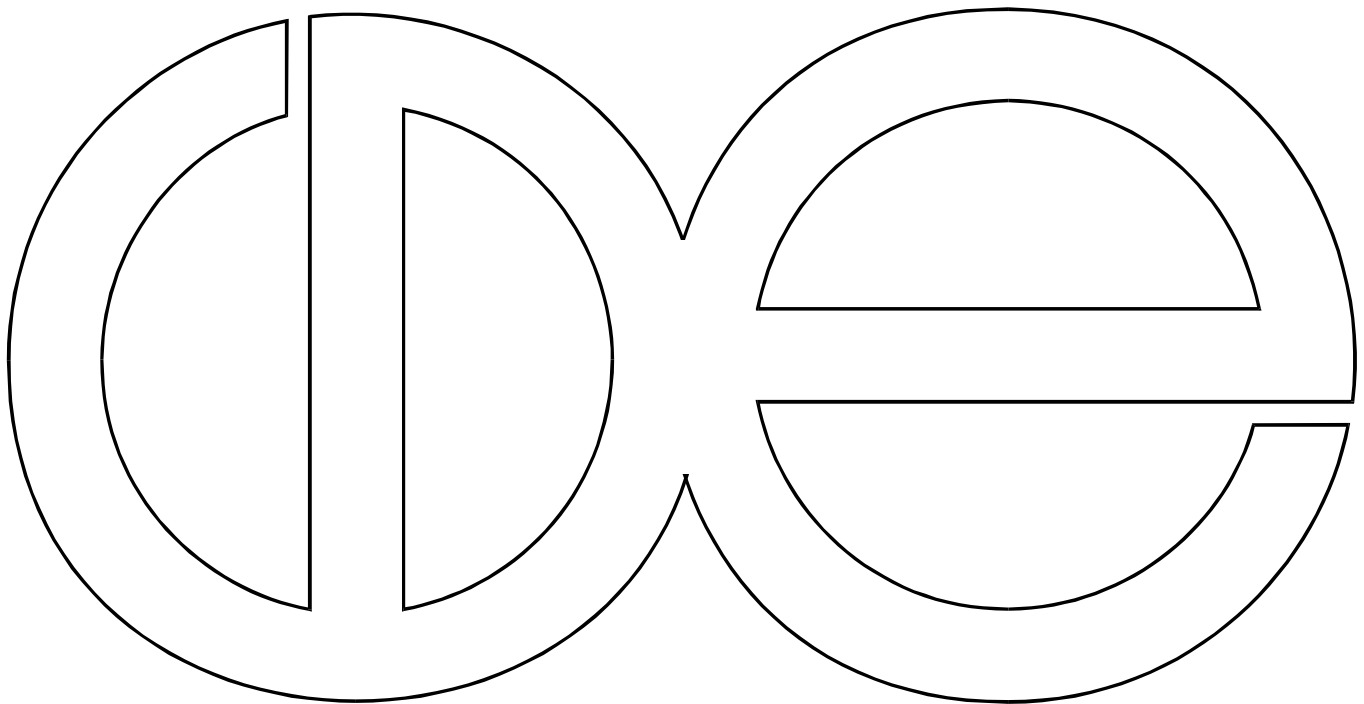


Center for Demography and Ecology
University of Wisconsin-Madison

**Racial Differentials in Longevity and Health Status:
U.S. Population 1980-1990**

Hani Guend
Alberto Palloni

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HANI GUEND, ALBERTO PALLONI

We examine differentials in adult Partial Life Expectancies by type of disability between two censuses within each racial group; and among white, black, Asian, and Native Americans in 1990. During the 1980s, women of minority groups benefited from an improvement in Disability Free Life Expectancy, while white women lived more years with disability. Black women experienced the most positive changes, while Native American men scored the worst. Elderly fared better than younger adults and elderly women improved regardless of race. Compared to whites in 1990, Native American males and females and black males are the most disadvantaged with higher disability free differentials. Disability data and the counts of persons are extracted from the US Censuses 1980 and 1990 (PUMS 1%). The counts of deaths come from vital statistics (100% counts). The procedure of analysis developed and applied here allows a simultaneous assessment of the differentials in longevity and disability.

1. Introduction

In the context of a substantial gain in longevity, integrated measures of longevity and health status are valuable tools for the analysis of demographic and health changes.

Recent population health literature has called for standard measures of population health that go beyond the measurement of longevity as a proxy to the health status of a population (Institute of Medicine 1998, Kindig 1997, Evans et al. 1994, Cox et al. 1992).

This increasing interest in measurement and assessment of the health of populations renewed the interest in the concept of Disability Free Life Expectancy (DFLE) which refers to the part of life expectancy lived free of health limitations. A method of calculation based on a period life table and prevalence rates of disability was developed and came to be known as the Sullivan Method (Sullivan 1966; 1971). Among the desirable features of the prevalence based DFLE are its intuitive interpretation and readily available census data for its implementation (Cambois et al. 1998). Sullivan's method is repeatedly used to produce cross-country comparisons of the health of populations (Hayward and Heron 1999; Robine et al. 2001; Cambois et al. 2001).

Prevalence based procedures of calculation result in the estimation of DFLE and Disability Life Years (DLYs), whose values add up to total Life Expectancy (LE). Disability life years is the part of life expectancy lived with health limitation(s).

Cross-population or cross-time comparisons using LE inform about the changes in longevity of the population but tell little about the improvement or worsening of its health status. This is especially critical in the context of a population characterized by a substantial gain in longevity, as it is the case in most industrialized countries. The policy implications of these demographic changes call for assessing the quality of life years added to the life span of males and females. This assessment of the health status of a population could be achieved through examining the change in DFLE by type of disability, along with the examination of the changes in longevity. Since the differentials in LE by health status might operate in opposite directions of each other and of the differentials in total LE, a simultaneous view of these differentials is necessary to account for the magnitude and direction of the changes.

