Lifetable

The lifetable was constructed using standard life table methodology. (Preston SH et al., 2001) Table 1 represents the lifetable with the time break of 100 days stratified by sex.The full table was in supplementary material. Based on the lifetable, the 50% survival time of male is between 285 to 286 days versus 433-434 for female. Male has lower survival time than female based on lifetable. The hypothesis need future testify in the following modeling fitting.

	tstart	tstop	nsubs	nlost	nrisk	nevent	surv	pdf	hazard	se.surv	se.pdf	se.hazard
0-100	0	100	103	0	103.0	17	1.00000000	0.0016504854	0.001798942	0.00000000	0.0003657782	0.0004345389
100-200	100	200	86	5	83.5	19	0.83495146	0.0018998895	0.002567568	0.03657782	0.0003920163	0.0005841662
200-300	200	300	62	7	58.5	18	0.64496250	0.0019845000	0.003636364	0.04760067	0.0004158393	0.0008428131
300-400	300	400	37	3	35.5	9	0.44651250	0.0011320035	0.002903226	0.05099700	0.0003507137	0.0009574916
400-500	400	500	25	3	23.5	6	0.33331215	0.0008510097	0.002926829	0.05012019	0.0003259763	0.0011820092
500-600	500	600	16	0	16.0	6	0.24821117	0.0009307919	0.004615385	0.04787378	0.0003499672	0.0018333649
600-700	600	700	10	0	10.0	4	0.15513198	0.0006205279	0.005000000	0.04239983	0.0002941465	0.0024206146
700-800	700	800	6	0	6.0	2	0.09307919	0.0003102640	0.004000000	0.03499672	0.0002137673	0.0027712813
800-900	800	900	4	2	3.0	1	0.06205279	0.0002068426	0.004000000	0.02941465	0.0001952848	0.0039191836
900-1000	900	1000	1	0	1.0	0	0.04136853	0.0000000000	0.000000000	0.02587989	NaN	NaN
1000-1100	1000	1100	1	1	0.5	0	0.04136853	0.0000000000	0.000000000	0.02587989	NaN	NaN
1100-1200	1100	1200	0	0	0.0	0	0.04136853	NaN	NaN	0.02587989	NaN	NaN
1200-Inf	1200	Inf	0	0	0.0	0	NaN	NA	NA	NaN	NA	NA

Table 1-1 Lifetable(male)

	tstart	tstop	nsubs	nlost	nrisk	nevent	surv	pdf	hazard	se.surv	se.pdf	se.hazard
0-100	0	100	64	0	64.0	7	1.0000000	0.0010937500	0.0011570248	0.00000000	0.0003901364	0.0004365819
100-200	100	200	57	3	55.5	5	0.8906250	0.0008023649	0.0009433962	0.03901364	0.0003440834	0.0004214300
200-300	200	300	49	12	43.0	7	0.8103885	0.0013192371	0.0017721519	0.04931280	0.0004632460	0.0006671758
300-400	300	400	30	4	28.0	7	0.6784648	0.0016961620	0.0028571429	0.06153038	0.0005761152	0.0010688223
400-500	400	500	19	0	19.0	5	0.5088486	0.0013390753	0.0030303030	0.07219475	0.0005480368	0.0013395469
500-600	500	600	14	4	12.0	2	0.3749411	0.0006249018	0.0018181818	0.07397516	0.0004217940	0.0012803251
600-700	600	700	8	0	8.0	2	0.3124509	0.0007811272	0.0028571429	0.07367033	0.0005125726	0.0019995835
700-800	700	800	6	1	5.5	3	0.2343382	0.0012782082	0.0075000000	0.07308191	0.0006375364	0.0040141352
800-900	800	900	2	1	1.5	0	0.1065174	0.0000000000	0.0000000000	0.05982461	NaN	NaN
900-1000	900	1000	1	1	0.5	0	0.1065174	0.0000000000	0.0000000000	0.05982461	NaN	NaN
1000-1100	1000	1100	0	0	0.0	0	0.1065174	NaN	NaN	0.05982461	NaN	NaN
1100-1200	1100	1200	0	0	0.0	0	NaN	NaN	NaN	NaN	NaN	NaN
1200-Inf	1200	Inf	0	0	0.0	0	NaN	NA	NA	NaN	NA	NA

Table 1-2 Lifetable(female)

Kaplan-Meier and Fleming-Harrington model

For nonparametric estimator, Kaplan-Meier(KM) model and Fleming-Harrington(FH) model were used to measure the fraction of subjects living for a certain amount of time after treatment with the stratify of sex.(Manish et al., 2010)

The Kaplan-Meier estimator

$$\hat{S}_K(t) = \begin{cases} 1 & \text{if } t < t_1 \\ \prod_{t_i \le t}[1 - \frac{d_i}{n_i}] & \text{if } t \ge t_1 \end{cases}$$

note: $d_i = \#\ of\ failure\ at\ time\ t_i$, $n_i = \#\ at\ risk\ at\ t_i^-$, $c_i = \#\ censored\ during\ the\ interval\ [t_i, t_{i+1}]$

