statgraphics

Ordered Waterfall Plots

statgraphics centurion
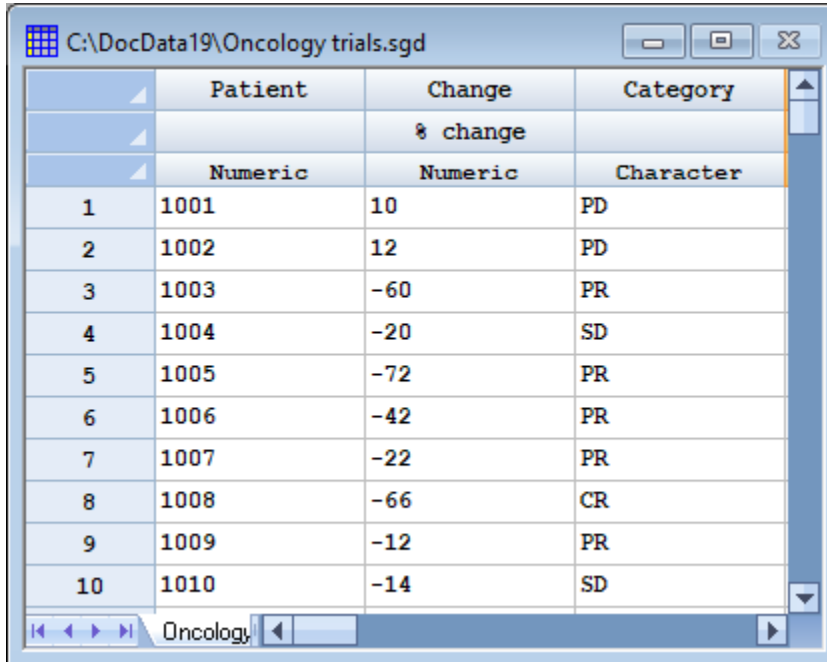
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Summary

Ordered Waterfall Plots are widely used to illustrate how a variable of interest increases or decreases amongst a sample of individuals. Data values are sorted and plotted as a barchart, usually with respect to a baseline equal to 0. A reference line may be added to the plot to display a target value.

One common application in oncology shows the changes in tumor size in response to a drug.

Sample StatFolio: *Waterfall1.sgp*

Sample Data

Pandya (2012) presents a dataset showing the maximum change in tumor size when 54 patients were given a particular drug. A portion of that data, contained in the data file named *Oncology trials.sgd*, is shown below:
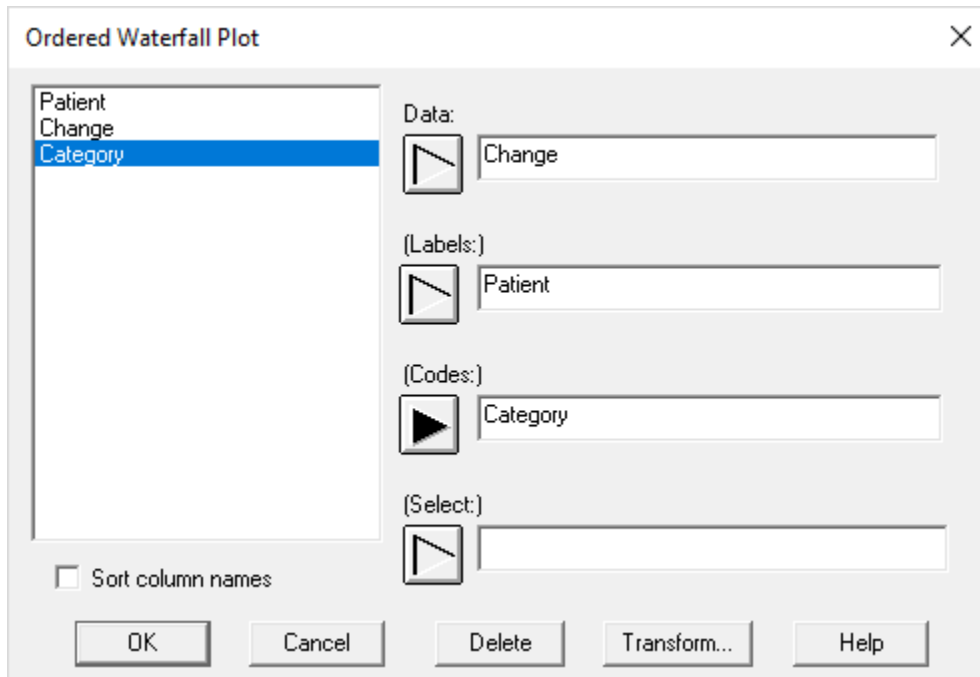
	Patient	Change	Category
		% change	
	Numeric	Numeric	Character
1	1001	10	PD
2	1002	12	PD
3	1003	-60	PR
4	1004	-20	SD
5	1005	-72	PR
6	1006	-42	PR
7	1007	-22	PR
8	1008	-66	CR
9	1009	-12	PR
10	1010	-14	SD