This paper presents a procedure for the simultaneous analysis of the differentials in DFLE and that of DLYs by type of disability using census-based prevalence rates of disability. This approach allows the estimation of indices that measure the magnitude and directions of the differentials in DFLE and DLYs characterized by a specific type of disability, the one characterized by two simultaneous types of disability, and the part of the differential free of disability. The procedure is then applied to analyze changes over time in adult Partial Life Expectancies (PLE) observed among the four major racial groups between the US Censuses of 1980 and 1990, for males and females separately. Partial life expectancy is an age constrained estimation of life expectancy wherein the

upper age limit does not correspond to the upper limit of the age span but it is rather chosen by the analyst to correspond to age spans of special interest. The procedure is also applied to analyzing racial differences in adult Disability Free Partial Life Expectancy (DFPLE) between white Americans as a reference group, on one hand, and each of the three other racial groups on the other hand, separately for males and females. The four racial groups are American Indians, Esquimo/Aleut (Native Americans); Asian Americans and Pacific Islanders (Asian Americans); black Americans; and white Americans; as defined in the US Censuses of 1980 and 1990.

Public Use Microdata Sample files (PUMS 1%) of both censuses were used to extract the data needed for the computation of prevalence rates of disability as well as for the construction of the period life tables. The complete counts of deaths come from vital statistics data and a 3-year average is used for the construction of the life tables underlying this comparison. Both the Census 1980 and Census 1990 asked two questions related to the active life of adults sixteen years old and older. The first question asked whether the respondent has had a health condition which limited the amount and type of work they could do and lasted at least six months. The second question asked whether the respondent has had a health condition which would have prevented them from work they usually do and lasted at least six months. These two questions and the result of their combination were used to calculate prevalence rates of disability for each of the two types of disability used in the following procedure. The sixteen to nineteen years prevalence rates of disability were applied to adjust the person-years of the age group 15-19 years, in order to start the analysis at fifteen years and use all information made

available by the Census. This assumes that persons fifteen years old have had on average the same disability rates as those sixteen to nineteen years old.

The prevalence rates of disability obtained from the census data are presented in Figures 1 and 2. Compared to 1980, the level of disability rates decreased a bit, which translated into a more flattened curves of disability rates for all eight race/sex groups. Probably due to lesser data quality, the fluctuations on the curves of native Americans and, to a less extent that of elderly Asian Americans, contrast with the smooth curves of white and black Americans. Also remarkable is the tendency towards a rectangularization of the distribution of disability rates if thought of as a continuum across racial groups that runs from the highest levels of disability rates of Native Americans to the lowest level of white Americans.

Fig. 1 and Fig. 2 about here

2. Method of Analysis

Assume that we calculate DFLE for two groups, say group A and group B , where A and B refer to two separate populations or a single population at two different points in time. Also, assume that there are two limitations that we are considering, say limitation 1 and limitation 2 .

Referring to the life table functions, Let L_x^A be the number of person-years in age interval $x, x+a$, in a group A , and L_x^B be the number of person-years in age interval $x, x+a$ in a group B . Also, Let P_{x1}^A be the proportion in the group A , in age group $x, x+a$ with limitation 1 , and P_{x2}^A be the proportion in the group A , in age group $x, x+a$ with limitation 2 . Similarly, Let P_{x1}^B be the proportion, in the group B , in age group $x, x+a$ with

limitation 1, and P_{x2}^B be the proportion in the group B, in age group $x, x+a$ with limitation

2. Then,

$$L_x^A = L_x^A (1 - P_{x1}^A)(1 - P_{x2}^A) + L_x^A P_{x1}^A + L_x^A P_{x2}^A + L_x^A P_{x1}^A P_{x2}^A \text{ and}$$

$$L_x^B = L_x^B (1 - P_{x1}^B)(1 - P_{x2}^B) + L_x^B P_{x1}^B + L_x^B P_{x2}^B + L_x^B P_{x1}^B P_{x2}^B$$

By definition, Partial Life Expectancy = $\sum_x^{x+a} L_x^A / l_x^A$, where x is the exact age and a is

the length of the age group of interest. The differences in PLE, in DLYs, and in DFLE

between age x and age $x+a$ can be expressed with the following five indices.

1. Longevity Differential, or the differential in partial life expectancy between A and B,

$$D_x^M = \sum_x^{x+a} L_x^A / l_x^A - \sum_x^{x+a} L_x^B / l_x^B$$

2. The differential in life years with limitation 1 only,

$$D_x^1 = \sum_x^{x+a} L_x^A P_{x1}^A / l_x^A - \sum_x^{x+a} L_x^B P_{x1}^B / l_x^B$$

3. The differential in life years with limitation 2 only,

$$D_x^2 = \sum_x^{x+a} L_x^A P_{x2}^A / l_x^A - \sum_x^{x+a} L_x^B P_{x2}^B / l_x^B$$

4. The differential in life years with the joint limitation 1 and 2,

$$D_x^{12} = \sum_x^{x+a} L_x^A P_{x1}^A P_{x2}^A / l_x^A - \sum_x^{x+a} L_x^B 1 - P_{x1}^B P_{x2}^B / l_x^B$$

5. The differential in life years free of any limitation,

$$D_x = D_x^M - (D_x^1 + D_x^2 + D_x^{12})$$

Application to total LE, instead of PLE, is immediate when the upper bound superscript of the summation sign is changed to the terminal age of the life span.

In the application to the temporal differentials between the 1980 and 1990 Censuses, A refers to 1990 while B refers to the 1980 Census. In the analysis of the racial gap however, white Americans are referred to as population A , the reference group, while the other sub-populations are referred to as population B . In the temporal comparisons, a negative index of the differentials in Disability related indices (D_x^1, D_x^2, D_x^{12}) denote an improvement in the health status of the population with regard to the measured type of disability, while a negative index of the differential in longevity (D_x^M) or a negative index for no-limitation (D_x) denote a worsening of the health condition of the population. For ease of interpretation the disability related indices were multiplied by (-1) prior to plotting on figures 3 and 4 while the no-disability related index was kept as it is in the Appendices 1 and 2. Therefore a positive bar on the chart represents an improvement while a negative bar represents a worsening over the decade of the health status of the sub-population of interest.

In the comparative analysis of the racial groups however, the indices compare the length of life years of each of the minority groups to that of the whites, for each disability status. A negative index of the differential in DLYs, in this case, says that the length of Disability Life Years is longer than that of the reference group, while a negative index of the no-disability indices tells that the length of DFLE is longer than that of the reference group. So in this case, the later index (D_x) was multiplied by minus one. Therefore, negative bars on the chart suggest that the subpopulation fared worse than the reference group, while positive charts suggest the opposite conclusion.

