



A Sequel Better than the Original: Intuitive Ideas Beyond the Basics of Proc SQL

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Writing code normally

Think what you want



Work out way to do it
using several data
sets, lots of sorting
and various data
step trickery



Write the code

Writing code with proc SQL

Think what you want



Write a proc SQL
step that intuitively
describes the idea of
what you want

The idea:

An extra where condition that is dependent on a summary function, where the summary function is calculated using the where and group by clauses.

Example 1.1

“For each subject and parameter, I want to choose baseline as the latest occurring record out of the pre-treatment records.”

```
/* Example of having clause */  
proc sql;
```

```
    create table lb_base as  
    select *  
    from lb_wip  
    where adt lt trtsdt  
    group by usubjid, lbtestcd  
    having adtm=max(adtm);
```

```
quit;
```

	USUBJID	lbseq	LBTESTCD	lbtest	lbcat	lbstresn	lbstresu	visitnum	visit	lbdtc	adt	atm	adtm	trtsdt
1	VERAMED_DUMMY-101001	1	ALT	ALANINE AMINOTRANSFERASE	CHEMISTRY	32.5	U/L	1	SCREENING	2014-04-30	30APR2014	0:53	30APR2014:00:53:25	2014-05-12
2	VERAMED_DUMMY-101001	2	AST	ASPARTATE AMINOTRANSFERASE	CHEMISTRY	22.7	U/L	1	SCREENING	2014-04-30	30APR2014	1:13	30APR2014:01:13:02	2014-05-12
3	VERAMED_DUMMY-101001	3	CRP	C REACTIVE PROTEIN	CHEMISTRY	28.56	NMOL/L	1	SCREENING	2014-04-30	30APR2014	2:15	30APR2014:02:15:07	2014-05-12
4	VERAMED_DUMMY-101001	12	DUMMY	DUMMY MARKER	IRON INDICES	67.22	MCG/L	1	SCREENING	2014-04-30	30APR2014	7:13	30APR2014:07:13:36	2014-05-12
5	VERAMED_DUMMY-101001	4	HCG	CHORIOGONADOTROPIN BETA	CHEMISTRY	.		1	SCREENING	2014-04-30	30APR2014	2:51	30APR2014:02:51:17	2014-05-12
6	VERAMED_DUMMY-101001	6	HCT	HEMATOCRIT	HEMATOLOGY	0.424	L/L	1	SCREENING	2014-04-30	30APR2014	3:55	30APR2014:03:55:25	2014-05-12
7	VERAMED_DUMMY-101001	7	HGB	HEMOGLOBIN	HEMATOLOGY	13.8	G/DL	1	SCREENING	2014-04-30	30APR2014	4:36	30APR2014:04:36:38	2014-05-12
8	VERAMED_DUMMY-101001	13	IRON	IRON	IRON INDICES	10.29825	UMOL/L	1	SCREENING	2014-04-30	30APR2014	7:43	30APR2014:07:43:03	2014-05-12
9	VERAMED_DUMMY-101001	5	PHOS	PHOSPHATE	CHEMISTRY	.		1	SCREENING		.	3:07	.	2014-05-12
10	VERAMED_DUMMY-101001	8	PLAT	PLATELETS	HEMATOLOGY	279	10^9/L	1	SCREENING	2014-04-30	30APR2014	5:07	30APR2014:05:07:18	2014-05-12
11	VERAMED_DUMMY-101001	9	RBC	ERYTHROCYTES	HEMATOLOGY	4.63	10^12/L	1	SCREENING	2014-04-30	30APR2014	5:50	30APR2014:05:50:05	2014-05-12
12	VERAMED_DUMMY-101001	14	TDUMMY	TRANSDUMMY	IRON INDICES	2.7	G/L	1	SCREENING	2014-04-30	30APR2014	8:31	30APR2014:08:31:20	2014-05-12
13	VERAMED_DUMMY-101001	16	TDUMMYSAT	TRANSDUMMY SATURATION	IRON INDICES	15.1	%	1	SCREENING	2014-04-30	30APR2014	9:41	30APR2014:09:41:58	2014-05-12
14	VERAMED_DUMMY-101001	10	WBC	LEUKOCYTES	HEMATOLOGY	5.18	10^9/L	1	SCREENING	2014-04-30	30APR2014	5:57	30APR2014:05:57:35	2014-05-12
15	VERAMED_DUMMY-101004	1	ALT	ALANINE AMINOTRANSFERASE	CHEMISTRY	22.9	U/L	1	SCREENING	2014-08-18	18AUG2014	0:52	18AUG2014:00:52:00	2014-09-03
16	VERAMED_DUMMY-101004	2	AST	ASPARTATE AMINOTRANSFERASE	CHEMISTRY	21.5	U/L	1	SCREENING	2014-08-18	18AUG2014	1:45	18AUG2014:01:45:15	2014-09-03
17	VERAMED_DUMMY-101004	3	CRP	C REACTIVE PROTEIN	CHEMISTRY	.	NMOL/L	1	SCREENING	2014-08-18	18AUG2014	1:57	18AUG2014:01:57:28	2014-09-03
18	VERAMED_DUMMY-101004	12	DUMMY	DUMMY MARKER	IRON INDICES	136	MCG/L	1	SCREENING	2014-08-18	18AUG2014	7:32	18AUG2014:07:32:07	2014-09-03
19	VERAMED_DUMMY-101004	4	HCG	CHORIOGONADOTROPIN BETA	CHEMISTRY	.		1	SCREENING		.	2:47	.	2014-09-03
20	VERAMED_DUMMY-101004	6	HCT	HEMATOCRIT	HEMATOLOGY	0.483	L/L	1	SCREENING	2014-08-18	18AUG2014	3:51	18AUG2014:03:51:45	2014-09-03
21	VERAMED_DUMMY-101004	7	HGB	HEMOGLOBIN	HEMATOLOGY	15.8	G/DL	1	SCREENING	2014-08-18	18AUG2014	4:15	18AUG2014:04:15:07	2014-09-03
22	VERAMED_DUMMY-101004	13	IRON	IRON	IRON INDICES	15.08022	UMOL/L	1	SCREENING	2014-08-18	18AUG2014	7:46	18AUG2014:07:46:07	2014-09-03

