mid-term

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1:

a.

Thus, our main result, the survival probabilities among patients with , low-, and high-level AML:

All Survival probability: 0.5392365

Survival probability low-risk AML: 0.7545357

Survival probability high-risk AML: 0.3793269

The relative risk of relapse for patients with and without each type of GVHD. is 0.4538

b.

the point estimates and 95% CIs for the relative risk of relapse in each of the GVHD groups, as compared to the group with no GVHD

only chronic GVHD: $(0.3349, 0.9291)$

We are 95% confident that being only chronic GVHD decreases the hazard by a factor of between 0.3349 and 0.9291.

only acute GVHD: $(1.3103, 5.3248)$

We are 95% confident that being only acute GVHD increases the hazard by a factor of between 1.3103 and $ 5.3248$.

both GVHD: $(0.2038, 1.1295)$

We are 95% confident that having both chornic acute GVHD decreases the hazard by a factor of between 0.1153 and 1.2607.

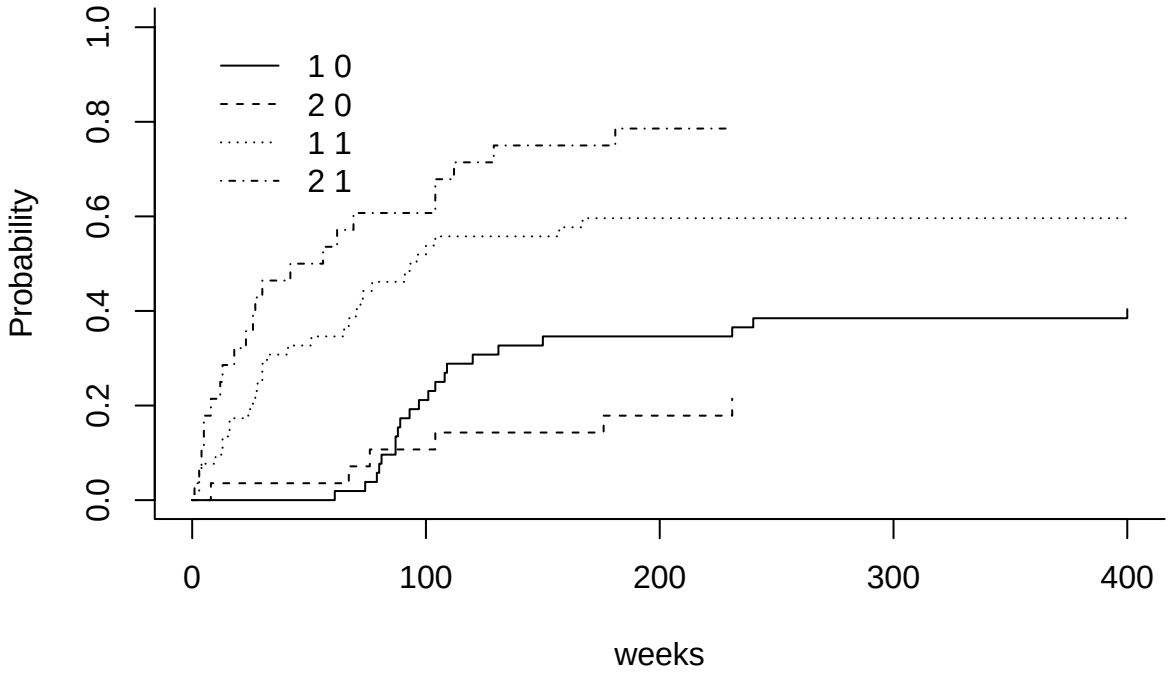
c.