3. Temporal Changes in Longevity

Ages fifteen, forty-five, and sixty-five are three turning points in adult life. The first is an approximate time of the start of occupational life, the second marks a mid-age turning point, and the third is a marker of retirement age and eligibility for Social Security and Medicare benefits. A summary of longevity and health status over the life course is given by LE at birth and at each of these three ages for each of the race/gender groups (Table 1).

American Asian population has the longest LE at birth for both males and females, in 1980 as well as in 1990. The data at hand also show that Native Americans have a longer life expectancy at birth. However, one should keep in mind that the differences could be due, at least in part, to misclassification of deaths of Native Americans, which possibly biases the death rates downward. Black American males have the shortest LE in 1980 and 1990 and the gap between them and their Asian American counterparts is fourteen to fifteen years. This is not the case with black American females whose LE at birth was a little higher than that of white American females in 1980 but had fallen below in 1990 by almost six years. At age fifteen, Asian Americans have the longest LE for both males and females in 1980 and 1990 alike, and black American males are still the most disadvantaged group at this age.

Table 1 about here

4. Temporal Differentials in Health Status

In the following applications, the index D_x^1 measures the differential in DLYs with “Limited in Work” type of disability; D_x^2 measures the differential of a more severe health condition “Prevented from Work”, while D_x^{12} refers to the part of these two health conditions combined. The index D_x measures the differences in disability free of these two conditions as well as of their combination. These four indices add up to the

difference in LE. The four disability indices are plotted on figures 3 and 4, where the contribution of each condition is presented in shaded color with a negative value meaning a negative contribution to healthy life years, and a positive value a positive contribution. The index D_x^M represents the differential in Partial Life Expectancy, which is composed of the sum of the differentials in DFLE and in DLYs, by type of limitation. The latter could be of opposite signs, thus canceling each other. The graphic presentation highlights where there was improvement and where there was regression with regard to healthy life years (Figures 3 and 4).

There could be a positive gain in health status with regard to both kinds of disability as it is the case for elderly females of all four racial groups where the gain in LE at age 65, between 1980 and 1990, was positive for all four indices. Comparison of Life Expectancies at age sixty five shows that Native American women lost 0.08 years between 1980 and 1990, a negative picture of longevity. This lack of improvement in longevity is nonetheless accompanied with an increase in DFLE. Thus, healthy life of elderly Native American women actually improved during the eighties although the total LE moved only slightly in a negative direction. LE of their male counterparts too changed only slightly with a reduction of 0.57 years. However, the “No Limitation” index, as well as D_x^1 and D_x^{12} changed in a negative direction among Native American males, where improvement occurred only on the ‘Limited in Work’ type of disability (D_x^1).

The gain in LE of elderly black American women and men alike is also too small to be significant (.10 and .04), but there was improvement in healthy life and a systematic reduction of Disability Life Years during the decade. While improvement in longevity

among elderly white American women and men was achieved mostly by an extension of life years with no limitation, improvement in the longevity of Asian American elderly counterparts is gained mainly on a reduction of years of disability, especially work limiting disability. In short, Asian American elderly men and women lived less years in work related disability during the eighties while their DFLE changed only a little. White elderly women and men on the other hand saw their DFLE extended but the Disability Life Years reduced only a little.

The indices at age fifteen tell the same story except for white American females and Native Americans where a negative tone should be added to the previous comments. Overall, the indices are negative for Native American males, which mean that on average Native American men experienced a reduction in their DFLE, and an extension of their Disability Life Years for all three types of disability. The gain by white Americans in female longevity was accompanied with an increase in Disability Life Years between ages fifteen and sixty five.

Figure 3 about here

5. Temporal Differentials in Partial Life Expectancies

Partial Life Expectancy is an age-constrained form of LE. It allows the analysis of survival within age spans of interest, also allowing exclusion of age groups with unreliable data, as it is often the case for the open terminal life table age group. As we did with LE at ages 15 and 65, we calculated the differentials in Partial Life Expectancy in early adulthood (15-44), middle age to retirement (45-64), and elderly ages (65-89) excluding the 90 years and over age group for the reason mentioned above (Figure 4). The two independent living questions in the Census 1990 offer a better proxy to assessing

disability of elderly population. Unfortunately, these two questions were not asked in 1980. The only proxies remaining for comparison are the work related disability questions. They are not perfect but since these questions inquired about “a disability which limited the kind or amount of work they *could* do at a job”, we used them to assess the changes in disability among elderly population as well as among younger adults. The way the questions are formulated made them relevant whether the respondent is actually working or not.

Between 1980 and 1990, black American females constitute the group with the most positive change during adult active life. The length of DLYs regressed while, during the same time period, Disability Free Partial Life Expectancy increased between the two censuses, especially for elderly and old adults. With the striking exception of Native American males and a less dramatic one for Asian American males, elderly population seems to have gained in the length of healthy life. While the work preventing disability life years had gotten a little bit worse among elderly Asian American males, elderly native American males had seen only a little improvement in limiting disability life years that is counter-balanced by a substantial decrease in disability free life years, an increase of the length of preventing disability life years, and the combination of the two types of disability.

The four disability related indices of partial life expectancy at 45 to 64 years also had gotten worse for native American men, in a sharp contrast with all other groups, where there is either a substantial improvement (white American men and women, black American women), moderate positive change (Asian American women, black American men) or, a small negative change (Native American women, Asian American men).

Among the young adult population (15-44), males, especially black American men, experienced a deterioration of Disability Free Partial Life Expectancy. An improvement in healthy life among black and Native American females goes along with a regression among white and Asian American young adult females between 1980 and 1990.

Figure 4 about here

6. The Racial Gap in Partial Life Expectancies

Here the procedure is applied to analyzing the differentials in Partial Life Expectancies among the eight race-gender groups using the 1990 data. Since white Americans are the reference group, there are six differentials to be described. The results are presented in figure 5. Without meaning to bring a value judgment about the observed changes, for each of the four indices a negative value on the bar chart means that the group in question fared worse than the reference group and a positive value means the opposite.

