

**sts list** — List the survivor or cumulative hazard function

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## Description

`sts list` lists the estimated survivor (failure) or the Nelson–Aalen estimated cumulative (integrated) hazard function. See [\[ST\] sts](#) for an introduction to this command.

`sts list` can be used with single- or multiple-record or single- or multiple-failure st data.

## Quick start

Kaplan–Meier survivor function using `stset` data

```
sts list
```

Survivor function for each level of `v1`

```
sts list, by(v1)
```

Results of above saved in `mydata.dta`

```
sts list, by(v1) saving(mydata)
```

Show only survivor functions for groups of `v1` at specified times

```
sts list, by(v1) at(10 20 30 40 50)
```

As above, but report groups side-by-side

```
sts list, by(v1) at(10 20 30 40 50) compare
```

Failure function

```
sts list, failure
```

Failure function adjusted for `v2 = 0`

```
sts list, failure adjustfor(v2)
```

As above, but with stratification on levels of `svar`

```
sts list, failure adjustfor(v2) strata(svar)
```

## Menu

Statistics > Survival analysis > Summary statistics, tests, and tables > List survivor and cumulative hazard functions

## Syntax

```
sts list [if] [in] [, options]
```

<i>options</i>	Description
Main	
<u>survival</u>	report Kaplan–Meier survivor function; the default
<u>failure</u>	report Kaplan–Meier failure function
<u>cumhaz</u>	report Nelson–Aalen cumulative hazard function
by( <i>varlist</i> )	estimate separate functions for each group formed by <i>varlist</i>
adjustfor( <i>varlist</i> )	adjust the estimates to zero values of <i>varlist</i>
strata( <i>varlist</i> )	stratify on different groups of <i>varlist</i>
Options	
<u>level</u> (#)	set confidence level; default is level(95)
at(#  <i>numlist</i> )	report estimated survivor/cumulative hazard function at specified times; default is to report at all unique time values
<u>enter</u>	report number lost as pure censored instead of censored minus lost
<u>noshow</u>	do not show st setting information
<u>compare</u>	report groups of survivor/cumulative hazard functions side by side
<u>saving</u> ( <i>filename</i> [, <i>replace</i> ])	save results to <i>filename</i> ; use <i>replace</i> to overwrite existing <i>filename</i>

You must `stset` your data before using `sts list`; see [\[ST\] stset](#).

`fweights`, `iwweights`, and `pweights` may be specified using `stset`; see [\[ST\] stset](#).

## Options

### Main

`survival`, `failure`, and `cumhaz` specify the function to report.

`survival` specifies that the Kaplan–Meier survivor function be listed. This option is the default if a function is not specified.

`failure` specifies that the Kaplan–Meier failure function  $1 - S(t + 0)$  be listed.

`cumhaz` specifies that the Nelson–Aalen estimate of the cumulative hazard function be listed.

`by`(*varlist*) estimates a separate function for each by-group. By-groups are identified by equal values of the variables in *varlist*. `by`() may not be combined with `strata`().

`adjustfor`(*varlist*) adjusts the estimate of the survivor (failure) function to that for 0 values of *varlist*. This option is not available with the Nelson–Aalen function. See [\[ST\] sts graph](#) for an example of how to adjust for values different from 0.

If you specify `adjustfor`() with `by`(), `sts` fits separate Cox regression models for each group, using the `adjustfor`() variables as covariates. The separately calculated baseline survivor functions are then retrieved.

If you specify `adjustfor`() with `strata`(), `sts` fits a stratified-on-group Cox regression model, using the `adjustfor`() variables as covariates. The stratified, baseline survivor function is then retrieved.

`strata(varlist)` requests estimates of the survivor (failure) function stratified on variables in *varlist*. It requires specifying `adjustfor()` and may not be combined with `by()`.

#### Options

`level(#)` specifies the confidence level, as a percentage, for the Greenwood pointwise confidence interval of the survivor (failure) or for the pointwise confidence interval of the Nelson–Aalen cumulative hazard function; see [U] 20.8 Specifying the width of confidence intervals.