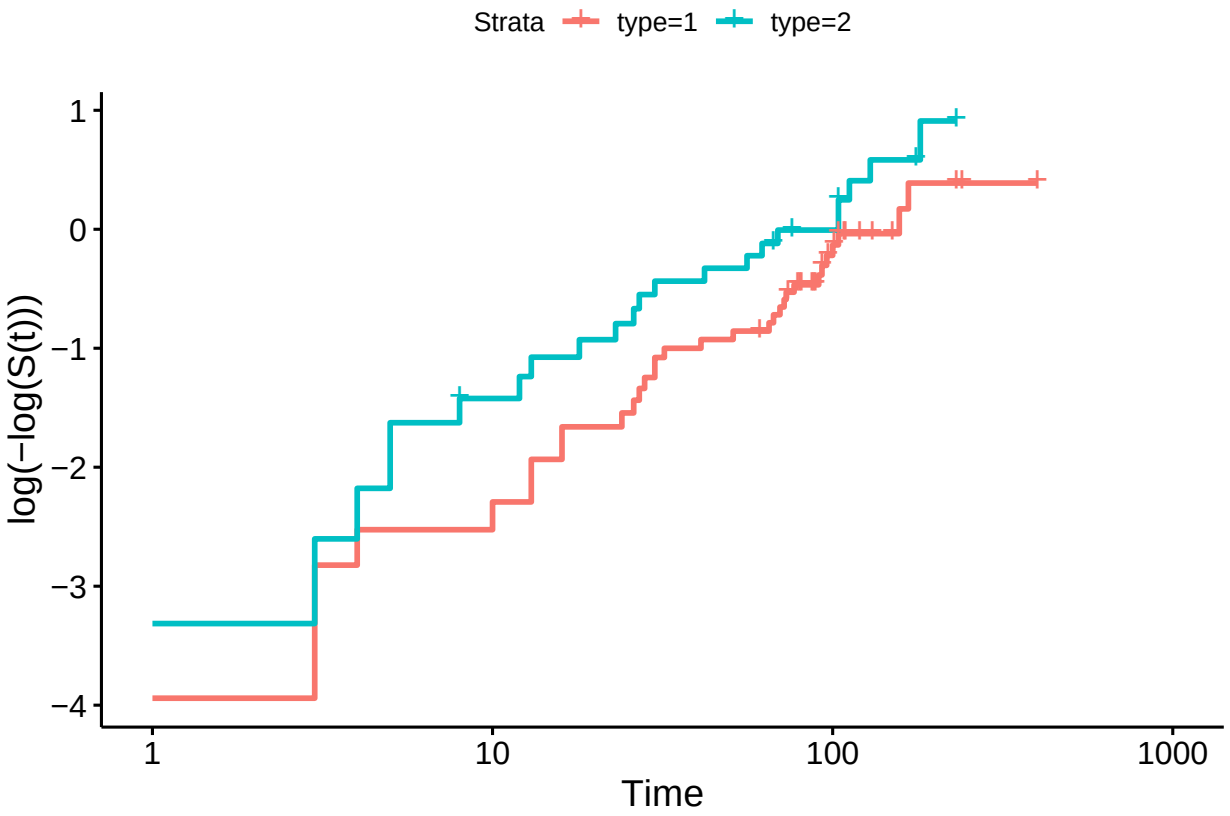
We can see that having only acute GVHD increases the risk of death over time compared to not having GVHD at all. It makes sense that having chronic GVHD implies that you have not died and reduces risk. You can't develop chronic GVHD, if you've died. It seems that it would be more appropriate to have censored on time to Chronic Graft-Versus-Host Disease instead of death.

2:

