



U.S. Department of Health and Human Services  
Assistant Secretary for Planning and Evaluation  
Office of Disability, Aging and Long-Term Care Policy



# **ESTIMATING THE PREVALENCE OF LONG-TERM DISABILITY FOR AN AGING POPULATION: TECHNICAL DOCUMENTATION**

April 1991

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# **ESTIMATING THE PREVALENCE OF LONG-TERM DISABILITY FOR AN AGING POPULATION: Technical Documentation**

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This document is the technical manual to accompany the paper, Estimating the Prevalence of Long-term Disability for an Aging Society.<sup>1</sup> That paper describes the results of research projecting to the year 2040 the numbers of older persons who will have long-term care needs in the future, under varying assumptions about the future of mortality and disability. This document describes in detail the methods, tasks, and procedures involved in those projections. Each step in the process is outlined, and the computer programs that accomplish each of these steps are included, with documentation.

There were three general steps in the projection of disability: 1) calculating beginning rates of disability; 2) trending disability rates over time, allowing for the possibilities that health of the older population may improve, stay about the same, or worsen; 3) applying the disability rates to the survived population, allowing for three different mortality scenarios (continuation of recent gains in life expectancy, faster improvement in mortality, slower improvement in mortality). Each of these three basic procedures involved multiple tasks and computer programs and generated computer data files. Details about these tasks, data files, and programs, are provided below.

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<sup>1</sup> See <http://aspe.hhs.gov/daltcp/reports/agsoces.htm>.

# CALCULATING BEGINNING DISABILITY RATES

Two national data sets were used as the basis for the beginning rates of disability among the older population: the National Long-Term Care Survey (NLTC) of 1982, which provided information on the community-based older population, and the National Nursing Home Survey (NNHS) of 1985, which surveyed institutionalized older people. Further information on these data sets is provided in the text of the overview paper, Estimating the Prevalence of Long-Term Disability for an Aging Society.<sup>2</sup> The rates of disability calculated from the two subpopulations were combined to provide overall disability rates for the older population. These rates were calculated for males and females for single years of age up to age 94; ages 95 through 99, and 100 plus were aggregated. Following are the detailed steps in this process.

1. Create disability measure. Based on past research and current practice regarding the measurement of disability, a three-category ordinal scale of level of disability was created. The three categories are: little or no disability, moderate disability, severe disability. Further discussion of these levels of disability, and the items that comprise the scale, are provided in the overview paper.
2. Calculate individual disability scores. After carefully selecting ADL-IADL items that were comparable on the two surveys, individual scores on each of the ADL-IADL items were calculated. Based on these responses, each individual was assigned to a disability category or level. Individuals in the NLTC with 7 or more missing items, and individuals in the NNHS with 5 or more missing items, were eliminated from the sample; in the remaining cases mean substitution was used for missing items. Details about the ADL and IADL items, and the program that calculates disability scores for the NLTC and NNHS samples are on pages 1-12 of the Program Appendix to this document.
3. Calculate proportions of older persons at three levels of disability. The age-and-sex specific proportions of individuals at each level of disability were calculated for each of the two subsamples. For the NNHS sample, this was a straightforward percentage taken from a frequency table of disability levels. The program which calculates these proportions is on page of the Program Appendix. For the NLTC, this calculation was more complicated because of the sampling procedure used for the detailed interviews. Anyone who reported no disability at the time of the screening interview was eliminated from the detailed sample. Thus, the detailed sample includes only those individuals who have at least one ADL or IADL impairment. To account for the excluded persons who actually comprise a large part of the "little or no" category, the proportions at various levels of disability in the NLTC detailed sample were weighted. The adjustment factor was an age-sex specific ratio of number in the detailed sample to number in the total sample. This factor was then multiplied times the proportion

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<sup>2</sup> See <http://aspe.hhs.gov/daltcp/reports/agsoces.htm>.

calculated for the detailed sample only. This adjustment effectively alters the denominator of the proportion to be equivalent to the total sample age-sex group, instead of the detailed sample age-sex group. Consider a hypothetical example of 120 70-year old women in the detailed sample; 60 of these women were moderately disabled. From just these figures, one might conclude that 50% of 70-year old women are moderately disabled. However, that proportion is exaggerated, because those 70-year old women with no disability were not included in the denominator. So, if there were 200 70-year old women in the total sample, that proportion calculated from the detailed sample (60/120) would be multiplied by 120/200; this procedure in effect alters the denominator to reflect the total sample rather than the detailed sample only. The logic of the adjustment factor is as explained above, the actual adjustment weights were calculated as five-year moving averages of the single-year weights, to compensate for variations in sample size and sampling error. The program that calculates the appropriate adjustment factors for each age-sex group, and further details on the moving-average procedure, is in the Appendix. The age-sex specific “little or no” disability category was then calculated by subtracting the sum of the adjusted moderate and severe proportions from 1.

4. Combine disability rates from nursing home sample with those from community-based sample. Since our goal during this phase of the project was to estimate overall prevalence of disability, it was necessary to combine information on the two subpopulations (nursing home and community-based). This was accomplished by weighting the information on the two subgroups according to their representation in the total older population.

Institutionalization rates were calculated, then age-sex specific community-based were calculated as (1 - the rates of institutionalization) for that age-sex group.

For the numerator of the age-sex specific rates of institutionalization, estimates of the numbers of older persons in institutions were taken from the 1980 Census Special Report<sup>3</sup> on persons in institutions and other groups quarters. It is important to note that, for this research, institutionalization was not defined as inclusively as is often the case. For example, the Bureau of the Census typically distinguishes two general categories of living arrangements: in households or in group quarters (including institutions and other noninstitutional group quarters). Since this research required information specifically on older persons living in nursing homes (to weight our nursing home sample appropriately), only those older persons living in “homes for the aged” were counted in the numerator of the rate of institutionalization. Therefore, these estimates of the rates of institutionalization will be lower than other rates based on more inclusive definitions of institutionalization.

Since the estimates of older people in homes for the aged were 1980 figures, counts of population for the denominator were 1980 estimates also. These

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<sup>3</sup> References for these data sources are given in Table T1.



population estimates by age and sex for the denominator were taken from two sources, since no single source provided the age-sex detail necessary. The primary source was the most recent published Census<sup>4</sup> estimates of the total population; however, this most recent publication did not include any age detail beyond 85+, so an earlier Census publication was used for estimates of those 85 to 89, 90 to 94, and 95 plus.

<b>TABLE 1: Rates of Institutionalization by Age and Sex</b>		
<b>Age</b>	<b>Males</b>	<b>Females</b>
65	0.01	0.01
66	0.01	0.01
67	0.01	0.01
68	0.01	0.01
69	0.01	0.01
70	0.01	0.02
71	0.02	0.02
72	0.02	0.02
73	0.02	0.03
74	0.02	0.03
75	0.03	0.04
76	0.03	0.04
77	0.04	0.05
78	0.04	0.06
79	0.05	0.08
80	0.05	0.09
81	0.06	0.10
82	0.07	0.12
83	0.07	0.13
84	0.09	0.15
85	0.11	0.18
86	0.13	0.20
87	0.15	0.22
88	0.16	0.25
89	0.16	0.28
90	0.19	0.29
91	0.20	0.30
92	0.20	0.31
93	0.20	0.32
94	0.20	0.32
95-99	0.28	0.48
100+	0.33	0.56
<b>DATA SOURCES:</b>		
1980 Census of Population, v.2 Subject Reports, <u>Persons in Institutions and Other Group Quarters</u> , U.S. Department of Commerce, 1984.		
Current Population Reports, Series P-25, Number 929, <u>Estimates of the Population of the U.S. by Age, Sex, and Race</u> , U.S. Department of Commerce, 1983.		

The age-sex specific rates of institutionalization, and the sources of data used to calculate those rates, are given in Table 1. These weights were applied to the disability rates for the two subsamples to produce overall age-sex proportions of

<sup>4</sup> See Footnote #3.

older persons at four levels of disability. The program that weights and combines the subsample proportions is part of the program in the Appendix.

5. Smoothing the age-disability curves. The single-year of age, sex-specific data for levels of disability produced a predictably jagged curve, which was smoothed using five-year moving averages. The five year span used in calculating the moving average included the two years before and the two years after a given year of age. The program which accomplished this task is in the appendix.
6. Produce data file of baseline rates. The preceding steps produced proportions disabled at three different levels for the older population, by sex and single years of age. These beginning rates which were used as a baseline for all projections are given in Table 2.

TABLE 2: Calculated Beginning of Disability Rates by Age and Sex								
Age	NODIS-M	NODIS-F	MILDDIS-M	MILDDIS-F	MODDIS-M	MODDIS-F	SVEREDIS-M	SVEREDIS-F
65	0.886540	0.872374	0.018675	0.012912	0.052111	0.068478	0.042674	0.046236
66	0.898503	0.879552	0.015516	0.011606	0.047082	0.061800	0.038899	0.047042
67	0.910492	0.891920	0.011271	0.010552	0.044144	0.054203	0.034093	0.043325
68	0.912165	0.894536	0.009686	0.011326	0.043442	0.051737	0.034707	0.042401
69	0.908763	0.896909	0.011688	0.012252	0.043032	0.052804	0.036517	0.038035
70	0.904047	0.893258	0.013954	0.011455	0.042771	0.054405	0.039228	0.040882
71	0.894966	0.877360	0.010231	0.011279	0.055794	0.064223	0.039009	0.047147
72	0.885851	0.864802	0.010085	0.012919	0.060262	0.069915	0.043801	0.052364
73	0.874615	0.852736	0.014040	0.015070	0.064407	0.076516	0.046938	0.055678
74	0.865530	0.846851	0.018675	0.016112	0.064258	0.080632	0.051536	0.056405
75	0.856974	0.834662	0.018537	0.014238	0.066068	0.087289	0.058427	0.063811
76	0.850976	0.818653	0.018058	0.014020	0.068774	0.093019	0.062192	0.074308
77	0.843089	0.798597	0.016053	0.015507	0.078460	0.097037	0.062398	0.088859
78	0.825720	0.777589	0.016639	0.018140	0.090549	0.106143	0.067092	0.098128
79	0.802035	0.752673	0.022068	0.017251	0.097367	0.118816	0.078530	0.111259
80	0.779377	0.726876	0.022477	0.020202	0.105129	0.131765	0.093017	0.121157
81	0.760430	0.697876	0.018404	0.028405	0.114488	0.146951	0.106678	0.126769
82	0.745541	0.671138	0.016711	0.031692	0.115733	0.161271	0.122015	0.135899
83	0.732364	0.642034	0.022943	0.030610	0.120239	0.165393	0.124454	0.161963
84	0.711687	0.615603	0.029535	0.026637	0.125125	0.169244	0.133654	0.188516
85	0.684635	0.585447	0.033016	0.026117	0.136895	0.179174	0.145454	0.209262
86	0.648618	0.555925	0.026264	0.021374	0.155378	0.194508	0.169741	0.228193
87	0.614459	0.519170	0.011255	0.022193	0.191934	0.202966	0.183252	0.256570
88	0.584799	0.470918	0.014180	0.023102	0.197537	0.219542	0.203484	0.286438
89	0.5410.13	0.412285	0.025174	0.022814	0.212405	0.238873	0.221408	0.326028
90	0.501841	0.370619	0.031514	0.020564	0.226852	0.261115	0.239793	0.347702
91	0.476466	0.354703	0.022347	0.017767	0.255428	0.266644	0.245758	0.360886
92	0.454570	0.338441	0.013466	0.016099	0.293437	0.252365	0.238527	0.393095
93	0.403403	0.299338	0.026168	0.009750	0.324142	0.259881	0.246287	0.431031
94	0.366625	0.276847	0.054570	0.017131	0.321344	0.249630	0.257461	0.456392
95	0.270686	0.263427	0.023223	0.012142	0.256135	0.224285	0.449955	0.500146
100	0.234400	0.182094	0.000000	0.051581	0.055110	0.135082	0.710490	0.631243

**RUN INFO:** 21-Feb-90, 19:21:47, Miami University, IBM 4381 M23 VM/CMS 5.0  
**NOTE:** The "no" and "mild" disability categories were combined following this step.

# PREDICTING FUTURE RATES OF DISABILITY

The next major task was to estimate future disability rates. This is clearly one of the most difficult aspects of this study. Based on past literature, three possible scenarios concerning future disability rates were considered: increase in disability, decrease in disability, and maintenance of current rates of disability. As noted in the overview paper, while several researchers have speculated about how disability or morbidity might be influenced over the next half century or so, few of these researchers have estimated the size of these changes. In order to develop estimates we reviewed those studies that examined past changes in rates of morbidity and disability over time. It was our contention that information on past disability trends would provide a basis for the development of estimates of future trends.

A review of the literature on disability identified a small number of studies that examined rates of disability over time. A summary of these studies is presented in Table 3. These studies use data collected annually from two national samples, one in Canada (first done in 1951) and one in the United States (1958). The studies used a range of measures such as the existence of an activity limitation, the number of days restricted in the home, and the number of days restricted to bed to assess disability. Although these major data bases (the National Health Interview Survey, and the Canadian Health Interview Survey) are an important data source, they are not without major methodological limitations. For example, while the Canadian Health Survey reports data annually from 1951, questionnaire wording changes limit the ability of the survey to analyze whether differences have actually occurred. In 1951 respondents were asked if they had a permanent physical disability, while in 1978 they were asked if they had any activity limitation. Thus, the fact that the proportion of the population that was disabled rose from 25.5% in 1951 to 38.2% in 1978 (a 50% increase) is not particularly meaningful. Measurement, sampling and weighting problems appear on the U. S. National Health Interview Survey as well. Thus, while data are available to examine trends of disability over time, such data need to be examined with caution.

