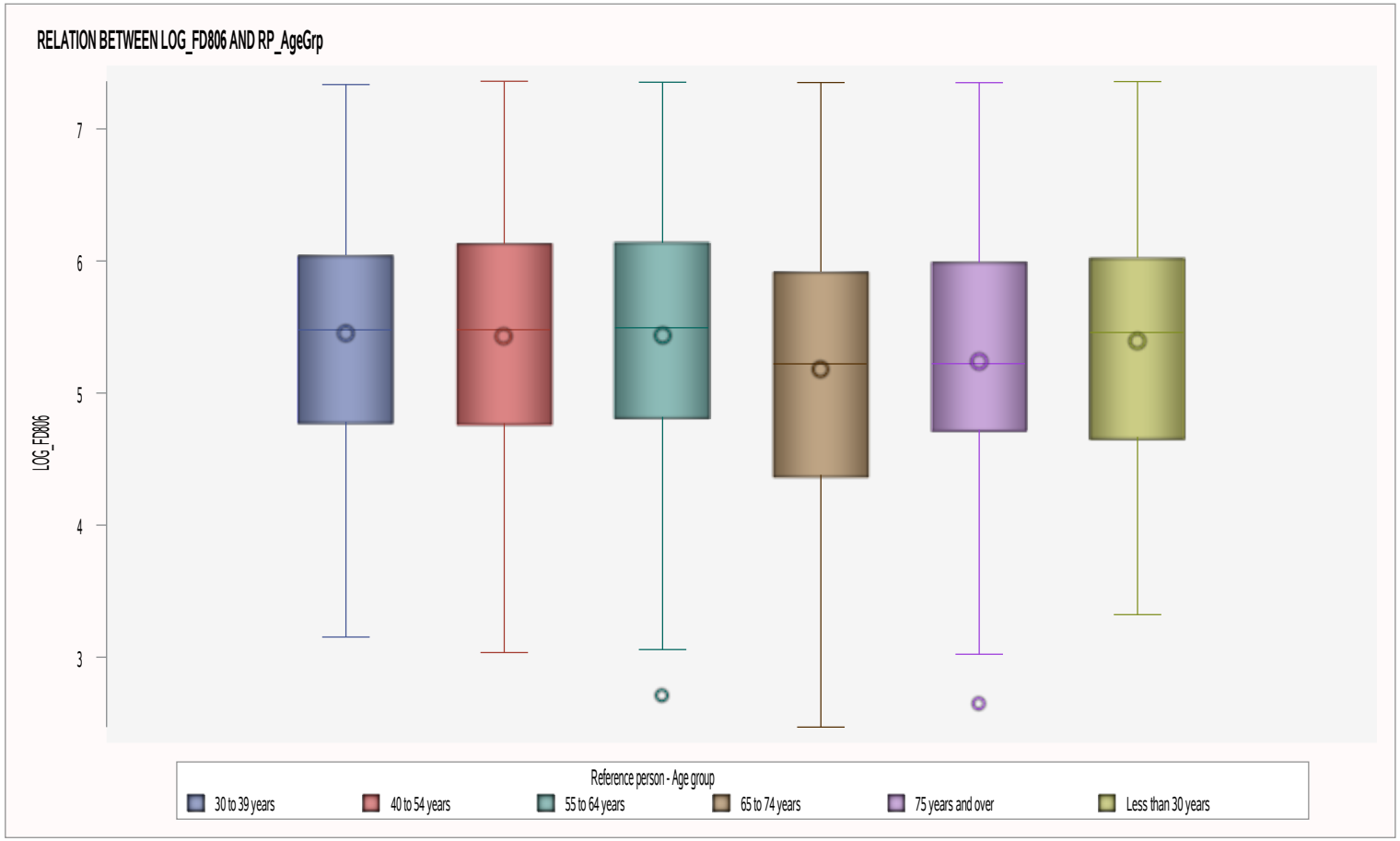
BIVARIATE ANALYSIS OF RP_AgeGrp AND LOG_FD806 FOR ANA.MODEL2
RELATION BETWEEN LOG_FD806 AND RP_AgeGrp