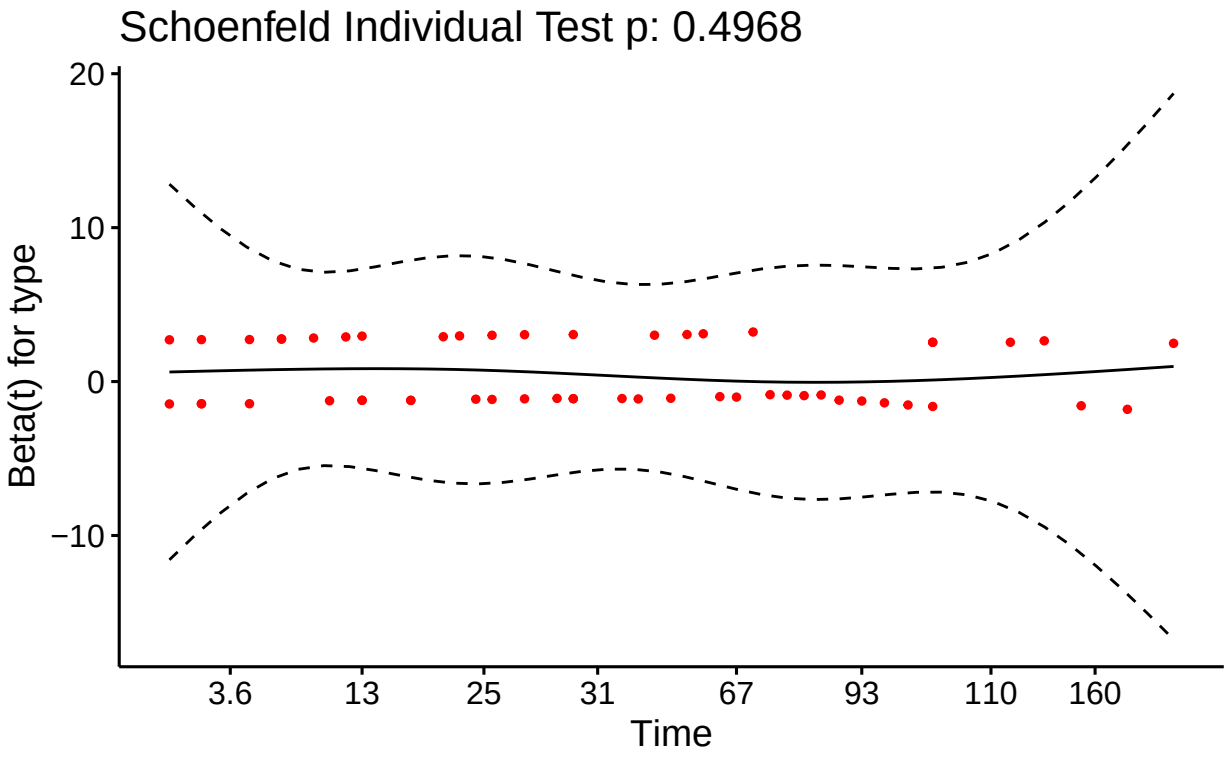
```
ci <-
  cuminc(
    ftime = tongue$time,
```

```
    fstatus = tongue$delta,
    group = tongue$type,
    cencode = 2
    )
plot(ci,xlab="weeks")
s<-survfit(surv2~type,data = tongue)
ggsurvplot(s, fun = "cloglog")
```



