only	8-10	1-3	4-7	0.62 (0.48-0.81)	0.40 (0.24-0.65)	0.17 (0.07-0.44)	19 (9-30)
440	>50	Others	Bone Only	8-10	1-3	8-10	0.69 (0.55-0.87)	0.48 (0.31-0.75)	0.25 (0.10-0.58)	24 (10-39)
441	>50	Others	Bone Only	8-10	4-7	0	0.69 (0.58-0.82)	0.48 (0.34-0.68)	0.25 (0.13-0.48)	24 (13-36)
442	>50	Others	Bone Only	8-10	4-7	1-3	0.62 (0.50-0.77)	0.39 (0.26-0.59)	0.16 (0.07-0.37)	19 (11-27)
443	>50	Others	Bone Only	8-10	4-7	4-7	0.54 (0.40-0.72)	0.30 (0.17-0.53)	0.10 (0.03-0.30)	14 (8-20)
444	>50	Others	Bone Only	8-10	4-7	8-10	0.61 (0.46-0.81)	0.38 (0.22-0.66)	0.16 (0.05-0.46)	19 (8-29)
445	>50	Others	Bone Only	8-10	8-10	0	0.66 (0.54-0.81)	0.45 (0.30-0.66)	0.21 (0.10-0.45)	20 (12-33)
446	>50	Others	Bone Only	8-10	8-10	1-3	0.58 (0.46-0.75)	0.35 (0.22-0.57)	0.13 (0.05-0.34)	16 (9-25)
447	>50	Others	Bone Only	8-10	8-10	4-7	0.50 (0.36-0.70)	0.26 (0.14-0.49)	0.08 (0.02-0.26)	13 (7-19)
448	>50	Others	Bone Only	8-10	8-10	8-10	0.58 (0.43-0.77)	0.34 (0.19-0.60)	0.13 (0.04-0.38)	16 (8-26)