Example 1.2

“I want to see all records where there is more than one record within a subject-test-date combination.”

```
/* Another example, finding and viewing duplicates */  
proc sql;  
  
    create table lb_dupout as  
    select *  
    from lb_dups  
    group by usubjid, lbtestcd, lbdtc  
    having count(*) gt 1;  
  
quit;
```

	USUBJID	lbseq	LBTESTCD	lbtest	lbcats	lbstresn	lbstresu	visitnum	visit	lbdtc	adt	atm	adtm	trtsdt
1	VERAMED_DUMMY-101004	2	AST	ASPARTATE AMINOTRANSFERASE	CHEMISTRY	21.5	U/L	1.01	SCREENING	2014-08-18	18AUG2014	1:45	18AUG2014:01:45:15	2014-09-03
2	VERAMED_DUMMY-101004	2	AST	ASPARTATE AMINOTRANSFERASE	CHEMISTRY	21.5	U/L	1	SCREENING	2014-08-18	18AUG2014	1:45	18AUG2014:01:45:15	2014-09-03
3	VERAMED_DUMMY-101004	6	HCT	HEMATOCRIT	HEMATOLOGY	0.483	L/L	1	SCREENING	2014-08-18	18AUG2014	3:51	18AUG2014:03:51:45	2014-09-03
4	VERAMED_DUMMY-101004	6	HCT	HEMATOCRIT	HEMATOLOGY	0.483	L/L	1.01	SCREENING	2014-08-18	18AUG2014	3:51	18AUG2014:03:51:45	2014-09-03
5	VERAMED_DUMMY-101004	26	PHOS	PHOSPHATE	CHEMISTRY	1.06267	MMOL/L	5.01	VISIT 5 WEEK 8	2014-10-29	29OCT2014	15:41	29OCT2014:15:41:23	2014-09-03
6	VERAMED_DUMMY-101004	26	PHOS	PHOSPHATE	CHEMISTRY	1.06267	MMOL/L	5	VISIT 5 WEEK 8	2014-10-29	29OCT2014	15:41	29OCT2014:15:41:23	2014-09-03
7	VERAMED_DUMMY-101004	9	RBC	ERYTHROCYTES	HEMATOLOGY	5.25	10 ¹² /L	1.01	SCREENING	2014-08-18	18AUG2014	5:42	18AUG2014:05:42:54	2014-09-03
8	VERAMED_DUMMY-101004	9	RBC	ERYTHROCYTES	HEMATOLOGY	5.25	10 ¹² /L	1	SCREENING	2014-08-18	18AUG2014	5:42	18AUG2014:05:42:54	2014-09-03
9	VERAMED_DUMMY-101004	40	TDUMMYSAT	TRANSDUMMY SATURATION	IRON INDICES	18.9	%	6.01	VISIT 6 END OF THE STUDY WEEK 12	2014-11-25	25NOV2014	23:39	25NOV2014:23:39:56	2014-09-03
10	VERAMED_DUMMY-101004	40	TDUMMYSAT	TRANSDUMMY SATURATION	IRON INDICES	18.9	%	6	VISIT 6 END OF THE STUDY WEEK 12	2014-11-25	25NOV2014	23:39	25NOV2014:23:39:56	2014-09-03
11	VERAMED_DUMMY-101005	3	DUMMY	DUMMY MARKER	IRON INDICES	213.6	MCG/L	1	SCREENING	2014-08-12	12AUG2014	1:46	12AUG2014:01:46:31	.
