



HEALTHCARE COST AND
UTILIZATION PROJECT



HCUP Trend Analysis Reference Section

Reference Section

If you have questions concerning the purchase of HCUP databases, please contact the [HCUP Central Distributor](#) by:

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Contacting Technical Assistance

If you have questions about HCUP databases, software tools, supplemental files, or other products, please contact HCUP User Support by email at hcup@ahrq.gov or call (toll-free) 1-866-290-HCUP (4287). International users, please contact HCUP User Support by email. HCUP research staff is trained in epidemiology, health services research, statistics, and economics, and is available to answer questions regarding the application of an HCUP tool or product to your work. Senior programming staff can also advise you on technical questions related to HCUP data and tools. Staff reviews messages daily and responds to inquiries within 3 business days.

Merging the NIS Trends (NIS-Trends) Files and the NIS Core Files

You obtained the complete NIS 1996-2005 and also the NIS Trend files associated with all of these complete NIS. You are planning to run trend analysis on the 10 years of the NIS using SAS.

1. Use the SASload_NIS_Trends_Supplemental_YYYY.SAS to load the NIS Trend File into SAS. This load program is provided to you when you purchase the trend file.
2. Save the NIS Trend files in the same folder as you saved the NIS Core files.
3. Find the two programs associated with the NIS Trend file for a given year. These programs are also provided to you when you purchase the trend file.
 - NIS_Trends_Supplemental_Merge_Driver.sas
 - NIS_Trends_Supplemental_Merge_Macro.sas
4. Modify these programs to work with your computer and use them to merge the Trend Files and the Core Files. Examples of how to modify the programs are presented below:

Modifying NIS_Trends_Supplemental_Merge_Driver.sas

For the NIS prior to 1998:

Please note that prior to 1998, the NIS Core was called as “NCORE”.

```
Options source2
      mprint
      macrogen
      compress = yes
      OBS = MAX
;

%LET year_      = 1996; * Update year value to year of NIS files to be merged;
%LET corepath_  = C:\NIS\&year_.\sasdata\; * Update to path location of current core
data set;
%LET corename_  = NCORE; * Update to name of current core data set;
%LET mrgpath_   = C:\Analysis\Trends_Supplemental; * Update to location to output
the merged data set;
%LET mrgname_   = NIS_Trends_Supplemental_&year_.; * Update to new name of output
merged data set;

%INCLUDE C:\Analysis\Trends_Supplemental\NIS_Trends_Supplemental_Merge_Macro.sas";
* Update to location of the macro program;

%NIS(&year_.,&corepath_.,&corename_.,&mrgpath_.,&mrgname__);

RUN;
```

For the NIS on and after 1998:

The original program includes “%LET corename_ = NIS_CORE_&year_.;”. Please be sure to modify it to %LET corename_ = NIS_&year_.CORE

```
Options source2
      mprint
      macrogen
      compress = yes
      OBS = MAX
;

%LET year_      = 2002; * Update year value to year of NIS files to be merged;
%LET corepath_  = C:\NIS\&year_.\SASDATA\; * Update to path location of current core
data set;
%LET corename_  = NIS_&year_.CORE; * Update to name of current core data set;
%LET mrgpath_   = C:\Analysis\Trends_Supplemental; * Update to location to output
the merged data set;
%LET mrgname_   = NIS_Trends_Supplemental_&year_.; * Update to new name of output
merged data set;

%INCLUDE "C:\Analysis\Trends_Supplemental\NIS_Trends_Supplemental_Merge_Macro.sas";
* Update to location of the macro program;

%NIS(&year_.,&corepath_.,&corename_.,&mrgpath_.,&mrgname__);

RUN;
```

Modifying NIS_Trends_Supplemental_Merge Macro.sas

For the NIS prior to 1998:

Please insert "v6" after LIBIN. This tells SAS that the NIS Core was created using the older SAS programs.

```
%MACRO NIS(yyyy_,inpath_,innname_,outpath_,outname_);  
TITLE "Merging NIS Trends Supplemental &yyyy_. file to original NIS data set";  
LIBNAME LIBIN v6 "&INPATH_.";  
LIBNAME LIBOUT "&OUTPATH_.";  
* List contents of NIS Trends Supplemental file ;  
PROC CONTENTS DATA= LIBIN.NIS_Trends_Supplemental_&yyyy_.;  
TITLE2 "Contents of SAS data set NIS_Trends_Supplemental_&yyyy_.";  
RUN;
```

For the NIS on and after 1998:

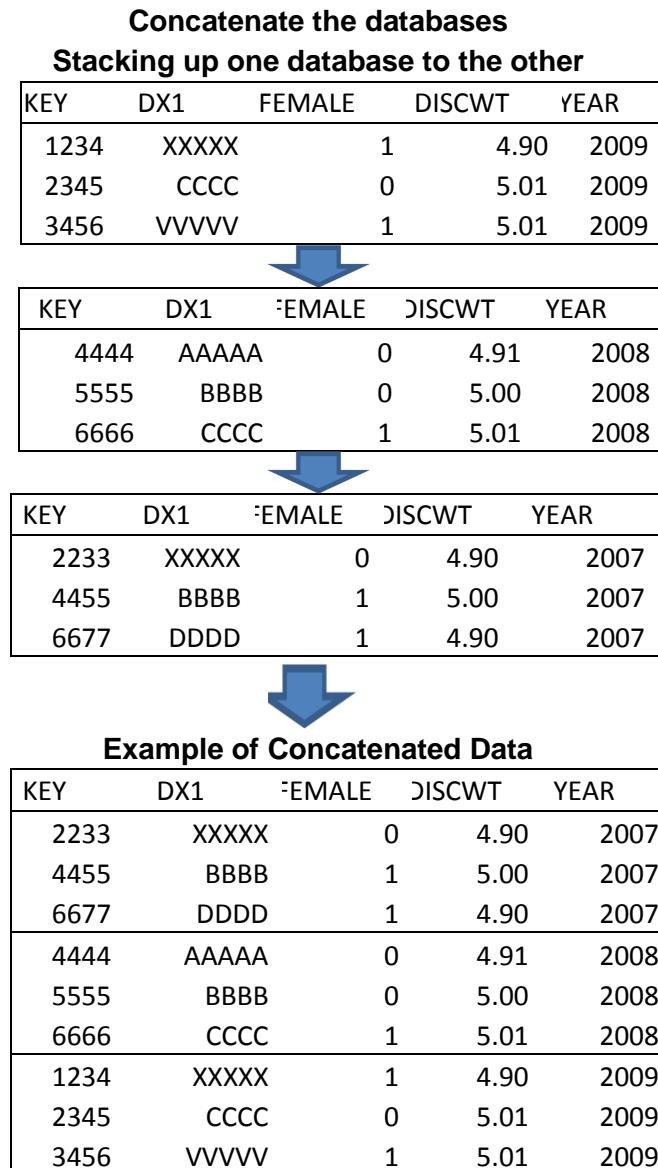
No changes are usually necessary on the NIS_Trends_Supplemental_Merge Macro.sas

1. Run modified NIS_Trends_Supplemental_Merge_Driver.sas for each year between 1996-2002. You do not need to manually run NIS_Trends_Supplemental_Merge Macro.sas. The NIS Trend file will be merged with the NIS Core file.
2. You will have in C:\Analysis\Trends_Supplemental
NIS_Trends_Supplemental_1996
NIS_Trends_Supplemental_1997
NIS_Trends_Supplemental_1998
NIS_Trends_Supplemental_1999
NIS_Trends_Supplemental_2000
NIS_Trends_Supplemental_2001
NIS_Trends_Supplemental_2002
3. The next step is to combine all these trend files and the complete NIS 2003-2005. The size of the combined NIS data for 10 years will be large. Subsetting the data files to keep the size smaller.