Appendix 4
Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
449	>50	Others	Others	0	0	0	0.77 (0.66-0.89)	0.60 (0.45-0.79)	0.37 (0.22-0.63)	35 (15-59)
450	>50	Others	Others	0	0	1-3	0.71 (0.57-0.88)	0.51 (0.34-0.78)	0.28 (0.12-0.61)	26 (10-44)
451	>50	Others	Others	0	0	4-7	0.64 (0.48-0.86)	0.42 (0.24-0.74)	0.19 (0.07-0.56)	20 (8-35)
452	>50	Others	Others	0	0	8-10	0.70 (0.55-0.91)	0.50 (0.31-0.82)	0.27 (0.11-0.69)	26 (8-48)
453	>50	Others	Others	0	1-3	0	0.72 (0.62-0.83)	0.52 (0.40-0.68)	0.29 (0.18-0.48)	27 (16-38)
454	>50	Others	Others	0	1-3	1-3	0.65 (0.53-0.80)	0.43 (0.29-0.64)	0.20 (0.09-0.42)	20 (11-31)
455	>50	Others	Others	0	1-3	4-7	0.57 (0.43-0.76)	0.34 (0.20-0.59)	0.13 (0.04-0.36)	16 (8-26)
456	>50	Others	Others	0	1-3	8-10	0.64 (0.50-0.83)	0.42 (0.26-0.69)	0.19 (0.07-0.50)	20 (9-34)
457	>50	Others	Others	0	4-7	0	0.65 (0.54-0.77)	0.43 (0.30-0.59)	0.19 (0.10-0.37)	20 (13-29)
458	>50	Others	Others	0	4-7	1-3	0.57 (0.44-0.73)	0.33 (0.20-0.53)	0.12 (0.05-0.30)	16 (10-23)
459	>50	Others	Others	0	4-7	4-7	0.48 (0.34-0.69)	0.24 (0.12-0.47)	0.07 (0.02-0.24)	13 (7-19)
460	>50	Others	Others	0	4-7	8-10	0.56 (0.40-0.78)	0.32 (0.17-0.61)	0.11 (0.03-0.39)	15 (7-25)
461	>50	Others	Others	0	8-10	0	0.61 (0.49-0.76)	0.39 (0.25-0.59)	0.16 (0.07-0.36)	19 (11-27)
462	>50	Others	Others	0	8-10	1-3	0.53 (0.39-0.72)	0.29 (0.16-0.52)	0.09 (0.03-0.29)	14 (8-20)
463	>50	Others	Others	0	8-10	4-7	0.44 (0.29-0.67)	0.20 (0.09-0.46)	0.05 (0.01-0.22)	11 (6-16)
464	>50	Others	Others	0	8-10	8-10	0.52 (0.37-0.75)	0.28 (0.14-0.56)	0.09 (0.02-0.33)	14 (7-20)
465	>50	Others	Others	1-3	0	0	0.77 (0.66-0.89)	0.60 (0.45-0.80)	0.37 (0.22-0.64)	35 (15-59)
466	>50	Others	Others	1-3	0	1-3	0.71 (0.58-0.87)	0.51 (0.34-0.76)	0.28 (0.13-0.59)	26 (11-44)
467	>50	Others	Others	1-3	0	4-7	0.64 (0.49-0.85)	0.42 (0.25-0.73)	0.19 (0.07-0.54)	20 (8-34)
468	>50	Others	Others	1-3	0	8-10	0.71 (0.55-0.90)	0.51 (0.31-0.81)	0.27 (0.11-0.66)	26 (8-48)
469	>50	Others	Others	1-3	1-3	0	0.72 (0.62-0.83)	0.52 (0.40-0.69)	0.29 (0.17-0.49)	27 (15-39)
470	>50	Others	Others	1-3	1-3	1-3	0.65 (0.54-0.79)	0.43 (0.30-0.62)	0.20 (0.10-0.40)	20 (12-30)
471	>50	Others	Others	1-3	1-3	4-7	0.58 (0.44-0.75)	0.34 (0.21-0.56)	0.13 (0.05-0.33)	16 (9-25)
472	>50	Others	Others	1-3	1-3	8-10	0.64 (0.51-0.82)	0.42 (0.27-0.68)	0.19 (0.08-0.47)	20 (10-33)
473	>50	Others	Others	1-3	4-7	0	0.65 (0.54-0.77)	0.43 (0.31-0.59)	0.20 (0.11-0.36)	20 (13-29)
474	>50	Others	Others	1-3	4-7	1-3	0.57 (0.46-0.70)	0.33 (0.22-0.49)	0.12 (0.06-0.26)	16 (11-21)
475	>50	Others	Others	1-3	4-7	4-7	0.48 (0.35-0.66)	0.24 (0.13-0.44)	0.07 (0.02-0.20)	13 (8-18)
476	>50	Others	Others	1-3	4-7	8-10	0.56 (0.41-0.76)	0.32 (0.18-0.58)	0.11 (0.04-0.35)	15 (8-23)
477	>50	Others	Others	1-3	8-10	0	0.62 (0.49-0.77)	0.39 (0.25-0.60)	0.16 (0.07-0.37)	19 (10-27)
478	>50	Others	Others	1-3	8-10	1-3	0.53 (0.40-0.71)	0.29 (0.17-0.51)	0.10 (0.03-0.27)	14 (8-20)
479	>50	Others	Others	1-3	8-10	4-7	0.45 (0.30-0.66)	0.21 (0.10-0.44)	0.05 (0.01-0.21)	11 (6-16)
480	>50	Others	Others	1-3	8-10	8-10	0.53 (0.37-0.74)	0.28 (0.15-0.55)	0.09 (0.03-0.31)	14 (7-20)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
481	>50	Others	Others	4-7	0	0	0.77 (0.66-0.89)	0.60 (0.45-0.80)	0.37 (0.21-0.64)	35 (15-59)
482	>50	Others	Others	4-7	0	1-3	0.71 (0.57-0.87)	0.51 (0.34-0.77)	0.28 (0.13-0.60)	26 (11-44)
483	>50	Others	Others	4-7	0	4-7	0.64 (0.48-0.85)	0.42 (0.24-0.73)	0.19 (0.07-0.54)	19 (8-34)
484	>50	Others	Others	4-7	0	8-10	0.70 (0.55-0.90)	0.50 (0.31-0.81)	0.27 (0.11-0.67)	26 (8-48)
485	>50	Others	Others	4-7	1-3	0	0.72 (0.63-0.82)	0.52 (0.40-0.67)	0.29 (0.18-0.46)	27 (16-38)
486	>50	Others	Others	4-7	1-3	1-3	0.65 (0.54-0.78)	0.43 (0.30-0.60)	0.20 (0.10-0.38)	20 (13-30)
487	>50	Others	Others	4-7	1-3	4-7	0.57 (0.45-0.74)	0.34 (0.21-0.55)	0.13 (0.05-0.31)	16 (9-24)
488	>50	Others	Others	4-7	1-3	8-10	0.64 (0.51-0.81)	0.42 (0.27-0.66)	0.19 (0.08-0.45)	19 (10-31)
489	>50	Others	Others	4-7	4-7	0	0.64 (0.55-0.75)	0.42 (0.32-0.57)	0.19 (0.11-0.34)	20 (14-27)
490	>50	Others	Others	4-7	4-7	1-3	0.57 (0.47-0.68)	0.33 (0.23-0.47)	0.12 (0.06-0.23)	16 (11-20)
491	>50	Others	Others	4-7	4-7	4-7	0.48 (0.36-0.64)	0.24 (0.14-0.41)	0.06 (0.02-0.18)	13 (8-17)
492	>50	Others	Others	4-7	4-7	8-10	0.56 (0.42-0.74)	0.32 (0.18-0.55)	0.11 (0.04-0.32)	15 (8-23)
493	>50	Others	Others	4-7	8-10	0	0.61 (0.50-0.75)	0.38 (0.26-0.56)	0.16 (0.08-0.33)	19 (11-26)
494	>50	Others	Others	4-7	8-10	1-3	0.53 (0.41-0.68)	0.29 (0.18-0.46)	0.09 (0.04-0.23)	14 (9-19)
495	>50	Others	Others	4-7	8-10	4-7	0.44 (0.31-0.63)	0.20 (0.10-0.40)	0.05 (0.01-0.17)	11 (7-16)
496	>50	Others	Others	4-7	8-10	8-10	0.52 (0.38-0.71)	0.28 (0.15-0.51)	0.09 (0.03-0.27)	14 (8-20)
497	>50	Others	Others	8-10	0	0	0.63 (0.47-0.84)	0.40 (0.23-0.70)	0.18 (0.06-0.51)	19 (8-31)
498	>50	Others	Others	8-10	0	1-3	0.55 (0.37-0.81)	0.31 (0.14-0.67)	0.11 (0.02-0.46)	15 (6-26)
499	>50	Others	Others	8-10	0	4-7	0.46 (0.27-0.77)	0.22 (0.08-0.60)	0.06 (0.01-0.38)	12 (5-19)
500	>50	Others	Others	8-10	0	8-10	0.54 (0.34-0.85)	0.30 (0.12-0.72)	0.10 (0.02-0.54)	14 (5-26)
501	>50	Others	Others	8-10	1-3	0	0.56 (0.42-0.74)	0.32 (0.18-0.56)	0.11 (0.04-0.33)	15 (8-23)
502	>50	Others	Others	8-10	1-3	1-3	0.47 (0.32-0.69)	0.23 (0.11-0.48)	0.06 (0.01-0.25)	12 (6-18)
503	>50	Others	Others	8-10	1-3	4-7	0.38 (0.23-0.63)	0.15 (0.06-0.40)	0.03 (0.00-0.18)	10 (5-14)
504	>50	Others	Others	8-10	1-3	8-10	0.46 (0.29-0.73)	0.22 (0.09-0.53)	0.06 (0.01-0.31)	12 (6-19)
505	>50	Others	Others	8-10	4-7	0	0.46 (0.33-0.65)	0.22 (0.12-0.43)	0.06 (0.02-0.20)	12 (7-17)
506	>50	Others	Others	8-10	4-7	1-3	0.37 (0.24-0.57)	0.14 (0.06-0.33)	0.02 (0.00-0.12)	9 (6-13)
507	>50	Others	Others	8-10	4-7	4-7	0.28 (0.15-0.50)	0.08 (0.03-0.26)	0.01 (0.00-0.08)	8 (4-11)
508	>50	Others	Others	8-10	4-7	8-10	0.36 (0.21-0.63)	0.14 (0.05-0.41)	0.02 (0.00-0.18)	9 (5-14)
509	>50	Others	Others	8-10	8-10	0	0.43 (0.29-0.62)	0.19 (0.09-0.39)	0.04 (0.01-0.17)	11 (6-15)
510	>50	Others	Others	8-10	8-10	1-3	0.33 (0.20-0.53)	0.11 (0.04-0.29)	0.02 (0.00-0.10)	9 (5-12)
511	>50	Others	Others	8-10	8-10	4-7	0.24 (0.13-0.45)	0.06 (0.02-0.21)	0.00 (0.00-0.05)	7 (4-10)
512	>50	Others	Others	8-10	8-10	8-10	0.32 (0.18-0.56)	0.11 (0.04-0.32)	0.01 (0.00-0.12)	8 (5-13)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
513	≤50	Breast	Bone Only	0	0	0	0.90 (0.83-0.97)	0.81 (0.70-0.94)	0.67 (0.50-0.88)	
514	≤50	Breast	Bone Only	0	0	1-3	0.87 (0.78-0.97)	0.76 (0.62-0.93)	0.59 (0.40-0.87)	70 (17-)
515	≤50	Breast	Bone Only	0	0	4-7	0.84 (0.73-0.96)	0.70 (0.54-0.92)	0.51 (0.31-0.85)	53 (13-)
516	≤50	Breast	Bone Only	0	0	8-10	0.87 (0.77-0.98)	0.76 (0.60-0.95)	0.58 (0.38-0.91)	70 (12-)
517	≤50	Breast	Bone Only	0	1-3	0	0.87 (0.81-0.94)	0.77 (0.66-0.89)	0.60 (0.46-0.79)	72 (31-)
518	≤50	Breast	Bone Only	0	1-3	1-3	0.84 (0.76-0.93)	0.71 (0.58-0.86)	0.52 (0.36-0.75)	55 (22-93)
519	≤50	Breast	Bone Only	0	1-3	4-7	0.80 (0.70-0.91)	0.64 (0.50-0.83)	0.43 (0.26-0.70)	40 (16-70)
520	≤50	Breast	Bone Only	0	1-3	8-10	0.84 (0.74-0.94)	0.70 (0.56-0.89)	0.51 (0.33-0.79)	53 (17-)
521	≤50	Breast	Bone Only	0	4-7	0	0.84 (0.76-0.93)	0.71 (0.58-0.86)	0.51 (0.35-0.74)	54 (21-93)
522	≤50	Breast	Bone Only	0	4-7	1-3	0.79 (0.70-0.90)	0.64 (0.50-0.81)	0.42 (0.26-0.67)	39 (18-63)
523	≤50	Breast	Bone Only	0	4-7	4-7	0.74 (0.62-0.89)	0.56 (0.40-0.79)	0.33 (0.17-0.63)	30 (13-52)
524	≤50	Breast	Bone Only	0	4-7	8-10	0.79 (0.67-0.93)	0.63 (0.46-0.86)	0.41 (0.23-0.74)	38 (13-70)
525	≤50	Breast	Bone Only	0	8-10	0	0.82 (0.73-0.92)	0.68 (0.54-0.85)	0.48 (0.31-0.73)	49 (19-83)
526	≤50	Breast	Bone Only	0	8-10	1-3	0.77 (0.66-0.90)	0.60 (0.45-0.81)	0.38 (0.22-0.66)	35 (15-62)
527	≤50	Breast	Bone Only	0	8-10	4-7	0.72 (0.59-0.88)	0.52 (0.35-0.77)	0.29 (0.14-0.61)	27 (11-47)
528	≤50	Breast	Bone Only	0	8-10	8-10	0.77 (0.65-0.91)	0.60 (0.43-0.83)	0.37 (0.20-0.70)	35 (13-62)
529	≤50	Breast	Bone Only	1-3	0	0	0.90 (0.83-0.97)	0.81 (0.70-0.94)	0.67 (0.51-0.88)	
530	≤50	Breast	Bone Only	1-3	0	1-3	0.87 (0.79-0.96)	0.76 (0.63-0.92)	0.59 (0.41-0.85)	71 (20-)
531	≤50	Breast	Bone Only	1-3	0	4-7	0.84 (0.73-0.95)	0.70 (0.55-0.91)	0.51 (0.32-0.83)	54 (14-)
532	≤50	Breast	Bone Only	1-3	0	8-10	0.87 (0.77-0.97)	0.76 (0.61-0.94)	0.59 (0.39-0.89)	70 (14-)
533	≤50	Breast	Bone Only	1-3	1-3	0	0.87 (0.81-0.94)	0.77 (0.67-0.88)	0.60 (0.46-0.79)	75 (34-)
534	≤50	Breast	Bone Only	1-3	1-3	1-3	0.84 (0.77-0.92)	0.71 (0.60-0.84)	0.52 (0.38-0.72)	58 (26-88)
535	≤50	Breast	Bone Only	1-3	1-3	4-7	0.80 (0.71-0.90)	0.64 (0.51-0.81)	0.43 (0.28-0.67)	40 (19-69)
536	≤50	Breast	Bone Only	1-3	1-3	8-10	0.84 (0.75-0.93)	0.70 (0.57-0.87)	0.51 (0.34-0.76)	54 (20-93)
537	≤50	Breast	Bone Only	1-3	4-7	0	0.84 (0.76-0.92)	0.71 (0.59-0.85)	0.51 (0.36-0.73)	54 (25-88)
538	≤50	Breast	Bone Only	1-3	4-7	1-3	0.79 (0.71-0.89)	0.64 (0.52-0.79)	0.42 (0.28-0.63)	39 (20-62)