As shown in Table 3, the analysis of disability over time has primarily relied on the National Health Interview Survey. Verbrugge (1984) has undertaken a detailed analysis of the survey between 1958 and 1980. Her work examined several variables including the presence of total restricted activity, a major activity limitation, and any activity limitation. Results from this work showed that between 1958 and 1980 there was an increase in the proportion of the older population that reported experiencing a disability. For the total restricted measure between 1958 and 1980 men age 65 and over showed a 4 percent increase in days restricted, and women 65 and over had a 10.3 percent increase. A second measure which examined the presence of a major activity limitation, showed an 11 percent increase for women and a 1.1 percent increase for men age 65 and over. A third measure that examined the existence of any limitation showed a 13.8 percent increase for men age 65 and over and a 2.3 percent increase for women of comparable ages. This study also examined changes for the 45 to 64 age group. Larger increases in the proportion of those experiencing a disability were

reported for this group. Men age 45 to 64 showed a 33 percent increase, while women of this group showed a 46 percent increase.

<b>TABLE 3: Review of Studies Examining Morbidity Changes Experienced by the U.S. Population</b>						
<b>Study/Data Base</b>	<b>Results</b>					
Verbrugge 1984/National Health Interview Survey, 1958- 1980	<b>Men 65+</b>		<b>Percent Change</b>	<b>Women 65+</b>		<b>Percent Change</b>
	<b>1958</b>	<b>1980</b>		<b>1958</b>	<b>1980</b>	
	<b>TOTAL RESTRICTED ACTIVITY</b>					
	37 days	38.5 days	4%	39 days	43 days	10.3%
	<b>MAJOR ACTIVITY LIMITATION</b>					
	45.5%	45%	1.1%	32%	35.5%	11%
	<b>ANY LIMITATION</b>					
43.5%	49.5%	11%	43%	44%	2.3%	
<b>MAJOR ACTIVITY/LIMITATIONS</b>						
15%	20%	33.3%	12%	17.5%	46%	
Colvez, Blanchet 1981/NHIS 1966- 1974	<b>Men 65+</b>		<b>Percent Change</b>	<b>Women 65+</b>		<b>Percent Change</b>
	<b>1966</b>	<b>1974</b>		<b>1966</b>	<b>1974</b>	
	<b>SEVERE LIMITATION OF ACTIVITY 65+ -- 1966-1974</b>					
	21.0%	29.8%	38%	5.12%	8.2%	6%
<b>MODERATE LIMITATION OF ACTIVITY</b>						
26.96%	15.1%	-44%	24.9%	27.1%	9%	
Culler, Van Veen Daigle 1983/NHIS	<b>1975</b>		<b>1981</b>		<b>Percent Change</b>	
	<b>RESTRICTED-ACTIVITY DAYS -- ALL 65+</b>					
	38.4		39.9		3.9%	
<b>BED-DISABILITY DAYS -- ALL 65+</b>						
12.9		14.0		8.5%		
Wilkins, Adams 1983/Canada Health Survey	<b>1951</b>		<b>1978</b>		<b>Percent Change</b>	
	<b>LONG TERM DISABILITY -- ALL AGE 65+</b>					
	25.5		38.2		50%	
	<b>Men 65+</b>		<b>Percent Change</b>	<b>Women 65+</b>		<b>Percent Change</b>
	<b>1951</b>	<b>1978</b>		<b>1951</b>	<b>1978</b>	
	<b>LONG-TERM DISABILITY</b>					
	27.0	31.1	15.2%	23.9	38.3	60.3%
	<b>1951</b>		<b>1978</b>		<b>Percent Change</b>	
<b>DISABILITY DAYS</b>						
29		35		21%		
<b>Men</b>		<b>Percent Change</b>	<b>Women</b>		<b>Percent Change</b>	
<b>1951</b>	<b>1978</b>		<b>1951</b>	<b>1978</b>		
<b>DISABILITY DAYS</b>						
29	30	3.4%	29	39	34%	

Although these numbers suggest increased disability, as noted earlier they need to be interpreted cautiously. Changes in questionnaires and in data collection and sampling procedures could effect results. Because the data from the survey are grouped in broad age categories (45-64, 65 and above) as the population has aged over the course of the studies, the average age of the groupings has risen, this could cause an increase in group disability rates that is not related to increasing rates of disability for comparable age groups.

Several other studies have also used the National Health Interview Survey (Colvez and Blanchet, 1981; Ycas, 1985, Chapman, LaPlante, Wilensky, 1986; Culler, Van Veen Daigle 1983). Although these studies examined different time periods (typically a smaller number of years), as might be expected the findings of these studies, while smaller in magnitude, were generally consistent with the Verbrugge study discussed above.

The second major data source was the Canadian Health Survey (Wilkins and Adams, 1983). Using measures of both the presence of a long-term disability and the number of disability days, the study examined changes between 1951 and 1978. Results also showed an increase in disability over time. Men age 65 and over showed a 15 percent increase, and women of comparable age were reported to show a 60 percent increase. The measure on disability days also showed an increase, but of smaller magnitude, in reported disability over time. For example, men age 65 and over were reported to have a 3.4 percent increase, and women of this age category had a 34 percent increase. The authors of this study pointed out several serious methodological problems. The most serious problem, as noted earlier, appears to be the change in definition of long-term disability, from permanent physical disability to any activity limitation. Other questionnaire wording and data collection changes and sample weighting problems were also noted.

In addition to these studies there were several other authors who speculated about future trends in disability (Fries, 1981; Manton, 1986; Brody, 1985; Schneider and Brody, 1983). These estimates were based on theoretical assumptions rather than data on trends in disability.

With these studies as background, we developed our estimates. Data from the NHIS for the over 65 population had suggested disability increases for the over 65 population ranging from 1 to 14 percent, depending on the measure. Larger increases (33% men, 46% women) were reported for the 45-64 age group. The Canadian survey reported increases on the disability days measure of 3.4% for men and 34% for women and increases in any long term disability of 50% for the over 65 population.

Based on these numbers we used a 15 percent increase in disability to represent our estimates for the increasing disability scenario. No supporting numbers were available for estimating an improvement in disability; Fries, the major proponent of the suggestion that health of older persons will improve over time, bases his argument on a theoretical rather than empirical foundation. Therefore, we used the 15 percent rate for the lowering of disability scenario as well. A best guess scenario, which assumed a smaller increase (7.5%) in disability rates was also estimated. The rationale for our best guess estimate was that while some increase in disability may have occurred, methodological concerns suggest that the increase has been over-estimated in the data presented. Yet it seems plausible that increase in longevity may result in a higher proportion of the population experiencing a disability. Thus, four specific possibilities were included in these projections: an increase of 15%, a decrease of 15%, an increase of 7.5%, and no change in disability among the older population. Each of these four

possibilities represented a different data set to be input into the projection program. Each of the three sets of disability rates that assume some change were created using the following simplifying assumptions: 1) that the change would occur during the next twenty-five years; after 2010, rates were held constant; 2) that the amount of change would be spread evenly over the twenty-five years, and evenly among the three levels of disability (little or none, moderate, severe); 3) that men's and women's disability rates would not converge at any age or at any point in time; 4) that the change would affect all ages.

An example of the programs used to trend disability rates over time is found in the Program Appendix. For each of the three disability scenarios involving change, the program is essentially the same, with differences only in the amount and direction of change over the next twenty-five years. For the fourth possibility, no change in disability, the baseline rates were used for each year of the projection. This step in the process resulted in four separate data files of disability rates, to be input into the projection program, depending on the assumption about disability being considered.

## **PROJECTING THE DISABLED POPULATION: APPLYING THE DISABILITY RATES TO THE SURVIVED POPULATION**

The final step in generating the projections was to apply the disability rates to the survived population. Estimates of the survived population through the year 2040 were generously provided by Gregory Spencer at the Bureau of the Census. Three different sets of estimates were used, based on three assumptions about mortality in the future: a continuation of recent gains in life expectancy, a faster improvement in life expectancy, and a slower improvement in life expectancy. These three sets of population estimates were used as input matrices; they were multiplied by the disability matrices. Population estimates and disability rates were input for five-year intervals from 1985 through 2040. Given four different disability matrices, and three different mortality matrices, twelve combinations were possible. All combinations were run, but the final report focused on only four, which were selected because they covered the range of possibilities, from longer life with worsening health to longer life with improving health. The programs that combined the disability and mortality matrices to project the numbers of other persons at various levels of disability are in the Program Appendix.

## **SUMMARY**

In summary, there were two types of input files: disability rates and population estimates by single years of age and sex, through the year 2040. There was one type of output file: estimates of disabled persons by single years of age and sex, through the year 2040. The exact nature of each of these input and output files depended upon the disability and mortality assumptions being considered in any particular projection run. The computer programs in the Program Appendix are arranged in a logical order, beginning with the programs that generated beginning rates of disability, followed by those programs that created disability rate matrices, followed by the projection programs.



# PROGRAM APPENDIX

Programs were written by: P. Neal Ritchey and Shahla Mehdizadeh

## PROGRAM NAME: ASPSTORY

- Calculates disability item scores for individuals
- Calculates disability level of individual

FILE: ASPSTORY TEXT A MIAMI UNIVERSITY VM/CMS REL 5

The following text will explain the process used in calculation of DISABILITY proportions used in the computation of the number of disabled and level of disability in ASPE project.

Process involves three steps:

- (1) Calculation of DISABILITY proportions for the institutionalized populations.
  - (a) Calculation of the individual ADL & IADL item scores for institutionalized sample.
  - (b) Using ADL & IADL scores according to our specific definition to arrive at institutionalized disability proportions.
- (2) Calculation of DISABILITY proportions for the non-institutionalized population.
  - (a) Calculation of the individual ADL & IADL item scores for the non-institutionalized sample.
  - (b) Using ADL & IADL scores according to our specific definition to arrive at non-institutionalized disability proportions.
  - (c) Conversion of the sample disability proportions to population proportions.
- (3) Combining of the two above proportions and smoothing to compensate for sampling error and variation in sample size at different age and sex.
  - 1.a) In order to arrive at the institutionalized DISABILITY proportions the 1985 National Nursing Home Survey of Current Residents were used. The following logical statements were used to arrive at ADL & IADL scores. (The questions that the Variable names stand for are listed first.)

ASSTBATH : DOES RES. REQUIRE ANY ASSISTANCE IN BATHING?

BATHSPEQ : DOES RES. BATHE WITH HELP OF SPECIAL EQUIPMENT?

BATHPERS : DOES RES. BATHE WITH HELP OF A PERSON?

ASSTDRES : DOES RES. REQUIRE ASSISTANCE IN DRESSING?  
 DRESSREQ : DOES RES. DRESS WITH HELP OF SPECIAL EQUIPMENT?  
 DRESPERS : DOES RES. DRESS WITH HELP OF A PERSON?  
 ASSTEAT : DOES RES. REQUIRE ASSISTANCE IN EATING?  
 EATSPEQ : DOES RES. EAT WITH HELP OF SPECIAL EQUIPMENT?  
 EATPERS : DOES RES. EAT WITH HELP OF A PERSON?  
 ASSTOUTB : DOES RES. REQUIRE ASSISTANCE TRANSFERRING OUT OF BED?  
 OUTBSPEQ : DOES RES. REQUIRE THE HELP OF SPECIAL EQUIPMENT?  
 OUTBREPS : DOES RES. REQUIRE HELP OUT OF BED:PERSON?  
 CHAIFAST : IS RES. CHAIRFAST?  
 BEDFAST : IS RES. BEDFAST?  
 ASSTTOIL : DOES RES. REQUIRE ASSISTANCE USING TOILET?  
 TOILSPEQ : DOES RES. REQUIRE HELP WITH SPECIAL EQUIPMENT?  
 TOILPERS : DOES RES. REQUIRE HELP OF A PERSON?  
 HELPFONE : DOES RES. RECEIVE HELP USING THE PHONE?  
 WALKHELP : DOES RES. CURRENTLY REQUIRE HELP WALKING?  
 WALKSPEQ : DOES RES. REQUIRE SPECIAL EQUIPMENT TO WALK?  
 WALKPERS : DOES RES. WALK WITH HELP OF A PERSON?  
 HANDLE\$ : DOES RES. RECEIVE HELP HANDLING MONEY?  
 OUTFACIL : DOES RES. GO OUTSIDE GROUPS OF FACILITY?  
 OUTSPEQ : DOES RES. GO OUTSIDE WITH HELP OF SPECIAL EQUIPMENT?  
 OUTPERS : DOES RES. GO OUTSIDE WITH HELP OF A PERSON?  
 DIFBOWEL : DOES RES. HAVE DIFFICULTY CONTROLLING BOWELS?  
 DIFBLADD : DOES RES. HAVE DIFFICULTY CONTROLLING BLADDER?  
 FDIFBOWL : HOW FREQUENTLY DOES RES. HAVE THIS DIFFICULTY?  
 FDIFBLAD : HOW FREQUENTLY DOES RES. HAVE THIS DIFFICULTY?  
 ONLYNITE : DOES THIS OCCUP ONLY AT NIGHT?  
 OSTOCATH : DOES RES. HAVE AN OSTOMY OR CATHETER?  
 BSTEAL : TYPES OF BEHAVIOR : STEALING  
 BGETLOST : TYPES OF BEHAVIOR : GETTING LOST  
 BADATTIM : BASIC ACTIVITIES : UNABLE TO REMEMBER DATES/TIME

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DO IF (ASSTBATH EQ 2)
  COMPUTE BATHING=0
ELSE IF (ASSTBATH EQ 1 AND BATHSPEQ EQ 1)
  COMPUTE BATHING=1
ELSE IF (ASSTBATH EQ 1 AND BATHPERS EQ 1)
  COMPUTE BATHING=1
ELSE
  COMPUTE BATHING=99
END IF
DO IF (ASSTDRES EQ 2)
  COMPUTE DRESSING=0
ELSE IF (ASSTDRES EQ 1 AND DRESSPEQ EQ 1)
  COMPUTE DRESSING=1
  