The MEANS Procedure

Analysis Variable : LOG_FD806														
Reference person - Age group	N Obs	N	N Miss	Minimum	Lower Quartile	Median	Mean	Upper Quartile	Maximum	Quartile Range	Coeff of Variation	Lower 95% CL for Mean	Upper 95% CL for Mean	Skewness
30 to 39 years	1399872	1399872	0	3.15	4.77	5.48	5.46	6.04	7.34	1.28	16.28	5.45	5.46	-0.03
40 to 54 years	2595446	2595446	0	3.03	4.76	5.48	5.43	6.13	7.36	1.37	17.40	5.43	5.43	-0.23
55 to 64 years	1693126	1693126	0	2.71	4.81	5.49	5.44	6.14	7.35	1.33	17.29	5.43	5.44	-0.14
65 to 74 years	1124539	1124539	0	2.47	4.37	5.22	5.18	5.92	7.35	1.55	18.77	5.18	5.18	0.09
75 years and over	670281	670281	0	2.64	4.71	5.22	5.24	5.99	7.35	1.28	18.79	5.24	5.24	-0.37
Less than 30 years	645612	645612	0	3.32	4.65	5.46	5.39	6.03	7.36	1.37	16.30	5.39	5.39	-0.16



One-way ANOVA Assumptions
In order to run a one-way ANOVA the following assumptions must be met:
1.The response of interest is continuous and normally distributed for each treatment group:
Normality test: PROC UNIVARIATE NORMAL and QQPlot for each group.
2.Treatment groups are independent of one another. Experimental units only receive one treatment,and they do not overlap.
3.There are no major outliers.
4.A check for unequal variances will help determine which version of a one-way ANOVA is most appropriate
(Levene's test, Null hypothesis: variances are equal between groups):
A .If variances are equal, then the assumptions of a standard one-way ANOVA are met.
B. If variances are unequal, then a Welch's one-way ANOVA is appropriate.

Normal Distribution?
Null hypothesis: sample has a normal distribution
CLT :
a.If it looks normal and each group have more than 30 observations
b.If moderately skewed, each group must have more than 100 observations
*rule of thumb: If skewness is between -1 and -0.5 or between 0.5 and 1, the distribution is moderately skewed.
*if the sample size is over 2000, the Kolmgorov test should be used. If the sample size is less than 2000, the Shapiro test is better.

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=30 to 39 years

Moments			
N	1399872	**Sum Weights**	1399872
Mean	5.45501049	**Sum Observations**	7636316.45
Std Deviation	0.88833792	**Variance**	0.78914425
Skewness	-0.0277237	**Kurtosis**	-0.5363713
Uncorrected SS	42760886.5	**Corrected SS**	1104700.16
Coeff Variation	16.2848067	**Std Error Mean**	0.00075082

Basic Statistical Measures			
Location		**Variability**	
Mean	5.455010	**Std Deviation**	0.88834
Median	5.478595	**Variance**	0.78914
Mode	5.958166	**Range**	4.18307
		Interquartile Range	1.27562

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=30 to 39 years

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	7265.434	**Pr > |t|**	<.0001
Sign	**M**	699936	**Pr >= |M|**	<.0001
Signed Rank	**S**	4.899E11	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.032795	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	279.4447	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	2269.057	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	7.33580
99%	7.29261
95%	6.93874
90%	6.65562
75% Q3	6.04444
50% Median	5.47860
25% Q1	4.76882
10%	4.27694
5%	3.96119
1%	3.36246
0% Min	3.15274

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=30 to 39 years

Extreme Observations					
Lowest			Highest		
Value	Freq	Obs	Value	Freq	Obs
3.15274	132	92	7.28220	1128	78
3.25810	2580	206	7.29261	12196	235
3.31200	9754	256	7.30953	8411	8
3.35061	1018	128	7.32818	59	343
3.36246	3183	143	7.33580	1566	179

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=40 to 54 years

Moments			
N	2595446	Sum Weights	2595446
Mean	5.43239591	Sum Observations	14099490.2
Std Deviation	0.94537734	Variance	0.89373831
Skewness	-0.226726	Kurtosis	-0.6273494
Uncorrected SS	78913661.8	Corrected SS	2319648.62
Coeff Variation	17.4025854	Std Error Mean	0.00058681

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=40 to 54 years

Basic Statistical Measures			
Location		**Variability**	
Mean	5.432396	**Std Deviation**	0.94538
Median	5.479472	**Variance**	0.89374
Mode	6.488141	**Range**	4.32579
		Interquartile Range	1.37222

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	9257.468	**Pr > |t|**	<.0001
Sign	**M**	1297723	**Pr >= |M|**	<.0001
Signed Rank	**S**	1.684E12	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.041734	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	1057.332	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	7707.702	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	7.36074
99%	7.17072
95%	6.91766
90%	6.60970

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=40 to 54 years

Quantiles (Definition 5)	
Level	**Quantile**
75% Q3	6.12994
50% Median	5.47947
25% Q1	4.75772
10%	4.08665
5%	3.90076
1%	3.30689
0% Min	3.03495

