Supplementary Material

1 Supplementary Data

1.1 Hypothesis tests results

Macro-regions

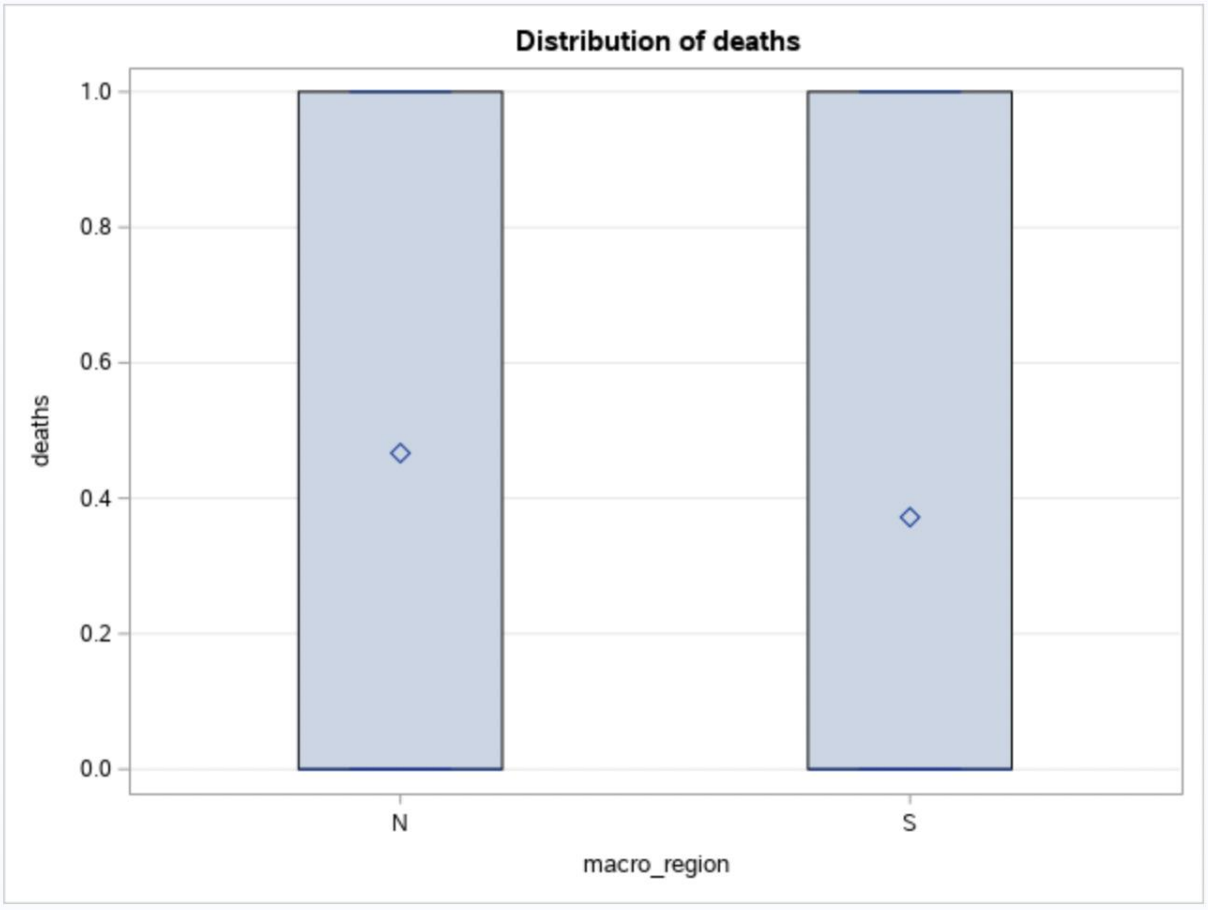
The test shows that there were more deaths in the Northern macro-region.
*Consider N for Northern and S for Central-South macro-region.

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1365.3510	1365.3510	5755.17	<.0001
Error	840199	199328.1249	0.2372		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	deaths Mean
0.006803	123.4747	0.487072	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
macro_region	1	1365.351033	1365.351033	5755.17	<.0001

The ANOVA Procedure



Supplementary Figure 1 Difference between Macro-regions Central-South and North

Ethnicity

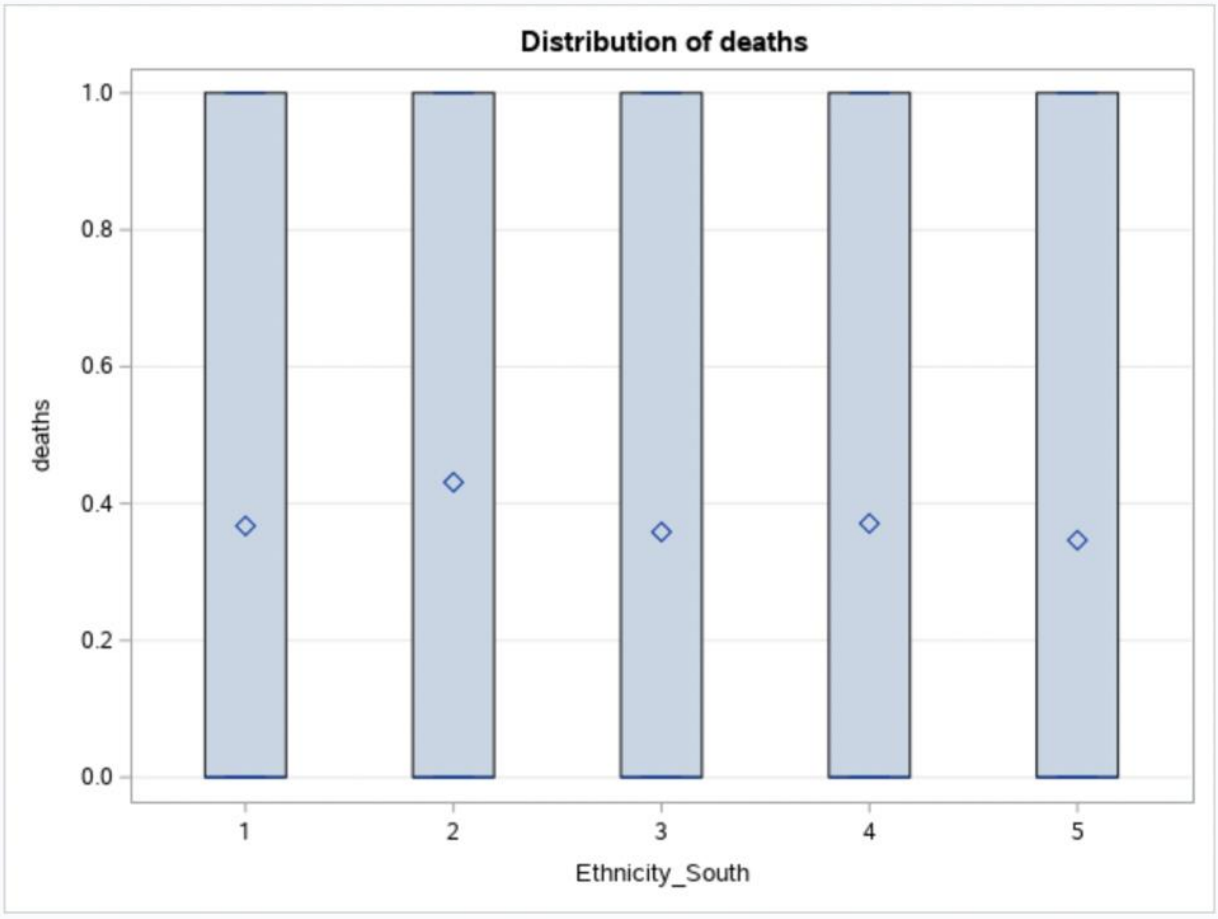
The test shows that were higher proportions of black ethnicities in deaths in the Central-South region.
*Consider the following values to each ethnicity:
1: White
2: Black
3: Asian
4: Mixed-race
5: Indigenous