539	≤50	Breast	Bone Only	1-3	4-7	4-7	0.74 (0.64-0.87)	0.56 (0.42-0.75)	0.33 (0.19-0.58)	30 (15-49)
540	≤50	Breast	Bone Only	1-3	4-7	8-10	0.79 (0.68-0.91)	0.63 (0.48-0.83)	0.41 (0.24-0.70)	38 (15-66)
541	≤50	Breast	Bone Only	1-3	8-10	0	0.82 (0.73-0.92)	0.68 (0.54-0.85)	0.48 (0.31-0.73)	49 (19-83)
542	≤50	Breast	Bone Only	1-3	8-10	1-3	0.77 (0.67-0.89)	0.61 (0.46-0.79)	0.38 (0.23-0.63)	35 (16-60)
543	≤50	Breast	Bone Only	1-3	8-10	4-7	0.72 (0.60-0.87)	0.52 (0.37-0.75)	0.29 (0.15-0.57)	27 (13-44)
544	≤50	Breast	Bone Only	1-3	8-10	8-10	0.77 (0.65-0.90)	0.60 (0.44-0.81)	0.37 (0.21-0.67)	35 (14-60)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
545	≤50	Breast	Bone Only	4-7	0	0	0.90 (0.83-0.97)	0.81 (0.70-0.94)	0.67 (0.50-0.88)	
546	≤50	Breast	Bone Only	4-7	0	1-3	0.87 (0.78-0.96)	0.76 (0.62-0.92)	0.59 (0.41-0.86)	70 (19-)
547	≤50	Breast	Bone Only	4-7	0	4-7	0.83 (0.73-0.95)	0.70 (0.54-0.91)	0.51 (0.31-0.83)	53 (14-)
548	≤50	Breast	Bone Only	4-7	0	8-10	0.87 (0.77-0.97)	0.75 (0.60-0.94)	0.58 (0.38-0.89)	70 (14-)
549	≤50	Breast	Bone Only	4-7	1-3	0	0.87 (0.81-0.94)	0.77 (0.67-0.88)	0.60 (0.46-0.78)	72 (34-)
550	≤50	Breast	Bone Only	4-7	1-3	1-3	0.84 (0.77-0.92)	0.71 (0.60-0.84)	0.52 (0.37-0.71)	55 (26-88)
551	≤50	Breast	Bone Only	4-7	1-3	4-7	0.80 (0.71-0.90)	0.64 (0.51-0.81)	0.43 (0.28-0.66)	39 (19-63)
552	≤50	Breast	Bone Only	4-7	1-3	8-10	0.83 (0.75-0.93)	0.70 (0.57-0.87)	0.51 (0.34-0.76)	53 (20-93)
553	≤50	Breast	Bone Only	4-7	4-7	0	0.84 (0.76-0.92)	0.70 (0.59-0.84)	0.51 (0.36-0.72)	53 (25-84)
554	≤50	Breast	Bone Only	4-7	4-7	1-3	0.79 (0.71-0.88)	0.63 (0.52-0.78)	0.42 (0.28-0.62)	39 (20-62)
555	≤50	Breast	Bone Only	4-7	4-7	4-7	0.74 (0.64-0.86)	0.56 (0.42-0.75)	0.33 (0.19-0.57)	30 (15-49)
556	≤50	Breast	Bone Only	4-7	4-7	8-10	0.79 (0.68-0.91)	0.63 (0.48-0.82)	0.41 (0.24-0.69)	38 (15-63)
557	≤50	Breast	Bone Only	4-7	8-10	0	0.82 (0.73-0.92)	0.68 (0.55-0.84)	0.47 (0.32-0.71)	49 (20-80)
558	≤50	Breast	Bone Only	4-7	8-10	1-3	0.77 (0.68-0.88)	0.60 (0.47-0.77)	0.38 (0.24-0.61)	35 (18-59)
559	≤50	Breast	Bone Only	4-7	8-10	4-7	0.72 (0.60-0.86)	0.52 (0.37-0.73)	0.29 (0.15-0.55)	27 (13-41)
560	≤50	Breast	Bone Only	4-7	8-10	8-10	0.77 (0.66-0.89)	0.60 (0.44-0.80)	0.37 (0.21-0.65)	35 (14-59)
561	≤50	Breast	Bone Only	8-10	0	0	0.83 (0.72-0.95)	0.69 (0.53-0.90)	0.49 (0.30-0.81)	52 (14-)
562	≤50	Breast	Bone Only	8-10	0	1-3	0.78 (0.65-0.94)	0.62 (0.44-0.88)	0.40 (0.20-0.78)	36 (10-70)
563	≤50	Breast	Bone Only	8-10	0	4-7	0.73 (0.58-0.92)	0.54 (0.34-0.85)	0.31 (0.13-0.73)	29 (8-53)
564	≤50	Breast	Bone Only	8-10	0	8-10	0.78 (0.64-0.95)	0.61 (0.41-0.90)	0.39 (0.18-0.82)	36 (8-71)
565	≤50	Breast	Bone Only	8-10	1-3	0	0.79 (0.69-0.90)	0.63 (0.49-0.81)	0.41 (0.25-0.67)	38 (17-63)
566	≤50	Breast	Bone Only	8-10	1-3	1-3	0.73 (0.62-0.87)	0.55 (0.40-0.76)	0.31 (0.17-0.58)	29 (14-49)
567	≤50	Breast	Bone Only	8-10	1-3	4-7	0.67 (0.54-0.84)	0.46 (0.30-0.70)	0.23 (0.10-0.51)	21 (11-35)
568	≤50	Breast	Bone Only	8-10	1-3	8-10	0.73 (0.60-0.89)	0.54 (0.37-0.79)	0.31 (0.15-0.64)	29 (11-50)
569	≤50	Breast	Bone Only	8-10	4-7	0	0.73 (0.62-0.87)	0.54 (0.39-0.75)	0.31 (0.16-0.58)	29 (13-48)
570	≤50	Breast	Bone Only	8-10	4-7	1-3	0.67 (0.54-0.82)	0.45 (0.30-0.67)	0.22 (0.10-0.46)	21 (11-34)
571	≤50	Breast	Bone Only	8-10	4-7	4-7	0.59 (0.45-0.78)	0.36 (0.21-0.61)	0.14 (0.05-0.39)	17 (9-26)
572	≤50	Breast	Bone Only	8-10	4-7	8-10	0.66 (0.51-0.85)	0.44 (0.27-0.72)	0.21 (0.08-0.54)	20 (9-35)
573	≤50	Breast	Bone Only	8-10	8-10	0	0.71 (0.59-0.85)	0.51 (0.35-0.72)	0.27 (0.14-0.54)	26 (13-39)
574	≤50	Breast	Bone Only	8-10	8-10	1-3	0.64 (0.51-0.79)	0.41 (0.27-0.63)	0.18 (0.08-0.42)	19 (11-30)
575	≤50	Breast	Bone Only	8-10	8-10	4-7	0.56 (0.42-0.75)	0.32 (0.18-0.56)	0.11 (0.04-0.33)	15 (8-23)
576	≤50	Breast	Bone Only	8-10	8-10	8-10	0.63 (0.49-0.81)	0.40 (0.25-0.66)	0.18 (0.07-0.45)	19 (9-30)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
577	≤50	Breast	Others	0	0	0	0.80 (0.69-0.93)	0.65 (0.49-0.86)	0.43 (0.25-0.75)	40 (14-75)
578	≤50	Breast	Others	0	0	1-3	0.75 (0.61-0.92)	0.57 (0.38-0.84)	0.34 (0.16-0.72)	31 (10-59)
579	≤50	Breast	Others	0	0	4-7	0.69 (0.53-0.90)	0.48 (0.29-0.82)	0.25 (0.09-0.68)	24 (7-41)
580	≤50	Breast	Others	0	0	8-10	0.74 (0.59-0.94)	0.56 (0.36-0.88)	0.33 (0.14-0.78)	30 (7-60)
581	≤50	Breast	Others	0	1-3	0	0.76 (0.65-0.87)	0.58 (0.44-0.76)	0.35 (0.21-0.59)	33 (16-52)
582	≤50	Breast	Others	0	1-3	1-3	0.69 (0.57-0.84)	0.49 (0.34-0.72)	0.26 (0.13-0.52)	25 (12-38)
583	≤50	Breast	Others	0	1-3	4-7	0.63 (0.48-0.81)	0.40 (0.24-0.66)	0.17 (0.07-0.46)	19 (9-30)
584	≤50	Breast	Others	0	1-3	8-10	0.69 (0.55-0.87)	0.48 (0.31-0.76)	0.25 (0.11-0.58)	24 (10-39)
585	≤50	Breast	Others	0	4-7	0	0.69 (0.57-0.84)	0.49 (0.33-0.70)	0.25 (0.12-0.51)	25 (12-38)
586	≤50	Breast	Others	0	4-7	1-3	0.62 (0.48-0.79)	0.39 (0.24-0.63)	0.17 (0.07-0.42)	19 (10-29)
587	≤50	Breast	Others	0	4-7	4-7	0.54 (0.38-0.76)	0.30 (0.15-0.58)	0.10 (0.03-0.35)	14 (7-22)
588	≤50	Breast	Others	0	4-7	8-10	0.61 (0.45-0.83)	0.38 (0.21-0.70)	0.16 (0.05-0.50)	19 (7-30)
589	≤50	Breast	Others	0	8-10	0	0.66 (0.53-0.83)	0.45 (0.29-0.69)	0.21 (0.10-0.48)	20 (11-34)
590	≤50	Breast	Others	0	8-10	1-3	0.59 (0.44-0.78)	0.35 (0.20-0.61)	0.14 (0.05-0.39)	16 (8-26)
591	≤50	Breast	Others	0	8-10	4-7	0.50 (0.34-0.74)	0.26 (0.12-0.55)	0.08 (0.02-0.32)	13 (6-20)
592	≤50	Breast	Others	0	8-10	8-10	0.58 (0.42-0.80)	0.34 (0.18-0.65)	0.13 (0.04-0.43)	16 (7-27)
593	≤50	Breast	Others	1-3	0	0	0.80 (0.69-0.92)	0.65 (0.49-0.85)	0.44 (0.26-0.74)	40 (15-72)
594	≤50	Breast	Others	1-3	0	1-3	0.75 (0.62-0.91)	0.57 (0.39-0.82)	0.34 (0.17-0.68)	31 (11-58)
595	≤50	Breast	Others	1-3	0	4-7	0.69 (0.54-0.89)	0.48 (0.30-0.79)	0.25 (0.10-0.63)	24 (8-41)
596	≤50	Breast	Others	1-3	0	8-10	0.74 (0.60-0.93)	0.56 (0.37-0.86)	0.33 (0.15-0.74)	31 (9-60)
597	≤50	Breast	Others	1-3	1-3	0	0.76 (0.66-0.87)	0.58 (0.45-0.75)	0.35 (0.22-0.57)	33 (17-52)
598	≤50	Breast	Others	1-3	1-3	1-3	0.70 (0.59-0.83)	0.49 (0.36-0.68)	0.26 (0.14-0.47)	25 (14-36)
599	≤50	Breast	Others	1-3	1-3	4-7	0.63 (0.50-0.79)	0.40 (0.26-0.62)	0.18 (0.08-0.40)	19 (10-29)
600	≤50	Breast	Others	1-3	1-3	8-10	0.69 (0.56-0.85)	0.48 (0.32-0.72)	0.25 (0.12-0.54)	24 (11-38)
601	≤50	Breast	Others	1-3	4-7	0	0.69 (0.58-0.83)	0.49 (0.35-0.68)	0.25 (0.13-0.48)	25 (13-36)
602	≤50	Breast	Others	1-3	4-7	1-3	0.62 (0.50-0.76)	0.39 (0.27-0.58)	0.17 (0.08-0.35)	19 (11-27)
603	≤50	Breast	Others	1-3	4-7	4-7	0.54 (0.41-0.72)	0.30 (0.17-0.52)	0.10 (0.04-0.29)	14 (8-20)
604	≤50	Breast	Others	1-3	4-7	8-10	0.61 (0.47-0.81)	0.38 (0.23-0.65)	0.16 (0.06-0.44)	19 (9-29)
605	≤50	Breast	Others	1-3	8-10	0	0.66 (0.54-0.82)	0.45 (0.30-0.68)	0.22 (0.10-0.47)	21 (11-34)
606	≤50	Breast	Others	1-3	8-10	1-3	0.59 (0.46-0.76)	0.35 (0.22-0.58)	0.14 (0.05-0.35)	17 (9-26)
607	≤50	Breast	Others	1-3	8-10	4-7	0.51 (0.36-0.71)	0.26 (0.14-0.51)	0.08 (0.02-0.27)	13 (7-19)
608	≤50	Breast	Others	1-3	8-10	8-10	0.58 (0.43-0.78)	0.35 (0.20-0.61)	0.13 (0.04-0.39)	16 (8-26)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
609	≤50	Breast	Others	4-7	0	0	0.80 (0.69-0.93)	0.65 (0.49-0.86)	0.43 (0.25-0.74)	40 (14-75)
610	≤50	Breast	Others	4-7	0	1-3	0.75 (0.61-0.91)	0.57 (0.39-0.83)	0.34 (0.16-0.69)	31 (11-58)
611	≤50	Breast	Others	4-7	0	4-7	0.69 (0.53-0.89)	0.48 (0.29-0.79)	0.25 (0.10-0.64)	24 (8-41)
612	≤50	Breast	Others	4-7	0	8-10	0.74 (0.59-0.93)	0.56 (0.36-0.86)	0.33 (0.14-0.75)	30 (8-59)
613	≤50	Breast	Others	4-7	1-3	0	0.75 (0.66-0.86)	0.58 (0.45-0.74)	0.35 (0.22-0.56)	33 (17-51)
614	≤50	Breast	Others	4-7	1-3	1-3	0.69 (0.59-0.82)	0.49 (0.36-0.67)	0.26 (0.14-0.46)	25 (14-36)
615	≤50	Breast	Others	4-7	1-3	4-7	0.63 (0.50-0.78)	0.40 (0.26-0.61)	0.17 (0.08-0.39)	19 (11-29)
616	≤50	Breast	Others	4-7	1-3	8-10	0.69 (0.56-0.85)	0.48 (0.32-0.72)	0.25 (0.12-0.53)	24 (11-38)
617	≤50	Breast	Others	4-7	4-7	0	0.69 (0.58-0.82)	0.48 (0.35-0.67)	0.25 (0.13-0.46)	24 (13-35)
618	≤50	Breast	Others	4-7	4-7	1-3	0.62 (0.51-0.75)	0.39 (0.27-0.57)	0.16 (0.08-0.34)	19 (12-27)
619	≤50	Breast	Others	4-7	4-7	4-7	0.54 (0.41-0.71)	0.30 (0.17-0.51)	0.10 (0.04-0.27)	14 (8-20)
620	≤50	Breast	Others	4-7	4-7	8-10	0.61 (0.47-0.80)	0.38 (0.23-0.64)	0.16 (0.06-0.42)	19 (9-29)
621	≤50	Breast	Others	4-7	8-10	0	0.66 (0.54-0.81)	0.45 (0.31-0.65)	0.21 (0.10-0.44)	20 (12-33)
622	≤50	Breast	Others	4-7	8-10	1-3	0.59 (0.46-0.74)	0.35 (0.22-0.55)	0.13 (0.06-0.31)	16 (10-24)
623	≤50	Breast	Others	4-7	8-10	4-7	0.50 (0.37-0.69)	0.26 (0.14-0.48)	0.08 (0.02-0.24)	13 (8-19)
624	≤50	Breast	Others	4-7	8-10	8-10	0.58 (0.44-0.76)	0.34 (0.20-0.58)	0.13 (0.05-0.36)	16 (9-26)
625	≤50	Breast	Others	8-10	0	0	0.68 (0.52-0.88)	0.47 (0.28-0.78)	0.23 (0.09-0.62)	22 (8-39)
626	≤50	Breast	Others	8-10	0	1-3	0.60 (0.42-0.86)	0.37 (0.18-0.74)	0.15 (0.04-0.57)	18 (6-30)
627	≤50	Breast	Others	8-10	0	4-7	0.52 (0.33-0.83)	0.28 (0.11-0.68)	0.09 (0.02-0.49)	14 (5-23)