It is noticeable that only Asian American males and females compare favorably to their white American counterparts, while the other three groups were disadvantaged over the whole adult life course except for one age group of elderly Native Americans, which probably reflects imperfections of the data rather than a real advantage. Except for the oldest age group, the gap between white and Asian American females is very small, and in almost all age groups, Asian American women had an advantage in gain over DLYs over their white counterparts (Figure 5). Compared to white American women and with only few exceptions, Asian American women had longer work limiting DLYs but a shorter work preventing DLYs, associated with shorter DFPLE from age fifteen to age forty-five, and longer DFPLE from fifty to eighty-nine years with few exceptions. This holds even more for Asian American males with regard to the disability part. Asian

American males experienced longer mild (Limiting) disabilities than white Americans, but less disability that could have prevented them from work. On the other hand, except for the 15 to 19, 30 to 34, and 85 to 89 age groups, Asian American males experienced a longer DFPLE over their adult life span.

The pattern of the black American differential is similar for males and females. Compared to white Americans, Black Americans had a shorter DFPLE associated with longer DLYs for all types of disability during the whole adult life span. This is also true for Native American women, except for the last age groups where the data show an advantage over white American females, but this might as well be due to imperfections in the data. Native American males are the most disadvantaged compared to white American males with a magnitude that is way above all other groups. Native American men lived less time free of disability and spent more time in either or both types of disability.

Figure 5 about here

7. Conclusion

Differences observed in total life expectancy inform about the changes in longevity that is also a summary measure of population health. Summary measures of longevity in each specific health status give more refined assessment of the health of a population but the differences in Disability Free Life Expectancy and in Disability Life Years do not operate necessarily in the same direction. A simple procedure was used for a simultaneous estimation of indices that measure the differentials in DFLE and DLYs. The procedure is readily applicable to the conventional period life table whenever Census-type disability

data are available to estimate prevalence rates of disability that match the life table person-years.

Data extracted from the US Censuses 1980 and 1990 were used to calculate period life tables by race and gender for the major four racial groups, and to estimate the prevalence rates of disability applied to calculate and decompose life expectancy into four indices that reflect the part of the differential characterized by a disability type 1, a disability type 2, the combination of the two types, and the part free of disability. First, this procedure is applied to analyzing the differential in life expectancy over time among a single race/gender group. Second, an application that compares the three minority racial groups to the white American sub-population shows how the procedure can be used to assess the differential between sub-populations.

Over the complete adult life span, females of the three minority groups benefited from a systematic improvement with longer DFLE, and shorter length of DLYs. Native American men experienced a negative change for all four disability related differentials, which translates into less DFLE coupled with more DLYs. The three other male groups had an overall positive change but with different distribution of the changes by type of disability. Elderly women 65 and older of all four racial groups gained in terms of extended DFLE between 1980 and 1990. Elderly black American men also had similar improvements, while Native Americans improved only on the mild disability type. Elderly white Americans achieved progress in DFLE, while elderly Asian Americans gained mainly on a reduction of DLYs. Black American females benefited from the most positive change between the two censuses, while Native American men scored the worst changes between the census dates. The elderly population also fared better than younger

adults with regard to the length of disability free differential and disability life year differentials as well. Compared to white Americans, Native American males and females, and black American males are the most disadvantaged groups with shorter disability free life years, and longer life with disability.

Disclaimer. The data utilized in this paper were made available in part, by the Inter-University Consortium for Political and Social Research. The data for the mortality-detail file 1989-1991 were originally collected by the NCHS. Neither the collectors of the original data nor the Consortium bear any responsibility for analysis or interpretation presented here.

