Question 1

1. Binary logistic regression results for the model predicting 6-month mortality from comorbidities and center membership are presented in Figure 1.1. Notice that in order to conserve space only partial output is presented given the large number of comorbidity indicators included in the model which are not of a direct interest in this question. Also note that the binary logistic regression results are based only on the subset of patients who had lung cancer (LungCancer = 1) because we are interested in examining lung cancer mortality across centers. The seven medical centers were modeled using six dummy variables with Center7 being the reference category.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Center1(1)	-.008	.061	.019	1	.890	.992
	Center2(1)	-.032	.061	.270	1	.603	.969
	Center3(1)	.011	.058	.038	1	.845	1.011
	Center4(1)	.015	.053	.079	1	.778	1.015
	Center5(1)	-.045	.059	.578	1	.447	.956
	Center6(1)	.011	.061	.034	1	.853	1.011
	I4019(1)	-.056	.034	2.817	1	.093	.945
	I496(1)	.175	.033	27.678	1	.000	1.191
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	IE8490(1)	.216	.091	5.592	1	.018	1.241
	I07054(1)	-.075	.076	.979	1	.322	.928
	I30390(1)	-.141	.082	2.994	1	.084	.868
	I2875(1)	.260	.095	7.479	1	.006	1.297
	IV4582(1)	-.200	.086	5.362	1	.021	.819
	Constant	.598	.048	152.189	1	.000	1.818

Figure 1.1

The intercepts along with the two center-level predictors (Distance, Satisfaction) are presented in Figure 1.2.

Medical_Center	Intercept	Distance	Satisfaction
Center1	0.590	50	79
Center2	0.566	80	82
Center3	0.609	70	80
Center4	0.613	70	79
Center5	0.553	80	79
Center6	0.609	70	83
Center7	0.598	80	81

Figure 1.2

2. Regression results predicting *Intercept* from *Distance* and *Satisfaction* are presented in Figure 1.3.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.448[a]	.201	-.199	.02549

a. Predictors: (Constant), Satisfaction, Distance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	2	.000	.502	.639[b]
	Residual	.003	4	.001		
	Total	.003	6			

a. Dependent Variable: Intercept
b. Predictors: (Constant), Satisfaction, Distance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.339	.530		.639	.557
	Distance	-.001	.001	-.459	-.964	.390
	Satisfaction	.004	.007	.280	.588	.588

a. Dependent Variable: Intercept

Figure 1.3

3.   <u>Interpretation</u>: The logistic regression result predicting log odds of lung cancer mortality partialled out the effect of comorbidities and suggested that the difference in log odds of such mortality between the reference center (Center7) and each of the other six centers was not significant, $p > .05$.

The multiple regression results predicting center *Intercept* (log odds of lung cancer mortality) from *Distance* and *Satisfaction* suggest that after controlling for comorbidities, the log odds of lung cancer mortality (center intercept) are not significantly affected by either Distance, $p = .390$ or Satisfaction, $p = .588$. The multiple regression model as a whole was insignificant, $p = .639$.

Since many of the comorbidity indicators were significant in the logistic regression model, there seems to be support for the claim that risk of lung cancer mortality is a function of individual patient attributes such as comorbidities (Level-1 characteristics) rather than center attributes (Level-2 characteristics) such as distance and overall satisfaction rate.