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	142.8372	35.7093	153.00	<.0001
Error	640911	149584.1785	0.2334		
Corrected Total	640915	149727.0157			

R-Square	Coeff Var	Root MSE	deaths Mean
0.000954	129.8703	0.483108	0.371993

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Ethnicity_South	4	142.8372286	35.7093071	153.00	<.0001

The ANOVA Procedure



Supplementary Figure 2 Deaths by ethnicity

Tukey test results:

Comparisons significant at the 0.05 level are indicated by ***.				
Ethnicity_South Comparison	**Difference Between Means**	**Simultaneous 95% Confidence Limits**		
Black – Mixed-race	0.060059	0.052622	0.067495	***
Black – White	0.063802	0.056705	0.070899	***
Black – Asian	0.072630	0.056051	0.089209	***
Black – Indigenous	0.084632	0.043247	0.126017	***
Mixed-race – White	0.003743	0.000070	0.007416	***
Mixed-race – Asian	0.012571	-0.002855	0.027998	
Mixed-race – Indigenous	0.024573	-0.016364	0.065510	
White – Asian	0.008828	-0.006438	0.024094	
White – Indigenous	0.020830	-0.020047	0.061707	
Asian – Mixed-race	-0.012571	-0.027998	0.002855	
Asian – White	-0.008828	-0.024094	0.006438	
Asian – Indigenous	0.012002	-0.031535	0.055538	

Supplementary Table 1 Tukey test results

Age

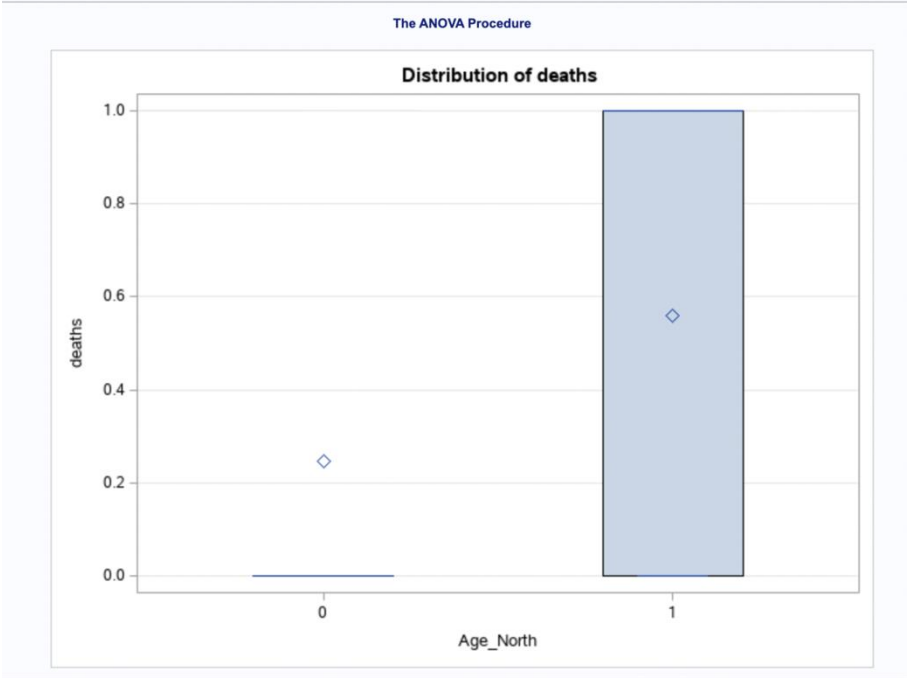
The test shows that the older patients had a greater mortality, especially in the North.

*Consider 0 representing patients under 51-year-old and 1 representing patients equal or over 51-year-old.

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	4001.79452	4001.79452	17489.1	<.0001
Error	199283	45599.31471	0.22882		
Corrected Total	199284	49601.10924			

R-Square	Coeff Var	Root MSE	deaths Mean
0.080680	102.4819	0.478348	0.466764

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Age_North	1	4001.794523	4001.794523	17489.1	<.0001