628	≤50	Breast	Others	8-10	0	8-10	0.59 (0.40-0.89)	0.36 (0.17-0.79)	0.14 (0.03-0.63)	17 (5-31)
629	≤50	Breast	Others	8-10	1-3	0	0.61 (0.47-0.79)	0.38 (0.23-0.63)	0.16 (0.06-0.42)	19 (9-29)
630	≤50	Breast	Others	8-10	1-3	1-3	0.53 (0.38-0.74)	0.29 (0.15-0.55)	0.09 (0.03-0.32)	14 (7-20)
631	≤50	Breast	Others	8-10	1-3	4-7	0.44 (0.29-0.68)	0.20 (0.09-0.46)	0.05 (0.01-0.23)	11 (6-17)
632	≤50	Breast	Others	8-10	1-3	8-10	0.52 (0.35-0.77)	0.28 (0.13-0.59)	0.09 (0.02-0.37)	14 (6-21)
633	≤50	Breast	Others	8-10	4-7	0	0.52 (0.37-0.73)	0.28 (0.15-0.54)	0.09 (0.03-0.31)	14 (7-20)
634	≤50	Breast	Others	8-10	4-7	1-3	0.43 (0.29-0.64)	0.19 (0.09-0.42)	0.04 (0.01-0.20)	11 (6-16)
635	≤50	Breast	Others	8-10	4-7	4-7	0.34 (0.20-0.58)	0.12 (0.04-0.34)	0.02 (0.00-0.13)	9 (5-13)
636	≤50	Breast	Others	8-10	4-7	8-10	0.42 (0.26-0.70)	0.19 (0.07-0.49)	0.04 (0.01-0.26)	11 (5-16)
637	≤50	Breast	Others	8-10	8-10	0	0.49 (0.34-0.69)	0.24 (0.12-0.48)	0.07 (0.02-0.25)	13 (7-19)
638	≤50	Breast	Others	8-10	8-10	1-3	0.39 (0.26-0.60)	0.16 (0.07-0.36)	0.03 (0.01-0.15)	10 (6-14)
639	≤50	Breast	Others	8-10	8-10	4-7	0.30 (0.17-0.52)	0.09 (0.03-0.27)	0.01 (0.00-0.09)	8 (5-11)
640	≤50	Breast	Others	8-10	8-10	8-10	0.38 (0.24-0.62)	0.15 (0.06-0.39)	0.03 (0.00-0.17)	10 (6-14)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
641	≤50	Prostate	Bone Only	0	0	0	0.81 (0.70-0.94)	0.66 (0.50-0.87)	0.46 (0.27-0.77)	44 (14-83)
642	≤50	Prostate	Bone Only	0	0	1-3	0.76 (0.62-0.93)	0.59 (0.40-0.87)	0.36 (0.17-0.76)	34 (9-62)
643	≤50	Prostate	Bone Only	0	0	4-7	0.70 (0.54-0.92)	0.50 (0.30-0.84)	0.27 (0.10-0.72)	26 (7-49)
644	≤50	Prostate	Bone Only	0	0	8-10	0.76 (0.60-0.95)	0.58 (0.37-0.91)	0.35 (0.15-0.83)	33 (6-63)
645	≤50	Prostate	Bone Only	0	1-3	0	0.77 (0.67-0.88)	0.60 (0.46-0.77)	0.37 (0.23-0.60)	35 (17-55)
646	≤50	Prostate	Bone Only	0	1-3	1-3	0.71 (0.59-0.86)	0.51 (0.36-0.73)	0.28 (0.14-0.55)	26 (13-41)
647	≤50	Prostate	Bone Only	0	1-3	4-7	0.64 (0.50-0.83)	0.42 (0.26-0.69)	0.19 (0.08-0.49)	20 (9-33)
648	≤50	Prostate	Bone Only	0	1-3	8-10	0.70 (0.56-0.89)	0.50 (0.32-0.78)	0.27 (0.12-0.63)	26 (10-44)
649	≤50	Prostate	Bone Only	0	4-7	0	0.71 (0.60-0.84)	0.51 (0.37-0.70)	0.27 (0.15-0.51)	26 (13-39)
650	≤50	Prostate	Bone Only	0	4-7	1-3	0.64 (0.51-0.80)	0.41 (0.27-0.64)	0.19 (0.08-0.43)	19 (11-31)
651	≤50	Prostate	Bone Only	0	4-7	4-7	0.56 (0.41-0.77)	0.32 (0.17-0.59)	0.11 (0.04-0.37)	15 (8-24)
652	≤50	Prostate	Bone Only	0	4-7	8-10	0.63 (0.47-0.85)	0.41 (0.23-0.72)	0.18 (0.06-0.53)	19 (7-33)
653	≤50	Prostate	Bone Only	0	8-10	0	0.68 (0.55-0.84)	0.47 (0.31-0.71)	0.24 (0.11-0.51)	23 (11-36)
654	≤50	Prostate	Bone Only	0	8-10	1-3	0.61 (0.46-0.80)	0.38 (0.22-0.65)	0.15 (0.05-0.43)	18 (8-28)
655	≤50	Prostate	Bone Only	0	8-10	4-7	0.52 (0.36-0.77)	0.28 (0.14-0.59)	0.09 (0.02-0.37)	14 (6-21)
656	≤50	Prostate	Bone Only	0	8-10	8-10	0.60 (0.43-0.83)	0.37 (0.19-0.69)	0.15 (0.04-0.50)	17 (7-29)
657	≤50	Prostate	Bone Only	1-3	0	0	0.81 (0.70-0.94)	0.67 (0.50-0.88)	0.46 (0.27-0.78)	45 (14-83)
658	≤50	Prostate	Bone Only	1-3	0	1-3	0.76 (0.63-0.93)	0.59 (0.41-0.86)	0.36 (0.18-0.74)	34 (10-62)
659	≤50	Prostate	Bone Only	1-3	0	4-7	0.71 (0.55-0.91)	0.51 (0.31-0.83)	0.27 (0.11-0.70)	26 (8-49)
660	≤50	Prostate	Bone Only	1-3	0	8-10	0.76 (0.61-0.95)	0.58 (0.38-0.90)	0.35 (0.16-0.81)	34 (7-63)
661	≤50	Prostate	Bone Only	1-3	1-3	0	0.77 (0.67-0.88)	0.60 (0.46-0.78)	0.38 (0.23-0.61)	35 (17-59)
662	≤50	Prostate	Bone Only	1-3	1-3	1-3	0.71 (0.60-0.85)	0.51 (0.37-0.72)	0.28 (0.15-0.53)	26 (13-40)
663	≤50	Prostate	Bone Only	1-3	1-3	4-7	0.65 (0.51-0.82)	0.43 (0.27-0.67)	0.20 (0.08-0.46)	20 (10-33)
664	≤50	Prostate	Bone Only	1-3	1-3	8-10	0.71 (0.57-0.88)	0.51 (0.33-0.77)	0.27 (0.12-0.60)	26 (10-41)
665	≤50	Prostate	Bone Only	1-3	4-7	0	0.71 (0.60-0.84)	0.51 (0.37-0.70)	0.27 (0.15-0.51)	26 (14-39)
666	≤50	Prostate	Bone Only	1-3	4-7	1-3	0.64 (0.52-0.78)	0.42 (0.28-0.62)	0.19 (0.09-0.39)	19 (11-30)
667	≤50	Prostate	Bone Only	1-3	4-7	4-7	0.56 (0.42-0.75)	0.32 (0.19-0.56)	0.12 (0.04-0.33)	16 (9-24)
668	≤50	Prostate	Bone Only	1-3	4-7	8-10	0.63 (0.48-0.83)	0.41 (0.24-0.70)	0.18 (0.06-0.50)	19 (8-31)
669	≤50	Prostate	Bone Only	1-3	8-10	0	0.68 (0.55-0.85)	0.47 (0.31-0.72)	0.24 (0.11-0.53)	23 (11-37)
670	≤50	Prostate	Bone Only	1-3	8-10	1-3	0.61 (0.46-0.80)	0.38 (0.22-0.63)	0.15 (0.06-0.41)	18 (9-28)
671	≤50	Prostate	Bone Only	1-3	8-10	4-7	0.53 (0.37-0.76)	0.29 (0.14-0.57)	0.09 (0.02-0.35)	14 (7-21)
672	≤50	Prostate	Bone Only	1-3	8-10	8-10	0.60 (0.44-0.83)	0.37 (0.20-0.68)	0.15 (0.05-0.48)	18 (7-29)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
673	≤50	Prostate	Bone Only	4-7	0	0	0.81 (0.70-0.94)	0.66 (0.50-0.89)	0.46 (0.26-0.79)	44 (13-83)
674	≤50	Prostate	Bone Only	4-7	0	1-3	0.76 (0.62-0.93)	0.59 (0.40-0.87)	0.36 (0.17-0.76)	34 (9-62)
675	≤50	Prostate	Bone Only	4-7	0	4-7	0.70 (0.54-0.92)	0.50 (0.30-0.84)	0.27 (0.10-0.72)	26 (7-49)
676	≤50	Prostate	Bone Only	4-7	0	8-10	0.76 (0.60-0.95)	0.58 (0.37-0.91)	0.35 (0.15-0.83)	33 (6-63)
677	≤50	Prostate	Bone Only	4-7	1-3	0	0.77 (0.67-0.88)	0.60 (0.46-0.78)	0.37 (0.23-0.61)	35 (16-58)
678	≤50	Prostate	Bone Only	4-7	1-3	1-3	0.71 (0.59-0.85)	0.51 (0.36-0.72)	0.28 (0.14-0.53)	26 (13-40)
679	≤50	Prostate	Bone Only	4-7	1-3	4-7	0.64 (0.51-0.82)	0.42 (0.27-0.67)	0.19 (0.08-0.47)	20 (10-32)
680	≤50	Prostate	Bone Only	4-7	1-3	8-10	0.70 (0.56-0.88)	0.50 (0.33-0.77)	0.27 (0.12-0.61)	26 (10-44)
681	≤50	Prostate	Bone Only	4-7	4-7	0	0.71 (0.60-0.84)	0.51 (0.37-0.70)	0.27 (0.15-0.50)	26 (14-38)
682	≤50	Prostate	Bone Only	4-7	4-7	1-3	0.64 (0.52-0.78)	0.41 (0.28-0.61)	0.18 (0.09-0.39)	19 (11-30)
683	≤50	Prostate	Bone Only	4-7	4-7	4-7	0.56 (0.42-0.75)	0.32 (0.18-0.56)	0.11 (0.04-0.33)	15 (8-23)
684	≤50	Prostate	Bone Only	4-7	4-7	8-10	0.63 (0.48-0.83)	0.40 (0.24-0.69)	0.18 (0.06-0.50)	19 (8-31)
685	≤50	Prostate	Bone Only	4-7	8-10	0	0.68 (0.55-0.84)	0.47 (0.31-0.70)	0.23 (0.11-0.51)	23 (11-36)
686	≤50	Prostate	Bone Only	4-7	8-10	1-3	0.60 (0.46-0.79)	0.37 (0.23-0.62)	0.15 (0.06-0.40)	18 (9-27)
687	≤50	Prostate	Bone Only	4-7	8-10	4-7	0.52 (0.37-0.75)	0.28 (0.14-0.56)	0.09 (0.02-0.33)	14 (7-20)
688	≤50	Prostate	Bone Only	4-7	8-10	8-10	0.60 (0.44-0.82)	0.37 (0.20-0.67)	0.15 (0.05-0.46)	17 (7-28)
689	≤50	Prostate	Bone Only	8-10	0	0	0.69 (0.53-0.90)	0.49 (0.29-0.81)	0.25 (0.10-0.67)	25 (8-41)
690	≤50	Prostate	Bone Only	8-10	0	1-3	0.62 (0.43-0.89)	0.39 (0.20-0.79)	0.17 (0.04-0.63)	19 (6-35)
691	≤50	Prostate	Bone Only	8-10	0	4-7	0.54 (0.34-0.86)	0.30 (0.12-0.74)	0.10 (0.02-0.56)	14 (4-26)
692	≤50	Prostate	Bone Only	8-10	0	8-10	0.61 (0.41-0.92)	0.38 (0.18-0.84)	0.16 (0.04-0.72)	19 (4-35)
693	≤50	Prostate	Bone Only	8-10	1-3	0	0.63 (0.49-0.81)	0.41 (0.25-0.66)	0.18 (0.07-0.45)	19 (9-30)
694	≤50	Prostate	Bone Only	8-10	1-3	1-3	0.55 (0.39-0.76)	0.31 (0.16-0.59)	0.11 (0.03-0.36)	15 (7-23)
695	≤50	Prostate	Bone Only	8-10	1-3	4-7	0.46 (0.30-0.71)	0.22 (0.10-0.51)	0.06 (0.01-0.28)	12 (6-19)
696	≤50	Prostate	Bone Only	8-10	1-3	8-10	0.54 (0.36-0.80)	0.30 (0.14-0.65)	0.10 (0.02-0.44)	14 (6-24)
697	≤50	Prostate	Bone Only	8-10	4-7	0	0.54 (0.40-0.74)	0.30 (0.17-0.55)	0.10 (0.03-0.33)	15 (8-22)
698	≤50	Prostate	Bone Only	8-10	4-7	1-3	0.45 (0.31-0.67)	0.21 (0.10-0.45)	0.05 (0.01-0.22)	12 (6-17)
699	≤50	Prostate	Bone Only	8-10	4-7	4-7	0.36 (0.22-0.60)	0.14 (0.05-0.37)	0.02 (0.00-0.15)	9 (5-14)
700	≤50	Prostate	Bone Only	8-10	4-7	8-10	0.44 (0.27-0.73)	0.21 (0.08-0.54)	0.05 (0.01-0.31)	11 (5-18)
701	≤50	Prostate	Bone Only	8-10	8-10	0	0.51 (0.36-0.72)	0.27 (0.13-0.52)	0.08 (0.02-0.29)	13 (7-19)
702	≤50	Prostate	Bone Only	8-10	8-10	1-3	0.41 (0.27-0.64)	0.18 (0.08-0.42)	0.04 (0.01-0.19)	11 (6-16)
703	≤50	Prostate	Bone Only	8-10	8-10	4-7	0.32 (0.18-0.57)	0.11 (0.04-0.33)	0.01 (0.00-0.13)	8 (5-13)
704	≤50	Prostate	Bone Only	8-10	8-10	8-10	0.41 (0.24-0.68)	0.17 (0.06-0.47)	0.03 (0.00-0.24)	10 (5-16)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
705	≤50	Prostate	Others	0	0	0	0.65 (0.49-0.87)	0.43 (0.24-0.75)	0.20 (0.07-0.58)	20 (8-35)
706	≤50	Prostate	Others	0	0	1-3	0.57 (0.38-0.86)	0.33 (0.15-0.74)	0.12 (0.03-0.57)	16 (5-28)
707	≤50	Prostate	Others	0	0	4-7	0.48 (0.28-0.84)	0.24 (0.08-0.70)	0.07 (0.01-0.51)	13 (3-21)
708	≤50	Prostate	Others	0	0	8-10	0.56 (0.35-0.90)	0.32 (0.13-0.81)	0.12 (0.02-0.67)	16 (3-29)
709	≤50	Prostate	Others	0	1-3	0	0.58 (0.44-0.77)	0.35 (0.20-0.59)	0.13 (0.05-0.36)	16 (9-26)
710	≤50	Prostate	Others	0	1-3	1-3	0.49 (0.33-0.73)	0.25 (0.12-0.54)	0.07 (0.02-0.31)	13 (6-19)
711	≤50	Prostate	Others	0	1-3	4-7	0.40 (0.24-0.68)	0.17 (0.06-0.47)	0.03 (0.00-0.24)	10 (5-16)
712	≤50	Prostate	Others	0	1-3	8-10	0.48 (0.30-0.78)	0.24 (0.10-0.61)	0.07 (0.01-0.39)	13 (5-20)
713	≤50	Prostate	Others	0	4-7	0	0.49 (0.34-0.70)	0.25 (0.12-0.49)	0.07 (0.02-0.26)	13 (7-19)
714	≤50	Prostate	Others	0	4-7	1-3	0.39 (0.24-0.64)	0.16 (0.06-0.42)	0.03 (0.00-0.19)	10 (5-15)