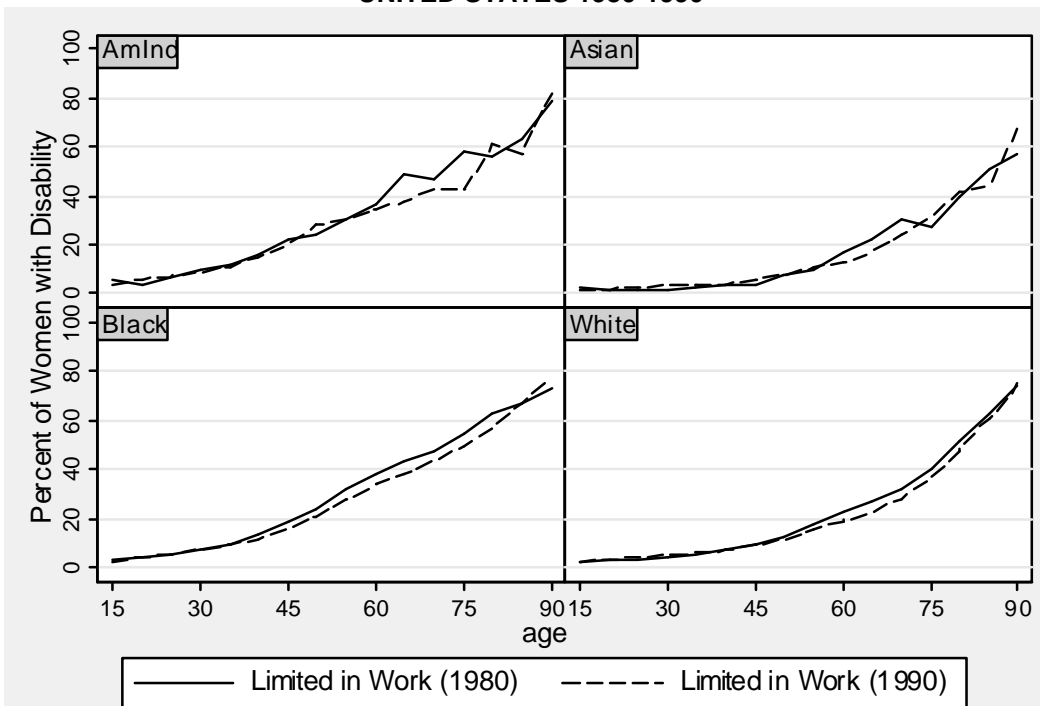
REFERENCES

- Cambois E., Robine J.M., Brouard N. "Les espérances de vie appliquées à des status spécifiques. Historiques des indicateurs et des méthodes de calcul" *Population*, 3, 1998, 447-476
- Cambois E., Robine J.M., Heyward M. "Social Inequalities in Disability-Free Life Expectancy in the French Male Population, 1980-1991" *Demography*, 38(4), 513-524, November 2001
- Cox D., Fitzpatrick R., Fletcher A., Gore S., Spiegelhalter D., Jones D. "Quality of life Assessment: Can We keep it Simple?" *Journal of the Royal Statistical Society. Series A*, 155(3), 1992, 353-393
- Evans R.G., Barer M.L., Marmor T.R. (Eds.) *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations* New York, Aldine De Gruyter, 1994
- Hayward M.D., Heron, M. "Racial Inequalities in Active Life among Adult Americans" *Demography*, 36(1), 77-91, February 1999
- Institute Of Medicine, *Summarizing Population Health*, National Academy Press, Washington D.C. 1998
- Kindig D. *Purchasing Population Health; Paying for the Results*, Ann Arbor, The University of Michigan Press, 1997
- Robine J.M., Jagger C., Romieu I. "Disability-Free Life Expectancies in the European Union Countries: Calculation and Comparisons" *Genus*, LVII(2), 89-101, April-June 2001
- Sullivan D. "Conceptual Problems In Developing an Index of Health" *National Center For Health Statistics, Series 2, N 17, Washington D.C., 1966*
 -----, "A Single Index of Mortality and Morbidity" *HSMA Health Reports, Vol. 84, N 4, April 1971.*

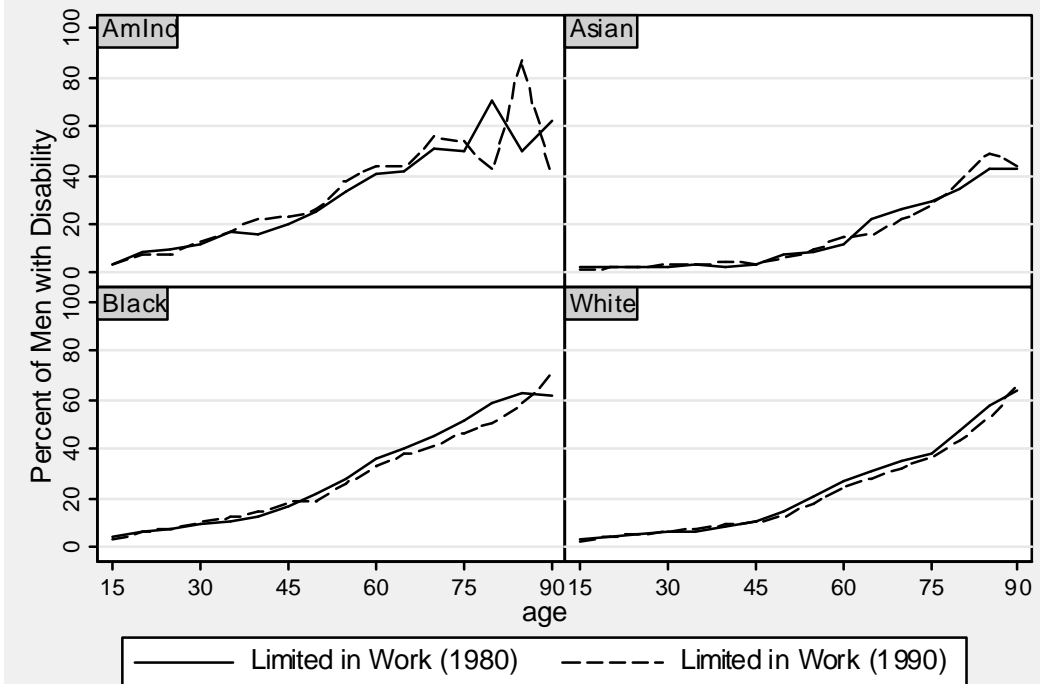
DATA SOURCES

- U.S. Dept. of Health and Human Services, National Center for Health Statistics
MORTALITY DETAIL FILES, 1968-1991 [PART 27: 1989 DATA] [PART 28: 1990 DATA] [PART 29: 1991 DATA] [Computer files]. Hyattsville, MD: U.S. Dept. of Health and Human Services, National Center for Health Statistics [producer], 1992. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 1993.
- Bureau of the Census, *Census Questionnaire Content*, document 1990 CQC-18, issued April 1996.
 -----, *Census of Population and Housing, 1990: Public Use Microdata Samples, U.S. [machine-readable data files]/prepared by the Bureau of the Census. Washington: The Bureau [Producer and distributor], 1992.*
 -----, *Census of Population and Housing, 1980: Public Use Microdata Sample 1% - Prepared by the Bureau of the Census. Washington: The Bureau, 1983.*

