

The SAS System

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GROUP=0

The LIFETEST Procedure

Product-Limit Survival Estimates

TIME	Survival	Failure	Survival Standard Error	Number Failed	Number Left
0.0000	1.0000	0	0	0	22
2.0000	0.9545	0.0455	0.0444	1	21
60.0000	0	1.0000	0	22	0

Summary Statistics for Time Variable TIME

Quantile	Point Estimate	95% Confidence Interval [Lower, Upper]	
75%	60.0000	41.0000	60.0000
50%	40.5000	28.0000	60.0000
25%	22.0000	4.0000	40.0000
Mean	38.5909	Standard Error	4.7703

Summary of the Number of Censored and Uncensored Values

Total	Failed	Censored	%Censored
22	22	0	0.0000

The SAS System

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GROUP=1

The LIFETEST Procedure

Product-Limit Survival Estimates

TIME	Survival	Failure	Survival Standard Error	Number Failed	Number Left
0.0000	1.0000	0	0	0	22
2.0000	0.9545	0.0455	0.0444	1	21
60.0000	0	1.0000	0	21	0

\* Censored Observation

Summary Statistics for Time Variable TIME

Quantile	Point Estimate	95% Confidence Interval [Lower, Upper)	
75%	60.0000	.	.
50%	60.0000	.	.
25%	60.0000	12.0000	60.0000

Mean	52.4545	Standard Error	3.9979
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Summary of the Number of Censored and Uncensored Values

Total	Failed	Censored	%Censored
22	21	1	4.5455

```
options ls=80 nocenter nodate;
```

```
data indat;
```

```
input group status time;
```

```
* group: 1=drug, 0=placebo;
```

```
* status: 1=death, 0=censoring;
```

```
cards;
```

```
0 1 2  
0 1 3  
0 1 4  
0 1 7  
0 1 10  
0 1 22  
0 1 28  
0 1 29  
0 1 32  
0 1 37  
0 1 40  
0 1 41  
0 1 54  
0 1 61  
0 1 63  
0 1 71  
0 0 127  
0 0 140  
0 0 146  
0 0 158  
0 0 167  
0 0 182  
1 1 2  
1 1 6  
1 1 12  
1 1 54  
1 0 56  
1 1 68  
1 1 89  
1 1 96  
1 1 96  
1 0 125  
1 0 128  
1 0 131  
1 0 140  
1 0 141  
1 1 143  
1 0 145  
1 1 146  
1 0 148  
1 0 162  
1 1 168  
1 0 173  
1 0 181
```

```
;
```

```
proc lifetest outsurv=odat;  
  by group;  
  time time*status(0);
```

```
data dat2;  
set indat;  
if time ge 60 then do;  
  time = 60;  
  status = 1; end;
```

```
proc lifetest intervals=60; by group; time time*status(0);
```

GROUP=0

The LIFETEST Procedure

Product-Limit Survival Estimates

TIME	Survival	Failure	Survival Standard Error	Number Failed	Number Left
0.000	1.0000	0	0	0	22
2.000	0.9545	0.0455	0.0444	1	21
3.000	0.9091	0.0909	0.0613	2	20
4.000	0.8636	0.1364	0.0732	3	19
7.000	0.8182	0.1818	0.0822	4	18
10.000	0.7727	0.2273	0.0893	5	17
22.000	0.7273	0.2727	0.0950	6	16
28.000	0.6818	0.3182	0.0993	7	15
29.000	0.6364	0.3636	0.1026	8	14
32.000	0.5909	0.4091	0.1048	9	13
37.000	0.5455	0.4545	0.1062	10	12
40.000	0.5000	0.5000	0.1066	11	11
41.000	0.4545	0.5455	0.1062	12	10
54.000	0.4091	0.5909	0.1048	13	9
61.000	0.3636	0.6364	0.1026	14	8
63.000	0.3182	0.6818	0.0993	15	7
71.000	0.2727	0.7273	0.0950	16	6
127.000*	.	.	.	16	5
140.000*	.	.	.	16	4
146.000*	.	.	.	16	3
158.000*	.	.	.	16	2
167.000*	.	.	.	16	1
182.000*	.	.	.	16	0

\* Censored Observation

Summary Statistics for Time Variable TIME

Quantile	Point Estimate	95% Confidence Interval (Lower, Upper)	
75%	.	41.000	.
50%	40.500	28.000	71.000
25%	22.000	4.000	40.000
Mean	42.273	Standard Error	5.661

NOTE: The last observation was censored so the estimate of the mean is biased.