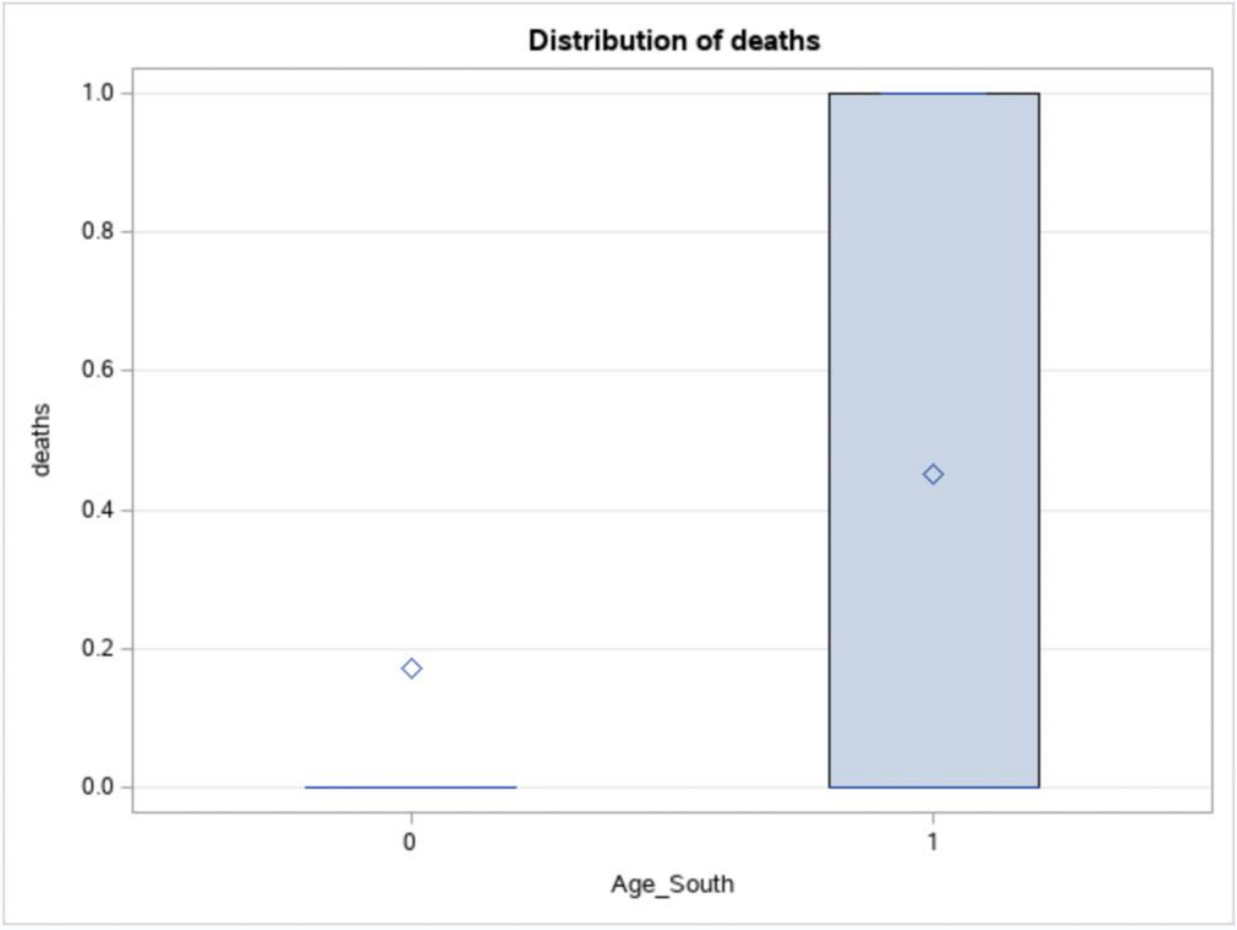
Supplementary Figure 3 Mortality in Northern macro-region by age

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	10442.3395	10442.3395	48050.1	<.0001
Error	640914	139284.6762	0.2173		
Corrected Total	640915	149727.0157			

R-Square	Coeff Var	Root MSE	deaths Mean
0.069743	125.3192	0.466178	0.371993

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Age_South	1	10442.33955	10442.33955	48050.1	<.0001

The ANOVA Procedure



Supplementary Figure 4 Mortality in Central-South macro-region by age

Comorbidities

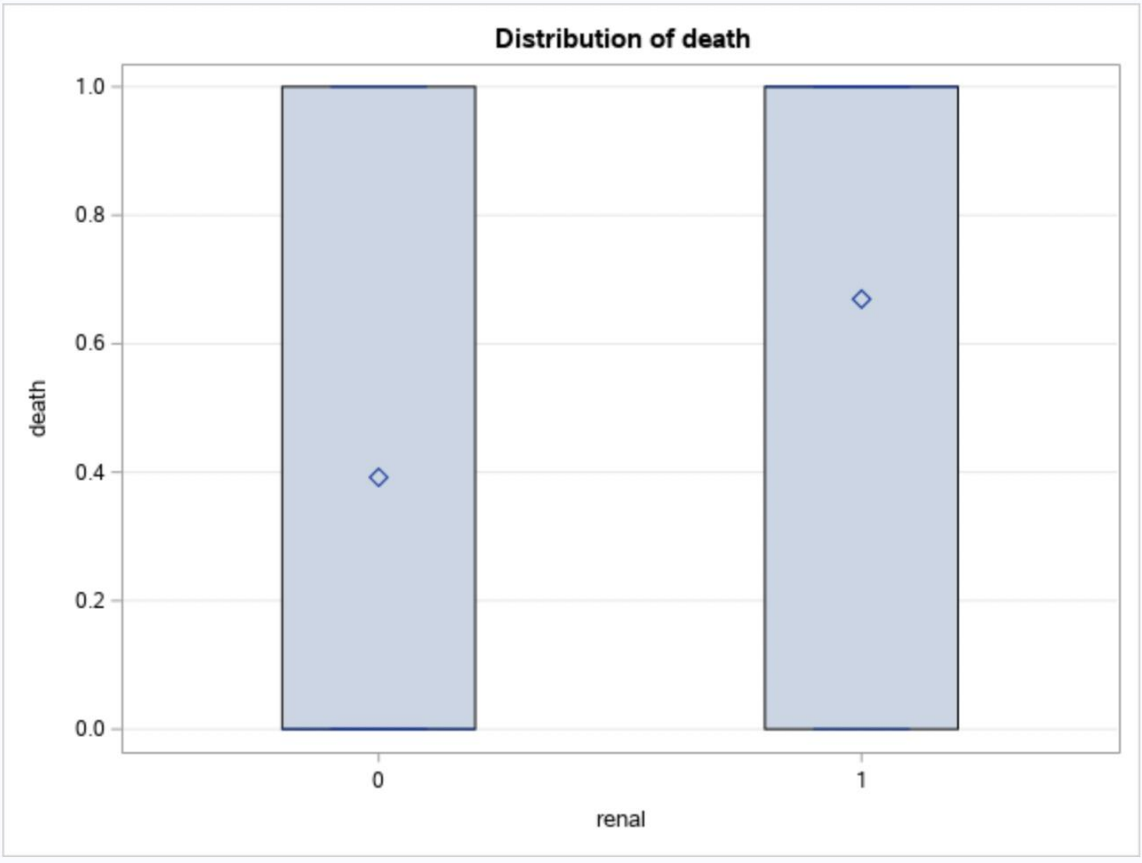
The test shows that there were more deaths in the North in all comorbidities.
*Consider 0 representing Central-South and 1 representing North macro-region.

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	555.0144	555.0144	2330.00	<.0001
Error	840199	200138.4615	0.2382		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.002765	123.7254	0.488061	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
renal	1	555.0144454	555.0144454	2330.00	<.0001