715	≤50	Prostate	Others	0	4-7	4-7	0.30 (0.15-0.59)	0.10 (0.03-0.35)	0.01 (0.00-0.14)	8 (4-12)
716	≤50	Prostate	Others	0	4-7	8-10	0.39 (0.21-0.72)	0.15 (0.05-0.51)	0.03 (0.00-0.28)	10 (4-16)
717	≤50	Prostate	Others	0	8-10	0	0.45 (0.29-0.69)	0.21 (0.09-0.48)	0.05 (0.01-0.25)	12 (6-18)
718	≤50	Prostate	Others	0	8-10	1-3	0.35 (0.20-0.64)	0.13 (0.04-0.41)	0.02 (0.00-0.18)	9 (5-14)
719	≤50	Prostate	Others	0	8-10	4-7	0.26 (0.12-0.58)	0.07 (0.02-0.34)	0.01 (0.00-0.13)	7 (3-12)
720	≤50	Prostate	Others	0	8-10	8-10	0.35 (0.18-0.68)	0.13 (0.03-0.46)	0.02 (0.00-0.23)	9 (3-14)
721	≤50	Prostate	Others	1-3	0	0	0.65 (0.49-0.87)	0.43 (0.25-0.76)	0.20 (0.07-0.58)	20 (7-35)
722	≤50	Prostate	Others	1-3	0	1-3	0.57 (0.38-0.85)	0.33 (0.15-0.72)	0.12 (0.03-0.53)	16 (6-27)
723	≤50	Prostate	Others	1-3	0	4-7	0.49 (0.29-0.82)	0.24 (0.09-0.68)	0.07 (0.01-0.47)	13 (4-20)
724	≤50	Prostate	Others	1-3	0	8-10	0.56 (0.36-0.89)	0.33 (0.13-0.79)	0.12 (0.02-0.63)	16 (4-29)
725	≤50	Prostate	Others	1-3	1-3	0	0.58 (0.44-0.77)	0.35 (0.20-0.59)	0.13 (0.05-0.37)	16 (8-26)
726	≤50	Prostate	Others	1-3	1-3	1-3	0.50 (0.34-0.72)	0.25 (0.12-0.52)	0.07 (0.02-0.28)	13 (7-19)
727	≤50	Prostate	Others	1-3	1-3	4-7	0.41 (0.25-0.66)	0.17 (0.07-0.44)	0.03 (0.01-0.21)	10 (5-15)
728	≤50	Prostate	Others	1-3	1-3	8-10	0.49 (0.31-0.76)	0.24 (0.10-0.58)	0.07 (0.01-0.36)	13 (6-20)
729	≤50	Prostate	Others	1-3	4-7	0	0.49 (0.34-0.70)	0.25 (0.13-0.49)	0.07 (0.02-0.25)	13 (7-19)
730	≤50	Prostate	Others	1-3	4-7	1-3	0.40 (0.26-0.61)	0.16 (0.07-0.38)	0.03 (0.01-0.16)	10 (6-15)
731	≤50	Prostate	Others	1-3	4-7	4-7	0.30 (0.17-0.55)	0.10 (0.03-0.31)	0.01 (0.00-0.11)	8 (4-12)
732	≤50	Prostate	Others	1-3	4-7	8-10	0.39 (0.22-0.69)	0.16 (0.05-0.47)	0.03 (0.00-0.24)	10 (4-15)
733	≤50	Prostate	Others	1-3	8-10	0	0.45 (0.29-0.70)	0.21 (0.09-0.49)	0.05 (0.01-0.26)	12 (6-18)
734	≤50	Prostate	Others	1-3	8-10	1-3	0.36 (0.20-0.62)	0.13 (0.05-0.39)	0.02 (0.00-0.16)	9 (5-14)
735	≤50	Prostate	Others	1-3	8-10	4-7	0.27 (0.13-0.56)	0.07 (0.02-0.31)	0.01 (0.00-0.11)	7 (3-11)
736	≤50	Prostate	Others	1-3	8-10	8-10	0.35 (0.18-0.66)	0.13 (0.04-0.44)	0.02 (0.00-0.21)	9 (4-14)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
737	≤50	Prostate	Others	4-7	0	0	0.65 (0.48-0.88)	0.43 (0.24-0.77)	0.20 (0.06-0.60)	20 (7-36)
738	≤50	Prostate	Others	4-7	0	1-3	0.57 (0.38-0.86)	0.33 (0.15-0.74)	0.12 (0.03-0.56)	16 (5-28)
739	≤50	Prostate	Others	4-7	0	4-7	0.48 (0.28-0.83)	0.24 (0.08-0.70)	0.07 (0.01-0.50)	13 (4-21)
740	≤50	Prostate	Others	4-7	0	8-10	0.56 (0.35-0.90)	0.32 (0.13-0.81)	0.11 (0.02-0.66)	15 (3-28)
741	≤50	Prostate	Others	4-7	1-3	0	0.58 (0.44-0.77)	0.34 (0.20-0.59)	0.13 (0.05-0.36)	16 (8-26)
742	≤50	Prostate	Others	4-7	1-3	1-3	0.49 (0.34-0.71)	0.25 (0.12-0.51)	0.07 (0.02-0.28)	13 (7-19)
743	≤50	Prostate	Others	4-7	1-3	4-7	0.40 (0.24-0.66)	0.17 (0.06-0.44)	0.03 (0.01-0.21)	10 (5-15)
744	≤50	Prostate	Others	4-7	1-3	8-10	0.48 (0.31-0.76)	0.24 (0.10-0.58)	0.07 (0.01-0.36)	13 (6-20)
745	≤50	Prostate	Others	4-7	4-7	0	0.49 (0.34-0.69)	0.24 (0.13-0.48)	0.07 (0.02-0.24)	13 (7-19)
746	≤50	Prostate	Others	4-7	4-7	1-3	0.39 (0.25-0.61)	0.16 (0.07-0.37)	0.03 (0.01-0.15)	10 (6-14)
747	≤50	Prostate	Others	4-7	4-7	4-7	0.30 (0.16-0.55)	0.10 (0.03-0.31)	0.01 (0.00-0.11)	8 (4-12)
748	≤50	Prostate	Others	4-7	4-7	8-10	0.38 (0.22-0.68)	0.15 (0.05-0.47)	0.03 (0.00-0.23)	10 (4-15)
749	≤50	Prostate	Others	4-7	8-10	0	0.45 (0.29-0.68)	0.21 (0.09-0.47)	0.05 (0.01-0.24)	12 (6-18)
750	≤50	Prostate	Others	4-7	8-10	1-3	0.35 (0.21-0.60)	0.13 (0.05-0.37)	0.02 (0.00-0.15)	9 (5-14)
751	≤50	Prostate	Others	4-7	8-10	4-7	0.26 (0.13-0.54)	0.07 (0.02-0.29)	0.01 (0.00-0.10)	7 (4-11)
752	≤50	Prostate	Others	4-7	8-10	8-10	0.34 (0.18-0.65)	0.12 (0.04-0.42)	0.02 (0.00-0.19)	9 (4-14)
753	≤50	Prostate	Others	8-10	0	0	0.47 (0.27-0.81)	0.23 (0.08-0.65)	0.06 (0.01-0.45)	12 (4-20)
754	≤50	Prostate	Others	8-10	0	1-3	0.37 (0.18-0.79)	0.14 (0.03-0.62)	0.02 (0.00-0.41)	9 (3-16)
755	≤50	Prostate	Others	8-10	0	4-7	0.28 (0.11-0.74)	0.08 (0.01-0.55)	0.01 (0.00-0.32)	8 (2-13)
756	≤50	Prostate	Others	8-10	0	8-10	0.36 (0.16-0.84)	0.14 (0.03-0.71)	0.02 (0.00-0.52)	9 (2-16)
757	≤50	Prostate	Others	8-10	1-3	0	0.38 (0.22-0.66)	0.15 (0.05-0.44)	0.03 (0.00-0.21)	10 (5-15)
758	≤50	Prostate	Others	8-10	1-3	1-3	0.29 (0.14-0.60)	0.09 (0.02-0.36)	0.01 (0.00-0.15)	8 (3-12)
759	≤50	Prostate	Others	8-10	1-3	4-7	0.20 (0.08-0.51)	0.04 (0.01-0.27)	0.00 (0.00-0.09)	6 (3-10)
760	≤50	Prostate	Others	8-10	1-3	8-10	0.28 (0.12-0.65)	0.08 (0.02-0.43)	0.01 (0.00-0.20)	8 (3-12)
761	≤50	Prostate	Others	8-10	4-7	0	0.28 (0.15-0.55)	0.09 (0.02-0.31)	0.01 (0.00-0.11)	8 (4-12)
762	≤50	Prostate	Others	8-10	4-7	1-3	0.19 (0.08-0.46)	0.04 (0.01-0.22)	0.00 (0.00-0.06)	6 (3-9)
763	≤50	Prostate	Others	8-10	4-7	4-7	0.12 (0.04-0.38)	0.02 (0.00-0.15)	0.00 (0.00-0.03)	5 (3-7)
764	≤50	Prostate	Others	8-10	4-7	8-10	0.19 (0.07-0.54)	0.04 (0.00-0.29)	0.00 (0.00-0.10)	6 (3-9)
765	≤50	Prostate	Others	8-10	8-10	0	0.25 (0.12-0.52)	0.06 (0.02-0.27)	0.01 (0.00-0.09)	7 (3-11)
766	≤50	Prostate	Others	8-10	8-10	1-3	0.16 (0.06-0.42)	0.03 (0.00-0.18)	0.00 (0.00-0.04)	6 (3-8)
767	≤50	Prostate	Others	8-10	8-10	4-7	0.10 (0.03-0.33)	0.01 (0.00-0.11)	0.00 (0.00-0.02)	5 (2-7)
768	≤50	Prostate	Others	8-10	8-10	8-10	0.16 (0.05-0.46)	0.03 (0.00-0.21)	0.00 (0.00-0.06)	6 (3-8)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
769	≤50	Lung	Bone Only	0	0	0	0.80 (0.68-0.93)	0.64 (0.47-0.87)	0.43 (0.24-0.76)	40 (13-80)
770	≤50	Lung	Bone Only	0	0	1-3	0.75 (0.60-0.92)	0.56 (0.37-0.85)	0.33 (0.15-0.74)	31 (9-59)
771	≤50	Lung	Bone Only	0	0	4-7	0.69 (0.52-0.91)	0.48 (0.28-0.82)	0.24 (0.09-0.69)	24 (7-41)
772	≤50	Lung	Bone Only	0	0	8-10	0.74 (0.58-0.94)	0.56 (0.35-0.89)	0.32 (0.13-0.80)	30 (7-60)
773	≤50	Lung	Bone Only	0	1-3	0	0.75 (0.65-0.88)	0.57 (0.43-0.77)	0.35 (0.20-0.60)	32 (15-52)
774	≤50	Lung	Bone Only	0	1-3	1-3	0.69 (0.57-0.84)	0.49 (0.33-0.71)	0.25 (0.12-0.53)	25 (12-38)
775	≤50	Lung	Bone Only	0	1-3	4-7	0.62 (0.48-0.81)	0.40 (0.24-0.66)	0.17 (0.06-0.46)	19 (9-30)
776	≤50	Lung	Bone Only	0	1-3	8-10	0.69 (0.54-0.87)	0.48 (0.30-0.76)	0.24 (0.10-0.59)	24 (9-39)
777	≤50	Lung	Bone Only	0	4-7	0	0.69 (0.57-0.83)	0.48 (0.33-0.70)	0.25 (0.12-0.50)	24 (12-36)
778	≤50	Lung	Bone Only	0	4-7	1-3	0.61 (0.48-0.78)	0.39 (0.24-0.62)	0.16 (0.07-0.40)	19 (10-28)
779	≤50	Lung	Bone Only	0	4-7	4-7	0.54 (0.38-0.75)	0.29 (0.15-0.56)	0.10 (0.03-0.34)	14 (7-21)
780	≤50	Lung	Bone Only	0	4-7	8-10	0.61 (0.45-0.83)	0.38 (0.21-0.68)	0.16 (0.05-0.49)	18 (7-29)
781	≤50	Lung	Bone Only	0	8-10	0	0.66 (0.52-0.84)	0.44 (0.28-0.70)	0.21 (0.09-0.51)	20 (10-35)
782	≤50	Lung	Bone Only	0	8-10	1-3	0.58 (0.43-0.79)	0.35 (0.19-0.63)	0.13 (0.04-0.41)	16 (8-26)
783	≤50	Lung	Bone Only	0	8-10	4-7	0.50 (0.33-0.75)	0.26 (0.12-0.56)	0.07 (0.02-0.34)	13 (6-20)
784	≤50	Lung	Bone Only	0	8-10	8-10	0.57 (0.41-0.81)	0.34 (0.17-0.66)	0.13 (0.03-0.46)	16 (7-27)
785	≤50	Lung	Bone Only	1-3	0	0	0.80 (0.68-0.93)	0.64 (0.48-0.87)	0.43 (0.24-0.77)	40 (13-80)
786	≤50	Lung	Bone Only	1-3	0	1-3	0.75 (0.61-0.92)	0.56 (0.38-0.84)	0.34 (0.16-0.71)	31 (10-59)
787	≤50	Lung	Bone Only	1-3	0	4-7	0.69 (0.53-0.90)	0.48 (0.29-0.81)	0.25 (0.09-0.66)	24 (8-41)
788	≤50	Lung	Bone Only	1-3	0	8-10	0.74 (0.59-0.94)	0.56 (0.36-0.87)	0.33 (0.14-0.77)	30 (7-59)
789	≤50	Lung	Bone Only	1-3	1-3	0	0.75 (0.65-0.88)	0.58 (0.43-0.77)	0.35 (0.20-0.60)	33 (15-52)
790	≤50	Lung	Bone Only	1-3	1-3	1-3	0.69 (0.58-0.83)	0.49 (0.34-0.69)	0.25 (0.13-0.50)	25 (13-36)
791	≤50	Lung	Bone Only	1-3	1-3	4-7	0.62 (0.49-0.80)	0.40 (0.25-0.64)	0.17 (0.07-0.42)	19 (10-29)
792	≤50	Lung	Bone Only	1-3	1-3	8-10	0.69 (0.55-0.86)	0.48 (0.31-0.74)	0.25 (0.11-0.56)	24 (10-38)
793	≤50	Lung	Bone Only	1-3	4-7	0	0.69 (0.57-0.83)	0.48 (0.34-0.69)	0.25 (0.12-0.49)	24 (13-36)
794	≤50	Lung	Bone Only	1-3	4-7	1-3	0.62 (0.50-0.76)	0.39 (0.26-0.58)	0.16 (0.07-0.36)	19 (11-27)
795	≤50	Lung	Bone Only	1-3	4-7	4-7	0.54 (0.40-0.72)	0.30 (0.17-0.52)	0.10 (0.03-0.29)	14 (8-20)
796	≤50	Lung	Bone Only	1-3	4-7	8-10	0.61 (0.46-0.81)	0.38 (0.22-0.65)	0.16 (0.06-0.44)	18 (8-28)
797	≤50	Lung	Bone Only	1-3	8-10	0	0.66 (0.52-0.84)	0.44 (0.28-0.71)	0.21 (0.09-0.52)	20 (10-35)
798	≤50	Lung	Bone Only	1-3	8-10	1-3	0.58 (0.44-0.78)	0.35 (0.20-0.61)	0.13 (0.05-0.39)	16 (8-26)
799	≤50	Lung	Bone Only	1-3	8-10	4-7	0.50 (0.34-0.73)	0.26 (0.12-0.54)	0.08 (0.02-0.31)	13 (6-20)
800	≤50	Lung	Bone Only	1-3	8-10	8-10	0.58 (0.42-0.80)	0.34 (0.18-0.64)	0.13 (0.04-0.43)	16 (7-26)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
801	≤50	Lung	Bone Only	4-7	0	0	0.80 (0.68-0.94)	0.64 (0.47-0.88)	0.43 (0.23-0.78)	39 (12-80)
802	≤50	Lung	Bone Only	4-7	0	1-3	0.74 (0.60-0.92)	0.56 (0.37-0.85)	0.33 (0.15-0.73)	31 (9-59)
803	≤50	Lung	Bone Only	4-7	0	4-7	0.68 (0.52-0.91)	0.48 (0.28-0.82)	0.24 (0.09-0.69)	24 (7-41)
804	≤50	Lung	Bone Only	4-7	0	8-10	0.74 (0.58-0.94)	0.55 (0.35-0.89)	0.32 (0.13-0.79)	30 (7-60)