The Fleming-Harrington estimator

$$\hat{S}_F(t) = \begin{cases} 1 & \text{if } t < t_1 \\ \prod_{t_i \le t} exp[-\frac{d_i}{n_i}] & \text{if } t \ge t_1 \end{cases}$$

Both the KM estimator and the FH estimator have P-values that are lower than 0.05. We have 95% confidence that there are differences between the survival curves over the male and female. According to the following graph(Figure 1), male have a lesser chance of living through the 3 years than female. The difference between sex is more significant in the early time point than the later time point.

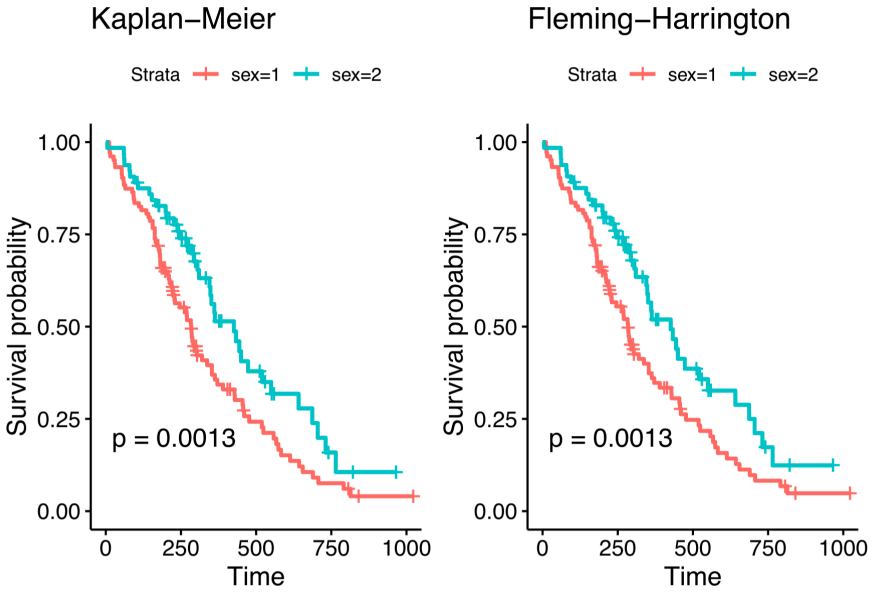

Figure 1: Kaplan-Meier model and Fleming -Harrington model (sex=1(male), sex=2(female))

The KM and FH model have similar trend with no significant difference. FH has slight higher estimator in the late time point than KM estimator. (Figure 2)

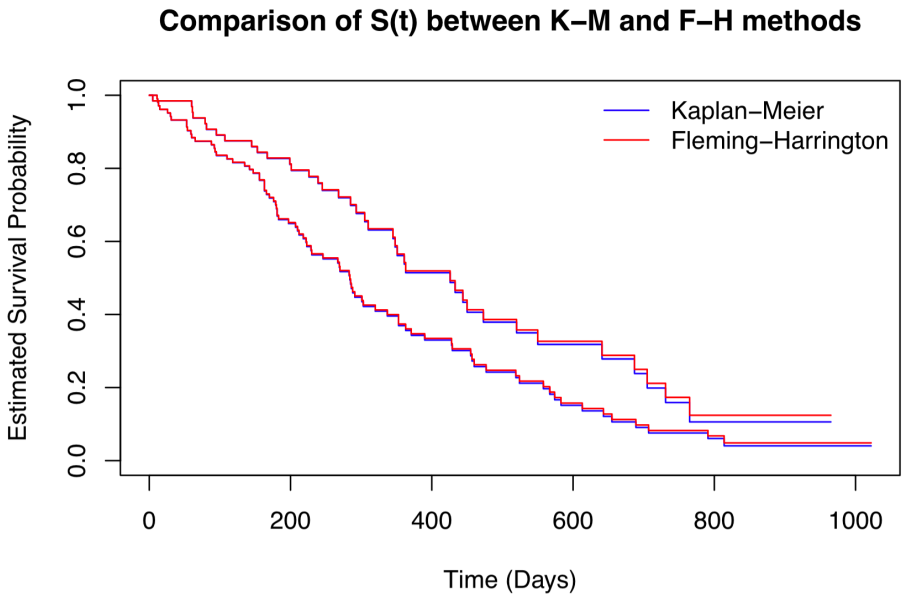

Figure 2: Kaplan-Meier model vs Fleming -Harrington model (sex=1(male), sex=2(female))

References

Preston SH, Heuveline P, Guillot M. Demography: measuring and modeling population processes. Blackwell Publishers, 2001.

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