The ANOVA Procedure



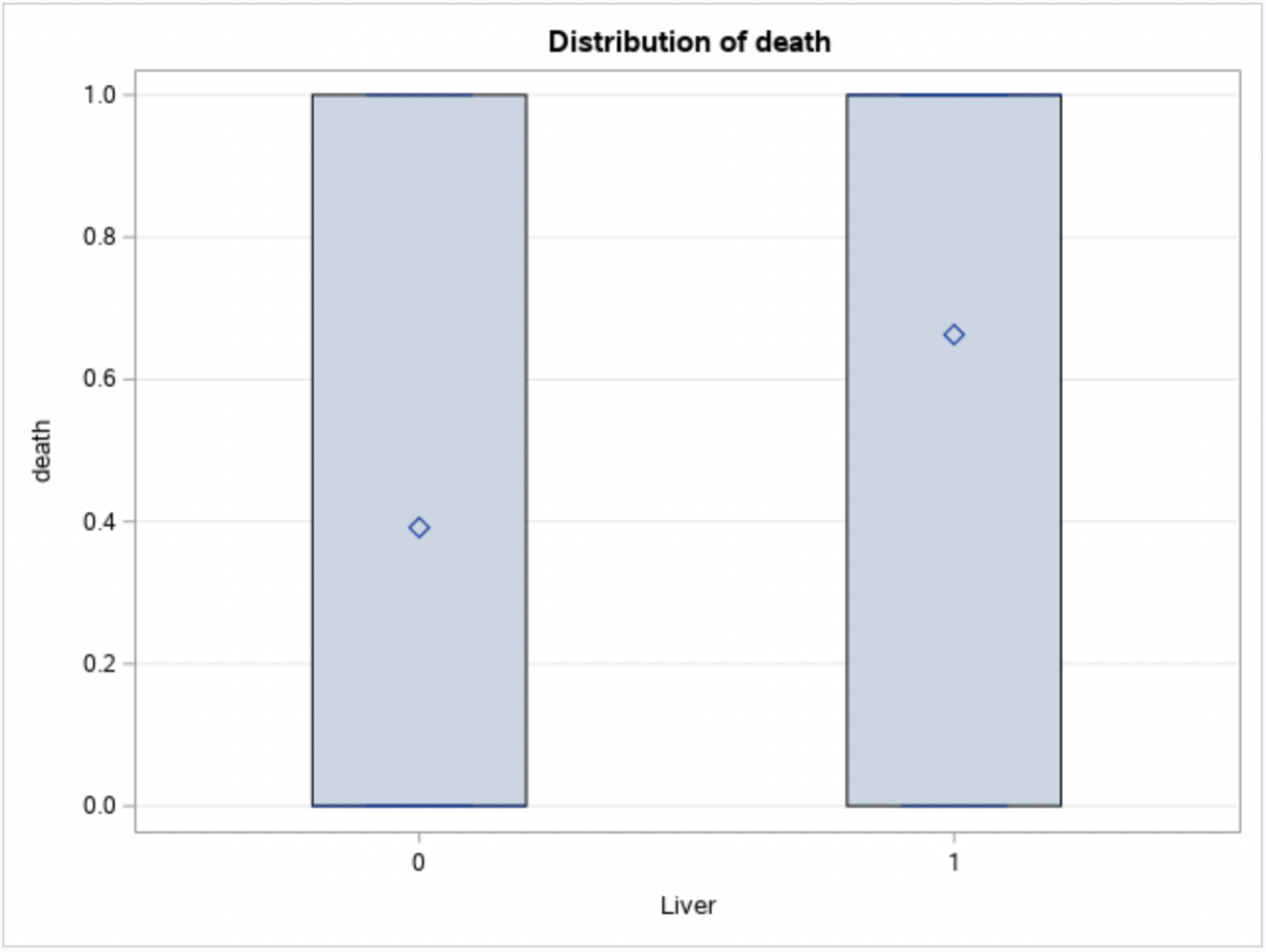
Supplementary Figure 5 Renal disease anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	631.5789	631.5789	2652.44	<.0001
Error	840199	200061.8971	0.2381		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.003147	123.7018	0.487968	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Liver	1	631.5788973	631.5788973	2652.44	<.0001

The ANOVA Procedure



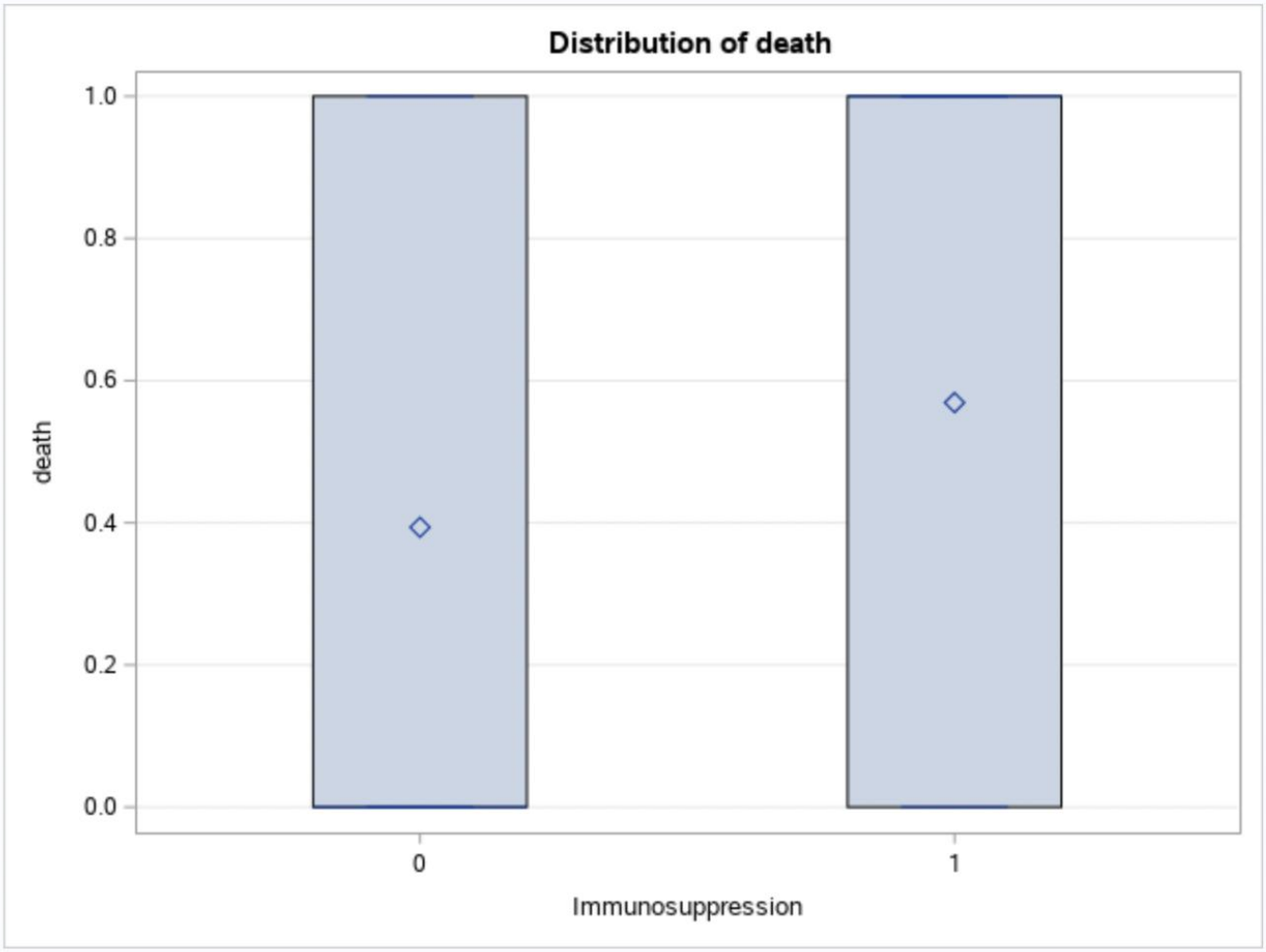
Supplementary Figure 6 Liver disease anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	129.5317	129.5317	542.63	<.0001
Error	840199	200563.9443	0.2387		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.000645	123.8569	0.488580	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Immunosuppression	1	129.5317117	129.5317117	542.63	<.0001