805	≤50	Lung	Bone Only	4-7	1-3	0	0.75 (0.64-0.88)	0.57 (0.43-0.77)	0.34 (0.20-0.60)	32 (15-52)
806	≤50	Lung	Bone Only	4-7	1-3	1-3	0.69 (0.57-0.83)	0.48 (0.34-0.70)	0.25 (0.13-0.50)	24 (13-36)
807	≤50	Lung	Bone Only	4-7	1-3	4-7	0.62 (0.48-0.80)	0.39 (0.24-0.64)	0.17 (0.07-0.43)	19 (10-30)
808	≤50	Lung	Bone Only	4-7	1-3	8-10	0.68 (0.55-0.86)	0.48 (0.31-0.74)	0.24 (0.10-0.56)	24 (10-38)
809	≤50	Lung	Bone Only	4-7	4-7	0	0.69 (0.57-0.83)	0.48 (0.33-0.69)	0.25 (0.12-0.49)	24 (13-36)
810	≤50	Lung	Bone Only	4-7	4-7	1-3	0.61 (0.49-0.76)	0.38 (0.25-0.58)	0.16 (0.07-0.36)	19 (11-27)
811	≤50	Lung	Bone Only	4-7	4-7	4-7	0.53 (0.40-0.72)	0.29 (0.17-0.52)	0.10 (0.03-0.29)	14 (8-20)
812	≤50	Lung	Bone Only	4-7	4-7	8-10	0.61 (0.46-0.81)	0.38 (0.22-0.65)	0.15 (0.05-0.44)	18 (8-28)
813	≤50	Lung	Bone Only	4-7	8-10	0	0.66 (0.52-0.83)	0.44 (0.28-0.70)	0.21 (0.09-0.50)	20 (10-34)
814	≤50	Lung	Bone Only	4-7	8-10	1-3	0.58 (0.44-0.77)	0.35 (0.20-0.59)	0.13 (0.05-0.37)	16 (8-26)
815	≤50	Lung	Bone Only	4-7	8-10	4-7	0.50 (0.34-0.72)	0.26 (0.12-0.52)	0.07 (0.02-0.30)	13 (6-19)
816	≤50	Lung	Bone Only	4-7	8-10	8-10	0.57 (0.42-0.79)	0.34 (0.18-0.63)	0.12 (0.04-0.41)	16 (8-26)
817	≤50	Lung	Bone Only	8-10	0	0	0.67 (0.51-0.89)	0.46 (0.27-0.80)	0.23 (0.08-0.65)	21 (7-39)
818	≤50	Lung	Bone Only	8-10	0	1-3	0.60 (0.41-0.87)	0.36 (0.18-0.75)	0.15 (0.04-0.58)	17 (6-30)
819	≤50	Lung	Bone Only	8-10	0	4-7	0.52 (0.32-0.83)	0.27 (0.11-0.69)	0.08 (0.01-0.50)	14 (4-23)
820	≤50	Lung	Bone Only	8-10	0	8-10	0.59 (0.39-0.89)	0.36 (0.16-0.80)	0.14 (0.03-0.65)	17 (4-30)
821	≤50	Lung	Bone Only	8-10	1-3	0	0.61 (0.46-0.80)	0.38 (0.22-0.64)	0.15 (0.06-0.43)	18 (9-28)
822	≤50	Lung	Bone Only	8-10	1-3	1-3	0.52 (0.37-0.74)	0.28 (0.15-0.54)	0.09 (0.02-0.32)	14 (7-20)
823	≤50	Lung	Bone Only	8-10	1-3	4-7	0.44 (0.28-0.67)	0.20 (0.08-0.46)	0.04 (0.01-0.23)	11 (6-16)
824	≤50	Lung	Bone Only	8-10	1-3	8-10	0.52 (0.35-0.77)	0.27 (0.13-0.59)	0.08 (0.02-0.37)	14 (6-20)
825	≤50	Lung	Bone Only	8-10	4-7	0	0.52 (0.37-0.72)	0.28 (0.15-0.53)	0.09 (0.02-0.30)	14 (7-20)
826	≤50	Lung	Bone Only	8-10	4-7	1-3	0.43 (0.29-0.63)	0.19 (0.09-0.40)	0.04 (0.01-0.18)	11 (6-15)
827	≤50	Lung	Bone Only	8-10	4-7	4-7	0.33 (0.20-0.55)	0.12 (0.04-0.31)	0.02 (0.00-0.12)	9 (5-13)
828	≤50	Lung	Bone Only	8-10	4-7	8-10	0.42 (0.26-0.68)	0.18 (0.07-0.47)	0.04 (0.01-0.24)	11 (5-16)
829	≤50	Lung	Bone Only	8-10	8-10	0	0.48 (0.33-0.71)	0.24 (0.11-0.50)	0.06 (0.02-0.28)	13 (6-19)
830	≤50	Lung	Bone Only	8-10	8-10	1-3	0.39 (0.25-0.61)	0.16 (0.06-0.38)	0.03 (0.01-0.16)	10 (6-14)
831	≤50	Lung	Bone Only	8-10	8-10	4-7	0.29 (0.17-0.53)	0.09 (0.03-0.28)	0.01 (0.00-0.10)	8 (5-12)
832	≤50	Lung	Bone Only	8-10	8-10	8-10	0.38 (0.23-0.63)	0.15 (0.06-0.40)	0.03 (0.00-0.18)	10 (5-14)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
833	≤50	Lung	Others	0	0	0	0.63 (0.47-0.84)	0.40 (0.23-0.70)	0.17 (0.06-0.51)	19 (8-31)
834	≤50	Lung	Others	0	0	1-3	0.54 (0.36-0.82)	0.30 (0.14-0.67)	0.10 (0.02-0.47)	15 (6-26)
835	≤50	Lung	Others	0	0	4-7	0.46 (0.27-0.78)	0.22 (0.08-0.61)	0.05 (0.01-0.39)	12 (4-19)
836	≤50	Lung	Others	0	0	8-10	0.54 (0.34-0.85)	0.30 (0.12-0.72)	0.10 (0.02-0.54)	14 (5-26)
837	≤50	Lung	Others	0	1-3	0	0.56 (0.43-0.72)	0.32 (0.19-0.53)	0.11 (0.04-0.30)	15 (9-21)
838	≤50	Lung	Others	0	1-3	1-3	0.47 (0.32-0.67)	0.22 (0.11-0.45)	0.06 (0.01-0.22)	12 (7-17)
839	≤50	Lung	Others	0	1-3	4-7	0.38 (0.23-0.61)	0.15 (0.06-0.37)	0.03 (0.00-0.16)	10 (5-14)
840	≤50	Lung	Others	0	1-3	8-10	0.46 (0.29-0.71)	0.22 (0.09-0.51)	0.05 (0.01-0.28)	12 (6-19)
841	≤50	Lung	Others	0	4-7	0	0.46 (0.33-0.65)	0.22 (0.11-0.42)	0.06 (0.02-0.20)	12 (7-16)
842	≤50	Lung	Others	0	4-7	1-3	0.37 (0.24-0.56)	0.14 (0.06-0.32)	0.02 (0.00-0.12)	9 (6-13)
843	≤50	Lung	Others	0	4-7	4-7	0.27 (0.15-0.50)	0.08 (0.03-0.25)	0.01 (0.00-0.08)	7 (4-11)
844	≤50	Lung	Others	0	4-7	8-10	0.36 (0.20-0.63)	0.13 (0.04-0.40)	0.02 (0.00-0.18)	9 (5-14)
845	≤50	Lung	Others	0	8-10	0	0.42 (0.28-0.64)	0.19 (0.08-0.42)	0.04 (0.01-0.19)	11 (6-16)
846	≤50	Lung	Others	0	8-10	1-3	0.33 (0.19-0.56)	0.11 (0.04-0.32)	0.02 (0.00-0.12)	8 (5-13)
847	≤50	Lung	Others	0	8-10	4-7	0.24 (0.11-0.49)	0.06 (0.01-0.25)	0.00 (0.00-0.07)	7 (3-10)
848	≤50	Lung	Others	0	8-10	8-10	0.32 (0.17-0.59)	0.11 (0.03-0.35)	0.01 (0.00-0.14)	8 (4-13)
849	≤50	Lung	Others	1-3	0	0	0.63 (0.47-0.84)	0.40 (0.23-0.70)	0.18 (0.06-0.51)	19 (8-31)
850	≤50	Lung	Others	1-3	0	1-3	0.55 (0.37-0.80)	0.31 (0.15-0.64)	0.10 (0.03-0.43)	15 (6-25)
851	≤50	Lung	Others	1-3	0	4-7	0.46 (0.28-0.76)	0.22 (0.08-0.58)	0.05 (0.01-0.35)	12 (5-19)
852	≤50	Lung	Others	1-3	0	8-10	0.54 (0.35-0.83)	0.30 (0.13-0.69)	0.10 (0.02-0.50)	14 (5-26)
853	≤50	Lung	Others	1-3	1-3	0	0.56 (0.43-0.72)	0.32 (0.19-0.53)	0.11 (0.04-0.29)	15 (9-21)
854	≤50	Lung	Others	1-3	1-3	1-3	0.47 (0.34-0.64)	0.23 (0.12-0.42)	0.06 (0.02-0.19)	12 (7-16)
855	≤50	Lung	Others	1-3	1-3	4-7	0.38 (0.25-0.58)	0.15 (0.07-0.34)	0.03 (0.01-0.13)	10 (6-13)
856	≤50	Lung	Others	1-3	1-3	8-10	0.46 (0.31-0.69)	0.22 (0.10-0.47)	0.05 (0.01-0.24)	12 (6-18)
857	≤50	Lung	Others	1-3	4-7	0	0.46 (0.34-0.64)	0.22 (0.12-0.41)	0.06 (0.02-0.18)	12 (7-16)
858	≤50	Lung	Others	1-3	4-7	1-3	0.37 (0.26-0.52)	0.14 (0.07-0.27)	0.02 (0.01-0.09)	9 (6-13)
859	≤50	Lung	Others	1-3	4-7	4-7	0.28 (0.17-0.45)	0.08 (0.03-0.21)	0.01 (0.00-0.05)	7 (5-10)
860	≤50	Lung	Others	1-3	4-7	8-10	0.36 (0.22-0.59)	0.13 (0.05-0.35)	0.02 (0.00-0.14)	9 (5-13)
861	≤50	Lung	Others	1-3	8-10	0	0.42 (0.28-0.65)	0.19 (0.08-0.42)	0.04 (0.01-0.20)	11 (6-16)
862	≤50	Lung	Others	1-3	8-10	1-3	0.33 (0.20-0.54)	0.11 (0.04-0.29)	0.02 (0.00-0.10)	8 (5-12)
863	≤50	Lung	Others	1-3	8-10	4-7	0.24 (0.12-0.46)	0.06 (0.02-0.22)	0.00 (0.00-0.06)	7 (4-10)
864	≤50	Lung	Others	1-3	8-10	8-10	0.32 (0.18-0.57)	0.11 (0.04-0.33)	0.01 (0.00-0.12)	8 (5-13)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
865	≤50	Lung	Others	4-7	0	0	0.63 (0.46-0.84)	0.40 (0.22-0.71)	0.17 (0.06-0.53)	19 (7-32)
866	≤50	Lung	Others	4-7	0	1-3	0.54 (0.36-0.81)	0.30 (0.14-0.66)	0.10 (0.02-0.45)	15 (6-26)
867	≤50	Lung	Others	4-7	0	4-7	0.46 (0.27-0.77)	0.22 (0.08-0.60)	0.05 (0.01-0.38)	12 (4-19)
868	≤50	Lung	Others	4-7	0	8-10	0.54 (0.34-0.84)	0.30 (0.12-0.71)	0.10 (0.02-0.53)	14 (5-26)
869	≤50	Lung	Others	4-7	1-3	0	0.55 (0.43-0.72)	0.32 (0.19-0.52)	0.11 (0.04-0.29)	15 (9-21)
870	≤50	Lung	Others	4-7	1-3	1-3	0.46 (0.34-0.64)	0.22 (0.12-0.42)	0.06 (0.02-0.19)	12 (7-17)
871	≤50	Lung	Others	4-7	1-3	4-7	0.37 (0.24-0.58)	0.15 (0.06-0.34)	0.03 (0.00-0.13)	10 (6-14)
872	≤50	Lung	Others	4-7	1-3	8-10	0.46 (0.30-0.69)	0.22 (0.10-0.47)	0.05 (0.01-0.24)	12 (6-17)
873	≤50	Lung	Others	4-7	4-7	0	0.46 (0.34-0.63)	0.22 (0.12-0.40)	0.05 (0.02-0.18)	12 (7-16)
874	≤50	Lung	Others	4-7	4-7	1-3	0.36 (0.26-0.52)	0.14 (0.07-0.27)	0.02 (0.01-0.09)	9 (6-13)
875	≤50	Lung	Others	4-7	4-7	4-7	0.27 (0.17-0.45)	0.08 (0.03-0.20)	0.01 (0.00-0.05)	7 (5-10)
876	≤50	Lung	Others	4-7	4-7	8-10	0.36 (0.22-0.58)	0.13 (0.05-0.35)	0.02 (0.00-0.14)	9 (5-13)
877	≤50	Lung	Others	4-7	8-10	0	0.42 (0.28-0.63)	0.18 (0.08-0.40)	0.04 (0.01-0.18)	11 (6-15)
878	≤50	Lung	Others	4-7	8-10	1-3	0.33 (0.20-0.52)	0.11 (0.04-0.27)	0.01 (0.00-0.09)	8 (5-12)
879	≤50	Lung	Others	4-7	8-10	4-7	0.24 (0.13-0.44)	0.06 (0.02-0.20)	0.00 (0.00-0.05)	7 (4-9)
880	≤50	Lung	Others	4-7	8-10	8-10	0.32 (0.18-0.55)	0.11 (0.04-0.30)	0.01 (0.00-0.11)	8 (5-12)
881	≤50	Lung	Others	8-10	0	0	0.44 (0.26-0.75)	0.20 (0.07-0.57)	0.05 (0.01-0.35)	11 (5-19)
882	≤50	Lung	Others	8-10	0	1-3	0.34 (0.17-0.70)	0.12 (0.03-0.50)	0.02 (0.00-0.28)	9 (3-14)
883	≤50	Lung	Others	8-10	0	4-7	0.25 (0.10-0.63)	0.07 (0.01-0.41)	0.01 (0.00-0.19)	7 (3-11)
884	≤50	Lung	Others	8-10	0	8-10	0.34 (0.15-0.74)	0.12 (0.03-0.56)	0.02 (0.00-0.34)	9 (3-14)
885	≤50	Lung	Others	8-10	1-3	0	0.36 (0.22-0.59)	0.13 (0.05-0.35)	0.02 (0.00-0.14)	9 (5-13)
886	≤50	Lung	Others	8-10	1-3	1-3	0.26 (0.14-0.50)	0.07 (0.02-0.25)	0.01 (0.00-0.08)	7 (4-11)
887	≤50	Lung	Others	8-10	1-3	4-7	0.18 (0.08-0.40)	0.03 (0.01-0.17)	0.00 (0.00-0.04)	6 (3-9)
888	≤50	Lung	Others	8-10	1-3	8-10	0.25 (0.12-0.54)	0.07 (0.02-0.29)	0.01 (0.00-0.10)	7 (3-11)
889	≤50	Lung	Others	8-10	4-7	0	0.26 (0.14-0.47)	0.07 (0.02-0.23)	0.01 (0.00-0.06)	7 (4-10)
890	≤50	Lung	Others	8-10	4-7	1-3	0.17 (0.08-0.35)	0.03 (0.01-0.13)	0.00 (0.00-0.02)	6 (3-8)
891	≤50	Lung	Others	8-10	4-7	4-7	0.10 (0.04-0.26)	0.01 (0.00-0.07)	0.00 (0.00-0.01)	5 (3-6)
892	≤50	Lung	Others	8-10	4-7	8-10	0.16 (0.07-0.41)	0.03 (0.00-0.17)	0.00 (0.00-0.04)	6 (3-8)
893	≤50	Lung	Others	8-10	8-10	0	0.22 (0.11-0.44)	0.05 (0.01-0.20)	0.00 (0.00-0.05)	6 (4-9)
894	≤50	Lung	Others	8-10	8-10	1-3	0.14 (0.06-0.31)	0.02 (0.00-0.10)	0.00 (0.00-0.01)	6 (3-7)
895	≤50	Lung	Others	8-10	8-10	4-7	0.08 (0.03-0.22)	0.01 (0.00-0.05)	0.00 (0.00-0.00)	4 (3-6)
896	≤50	Lung	Others	8-10	8-10	8-10	0.13 (0.05-0.33)	0.02 (0.00-0.11)	0.00 (0.00-0.02)	5 (3-7)