FIGURE 1
PREVALENCE RATES OF WORK LIMITING DISABILITY
UNITED STATES 1980-1990

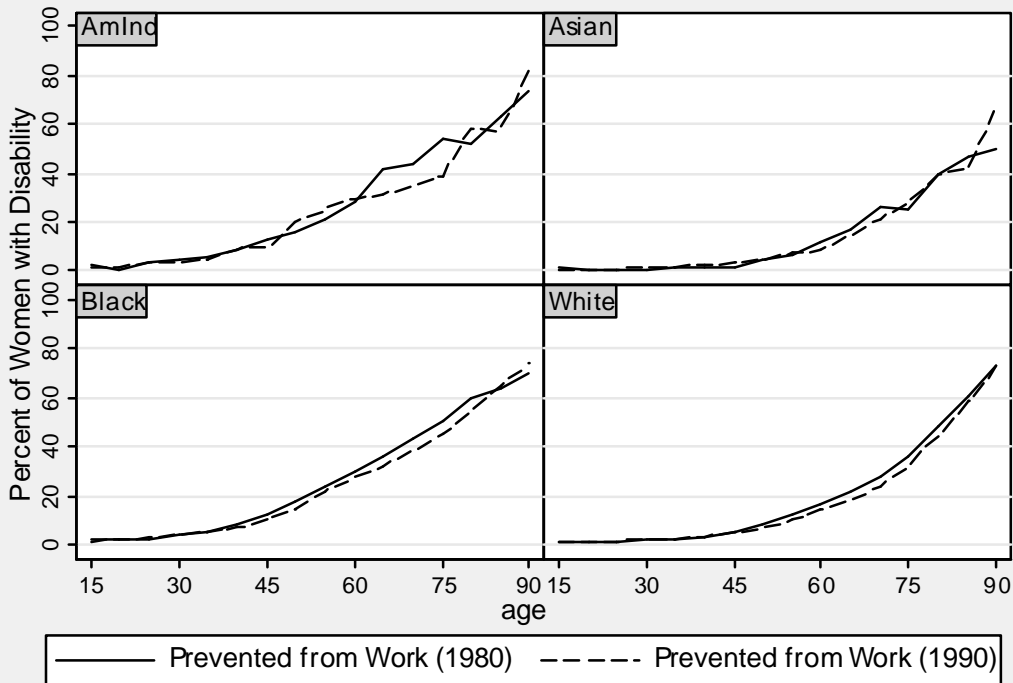


Graphs by race

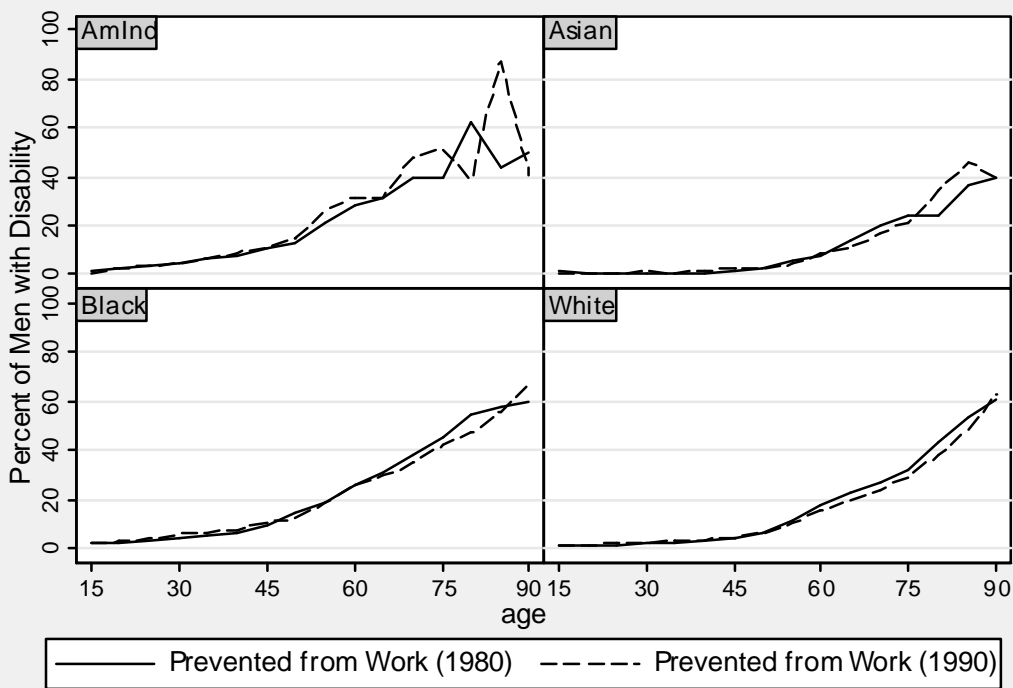


Graphs by race

FIGURE 2
PREVALENCE RATES OF WORK PREVENTING DISABILITY
UNITED STATES 1980-1990



Graphs by race



Graphs by race

TABLE 1
ADULT LIFE EXPECTANCY AT SELECTED AGES BY GENDER/RACE GROUPS
UNITED STATES 1980, 1990

Year	Females				Males			
	White	Black	Native	Asian	White	Black	Native	Asian
	American	American	American	American	American	American	American	American
At Birth								
1980	72.02	72.94	79.33	85.89	70.50	63.84	71.43	78.59
1990	79.04	73.22	80.38	84.22	72.15	63.83	72.97	78.03
Difference	7.02	0.28	1.05	-1.67	1.65	-0.01	1.54	-0.56
15 years								
1980	58.04	59.94	65.82	71.80	56.83	50.93	58.05	64.50
1990	65.01	60.30	66.55	69.97	58.31	51.11	59.35	64.09
Difference	6.97	0.36	0.73	-1.83	1.48	0.18	1.30	-0.41
45 years								
1980	29.12	32.15	38.21	42.74	29.39	25.48	32.97	35.97
1990	36.14	32.59	38.18	40.74	30.88	26.20	33.12	35.52
Difference	7.02	0.44	-0.03	-2.00	1.49	0.72	0.15	-0.45
65 years								
1980	18.51	17.51	21.50	24.88	14.20	13.23	18.38	19.29
1990	19.05	17.41	21.42	22.76	15.12	13.27	17.81	18.39
Difference	0.54	-0.10	-0.08	-2.12	0.92	0.04	-0.57	-0.90

FIGURE 3
ADULT LIFE EXPECTANCY DIFFERENTIALS BY HEALTH STATUS
AT AGES 15 AND 65 YEARS, RACE/GENDER GROUPS
UNITED STATES 1980-1990