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ELSE IF (ASSTDRES EQ 1 AND DRESPERS EQ 1)
COMPUTE DRESSING=1
ELSE
COMPUTE DRESSING=99
END IF
DO IF (ASSTEAT EQ 2)
COMPUTE EATING=0
ELSE IF (ASSTEAT EQ 1 AND EATSPEQ EQ 1)
COMPUTE EATING=1
ELSE IF (ASSTEAT EQ 1 AND EATPERS EQ 1)
COMPUTE EATING=1
ELSE
COMPUTE EATING=99
END IF
DO IF (ASSTOUTB EQ 2)
COMPUTE TRANSFER=0
ELSE IF (ASSTOUTB EQ 1 AND OUTBSPEQ EQ 1)
COMPUTE TRANSFER=1
ELSE IF (ASSTOUTB EQ 1 AND OUTBPERS EQ 1)
COMPUTE TRANSFER=1
ELSE IF (CHAIFAST EQ 1)
COMPUTE TRANSFER=1
ELSE IF (BEDFAST EQ 1)
COMPUTE TRANSFER=1
ELSE
COMPUTE TRANSFER=99
END IF
DO IF (ASSTTOIL EQ 2)
COMPUTE TOILTING=0
ELSE IF (ASSTTOIL EQ 1 AND TOILSPEQ EQ 1)
COMPUTE TOILTING=1
ELSE IF (ASSTTOIL EQ 1 AND TOILPERS EQ 1)
COMPUTE TOILTING=1
ELSE
COMPUTE TOILTING=99
END IF
DO IF (HELPFONE EQ 2)
COMPUTE FONEUSE=0
ELSE IF (HELPFONE EQ 1)
COMPUTE FONEUSE=1
ELSE
COMPUTE FONEUSE=99
END IF
DO IF (WALKHELP EQ 2)
COMPUTE WALKING=0
ELSE IF (WALKHELP EQ 1 AND WALKSPEQ EQ 1)

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COMPUTE WALKING=1
ELSE IF (WALKHELP EQ 1 AND WALKPERS EQ 1)
COMPUTE WALKING=1
ELSE
COMPUTE WALKING=99
END IF
DO IF (HANDLE$ EQ 2)
COMPUTE MONEYMGT=0
ELSE IF (HANDLE$ EQ 1)
COMPUTE MONEYMGT=1
ELSE
COMPUTE MONEYMGT=99
END IF
DO IF (OUTFACIL EQ 2)
COMPUTE TRAVEL=0
ELSE IF (OUTFACIL EQ 1 AND OUTSPEQ EQ 1)
COMPUTE TRAVEL=1
ELSE IF (OUTFACIL EQ 1 AND OUTPERS EQ 1)
COMPUTE TRAVEL=1
ELSE
COMPUTE TRAVEL=99
END IF
DO IF (DIFBOWEL EQ 2 OR DIFBLADD EQ 2)
COMPUTE CONTINEN=0
ELSE IF ((DIFBOWEL EQ 1 AND FDIFBOWL LE 3) OR (DIFBLADD EQ 1 AND
        FDIFBLAD LE 3))
COMPUTE CONTINEN=1
ELSE IF ((DIFBOWEL EQ 1 AND FDIFBOWL EQ 4) OR (DIFBLADD EQ 1 AND
        FDIFBLAD EQ 4))
COMPUTE CONTINEN=0
ELSE IF (ONLYNITE EQ 1)
COMPUTE CONTINEN=1
ELSE IF (OSTOCATH EQ 1)
COMPUTE CONTINEN=1
ELSE
COMPUTE CONTINEN=99
END IF
DO IF (BSTEAL EQ 1 OR BGETLOST EQ 1 OR BADATTIM EQ 1)
COMPUTE COGNETIV=1
ELSE
COMPUTE COGNETIV=0
END IF
MISSING VALUES BATHING TO COGNETIV(99)
COMPUTE AGE=1985-DATEBIRY
VALUE LABEL BATHING TO COGNETIV 0 'INDEPENDENT' 1 'DISABLED'

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- 1.b) Since not all the questions were answered by all the respondents missing values were generated in the calculation of ADL & IADL scores.

The respondents who had 6 or more ADL IADL scores missing were excluded from further calculations. For the remaining respondents the missing value was substituted by the mean value of the specific ADL IADL score of the appropriate age and sex.

The following logical statements were used to employ ADL & IADL scores in order to create DISABILITY proportions for institutionalized sample.

```
COUNT NOFMISS=BATHING TO COGNET IV(99)
DO IF (NOFMISS GE 6)
MISSING VALUES BATHING TO COGNETIV( )
COMPUTE CHECK=1
ELSE
COMPUTE CHECK=0
END IF
IF (AGE EQ 106) TOILTING=0
COMPUTE SEVERADL=EATING+TRANSFER+TOILTING+DRESSING+CONTINEN+
    COGNETIV
COMPUTE MODADL=EATING+TRANSFER+TOILTING+DRESSING+CONTINEN+
    BATHING
COMPUTE MODIADL=WALKING+FONEUSE+TRAVEL
DO IF (CHECK EQ 1)
COMPUTE DISABLT=99
ELSE IF (SEVERADL GE 2)
COMPUTE DISABLT=4
ELSE IF (MODADL EQ 1 OR (MODIADL EQ 2))
COMPUTE DISABLT=3
ELSE IF (TRAVEL EQ 1 OR (MONEYMGT EQ 1 AND FONEUSE EQ 1))
COMPUTE DISABLT=2
ELSE
COMPUTE DISABLT=1
END IF
```

- 1.c) after the disability score for each respondent in the sample was calculated, a frequency table of this score for each single year of age and sex was formed. The % of the respondents at each level of disability of this table was used as the proportion of the sample with that level of disability for the specific age and sex.

As a result of the above performance for each single year of age and sex four disability proportion exist. i.e.

Age sex No or Mild Dis. Mod Dis. Sev. Dis.

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2.a) In order to arrive at the non-institutionalized DISABILITY proportions the 1982 National Long Term Care (Detailed Survey) were used. The following logical statements were used to arrive at ADL & IADL scores. (The questions that the Variable names stand for are listed first.)

PCTRLBS : TROUBLE CONTROLLING BLADDER?  
PCOLOS : USE CATHETER OR COLOSTOMY?  
PHUEAT1 : IN PAST WEEK GET HELP TO EAT?  
PFEEDU : DID SOMEONE FEED YOU?  
PCUTMEAT : DID SOMEONE CUT YOUR MEAT?  
PSPUTN2 : DID YOU USE SPECIAL UTENSILS?  
PSPUTN1 : USE SPECIAL UTENSILS?  
PNEPEAT1 : SOMEONE STAY NEAR WHEN EATING?  
PPWALKIN : PROBLEM WALKING INSIDE WITHOUT HELP?  
PFONHERE : IS THERE A PHONE HERE?  
PCANFON : CAN YOU MAKE OWN PHONE CALLS?  
PTYPEON : IS IT A REGULAR OR SPECIAL PHONE?  
PUFON : DO YOU MAKE OWN PHONE CALLS?  
PMG\$WOH : MANAGE MONEY WITHOUT HELP?  
PHNWALK : NEED HELP OUTSIDE OF WALKING DISTANCE?  
PHBATHRM : SOMEONE HELP YOU TO BATHROOM?  
PUTOIL2 : TAKE YOURSELF TO TOILET?  
PSPTOL1 : USE SPECIAL EQUIPMENT TO USE TOILET?  
PNEPTOL2 : SOMEONE STAY NEAR I CASE NEED HELP?  
PHDRESS : SOMEONE HELP YOU GET DRESSED?  
PSPDRES1 : SPECIAL CLITHING OR EQUIPMENT TO DRESS?  
PNERDRS1 : SOMEONE STAY NEAR IN CASE YOU NEED HELP?  
PNOBED : NOT GET OUT OF BED?  
PWCHAIR : CONFINED TO A WHEELCHAIR?  
PHUBED : SOMEONE HELP YOU GET IN/OUT OF BED?  
PSPBED1 : USE SPECIAL EQUIPMENT TO GET OUT OF BED?  
PNEP1 : SOMEONE STAY NEAR IN CASE NEED HELP?  
PHBATHE : SOMEONE HELP YOU BATHE?  
PSNKBSN : WASH AT SINK OR BASIN?  
PBEDBATH : HAVE A BEDBATH?  
PSPBATH1 : USE SPECIAL EQUIPMENT TO BATHE?  
PNERBTH1 : SOMEONE STAY NEAR IN CASE NEED HELP?  
PLOST : GET LOST AND NOT FIND WAY BACK?  
PSTEAL : TAKE SOMETHING NOT BELONGING TO YOU?  
PFORGET : FORGET IMPORTANT THINGS?

PUMEAL : DO YOU PREPARE OWN MEALS?  
PCANMEAL : CAN YOU PREPARE OWN MEALS?  
PRMOMEAL : REASON CAN NOT PREPARE OWN MEALS  
PUSHOP2 : DO YOU SHOP FOR OWN GROCERIES?  
PCANSHOP : CAN YOU SHOP FOR OWN GROCERIES?  
PRNOSHOP : REASON CAN NOT SHOP FOR GROCERIES  
PLWORK2 : DO YOU DO LIGHT WORK?  
PCANLWK : CAN YOU DO LIGHT WORK?  
PRNOLWK : REASON CAN NOT DO LIGHT WORK  
PLAUD1 : DO YOU DO LAUNDRY?  
PCANLAUD : CAN YOU DO LAUNDRY?  
PRNOLAUD : REASON CAN NOT DO LAUNDRY

DO IF (PCTRLBB EQ 2)  
COMPUTE CONTINEN=0  
ELSE IF (PCTRLBB EQ 1)  
COMPUTE CONTINEN=1  
ELSE IF (PCOLOS EQ 1)  
COMPUTE CONTINEN=1  
ELSE  
COMPUTE CONTINNEN=99  
END IF  
DO IF (PHUEAT1 EQ 3)  
COMPUTE EATING=99  
ELSE IF (PHUEAT1 EQ 1 AND PFEEDU EQ 1)  
COMPUTE EATING=1  
ELSE IF (PHUEAT1 EQ 1 AND PCUTMEAT EQ 1 AND PSPUTN2 EQ 2)  
COMPUTE EATING=0  
ELSE IF (PHUEAT1 EQ 1 AND PCUTMEAT EQ 1 AND PSPUTN2 EQ 1)  
COMPUTE EATING=1  
ELSE IF (PHUEAT1 EQ 1)  
COMPUTE EATING=1  
ELSE IF (PHUEAT1 EQ 2 AND PSPUTN1 EQ 1)  
COMPUTE EATING=1  
ELSE IF (PHUEAT1 EQ 2 AND PNEREAT1 EQ 1)  
COMPUTE EATING=1  
ELSE IF (PHUEAT1 EQ 2)  
COMPUTE EATING=0  
ELSE  
COMPUTE EATING=99  
END IF  
DO IF (PPWALKIN EQ 1)  
COMPUTE WALKING=1  
ELSE IF (PPWALKIN EQ 2)  
COMPUTE WALKING=0

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ELSE
COMPUTE WALKING=99
END IF
DO IF (PFONHERE EQ 2 AND PCANFON EQ 1)
COMPUTE FONDUSE=0
ELSE IF (PFONHERE EQ 2 AND PCANFON EQ 2)
COMPUTE FONEUSE=1
ELSE IF (PFONHERE EQ 1 AND PTYPFON EQ 1 AND PUFON EQ 1)
COMPUTE FONEUSE=0
ELSE IF (PFONHERE EQ 1 AND PTYPFON EQ 2 AND PUFON EQ 1)
COMPUTE FONEUSE=1
ELSE IF (PFONHERE EQ 1 AND PTYPFON EQ 1 AND PUFON EQ 2)
COMPUTE FONEUSE=1
ELSE IF (PFONHERE EQ 1 AND PTYPFON EQ 2 AND PUFON EQ 2)
COMPUTE FONEUSE=1
ELSE
COMPUTE FONEUSE=99
END IF
DO IF (PMG$WOH EQ 1)
COMPUTE MONEYMGT=0
ELSE IF (PMG$WOH EQ 2)
COMPUTE MONEYMGT=1
END IF
DO IF (PNHWALK EQ 1)
COMPUTE TRAVEL=1
ELSE
COMPUTE TRAVEL=0
END IF
DO IF (PHBATHRM EQ 3 AND PUTOIL2 EQ 1)
COMPUTE TOILTING=1
ELSE IF (PHBATHRM EQ 1)
COMPUTE TOILTING=1
ELSE IF (PHBATHRM EQ 2 AND PSPTOL1 EQ 1)
COMPUTE TOILTING=1
ELSE IF (PHBATHRM EQ 2 AND PNERTOL1 EQ 1)
COMPUTE TOILETING=1
ELSE IF (PHBATHRM EQ 2)
COMPUTE TOILTING=0
ELSE
COMPUTE TOILTING=99
END IF
DO IF (PHDRESS EQ 3 AND PHPJ EQ 1)
COMPUTE DRESSING=1
ELSE IF (PHDRESS EQ 2 AND PSPDRES1 EQ 1)
COMPUTE DRESSING=1
ELSE IF (PHDRESS EQ 2 AND PNERDRS1 EQ 1)

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COMPUTE DRESSING=1
ELSE IF (PHDRESS EQ 3)
COMPUTE SHOPPING=99
END IF
DO IF (PLWORK2 EQ 1 OR PCONLWK EQ 1)
COMPUTE HKEEP=0
ELSE IF (PLWORK2 EQ 2 OR PCANLWK EQ 2 AND PRNOLWK EQ 1)
COMPUTE HKEEP=1
ELSE
COMPUTE HKEEP=99
END IF
DO IF (PLAUD1 EQ 1 OR PCANLAUD EQ 1)
COMPUTE LAUNDRY=0
ELSE IF (PLAUD1 EQ 2 OR PCANLAUD EQ 2 AND PRNOLAUD EQ 1)
COMPUTE LAUNDRY=1
ELSE
COMPUTE LAUNDRY=99
END IF
DO IF (LAUNDRY EQ 1 OR HKEEP EQ 1)
COMPUTE HOUSKEEP=1
ELSE IF (LAUNDRY EQ 99 AND HKEEP EQ 99)
COMPUTE HOUSKEEP=99
ELSE
COMPUTE HOUSKEEP=0
END IF
MISSING VALUES CONTINEN TO HOUSKEEP (99)
VALUE LABEL
CONTINEN TO HOUSKEEP 0 'INDEPENDENT' 1 'DISABLED'/

```

- 2.b) Since not all the questions were answered by all the respondents missing values were generated in the calculation of ADL & IADL scores.

The respondents that had 8 or more ADL & IADL scores missing were excluded from further calculations. For the remaining respondents the missing values were substituted by the mean value of the specific ADL IADL score of the appropriate age and sex.

The following logical statements were used to employ ADL & IADL scores in order to create DISABILITY proportions for non-institutionalized sample.

