

Supplemental Online Content

Wu SY, Yee E, Vasudevan HN, et al. Risk stratification for imminent risk of death at the time of palliative radiotherapy consultation. *JAMA Netw Open*. 2021;4(7):e2115641. doi:10.1001/jamanetworkopen.2021.15641

eTable. Patient Characteristics

eAppendix. Source Code

This supplemental material has been provided by the authors to give readers additional information about their work.

eTable. Patient characteristics

Variable	Median (IQR) or % (n, of 518)
Age at diagnosis	60 (50-68)
Age at palliative radiotherapy (RT)	63 (54-71)
Gender	
Female	46% (238)
Male	54% (280)
Race	
White	66% (340)
East Asian	14% (74)
African American	8.7% (45)
South Asian	7.3% (38)
Other (includes American Indian, Pacific Islander)	4.1% (21)
Percent Hispanic	9.1% (47)
Primary diagnosis	
Lung	26% (137)
Breast	19% (97)
Prostate	9.7% (50)
Renal cell	5.8% (30)
Colorectal	5.8% (30)
Hepatocellular	3.8% (20)
Head and Neck	3.5% (18)
Skin	3.3% (17)
Other*	23% (119)
Metastatic at diagnosis	49% (254)
Site of metastases	
Brain	47% (244)
Lung	55% (284)
Liver	40% (208)
Bone only	17% (90)
Body mass index last course	24 (21-27)
KPS last consult	60 (50-80)
KPS >70	45% (231/511)
Hospitalization within 3 months of RT consult	58% (289/500)
Survival time since diagnosis (months)	28 (11-53)
Survival time following RT (months)	2.2 (0.9-5.5)

TEACHH score ²	% (N*)	Median survival in our cohort, (95% CI)	Published median survival, (95% CI, if available)
0-1 (Group A)	6.2% (32/450)	6.0 mo (3.2-8.2)	20 mo (14-31)
2-4 (Group B)	68% (352/450)	2.0 mo (1.7-2.3)	5.0 mo (4.3-5.6)
5-6 (Group C)	13% (66/450)	1.3 mo (0.7-1.7)	1.7 mo (1.2-2.1)
Chow group³			
I	18% (92/510)	4.7 wks (2-11)	60 wks (37-70)†
II	44% (227/510)	2.5 wks (1.0-5.6)	26 wks (20-31)†
III	37% (191/510)	1.6 wks (0.7-2.7)	9.0 wks (6-11) †
NEAT group (score)⁴			
Very low risk (0-1)	19% (57/297)	5.4 mo	25 mo
Low risk (2)	29% (85/297)	3.3 mo	15 mo
Intermediate risk (2.5-3.5)	38% (114/297)	2.0 mo	4.0 mo
High risk (4-5)	14% (41/297)	1.4 mo	1.2mo

Abbreviations: RT: radiotherapy; KPS: Karnofsky performance status

*Denominator reflects limited data, scores only calculated if all variables available

†Training set, with similar numbers for the temporal and external validation sets