Summary of the Number of Censored and Uncensored Values

Total	Failed	Censored	%Censored
22	16	6	27.2727

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The LIFETEST Procedure

Product-Limit Survival Estimates

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0.000	1.0000	0	0	0	22
2.000	0.9545	0.0455	0.0444	1	21
6.000	0.9091	0.0909	0.0613	2	20
12.000	0.8636	0.1364	0.0732	3	19
54.000	0.8182	0.1818	0.0822	4	18
56.000*	.	.	.	4	17
68.000	0.7701	0.2299	0.0904	5	16
89.000	0.7219	0.2781	0.0967	6	15
96.000	.	.	.	7	14
96.000	0.6257	0.3743	0.1051	8	13
125.000*	.	.	.	8	12
128.000*	.	.	.	8	11
131.000*	.	.	.	8	10
140.000*	.	.	.	8	9
141.000*	.	.	.	8	8
143.000	0.5475	0.4525	0.1175	9	7
145.000*	.	.	.	9	6
146.000	0.4562	0.5438	0.1285	10	5
148.000*	.	.	.	10	4
162.000*	.	.	.	10	3
168.000	0.3041	0.6959	0.1509	11	2
173.000*	.	.	.	11	1
181.000*	.	.	.	11	0

\* Censored Observation

Summary Statistics for Time Variable TIME

Quantile	Point Estimate	95% Confidence Interval [Lower, Upper)	
75%	.	146.000	.
50%	146.000	96.000	.
25%	89.000	12.000	146.000
Mean	121.310	Standard Error	13.125

NOTE: The last observation was censored so the estimate of the mean is biased.

Summary of the Number of Censored and Uncensored Values

Total	Failed	Censored	%Censored
22	11	11	50.0000

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2.0000	0.9545	0.0455	0.0444	1	21
60.0000	0	1.0000	0	22	0

Summary Statistics for Time Variable TIME

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75%	60.0000	41.0000	60.0000
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25%	22.0000	4.0000	40.0000
Mean	38.5909	Standard Error	4.7703

Summary of the Number of Censored and Uncensored Values

Total	Failed	Censored	%Censored
22	22	0	0.0000

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GROUP=1

The LIFETEST Procedure

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60.0000	0	1.0000	0	21	0

\* Censored Observation

Summary Statistics for Time Variable TIME

Quantile	Point Estimate	95% Confidence Interval [Lower, Upper)	
75%	60.0000	.	.
50%	60.0000	.	.
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Mean	52.4545	Standard Error	3.9979
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Summary of the Number of Censored and Uncensored Values

Total	Failed	Censored	%Censored
22	21	1	4.5455



The SAS System

group=0

The LIFEREG Procedure

Model Information

Data Set	WORK.INDAT
Dependent Variable	Log(time)
Censoring Variable	status
Censoring Value(s)	0
Number of Observations	22
Noncensored Values	16
Right Censored Values	6
Left Censored Values	0
Interval Censored Values	0
Name of Distribution	EXPONENT
Log Likelihood	-39.6163122

כדי לקבל את תוצאות האם, יש להוסיף  
 את הפרוטוקול הבא למכונה שבפרוטוקול הדיקט  
 בשביל שאז:

```
PROC LIFEREG; BY GROUP;
MODEL TIME * STATUS(0)
/ DIST = EXPONENTIAL;
```

Algorithm converged.

Analysis of Parameter Estimates

Variable	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq	Label
Intercept	1	4.48864	0.25000	322.3658	<.0001	Intercept
Scale	0	1.00000	0			Extreme value scale

Lagrange Multiplier Statistics

Variable	Chi-Square	Pr > ChiSq
Scale	1.9204	0.1658

$$\hat{\lambda} = e^{-\hat{\mu}} = e^{-4.48864} = 0.01124$$

$$\hat{Var}(\hat{\lambda}) = \hat{\lambda}^2 \hat{Var}(\hat{\mu}) \quad [לפי שני ה(8)ה]$$

$$= (0.01124)^2 (0.2500)^2 = 7.890 \times 10^{-6}$$

תוצאות גואאום עם הדיקט הקני.

group=1

The LIFEREG Procedure

Model Information

Data Set	WORK.INDAT
Dependent Variable	Log(time)
Censoring Variable	status
Censoring Value(s)	0
Number of Observations	22
Noncensored Values	11
Right Censored Values	11
Left Censored Values	0
Interval Censored Values	0
Name of Distribution	EXPONENT
Log Likelihood	-28.41830126

Algorithm converged.

Analysis of Parameter Estimates

Variable	DF	Estimate	Standard		Pr > ChiSq	Label
			Error	Chi-Square		
Intercept	1	5.38948	0.30151	319.5127	<.0001	Intercept
Scale	0	1.00000	0			Extreme value scale

Lagrange Multiplier Statistics

Variable	Chi-Square	Pr > ChiSq
Scale	0.0262	0.8715

$$\hat{\lambda} = e^{-\hat{\mu}} = e^{-5.38948} = 0.004564$$

$$\begin{aligned} \hat{Var}(\hat{\lambda}) &= \hat{\lambda}^2 \hat{Var}(\hat{\mu}) \\ &= (0.004564)^2 (0.30151)^2 = 1.894 \times 10^{-6} \end{aligned}$$

התוצאות הן אכן אלו שצוינו בפרק.