```

RECODE HOUSKEEP(SYSMIS=0)
COUNT NOFMISS=BATHING DRESSING EATING TOILTING TRANSFER CONTINEN
WALKING FONEUSE MONEYMGMT TRAVEL COGNETIV MEALPREP
SHOPPING HKEEP LAUNDRY HOUSKEEP(99)

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```

DO IF (NOFMISS GE 8)
COMPUTE CHECK=1
ELSE
COMPUTE CHECK=0
END IF
COMPUTE SEVERADL=EATING+TRANSFER+TOILTING+DRESSING+CONTINEN+
      COGNATIV
IF (SEVERADL GT 0 AND SEVEADL LT 1)SEVERADL=0
IF (FONEUSE GT 0 AND FONEUSE LT 1)FONEUSE=0
RECODE MONEYMGT(SYSMIS=0)
COMPUTE MODADL=EATING+TRANSFER+TOILTING+DRESSING+CONTINEN
IF (MODADL GT 0 AND MODADL LT 1)MODADL=0
COMPUTE MODIADL=HOUSKEEP+SHOPING+MEALPREP+WALKING
IF (MODIADL GT 1 AND MODIADL LT2)MODIADL=1
COMPUTE MODIADL2=MODIADL+TRAVEL+FONEUSE
COMPUTE MILDIADL=MODIALD+TRAVEL
COMPUTE OTHRIADL=MONEYMGT+FONEUSE
COMPUTE IADL=HOUSKEEP+SHOPPING+MEALPREP+FONEUSE+MONEYMGT+
      TRAVEL
COMPUTE ADL=EATING+DRESSING+TOILTING+BATHING+TRANSFER
DO IT (CHECK=1)
COMPUTE DISABLTY=99
ELSE IF (SEVERADL GE 2)
COMPUTE DISABLTY=4
ELSE IF (MODADL EQ 1 OR BATHING EQ 1 OR(MODIADL2 GE 2 AND MODIADL GE
      1))
COMPUTE DISABLTY=3
ELSE IF (MILDIADL EQ 1 OR OTHRIADL EQ 2)
COMPUTE DISABLTY=2
ELSE IF (ADL EQ 0 AND IALD EQ 0 OR (ADL EQ 0 AND (MONEYMGT FQ 1 OR
      FONEUSE EQ 1)))
COMPUTE DISABLTY=1
ELSE
COMPUTE DISABLTY=1
END IF
MISSING VALUES DISABLTY ADL (99)
RECODE DISABLTY(SYSMIS=2)

```

- 2.c) after the disability score for each respondent in the sample was calculated, a frequency table of this score for each single year of age and sex was formed. The % of the respondents at each level of disability of this table was used as the proportion of the sample with that level of disability for the specific age and sex.

As a result of the above performance for each single year of age and sex four disability proportions exist. i.e.

Age sex No or Mild Dis. Mod Dis. Sev. Dis.

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ininstitutionalized with severe dis.(2.c

To compensate for variation in sample size in different age and sex and sampling error a five year moving average procedure was used. The five year consisted of two years before and two years after. As a result of this procedure the first two ages (65 and 66) remained blank, for 65 the actual proportions as they were used, for 66 the three year moving average was used.

Because the sample size for ages 95+ was very small, the disability proportions for ages 95-99 and 100+ was calculated together as a group rather than single year of age, for this reason the dis. proportions for these two age group are the actual proportions rather than the smoothed one. however the single year of age disability proportions for 95 and 96 was used to calculate the smoothed dis. proportion for 94 year olds.

## PROGRAM NAME: PROCORR

- Weights NLTCs detailed sample by its relative representation in total sample
- Combines weighted disability rates for community and nursing home sample
- Calculates five-year moving average for total disability rates

FILE: PROCORR SAS A MIAMI UNIVERSITY VM/CMS REL 5

```
CMS FILEDEF RATE95 DISK INSTR3 DATA;
CMS FILEDEF DISABLTY DISK COMOIS95 DATA;
CMS FILEDEF RATIOS DISK INSTRATE DATA;
CMS FILEDEF DISABL95 DISK COMOIS95 DATA;
DATA INS_COM;
INFILE RATIOS;
INPUT AGE MALEINS MALECOM FEMALINS FEMALCOM;
IF AGE >=65;
DATA INS_COM5;
INFILE RATE95;
INPUT AGE MALEINS MAILCOM FEMALINS FEMALCOM;
DATA PART2;
INFILE DISABLTY;
INPUT AGE SEX NN NNMI NNMC NNS NL NLMI NLMO NLS;
NTOTAL=NN+NNMI+NNMO+NNS;
ADJUSTN=1-NTOTAL;
IF NTOTAL<1 THEN NNN=NN+ADJUSTN;
ELSE IF NTOTAL=1.001 THEN NNN=NN+ADJUSTN;
ELSE IF NTOTAL=1.000 THEN NNN=NN;
LTOTAL=NL+NLMI+NLMO+NLS;
ADJUSTL=1-LTOTAL;
IF LTOTAL<1 THEN NLN=NL+ADJUSTL;
ELSE IF LTOTAL=1.001 THEN NLN=NL+ADJUSTL;
IF LTOTAL=1.000 THEN NLN=NL;
NTOTAL=NNN+NNMI+NNMO+NNS;
LTOTALC=NLN+NLMI+NLMO+NLS;
PROC PRINT; VAR NTOTALC LTOTALC;
DATA PART295;
INFILE DISABL95;
INPUT AGE SEX NNN NNMI NNMO NNS NLN NLMI NLMO NLS;
NTOTAL=NNN+NNMI+NNMO+NNS;
LTOTAL=NLN+NLMI+NLMO+NLS;
CMS FILEDEF SWEIGHT DISK SOWEIGHT DATA A;
CMS FILEDEF SWEIGHT2 DISK SOW95PLS DATA A;
DATA NEWFIND; INFILE SWEIGHT; INPUT AGE 1-3 SEX 5 WEIGHT 7-14 6;
PROC SORT; BY AGE SEX;
PROC PRINT;
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DATA NEWFIND2; INFILE SWEIGHT2; INPUT AGE 1-3 SEX 5 WEIGHT 7-14 6;
PROC SORT; BY AGE SEX;
PROC PRINT;
DATA CORRCTED;
MERGE PART2 NEW FIND; BY AGE SEX;
CNLMI=WEIGHT*NLMI;
CNLMO=WEIGHT*NLMO;
CNLS=WEIGHT*NLS;
CNLN=1-(CNLMI+CNLMO+CNLS);
CLTOTAL=CNLN+CNLMI+CNLMO+CNLS;
DATA C95PLUS;
MERGE PART295 NEWFIND2;
CNLMI=WEIGHT*NLMI;
CNLMO=WEIGHT*NLMO;
CNLS=WEIGHT*NLS;
CNLN=1-(CNLMI+CNLMO+CNLS);
CLTOTAL=CNLN+CNLMI+CNLMO+CNLS;
PROC PRINT;

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DATA MALE;
SET CORRCTED;
KEEP AGE SEX NNN NNMI NNMO NNS CNLN CNLMI CNLMO CNLS;
IF SEX=1;
DATA FEMALE;
SET CORRCTED;
IF SEX=2;
KEEP AGE SEX NNN NNMI NNMO NNS CNLN CNLMI CNLMO CNLS;
REMAIN NNN=NNNF NNMI=NNMIF NNMO=NNMCF NNS=NNSF CNLN=CNLNF
      CNLMI=CNLMIF CNLMO=CNLMOF CNLS=CNLSF;
DATA ALL;
MERGE MALE FEMALE;
BY AGE;
DATA ADJUSTED;
MEGER ALL INS_COM;
BY AGE;
PNDM=MALEINS*NNN+MALECOM*CNLN;
PNDF=FEMALINS*NNNF+FEMALCOM*CNLNF;
PLDM=MALEINS*NNMI+MALECOM*CNLMI;
PLDF=FEMALINS*NNMIF+FEMALCOM*CNLMIF;
PMODDM=MALEINS*NNMC+MALECOM*CNLMO;
CMODDF=FEMALINS*NNMCF+FEMALCOM*CNLMOF;
PMOSDM=MALEINS*NNS+MALECOM*CNLS;
PMOSDF=FEMALINS*NNSF+FEMALCOM*CNLSF;
PNDM_1=LAG(PNDM);
PNDF_1=LAG(PNDF);

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PLDM_1=LAG(PLDM);
PLDF_1=LAG(PLDF);
PMODDM_1=LAG(PMODDM);
PMODDF_1=LAG(PMODDF);
PMOSDM_1=LAG(FMOSDM);
PMOSDF_1=LAG(FMOSDF);
PNDM_2=LAG(PNDM_1);
PNDF_2=LAG(PNDF_1);
PLDM_2=LAG(PLDM_1);
PLDF_2=LAG(PLDF_1);
PMODDM_2=LAG(PMODDM_1);
PMODDF_2=LAG(PMODDF_1);
PMOSDM_2=LAG(PMOSDM_1);
PMOSDF_2=LAG(PMOSDF_1);
PNDM_3=LAG(PNDM_2);
PNDF_3=LAG(PNDF_2);
PLDM_3=LAG(PLDM_2);
PLDF_3=LAG(PLDF_2);
PMODDM_3=LAG(PMODDM_2);
PMODDF_3=LAG(PMODDF_2);
PMOSDM_3=LAG(PMOSDM_2);
PMOSDF_3=LAG(PMOSDF_2);
PNDM_4=LAG(PNDM_3);
PNDF_4=LAG(PNDF_3);
PLDM_4=LAG(PLDM_3);
PLDF_4=LAG(PLDF_3);
PMODDM_4=LAG(PMODDM_3);
PMODDF_4=LAG(PMODDF_3);
PMOSDM_4=LAG(PMOSDM_3);
PMOSDF_4=LAG(PMOSDF_3);
DATA LEAD1;
SET ADJUSTED;
KEEP AGE PNDM--PMOSDF;
RENAME PNDM=PNDM1 PNDF=PNDF1 PLDM=PLDM1 PLDF=PLDF1
        PMODDM=PMODDM1 PMODDF=PMODDF1 PMOSDM=PMOSDM1
        PMOSDF=PMOSDF1;
AGE=AGE+1;
DATA LEAD2;
SET ADJUSTED;
KEEP AGE PNDM--PMOSDF;
RENAME PNDM=PNDM2 PNDF=PNDF2 PLDM=PLDM2 PLDF=PLDF2 PMODDM=PMODDM2
        PMODDF=PMODDF2 PMOSDM=PMOSDM2 PMOSDF=PMOSDF2;
AGE=AGE+2;
DATA LEAD3;
SET ADJUSTED;
KEEP AGE PNDM--PMOSDF;