When you combine multiple years of the NIS, please concatenate them.

Concatenating Multi-year NIS and Using Weights to Calculate Estimates

Concatenating databases: This is like “stacking up one database on the other database”.



```
%Let Obs_ = MAX;

Options Obs=&Obs_
      FormChar='|---|+|---+=|#/|<>*' ;
      Libname TREND96 "\Server\NIS\1996\SASData\Longitudinal";
      Libname TREND97 "\Server\NIS\1997\SASData\Longitudinal";
      Libname TREND98 "\Server\NIS\1998\SASData\Longitudinal";
      Libname TREND99 "\Server\NIS\1999\SASData\Longitudinal";
```

```

Libname TREND00 "\Server\NIS\2000\SASData\Longitudinal";
Libname TREND01 "\Server\NIS\2001\SASData\Longitudinal";
Libname TREND02 "\Server\NIS\2002\SASData\Longitudinal";
Libname NIS98 "\Server\NIS\1998\SASData";
Libname NIS99 "\Server\NIS\1999\SASData";
Libname NIS03 "\Server\NIS\2003\SASData";
Libname NIS04 "\Server\NIS\2004\SASData";
Libname NIS05 "\Server\NIS\2005\SASData";
Libname OUT "\Server\Trends_Supplemental";

/* Take care of changes associated with NIS_STRATUM */
/* NIS_STRATUM is included in the NIS hospital files in 1998 and 1999. Merging the
Core files with the Trend Files does not take care of this change */
/* You need to merge hospital file with the merged NIS Core file and Trend file */

/* The 1998 merged Core_Trend file is merged with hospital file */

PROC SORT DATA=TREND98.nis_core_trends_supp_1998 OUT=S_CORE_TREND98;
  BY HOSPID;
RUN;

PROC SORT DATA=NIS98.nis_1998_hospital OUT=S_HOSP98;
  BY HOSPID;
RUN;

DATA OUT.CORE_TREND98;
  MERGE S_CORE_TREND98 (in=a) S_HOSP98;
  BY HOSPID;
  IF a;
RUN;

PROC PRINT DATA=OUT.CORE_TREND98 (OBS=10);
  VAR KEY HOSPID NIS_STRATUM;
  TITLE "Check Merged file";
RUN;

/* The 1999 merged Core_Trend file is merged with hospital file */

PROC SORT DATA=TREND99.nis_core_trends_supp_1999 OUT=S_CORE_TREND99;
  BY HOSPID;
RUN;

PROC SORT DATA=NIS99.nis_1999_hospital OUT=S_HOSP99;
  BY HOSPID;
RUN;

DATA OUT.CORE_TREND99;
  MERGE S_CORE_TREND99 (in=a) S_HOSP98;
  BY HOSPID;
  IF a;
RUN;

PROC PRINT DATA=OUT.CORE_TREND99 (OBS=10);
  VAR KEY HOSPID NIS_STRATUM;
  TITLE "Check Merged file";
Run;

/* Concatenate the merged NIS Core_Trend Files 1996 - 2005 */
/* For 1998 and 1999, use CORE_TREND98 and CORE_TREND99 just created */
/* Concatenate the merged Trend_Core files for 1996-2002. No trend files are
available for the NIS 2003-2005 */
/* Subset the data: Keep discharges with Female=1*/