12	VERAMED_DUMMY-101005	3	DUMMY	DUMMY MARKER	IRON INDICES	213.6	MCG/L	1.01	SCREENING	2014-08-12	12AUG2014	1:46	12AUG2014:01:46:31	.
13	VERAMED_DUMMY-101010	11	DUMMY	DUMMY MARKER	IRON INDICES	70.6	MCG/L	1	SCREENING	2015-01-12	12JAN2015	6:38	12JAN2015:06:38:30	2015-01-20
14	VERAMED_DUMMY-101010	12	DUMMY	DUMMY MARKER	IRON INDICES	71.2	MCG/L	1	SCREENING	2015-01-12	12JAN2015	7:20	12JAN2015:07:20:17	2015-01-20
15	VERAMED_DUMMY-101011	12	DUMMY	DUMMY MARKER	IRON INDICES	20.32	MCG/L	1	SCREENING	2015-01-19	19JAN2015	7:03	19JAN2015:07:03:23	2015-02-10
16	VERAMED_DUMMY-101011	11	DUMMY	DUMMY MARKER	IRON INDICES	324	MCG/L	1	SCREENING	2015-01-19	19JAN2015	6:56	19JAN2015:06:56:52	2015-02-10
17	VERAMED_DUMMY-101011	9	RBC	ERYTHROCYTES	HEMATOLOGY	4.71	10 ¹² /L	1	SCREENING	2015-01-19	19JAN2015	5:30	19JAN2015:05:30:36	2015-02-10
18	VERAMED_DUMMY-101011	9	RBC	ERYTHROCYTES	HEMATOLOGY	4.71	10 ¹² /L	1.01	SCREENING	2015-01-19	19JAN2015	5:30	19JAN2015:05:30:36	2015-02-10
19	VERAMED_DUMMY-101011	24	TDUMMY	TRANSDUMMY	IRON INDICES	2.57	G/L	4	VISIT 4 WEEK 4	2015-03-10	10MAR2015	14:37	10MAR2015:14:37:25	2015-02-10
20	VERAMED_DUMMY-101011	24	TDUMMY	TRANSDUMMY	IRON INDICES	2.57	G/L	4.01	VISIT 4 WEEK 4	2015-03-10	10MAR2015	14:37	10MAR2015:14:37:25	2015-02-10
21	VERAMED_DUMMY-101012	1	ALT	ALANINE AMINOTRANSFERASE	CHEMISTRY	18.9	U/L	1.01	SCREENING	2015-01-21	21JAN2015	1:09	21JAN2015:01:09:11	2015-01-28
22	VERAMED_DUMMY-101012	1	ALT	ALANINE AMINOTRANSFERASE	CHEMISTRY	18.9	U/L	1	SCREENING	2015-01-21	21JAN2015	1:09	21JAN2015:01:09:11	2015-01-28
23	VERAMED_DUMMY-101012	12	DUMMY	DUMMY MARKER	IRON INDICES	62.52	MCG/L	1	SCREENING	2015-01-21	21JAN2015	7:34	21JAN2015:07:34:47	2015-01-28
24	VERAMED_DUMMY-101012	11	DUMMY	DUMMY MARKER	IRON INDICES	62.2	MCG/L	1	SCREENING	2015-01-21	21JAN2015	7:00	21JAN2015:07:00:15	2015-01-28

The idea:

The on condition of a join can be more than matching key variables; we can add anything as long as it is a valid where condition.