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```

RENAME PNDM=PNDM3 PNDF=PNDF3 PLDM=PLDM3 PLDF=PLDF3
      PMODDM=PMODDM3 PMODDF=PMODDF3 PMOSDM=PMOSDM3
      PMOSDF=PMOSDF3;
AGE=AGE+3;
DATA LEAD4;
SET ADJUSTED;
KEEP AGE PNDM--PMOSDF;
RENAME PNDM=PNDM4 PNDF=PNDF4 PLDM=PLDM4 PLDF=PLDF4
      PMODDM=PMODDM4 PMODDF=PMODDF4 PMOSDM=PMOSDM4
      PMOSDF=PMOSDF4;
AGE=AGE+4;
DATA ALL;
MERGE ADJUSTED LEAD1 LEAD2 LEAD3 LEAD4;
BY AGE;
SMONM3=(PNDM1+PNDM+PNDM_1)/3;
SMOLM3=(PLDM1+PLDM+PLDM_1)/3;
SMOMDDM3=(PMODDM1+PMODDM+PMODDM_1)/3;
SMOMOSM3=(PMOSDM1+PMOSDM+PMOSDM_1)/3;
SMONF3=(PNDF1+PNDF+PNDF_1)/3;
SMOLF3=(PLDF1+PLDF+PLDF_1)/3;
SMOMODF3=(PMODDF1+PMODDF+PMODDF_1)/3;
SMOMOSF3=(PMOSDF1+PMOSDF+PMOSDF_1)/3;
SMONM5=(PNDM2+PNDM1+PNDM+PNDM_1+PNDM_2)/5;
SMOLM5=(PLDM2+PLDM1+PLDM+PLDM_1+PLDM_2)/5;
SMOMODM5=(PMODDM2+PMODDM1+PMODDM+PMODDM_1+PMODDM_2)/5;
PMOMOSM5=(PMOSDM2+PMOSDM1+PMOSDM+PMOSDM_1+PMOSDM_2)/5;
SMONF5=(PNDF2+PNDF1+PNDF+PNDF_1+PNDF_2)/5;
SMOLF5=(PLDF2+PLDF1+PLDF+PLDF_1+PLDF_2)/5;
SMOMODF5=(PMODDF2+PMODDF1+PMODDF+PMODDF_1+PMODDF_2)/5;
SMODOSF5=(PMOSDF2+PMOSDF1+PMOSDF+PMOSDF_1+PMOSDF_2)/5;
SMONM7=(PNDM3+PNDM2+PNDM1+PNDM+PNDM_1+PNDM_2+PNDM_3)/7;
SMOLM7=(PLDM3+PLDM2+PLDM1+PLDM+PLDM_1+PLDM_2+PLDM_3)/7;
SMOMODM7=(PMODDM3+PMODDM2+PMODDM1+PMODDM+PMODDM_1+
      PMODDM_2+PMODDM_3)/7;
SMOMOSM7=(PMOSDM3+PMOSDM2+PMOSDM1+PMOSDM+PMOSDM_1+
      PMOSDM_2+PMOSDM_3)/7;
SMONF7=(PNDF3+PNDF2+PNDF1+PNDF+PNDF_1+PNDF_2+PNDF_3)/7;
SMOLF7=(PLDF3+PLDF2+PLDF1+PLDF+PLDF_1+PLDF_2+PLDF_3)/7;
SMOMODF7=(PMODDF3+PMODDF2+PMODDF1+PMODDF+PMODDF_1+
      PMODDF_2+PMODDF_3)/7;
SMOMOSF7=(PMOSDF3+PMOSDF2+PMOSDF1+PMOSDF+PMOSDF_1+
      PMOSDF_2+PMOSDF_3)/7;
SMONM9=(PNDM4+PNDM3+PNDM2+PNDM1+PNDM+PNDM_1+PNDM_2+PNDM_3
      +PNDM_4)/9; ;
SMOLM9=(PLDM4+PLDM3+PLDM2+PLDM1+PLDM+PLDM_1+PLDM_2+PLDM_3+
      PLDM_4)/9;

```

```

SMOMODM9=(PMODDM3+PMODDM2+PMODDM1+PMODDM+PMODDM_1+
  PMODDM_2+PMODDM_3+PMODDM4+PMODDM_4)/9;
SMOMOSM9=(PMOSDM3+PMOSDM2+PMOSDM1+PMOSDM+PMOSDM_1+
  PMOSDM_2+PMOSDM_3+PMOSDM4+PMOSDM_4)/9;
SMONF9=(PNDF4+PNDF3+PNDF2+PNDF1+PNDF+PNDF_1+PNDF_2+PNDF_3+
  PNDF_4)/9;
SMOLF9=(PLDF4+PLDF3+PLDF2+PLDF1+PLDF+PLDF_1+PLDF_2+PLDF_3+
  PLDF_4)/9;
SMOMODF9=(PMODDF3+PMODDF2+PMODDF1+PMODDF+PMODDF_1+
  PMODDF_2+PMODDF_3+PMODDF4+PMODDF_4)/9;
SMOMOSF9=(PMOSDF3+PMOSDF2+PMOSDF1+PMOSDF+PMOSDF_1+
  PMOSDF_2+PMOSDF_3+PMOSDF4+PMOSDF_4)/9;
PROC PRINT; VAR AGE SMONM3--SMOMCSF3;
DATA MALE95;
SET C95PLUS;
KEEP AGE SEX NNN NNMI NNMO NNS CNLN CNLMI CNLMO CNLS;
IF SEX=1;
DATA FEMALE95;
SET C95PLUS;
IF SEX=2;
KEEP AGE SEX NNN NNMI NNMO NNS CNLN CNLMI CNLMO CNLS;
RENAME NNN=NNNF NNMI=NNMIF NNMO=NNMOF NNS=NNSF CNLN=CNLNF
  CNLMI=CNLMF CNLMO=CNLMOF CNLS=CNLSF;
DATA ALL95;
MERGE MALE95 FEMALE95;
BY AGE;
DATA ADJUST95;
MERGE ALL95 INS_COM5;
BY AGE;
PNDM=MALEINS*NNN*MALECOM*CNLN;
PNDF=FEMALINS*NNNF*FEMALCOM*CNLNF;
PLDM=MALEINS*NNMI+MALECOM*CNLMI;
PLDF=FEMALINS*NNMIF+FEMALCOM*CNLMIF;
PMODDM=MALEINS*NNMO+MALECOM*CNLMO;
PMODDF=FEMALINS*NNMOF+FEMALCOM*CNLMOF;
PMOSDM=MALEINS*NNS+MALECOM*CNLS;
PMOSDF=FEMALINS*NNSF+FEMALCOM*CNLSF;
SMONM5=PNDM;
SMOLM5=PLDM;
SMOMODM5=PMCDDM;
SMOMOSM5=PMCSDM;
SMONF5=PNDF;
PMOLF5=PLDF;
SMOMODF5=PMCDDF;
SMOMOSF5=PMCSDF;
DATA ALL_1;

```



```

SET ALL;
IF AGE<95 AND AGE>=65;
KEEP AGE PNDM--PMOSDF SMONM5=SMOMOSF5;
PROC PRINT;VAR AGE PNDM--PMOSDF SMONM5--SMOMOSF5;
DATA ALL95_C; SET ADJUST95;
KEEP AGE PNDM--PMOSDF SMONM5--SMOMOSF5;
DATA FINAL;SET ALL_1 ALL95_C;
IF AGE=65 THEN SMONM5=.886539;
IF AGE=65 THEN SMOLM5=.0186755;
IF AGE=65 THEN SMOMODM5=.052111;
IF AGE=65 THEN SMOMOSM5=.042674;
IF AGE=65 THEN SMONF5=.872375;
IF AGE=65 THEN SMOLF5=.0129119;
IF AGE=65 THEN SMOMCDF5=.068478;
IF AGE=65 THEN SMOMCSF5=.046236;
IF AGE=66 THEN SMONM5=.898503;
IF AGE=66 THEN SMOLM5=.0155162;
IF AGE=66 THEN SMOMCDM5=.047082;
IF AGE=66 THEN SMOMCSM5=.038899;
IF AGE=66 THEN SMONF5=.879552;
IF AGE=66 THEN SMOLF5=.0116058;
IF AGE=66 THEN SMOMCDF5=.061800;
IF AGE=66 THEN SMOMCSF5=.047042;
TM=SUM(OF SMONM5--SMOMCSM5);
TF=SUM(CF SMONF5--SMOMCSF5);
PROC PRINT; VAR TM TF;
PROC PRINT;
VAR AGE PNDM--PMOSDF;
PROC PRINT;
VAR AGE SMONM5--SMOMOSF5;
CMS FILEDEF OUT DISK FILE1C DATA;
DATA LAST; FILE OUT;SET FINAL;
PUT @1 '1986' @5 '1' AGE 6-8 SMONM5 10-17 6 SMOLM5 19-26 6 SMOMODMS
      28-35 6 SMOMCSM5 37-44 6 SMONF5 46-53 F SMOLF5 55-62 6 SMOMCDF5
      64-71 6 SMOMOSF5 73-80 6;

```

## PROGRAM NAME: DISESFIO

- Sample program that calculates marginals for projected disability over time; this example calculates marginals for an increase of 7.5% in disability of women

FILE: DISESF10 SAS A MIAMI UNIVERSITY VM/CMS REL 5

```
TITLE1 'THIS FILE WILL CREATE THE "MARGINAL" DISABILITIES FOR 1986';
TITLE2 'AND EVERY FIVE YEAR AFTER THAT. THE 7.5% CHANGE IS DIVIDED';
TITLE3 'EVENLY BETWEEN 1986 AND 2010';
DATA MARGINAL;
INPUT YEAR SEX MD1-MD4;
TOTAL=MD1+MD2+MD3+MD4;
ARRAY A MD1-MD4;
ARRAY B SMD1-SMD4;
DO OVER A;
DO OVER B;
B=A/32;
END; END;
TOTAL SD=SUM(OF SMD1-SMD4);
CHNG1SM2=SMD2*1.015;
CHNG1SM3=SMD3*1.015;
CHNG1SM4=SMD4*1.015;
CHNG1SM1=1-(CHNG1SM4+CHNG1SM2+CHNG1SM3);
CHNG2SM2=CHNG1SM2*1.015;
CHNG2SM3=CHNG1SM3*1.015;
CHNG2SM4=CHNG1SM4*1.015;
CHNG2SM1=1-(CHNG2SM4+CHNG2SM2+CHNG2SM3);
CHNG3SM2=CHNG2SM2*1.015;
CHNG3SM3=CHNG2SM3*1.015;
CHNG3SM4=CHNG2SM4*1.015;
CHNG3SM1=1-(CHNG3SM4+CHNG3SM2+CHNG3SM3);
CHNG4SM2=CHNG3SM2*1.015;
CHNG4SM3=CHNG3SM3*1.015;
CHNG4SM4=CHNG3SM4*1.015;
CHNG4SM1=1-(CHNG4SM4+CHNG4SM2+CHNG4SM3);
CHNG5SM2=CHNG4SM2*1.015;
CHNG5SM3=CHNG4SM3*1.015;
CHNG5SM4=CHNG4SM4*1.015;
CHNG5SM1=1-(CHNG5SM4+CHNG5SM2+CHNG5SM3);
TOTAL1=SUM(CF CHNG1SM1-CHNG1SM4);
TOTAL2=SUM(CF CHNG2SM1-CHNG2SM4);
TOTAL3=SUM(CF CHNG3SM1-CHNG3SM4);
TOTAL4=SUM(CF CHNG4SM1-CHNG4SM4);
TOTAL5=SUM(CF CHNG5SM1-CHNG5SM4);
```

```
CARDS;
1986 2 20.7352 .60281 4.59481 6.06717
PROC PRINT; VAR SMD1-SMD4 TOTAL SD;
PROC PRINT; VAR CHNG1SM1-CHNG1SM4 TOTAL1;
PROC PRINT; VAR CHNG2SM1-CHNG2SM4 TOTAL2;
PROC PRINT; VAR CHNG3SM1-CHNG3SM4 TOTAL3;
PROC PRINT; VAR CHNG4SM1-CHNG4SM4 TOTAL4;
PROC PRINT; VAR CHNG5SM1-CHNG5SM4 TOTAL5;
CMS FILEDEF R1 DISK R1 DATA;
DATA NEW; SET MARGINAL; FILE R1;
PUT '1986' SEX SMD1-SMD4;
CMS FILEDEF R2 DISK R2 DATA;
DATA NEW; SET MARGINAL; FILE R2;
PUT '1990' SEX CHNG1SM1-CHNG1SM4;
CMS FILEDEF R3 DISK R3 DATA;
DATA NEW; SET MARGINAL; FILE R3;
PUT '1995' SEX CHNG2SM1-CHNG2SM4;
CMS FILEDEF R4 DISK R4 DATA;
DATA NEW; SET MARGINAL; FILE R4;
PUT '2000' SEX CHNG3SM1-CHNG3SM4;
CMS FILEDEF R5 DISK R5 DATA;
DATA NEW; SET MARGINAL; FILE R5;
PUT '2005' SEX CHNG4SM1-CHNG4SM4;
CMS FILEDEF R6 DISK R6 DATA;
DATA NEW; SET MARGINAL; FILE R6;
PUT '2010' SEX CHNG5SM1-CHNG5SM4;
```

**PROGRAM NAME: MATRXFIO**

- Sample program that projects proportions disabled to the marginals calculated in preceding program

FILE: MATRXFIO SAS A MIAMI UNIVERSITY VM/CMS REL 5

TITLE1 'THIS PROGRAM PRODUCES THE PROJECTIONS FOR FEMALE';  
\*\*\*\*\* PROGRAM CREATING AGE SPECIFIC TRANSITION RATES \*\*\*\*\*;  
\*NOTE THIS PROGRAM WILL BE RUN FOR MALE AND FEMALE SEPARATELY  
AND \*;  
\* THE TWO DATA SETS WILL BE COMBINED\*;  
\* INPUT AGE-SPECIFIC BASE RATES ;

CMS FILEDEF RAW DISK FILEIO DATA;  
DATA BASE;  
INFILE RAW;  
INPUT @6 AGE 3. @46 R1 8.7 @55 R2 8.7 @64 R3 8.7 @73 R4 8.7;

PROC SORT;  
BY AGE;

\* INPUT COLUMN MARGINALS OVER TIME HORIZON;  
\* NOTE FIRST OBSERVATION IS BASE RATES' MARGINALS;  
CMS FILEDEF RAW1F DISK RAW10F DATA;  
DATA MARGINAL;  
INFILE RAW1F;  
INPUT YEAR 1-4 @7 R1-R4;

PROC SORT;  
BY YEAR;

\*\*\*\*\* CONVERSIONS \*\*\*\*\* ;

PROC MATRIX FUZZ FW=10;

\* FETCHING DATA IN BASE = AGER;

FETCH AGER 36 DATA = BASE (KEEP=R1-R4);

\* FETCHING BASE RATES' MARGINALS = BCM;

FETCH BCM 1 DATA = MARGINAL (KEEP=R1-R4);

\*\*\*\*\* LOOP YEAR FOR EACH FUTURE YEAR IN TIME HORIZON \*\*\*\*\*;

```

* DO YEAR = 1985 TO 2040 BY 5;
  DO YEAR = 1985 TO 2010 BY 5;

  WK1 = J(36,4,0);

* FETCHING GOAL COLUMN MARGINAL = GCM ;

  FETCH GCM 1 DATA=MARGINAL (KEEP=R1-R4);

* COMPUTING ROW VECTOR OF INITIAL COLUMN RATIOS = ICR ;