Extreme Observations					
Lowest			**Highest**		
Value	**Freq**	**Obs**	**Value**	**Freq**	**Obs**
3.03495	8060	932	7.27547	1311	619
3.08374	1372	991	7.28345	442	597
3.08374	3250	403	7.34003	776	531
3.10727	381	762	7.34357	669	491
3.21727	1553	691	7.36074	43	1009

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=55 to 64 years

Moments			
N	1693126	**Sum Weights**	1693126
Mean	5.43501741	**Sum Observations**	9202169.29
Std Deviation	0.93966324	**Variance**	0.88296701
Skewness	-0.1408492	**Kurtosis**	-0.6203097
Uncorrected SS	51508923.8	**Corrected SS**	1494973.51
Coeff Variation	17.2890567	**Std Error Mean**	0.00072215

Basic Statistical Measures			
Location		**Variability**	
Mean	5.435017	**Std Deviation**	0.93966
Median	5.494295	**Variance**	0.88297
Mode	7.114859	**Range**	4.64024
		Interquartile Range	1.33164

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	7526.158	**Pr > |t|**	<.0001
Sign	**M**	846563	**Pr >= |M|**	<.0001
Signed Rank	**S**	7.167E11	**Pr >= |S|**	<.0001

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=55 to 64 years

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.045528	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	572.5071	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	4947.638	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	7.35361
99%	7.24213
95%	6.97337
90%	6.65639
75% Q3	6.13729
50% Median	5.49430
25% Q1	4.80566
10%	4.09201
5%	3.95124
1%	3.27790
0% Min	2.71337

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=55 to 64 years

Extreme Observations					
Lowest			Highest		
Value	Freq	Obs	Value	Freq	Obs
2.71337	1520	1355	7.28773	45	1552
3.05777	7665	1495	7.30361	5912	1081
3.21165	209	1262	7.32095	5649	1070
3.24805	1311	1236	7.32214	2134	1194
3.26805	1144	1119	7.35361	491	1126

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=65 to 74 years

Moments			
N	1124539	**Sum Weights**	1124539
Mean	5.17856193	**Sum Observations**	5823494.85
Std Deviation	0.97185179	**Variance**	0.9444959
Skewness	0.0934121	**Kurtosis**	-0.7052274
Uncorrected SS	31219450.3	**Corrected SS**	1062121.53
Coeff Variation	18.7668276	**Std Error Mean**	0.00091646

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=65 to 74 years

Basic Statistical Measures			
Location		**Variability**	
Mean	5.178562	**Std Deviation**	0.97185
Median	5.221004	**Variance**	0.94450
Mode	5.560682	**Range**	4.88045
		Interquartile Range	1.55215

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	5650.624	**Pr > |t|**	<.0001
Sign	**M**	562269.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	3.161E11	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.060224	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	743.6633	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	5697.853	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	7.35109
99%	7.28909
95%	6.69241
90%	6.45104

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=65 to 74 years

Quantiles (Definition 5)	
Level	**Quantile**
75% Q3	5.91919
50% Median	5.22100
25% Q1	4.36704
10%	3.93378
5%	3.84031
1%	3.38912
0% Min	2.47064

Extreme Observations					
Lowest			**Highest**		
Value	**Freq**	**Obs**	**Value**	**Freq**	**Obs**
2.47064	3940	1593	7.21716	680	1606
3.07177	347	1697	7.28909	12702	1806
3.22764	463	1659	7.30971	58	1944
3.23789	987	1649	7.33995	1345	1610
3.25810	975	1669	7.35109	759	1739

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=75 years and over

Moments			
N	670281	**Sum Weights**	670281
Mean	5.23742365	**Sum Observations**	3510545.56
Std Deviation	0.98415502	**Variance**	0.9685611
Skewness	-0.3698554	**Kurtosis**	-0.1377097
Uncorrected SS	19035421.5	**Corrected SS**	649207.131
Coeff Variation	18.7908232	**Std Error Mean**	0.00120208

Basic Statistical Measures			
Location		**Variability**	
Mean	5.237424	**Std Deviation**	0.98416
Median	5.222408	**Variance**	0.96856
Mode	6.188552	**Range**	4.70538
		Interquartile Range	1.28041

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	4356.951	**Pr > |t|**	<.0001
Sign	**M**	335140.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	1.123E11	**Pr >= |S|**	<.0001