Example 2.1

“I want to merge the baseline value for each subject and parameter,
from my baseline dataset back onto the main dataset, but
only populating it at post-baseline records so that change from baseline
calculations are only carried out where relevant.”

```
/* Post-baseline only merge */  
proc sql;  
  
    create table lb_add_base as  
    select a.*,  
           b.lbstresn as base  
    from lb_wip a left join lb_base b on a.usubjid=b.usubjid and a.lbtestcd=b.lbtestcd and a.adt gt a.trtsdt  
    order by usubjid, lbtestcd, lbdtc;  
  
quit;
```

	USUBJID	lbseq	LBTESTCD	lbtest	lbcat	lbstresn	lbstresu	visitnum	visit	adtm	trtsdt	base
1	VERAMED_DUMMY-101001	1	ALT	ALANINE AMINOTRANSFERASE	CHEMISTRY	32.5	U/L	1	SCREENING	30APR2014:00:53:25	2014-05-12	.
2	VERAMED_DUMMY-101001	28	ALT	ALANINE AMINOTRANSFERASE	CHEMISTRY	32.1	U/L	6	VISIT 6 END OF THE STUDY WEEK 12	04AUG2014:16:57:39	2014-05-12	32.5
3	VERAMED_DUMMY-101001	2	AST	ASPARTATE AMINOTRANSFERASE	CHEMISTRY	22.7	U/L	1	SCREENING	30APR2014:01:13:02	2014-05-12	.
4	VERAMED_DUMMY-101001	29	AST	ASPARTATE AMINOTRANSFERASE	CHEMISTRY	21.8	U/L	6	VISIT 6 END OF THE STUDY WEEK 12	04AUG2014:17:00:59	2014-05-12	22.7
5	VERAMED_DUMMY-101001	3	CRP	C REACTIVE PROTEIN	CHEMISTRY	28.56	NMOL/L	1	SCREENING	30APR2014:02:15:07	2014-05-12	.
6	VERAMED_DUMMY-101001	30	CRP	C REACTIVE PROTEIN	CHEMISTRY	42.84	NMOL/L	6	VISIT 6 END OF THE STUDY WEEK 12	04AUG2014:17:59:34	2014-05-12	28.56
7	VERAMED_DUMMY-101001	11	DUMMY	DUMMY MARKER	IRON INDICES	81.1	MCG/L	1	SCREENING	25APR2014:07:01:09	2014-05-12	.
8	VERAMED_DUMMY-101001	12	DUMMY	DUMMY MARKER	IRON INDICES	67.22	MCG/L	1	SCREENING	30APR2014:07:13:36	2014-05-12	.
9	VERAMED_DUMMY-101001	18	DUMMY	DUMMY MARKER	IRON INDICES	65.66	MCG/L	2	BASELINE	12MAY2014:11:01:47	2014-05-12	.
10	VERAMED_DUMMY-101001	20	DUMMY	DUMMY MARKER	IRON INDICES	668	MCG/L	3	VISIT 3 WEEK 1	19MAY2014:12:07:09	2014-05-12	67.22
11	VERAMED_DUMMY-101001	22	DUMMY	DUMMY MARKER	IRON INDICES	348	MCG/L	4	VISIT 4 WEEK 4	11JUN2014:13:15:57	2014-05-12	67.22
12	VERAMED_DUMMY-101001	27	DUMMY	DUMMY MARKER	IRON INDICES	233	MCG/L	5	VISIT 5 WEEK 8	09JUL2014:16:08:49	2014-05-12	67.22
13	VERAMED_DUMMY-101001	37	DUMMY	DUMMY MARKER	IRON INDICES	186	MCG/L	6	VISIT 6 END OF THE STUDY WEEK 12	04AUG2014:22:03:55	2014-05-12	67.22
14	VERAMED_DUMMY-101001	4	HCG	CHORIOGONADOTROPIN BETA	CHEMISTRY	.		1	SCREENING	30APR2014:02:51:17	2014-05-12	.
15	VERAMED_DUMMY-101001	6	HCT	HEMATOCRIT	HEMATOLOGY	0.424	L/L	1	SCREENING	30APR2014:03:55:25	2014-05-12	.
16	VERAMED_DUMMY-101001	32	HCT	HEMATOCRIT	HEMATOLOGY	0.442	L/L	6	VISIT 6 END OF THE STUDY WEEK 12	04AUG2014:18:52:01	2014-05-12	0.424
17	VERAMED_DUMMY-101001	7	HGB	HEMOGLOBIN	HEMATOLOGY	13.8	G/DL	1	SCREENING	30APR2014:04:36:38	2014-05-12	.
18	VERAMED_DUMMY-101001	33	HGB	HEMOGLOBIN	HEMATOLOGY	14.5	G/DL	6	VISIT 6 END OF THE STUDY WEEK 12	04AUG2014:19:51:39	2014-05-12	13.8
19	VERAMED_DUMMY-101001	13	IRON	IRON	IRON INDICES	10.29825	UMOL/L	1	SCREENING	30APR2014:07:43:03	2014-05-12	.
20	VERAMED_DUMMY-101001	23	IRON	IRON	IRON INDICES	17.46225	UMOL/L	4	VISIT 4 WEEK 4	11JUN2014:14:01:24	2014-05-12	10.29825
21	VERAMED_DUMMY-101001	38	IRON	IRON	IRON INDICES	15.13395	UMOL/L	6	VISIT 6 END OF THE STUDY WEEK 12	04AUG2014:22:38:05	2014-05-12	10.29825
22	VERAMED_DUMMY-101001	5	PHOS	PHOSPHATE	CHEMISTRY	.		1	SCREENING	.	2014-05-12	.
23	VERAMED_DUMMY-101001	17	PHOS	PHOSPHATE	CHEMISTRY	1.21448	MMOL/L	2	BASELINE	12MAY2014:10:09:16	2014-05-12	.