The ANOVA Procedure



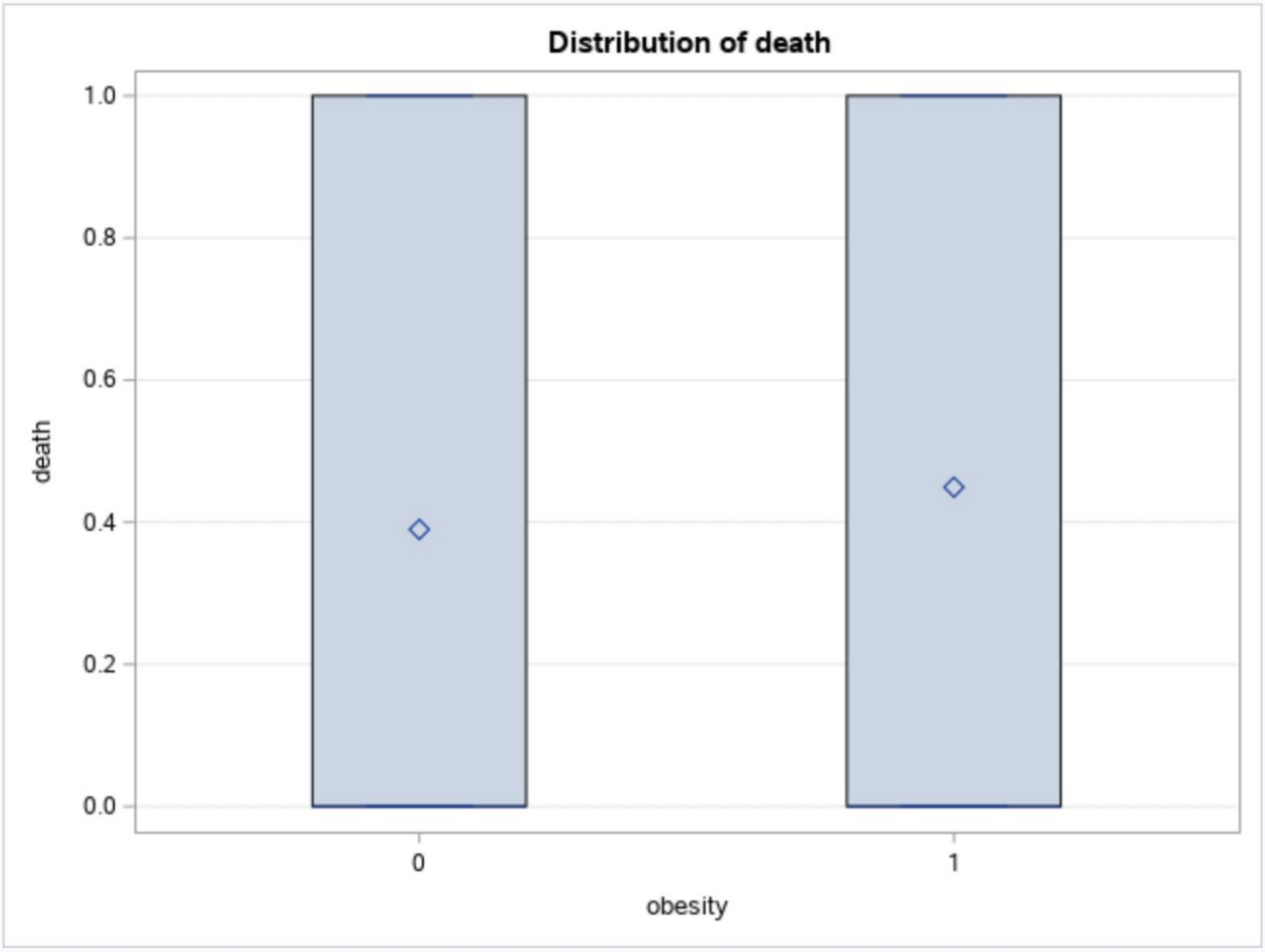
Supplementary Figure 7 Immunosuppression disease anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	210.0553	210.0553	880.31	<.0001
Error	840199	200483.4206	0.2386		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.001047	123.8320	0.488482	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
obesity	1	210.0553463	210.0553463	880.31	<.0001

The ANOVA Procedure



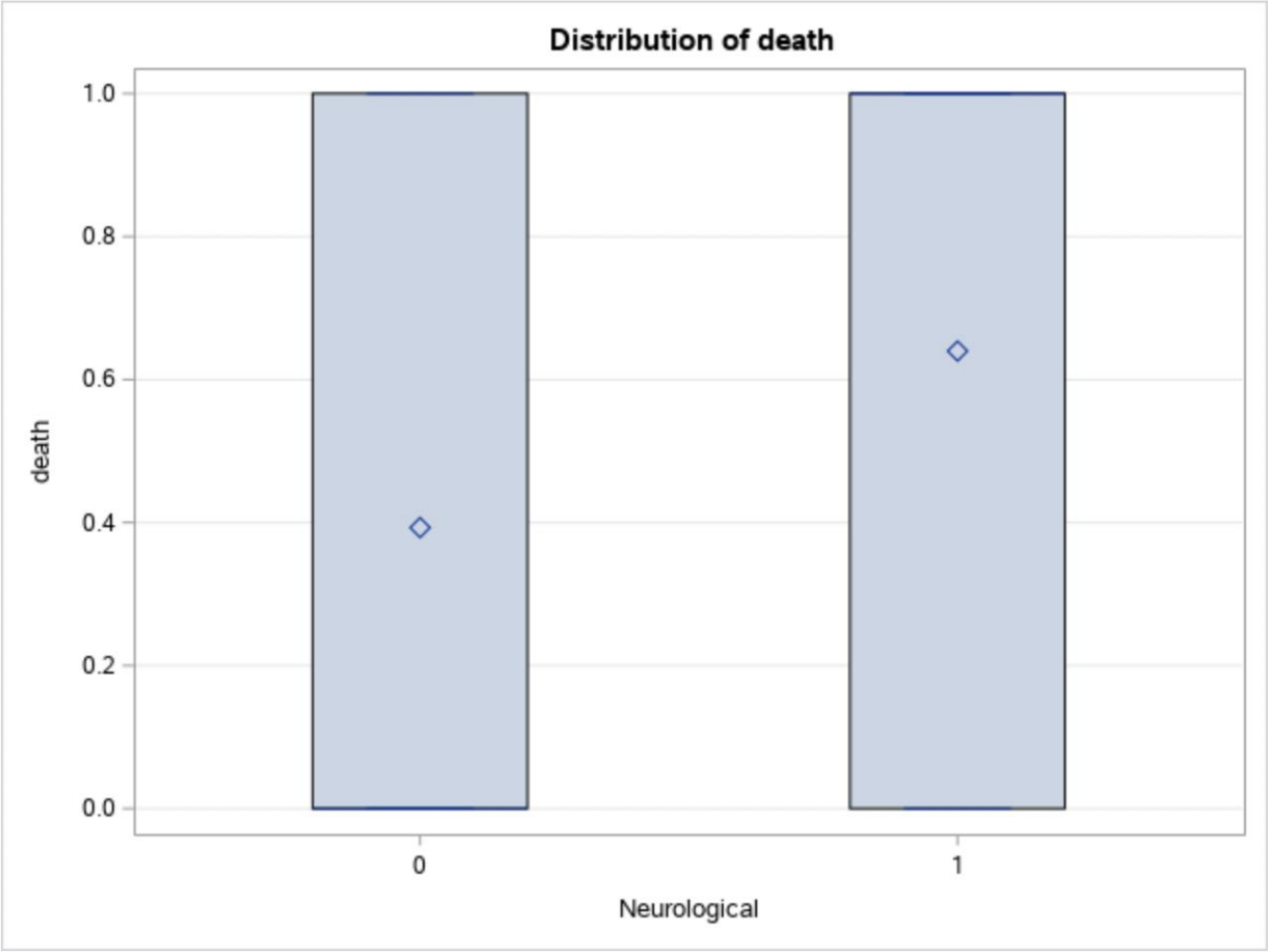
Supplementary Figure 8 Obesity anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	296.2204	296.2204	1241.95	<.0001
Error	840199	200397.2556	0.2385		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.001476	123.8054	0.488377	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Neurological	1	296.2204038	296.2204038	1241.95	<.0001