  ICR = GCM #/ BCM ;
  PRINT ICR;
* ROUND 1 ADJUSTMENT WHERE ROUND = ADJUSTMENT BASED ON COLUMN
  THEN ROW TOTALS;

  DO I = 1 TO 36;
    WK1(I,) = AGER(I,) * ICR ;

  END;

  LINK RSUM;

* ADDITIONAL ROUNDS CONTROLLED BY INDEX TIMES -- SET TO DO 8 IN ALL;

  DO TIME = 2 TO 8;
    LINK CSUM;
    LINK RSUM;
    END;

***** OUTPUT TO SAS DATA SET = PROGRATE *****;

  OUTDAT = J(36,7,0);

* SET YEAR ON RECORD ;
  OUTDAT(,1) = YEAR;

* SET DISABILITY SERIES # ON RECORD ;

  OUTDAT(,2) = 1;

* SET AGE ON RECORD ;

  CT = 0;
  DO AGE = 65 TO 100 ;

```

```
CT = CT + 1;
OUTDAT(CT,3) - AGE;
END;
```

```
* SET COMPUTED RATES ;
```

```
OUTDAT(,4:7) = WK1(,1:4);
```

```
* OUTPUT;
```

```
OUTPUT OUT DAT OUT=PROGRATE(RENAME=(COL1=YEAR COL2=DIS_AB_S
COL3=AGE COL4=APPRO1 COL5=APPRO2 COL6=APPRO3
COL7=APPRO4));
```

```
* END LOOP;
```

```
END;
```

```
***** SUEROUNTINES RSUM & CSUM *****;
```

```
RSUM:
```

```
WK2 = J(36,4,0);      RS = J(36,1,0);      RRS = J(36,1,0);
RS = WK1(+);
RRS = 1 #/ RS;
DO C = 1 TO 4;
  WK2(C) = WK1(C) # RRS;
WK1 = WK2;
RETURN;
```

```
CSUM:
```

```
WK2 = J(36,4,0);  CS = J(1,4,0);      RCS = J(1,4,0);
CS = WK1(+);
RCS = GCM #/ (CS #/ 36);
DO R = 1 TO 36;
  WK2(R,) = WK1(R,) # RCS;
WK1 = WK2;
RETURN;
```

```
***** PROC MATRIX DONE *****;
```

```
***** NEW DATA SET TO DO WHATEVER WITH PROGRATE *****;
```

```
PROC PRINT DATA= PROGRATE;
```

```
SUM APPRO1 APPRO2 APPRO3 APPRO4;
BY YEAR;
```

```
CMS FILEDEF UTF DISK FILE1F10 DATA ;
```

```
DATA NEW; SET PROGRATE; FILE UTF;
```

```
PUT YEAR 1-4 AGE 5-8 @10 '2' @12 APPRO1-APPRO4;
```

**PROGRAM NAME: COMPRJCT**

- Combines disability projections for men and women

FILE: COMPRJCT SAS A MIAMI UNIVERSITY VM/CMS REL 5

TITLE1 'THIS IS THE PROGRAM THAT COMBINES THE PROJECTED DISABILITY';  
TITLE2 'RATES FOR MALE AND FEMALE AND PRODUCES FILE129';

```
CMS FILEDEF MALE DISK FILE1M29 DATA;
CMS FILEDEF FEMALE DISK FILE1F29 DATA;
DATA MALE;
INFILE MALE;
INPUT YEAR AGE SEX DISPRO1-DISPRO4;
DATA FEMALE;
INFILE FEMALE;
INPUT YEAR AGE SEX DISPRO1-DISPRO4;
DATA ALL;SET MALE FEMALE;
IF AGE>96 THEN DELETE;
IF AGE=96 THEN AGE =100;
IF YEAR=1985 THEN YEAR 1986;
PROC SORT; BY YEAR AGE SEX ;
CMS FILE DEF COMB DISK COMB DATA;
DATA LAST; SET ALL;FILE COMB;
PUT YEAR AGE SEX DISPRO1-DISPRO4;
DATA NEW; INFILE COMB;
INPUT YEAR AGE SEX DISM1-DISM4 #2 @12 DISF1-DISF4;
CMS FILEDEF XXXX DISK FILE129 DATA;
DATA NEW;SET NEW; FILE XXXX;
PUT YEAR 1-4 '3' @6 AGE 3. @10 DISM1 8.7 @19 DISM2 8.7 @28 DISM3 8.7 @37
DISM4 8.7 @46 DISF1 8.7 @55 DISF2 8.7 @64 DISF3 8.7 @73 DISF4 8.7;
```

## PROGRAM NAME: PROGIOS

- Sample program that projects numbers disabled, using population counts and disability rate matrices as input

FILE: PROGIOS SAS A MIAMI UNIVERSITY VM/CMS REL 5

TITLE1 'THIS IS THE 10TH SCENARIO WITH BASELINE, CONTINUATION OF '  
TITLE2 'CURRENT, MORTALITY, "1", AND INCREASE IN DISABILITY, "4", '  
TITLE3 'THE INCREASE IN DISABILITY IS 7.5% FROM 1985 TO 2010 AND NO';  
TITLE4 'CHANGE FROM 2010 TO 2040';

\*\*\*\*\* PROGRAM I \*\*\*\*\*;

CMS FILEDEF FILE1 DISK FILEI10 DATA;  
CMS FILEDEF FILE2 DISK CENSUS1 DATA;

TITLE "CREATING FILES 3 AND 4 FROM FILES 1 AND 2";

\* READING FILE 1 INTO SASFILES DIS\_DNE, DIS\_TWO, & DIS\_TRI =  
SEGREGATING DISABILITY RATES BY DISABILITY SERIES;

DATA DIS\_ONE;  
INFILE FILE1;  
INPUT @1 YEAR 4.0 @5 DIS\_AB\_S 1.0 @6 AGE 3.0 @10 MAL\_D\_RI 8.7 @19  
MAL\_D\_R2 8.7 @28 MAL\_D\_R3 8.7 @37 MAL\_D\_R4 8.7 @46 FEM\_D\_R1 8.7  
@55 FEM\_D\_R2 8.7 @64 FEM\_D\_R3 8.7 @73 FEM\_D\_R4 8.7;  
MAL\_D\_R=MAL\_D\_R1+MAL\_D\_R2;  
FEM-D-R=FEM\_D\_R1+FEM\_D\_R2;  
PROC SORT DATA = DIS\_ONE;  
BY YEAR AGE;

\* READING FILE 2 INTO SASFILE MCRT\_ONE=SEGREGATING PROJECTED  
POPULATION COUNTS BY MORTALITY SERIES;

DATA MORT\_ONE;  
INFILE FILE2;  
INPUT YEAR MORT\_S AGE MALE\_CNT FEM\_CNT;

\* MERGING INPUT SASFILES TO NIN COMBINATIONS OF RATES AND COUNTS =  
CREATING NINE SEPARATE SASFILES WITH PROJECTED COUNTS BY  
DISABILITY STATUS;

\* NOTE EACH OF THESE FILES RESEMBLE FILE 3;

DATA TEMP1;  
MERGE DIS\_ONE MORT\_ONE;



```

* TOTAL POPULATION AT AGE;
  TOTL_CNT = MALE_CNT + FEM_CNT;
* MALE AND FEMALE COUNT BY DISABILITY STATUS;
  MAL_D_C1 =ROUND(MAL_D_R1 * MALE_CNT) ; MAL_D_C2 =ROUND(MAL_D_R2
    * MALE_CNT);
  MAL_D_C=MAL_D_C1+MAL_D_C2;

  MAL_D_C3 = ROUND(MAL_D_R3 * MALE_CNT) ;
  MAL_D_C4 = MALE_CNT - (MAL_D_C1 + MAL_D_C2 + MAL_D_C3) ;
  FEM_D_C1 =ROUND(FEM_D_R1 * FEM_CNT) ; FEM_D_C2 = ROUND(FEM_D_R2
    * FEM_CNT);
  FEM_D_C=FEM_D_C4+FEM_D_C2;
  FEM_D_C3 = ROUND(FEM_D_R3 * FEM_CNT) ;
  FEM_D_C4 = FEM_CNT - (FEM_D_C1 + FEM_D_C2 + FEM_D_C3) ;
* TOTAL COUNT BY DISABILITY STATUS;
  TOT_D_C1 = MAL_D_C1 + FEM_D_C1 ; TOT_D_C2 = MAL_D_C2 + FEM_D_C2 ;
  TOT_D_C3 = MAL_D_C3 + FEM_D_C3 ; TOT_D_C4 = MAL_D_C4 + FEM_D_C4 ;
  TOT_D_C=MAL_D_C+FEM_D_C;
* PROPORTION OF TOTAL COUNT BY DISABILITY STATUS;
  TOT_D_P1 = TOT_D_C1 / TOTL_CNT; TOT_D_P2 = TOT_D_C2 / TOTL_CNT;
  TOT_D_P3 = TOT_D_C3 / TOTL_CNT; TOT_D_P4 = TOT_D_C4 / TOTL_CNT;
  TOT_D_P=TOT_D_P1 + TOT_D_P2;

* CONCATENATE NINE SCENARIOS INTO TEMPORARY FILE 2;

DATA TFILES3;

SET TEMP1;
  KEEP YEAR DIS_AB_S MORT_2 AGE TOTL_CNT MALE_CNT FEM_CNT
    MAL_D_R1 MAL_D_R2 MAL_D_R3 MAL_D_R4 MAL_D_R FEM_D_R1
    FEM_D_R2 FEM_D_R3 FEM_D_R4 FEM_D_R MAL_D_C1 MAL_D_C2
    MAL_D_C3 MAL_D_C4 MAL_D_C FEM_D_C1 FEM_D_C2 FEM_D_C3
    FEM_D_C4 FEM_D_C TOT_D_C1 TOT_D_C2 TOT_D_C3 TOT_D_C4
    TOT_D_C TOT_D_P1 TOT_D_P2 TOT_D_P3 TOT_D_P4 TOT_D_P;

PROC SORT DATA=TFILE3;
  BY YEAR DIS_AB_S MORT_S;

* CREATING FILE 4;

DATA FILE4; SET TFILE3;
  BY YEAR DIS_AB_S MORT_S;

RETAIN SUM_PCP SUM_MALE SUM_FEM S_M_D_C1 S_M_D_C2 S_M_D_C3
  S_M_D_C4 S_M_D_C S_F_D_C1 S_F_D_C2 S_F_D_C3 S_F_D_C4 S_F_D_C

```

```
STD_M_D1 STD_M_D2 STD_M_D3 STD_M_D4 STD_M_D STD_F_D1
STD_F_D2 STD_F_D3 STD_F_D4 STD_F_D;
```

```
ARRAY L1 SUM_POP SUM_MALE SUM_FEM S_M_D_C1 S_M_D_C2 S_M_D_C3
S_M_D_C4 S_M_D_C S_F_D_C1 S_F_D_C2 S_F_D_C3 S_F_D_C4 S_F_D_C
STD_M_D1 STD_M_D2 STD_M_D3 STD_M_D4 STD_M_D STD_F_D1
STD_F_D2 STD_F_D3 STD_F_D4 STD_F_D;
```

```
ARRAY L2 TOTL_CNT MALE_CNT FEM_CNT MAL_D_C1 MAL_D_C2 MAL_D_C3
MAL_D_C4 MAL_D_C FEM_D_C1 FEM_D_C2 FEM_D_C3 FEM_D_C4
FEM_D_C MAL_D_R1 MAL_D_R2 MAL_D_R3 MAL_D_R4 MAL_D_R
FEM_D_R1 FEM_D_R2 FEM_D_R3 FEM_D_R4 FEM_D_R;
```

```
KEEP YEAR DIS_AB_S MORT_S SUM_POP SUM_MALE SUM_FEM ACT_M_P1
ACT_M_P2 ACT_M_P3 ACT_M_P4 ACT_M_P ACT_F_P1 ACT_F_P2
ACT_F_P3 ACT_F_P4 ACT_F_P S_M_D_C1 S_M_D_C2 S_M_D_C3
S_M_D_C4 S_M_D_C S_F_D_C1 S_F_D_C2 S_F_D_C3 S_F_D_C4 S_F_D_C
SUM_C1 SUM_C2 SUM_C3 SUM_C4 SUM_C ACT_P1 ACT_P2 ACT_P3
ACT_P4 ACT_P STD_M_D1 STD_M_D2 STD_M_D3 STD_M_D4 STD_M_D
STD_F_D1 STD_F_D2 STD_F_D3 STD_F_D4 STD_F_D STD_D1 STD_D2
STD_D3 STD_D4 STD_D;
```

```
***** .
;
```

```
* NOTE N_AGES MUST BE SET = # OF AGE GROUPS SELECTED...
ALL AGE GROUPS = 32;
```

```
N_AGES = 32;
```

```
***** .
;
```

```
IF FIRST.MORT_S THEN DO;
DO OVER L1;
L1 = 0;
END;
END;
```

```
DO OVER L1;
L1 = L1 + L2;
END;
```

```
IF LAST.MORT_S THEN DO;
ACT_M_P1 = S_M_D_C1 / SUM_MALE; ACT_M_P2 = S_M_D_C2 / SUM_MALE;
ACT_M_P3 = S_M_D_C3 / SUM_MALE; ACT_M_P4 = S_M_D_C4 / SUM_MALE;
ACT_M_P = ACT_M_P1 + ACT_M_P2;
ACT_F_P1 = S_F_D_C1 / SUM_FEM; ACT_F_P2 = S_F_D_C2 / SUM_FEM;
ACT_F_P3 = S_F_D_C3 / SUM_FEM; ACT_F_P4 = S_F_D_C4 / SUM_FEM;
```