`at(# | numlist)` specifies the time values at which the estimated survivor (failure) or cumulative hazard function is to be listed.

The default is to list the function at all the unique time values in the data, or if functions are being compared, at about 10 times chosen over the observed interval. In any case, you can control the points chosen.

`at(5 10 20 30 50 90)` would display the function at the designated times.

`at(10 20 to 100)` would display the function at times 10, 20, 30, 40, . . . , 100.

`at(0 5 10 to 100 200)` would display the function at times 0, 5, 10, 15, . . . , 100, and 200.

`at(20)` would display the curve at (roughly) 20 equally spaced times over the interval observed in the data. We say roughly because Stata may choose to increase or decrease your number slightly if that would result in rounder values of the chosen times.

`enter` specifies that the table contain the number who enter and, correspondingly, that the number lost be displayed as the pure number censored rather than censored minus entered. The logic underlying this is explained in [ST] *sts*.

`noshow` prevents `sts list` from showing the key `st` variables. This option is seldom used because most people type `stset`, `show` or `stset, noshow` to set whether they want to see these variables mentioned at the top of the output of every `st` command; see [ST] *stset*.

`compare` is specified only with `by()` or `strata()`. It compares the survivor (failure) or cumulative hazard functions and lists them side by side rather than first one and then the next.

`saving(filename [, replace])` saves the results in a Stata data file (`.dta` file).

`replace` specifies that *filename* be overwritten if it exists.

## Remarks and examples

[stata.com](http://www.stata.com)

Only one of `sts list`'s options—`adjustfor()`—modifies the calculation. All the other options merely determine how the results of the calculation are displayed.

If you do not specify `adjustfor()` or `cumhaz`, `sts list` displays the Kaplan–Meier product-limit estimate of the survivor (failure) function. Specify `by()` to perform the calculation separately on the different groups.

Specify `adjustfor()` to calculate an adjusted survival curve. Now if you specify `by()` or `strata()`, this further modifies how the adjustment is made.

`sts list`, `cumhaz` displays the Nelson–Aalen estimate of the cumulative hazard function.

We demonstrate many of `sts list`'s features in [ST] *sts*. This discussion picks up where that entry leaves off.

By default, `sts list` will bury you in output. With the Stanford heart transplant data introduced in [ST] *stset*, the following commands produce 154 lines of output.

#### 4 sts list — List the survivor or cumulative hazard function

```
. use http://www.stata-press.com/data/r15/stan3
(Heart transplant data)
. stset, noshow
. sts list, by(posttran)
```

Time	Beg. Total	Fail	Net Lost	Survivor Function	Std. Error	[95% Conf. Int.]	
posttran=0							
1	103	1	3	0.9903	0.0097	0.9331	0.9986
2	99	3	3	0.9603	0.0195	0.8976	0.9849
3	93	3	3	0.9293	0.0258	0.8574	0.9657
<i>(output omitted)</i>							
1400	1	0	1	0.2359	0.1217	0.0545	0.4882
posttran=1							
1	0	0	-3	1.0000	.	.	.
2	3	0	-3	1.0000	.	.	.
<i>(output omitted)</i>							
5.1	14	1	0	0.9286	0.0688	0.5908	0.9896
6	13	0	-1	0.9286	0.0688	0.5908	0.9896
<i>(output omitted)</i>							
1799	1	0	1	0.1420	0.0546	0.0566	0.2653

at() and compare are the solutions. Here is another detailed, but more useful, view of the heart transplant data:

```
. sts list, at(10 40 to 170) by(posttran)
```