The ANOVA Procedure



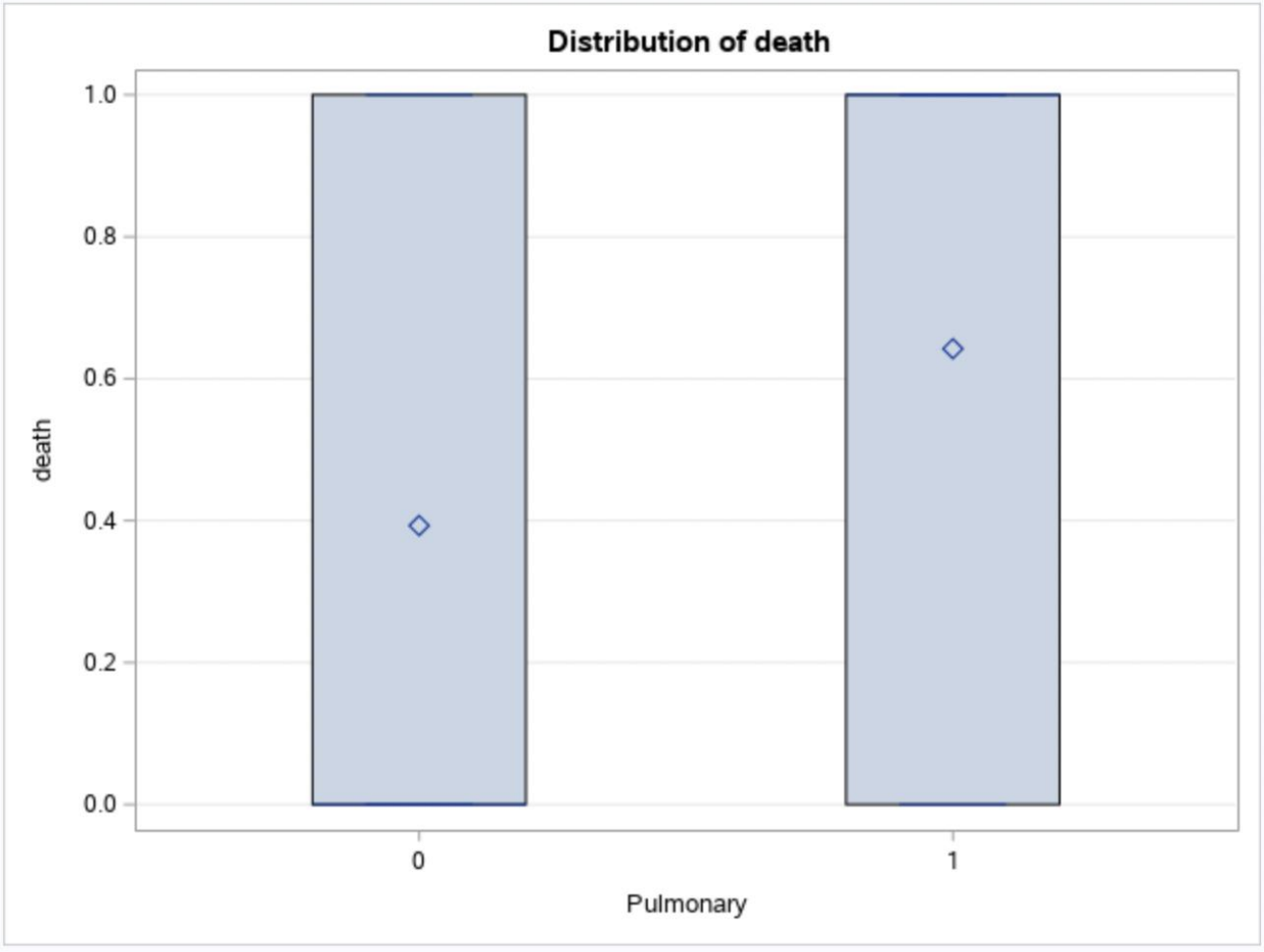
Supplementary Figure 9 Neurological disease anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	286.8598	286.8598	1202.65	<.0001
Error	840199	200406.6161	0.2385		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.001429	123.8083	0.488388	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Pulmonary	1	286.8598372	286.8598372	1202.65	<.0001