```

ACT_F_P = ACT_F_P1 + ACT_F_P2;
SUM_C1 = S_M_D_C1 + S_F_D_C1; SUM_C2 = S_M_D_C2 + S_F_D_C2;
SUM_C3 = S_M_D_C3 + S_F_D_C3; SUM_C4 = S_M_D_C4 + S_F_D_C4;
SUM_C = SUM_C1 + SUM_C2;
ACT_P1 = SUM_C1 / SUM_POP; ACT_P2 = SUM_C2 / SUM_POP;
ACT_P3 = SUM_C3 / SUM_POP; ACT_P4 = SUM_C4 / SUM_POP;
ACT_P = ACT_P1 + ACT_P2;

```

```

ARRAY L3 STD_M_D1--STD_M_D STD_F_D1--STD_F_D;
DO OVER L3;
  L3 = L3 / N_AGES;
  END;
  STD_D1 = (STD_M_D1 + STD_F_D1) / 2;
  STD_D2 = (STD_M_D2 + STD_F_D2) / 2;
  STD_D3 = (STD_M_D3 + STD_F_D3) / 2;
  STD_D4 = (STD_M_D4 + STD_F_D4) / 2;
  STD_D = STD_D1 + STD_D2;
OUTPUT;
END;

```

```

LABEL YEAR = 'PROJECTION YEAR';
LABEL DIS_AB_S = 'DISABILITY SERIES';
LABEL MORT_S = 'MORTALITY SERIES';

```

```

LABEL SUM_POP = 'POP 65 AND OLDER';
LABEL SUM_MALE = 'MALES 65 AND OLDER';
LABEL SUM_FEM = 'FEMALES 65 AND OLDER';

```

```

LABEL ACT_M_P = 'MALE, (% NOT + % LEAST) DISABLED';
LABEL ACT_M_P1 = 'MALE, % NOT DISABLED';
LABEL ACT_M_P2 = 'MALE, % LEAST DISABLED';
LABEL ACT_M_P3 = 'MALE, % MODERATELY DISABLED';
LABEL ACT_M_P4 = 'MALE, % MOST DISABLED';
LABEL ACT_F_P = 'FEMALE, (% NOT + % LEAST) DISABLED';
LABEL ACT_F_P1 = 'FEMALE, % NOT DISABLED';
LABEL ACT_F_P2 = 'FEMALE, % LEAST DISABLED';
LABEL ACT_F_P3 = 'FEMALE, % MODERATELY DISABLED';
LABEL ACT_F_P4 = 'FEMALE, % MOST DISABLED';
LABEL S_M_D_C = 'MALE, COUNT (NOT + LEAST) DISABLED';
LABEL S_M_D_C1 = 'MALE, COUNT NOT DISABLED';
LABEL S_M_D_C2 = 'MALE, COUNT LEAST DISABLED';
LABEL S_M_D_C3 = 'MALE, COUNT MODERATELY DISABLED';
LABEL S_M_D_C4 = 'MALE, COUNT MOST DISABLED';
LABEL S_F_D_C = 'FEMALE, COUNT (NOT + LEAST) DISABLED';
LABEL S_F_D_C1 = 'FEMALE, COUNT NOT DISABLED';
LABEL S_F_D_C2 = 'FEMALE, COUNT LEAST DISABLED';

```

LABEL S\_F\_D\_C3 = 'FEMALE, COUNT MODERATELY DISABLED';  
 LABEL S\_F\_D\_C4 = 'FEMALE, COUNT MOST DISABLED';  
 LABEL SUM\_C = 'COUNT (NOT + LEAST) DISABLED';  
 LABEL SUM\_C1 = 'COUNT NOT DISABLED';  
 LABEL SUM\_C2 = 'COUNT LEAST DISABLED';  
 LABEL SUM\_C3 = 'COUNT MODERATELY DISABLED';  
 LABEL SUM\_C4 = 'COUNT MOST DISABLED';  
 LABEL ACT\_P = '% (NOT + LEAST) DISABLED';  
 LABEL ACT\_P1 = '% NOT DISABLED';  
 LABEL ACT\_P2 = '% LEAST DISABLED';  
 LABEL ACT\_P3 = '% MODERATELY DISABLED';  
 LABEL ACT\_P4 = '% MOST DISABLED';  
 LABEL STD\_M\_D = 'MALE, STANDARD % (NOT + LEAST) DISABLED';  
 LABEL STD\_M\_D1= 'MALE, STANDARD % NOT DISABLED';  
 LABEL STD\_M\_D2= 'MALE, STANDARD % LEAST DISABLED';  
 LABEL STD\_M\_D3= 'MALE, STANDARD % MODERATELY DISABLED';  
 LABEL STD\_M\_D4= 'MALE, STANDARD % MOST DISABLED';  
 LABEL STD\_F\_D = 'FEMALE, STANDARD % (NOT + LEAST) DISABLED';  
 LABEL STD\_F\_D1= 'FEMALE, STANDARD % NOT DISABLED';  
 LABEL STD\_F\_D2= 'FEMALE, STANDARD % LEAST DISABLED';  
 LABEL STD\_F\_D3= 'FEMALE, STANDARD % MODERATELY DISABLED';  
 LABEL STD\_F\_D4= 'FEMALE, STANDARD % MOST DISABLED';  
 LABEL STD\_D = 'STANDARD % (NOT + LEAST) DISABLED';  
 LABEL STD\_D1= 'STANDARD % NOT DISABLED';  
 LABEL STD\_D2= 'STANDARD % LEAST DISABLED';  
 LABEL STD\_D3= 'STANDARD % MODERATELY DISABLED';  
 LABEL STD\_D4= 'STANDARD % MOST DISABLED';

\* FINISHING FILE 3 CONSTRUCTION;

DATA FILE3; MERGE TFILE3 FILE4;

BY YEAR DIS\_AB\_S MORT\_S;

KEEP YEAR DIS\_AB\_S MORT\_S AGE TOTL\_CNT MALE\_CNT FEM\_CNT  
 MAL\_D\_R1 MAL\_D\_R2 MAL\_D\_R3 MAL\_D\_R4 MAL\_D\_R FEM\_D\_R1  
 FEM\_D\_R2 FEM\_D\_R3 FEM\_D\_R4 FEM\_D\_R MAL\_D\_C1 MAL\_D\_C2  
 MAL\_D\_C3 MAL\_D\_C4 MAL\_D\_C FEM\_D\_C1 FEM\_D\_C2 FEM\_D\_C3  
 FEM\_D\_C4 FEM\_D\_C TOT\_D\_C1 TOT\_D\_C2 TOT\_D\_C3 TOT\_D\_C4  
 TOT\_D\_C TOT\_D\_P1 TOT\_D\_P2 TOT\_D\_P3 TOT\_D\_P4 TOT\_D\_P SUM\_POP  
 SUM\_MALE SUM\_FEM S\_M\_D\_C1 S\_M\_D\_C2 S\_M\_D\_C3 S\_M\_D\_C4  
 S\_M\_D\_C S\_F\_D\_C1 S\_F\_D\_C2 S\_F\_D\_C3 S\_F\_D\_C4 S\_F\_D\_C SUM\_C1  
 SUM\_C2 SUM\_C3 SUM\_C4 SUM\_C;

LABEL YEAR = 'PROJECTION YEAR';  
 LABEL DIS\_AB\_S = 'DISABILITY SERIES';  
 LABEL MORT\_S = 'MORTALITY SERIES';  
 LABEL AGE = 'AGE GROUP';

LABEL TOTL\_CNT = 'TOTAL POP -- THIS AGE GRP';  
  
 LABEL MALE\_CNT = 'MALES -- THIS AGE GRP';  
 LABEL FEM\_CNT = 'FEMALES -- THIS AGE GRP';  
 LABEL MAL\_D\_R = 'MALE, % (NOT + % LEAST) DISABLED';  
 LABEL MAL\_D\_R1 = 'MALE, % NOT DISABLED';  
 LABEL MAL\_D\_R2 = 'MALE, % LEAST DISABLED';  
 LABEL MAL\_D\_R3 = 'MALE, % MODERATELY DISABLED';  
 LABEL MAL\_D\_R4 = 'MALE, % MOST DISABLED';  
 LABEL FEM\_D\_R = 'FEMALE, % (NOT + % LEAST) DISABLED';  
 LABEL FEM\_D\_R1 = 'FEMALE, % NOT DISABLED';  
 LABEL FEM\_D\_R2 = 'FEMALE, % LEAST DISABLED';  
 LABEL FEM\_D\_R3 = 'FEMALE, % MODERATELY DISABLED';  
 LABEL FEM\_D\_R4 = 'FEMALE, % MOST DISABLED';  
 LABEL MAL\_D\_C = 'MALE, COUNT (NOT + LEAST) DISABLED';  
 LABEL MAL\_D\_C1 = 'MALE, COUNT NOT DISABLED';  
 LABEL MAL\_D\_C2 = 'MALE, COUNT LEAST DISABLED';  
 LABEL MAL\_D\_C3 = 'MALE, COUNT MODERATELY DISABLED';  
 LABEL MAL\_D\_C4 = 'MALE, COUNT MOST DISABLED';  
 LABEL FEM\_D\_C = 'FEMALE, COUNT (NOT + LEAST) DISABLED';  
 LABEL FEM\_D\_C1 = 'FEMALE, COUNT NOT DISABLED';  
 LABEL FEM\_D\_C2 = 'FEMALE, COUNT LEAST DISABLED';  
 LABEL FEM\_D\_C3 = 'FEMALE, COUNT MODERATELY DISABLED';  
 LABEL FEM\_D\_C4 = 'FEMALE, COUNT MOST DISABLED';  
 LABEL TOT\_D\_C = 'COUNT (NOT + LEAST) DISABLED';  
 LABEL TOT\_D\_C1 = 'COUNT NOT DISABLED';  
 LABEL TOT\_D\_C2 = 'COUNT LEAST DISABLED';  
 LABEL TOT\_D\_C3 = 'COUNT MODERATELY DISABLED';  
 LABEL TOT\_D\_C4 = 'COUNT MOST DISABLED';  
 LABEL TOT\_D\_P = '% (NOT + LEAST) DISABLED';  
 LABEL TOT\_D\_P1 = '% NOT DISABLED';  
 LABEL TOT\_D\_P2 = '% LEAST DISABLED';  
 LABEL TOT\_D\_P3 = '% MODERATELY DISABLED';  
 LABEL TOT\_D\_P4 = '% MOST DISABLED';  
  
 LABEL SUM\_POP = 'POP 65 AND OLDER';  
 LABEL SUM\_MALE = 'MALES 65 AND OLDER';  
 LABEL SUM\_FEM = 'FEMALES 65 AND OLDER';  
 LABEL S\_M\_D\_C = '65+ - MALE, COUNT (NOT+LEAST) DISABLED';  
 LABEL S\_M\_D\_C1 = '65+ - MALE, COUNT NOT DISABLED';  
 LABEL S\_M\_D\_C2 = '65+ - MALE, COUNT LEAST DISABLED';  
 LABEL S\_M\_D\_C3 = '65+ - MALE, COUNT MODERATELY DISABLED';  
 LABEL S\_M\_D\_C4 = '65+ - MALE, COUNT MOST DISABLED';  
 LABEL S\_F\_D\_C = '65+ - FEMALE, COUNT (NOT+LEAST) DISABLED';  
 LABEL S\_F\_D\_C1 = '65+ - FEMALE, COUNT NOT DISABLED';  
 LABEL S\_F\_D\_C2 = '65+ - FEMALE, COUNT LEAST DISABLED';

