

## Exercise 1

**Table 17.21.** Logistic regression of graft failure after 6 months (Thomas *et al.* 1993)

Variable	Coef.	Std. Err.	$z = \text{coef}/\text{se}$	P	95% Conf. interval	
White cell count	1.238	0.273	4.539	< 0.001	0.695	1.781
Graft type 1	0.175	0.876	0.200	0.842	-1.570	1.920
Graft type 2	0.973	1.030	0.944	0.348	-1.080	3.025
Graft type 3	0.038	1.518	0.025	0.980	-2.986	3.061
Female	-0.289	0.767	-0.377	0.708	-1.816	1.239
Age	0.022	0.035	0.633	0.528	-0.048	0.092
Smoker	0.998	0.754	1.323	0.190	-0.504	2.501
Diabetic	1.023	0.709	1.443	0.153	-0.389	2.435
Constant	-13.726	3.836	-3.578	0.001	-21.369	-6.083

Number of observations = 84, chi-squared = 38.05, d.f. = 8,  $P < 0.0001$ .

95. Table 17.21 shows the logistic regression of vein graft failure on some potential explanatory variables. From this analysis:

- patients with high white cell counts were more likely to have graft failure;
- the log odds of graft failure for a diabetic is between 0.389 less and 2.435 greater than that for a non-diabetic;
- grafts were more likely to fail in female subjects, though this is not significant;
- there were four types of graft;
- any relationship between white cell count and graft failure may be due to smokers having higher white cell counts.

## Exercise 2

Sønderstrøm and colleagues wanted to predict if patients entering the emergency room had a high blood concentration of alcohol. Therefore they collected a dataset that you can find on the homepage. They noted some obvious features of the patients and measured their alcohol concentration. The variable coding is shown in the table below.

- Build a logistic regression model to describe the possible predictive or explanatory value of the variables they observed (If you do not have a statistical program, find the regression result in the answers to continue).
- Which variables are significant?
- How good is the model
- What is the probability that a 27 year old Caucasian man who comes to the emergency department Saturday night after an accident has a blood alcohol concentration  $> 50\text{mg/dl}$ ?

	Value	Frequency
<b>Age</b>		
39 or younger	0	3514
40 or older	1	1534
<b>Time of Day</b>		
6 PM–6 AM	0	2601
6 AM–6 PM	1	2447
<b>Day of week</b>		
Monday–Thursday	0	2642
Friday–Sunday	1	2406
<b>Sex</b>		
Female	0	1457
Male	1	3591
<b>Race</b>		
Non-Caucasian	0	1758
Caucasian	1	3290
<b>Injury Type</b>		
Unintentional	0	3966
Intentional	1	1082
<b>Blood Alcohol Concentration</b>		
<50 mg/dL	0	4067
≥50 mg/dL	1	1465

<sup>a</sup>Not all totals are the same because of missing data on some variables.

Source: Data, used with permission, from Soderstrom CA, Kufera JA, Dischinger PC, Kerns TJ, Murphy JG, Lowenfels A: Predictive model to identify trauma patients with blood alcohol concentrations  $\geq 50$  mg/dL. *J Trauma* 1997;**42**:67–73.