Time	Beg. Total	Fail	Survivor Function	Std. Error	[95% Conf. Int.]	
posttran=0						
10	74	12	0.8724	0.0346	0.7858	0.9256
40	31	11	0.6781	0.0601	0.5446	0.7801
70	17	2	0.6126	0.0704	0.4603	0.7339
100	11	1	0.5616	0.0810	0.3900	0.7022
130	10	1	0.5054	0.0903	0.3199	0.6646
160	7	1	0.4422	0.0986	0.2480	0.6204
posttran=1						
10	16	1	0.9286	0.0688	0.5908	0.9896
40	43	6	0.7391	0.0900	0.5140	0.8716
70	45	9	0.6002	0.0841	0.4172	0.7423
100	40	9	0.4814	0.0762	0.3271	0.6198
130	38	1	0.4687	0.0752	0.3174	0.6063
160	36	1	0.4561	0.0742	0.3076	0.5928

Note: Survivor function is calculated over full data and evaluated at indicated times; it is not calculated from aggregates shown at left.

We specified at(10 40 to 170) when that is not strictly correct; at(10 40 to 160) would make sense and so would at(10 40 to 180), but sts list is not picky.

#### □ Technical note

When used with at(), sts list is designed to give you only a snapshot of the full Kaplan–Meier curve. That is, the Beg. Total information is that for the last observed failure time (before the failures occur).

When the `at()` option is used, the `Beg. Total` column in the output does not contain the number at risk at the time indicated in the `Time` column. It shows the number at risk at the time just before the previous failure.



Similar output for the Nelson–Aalen estimated cumulative hazard can be produced by specifying the `cumhaz` option:

```
. sts list, cumhaz at(10 40 to 170) by(posttran)
```

Time	Beg. Total	Fail	Nelson-Aalen Cum. Haz.	Std. Error	[95% Conf. Int.]	
posttran=0						
10	74	12	0.1349	0.0391	0.0764	0.2382
40	31	11	0.3824	0.0871	0.2448	0.5976
70	17	2	0.4813	0.1124	0.3044	0.7608
100	11	1	0.5646	0.1400	0.3473	0.9178
130	10	1	0.6646	0.1720	0.4002	1.1037
160	7	1	0.7896	0.2126	0.4658	1.3385
posttran=1						
10	16	1	0.0714	0.0714	0.0101	0.5071
40	43	6	0.2929	0.1176	0.1334	0.6433
70	45	9	0.4981	0.1360	0.2916	0.8507
100	40	9	0.7155	0.1542	0.4691	1.0915
130	38	1	0.7418	0.1564	0.4908	1.1214
160	36	1	0.7689	0.1587	0.5130	1.1523

Note: Nelson-Aalen function is calculated over full data and evaluated at indicated times; it is not calculated from aggregates shown at left.

Here is the result of the survivor functions with the `compare` option:

```
. sts list, at(10 40 to 170) by(posttran) compare
```

posttran	time	Survivor Function	
		0	1
	10	0.8724	0.9286
	40	0.6781	0.7391
	70	0.6126	0.6002
	100	0.5616	0.4814
	130	0.5054	0.4687
	160	0.4422	0.4561

And here is the result of the cumulative hazard functions with the `compare` option:

```
. sts list, cumhaz at(10 40 to 170) by(posttran) compare
```

posttran	time	Nelson-Aalen Cum. Haz.	
		0	1
	10	0.1349	0.0714
	40	0.3824	0.2929
	70	0.4813	0.4981
	100	0.5646	0.7155
	130	0.6646	0.7418
	160	0.7896	0.7689

## Video example

How to calculate the Kaplan-Meier survivor and Nelson-Aalen cumulative hazard functions

## Methods and formulas

See [\[ST\] sts](#).

## References

See [\[ST\] sts](#) for references.

## Also see

[\[ST\] sts](#) — Generate, graph, list, and test the survivor and cumulative hazard functions

[\[ST\] sts generate](#) — Create variables containing survivor and related functions

[\[ST\] sts graph](#) — Graph the survivor, hazard, or cumulative hazard function

[\[ST\] sts test](#) — Test equality of survivor functions

[\[ST\] stset](#) — Declare data to be survival-time data