

DTU



STATISTICAL MODELLING: Theory and practice

Project 2: Survival data

Introduction I: Survival data

AZT	AIDS_yes	AIDS_no
Yes	25	170
No	44	168

To start with the binary data, compute the probabilities with a **Frequentist approach** (probability is assimilated to a frequency), then it will be compared to the **Bayesian approach** (use of the likelihood).

Introduction II: Survival data

Compute: $AIDS_individuals/n$, data without grouping by AZT treatment with probability (p_0), then with AZT treatment (p_1) and finally without treatment (p_2):

$$p_0 = (25 + 44)/(170 + 168) = 0.204142 \quad (1)$$

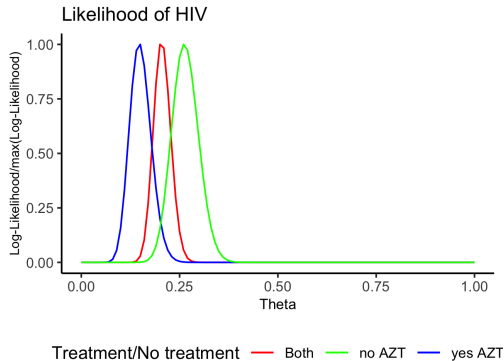
$$p_1 = 25/170 = 0.1470588 \quad (2)$$

$$p_2 = 44/170 = 0.2619048 \quad (3)$$

Further tests should be performed to test the confidence of our hypothesis.

Next step: estimate the probabilities using likelihood approaches with the same groupings as before.

Survival data: likelihood function



Likelihood function for binomial data:

$$L(\theta) = P_{\theta}(X = x)$$
$$= \binom{n}{x} \theta^x (1 - \theta)^{n-x}$$

Conclusions

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Assignment 2: Binary data

	tx	aids
1	1.00	1.00
2	1.00	1.00
...
26	1.00	0.00
27	1.00	0.00
...
171	0.00	1.00
172	0.00	1.00
...
337	0.00	0.00
338	0.00	0.00

Logistic regression model

Here put the formula of the model put the summary of both Model 1 and Model 0 -
Present the odds ratio

Hypothesis testing: Likelihood Ratio test

put formula + results

Hypothesis testing: Wald test

formula. + results

Hypothesis testing: Score test

formula + results

Assignment 2: Survival data

put table data

put counts that are asked in question

Assignment 2: Survival data

figure surv

figure cuminc

Assignment 2: Survival data

log rank test

Code of the project can be found at: https://github.com/laurasansc/statistical_modelling

- Pawitan Y. In All Likelihood: Statistical Modelling and Inference Using Likelihood. OUP Oxford; 2001. (Oxford science publications).