

## Comparing Dates without an Array

Laurie Smith, Cincinnati Children's Hospital Medical Center, Cincinnati, OH

### ABSTRACT

This macro will help a beginner or better SAS® user compare dates for a subject in separate observations against each other without using a transpose with an array. Proc sql allows a user to compare and retain dates that satisfy a defined condition, creating a final dataset with those desired dates.

### INTRODUCTION

As a SAS® programmer, often programming data quality checks or preparing data for analysis by subsetting per a date comparison condition is necessary. Dates are often collected in log forms, which could mean not in order or related to a visit, requiring a many-to-many date comparison when necessary. This macro allows a beginner or experienced SAS® Programmer to easily implement these date comparisons. This could be useful for example when comparing adverse event dates against concomitant medications start/end dates.

### BEFORE PROC SQL

In the past, performing a many-to-many date comparison would require a transpose of one of the dates per subject with a merge per subject of the second date with an array definition. Now we can easily use proc sql to perform a many-to-many comparison, with the ability to include conditional statements.

### USING PROC SQL

The example data used to demonstrate this macro are in 3 datasets, one with visit data per subject, one with procedure data per subject, and one with lab result data per subject, all of which contain dates collected in no particular order. For the purposes of this demonstration, only the subject ID (subjid), and dates (visdt, prcddt, and lbdtd, respectively) have been retained.

subjid	visdt	subjid	prcddt	subjid	lbdtd
1-001	01/31/2005	1-001	02/21/2005	1-001	11/10/2005
1-001	02/02/2005	1-001	05/02/2005	1-001	09/27/2005
1-001	06/28/2005	1-001	01/09/2005	1-001	05/05/2005
1-001	08/22/2005	1-001	10/31/2005	1-001	05/23/2005
1-002	01/13/2009	1-002	02/02/2009	1-002	08/07/2009
1-002	05/29/2009	1-002	06/26/2009	1-002	06/20/2009
1-002	10/04/2009	1-002	11/30/2009	1-002	01/03/2009
1-002	10/16/2009	1-002	10/18/2009	1-002	04/27/2003
1-003	02/24/2003	1-003	01/21/2003	1-003	10/05/2003
1-003	05/10/2003	1-003	03/21/2003	1-003	07/05/2003
1-003	06/15/2003	1-003	01/09/2003	1-003	05/26/2003
1-003	06/16/2003	1-003	08/02/2003	1-004	11/09/2006
1-004	01/25/2006	1-004	05/07/2006	1-004	02/23/2006
1-004	06/25/2006	1-004	03/26/2006	1-004	10/18/2006
1-004	08/23/2006	1-004	01/13/2006	1-004	01/16/2006
1-004	09/08/2006	1-005	06/29/2006	1-005	07/24/2006
1-005	03/17/2006	1-005	01/27/2006	1-005	09/29/2006
1-005	05/05/2006	1-005	10/11/2006	1-005	10/22/2006
1-005	05/08/2006	1-005	05/02/2006	1-005	08/09/2006
1-005	08/25/2006	1-006	08/06/2005	1-006	03/08/2005
1-006	05/06/2005	1-006	05/19/2005	1-006	08/26/2005
1-006	06/24/2005	1-006	04/08/2005	1-006	10/29/2005
1-006	08/26/2005	1-006	01/02/2005		
1-006	09/04/2005				

Figure 1. Example of Visit data, Procedure data, Lab data

The macro is straight forward. All data is being accessed from/saved in a SAS library named 'derived' defined using a libname statement. There are 4 parameters:

rdsnm=name of the resulting dataset

dsnm1=dataset with the 1<sup>st</sup> date

dsnm2=dataset with the 2<sup>nd</sup> date

cond=condition statement needed for subsetting the data

```
%macro DateCompare(rdsnm=,dsnm1=,dsnm2=,cond=);  
  proc sql;  
    create table derived.&rdsnm (drop=ssubjid) as  
    select f.*,s.*  
    from derived.&dsnm1 as f join derived.&dsnm2  
  (rename=(subjid=ssubjid)) as s  
    on f.subjid=s.ssubjid and &cond;  
  quit;  
%mend;
```

### OBTAIN ALL PROCEDURES DATES WITHIN 30 DAYS AFTER THE VISIT DATE

Suppose a subset of these datasets with all the procedure dates within 30 days after the visit date are needed. Execute the macro as follows:

```
%DateCompare(rdsnm=visprcd,dsnm1=visdata,dsnm2=prcddata,cond=0<=intck('day'  
,visdt,prcddt,'c')<=30);
```

subjid	visdt	prcddt
1-001	01/31/2005	02/21/2005
1-001	02/02/2005	02/21/2005
1-002	01/13/2009	02/02/2009
1-002	05/29/2009	06/26/2009
1-002	10/04/2009	10/18/2009
1-002	10/16/2009	10/18/2009
1-003	02/24/2003	03/21/2003
1-006	05/06/2005	05/19/2005
1-008	08/29/2005	09/21/2005
1-008	10/29/2005	11/26/2005
1-009	06/27/2009	06/30/2009

Figure 2. Example result of the macro execution

### OBTAIN ALL LAB DATES AT LEAST 90 DAYS AFTER THE PROCEDURE DATE

Similar to above, suppose a subset of these datasets with all the Lab result dates at least 90 days after the any procedure date are needed. Execute the macro as follows:

```
%DateCompare(rdsnm=prcdlb,dsnm1=prcddata,dsnm2=lbddata,cond=intck('day',prcd  
dt,lbd,'c')>=90);
```

subjid	prcdt	lbd
1-001	02/21/2005	11/10/2005
1-001	02/21/2005	05/23/2005
1-001	02/21/2005	09/27/2005
1-001	05/02/2005	11/10/2005
1-001	05/02/2005	09/27/2005
1-001	01/09/2005	11/10/2005
1-001	01/09/2005	05/23/2005
1-001	01/09/2005	05/05/2005
1-001	01/09/2005	09/27/2005
1-002	02/02/2009	08/07/2009
1-002	02/02/2009	06/20/2009
1-003	01/21/2003	04/27/2003
1-003	01/21/2003	05/26/2003
1-003	01/21/2003	07/05/2003
1-003	01/21/2003	10/05/2003
1-003	03/21/2003	07/05/2003
1-003	03/21/2003	10/05/2003
1-003	01/09/2003	04/27/2003
1-003	01/09/2003	05/26/2003
1-003	01/09/2003	07/05/2003
1-003	01/09/2003	10/05/2003
1-004	05/07/2006	11/09/2006
1-004	05/07/2006	10/18/2006
1-004	03/26/2006	11/09/2006
1-004	03/26/2006	10/18/2006
1-004	01/13/2006	11/09/2006
1-004	01/13/2006	10/18/2006
1-005	06/29/2006	10/22/2006
1-005	06/29/2006	09/29/2006
1-005	01/27/2006	07/24/2006
1-005	01/27/2006	08/09/2006
1-005	01/27/2006	10/22/2006

Figure 3. Example result of the macro execution

## CONCLUSION

Many-to-many date comparisons can be a hassle sometimes. But this macro can help alleviate some of that hassle. This macro can easily be modified for full, left, or right join, also for datasets with more related variables.

## CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Laurie Smith  
Cincinnati Children's Hospital Medical Center  
(513) 803-9001  
laurie.bishop@cchmc.org

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.