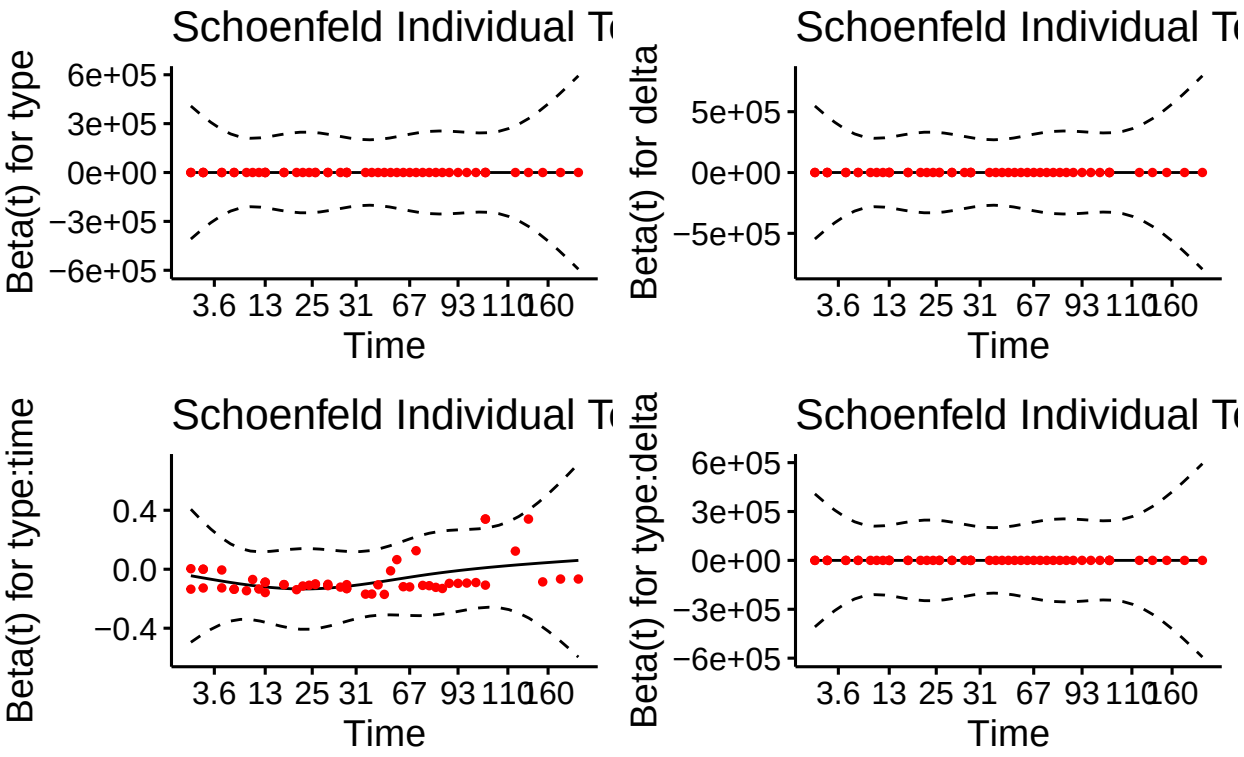


First, after making a plot to examine the validity of the proportional hazards assumption, We can conclude that the proportional hazards assumption is met.



We fail to reject the null hypothesis, so we can conclude that the proportional hazards assumption is met for both types.

```
##                chisq df       p
## type        8.89e+01  1 < 2e-16
## delta       3.98e-07  1       1
## type:time   5.58e+01  1 8.1e-14
## type:delta 8.89e+01  1 < 2e-16
## GLOBAL      1.02e+02  4 < 2e-16
```

