

Agenda

- ▶ Introduction
- ▶ Drill-Down Examples
 - Adverse Event
- ▶ Drop-Down Selection Menu

Introduction

Benefits of Drill-Down Feature

- ▶ You're able to Interrogate your graphs
- ▶ Understand your data better

Requirements

▶ Main Requirements

- Must produce graph in HTML
- Knowing how to create graphs using SG Procedures or GTL
- Knowing how you want the drill-down process to work

▶ Additional Requirements

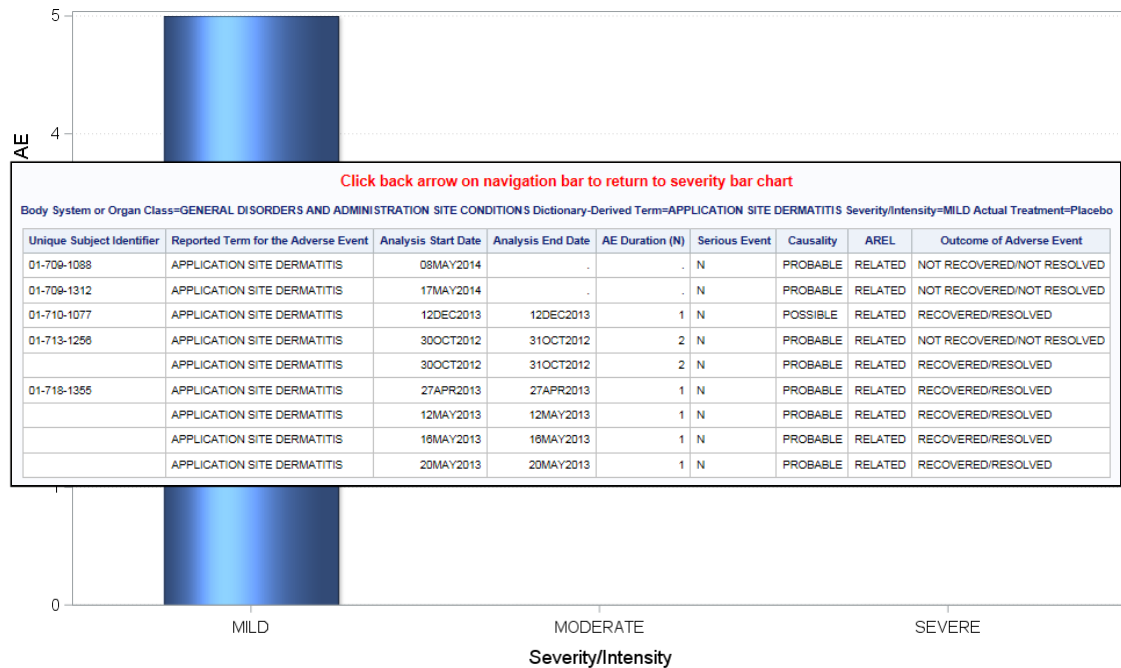
- Use ODS OUTPUT HTML for outputs
- Use URL = option on plot statements
- Use IMAGEMAP = ON within ODS GRAPHICS statement

Adverse Event (AE) Drill-Down Example

Desired AE Drill-Down Output

<https://www.krissharris.co.uk/sgf/2019/3261/output/aes.html>

Interactive AE Example

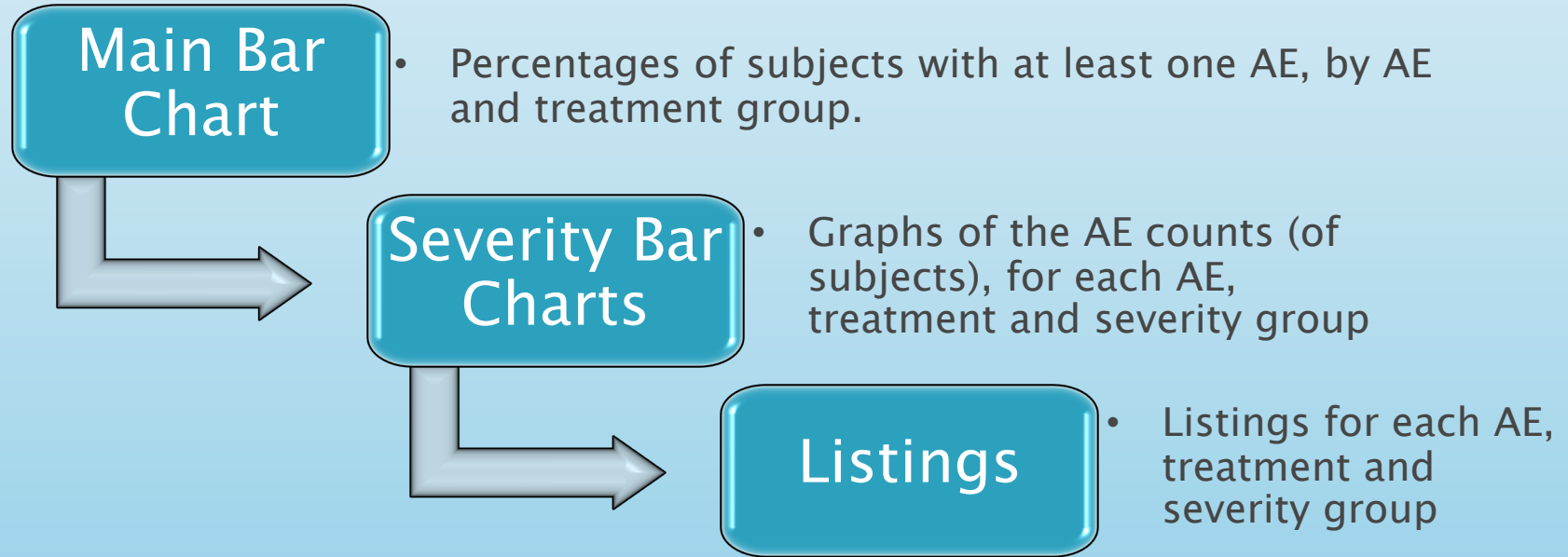


Drill-Down Capabilities for Adverse Events

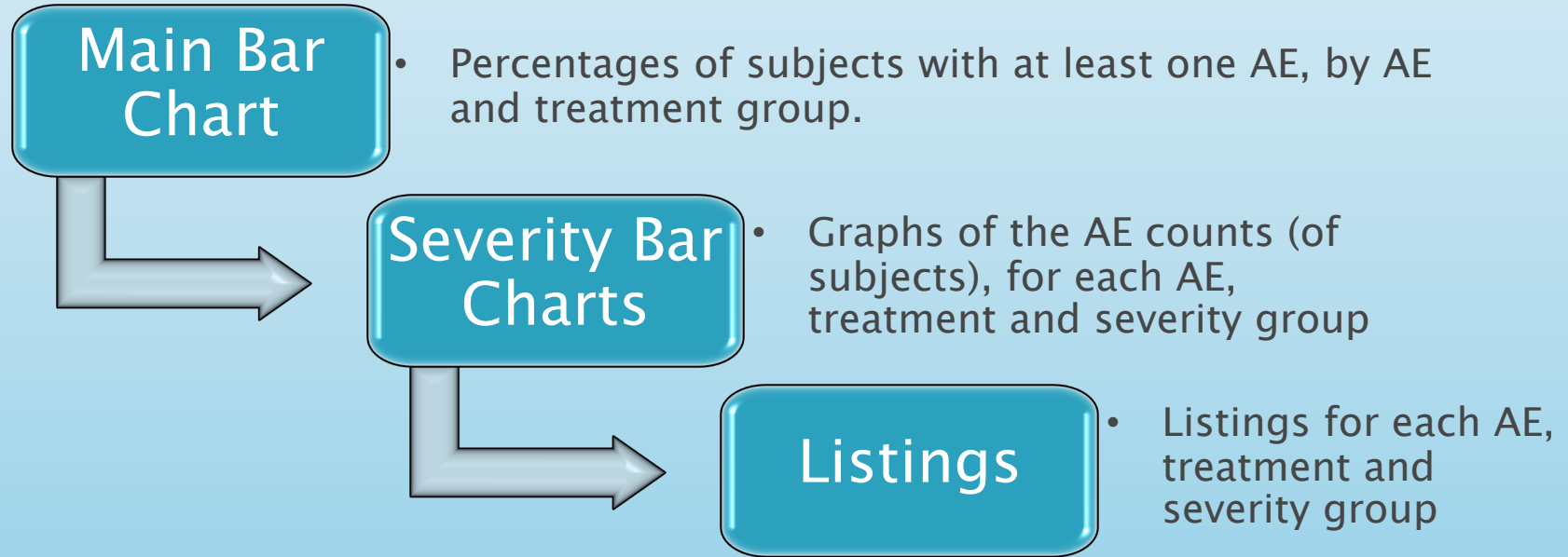
What is the End Goal?

- ▶ Create a barchart for Dermatological adverse event by treatment group
- ▶ For each AE and treatment bar
 - Select a treatment to see a breakdown by severity
- ▶ For each severity bar
 - Select a severity and see underlying data

Interactive AE Example Process Flow



Interactive AE Example Code Flow



Starting with AE Listings

▶ What information is needed?

- Subject identifier
- Start and end date of AE as well as duration
- Seriousness
- Relation to study drug
- Outcome

▶ What level of granularity do we want the listings?

- For each AE?
- For each treatment?
- For each severity?
- For each unique combination of AE, treatment and severity?

Interactive AE Example

Proc Report Code for Listings (Code Inside Macro)

```
ods html path = outp file = "&upttrt..html";
title color=red "Click back arrow on navigation bar to return to
severity bar chart";
proc report data = adae____&x;
  by AEBODSYS AEDECOD AESEV TRTA;
  columns USUBJID AETERM ASTDT AENDT ADURN AESER AEREL AREL
    AEOUT;
  define USUBJID / group;
  break after USUBJID / skip;
run;
ods html close;
```

Interactive AE Example

Proc Report Code for Listings (Macro Code)

```
%macro genlist;
  %let x = 1; %let upttrt = %scan(&allpttrt, &x, '#');
  %do %while (&upttrt ne  );
    proc sort data = adae out = adae____&x;
      where pttrtsev = "&upttrt";
      by AEBODSYS AEDECOD AESEV TRTA USUBJID ASTDT AENDT;
    run;
    PROC REPORT CODE
    %let x = %eval(&x + 1);
    %let upttrt = %scan(&allpttrt, &x, '#');
  %end;
%mend genlist;
%genlist
```

Interactive AE Example

Output of Proc Report Code for Listings

Click back arrow on navigation bar to return to severity bar chart

Body System or Organ Class=GENERAL DISORDERS AND ADMINISTRATION SITE CONDITIONS Dictionary-Derived Term=APPLICATION SITE DERMATITIS Severity/Intensity=MILD Actual Treatment=Placebo

Unique Subject Identifier	Reported Term for the Adverse Event	Analysis Start Date	Analysis End Date	AE Duration (N)	Serious Event	Causality	AREL	Outcome of Adverse Event
01-709-1088	APPLICATION SITE DERMATITIS	08MAY2014	.	.	N	PROBABLE	RELATED	NOT RECOVERED/NOT RESOLVED
01-709-1312	APPLICATION SITE DERMATITIS	17MAY2014	.	.	N	PROBABLE	RELATED	NOT RECOVERED/NOT RESOLVED
01-710-1077	APPLICATION SITE DERMATITIS	12DEC2013	12DEC2013	1	N	POSSIBLE	RELATED	RECOVERED/RESOLVED
01-713-1256	APPLICATION SITE DERMATITIS	30OCT2012	31OCT2012	2	N	PROBABLE	RELATED	NOT RECOVERED/NOT RESOLVED
	APPLICATION SITE DERMATITIS	30OCT2012	31OCT2012	2	N	PROBABLE	RELATED	RECOVERED/RESOLVED
01-718-1355	APPLICATION SITE DERMATITIS	27APR2013	27APR2013	1	N	PROBABLE	RELATED	RECOVERED/RESOLVED
	APPLICATION SITE DERMATITIS	12MAY2013	12MAY2013	1	N	PROBABLE	RELATED	RECOVERED/RESOLVED
	APPLICATION SITE DERMATITIS	16MAY2013	16MAY2013	1	N	PROBABLE	RELATED	RECOVERED/RESOLVED
	APPLICATION SITE DERMATITIS	20MAY2013	20MAY2013	1	N	PROBABLE	RELATED	RECOVERED/RESOLVED

Interactive AE Example

Severity Barcharts Code – Proc Template

```
define statgraph sevfreq&trt;  
  begingraph;  
    entryfootnote textattrs = (size = 12 pt color = green) "<Text1>";  
    entryfootnote " ";  
    entryfootnote textattrs = (size = 12 pt color = red) "<Text2>";  
    layout overlay / yaxisopts = (label = "<Label1>" griddisplay = on  
                                gridattrs = (color = lightgray pattern = dot));  
    barchart category = AESEV response = COUNT / barwidth = 0.5  
      fillattrs = (color = &color) dataskin = sheen url = url1;  
    endlayout;  
  endgraph;  
end;
```

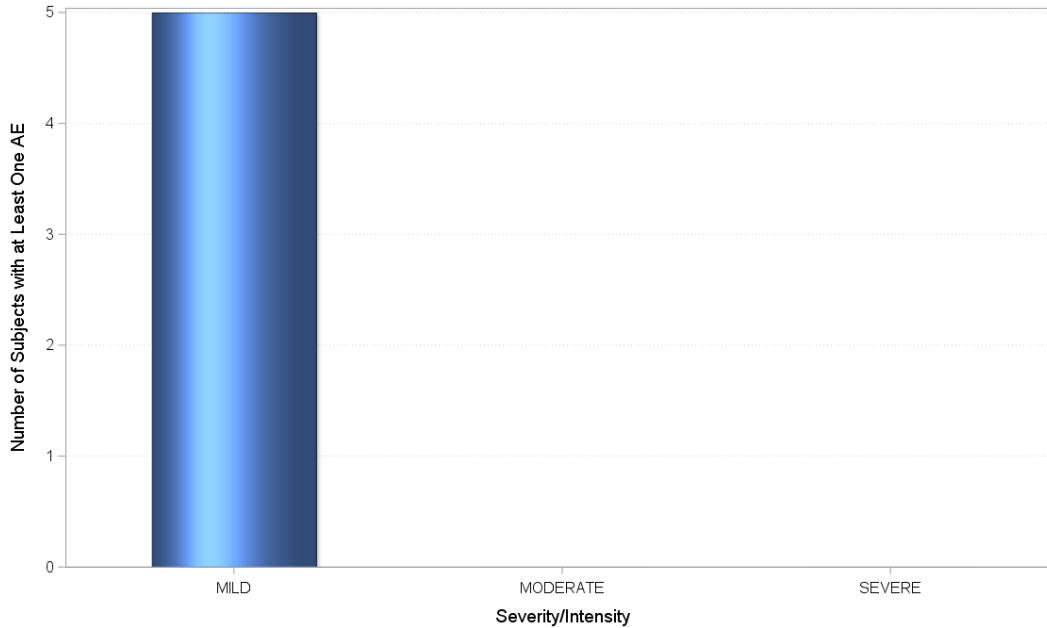
Interactive AE Example

Severity Barcharts Code – Outputting Graphs

```
ods graphics / reset imagemap = on imagename = "&upt"  
    drilltarget = "_self" height = 8in width = 12in;  
  
/* Generate the graph using ODS HTML. */  
ods html path = outp file = "&upt..html";  
proc sgrender data = adaesev template = sevfreq&trt;  
    where pttrt = "&upt";  
    by AEDECOD TRTA;  
run;  
ods html close;
```

Interactive AE Example

Output of Severity Barcharts



Click on severity bar for Preferred Term and Treatment details

Click back arrow on navigation bar to return to main bar chart

Interactive AE Example

Main Bar Chart – Proc Template

```
define statgraph ptfreq;
  begingraph;
    entrytitle "Dermatological Events";
    entryfootnote textattrs = (size = 12 pt) "<Text1>";
    layout overlay / yaxisopts = (label = "<Text2>" griddisplay = on
      gridattrs = (color = lightgray pattern = dot));
    barchart category = AEDECOD response = PERCENT /
      name = "dermevent" group = TRTA groupdisplay = cluster
      barwidth = 0.75 dataskin = sheen url = url0;
    discretelegend "dermevent" / title = "Treatment:";
  endlayout;
endgraph;
end;
```

Interactive AE Example

Main Bar Chart – Outputting Graph

```
/* Enable image mapping in the HTML output and specify a base image name*/  
ods graphics / reset imagemap = on imagename = "aes" drilltarget = "_top"  
height = 8in width = 12in;  
  
/* Generate the drill-down graph using ODS HTML */  
ods html path = outp file = "aes.html";  
proc sgrender data = ptcnt2 template = ptfreq;  
run;  
ods html close;
```

Final AE Drill-Down Output

<https://www.krissharris.co.uk/sgf/2019/3261/output/aes.html>

Drop-Down Selection Menu

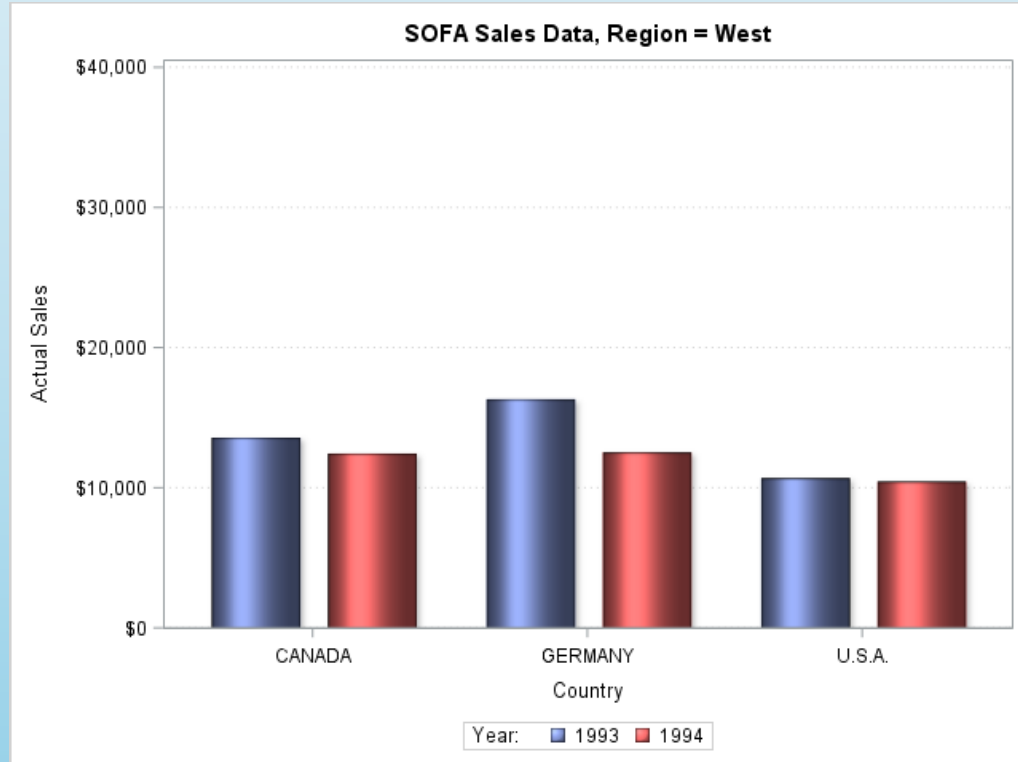
Desired Drop-Down Selection Menu

https://www.krissharris.co.uk/sgf/2019/3261/output/filter/SOFA_all.html

Filter Example – Graphs



Filter Example – Graphs



Drop-Down Selection Menu

Creating Graphs for Each Region – Macro

```
%macro genchart(product=, region=, regioncls=, outname=);  
ods graphics / reset=all imagemap=on  
    imagename="&product._&outname";  
  
ods _all_ close;  
    ods html path=outp file="&product._&outname..html"  
        text="&filterlink."  
        headtext='<script src="myScript.js"></script>  
<link rel="stylesheet" type="text/css"  
    href="myScript.css">';  
proc sgrender data=sales template=drilldown;  
    where product = "&product" and &regioncls.;  
    dynamic product="&product" region="&region";  
run;  
ods html close;  
%mend genchart;
```

Drop-Down Selection Menu

Creating Graphs for Each Region – Macro Calls

```
/* Use the macro to generate the supporting graphs. */  
%genchart(product=SOFA, region=%str(West and East),  
regioncls=%str(region in ('EAST', 'WEST')), outname=all);  
  
%genchart(product=SOFA, region=%str(West),  
regioncls=%str(region in ('WEST')), outname=west);  
  
%genchart(product=SOFA, region=%str(East),  
regioncls=%str(region in ('EAST')), outname=east);
```

Final Drop-Down Selection Menu

https://www.krissharris.co.uk/sgf/2019/3261/output/filter/SOFA_all.html

Conclusion

Conclusions

- ▶ SAS can produce interactive graphics when it is combined with HTML.
- ▶ Interactive graphics allow you to drill-down or filter you graphs, and allows you to understand the data better.

Thank you!

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Questions ?