Appendix 4 Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
897	≤50	Others	Bone Only	0	0	0	0.76 (0.64-0.91)	0.59 (0.43-0.82)	0.37 (0.20-0.69)	34 (13-60)
898	≤50	Others	Bone Only	0	0	1-3	0.71 (0.55-0.90)	0.51 (0.32-0.81)	0.27 (0.11-0.67)	26 (8-47)
899	≤50	Others	Bone Only	0	0	4-7	0.64 (0.46-0.88)	0.42 (0.22-0.78)	0.19 (0.06-0.63)	19 (6-35)
900	≤50	Others	Bone Only	0	0	8-10	0.70 (0.53-0.93)	0.50 (0.29-0.86)	0.26 (0.09-0.75)	26 (6-49)
901	≤50	Others	Bone Only	0	1-3	0	0.71 (0.61-0.84)	0.52 (0.38-0.71)	0.28 (0.15-0.52)	27 (14-39)
902	≤50	Others	Bone Only	0	1-3	1-3	0.65 (0.51-0.81)	0.42 (0.27-0.66)	0.19 (0.08-0.46)	20 (10-31)
903	≤50	Others	Bone Only	0	1-3	4-7	0.57 (0.41-0.78)	0.33 (0.18-0.62)	0.12 (0.04-0.40)	16 (7-26)
904	≤50	Others	Bone Only	0	1-3	8-10	0.64 (0.48-0.85)	0.42 (0.24-0.72)	0.19 (0.06-0.54)	19 (8-34)
905	≤50	Others	Bone Only	0	4-7	0	0.64 (0.52-0.79)	0.42 (0.28-0.63)	0.19 (0.09-0.41)	19 (11-30)
906	≤50	Others	Bone Only	0	4-7	1-3	0.56 (0.42-0.74)	0.32 (0.19-0.56)	0.12 (0.04-0.33)	16 (9-24)
907	≤50	Others	Bone Only	0	4-7	4-7	0.48 (0.32-0.71)	0.23 (0.11-0.51)	0.06 (0.01-0.28)	13 (6-19)
908	≤50	Others	Bone Only	0	4-7	8-10	0.55 (0.38-0.80)	0.31 (0.15-0.64)	0.11 (0.03-0.43)	15 (6-25)
909	≤50	Others	Bone Only	0	8-10	0	0.61 (0.47-0.79)	0.38 (0.23-0.63)	0.16 (0.06-0.41)	19 (9-29)
910	≤50	Others	Bone Only	0	8-10	1-3	0.53 (0.37-0.74)	0.28 (0.15-0.56)	0.09 (0.02-0.33)	14 (7-20)
911	≤50	Others	Bone Only	0	8-10	4-7	0.44 (0.27-0.71)	0.20 (0.08-0.50)	0.05 (0.01-0.27)	11 (5-17)
912	≤50	Others	Bone Only	0	8-10	8-10	0.52 (0.34-0.78)	0.28 (0.13-0.61)	0.09 (0.02-0.39)	14 (6-21)
913	≤50	Others	Bone Only	1-3	0	0	0.77 (0.65-0.91)	0.59 (0.43-0.82)	0.37 (0.20-0.69)	35 (13-61)
914	≤50	Others	Bone Only	1-3	0	1-3	0.71 (0.56-0.89)	0.51 (0.33-0.79)	0.27 (0.12-0.64)	26 (9-44)
915	≤50	Others	Bone Only	1-3	0	4-7	0.64 (0.47-0.87)	0.42 (0.23-0.76)	0.19 (0.06-0.59)	19 (7-35)
916	≤50	Others	Bone Only	1-3	0	8-10	0.70 (0.54-0.92)	0.50 (0.30-0.84)	0.26 (0.10-0.72)	26 (7-48)
917	≤50	Others	Bone Only	1-3	1-3	0	0.72 (0.61-0.84)	0.52 (0.38-0.71)	0.29 (0.16-0.52)	27 (14-40)
918	≤50	Others	Bone Only	1-3	1-3	1-3	0.65 (0.52-0.80)	0.43 (0.29-0.64)	0.20 (0.09-0.42)	20 (11-31)
919	≤50	Others	Bone Only	1-3	1-3	4-7	0.57 (0.43-0.77)	0.33 (0.19-0.59)	0.12 (0.04-0.36)	16 (8-25)
920	≤50	Others	Bone Only	1-3	1-3	8-10	0.64 (0.49-0.84)	0.42 (0.25-0.70)	0.19 (0.07-0.50)	19 (9-34)
921	≤50	Others	Bone Only	1-3	4-7	0	0.64 (0.53-0.79)	0.42 (0.29-0.62)	0.19 (0.09-0.40)	19 (11-30)
922	≤50	Others	Bone Only	1-3	4-7	1-3	0.56 (0.44-0.72)	0.33 (0.21-0.51)	0.12 (0.05-0.28)	16 (10-22)
923	≤50	Others	Bone Only	1-3	4-7	4-7	0.48 (0.34-0.68)	0.24 (0.12-0.46)	0.06 (0.02-0.23)	13 (7-18)
924	≤50	Others	Bone Only	1-3	4-7	8-10	0.56 (0.40-0.78)	0.32 (0.17-0.60)	0.11 (0.03-0.38)	15 (7-25)
925	≤50	Others	Bone Only	1-3	8-10	0	0.61 (0.47-0.80)	0.38 (0.23-0.63)	0.16 (0.06-0.42)	19 (9-29)
926	≤50	Others	Bone Only	1-3	8-10	1-3	0.53 (0.38-0.73)	0.29 (0.15-0.53)	0.09 (0.03-0.30)	14 (8-20)
927	≤50	Others	Bone Only	1-3	8-10	4-7	0.44 (0.28-0.69)	0.20 (0.08-0.48)	0.05 (0.01-0.24)	11 (6-17)
928	≤50	Others	Bone Only	1-3	8-10	8-10	0.52 (0.35-0.76)	0.28 (0.13-0.58)	0.09 (0.02-0.36)	14 (6-20)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
929	≤50	Others	Bone Only	4-7	0	0	0.76 (0.64-0.91)	0.59 (0.42-0.83)	0.36 (0.19-0.69)	34 (13-61)
930	≤50	Others	Bone Only	4-7	0	1-3	0.70 (0.56-0.89)	0.50 (0.32-0.80)	0.27 (0.11-0.64)	26 (9-45)
931	≤50	Others	Bone Only	4-7	0	4-7	0.64 (0.46-0.88)	0.42 (0.22-0.77)	0.19 (0.06-0.60)	19 (6-35)
932	≤50	Others	Bone Only	4-7	0	8-10	0.70 (0.53-0.92)	0.50 (0.29-0.85)	0.26 (0.09-0.73)	26 (6-48)
933	≤50	Others	Bone Only	4-7	1-3	0	0.71 (0.61-0.84)	0.52 (0.38-0.70)	0.28 (0.16-0.50)	27 (14-39)
934	≤50	Others	Bone Only	4-7	1-3	1-3	0.64 (0.52-0.79)	0.42 (0.29-0.63)	0.19 (0.09-0.41)	20 (11-30)
935	≤50	Others	Bone Only	4-7	1-3	4-7	0.57 (0.43-0.76)	0.33 (0.19-0.58)	0.12 (0.04-0.35)	16 (8-25)
936	≤50	Others	Bone Only	4-7	1-3	8-10	0.64 (0.49-0.83)	0.42 (0.25-0.69)	0.19 (0.07-0.49)	19 (9-33)
937	≤50	Others	Bone Only	4-7	4-7	0	0.64 (0.53-0.77)	0.42 (0.29-0.60)	0.19 (0.09-0.38)	19 (12-29)
938	≤50	Others	Bone Only	4-7	4-7	1-3	0.56 (0.45-0.70)	0.32 (0.21-0.50)	0.11 (0.05-0.26)	15 (10-20)
939	≤50	Others	Bone Only	4-7	4-7	4-7	0.47 (0.34-0.67)	0.23 (0.12-0.45)	0.06 (0.02-0.22)	13 (7-18)
940	≤50	Others	Bone Only	4-7	4-7	8-10	0.55 (0.40-0.77)	0.31 (0.17-0.59)	0.11 (0.03-0.37)	15 (7-23)
941	≤50	Others	Bone Only	4-7	8-10	0	0.61 (0.48-0.78)	0.38 (0.24-0.60)	0.16 (0.06-0.38)	18 (10-27)
942	≤50	Others	Bone Only	4-7	8-10	1-3	0.52 (0.39-0.71)	0.28 (0.16-0.50)	0.09 (0.03-0.27)	14 (8-20)
943	≤50	Others	Bone Only	4-7	8-10	4-7	0.44 (0.29-0.66)	0.20 (0.09-0.44)	0.05 (0.01-0.21)	11 (6-16)
944	≤50	Others	Bone Only	4-7	8-10	8-10	0.52 (0.36-0.74)	0.28 (0.14-0.55)	0.08 (0.02-0.33)	14 (7-20)
945	≤50	Others	Bone Only	8-10	0	0	0.62 (0.46-0.85)	0.40 (0.22-0.72)	0.17 (0.05-0.54)	19 (7-32)
946	≤50	Others	Bone Only	8-10	0	1-3	0.54 (0.36-0.82)	0.30 (0.13-0.68)	0.10 (0.02-0.48)	14 (6-25)
947	≤50	Others	Bone Only	8-10	0	4-7	0.46 (0.26-0.79)	0.21 (0.07-0.62)	0.05 (0.01-0.41)	12 (4-19)
948	≤50	Others	Bone Only	8-10	0	8-10	0.53 (0.33-0.86)	0.29 (0.12-0.74)	0.10 (0.02-0.58)	14 (4-26)
949	≤50	Others	Bone Only	8-10	1-3	0	0.55 (0.41-0.74)	0.31 (0.18-0.56)	0.11 (0.04-0.33)	15 (8-22)
950	≤50	Others	Bone Only	8-10	1-3	1-3	0.46 (0.31-0.68)	0.22 (0.10-0.47)	0.06 (0.01-0.24)	12 (6-18)
951	≤50	Others	Bone Only	8-10	1-3	4-7	0.37 (0.22-0.62)	0.14 (0.05-0.39)	0.02 (0.00-0.18)	9 (5-14)
952	≤50	Others	Bone Only	8-10	1-3	8-10	0.46 (0.28-0.73)	0.21 (0.09-0.54)	0.05 (0.01-0.31)	12 (5-19)
953	≤50	Others	Bone Only	8-10	4-7	0	0.46 (0.32-0.65)	0.22 (0.11-0.43)	0.05 (0.01-0.21)	12 (7-17)
954	≤50	Others	Bone Only	8-10	4-7	1-3	0.36 (0.24-0.56)	0.14 (0.06-0.32)	0.02 (0.00-0.12)	9 (6-13)
955	≤50	Others	Bone Only	8-10	4-7	4-7	0.27 (0.15-0.49)	0.08 (0.02-0.25)	0.01 (0.00-0.08)	7 (4-11)
956	≤50	Others	Bone Only	8-10	4-7	8-10	0.35 (0.20-0.63)	0.13 (0.04-0.41)	0.02 (0.00-0.19)	9 (5-14)
957	≤50	Others	Bone Only	8-10	8-10	0	0.42 (0.28-0.63)	0.18 (0.08-0.40)	0.04 (0.01-0.18)	11 (6-15)
958	≤50	Others	Bone Only	8-10	8-10	1-3	0.32 (0.20-0.53)	0.11 (0.04-0.29)	0.01 (0.00-0.10)	8 (5-12)
959	≤50	Others	Bone Only	8-10	8-10	4-7	0.23 (0.12-0.46)	0.06 (0.02-0.22)	0.00 (0.00-0.06)	7 (4-10)
960	≤50	Others	Bone Only	8-10	8-10	8-10	0.32 (0.17-0.57)	0.10 (0.03-0.33)	0.01 (0.00-0.13)	8 (4-13)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
961	≤50	Others	Others	0	0	0	0.57 (0.41-0.79)	0.34 (0.18-0.63)	0.13 (0.04-0.42)	16 (7-26)
962	≤50	Others	Others	0	0	1-3	0.49 (0.30-0.78)	0.24 (0.10-0.61)	0.07 (0.01-0.39)	13 (5-20)
963	≤50	Others	Others	0	0	4-7	0.40 (0.21-0.75)	0.16 (0.05-0.56)	0.03 (0.00-0.34)	10 (3-16)
964	≤50	Others	Others	0	0	8-10	0.48 (0.28-0.83)	0.24 (0.08-0.69)	0.06 (0.01-0.50)	13 (3-20)
965	≤50	Others	Others	0	1-3	0	0.50 (0.37-0.68)	0.26 (0.14-0.46)	0.07 (0.02-0.23)	13 (8-19)
966	≤50	Others	Others	0	1-3	1-3	0.40 (0.26-0.63)	0.17 (0.07-0.41)	0.03 (0.01-0.18)	10 (6-15)
967	≤50	Others	Others	0	1-3	4-7	0.31 (0.17-0.58)	0.10 (0.03-0.34)	0.01 (0.00-0.13)	8 (4-13)
968	≤50	Others	Others	0	1-3	8-10	0.40 (0.23-0.69)	0.16 (0.06-0.48)	0.03 (0.00-0.25)	10 (5-16)
969	≤50	Others	Others	0	4-7	0	0.40 (0.27-0.59)	0.17 (0.08-0.35)	0.03 (0.01-0.14)	10 (6-14)
970	≤50	Others	Others	0	4-7	1-3	0.30 (0.18-0.52)	0.10 (0.03-0.28)	0.01 (0.00-0.09)	8 (5-11)
971	≤50	Others	Others	0	4-7	4-7	0.22 (0.10-0.47)	0.05 (0.01-0.22)	0.00 (0.00-0.06)	6 (3-9)
972	≤50	Others	Others	0	4-7	8-10	0.29 (0.14-0.60)	0.09 (0.02-0.37)	0.01 (0.00-0.15)	8 (3-13)
973	≤50	Others	Others	0	8-10	0	0.36 (0.22-0.58)	0.14 (0.05-0.34)	0.02 (0.00-0.13)	9 (6-13)
974	≤50	Others	Others	0	8-10	1-3	0.26 (0.14-0.51)	0.07 (0.02-0.27)	0.01 (0.00-0.08)	7 (4-11)
975	≤50	Others	Others	0	8-10	4-7	0.18 (0.07-0.45)	0.04 (0.01-0.21)	0.00 (0.00-0.05)	6 (3-9)
976	≤50	Others	Others	0	8-10	8-10	0.26 (0.12-0.56)	0.07 (0.02-0.32)	0.01 (0.00-0.11)	7 (3-11)
977	≤50	Others	Others	1-3	0	0	0.58 (0.42-0.79)	0.34 (0.18-0.63)	0.13 (0.04-0.41)	16 (7-26)
978	≤50	Others	Others	1-3	0	1-3	0.49 (0.31-0.76)	0.25 (0.10-0.58)	0.07 (0.01-0.35)	13 (6-19)
979	≤50	Others	Others	1-3	0	4-7	0.40 (0.22-0.72)	0.16 (0.05-0.53)	0.03 (0.00-0.29)	10 (4-16)
980	≤50	Others	Others	1-3	0	8-10	0.48 (0.28-0.81)	0.24 (0.09-0.66)	0.06 (0.01-0.45)	13 (4-20)
981	≤50	Others	Others	1-3	1-3	0	0.50 (0.37-0.68)	0.26 (0.14-0.46)	0.07 (0.02-0.23)	13 (8-19)
982	≤50	Others	Others	1-3	1-3	1-3	0.41 (0.27-0.60)	0.17 (0.08-0.37)	0.03 (0.01-0.15)	10 (6-14)
983	≤50	Others	Others	1-3	1-3	4-7	0.31 (0.18-0.55)	0.10 (0.04-0.30)	0.01 (0.00-0.10)	8 (5-12)
984	≤50	Others	Others	1-3	1-3	8-10	0.40 (0.24-0.66)	0.16 (0.06-0.44)	0.03 (0.00-0.21)	10 (5-16)
985	≤50	Others	Others	1-3	4-7	0	0.40 (0.28-0.58)	0.17 (0.08-0.34)	0.03 (0.01-0.13)	10 (6-14)
986	≤50	Others	Others	1-3	4-7	1-3	0.30 (0.20-0.47)	0.10 (0.04-0.23)	0.01 (0.00-0.06)	8 (6-11)
987	≤50	Others	Others	1-3	4-7	4-7	0.22 (0.11-0.42)	0.05 (0.01-0.18)	0.00 (0.00-0.04)	6 (4-9)
988	≤50	Others	Others	1-3	4-7	8-10	0.30 (0.16-0.56)	0.09 (0.03-0.32)	0.01 (0.00-0.11)	8 (4-12)
989	≤50	Others	Others	1-3	8-10	0	0.36 (0.22-0.58)	0.14 (0.05-0.35)	0.02 (0.00-0.13)	9 (5-13)
990	≤50	Others	Others	1-3	8-10	1-3	0.27 (0.15-0.48)	0.08 (0.02-0.24)	0.01 (0.00-0.07)	7 (4-11)
991	≤50	Others	Others	1-3	8-10	4-7	0.18 (0.08-0.42)	0.04 (0.01-0.18)	0.00 (0.00-0.04)	6 (3-9)
992	≤50	Others	Others	1-3	8-10	8-10	0.26 (0.13-0.53)	0.07 (0.02-0.28)	0.01 (0.00-0.09)	7 (4-11)