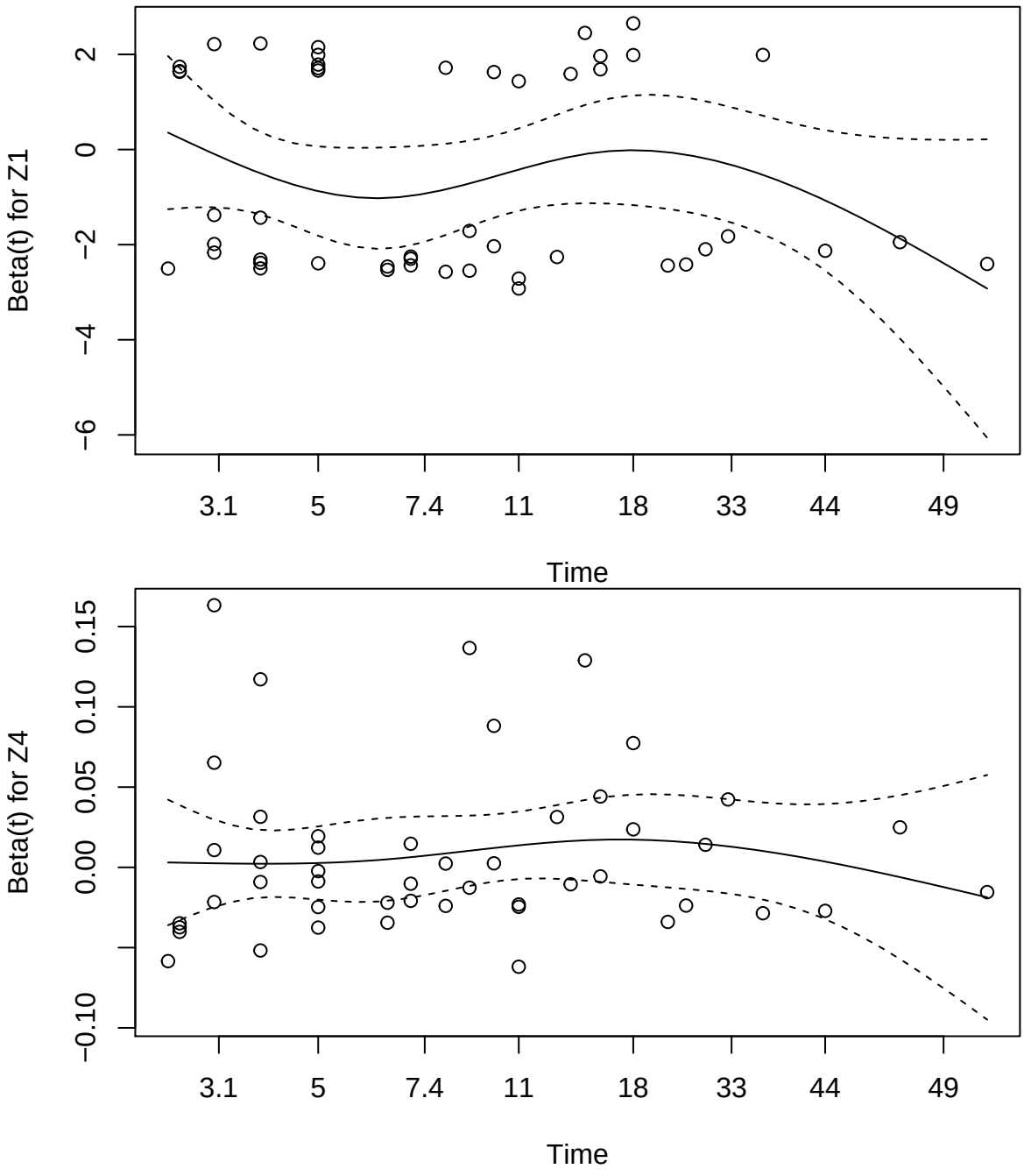


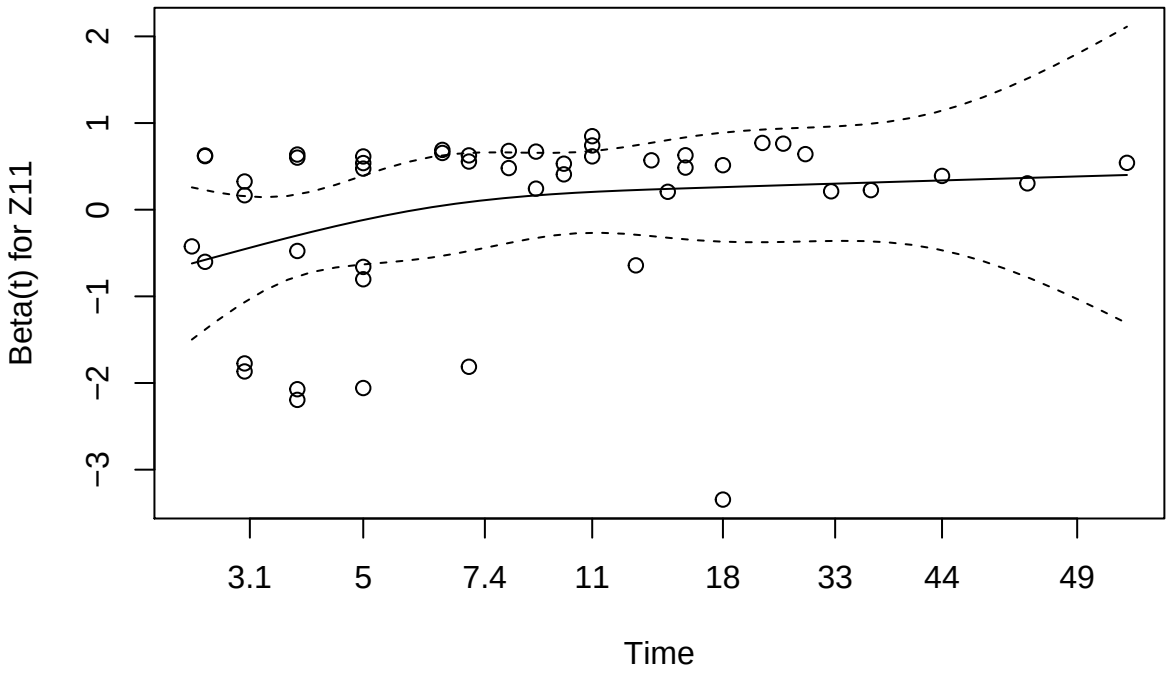
After using an appropriate time-dependent covariate using the interaction (time:type), we can conclude that the proportional hazards assumption is not met.

3:

a.

The Residual plots suggest that the total surface area burned should be entered linearly into the proportional hazards model.