eAppendix. Source Code

```
#univariate models for survival  
require(survival)
```

```
agecox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ AgeTx, data =  
Data10092019)  
summary(agecox)  
cox.zph(agecox)#test proportional hazards assumption
```

```
agedxcox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ AgeDx, data =  
Data10092019)  
summary(agedxcox)  
cox.zph(agedxcox)#test proportional hazards assumption
```

```
racecox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ RaceCod, data =  
Data10092019)  
summary(racecox)  
cox.zph(racecox)#test proportional hazards assumption
```

```
txsitecox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ TxSiteGen, data =  
Data10092019)  
summary(txsitecox)  
cox.zph(txsitecox)#test proportional hazards assumption
```

```
codedsitecox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ CodedBreastProstate,  
data = Data10092019)  
summary(codedsitecox)  
cox.zph(codedsitecox)#test proportional hazards assumption
```

```
numpallchemocox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~  
NumberPalliativeChemo, data = Data10092019)  
summary(numpallchemocox)  
cox.zph(numpallchemocox)#test proportional hazards assumption
```

```
bmicox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ BMI, data = Data10092019)  
summary(bmicox)  
cox.zph(bmicox)#test proportional hazards assumption
```

```
hosp3cox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ Hosp3moconsult, data =  
Data10092019)  
summary(hosp3cox)  
cox.zph(hosp3cox)#test proportional hazards assumption
```

```
hepcocx <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ HepaticMet, data =  
Data10092019)  
summary(hepcocx)  
cox.zph(hepcocx)#test proportional hazards assumption
```

```
ecogcox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ ECOGscore, data =  
Data10092019)  
summary(ecogcox)  
cox.zph(ecogcox)#test proportional hazards assumption
```

```
metdxcox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ MetDx, data =  
Data10092019)  
summary(metdxcox)  
cox.zph(metdxcox)#test proportional hazards assumption
```

```
braincox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ BrainMet, data =  
Data10092019)  
summary(braincox)  
cox.zph(braincox)#test proportional hazards assumption
```

```
lungcox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ LungMet, data =  
Data10092019)  
summary(lungcox)  
cox.zph(lungcox)#test proportional hazards assumption
```

```
numbmetcox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ NumMets, data =  
Data10092019)  
summary(numbmetcox)  
cox.zph(numbmetcox)#test proportional hazards assumption
```

```
albcox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ Albuming, data =  
Data10092019)  
summary(albcox)  
cox.zph(albcox)#test proportional hazards assumption
```

```
#multivariate model based on univariate and clinical judgment
```

```
mvcox <- coxph(Surv(StartToDeath, rep(1, nrow(Data10092019)))~ Albuming + NumMets +  
LungMet +  
BrainMet + ECOGscore + HepaticMet + Hosp3moconsult + BMI + NumberPalliativeChemo  
+  
CodedBreastProstate + AgeTx, data = Data10092019)
```

```
summary(mvcox)
```

```

RPA for death
#RPA.r
#imports Data10092019met database and reformats variables appropriately
#computes RPA and prints out outcomes data

#appropriately format variables
Data10092019$SexCod <- as.factor(Data10092019$SexCod)
Data10092019$RaceCod <- as.factor(Data10092019$RaceCod)
Data10092019$TxSiteGen <- as.factor(Data10092019$TxSiteGen)
Data10092019$TxSiteSpec <- as.factor(Data10092019$TxSiteSpec)
Data10092019$CodedBreastProstate <- as.factor(Data10092019$CodedBreastProstate)
Data10092019$Hosp3moconsult <- as.factor(Data10092019$Hosp3moconsult)
Data10092019$HepaticMet <- as.factor(Data10092019$HepaticMet)
#Data10092019$ECOGscore <- as.numeric(Data10092019$ECOGscore)
Data10092019$OtherMets <- as.factor(Data10092019$OtherMets)
Data10092019$MetDx <- as.factor(Data10092019$MetDx)
Data10092019$BrainMet <- as.factor(Data10092019$BrainMet)
Data10092019$LungMet <- as.factor(Data10092019$LungMet)
Data10092019$InpatientCoded <- as.factor(Data10092019$InpatientCoded)
Data10092019$NumMets <- as.factor(Data10092019$NumMets)
Data10092019$PtBase <- as.factor(Data10092019$PtBase)
Data10092019$CodIncompleeFx <- as.factor(Data10092019$CodIncompleeFx)

#RPA w StartToDeath
library(rpart)
library(survival)
set.seed(220)
#include all variables to start
osrpa <- rpart(Surv(StartToDeath, rep(1, nrow(Data10092019))) ~ SexCod + RaceCod +
TxSiteGen +
          CodedBreastProstate + Hosp3moconsult + HepaticMet + ECOGscore + OtherMets +
          MetDx + BrainMet + LungMet + InpatientCoded + NumMets + PtBase + AgeTx +
NumberPalliativeChemo + BMI,
          data = Data10092019)
library(rpart.plot)
prp(osrpa) #print pre-parsed

#check to prune the tree
plotcp(osrpa) #print out plot to determine the appropriate complexity parameter
prunedos <- prune(osrpa, 0.014)
prp(prunedos)

```