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=75 years and over

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.060496	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	411.4269	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	3004.562	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	7.35014
99%	6.99866
95%	6.82113
90%	6.49147
75% Q3	5.98859
50% Median	5.22241
25% Q1	4.70818
10%	3.87867
5%	3.58574
1%	2.64476
0% Min	2.64476

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=75 years and over

Extreme Observations					
Lowest			Highest		
Value	Freq	Obs	Value	Freq	Obs
2.64476	15313	2102	6.95519	558	2140
3.02237	4062	2132	6.99866	5455	2133
3.07177	840	2027	7.00661	800	1987
3.21727	186	1980	7.33743	836	2012
3.33220	6907	2057	7.35014	1360	2001

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=Less than 30 years

Moments			
N	645612	Sum Weights	645612
Mean	5.38890329	Sum Observations	3479140.63
Std Deviation	0.87832954	Variance	0.77146278
Skewness	-0.1637828	Kurtosis	-0.4783547
Uncorrected SS	19246817.3	Corrected SS	498064.856
Coeff Variation	16.2988551	Std Error Mean	0.00109313

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=Less than 30 years

Basic Statistical Measures			
Location		**Variability**	
Mean	5.388903	**Std Deviation**	0.87833
Median	5.458777	**Variance**	0.77146
Mode	4.654532	**Range**	4.03628
		Interquartile Range	1.37126

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	4929.793	**Pr > |t|**	<.0001
Sign	**M**	322806	**Pr >= |M|**	<.0001
Signed Rank	**S**	1.042E11	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.082811	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	602.5488	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	3129.265	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	7.35843
99%	7.09923
95%	6.75944
90%	6.48150

The UNIVARIATE Procedure
Variable: LOG_FD806

Freq: WeightD

Reference person - Age group=Less than 30 years

Quantiles (Definition 5)	
Level	**Quantile**
75% Q3	6.02579
50% Median	5.45878
25% Q1	4.65453
10%	4.23642
5%	3.78918
1%	3.40652
0% Min	3.32215

Extreme Observations					
Lowest			**Highest**		
Value	**Freq**	**Obs**	**Value**	**Freq**	**Obs**
3.32215	969	2195	7.09923	7410	2287
3.38912	1988	2192	7.13636	52	2317
3.40652	12248	2290	7.20471	1074	2198
3.58269	838	2312	7.27783	46	2323
3.59457	11993	2258	7.35843	4907	2228

Null hypothesis: equal variances
a.If variances are equal, then a pooled t-test is appropriate
b.If variances are unequal, then a Satterthwaite (also known as Welch's) test is appropriate

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
RP_AgeGrp	6	30 to 39 years 40 to 54 years 55 to 64 years 65 to 74 years 75 years and over Less than 30 years

Number of Observations Read	2327
Number of Observations Used	2327
Sum of Frequencies Read	8128876
Sum of Frequencies Used	8128876

The GLM Procedure

Dependent Variable: LOG_FD806

Frequency: WeightD

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	79395.211	15879.042	18106.9	<.0001
Error	8.13E6	7128715.803	0.877		
Corrected Total	8.13E6	7208111.014			

R-Square	Coeff Var	Root MSE	LOG_FD806 Mean
0.011015	17.39929	0.936463	5.382190

Source	DF	Type I SS	Mean Square	F Value	Pr > F
RP_AgeGrp	5	79395.21071	15879.04214	18106.9	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
RP_AgeGrp	5	79395.21071	15879.04214	18106.9	<.0001

The GLM Procedure

Levene's Test for Homogeneity of LOG_FD806 Variance ANOVA of Absolute Deviations from Group Means					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
RP_AgeGrp	5	6310.5	1262.1	4419.43	<.0001
Error	8.13E6	2321432	0.2856		

Welch's ANOVA for LOG_FD806			
Source	**DF**	**F Value**	**Pr > F**
RP_AgeGrp	5.0000	17164.4	<.0001
Error	2737876		

The GLM Procedure

Level of RP_AgeGrp	N	LOG_FD806	
		Mean	**Std Dev**
30 to 39 years	1399872	5.45501049	0.88833792
40 to 54 years	2595446	5.43239591	0.94537734
55 to 64 years	1693126	5.43501741	0.93966324
65 to 74 years	1124539	5.17856193	0.97185179
75 years and over	670281	5.23742365	0.98415502
Less than 30 years	645612	5.38890329	0.87832954