```

```

DATA OUT.MULTI_NIS;
  SET TREND96.nis_core_trends_supp_1996 (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID
    NIS_STRATUM DX1)
    TREND97.nis_core_trends_supp_1997 (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID
    NIS_STRATUM DX1)
    OUT_CORE_TREND98 (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID NIS_STRATUM DX1)
    OUT_CORE_TREND99 (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID NIS_STRATUM DX1
    In=F99)
    TREND00.nis_core_trends_supp_2000 (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID
    NIS_STRATUM DX1)
    TREND01.nis_core_trends_supp_2001 (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID
    NIS_STRATUM DX1)
    TREND02.nis_core_trends_supp_2002 (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID
    NIS_STRATUM DX1)
    NIS03.nis_2003_core (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID NIS_STRATUM
    DX1)
    NIS04.nis_2004_core (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID NIS_STRATUM
    DX1)
    NIS05.nis_2005_core (KEEP=TOTCHG FEMALE YEAR DISCWT HOSPID NIS_STRATUM
    DX1);

  IF FEMALE=1;
  IF F99 AND YEAR ^= 1999 THEN DELETE; /* The NIS 1999 includes some discharges
    with YEAR=1998. We exclude them */

  IF DX1="4280" THEN CHF=1; /* Flag discharges with DX1="4280" */
  ELSE CHF=0;
Run;

PROC FREQ DATA=OUT.MULTI_NIS;
  TABLES YEAR*CHF/LIST MISSING;
  TITLE "Check the Concatenated Data";
RUN;

ODS LISTING CLOSE;
ODS HTML FILE="\Server\Trends_Supplemental\ANALYSIS_NIS_TREND.xls" RS=NONE
STYLE=MINIMAL;
PROC MEANS DATA=OUT.MULTI_NIS;
  CLASS YEAR CHF;
  WEIGHT DISCWT;
  VAR TOTCHG;
  TITLE "Total charges - patients with DX1, CHF";

PROC SURVEYFREQ DATA=OUT.MULTI_NIS MISSING;
  WEIGHT DISCWT;
  CLUSTER HOSPID;
  STRATA NIS_STRATUM;
  TABLES YEAR*CHF;
  TITLE "Total discharge - patients with DX1, CHF";
RUN;
ODS HTML CLOSE;
ODS LISTING;

```

Output: Total charges - patients with DX1, CHF

The MEANS Procedure

Analysis Variable : TOTCHG I:Total charges (cleaned)								
Calendar year	CHF	N Obs	N	Mean	Std Dev	Min	Max	
96	0	743494	3662168	9569.12	7780.64	1	0000000	
	1	95361	94234	1041.97	7213.86	1	1222405	
97	0	105194	4017931	10140.08	13430.96	1	5706195	
	1	06194	105098	1610.83	10562.85	15	1479883	
1998	0	924574	3839809	9616.01	12570.88	25	1000000	
	1	04150	102572	2357.57	10339.64	25	799171	
1999	0	128335	4018897	1203.76	16232.37	25	1000000	
	1	05434	103444	3059.82	15934.97	25	904431	
2000	0	305767	4004853	2429.75	50771.38	25	1000000	
	1	11145	104117	4587.89	55793.14	45	1000000	
2001	0	300448	4246071	13463.9	54843.15	25	1000000	
	1	11347	110478	6044.26	56049.85	28	962788	
2002	0	546683	4433950	5405.54	51753.34	25	999791	
	1	12363	110649	9271.95	69930.6	54	994328	
2003	0	596096	4498603	7584.42	70828.84	25	999945	
	1	11650	110315	1822.46	73891.03	39	980478	
2004	0	507065	4516251	8290.63	59477.21	25	999891	
	1	06888	105640	3406.46	75953.42	30	928162	
2005	0	593024	4520102	9918.71	76462.56	25	999720	
	1	99620	98804	4961.23	82514.8	29	995531	

Output: Total discharges - patients with DX1, CHF

The SURVEYFREQ Procedure

Data Summary	
Number of Strata	115
Number of Clusters	5258
Number of Observations	43914832
Number of Observations Used	43896290
Number of Obs with Nonpositive Weights	18542
Sum of Weights	216174393