Beta(t) for Z1
2
0
−2
−4
−6
3.1
5
7.4
11
18
33
44
49
Time
Beta(t) for Z4
0.15
0.10
0.05
0.00
−0.10
3.1
5
7.4
11
18
33
44
49
Time



the point estimates and 95% CIs for the relative risk of Time to infection, as compared to the group with routine bathing

body cleansing : $(0.3310, 1.058)$

We are 95% confident that body cleansing increases the hazard by a factor of between $ 0.3310$ and 1.058

b.

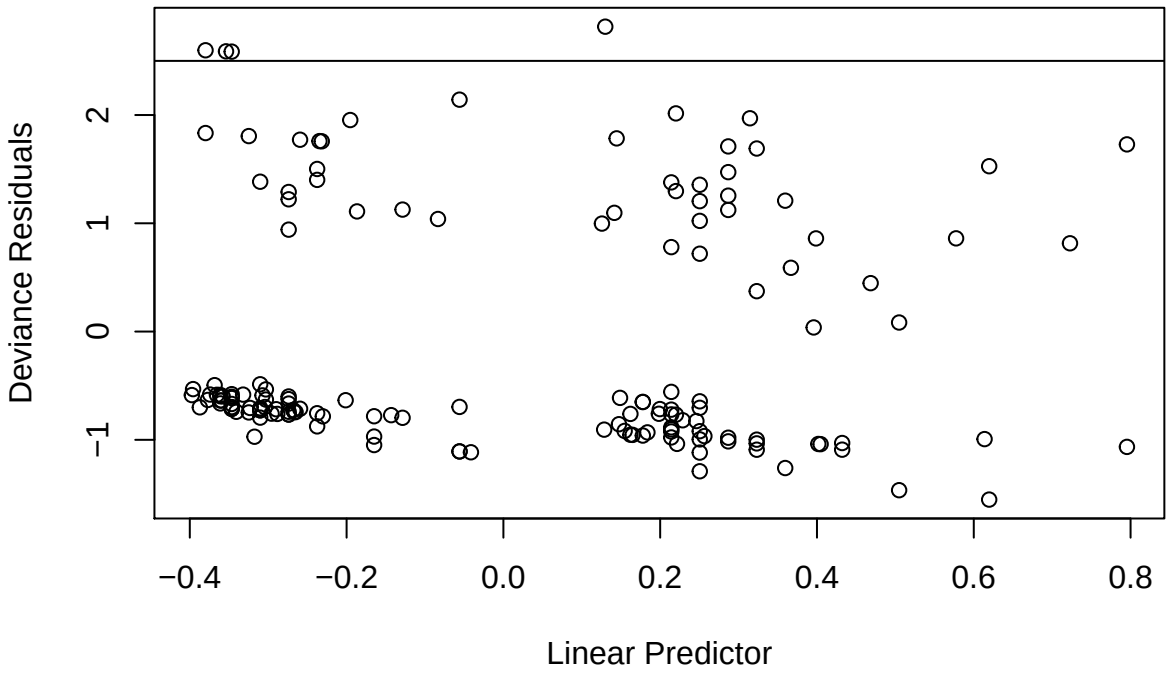
cutpoint = 32

For the routine of bathing care the cut point is 32% of the total surface area burned.

When accounting for type of burn and total surface area burned the relative risk of the traphylocous aureaus infection for Body cleansing compared to routine bathing decreases.

c.

The deviance residual plot suggest that there are a number of data points which don't fit the model well. These are points with deviance greater than 2.5, observations 58,75,79 and 153. These points are outliers.



d.

I don't think that they will influence the results of the analysis in regard to the effect of bathing solution because the effects seem to cancel out.

e.

Once adjusted for type of burn and total surface area,bathing solution (disinfectant protocol) does appear to have an effect on time to infection

4:

a.

The structure of the data allows us to use multilevel models. Multilevel models use covariates that are measured at any level of the hierarchy allowing to observe effects at each level (gender, treatment).

Multilevel models present an effective approach to data analysis that accounts for correlations induced by clustering.

b.

1.

see code file

2.

There is evidence that log CD4 is associated with age or gender. and the effect of age or gender changed over time and depended on the dual or triple therapy.

c.

We have enough evidence to conclude that receiving dual therapy patients would on average stay for at least 4 months.