Example 2.2

“Ongoing medication is in SUPPMH and will merge to MH for each subject and MHSEQ, but the character IDVARVAL needs to be matched with numeric MHSEQ to merge properly.”

```
/* Use functions to match character to numeric */
proc sql noprint;

    create table mhplus as
    select a.*,
           b.qval as mhongo
    from sdtm.mh a left join sdtm.suppmh b on a.usubjid=b.usubjid and
           a.mhseq=input(b.idvarval, 3.) and b.idvar="MHSEQ" and b.qnam="MHONGO";

quit;
```

	USUBJID	MHSEQ	MHTERM	MHDECOD	MHBODSYS	MHSOC	MHSTDTC	MHENDTC	mhongo
1	VERAMED_DUMMY-101001	1	DUMMY CONDITION	DUMMY CONDITION	NERVOUS SYSTEM DISORDERS	NERVOUS SYSTEM DISORDERS	2000----		Y
2	VERAMED_DUMMY-101001	2	BRONCHIAL ASTHMA ASTHMA BRONCHIALE	ASTHMA	RESPIRATORY, THORACIC AND MEDIASTINAL DISORDERS	RESPIRATORY, THORACIC AND MEDIASTINAL DISORDERS	1995----		Y
3	VERAMED_DUMMY-101001	3	HYPOTHYROIDISM HYPOTHYREOSE	HYPOTHYROIDISM	ENDOCRINE DISORDERS	ENDOCRINE DISORDERS	2000----		Y
4	VERAMED_DUMMY-101001	4	MIGRAINE MIGRAENE	MIGRAINE	NERVOUS SYSTEM DISORDERS	NERVOUS SYSTEM DISORDERS	1990----		Y
5	VERAMED_DUMMY-101001	5	LYMPHATIC EDEMA LYMPHOEDEMA	LYMPHOEDEMA	VASCULAR DISORDERS	VASCULAR DISORDERS	1960----		Y
6	VERAMED_DUMMY-101001	6	CHRONIC BACK PAIN RUECKENSCHMERZEN	BACK PAIN	MUSCULOSKELETAL AND CONNECTIVE TISSUE DISORDERS	MUSCULOSKELETAL AND CONNECTIVE TISSUE DISORDERS	2000----		Y
7	VERAMED_DUMMY-101001	7	MORBUS BASEDOW	BASEDOW'S DISEASE	ENDOCRINE DISORDERS	ENDOCRINE DISORDERS	1997----		Y
8	VERAMED_DUMMY-101004	1	DUMMY CONDITION	DUMMY CONDITION	NERVOUS SYSTEM DISORDERS	NERVOUS SYSTEM DISORDERS	2003----		Y
9	VERAMED_DUMMY-101004	2	HYPERTENSION	HYPERTENSION	VASCULAR DISORDERS	VASCULAR DISORDERS	2004----		Y
10	VERAMED_DUMMY-101004	3	HEPATITIS A	HEPATITIS A	INFECTIONS AND INFESTATIONS	INFECTIONS AND INFESTATIONS	1987-08--	1987-11--	
11	VERAMED_DUMMY-101004	4	MALARIA	MALARIA	INFECTIONS AND INFESTATIONS	INFECTIONS AND INFESTATIONS	2008-08--	2008-08--	
12	VERAMED_DUMMY-101004	5	APPENDECTOMY	APPENDICECTOMY	SURGICAL AND MEDICAL PROCEDURES	SURGICAL AND MEDICAL PROCEDURES	1961-10--	1961-10--	
13	VERAMED_DUMMY-101004	6	HYPERCHOLESTERIAEMIA	HYPERCHOLESTEROLAEMIA	METABOLISM AND NUTRITION DISORDERS	METABOLISM AND NUTRITION DISORDERS	2008----		Y
14	VERAMED_DUMMY-101010	1	DUMMY CONDITION	DUMMY CONDITION	NERVOUS SYSTEM DISORDERS	NERVOUS SYSTEM DISORDERS	2007-10--		Y
15	VERAMED_DUMMY-101010	2	LUMBAR DISC SLIPPED	INTERVERTEBRAL DISC PROTRUSION	MUSCULOSKELETAL AND CONNECTIVE TISSUE DISORDERS	MUSCULOSKELETAL AND CONNECTIVE TISSUE DISORDERS	1997-06--	2000-11--	
16	VERAMED_DUMMY-101010	3	INSOMNIA	INSOMNIA	PSYCHIATRIC DISORDERS	PSYCHIATRIC DISORDERS	2012----		Y
17	VERAMED_DUMMY-101011	1	DUMMY CONDITION	DUMMY CONDITION	NERVOUS SYSTEM DISORDERS	NERVOUS SYSTEM DISORDERS	1971-05--		Y
18	VERAMED_DUMMY-101011	2	OSTEOPOROSIS	OSTEOPOROSIS	MUSCULOSKELETAL AND CONNECTIVE TISSUE DISORDERS	MUSCULOSKELETAL AND CONNECTIVE TISSUE DISORDERS	2014-07--		Y
19	VERAMED_DUMMY-101011	3	DUMMY CONDITION	BLADDER DISORDER	RENAL AND URINARY DISORDERS	RENAL AND URINARY DISORDERS	1980----		Y
20	VERAMED_DUMMY-101011	4	CHOLECYSTECTOMIE	CHOLECYSTECTOMY	SURGICAL AND MEDICAL PROCEDURES	SURGICAL AND MEDICAL PROCEDURES	1978-10--	1978-12--	

The idea:

A subquery (or nested query) is quite self explanatory; it is a query within a query. This is extremely flexible, especially with understanding of how the subquery interacts with the main query.

Example 3.1

“I want to see data for all subjects that are flagged as screen failures in DM, but do not have a record indicating they failed any inclusion/exclusion criteria in IE.”

```
/* Cross checking screen fails are accounted for in IE */  
proc sql noprint;
```

```
create table scrn_fail_check as  
select *  
from sdtm.dm  
where armcd eq "SCRNFAIL" and usubjid not in (  
    select usubjid  
    from ie_miss  
    where iestresc eq "N"  
    );
```

```
quit;
```

	DOMAIN	USUBJID	SUBJID	RFSTDTC	RFENDTC	RFXSTDTC	RFXENDTC	RFICDTC	RFPENDTC	DTHDTC	DTHFL	SITEID	AGE	AGEU	SEX	ARMCD	ARM	ACTARMCD	ACTARM	COUNTRY
1	DM	VERAMED_DUMMY-101014	014					2015-03-11	2015-03-11			101	75	YEARS	F	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU
2	DM	VERAMED_DUMMY-107012	012					2014-05-13	2014-05-13			107	73	YEARS	F	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU
3	DM	VERAMED_DUMMY-108004	004					2014-07-17	2014-07-17			108	56	YEARS	M	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU
4	DM	VERAMED_DUMMY-202014	014					2014-05-27	2014-05-27			202	68	YEARS	F	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	FIN
5	DM	VERAMED_DUMMY-203027	027					2014-04-15	2014-04-15			203	68	YEARS	M	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	FIN
6	DM	VERAMED_DUMMY-302002	002					2015-02-11	2015-02-11			302	66	YEARS	F	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	CHE

Example 3.2

“The safety population is any subject who received a dose; I want to add this directly onto my main dataset as a 0/1 flag and add a Y/N equivalent.”

```
/* Writing a flag directly to a dataset */
proc sql noprint;

    create table dm_saffn as
    select *,
        (usubjid in(
            select distinct usubjid
            from sdtm.ex where not missing(exdose)
        )) as saffn,
        put(calculated saffn, yn.) as saffl
    from sdtm.dm;

quit;
```

	USUBJID	SUBJID	DTHDTC	DTHFL	SITEID	AGE	AGEU	SEX	RACE	ARMCD	ARM	ACTARMCD	ACTARM	COUNTRY	saffn	saffl
1	VERAMED_DUMMY-101001	001			101	53 YEARS		F	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y
2	VERAMED_DUMMY-101002	002			101	72 YEARS		F	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
3	VERAMED_DUMMY-101003	003			101	61 YEARS		M	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
4	VERAMED_DUMMY-101004	004			101	68 YEARS		M	NA	ARMB	PLACEBO	ARMB	PLACEBO	DEU	1	Y
5	VERAMED_DUMMY-101005	005			101	71 YEARS		F	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
6	VERAMED_DUMMY-101006	006			101	52 YEARS		F	NA	NOTASSGN	NOT ASSIGNED	NOTASSGN	NOT ASSIGNED	DEU	0	N
7	VERAMED_DUMMY-101007	007			101	55 YEARS		F	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
8	VERAMED_DUMMY-101008	008			101	81 YEARS		M	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
9	VERAMED_DUMMY-101009	009			101	72 YEARS		M	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
10	VERAMED_DUMMY-101010	010			101	59 YEARS		F	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y
11	VERAMED_DUMMY-101011	011			101	66 YEARS		F	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y
12	VERAMED_DUMMY-101012	012			101	55 YEARS		F	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y
13	VERAMED_DUMMY-101013	013			101	68 YEARS		F	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
14	VERAMED_DUMMY-101014	014			101	75 YEARS		F	NA	SCRNFAIL	SCREEN FAILURE	SCRNFAIL	SCREEN FAILURE	DEU	0	N
15	VERAMED_DUMMY-101015	015			101	76 YEARS		F	NA	NOTASSGN	NOT ASSIGNED	NOTASSGN	NOT ASSIGNED	DEU	0	N
16	VERAMED_DUMMY-101016	016			101	54 YEARS		F	NA	ARMB	PLACEBO	ARMB	PLACEBO	DEU	1	Y
17	VERAMED_DUMMY-102001	001			102	30 YEARS		F	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y
18	VERAMED_DUMMY-102002	002			102	68 YEARS		M	NA	ARMB	PLACEBO	ARMB	PLACEBO	DEU	1	Y
19	VERAMED_DUMMY-102003	003			102	44 YEARS		F	NA	ARMB	PLACEBO	ARMB	PLACEBO	DEU	1	Y
20	VERAMED_DUMMY-102004	004			102	71 YEARS		F	NA	ARMB	PLACEBO	ARMB	PLACEBO	DEU	1	Y
21	VERAMED_DUMMY-102005	005			102	49 YEARS		M	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y
22	VERAMED_DUMMY-102006	006			102	43 YEARS		M	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y
23	VERAMED_DUMMY-102007	007			102	74 YEARS		F	NA	ARMA	DUMMY DRUG	ARMA	DUMMY DRUG	DEU	1	Y

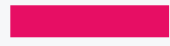
Example 3.3

“I want to derive Base, but I consider the derivation of the baseline values themselves trivial and not worth creating an extra WORK dataset for.” (NOT recommended!)

```
/* Creating a join part with a subquery */  
proc sql noprint;
```

```
create table lb_add_base_2 as  
select a.*,  
       b.lbstresn as base  
from lb_wip a left join (  
  select *  
  from lb_wip  
  where adt lt trtsdt  
  group by usubjid, lbtestcd  
  having adtm=max(adtm)  
) b on a.usubjid=b.usubjid and a.lbtestcd=b.lbtestcd and a.adt gt a.trtsdt  
order by usubjid, lbtestcd, lbdtc;
```

```
quit;
```



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**Thank
You**

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