Table of YEAR by CHF							
YEAR	CHF	frequency	Weighted frequency	d Dev of /gt Freq	ercent	d Err of ercent	
96	0	3735731	19584176	712053	9.0594	0.3119	
	1	95267	512015	18448	0.2369	0.0082	
	Total	3830998	20096191	727319	9.2963	0.3185	
97	0	4094624	19931379	691434	9.22	0.3044	
	1	106079	522520	17683	0.2417	0.0079	
	Total	4200703	20453899	706162	9.4618	0.3109	
1998	0	3924574	20019830	871735	9.261	0.3715	
	1	104150	530890	22373	0.2456	0.0096	
	Total	4028724	20550719	891883	9.5065	0.38	
1999	0	4128335	20318577	836059	9.3992	0.3549	
	1	105434	520607	20250	0.2408	0.0087	
	Total	4233769	20839185	853609	9.64	0.3622	
2000	0	4305767	21034558	939112	9.7304	0.3982	
	1	111145	545782	22971	0.2525	0.01	
	Total	4416912	21580340	959593	9.9828	0.4069	
2001	0	4300448	21430409	934170	9.9135	0.4025	
	1	111347	554440	23212	0.2565	0.0102	
	Total	4411795	21984848	955017	10.17	0.4116	
2002	0	4546683	21853932	961360	10.1094	0.4081	
	1	112363	543992	23573	0.2516	0.0101	
	Total	4659046	22397925	982583	10.361	0.4171	
2003	0	4596096	21997655	973880	10.1759	0.4165	
	1	111650	536049	23669	0.248	0.0102	
	Total	4707746	22533704	995008	10.4239	0.4255	

2004	0	4607065	22241173	989807	10.2885	0.4267
	1	106888	516385	22504	0.2389	0.0098
	Total	4713953	22757558	1009835	10.5274	0.4353
2005	0	4593024	22491063	1011429	10.4041	0.4587
	1	99620	488962	21048	0.2262	0.0096
	Total	4692644	22980025	1030201	10.6303	0.4672
Total	0	42832347	210902752	3205221	97.5614	0.0221
	1	1063943	5271641	84787	2.4386	0.0221
	Total	43896290	216174393	3275496	100	

Output: Total charges - Pediatric patients with DX1, Asthma

The MEANS Procedure

Analysis Variable : TOTCHG Total charges (cleaned)								
Calendar year	STHMA	N Obs	N	Mean	Std Dev	Minimum	Maximum	
2003	0	959994	2892199	10193.95	53287.86	25	999807	
	1	24135	23904	9602.64	20990.73	29	817271	
2006	0	110455	3050074	13028.53	54109.61	25	999999	
	1	20869	20745	12220.82	18314.55	45	538112	
2009	0	382052	3318024	16826.97	82262.9	100	1499997	
	1	25094	24965	15087.37	25740.73	514	783592	

Output: Total discharges - Pediatric patients with DX1, Asthma

The SURVEYFREQ Procedure

Data Summary	
Number of Strata	63
Number of Clusters	5882
Number of Observations	9522599
Sum of Weights	22338177.2

Table of YEAR by ASTHMA						
YEAR	ASTHMA	Frequency	Weighted Frequency	Std Dev of Wgt Freq	Percent	Std Err of Percent
2003	0	2959994	7367828	157045	32.9831	0.4379
	1	24135	41333	2509	0.185	0.0106
	Total	2984129	7409162	158197	33.1682	0.4413
2006	0	3110455	7524118	159134	33.6828	0.3556
	1	20869	34694	2354	0.1553	0.0098
	Total	3131324	7558812	160147	33.8381	0.3579
2009	0	3382052	7332496	144413	32.825	0.3832
	1	25094	37707	3300	0.1688	0.0143
	Total	3407146	7370203	145625	32.9938	0.3867
Total	0	9452501	22224442	377787	99.4908	0.0253
	1	70098	113735	6206	0.5092	0.0253
	Total	9522599	22338177	380409	100	