The ANOVA Procedure



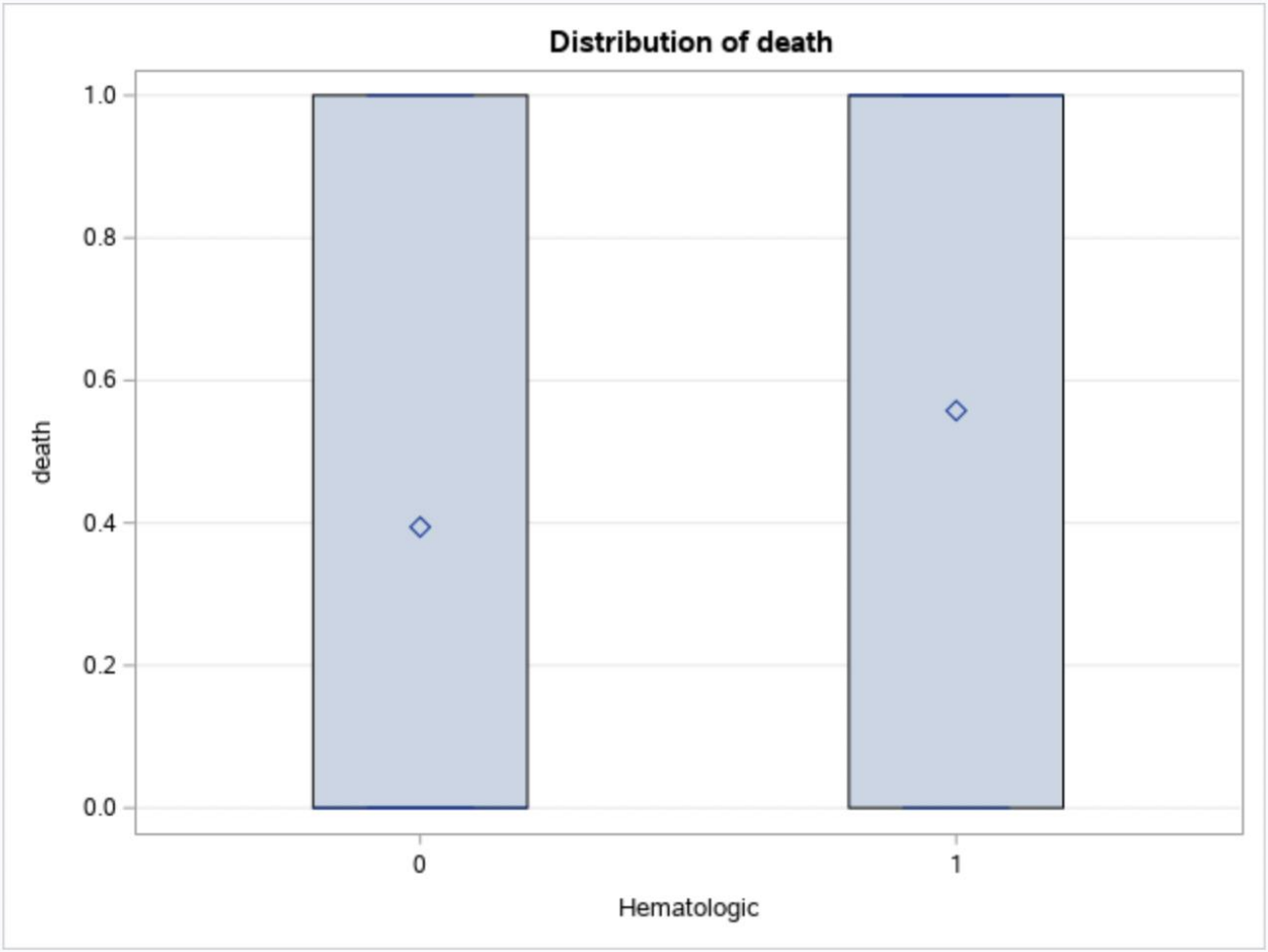
Supplementary Figure 10 Pulmonary disease anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	31.9240	31.9240	133.67	<.0001
Error	840199	200661.5520	0.2388		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.000159	123.8870	0.488698	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Hematologic	1	31.92398222	31.92398222	133.67	<.0001

The ANOVA Procedure



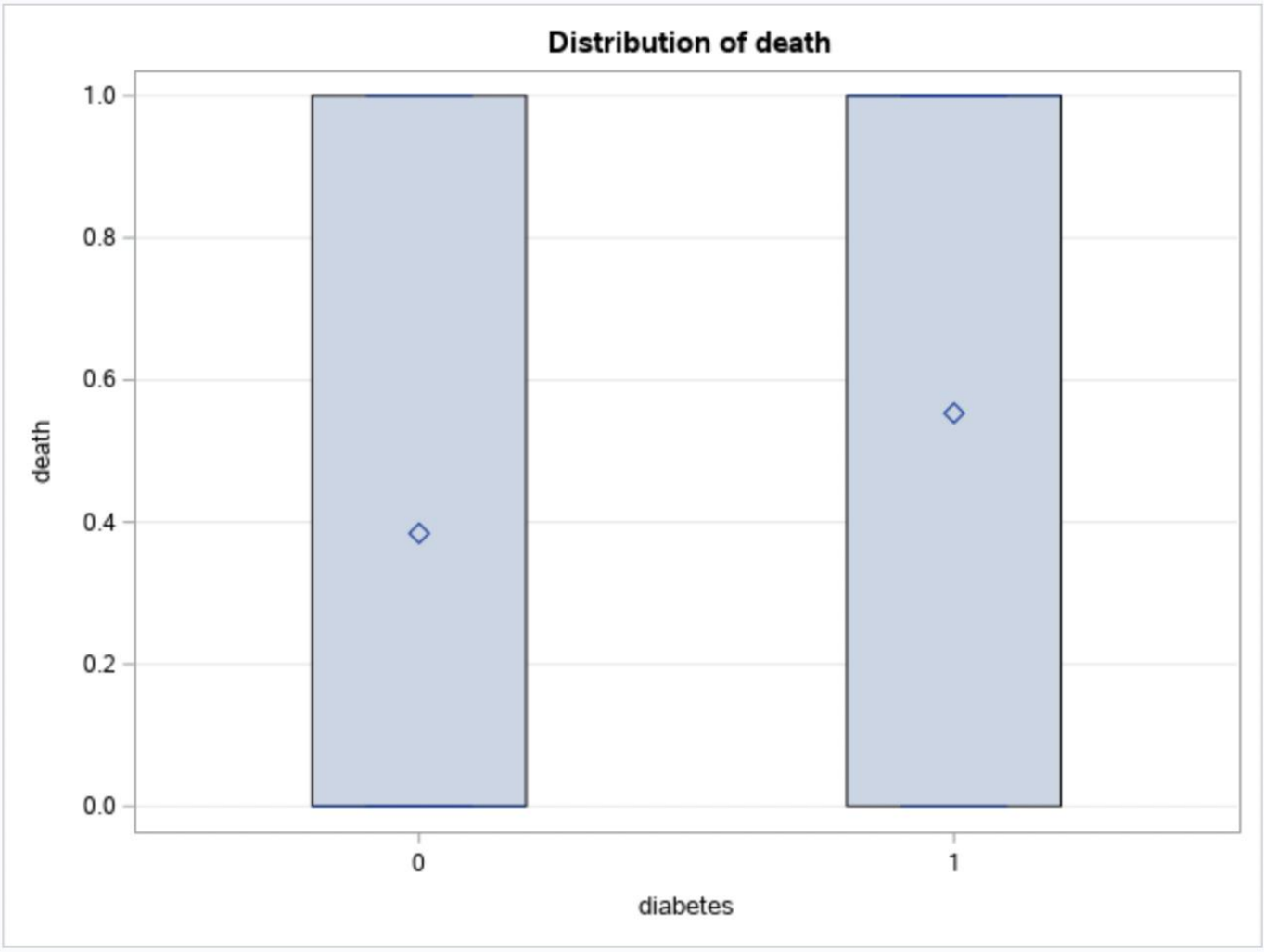
Supplementary Figure 11 Hematologic disease anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1346.3941	1346.3941	5674.72	<.0001
Error	840199	199347.0819	0.2373		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.006709	123.4806	0.487095	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
diabetes	1	1346.394087	1346.394087	5674.72	<.0001