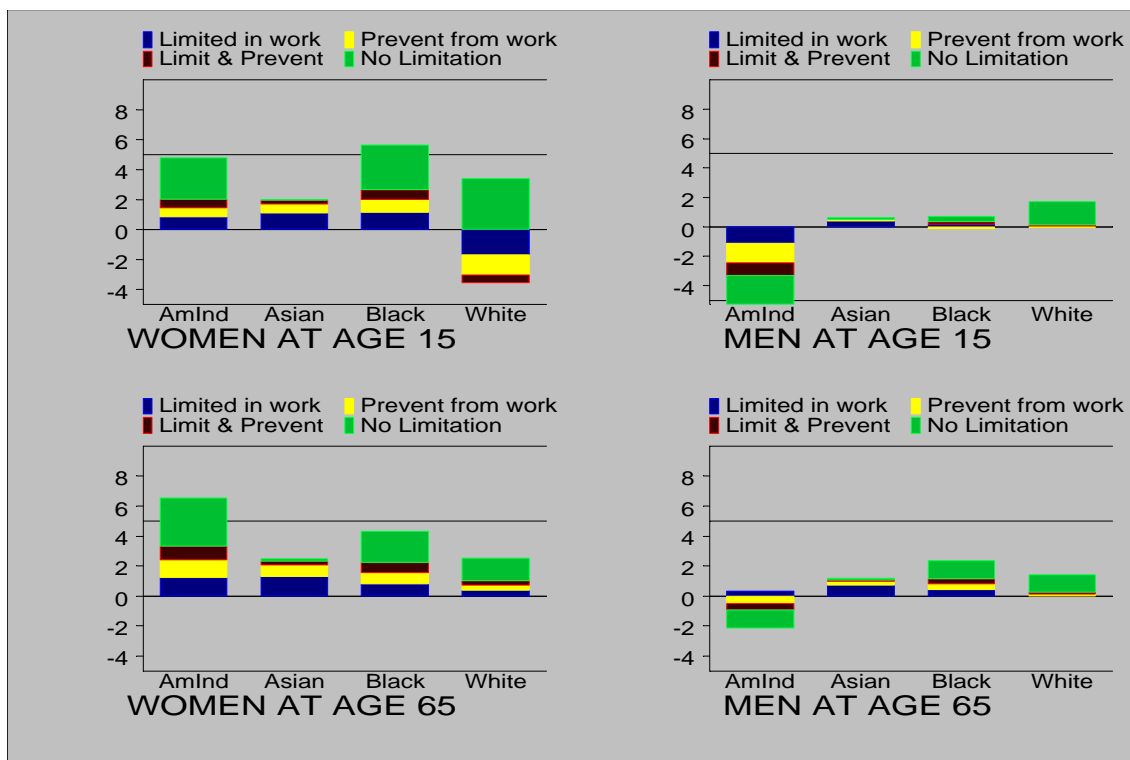


FIGURE 4
ADULT PARTIAL LIFE EXPECTANCY DIFFERENTIALS BY HEALTH STATUS
RACE/GENDER GROUPS, SELECTED AGES, UNITED STATES 1980-1990

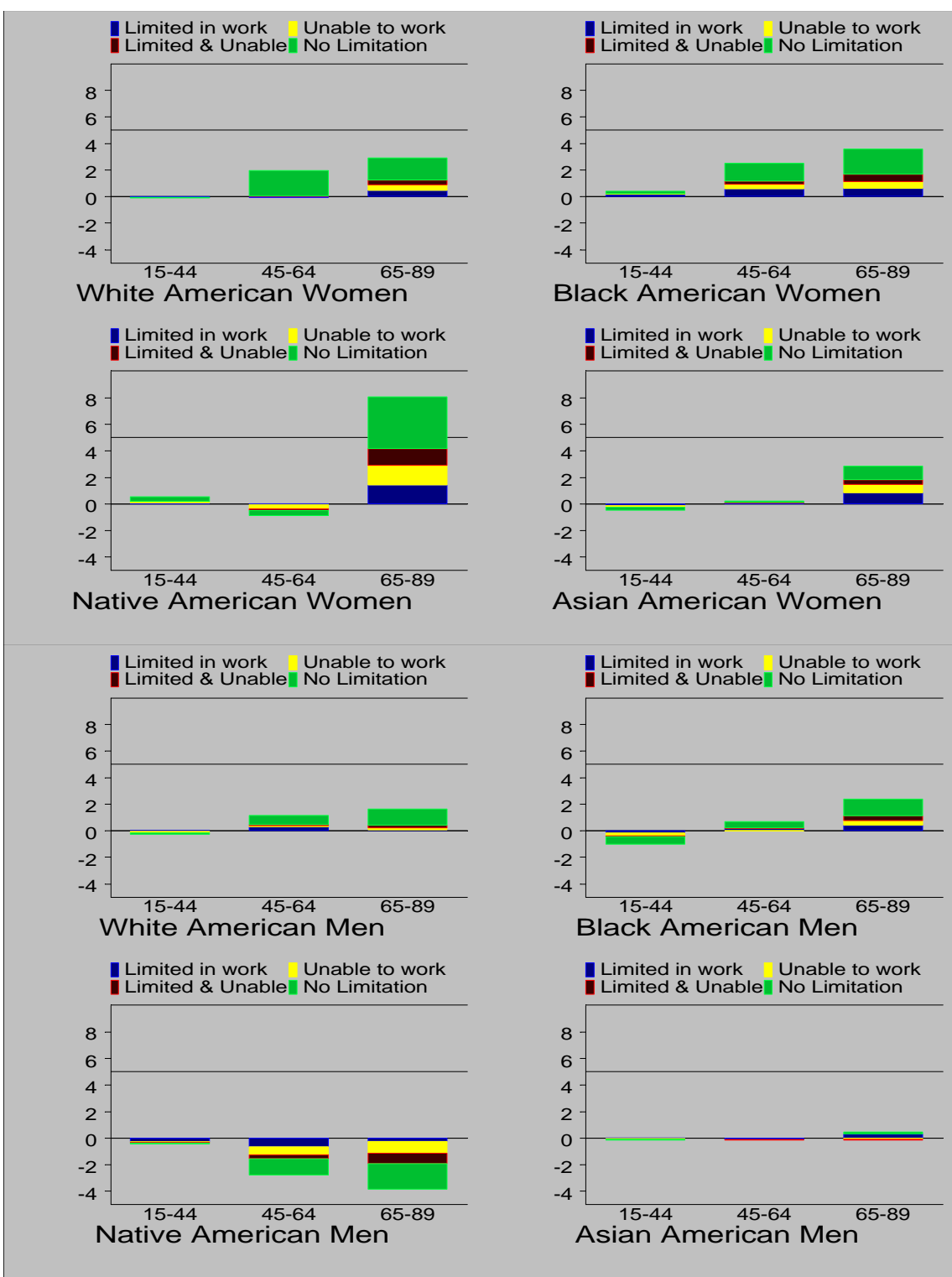
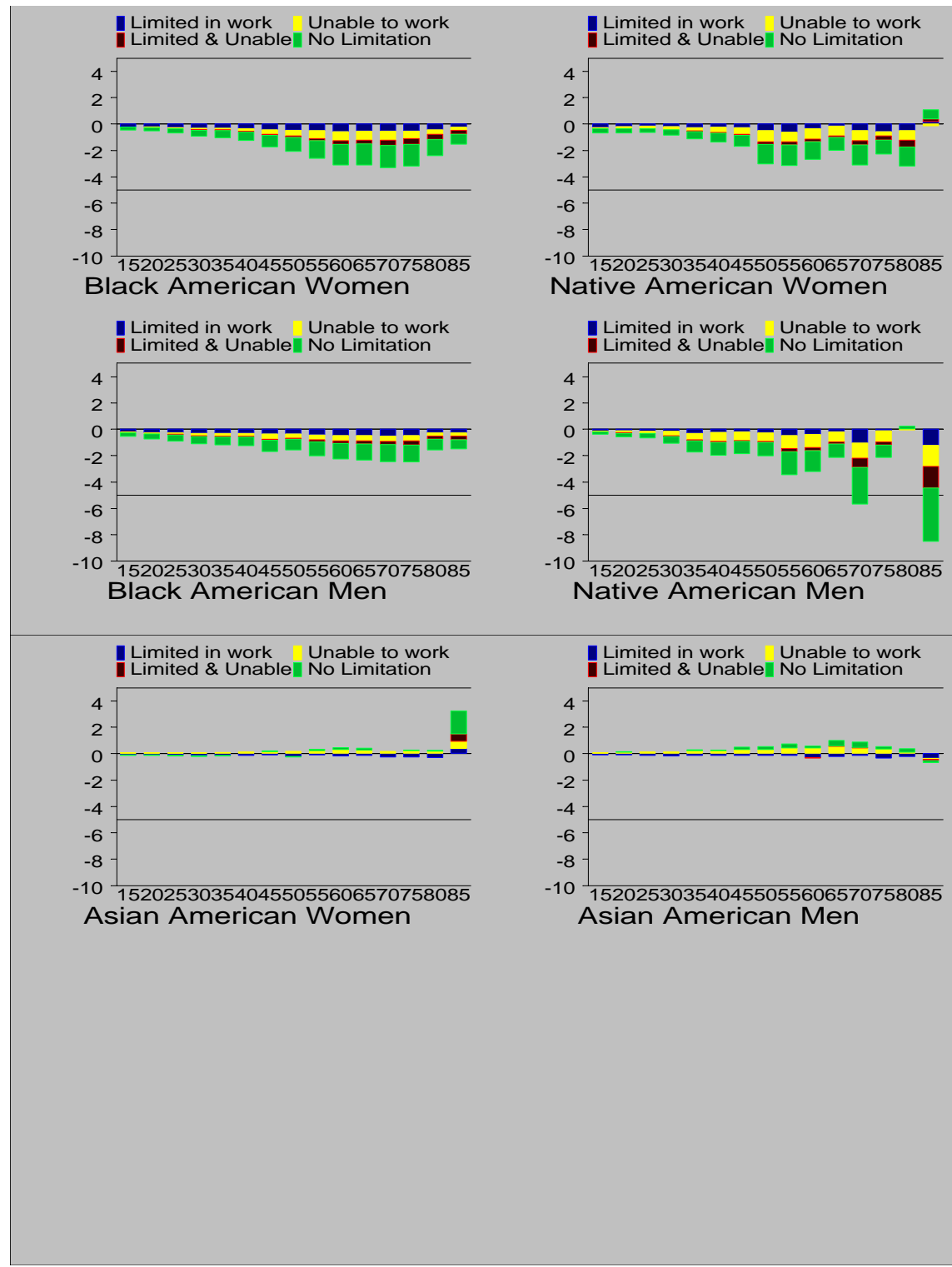