C:\DocData19\Oncology trials.sgd

Patients are divided into 5 categories based on their response and status:

CR – Complete Response
PR – Partial Response
PD – Progressive Disease
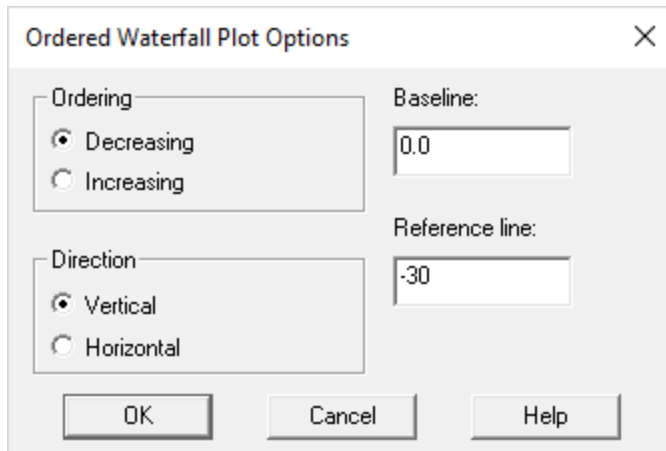SD – Stable Disease
ED – Early Death

Data Input

When the procedure is first selected, a data input dialog box is displayed requesting the name of the column containing the data to be plotted and other supporting information:

- **Data:** the name of a numeric column containing the data values to be plotted.

- **(Labels:)** optional character or numeric column identifying each data value. If supplied, these labels will identify each bar on the waterfall plot. If not supplied, row numbers will be used for the labels.

- **(Codes:)** optional character or numeric column identifying which group each data value belongs to. If supplied, these codes will be used to determine the color of each bar.

- **(Select:)** optional subset selection.
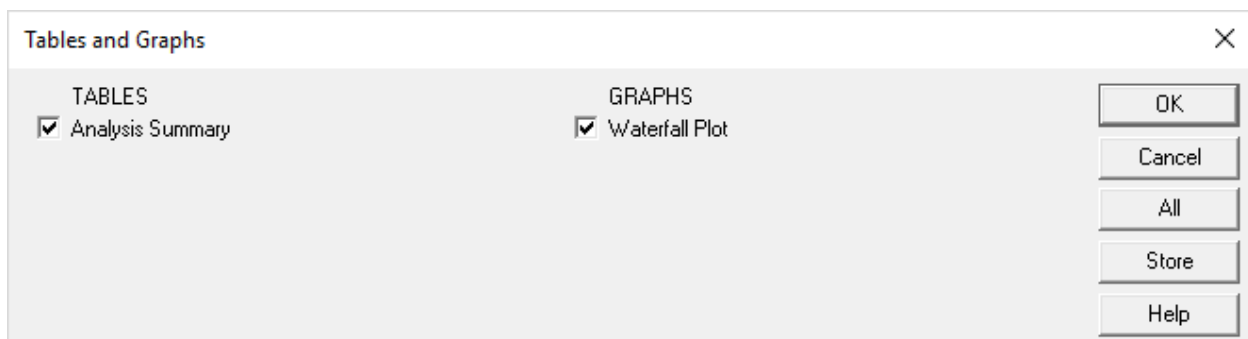
Analysis Options

The *Analysis Options* dialog box sets various options for the plot:

- **Ordering**: whether the data values should be plotted in decreasing or increasing order.

- **Direction**: whether the bars should be vertical or horizontal.

- **Baseline**: the location from which the bars extend.

- **Reference line**: an optional location at which a reference line will be drawn.

Tables and Graphs

The following tables and graphs may be created:

Analysis Summary

The *Analysis Summary* displays the values in sorted order:
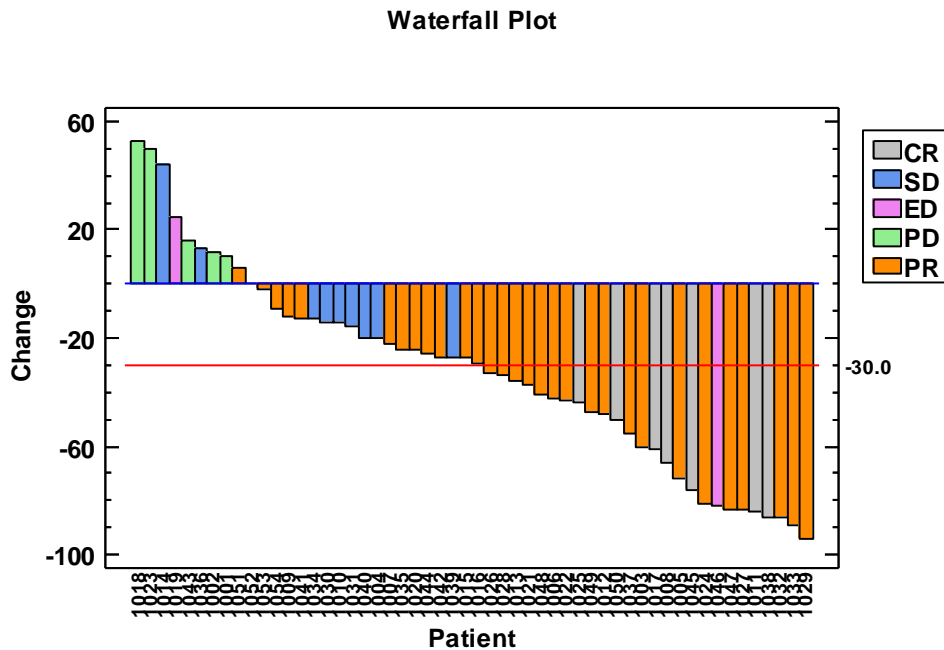
Ordered Waterfall Plot - Change
Data variable: Change (% change)

Patient	Change	Category
1018	53.0	PD
1023	50.0	PD
1014	44.0	SD
1019	25.0	ED
1043	16.0	PD
1036	13.0	SD
1002	12.0	PD
1001	10.0	PD
1051	6.0	PR
1052	0.0	SD
1053	-2.0	PR
1054	-9.0	PR
1009	-12.0	PR
1041	-13.0	PR
1034	-13.0	SD
1030	-14.0	SD
1010	-14.0	SD
1031	-16.0	SD
1040	-20.0	SD
1004	-20.0	SD
1007	-22.0	PR
1035	-24.0	PR
1020	-24.0	PR
1044	-26.0	PR
1042	-27.0	PR
1039	-27.0	SD
1015	-27.0	PR
1016	-29.0	PR
1026	-33.0	PR
1028	-34.0	PR
1013	-36.0	PR
1021	-37.0	PR
1048	-41.0	PR
1006	-42.0	PR
1022	-43.0	PR
1025	-44.0	CR
1049	-47.0	PR

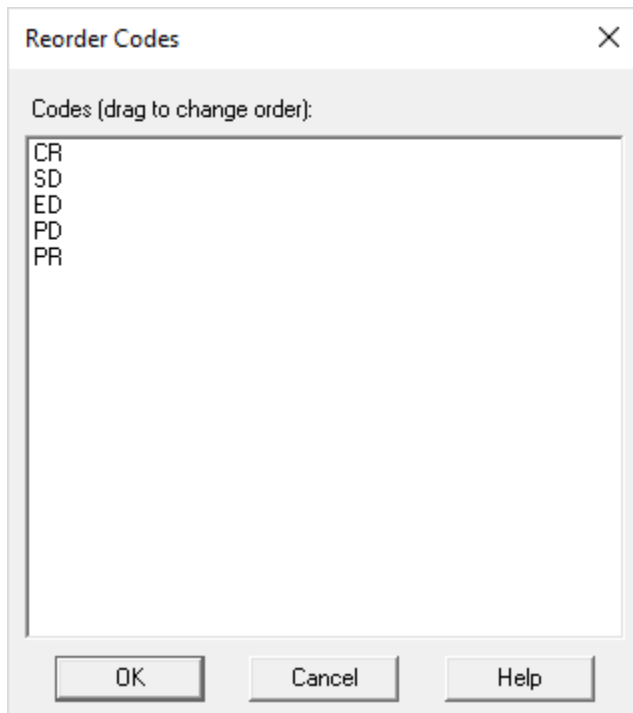| 1012	-48.0	PR
1050	-50.0	CR
1037	-55.0	PR
1003	-60.0	PR
1017	-61.0	CR
1008	-66.0	CR
1005	-72.0	PR
1045	-76.0	CR
1024	-81.0	PR
1046	-82.0	ED
1047	-83.0	PR
1027	-83.0	PR
1011	-84.0	CR
1038	-86.0	CR
1032	-86.0	PR
1033	-89.0	PR
1029	-94.0	PR

Waterfall Plot

This pane shows the waterfall plot:

By default, the values are plotted from largest to smallest. Horizontal lines are drawn at the baseline value and at the reference value (if entered). If a coding variable is supplied, the color of the bars indicates the category that each data value belongs to.

Pane Options

This dialog box may be used to reorder the categories.

Reorder Codes   ✕

Codes (drag to change order):

```
CR
SD
ED
PD
PR
```

OK   Cancel   Help

References

Pandya, Niraj J. (2012) "Waterfall Charts in Oncology Trials – Ride the Wave".
https://www.pharmasug.org/proceedings/2012/DG/PharmaSUG-2012-DG13.pdf