The ANOVA Procedure



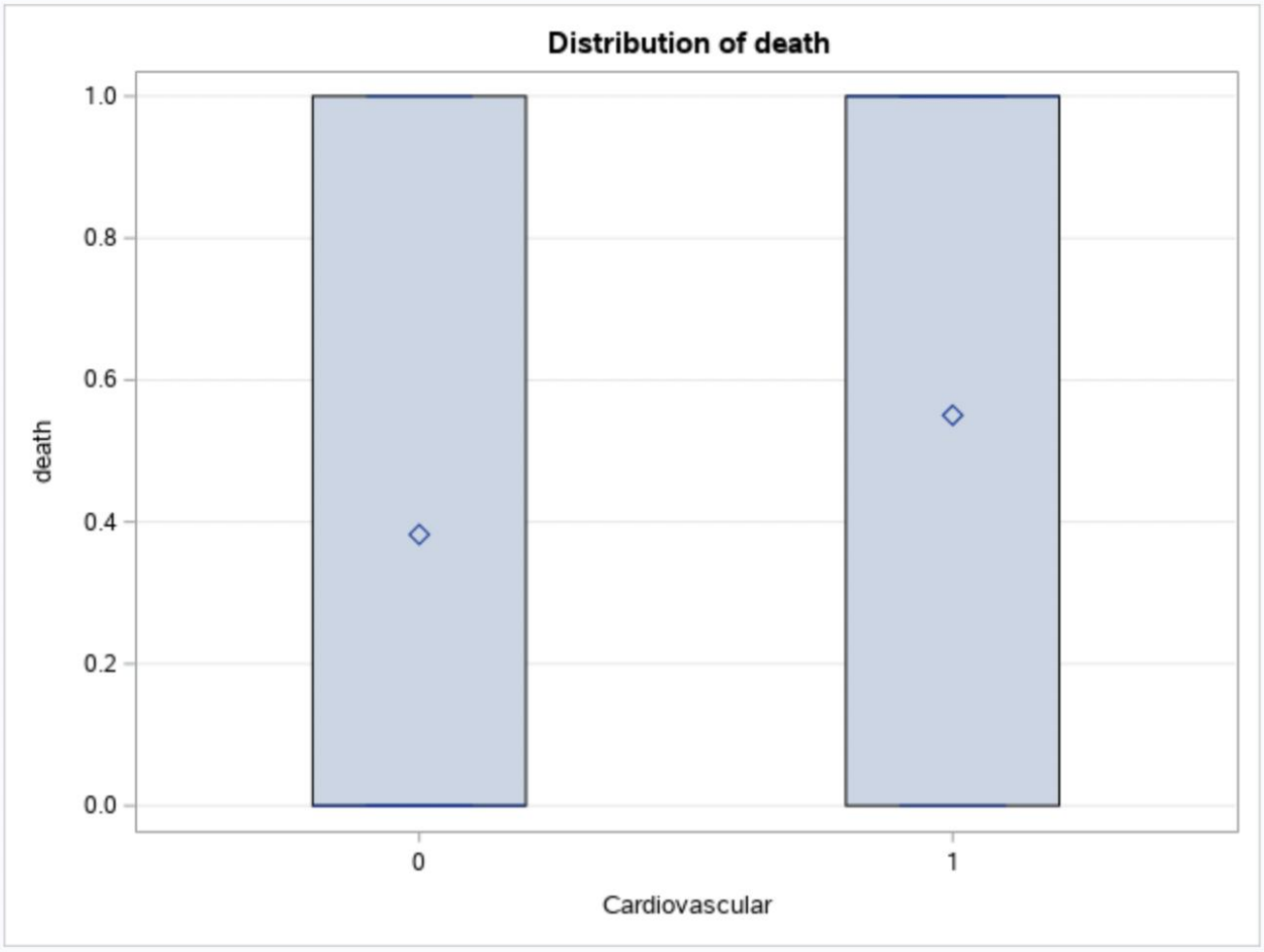
Supplementary Figure 12 Diabetes anova test

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1594.5487	1594.5487	6729.01	<.0001
Error	840199	199098.9273	0.2370		
Corrected Total	840200	200693.4760			

R-Square	Coeff Var	Root MSE	death Mean
0.007945	123.4037	0.486792	0.394471

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Cardiovascular	1	1594.548717	1594.548717	6729.01	<.0001

The ANOVA Procedure



Supplementary Figure 13 Cardiovascular disease anova test

1.2 Code used to perform the Logistic Regression

```
LIBNAME mydata "/home/u49148566/ " access=readonly;
DATA new; set home.covid_paciente; /*database released on May/15/2021*/

if cs_raca in (2,3,4,5) then cs_raca = 0; /*Raça não branca*/

if macro_regiao = 'S' THEN macro_regiao = 1;
if macro_regiao = 'N' THEN macro_regiao = 0;
macro_regiao1 = input(macro_regiao, 4.); /*casting the variable*/

/*We selected the patients that were between 14 and 100 years old*/
if idade_paciente >= 14 or idade_paciente >100;

/*Divided the patients between Age_less_50_years and Age_50_years_higher*/
if idade_paciente <=50 then idade_menor_40 = 1;
if idade_paciente > 50 then idade_maior_50 = 1;

/*The relative income means the inverse of the relative income. The higher that indicator, the worse the individual's economic condition.*/
renda_relativa1 = 1-renda_relativa_p3;

/*Renaming the variables*/
RENAME evolucao = Death renal = Renal_disease macro_regiao1 = Region neurologic = Neurological_disease imunodepre = Immunosuppresions
       hepatica = Liver_disease pneumopati = Pulmonary_disease cs_escol_n_analfabeto = Illiterate_patient idade_maior_60 = Age_50_years_higher
       Obesidade = Obesity hematologi = Hematological_disease diabetes = Diabetes cs_sexo = Gender cardiopati = Cardiovascular_disease
       cs_raca = Ethnicity idade_menor_40 = Age_less_50_years renda_relativa1 = I_relative_income sind_down = Down_syndrome;

/*Applying the logistic regression*/
PROC LOGISTIC descending plots(only)=oddsratio(order = descending)simple ; /*range = (0,2)*/

class Ethnicity(ref='1') Gender(ref='F') Region(ref='1') / param=ref;

model Death = Age_50_years_higher Age_less_50_years Down_syndrome Region Neurological_disease Renal_disease Immunosuppresions
              Liver_disease Pulmonary_disease Illiterate_patient Obesity Hematological_disease Diabetes Gender Cardiovascular_disease
              Ethnicity I_relative_income / ctable;

run;
```