```
LABEL S_F_D_C3 = '65+ - FEMALE, COUNT MODERATELY DISABLED';
LABEL S_F_D_C4 = '65+ - FEMALE, COUNT MOST DISABLED';
LABEL SUM_C = '65+ - COUNT (NOT+LEAST) DISABLED';
LABEL SUM_C1 = '65+ - COUNT NOT DISABLED';
LABEL SUM_C2 = '65+ - COUNT LEAST DISABLED';
LABEL SUM_C3 = '65+ - COUNT MODERATELY DISABLED';
LABEL SUM_C4 = '65+ - COUNT MOST DISABLED';
CMS FIL5DEF FILE3 DISK FILE310 SYSFILE;
  DATA FILE3.FILE310;
  SET FILE3;
CMS FILEDEF FILE4 DISK FILE410 SYSFILE;
  DATA FILE4.FILE410;
  SET FILE4;
```

**PROGRAM NAME: PRGRAM 20 and PRGRAM 30**

- Sample programs to present data from projections in tabular and graph form

FILE: PRGRAM20 SAS A MIAMI UNIVERSITY VM/CMS REL 5

TITLE1 'THIS IS THE 10TH SCENARIO WITH BASELINE, CONTINUATION OF ' ;  
TITLE2 'CURRENT, MORTALITY, "1", AND INCREASE IN DISABILITY, "4", ' ;  
TITLE3 'THE INCREASE IN DISABILITY IS 7.5% FROM 1985 TO 2010 AND NO' ;  
TITLE4 'CHANGE FROM 2010 TO 2040' ;

\*\*\*\*\* PROGRAM II \*\*\*\*\*  
CMS FILEDEF FILE3 DISK FILE310 FILE 3 A ;  
DATA FILE3; SET FILE3.FILE310 ;  
\*\*\*\*\*

\* IF YOU WANT TO SELECT A CERTAIN SENARIO(S) FOR THIS RUN THEN  
SELECT ON DIS\_AB\_S & MORT\_S IN FOLLOWING EXAMPLE IF  
STATEMENT. SAME IF STATEMENT COULD SELECT PROJECTION YEAR IF  
DESIRED. NOT REMOVE COMMENT ASTERISK...;

\* YEAR = 'PROJECTION YEAR';  
\* DIS\_AB\_S = 'DISABILITY SERIES';  
\* MORT\_S = 'MORTALITY SERIES';  
\* AGE = 'AGE GROUP';  
\* TOT\_CNT = 'TOTAL POP -- THIS AGE GRP';  
\* MALE\_CNT = 'MALES -- THIS AGE GRP';  
\* FEM\_CNT = 'FEMALES -- THIS AGE GRP';  
\* MAL\_D\_R = 'MALE, % (NOT+LEAST) DISABLED';  
\* MAL\_D\_R1 = 'MALE, % NOT DISABLED';  
\* MAL\_D\_R2 = 'MALE, % LEAST DISABLED';  
\* MAL\_D\_R3 = 'MALE, % MODERATELY DISABLED';  
\* MAL\_D\_R4 = 'MALE, % MOST DISABLED';  
\* FEM\_D\_R = 'FEMALE, % (NOT+LEAST) DISABLED';  
\* FEM\_D\_R1 = 'FEMALE, % NOT DISABLED';  
\* FEM\_D\_R2 = 'FEMALE, % LEAST DISABLED';  
\* FEM\_D\_R3 = 'FEMALE, % MODERATELY DISABLED';  
\* FEM\_D\_R4 = 'FEMALE, % MOST DISABLED';  
\* MAL\_D\_C = 'MALE, COUNT (NOT+LEAST) DISABLED';  
\* MAL\_D\_C1 = 'MALE, COUNT NOT DISABLED';  
\* MAL\_D\_C2 = 'MALE, COUNT LEAST DISABLED';  
\* MAL\_D\_C3 = 'MALE, COUNT MODERATELY DISABLED';  
\* MAL\_D\_C4 = 'MALE, COUNT MOST DISABLED';  
\* FEM\_D\_C = 'FEMALE, COUNT (NOT+LEAST) DISABLED';  
\* FEM\_D\_C1 = 'FEMALE, COUNT NOT DISABLED';

\* FEM\_D\_C2 = 'FEMALE, COUNT LEAST DISABLED';  
 \* FEM\_D\_C3 = 'FEMALE, COUNT MODERATELY DISABLED';  
 \* FEM\_D\_C4 = 'FEMALE, COUNT MOST DISABLED';  
 \* TOT\_D\_C = 'COUNT (NOT+LEAST) DISABLED';  
 \* TOT\_D\_C1 = 'COUNT NOT DISABLED';  
 \* TOT\_D\_C2 = 'COUNT LEAST DISABLED';  
 \* TOT\_D\_C3 = 'COUNT MODERATELY DISABLED';  
 \* TOT\_D\_C4 = 'COUNT MOST DISABLED';  
 \* TOT\_D\_P = '% (NOT+LEAST) DISABLED';  
 \* TOT\_D\_P1 = '% NOT DISABLED';  
 \* TOT\_D\_P2 = '% LEAST DISABLED';  
 \* TOT\_D\_P3 = '% MODERATELY DISABLED';  
 \* TOT\_D\_P4 = '% MOST DISABLED';  
 \* SUM\_POP = 'POP 65 AND OLDER';  
 \* SUM\_MALE = 'MALES 65 AND OLDER';  
 \* SUM\_FEM = 'FEMALES 65 AND OLDER';  
 \* S\_M\_D\_C = '65+ -- MALE, COUNT (NOT+LEAST) DISABLED';  
 \* S\_M\_D\_C1 = '65+ -- MALE, COUNT NOT DISABLED';  
 \* S\_M\_D\_C2 = '65+ -- MALE, COUNT LEAST DISABLED';  
 \* S\_M\_D\_C3 = '65+ -- MALE, COUNT MODERATELY DISABLED';  
 \* S\_M\_D\_C4 = '65+ -- MALE, COUNT MOST DISABLED';  
 \* S\_F\_D\_C = '65+ -- FEMALE, COUNT (NOT+LEAST) DISABLED';  
 \* S\_F\_D\_C1 = '65+ -- FEMALE, COUNT NOT DISABLED';  
 \* S\_F\_D\_C2 = '65+ -- FEMALE, COUNT LEAST DISABLED';  
 \* S\_F\_D\_C3 = '65+ -- FEMALE, COUNT MODERATELY DISABLED';  
 \* S\_F\_D\_C4 = '65+ -- FEMALE, COUNT MOST DISABLED';  
 \* SUM\_C = '65+ -- COUNT (NOT+LEAST) DISABLED';  
 \* SUM\_C1 = '65+ -- COUNT NOT DISABLED';  
 \* SUM\_C2 = '65+ -- COUNT LEAST DISABLED';  
 \* SUM\_C3 = '65+ -- COUNT MODERATELY DISABLED';  
 \* SUM\_C4 = '65+ -- COUNT MOST DISABLED';

\*\*\*\*\*.

\* TO PRINT A TYPE OF ITEM BY AGE AND SEX OR BY AGE FOR ALL OR  
SELECTED SENARIOS

NAME ITEMS ON VAR CARD;

\* LEAVE AGE IN FIRST POSITION ON VAR CARD TO GET AGE GROUP NOTATION  
PRINTED ON OUTPUT;

\* NOTE CAN SUM VARIABLE OVER AGE CASES WITH SUM STATEMENT IN PROC  
PRINT BY NAMING VARIABLE ON SUM CARD (REMEMBER SUM ONLY  
COUNTS, NOT RATES);



```
PROC SORT;
  BY DIS_AB_S MORT_S YEAR AGE;
```

```
PROC PRINT;
  VAR AGE TOT_D_C1 TOT_D_C2 TOT_D_C TOT_D_C3 TOT_D_C4 TOT_D_P1
      TOT_D_P2 TOT_D_P TOT_D_P3 TOT_D_P4;
  SUM TOT_D_C1 TOT_D_C2 TOT_D_C TOT_D_C3 TOT_D_C4;
  BY DIS_AB_S MORT_S YEAR;
  *****;
```

```
TITLE1 'THIS IS THE 10TH SCENARIO WITH BASELINE, CONTINUATION OF ';
TITLE2 'CURRENT, MORTALITY, "1", AND INCREASE IN DISABILITY, "4", ';
TITLE3 'THE INCREASE IN DISABILITY IS 7.5% FROM 1985 TO 2010 AND NO';
TITLE4 'CHANGE FROM 2010 TO 2040';
```

```
***** PROGRAM III *****;
CMS FILEDEF FILE4 DISK FILE410 FILE 4;
  DATA FILE4; SET FILE4.FILE410;
***** PROGRAM III *****;
```

\* VARIABLES ARE:

```
YEAR DIS_AB_S MORT_S SUM_POP SUM_MALE SUM_FEM ACT_M_P1
ACT_M_P2 ACT_M_P3 ACT_M_P4 ACT_M_P ACT_F_P1 ACT_F_P2
ACT_F_P3 ACT_F_P4 ACT_F_P S_M_D_C1 S_M_D_C2 S_M_D_C3
S_M_D_C4 S_M_D_C S_F_D_C1 S_F_D_C2 S_F_D_C3 S_F_D_C4 S_F_D_C
SUM_C1 SUM_C2 SUM_C3 SUM_C4 SUM_C ACT_P1 ACT_P2 ACT_P3
ACT_P4 ACT_P STD_M_D1 STD_M_D2 STD_M_D3 STD_M_D4 STD_M_D
STD_F_D1 STD_F_D2 STD_F_D3 STD_F_D4 STD_F_D STD_D1 STD_D2
STD_D3 STD_D4 STD_D;
```

```
* YEAR = 'PROJECTION YEAR';
* DIS_AB_S = 'DISABILITY SERIES';
* MORT_S = 'MORTALITY SERIES';
```

```
* SUM_POP = 'POP 65 AND OLDER';
* SUM_MALE = 'MALES 65 AND OLDER';
* SUM_FEM = 'FEMALES 65 AND OLDER';
```

```
* ACT_M_P = 'MALE, % (NOT + LEAST) DISABLED';
* ACT_M_P1 = 'MALE, % NOT DISABLED';
* ACT_M_P2 = 'MALE, % LEAST DISABLED';
* ACT_M_P3 = 'MALE, % MODERATELY DISABLED';
* ACT_M_P4 = 'MALE, % MOST DISABLED';
* ACT_F_P = 'FEMALE, % (NOT + LEAST) DISABLED';
* ACT_F_P1 = 'FEMALE, % NOT DISABLED';
* ACT_F_P2 = 'FEMALE, % LEAST DISABLED';
```

\* ACT\_F\_P3 = 'FEMALE, % MODERATELY DISABLED';  
 \* ACT\_F\_P4 = 'FEMALE, % MOST DISABLED';  
  
 \* S\_M\_D\_C = 'MALE, COUNT (NOT + LEAST) DISABLED';  
 \* S\_M\_D\_C1 = 'MALE, COUNT NOT DISABLED';  
 \* S\_M\_D\_C2 = 'MALE, COUNT LEAST DISABLED';  
 \* S\_M\_D\_C3 = 'MALE, COUNT MODERATELY DISABLED';  
 \* S\_M\_D\_C4 = 'MALE, COUNT MOST DISABLED';  
 \* S\_F\_D\_C = 'FEMALE, COUNT (NOT + LEAST) DISABLED';  
 \* S\_F\_D\_C1 = 'FEMALE, COUNT NOT DISABLED';  
 \* S\_F\_D\_C2 = 'FEMALE, COUNT LEAST DISABLED';  
 \* S\_F\_D\_C3 = 'FEMALE, COUNT MODERATELY DISABLED';  
 \* S\_F\_D\_C4 = 'FEMALE, COUNT MOST DISABLED';  
  
 \* SUM\_C = 'COUNT (NOT + LEAST) DISABLED';  
 \* SUM\_C1 = 'COUNT NOT DISABLED';  
 \* SUM\_C2 = 'COUNT LEAST DISABLED';  
 \* SUM\_C3 = 'COUNT MODERATELY DISABLED';  
 \* SUM\_C4 = 'COUNT MOST DISABLED';  
  
 \* ACT\_P = '% (NOT + LEAST) DISABLED';  
 \* ACT\_P1 = '% NOT DISABLED';  
 \* ACT\_P2 = '% LEAST DISABLED';  
 \* ACT\_P3 = '% MODERATELY DISABLED';  
 \* ACT\_P4 = '% MOST DISABLED';  
  
 \* STD\_M\_D = 'MALE, STANDARD % (NOT + LEAST) DISABLED';  
 \* STD\_M\_D1 = 'MALE, STANDARD % NOT DISABLED';  
 \* STD\_M\_D2 = 'MALE, STANDARD % LEAST DISABLED';  
 \* STD\_M\_D3 = 'MALE, STANDARD % MODERATELY DISABLED';  
 \* STD\_M\_D4 = 'MALE, STANDARD % MOST DISABLED';  
  
 \* STD\_F\_D = 'FEMALE, STANDARD % (NOT + LEAST) DISABLED';  
 \* STD\_F\_D1 = 'FEMALE, STANDARD % NOT DISABLED';  
 \* STD\_F\_D2 = 'FEMALE, STANDARD % LEAST DISABLED';  
 \* STD\_F\_D3 = 'FEMALE, STANDARD % MODERATELY DISABLED';  
 \* STD\_F\_D4 = 'FEMALE, STANDARD % MOST DISABLED';  
  
 \* STD\_D = 'STANDARD % (NOT + LEAST) DISABLED';  
 \* STD\_D1 = 'STANDARD % NOT DISABLED';  
 \* STD\_D2 = 'STANDARD % LEAST DISABLED';  
 \* STD\_D3 = 'STANDARD % MODERATELY DISABLED';  
 \* STD\_D4 = 'STANDARD % MOST DISABLED';

\*\*\*\*\*,

\* IF YOU WANT TO SELECT A CERTAIN SENARIO(S) FOR THIS RUN THEN  
SELECT ON DIS\_AB\_S & MORT\_S IN FOLLOWING EXAMPLE IF  
STATEMENT. NOTE REMOVE COMMENT ASTERISK...;

\*\*\*\*\*.

\* TO PRINT A TYPE OF ITEM BY YEAR FOR ALL OR SELECTED SENARIOS, NAME  
ITEMS ON VAR CARD;

```
PROC SORT DATA=FILE4;  
  BY DIS_AB_S MORT_S YEAR;
```

```
PROC PRINT;  
  VAR SUM_POP SUM_MALE SUM_FEM STD_D1 STD_D2 STD_D STD_D3  
  STD_D4;  
  BY DIS_AB_S MORT_S YEAR;
```

\*\*\*\*\*.

\* TO PLOT TREND IN VARIABLE OVER TIME HORIZON REQUIRES STATING  
VARIABLE\*YEAR ON PLOT CARD. OVERLAYS FOR SEVERAL VARIABLES  
ARE POSSIBLE THRU OVERLAY OPTION. TITLE CARD CONTAINS  
MESSAGE IN QUOTES;

To obtain a printed copy of this report, send the full report title and your mailing information to:

U.S. Department of Health and Human Services  
Office of Disability, Aging and Long-Term Care Policy  
Room 424E, H.H. Humphrey Building  
200 Independence Avenue, S.W.  
Washington, D.C. 20201  
FAX: 202-401-7733  
Email: [webmaster.DALTCP@hhs.gov](mailto:webmaster.DALTCP@hhs.gov)

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**RETURN TO:**

Office of Disability, Aging and Long-Term Care Policy (DALTCP) Home  
[\[http://aspe.hhs.gov/office\\_specific/daltcp.cfm\]](http://aspe.hhs.gov/office_specific/daltcp.cfm)

Assistant Secretary for Planning and Evaluation (ASPE) Home  
[\[http://aspe.hhs.gov\]](http://aspe.hhs.gov)

U.S. Department of Health and Human Services Home  
[\[http://www.hhs.gov\]](http://www.hhs.gov)

# ESTIMATING THE PREVALENCE OF LONG-TERM DISABILITY FOR AN AGING SOCIETY

## Files Available for This Report

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HTML <http://aspe.hhs.gov/daltcp/reports/agsoces.htm>

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