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

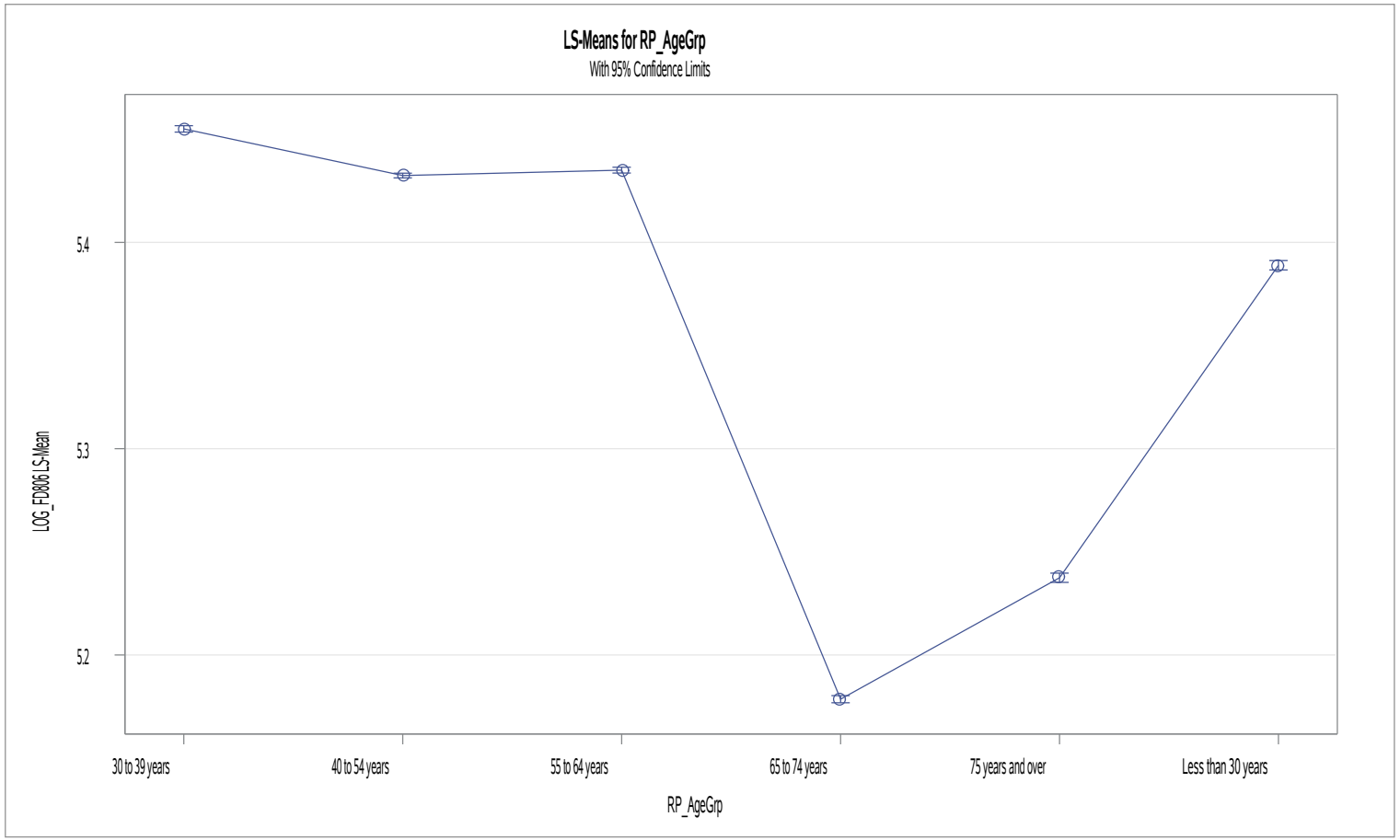
RP_AgeGrp	LOG_FD806 LSMEAN	LSMEAN Number
30 to 39 years	5.45501049	1
40 to 54 years	5.43239591	2
55 to 64 years	5.43501741	3
65 to 74 years	5.17856193	4
75 years and over	5.23742365	5
Less than 30 years	5.38890329	6

Least Squares Means for effect RP_AgeGrp
Pr > |t| for H0: LSMean(i)=LSMean(j)

Dependent Variable: LOG_FD806

i/j	1	2	3	4	5	6
1		<.0001	<.0001	<.0001	<.0001	<.0001
2	<.0001		0.0523	<.0001	<.0001	<.0001
3	<.0001	0.0523		<.0001	<.0001	<.0001
4	<.0001	<.0001	<.0001		<.0001	<.0001
5	<.0001	<.0001	<.0001	<.0001		<.0001
6	<.0001	<.0001	<.0001	<.0001	<.0001	

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey



The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey