



Using ODS and XML to produce Excel Output



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Agenda

- Overview
- Step by step SAS to Excel (XML)
- Advanced features
- References
- Questions





Advantages of using XML for Excel Output

- A modern approach of creating Excel output in SAS
- Excel does not have to be installed or referenced
- Leveraging ODS and SAS Procs





ODS

- The Output Delivery System enables you to produce SAS output in a variety of destinations
 - HTML
 - RTF
 - PDF
 - XML
- The output format discussed in this presentation is XML





TAGSET

- Specifies instruction for creating the proper XML output
- ExcelXP Tagset: XML specifications for Excel spreadsheets





From this . . .

	Province	BMIDES	BMI	Y1995	X1995	Y1997	X1997	Y1999	X1999	Y2001	X2001	Y2003	X2003	Y2005	X2005	Y2007	X2007
1	Canada	Underweight	> 18.50	2.7		2.3		2.3		2.9		2.6		2.7		2.6	
2	Canada	Normal weight	18.50 to 24.99	48.5		48.3		47.1		48.4		46.7		46.2		44.4	
3	Canada	Overweight	25.00 to 29.99	34.7		34.3		35.1		32.4		33.3		33.4		32.4	
4	Canada	Obese, class I	30.00 to 34.99	9.8		9.4		10.6		10.8		11		11.3		11.5	
5	Canada	Obese, class II	35.00 to 39.99	2		1.9		2.5		2.7		2.7		2.9		3.1	
6	Canada	Obese, class III	< 40.00	0.9		0.7		1		1		1.2		1.2		1.5	
7	Canada	Not stated		1.3		3.1		1.4		1.8		2.5		2.2		4.6	
8	Newfoundland and Labrador	Underweight	> 18.50	2 E		1.3 E		F		1.5		1.5 E		1.4		2.1 E	
9	Newfoundland and Labrador	Normal weight	18.50 to 24.99	41.4		43.1		39.3		39.4		36.6		35.1		33.3	
10	Newfoundland and Labrador	Overweight	25.00 to 29.99	38.4		37.6		39.5		37.9		38.6		37.2		37.7	
11	Newfoundland and Labrador	Obese, class I	30.00 to 34.99	12.6		12.4		14.6		15.2		14.9		16.2		16.3	
12	Newfoundland and Labrador	Obese, class II	35.00 to 39.99	3 E		3.1 E		3.5 E		3.8		3.3		5.7		3.5	
13	Newfoundland and Labrador	Obese, class III	< 40.00	F		F		F		1.3		1.9 E		1.9		2.2 E	
14	Newfoundland and Labrador	Not stated		F		F		F		1.1 E		3.2		2.4		4.9	
15	Prince Edward Island	Underweight	> 18.50	2 E		2.1 E		F		1.5		1.7 E		1.1 E		1.3 E	
16	Prince Edward Island	Normal weight	18.50 to 24.99	40.7		41.3		37.8		40.6		37.1		37.3		36.5	
17	Prince Edward Island	Overweight	25.00 to 29.99	40.1		40.2		42.6		37.8		37.1		36.4		35.3	
18	Prince Edward Island	Obese, class I	30.00 to 34.99	11.9		9.9		11.8		13.1		14.5		15.5		15.8	
19	Prince Edward Island	Obese, class II	35.00 to 39.99	2.7 E		3.4 E		2.5 E		2.9		4.5		4.4		4	
20	Prince Edward Island	Obese, class III	< 40.00	F		F		F		1.4 E		1.6 E		2.6 E		1.5 E	
21	Prince Edward Island	Not stated		1.8 E		2.3 E		2.1 E		2.6		3.5 E		2.7 E		5.5	
22	Nova Scotia	Underweight	> 18.50	2.1 E		F		F		1.9		2.3		1.7		2.1 E	
23	Nova Scotia	Normal weight	18.50 to 24.99	41.4		41.1		42		41.6		40.7		39.2		38.4	
24	Nova Scotia	Overweight	25.00 to 29.99	38.1		37.1		37		34.1		34.3		35.8		35.1	
25	Nova Scotia	Obese, class I	30.00 to 34.99	13.2		15		14.3		14.5		14.2		14.7		13.7	
26	Nova Scotia	Obese, class II	35.00 to 39.99	2.9 E		2.6 E		3.7 E		4.2		4		3.8		3.8	
27	Nova Scotia	Obese, class III	< 40.00	F		F		F		1.7		1.5		2.1		2.6	
28	Nova Scotia	Not stated		1.8 E		1.8 E		F		2		2.9		2.5		4.3	
29	New Brunswick	Underweight	> 18.50	1.9 E		1.5 E		F		2		1.4		1.9		0.8 E	
30	New Brunswick	Normal weight	18.50 to 24.99	40.6		39.1		39.3		41.9		40.3		36.8		37.4	
31	New Brunswick	Overweight	25.00 to 29.99	39.5		40.4		38.4		34.4		35.5		36.5		35.6	
32	New Brunswick	Obese, class I	30.00 to 34.99	13.6		13.4		14.4		14.7		13.9		15.2		14.2	
33	New Brunswick	Obese, class II	35.00 to 39.99	2.8 E		2.7 E		3 E		3.5		3.9		4.8		3.8	
34	New Brunswick	Obese, class III	< 40.00	0.9 E		F		1.8 E		1.5		2.2		2.5		2.1	
35	New Brunswick	Not stated		F		F		F		1.9		2.8		2.2		6.1	
36	Quebec	Underweight	> 18.50	3.1		2.8		3.2		2.9		3.1		2.8		2.8	
37	Quebec	Normal weight	18.50 to 24.99	53		50.8		52		52		49.7		49.9		46.8	
38	Quebec	Overweight	25.00 to 29.99	31.7		33.4		32.1		31.5		32.9		32.3		31.5	
39	Quebec	Obese, class I	30.00 to 34.99	8.7		8.7		8.6		9.4		10.3		10.7		11.1	
40	Quebec	Obese, class II	35.00 to 39.99	1.6		1.4 E		2.1 E		2.3		2.4		2.6		3.2	
41	Quebec	Obese, class III	< 40.00	0.8 E		F		0.7 E		0.8		1.2		0.9		1.1	
42	Quebec	Not stated		1.2 E		2.5		2.1 E		0.9		1.6		1.6		3.6	
43	Ontario	Underweight	> 18.50	2.8		2.6		2.3		3.1		2.7		2.7		2.7	
44	Ontario	Normal weight	18.50 to 24.99	46.7		48		45.6		47.5		46.5		46.3		43.6	
45	Ontario	Overweight	25.00 to 29.99	35.9		33.1		36.4		32.8		33.3		33.4		33.1	
46	Ontario	Obese, class I	30.00 to 34.99	10.2		9.2		10.9		10.9		11.1		11		11.6	
47	Ontario	Obese, class II	35.00 to 39.99	2.1		1.8		2.8		2.8		2.7		2.8		2.9	
48	Ontario	Obese, class III	< 40.00	1 E		0.7		1 E		1.1		1.1		1.2		1.6	
49	Ontario	Not stated		1.3		4.6		1 E		1.8		2.6		2.5		4.5	

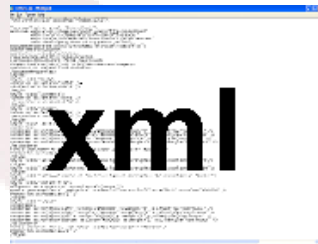
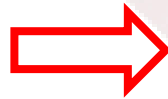
SAS Dağaset



Transition



SAS DATASET



XML FILE



**Microsoft
Excel**





Example of an XML File

```
1stStep.xls - Notepad
File Edit Format Help
<?xml version="1.0" encoding="windows-1252"?>
<?mso-application progid="Excel.Sheet"?>
<workbook xmlns="urn:schemas-microsoft-com:office:spreadsheet"
  xmlns:x="urn:schemas-microsoft-com:office:excel"
  xmlns:ss="urn:schemas-microsoft-com:office:spreadsheet"
  xmlns:html="http://www.w3.org/TR/REC-html140">
<DocumentProperties xmlns="urn:schemas-microsoft-com:office">
  <Author>westrob</Author>
  <LastAuthor>westrob</LastAuthor>
  <Created>2009-06-19T13:59:34</Created>
  <LastSaved>2009-06-19T13:59:34</LastSaved>
  <Company>SAS Institute Inc. http://www.sas.com</Company>
  <Version>9.01.01M3P06172005</Version>
</DocumentProperties>
<Styles>
<Style ss:ID="_body">
  <Interior ss:Pattern="solid" />
  <Protection ss:Protected="1" />
</Style>
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  <Interior ss:Pattern="solid" />
  <Protection ss:Protected="1" />
</Style>
<Style ss:ID="_pages">
  <Interior ss:Pattern="solid" />
  <Protection ss:Protected="1" />
</Style>
<Style ss:ID="table">
<ss:Borders>
<ss:Border ss:Position="Left" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
<ss:Border ss:Position="Right" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
<ss:Border ss:Position="Top" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
<ss:Border ss:Position="Bottom" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
</ss:Borders>
<Font ss:FontName="Arial, Helvetica" ss:Size="10" ss:Color="#000000" />
<Protection ss:Protected="1" />
</Style>
<Style ss:ID="table__1" ss:Parent="table"><Alignment ss:wrapText="1" ss:Horizontal="Left"/>
</Style>
<Style ss:ID="table__" ss:Parent="table"><Alignment ss:wrapText="1" ss:Horizontal="Right"/>
</Style>
<Style ss:ID="table__c" ss:Parent="table"><Alignment ss:wrapText="1" ss:Horizontal="Center"/>
</Style>
<Style ss:ID="contenttitle">
<Alignment ss:wrapText="1" ss:Horizontal="Center"/>
<Font ss:FontName="Arial, Helvetica" ss:Size="15" ss:Italic="1" ss:Bold="1" ss:Color="#000000" />
<Protection ss:Protected="1" />
</Style>
<Style ss:ID="output">
<ss:Borders>
<ss:Border ss:Position="Left" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
<ss:Border ss:Position="Right" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
<ss:Border ss:Position="Top" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
<ss:Border ss:Position="Bottom" ss:Color="#000000" ss:Weight="1" ss:LineStyle="Continuous" />
</ss:Borders>
<Font ss:FontName="Arial, Helvetica" ss:Size="10" ss:Color="#000000" />
<Protection ss:Protected="1" />
</Style>
```





First Step: ODS, Tagsets and Templates

```
libname datain "C:\temp ";
```

```
ods listing close;
```

```
ods tagsets.ExcelXP style=XLsansPrinter2 path "C:\temp" file="1stStep.xls";
```

```
proc report data=datain.bmi nowd;  
run;
```

```
ods tagsets.ExcelXP close
```

```
ods listing;
```





Output from First Step

The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E	F
1	Province	BMIDES	BMI	Y1995	X1995	Y1997
2	Canada	ght	> 18.50	2.7		2.3
3	Canada	weight	24.99	48.5		48.3
4	Canada	t	29.99	34.7		34.3
5	Canada	class I	21.99	9.3		9.4
6	Canada	class II	39.99	2		1.9
7	Canada	class III	< 40.00	0.9		0.7
8	Canada	stated	1.1			3.1
9	and and	ght	> 18.50	2	E	1.3
10	and and	weight	24.99	41.4		43.1

Annotations on the spreadsheet include:

- Add titles
- Change the column widths
- Add column labels

Unformatted Excel Spreadsheet



Second Step: Titles, Footnotes, Column widths and Labels

```
ods tagsets.ExcelXP style=XLsansPrinter2 path="C:\temp" file="2ndStep.xls";
```

```
options(embedded_titles='yes'  
        embedded_footnotes='yes'  
        absolute_column_width='25,15,15,5,2,5,2,5,2,5,2,5,2,5,2');
```

```
proc report data=datain.bmi nowd;
```

```
columns Province  
          Bmides  
          Bmi  
          ("YEAR"  
          Y1995  
          ...  
          Y2007  
          X2007);  
label Bmides = 'STATUS'  
      Bmi    = 'BMI RANGE'  
      ...  
      Y1995 = '1995'  
      Y2007 = '2007';
```

```
title    'BMI RATES FOR THE YEARS 1995 – 2007';  
footnote 'DATA SOURCE: HPHS, CCHS';
```

```
run;
```



Output from Second Step

Microsoft Excel - 2ndStep.xls

File Edit View Insert Format Tools Data Window Help

Table 1 - Detailed and or summa

BMI RATES FOR THE YEARS 1995 - 2007

	YEAR						YEAR				X
	1995	1997	1999	2001	2003	2001	2003	2005	2007		
Canada	2.7	2.3	2.3	2.9	2.6	2.9	2.6	2.7	2.6		
Canada	46.5	48.8	47.1	48.4	46.7	48.4	46.7	46.2	44.4		
Canada	34.7	34.3	35.1	32.4	33.3	32.4	33.3	33.4	32.4		
Canada	10.8	11	11.3	11.5	11.5	10.8	11	11.3	11.5		
Canada	2.9	2.7	2.9	3.1	3.1	2.9	2.7	2.9	3.1		
Canada	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2		
Canada	1.1	1.5	1.5	2.2	2.4	1.1	1.5	1.5	2.2		
Newfoundland	1.5	1.5	1.4	2.1	2.1	1.5	1.5	1.4	2.1		
Newfoundland	39.4	36.6	35.1	33.3	33.3	39.4	36.6	35.1	33.3		
Newfoundland	37.8	38.6	37.2	37.7	37.7	37.8	38.6	37.2	37.7		
Newfoundland	15.2	14.9	16.2	16.3	16.3	15.2	14.9	16.2	16.3		
Newfoundland	3.8	3.3	5.7	3.5	3.5	3.8	3.3	5.7	3.5		
Newfoundland	1.3	1.9	1.9	2.2	2.2	1.3	1.9	1.9	2.2		
Newfoundland	1.1	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.2		
Prince Edward Island	1.3	1.1	1.4	1.8	2.1	1.3	1.1	1.4	1.8		
Prince Edward Island	2.5	2.7	1.1	3.3	3.3	2.5	2.7	1.1	3.3		
Prince Edward Island	40.6	37.1	37.3	36.5	36.5	40.6	37.1	37.3	36.5		
Prince Edward Island	37.8	37.1	36.4	35.3	35.3	37.8	37.1	36.4	35.3		
Prince Edward Island	13.1	14.5	15.5	15.8	15.8	13.1	14.5	15.5	15.8		
Prince Edward Island	2.9	4.5	4.4	4	4	2.9	4.5	4.4	4		
Prince Edward Island	1.4	1.6	2.6	1.5	1.5	1.4	1.6	2.6	1.5		
Prince Edward Island	2.6	3.5	2.7	5.5	5.5	2.6	3.5	2.7	5.5		
Nova Scotia	1.9	2.3	1.7	2.1	2.1	1.9	2.3	1.7	2.1		
Nova Scotia	41.6	40.7	39.2	38.4	38.4	41.6	40.7	39.2	38.4		
Nova Scotia	34.1	34.3	35.8	35.1	35.1	34.1	34.3	35.8	35.1		
Nova Scotia	14.5	14.2	14.7	13.7	13.7	14.5	14.2	14.7	13.7		
Nova Scotia	4.2	4	3.8	3.8	3.8	4.2	4	3.8	3.8		
Nova Scotia	1.7	1.5	2.1	2.6	2.6	1.7	1.5	2.1	2.6		
Nova Scotia	2	2.9	2.5	4.3	4.3	2	2.9	2.5	4.3		
New Brunswick	1.9	1.5	1.9	0.8	0.8	1.9	1.5	1.9	0.8		
New Brunswick	18.50	18.50	24.99	39.3	39.3	18.50	18.50	24.99	39.3		
New Brunswick	40.6	39.1	39.3	41.9	40.3	40.6	39.1	39.3	41.9		
New Brunswick	39.5	40.4	38.4	34.4	35.5	39.5	40.4	38.4	34.4		
New Brunswick	30.00	34.99	13.6	13.4	14.4	30.00	34.99	13.6	13.4		
New Brunswick	13.6	13.4	14.4	14.7	13.9	13.6	13.4	14.4	14.7		
New Brunswick	2.8	2.7	3	3.5	3.9	2.8	2.7	3	3.5		
New Brunswick	0.9	1.8	1.8	1.8	1.5	0.9	1.8	1.8	1.8		
New Brunswick	1.9	2.8	2.2	6.1	6.1	1.9	2.8	2.2	6.1		
Quebec	3.1	2.8	2.5	3.2	2.9	3.1	2.8	2.5	3.2		
Quebec	40.50	34.00	35.00	35.00	35.00	40.50	34.00	35.00	35.00		

- Format the data in the cells
- Add background colours



Third Step: Cell formatting and Background Colours

```
proc report data=datain.bmi nowd;  
  define X1995 /noprint;
```

```
  ...
```

```
  compute X1995:
```

```
    if X1995 = 'F' then call define("_C4_", 'style', 'style=[background=RED]');
```

```
    if X1995 = 'E' then call define("_C4_", 'style', 'style=[background=yellow font_weight=bold  
tagattr = "format:0.0"]');
```

```
  endcomp;
```

```
  ...
```

```
  define Y1995 / style(column) = data_decimal_1;
```

```
  ...
```

```
  column Bmides  
         Bmi  
         ("YEAR"  
         Y1995  
         X1995
```

```
         ...
```

```
run;
```





Output from Third Step

Microsoft Excel - 3rdStep.xls

File Edit View Insert Format Tools Data Window Help

Table 1 - Detailed and or summary

Province	STATUS	2001	2005	2007					
Canada	Underweight								
Canada	Normal weight	46.7	46.2	44.4					
Canada	Overweight	2.8	2.7	2.6					
Canada	Obese, class I	46.7	46.2	44.4					
Canada	Obese, class II	33.3	33.4	32.4					
Canada	Obese, class III	11.0	11.3	11.5					
Canada	Not stated	1.2	1.2	1.5					
Newfoundland and Labrador	Underweight	2.7	2.7	2.7					
Newfoundland and Labrador	Normal weight	1.2	1.2	1.5					
Newfoundland and Labrador	Overweight	2.5	2.2	4.6					
Newfoundland and Labrador	Obese, class I	1.5	1.4	2.1					
Newfoundland and Labrador	Obese, class II	36.6	35.1	33.3					
Newfoundland and Labrador	Obese, class III	38.6	37.2	37.7					
Newfoundland and Labrador	Not stated	14.9	16.2	16.3					
Prince Edward Island	Underweight	3.3	5.7	3.5					
Prince Edward Island	Normal weight	1.3	1.9	1.9					
Prince Edward Island	Overweight	1.3	1.9	2.2					
New Brunswick	Normal weight	18.50 to 24.99	40.6	39.1	39.3	41.9	40.3	36.6	37.4
New Brunswick	Overweight	25.00 to 29.99	39.5	40.4	38.4	34.4	35.5	36.5	36.6
New Brunswick	Obese, class I	30.00 to 34.99	13.6	13.4	14.4	14.7	13.9	15.2	14.2
New Brunswick	Obese, class II	35.00 to 39.99	2.8	2.7	3	3.5	3.9	4.8	3.8
New Brunswick	Obese, class III	< 40.00	0.9		1.8	1.5	2.2	2.5	2.1
New Brunswick	Not stated					1.9	2.8	2.2	6.1
Quebec	Underweight	> 18.50	3.1	2.8	2.5	3.2	2.9	3.1	2.8

- Create multi-sheet output
- Add footnotes to explain background colours

Formatting and Background Colours



Fourth Step: Creating Multi-Sheet Output

```
ods tagsets.ExcelXP style=XLsansPrinter2 path="C:\temp: file="4thStep.xml"  
  options(sheet_interval='bygroup'  
    embedded_titles='yes'  
    embedded_footnotes='yes'  
    absolute_column_width='15,15,5,5,5,5,5,5,5'  
    zoom='160');  
  
proc report data=pres.first nowd;  
  by Province notsorted;  
  ...  
  footnote2 'Background yellow = Use with caution';  
  fotenote3 'Background Red = Too unreliable to be published';  
  ...  
run;
```





Output from Fourth Step

Microsoft Excel - 4thStep.xls

File Edit View Insert Format Tools Data Window Help

160%

Province=Newfoundla

BMI RATES FOR THE YEARS 1995 - 2007

STATUS	BMI RANGE	YEAR						
		1995	1997	1999	2001	2003	2005	2007
Underweight	> 18.50	2	1.3		1.5	1.5	1.4	2.1
Normal weight	18.50 to 24.99	41.4	43.1	39.3	39.4	36.6	35.1	33.3
Overweight	25.00 to 29.99	39.4	37.6	39.5	37.8	38.6	37.2	37.7
Obese, class I	30.00 to 34.99	12.6	12.4	14.6	15.2	14.9	16.2	16.3
Obese, class II	35.00 to 39.99	3	3.1	3.5	3.8	3.3	5.7	3.5
Obese, class III	< 40.00				1.3	1.9	1.9	2.2
Not stated					1.1	3.2	2.4	4.9

DATA SOURCE: NPHS, CCHS
Background yellow = Use with caution
Background Red = Too unreliable to be published

Province=Newfoundland and Labra

Province=Canada Province=Newfoundland and Labra Province=Prince Edward Island Province=Nova Scotia

Multi-sheet output



Final Step: Cleaning up the output

```
ods tagsets.ExcelXP style=XLsansPrinter2 path="C:\temp" file="FinalStep.xls"
options(sheet_interval='bygroup'
sheet_label=' '
suppress_bylines='yes'
embedded_titles='yes'
embedded_footnotes='yes'
absolute_column_width='15,15,5,5,5,5,5,5,5'
zoom='160');
...
title2 #byvalue(Province);
...
```





Final Output

Microsoft Excel - FinalStep.xls

File Edit View Insert Format Tools Data Window Help

Microsoft Office Word 2003 160%

Arial, Helvetica 10 B I U

L10

	A	B	C	D	E	F	G	H	I	J
1	BMI RATES FOR THE YEARS 1995 - 2007									
2	Newfoundland and Labrador									
3										
4			YEAR							
5	STATUS	BMI RANGE	1995	1997	1999	2001	2003	2005	2007	
6	Underweight	> 18.50	2.0	1.3	1.5	1.5	1.4	2.1		
7	Normal weight	18.50 to 24.99	41.4	43.1	39.3	39.4	36.6	35.1	33.3	
8	Overweight	25.00 to 29.99	39.4	37.6	39.5	37.8	38.6	37.2	37.7	
9	Obese, class I	30.00 to 34.99	12.6	12.4	14.6	15.2	14.9	16.2	16.3	
10	Obese, class II	35.00 to 39.99	3.0	3.1	3.5	3.8	3.3	5.7	3.5	
11	Obese, class III	< 40.00				1.3	1.9	1.9	2.2	
12	Not stated					1.1	3.2	2.4	4.9	
13										
14	DATA SOURCE: NPHS, CCHS									
15	Background yellow = Use with caution									
16	Background Red = Too unreliable to be published									
17										
18										
19										
20										
21										
22	a Newfoundland and Labrador									
23										
24										
25										

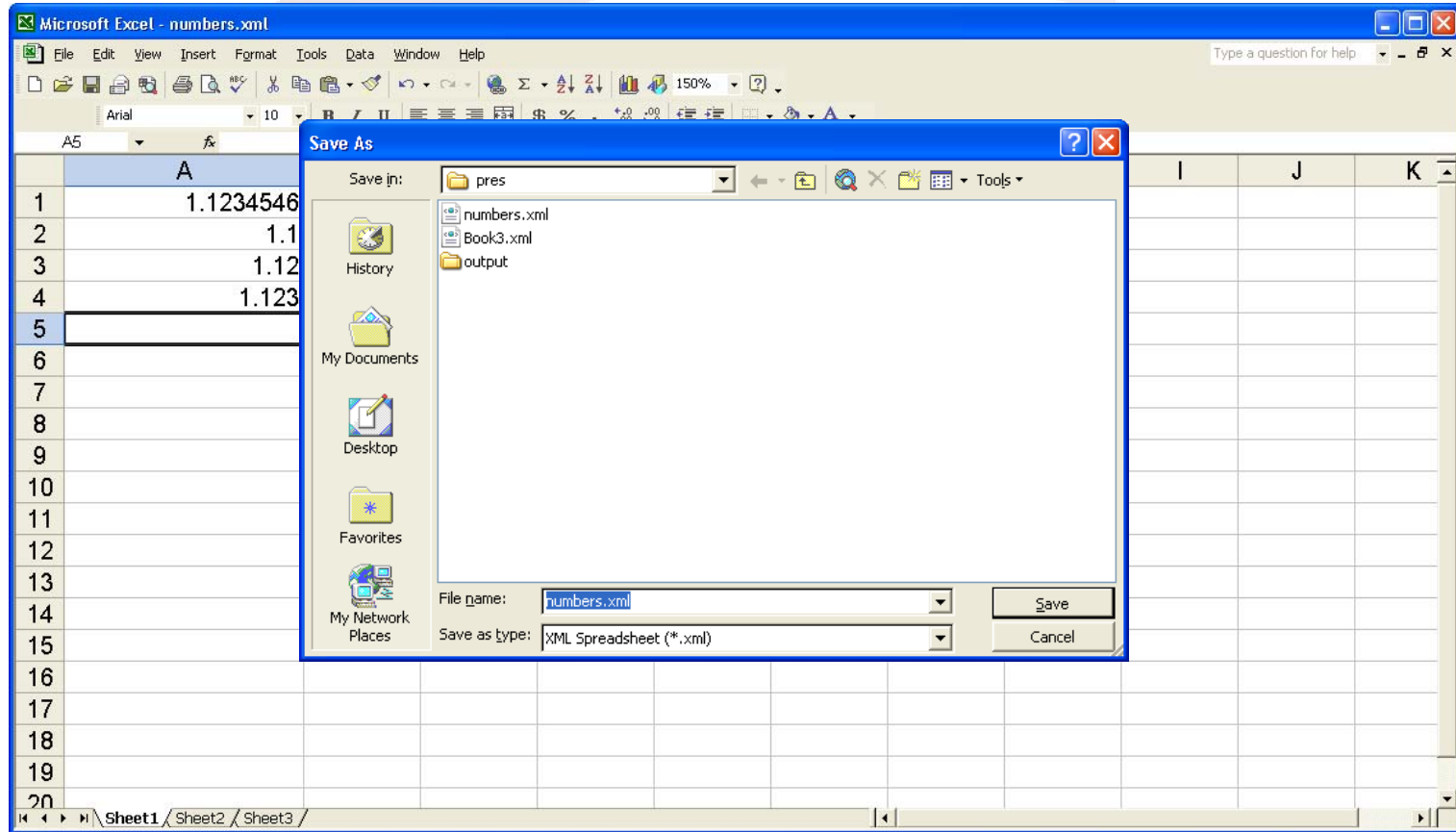
Ready

Canada Newfoundland and Labrador Prince Edward Island Nova Scotia New Brunswick Quebec Ontario



Advanced Features

Number Formats



Some Number Formats



Style Sheet

```
proc template;
```

```
define style Styles.XLNumberFormats;  
parent = styles. XLsansPrinter2;  
style header_id from header /  
font_weight = Light;
```

```
style data_decimal_1 from data /  
tagattr = "format:0.0";
```

```
style data_decimal_2 from data /  
tagattr = "fixed";
```

```
style data_decimal_3 from data /  
tagattr = "format:0.000";
```

```
end;
```

```
run;
```





How to Use It

- Place the following line in the Proc Report
ods tagsets.ExcelXP **style=XLNumberFormats** path ...

...

```
define Y1995 / style(column) = data_decimal_1;
```

...

```
if X1995 = 'E' then call define  
  ("_C4_", 'style', 'style=[background=yellow  
  font_weight=bold  
  tagattr = "format:0.0"]');
```

...





Other Advanced Features

- Advanced formatting using Excel specifications.
- Use of Excel formulas in the SAS code.
- Use of multiple and different procedures in one session
- Formatting for printed documents





To Recap

You can create output using SAS that can be read by your current Excel application

- Without the need to run EXCEL
- Without Using DDE
- Without having Excel installed on the platform you are using
- Without the need to run the SAS Excel Engine





References

Available on the <http://SAS> website

- **Creating Multi-Sheet Excel Workbooks the Easy Way with SAS**, Vincent DelGobbo, SAS Institute Inc., Cary, NC, SAS Global Forum 2007
- **You Use SAS, Your Boss Uses Excel, Guess Where Your Results Are Going to Appear! Using ODS to Create Your Results in Excel**, William E Benjamin Jr, Owl Computer Consultancy, LLC, Phoenix, AZ, SAS Global Forum 2009
- **ExcelXP Tagset Help** SAS 9.1.3, v1.70, 6/5/2007 Release, SAS Institute
- Code for the examples, ExcelXP tagset and style sheet





Using ODS and XML to produce Excel Output

Questions 