Appendix 4

Prognostic Index/ Nomogram: Predicted Survival Probability

Scenario	KPS Score	Primary Cancer Site	Site of Metastases	Appetite Score	Fatigue Score	Shortness of Breath Score	Predicted Survival Probability at 3 months (95% CI)	Predicted Survival Probability at 6 months (95% CI)	Predicted Survival Probability at 1 year (95% CI)	Median Survival in weeks (95% CI)
993	≤50	Others	Others	4-7	0	0	0.57 (0.41-0.79)	0.34 (0.18-0.63)	0.12 (0.04-0.42)	16 (7-26)
994	≤50	Others	Others	4-7	0	1-3	0.48 (0.31-0.76)	0.24 (0.10-0.59)	0.07 (0.01-0.36)	13 (6-20)
995	≤50	Others	Others	4-7	0	4-7	0.39 (0.21-0.73)	0.16 (0.05-0.53)	0.03 (0.00-0.30)	10 (4-16)
996	≤50	Others	Others	4-7	0	8-10	0.48 (0.28-0.81)	0.23 (0.08-0.66)	0.06 (0.01-0.45)	13 (4-20)
997	≤50	Others	Others	4-7	1-3	0	0.50 (0.37-0.66)	0.25 (0.15-0.44)	0.07 (0.03-0.21)	13 (8-19)
998	≤50	Others	Others	4-7	1-3	1-3	0.40 (0.28-0.59)	0.17 (0.08-0.35)	0.03 (0.01-0.14)	10 (6-14)
999	≤50	Others	Others	4-7	1-3	4-7	0.31 (0.18-0.53)	0.10 (0.04-0.29)	0.01 (0.00-0.10)	8 (5-12)
1000	≤50	Others	Others	4-7	1-3	8-10	0.39 (0.24-0.65)	0.16 (0.06-0.42)	0.03 (0.00-0.20)	10 (5-15)
1001	≤50	Others	Others	4-7	4-7	0	0.40 (0.29-0.55)	0.16 (0.09-0.31)	0.03 (0.01-0.11)	10 (7-14)
1002	≤50	Others	Others	4-7	4-7	1-3	0.30 (0.20-0.45)	0.10 (0.04-0.21)	0.01 (0.00-0.05)	8 (6-11)
1003	≤50	Others	Others	4-7	4-7	4-7	0.21 (0.12-0.39)	0.05 (0.02-0.16)	0.00 (0.00-0.03)	6 (4-9)
1004	≤50	Others	Others	4-7	4-7	8-10	0.29 (0.16-0.54)	0.09 (0.03-0.30)	0.01 (0.00-0.10)	8 (4-12)
1005	≤50	Others	Others	4-7	8-10	0	0.36 (0.23-0.55)	0.13 (0.06-0.30)	0.02 (0.00-0.11)	9 (6-13)
1006	≤50	Others	Others	4-7	8-10	1-3	0.26 (0.16-0.44)	0.07 (0.03-0.20)	0.01 (0.00-0.05)	7 (5-10)
1007	≤50	Others	Others	4-7	8-10	4-7	0.18 (0.09-0.38)	0.04 (0.01-0.15)	0.00 (0.00-0.03)	6 (3-8)
1008	≤50	Others	Others	4-7	8-10	8-10	0.26 (0.13-0.49)	0.07 (0.02-0.25)	0.01 (0.00-0.07)	7 (4-10)
1009	≤50	Others	Others	8-10	0	0	0.38 (0.21-0.69)	0.15 (0.05-0.48)	0.03 (0.00-0.25)	10 (4-15)
1010	≤50	Others	Others	8-10	0	1-3	0.28 (0.12-0.65)	0.08 (0.02-0.43)	0.01 (0.00-0.20)	8 (3-13)
1011	≤50	Others	Others	8-10	0	4-7	0.20 (0.07-0.58)	0.04 (0.00-0.35)	0.00 (0.00-0.14)	6 (2-10)
1012	≤50	Others	Others	8-10	0	8-10	0.27 (0.11-0.71)	0.08 (0.01-0.51)	0.01 (0.00-0.28)	7 (2-13)
1013	≤50	Others	Others	8-10	1-3	0	0.29 (0.16-0.53)	0.09 (0.03-0.28)	0.01 (0.00-0.09)	8 (5-12)
1014	≤50	Others	Others	8-10	1-3	1-3	0.20 (0.09-0.44)	0.04 (0.01-0.21)	0.00 (0.00-0.05)	6 (3-9)
1015	≤50	Others	Others	8-10	1-3	4-7	0.13 (0.05-0.36)	0.02 (0.00-0.14)	0.00 (0.00-0.03)	5 (3-7)
1016	≤50	Others	Others	8-10	1-3	8-10	0.20 (0.08-0.50)	0.04 (0.01-0.26)	0.00 (0.00-0.08)	6 (3-9)
1017	≤50	Others	Others	8-10	4-7	0	0.20 (0.10-0.40)	0.04 (0.01-0.16)	0.00 (0.00-0.03)	6 (4-9)
1018	≤50	Others	Others	8-10	4-7	1-3	0.12 (0.05-0.29)	0.02 (0.00-0.09)	0.00 (0.00-0.01)	5 (3-7)
1019	≤50	Others	Others	8-10	4-7	4-7	0.07 (0.02-0.22)	0.01 (0.00-0.05)	0.00 (0.00-0.00)	4 (2-6)
1020	≤50	Others	Others	8-10	4-7	8-10	0.12 (0.04-0.37)	0.02 (0.00-0.14)	0.00 (0.00-0.03)	5 (2-7)
1021	≤50	Others	Others	8-10	8-10	0	0.17 (0.08-0.35)	0.03 (0.01-0.13)	0.00 (0.00-0.02)	6 (3-8)
1022	≤50	Others	Others	8-10	8-10	1-3	0.10 (0.04-0.25)	0.01 (0.00-0.07)	0.00 (0.00-0.01)	5 (3-6)
1023	≤50	Others	Others	8-10	8-10	4-7	0.05 (0.01-0.18)	0.00 (0.00-0.03)	0.00 (0.00-0.00)	3 (2-5)
1024	≤50	Others	Others	8-10	8-10	8-10	0.09 (0.03-0.28)	0.01 (0.00-0.09)	0.00 (0.00-0.01)	5 (3-6)

Blank in median survival = not yet achieved

Ethics Approval

MEMORANDUM

To: Dr. E. Chow
Radiation Oncology
TSRCC

From: Philip Hébert MD

Date: December 20, 2000

Subject: A Predictive Model for Survival in Metastatic Cancer Patients Attending an Out Patient Palliative Radiotherapy Clinic

Research Ethics Board
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Project Identification Number: 418-2000
Approval Date: December 20, 2000

The Research Ethics Board of Sunnybrook & Women's College Health Sciences Centre has conducted a review of the research protocol referenced above on the above captioned date and approved the involvement of human subjects as specified in the protocol.

The quorum for approval did not involve any member associated with this project.

The Research Ethics Board has procedures and responsibilities that are in accordance with the ICH Guidelines for Good Clinical Practice.

Should your study continue for more than one year you must request a renewal on or before one year from the approval date. Please advise the Board of the progress of your research annually and/or any adverse reactions or deviations which may occur in the future.

The above project identification number has been assigned to your study. Please refer to this number on all future correspondence.

Philip Hébert, MD., PhD., CCFP (C)
Chair, Research Ethics Board

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