Using the HELP Survival Model of Teno et al for Predicting the Survival of Older Hospitalized Patients

Overview: An older patient who has been admitted to the hospital may experience decreased survival after discharge depending on the severity of his or her underlying conditions. The HELP survival model can be used to estimate the patient's survival and can help identify patients who are at greatest risk. The authors are from 9 institutions in the USA with the lead author from Brown University.

Patients: 80 years of age or older

Parameters:

(1) disease class

(2) age

(3) Glasgow coma score

(4) acute physiologic score (APS) from APACHE III determined on day 3

(5) activities of daily living (ADL) using a modified Katz scale with: eating continence toileting transferring bathing dressing and walking

(6) unintended weight loss

Parameter	Finding	Points
disease class	acute renal failure coma or multiorgan system failure	49
	CHF	35
	cancer	47
	orthopedic disorder	0
	all others	25
age of the patient	<=85	0
	86 - 100	(-0.049 * ((age)^2)) + (11.067 * (age)) - 586.39
	> 100	30.6
Glasgow coma score	15	0
	14	6.9
	13	20
	12	28
	11	31.25

	8 - 10	33.75
	7	42
	6	46.75
	5	68
	4	71.9
	3	76.25
APS	0	0
	0 - 70	(1.4315 * (APS)) - 0.327
	70+	100
ADL	none dependent	0
	1 dependent	17.5
	2 dependent	26.25
	3 dependent	30.3
	4 dependent	34
	5 dependent	37.5
	6 dependent	41
	7 dependent	44.38
unintended weight loss	none	0
	present	15

from Figure 5 page S23

total points = SUM(points for all 6 parameters)

Interpretation:

• minimum total points: 0

• maximum total points: 350+

• The higher the score the worse the survival.

Using JMP to analyze the survival data in Figure 5 the following relations can be derived:

X for 1 year survival = (-0.03493 * (total points)) + 4.3593

probability of 1 year survival = 1 / (1 + EXP((-1) * (X)))

Y for 2 year survival = (-0.03415 * (total points)) + 3.609

probability of 2 year survival = 1 / (1 + EXP((-1) * (Y)))

Total Points	Median Survival in Months
< 72	84
72 - 250	(-0.03821 * LN(points)) + 7.18329
>= 250	0.1

NOTE: The equation for predicting the median survival gives values that deviate from that given in the nomogram but they look close enough.

References:

Teno JM Harrell FE Jr et al. Prediction of survival for older hospitalized patients: The HELP survival model. J Am Geriatric Soc. 2000; 48: S16 - S24.