FIGURE 5
ADULT LIFE EXPECTANCY DIFFERENTIALS BY HEALTH STATUS
WHITE AMERICANS AS REFERENCE GROUP
UNITED STATES 1990



APPENDIX 1
ADULT LIFE EXPECTANCY DIFFERENTIALS BY HEALTH STATUS
RACE/GENDER GROUPS, UNITED STATES 1980-1990

Indices	Females				Males			
	AmerInd	Asian	Black	White	AmerInd	Asian	Black	White
At age 15								
D_x^1	-0.8368	-1.1111	-1.1571	1.6682	1.1326	-0.3735	-0.1692	-0.0437
D_x^2	-0.6006	-0.5909	-0.8299	1.3551	1.3231	-0.1236	0.1349	0.0638
D_x^{12}	-0.6062	-0.2222	-0.6613	0.5200	0.8345	-0.0194	-0.1618	-0.0900
D_x	2.7668	0.1001	3.0050	3.4289	-1.9957	0.1085	0.3766	1.5548
D_x^M (Total)	0.7232	-1.8241	0.3567	6.9722	1.2945	-0.4080	0.1805	1.4849
At age 65								
D_x^1	-1.2237	-1.3043	-0.7960	-0.3634	-0.3159	-0.7050	-0.4329	0.0051
D_x^2	-1.1640	-0.7607	-0.7424	-0.3603	0.5066	-0.2706	-0.3604	-0.1191
D_x^{12}	-0.9310	-0.2236	-0.6681	-0.2721	0.4312	-0.0622	-0.3514	-0.1268
D_x	3.2402	0.1675	2.1112	1.5362	-1.1899	0.1303	1.1830	1.1673
D_x^M (Total)	-0.0785	-2.1211	-0.0953	0.5404	-0.5680	-0.9075	0.0383	0.9265

APPENDIX 2
ADULT PARTIAL LIFE EXPECTANCY DIFFERENTIALS BY HEALTH STATUS
RACE/GENDER GROUPS, UNITED STATES 1980-1990

Indices	Females				Males			
	AmerInd	Asian	Black	White	AmerInd	Asian	Black	White
15-44 years								
D_x^1	-0.1079	0.1422	-0.1578	0.0644	0.2377	0.0357	0.1461	0.0367
D_x^2	-0.1201	0.1079	-0.0433	-0.0045	0.0191	0.0476	0.2323	0.1124
D_x^{12}	-0.0154	0.0057	-0.0150	0.0006	0.0347	0.0031	0.0363	0.0098
D_x	0.3884	-0.2306	0.1889	-0.0334	0.0206	-0.0790	-0.6223	-0.1041
D_x^M	0.1449	0.0252	-0.0272	0.0271	0.3121	0.0075	-0.2077	0.0548
45-64 years								
D_x^1	-0.0739	-0.0828	-0.6196	0.0678	0.3736	0.1219	-0.1584	-0.2710
D_x^2	0.2248	-0.0192	-0.4148	0.0006	0.4180	0.0016	0.0469	-0.1020
D_x^{12}	0.0860	-0.0277	-0.2394	-0.0274	0.2643	0.0131	-0.0397	-0.0626
D_x	-0.1630	0.1441	1.4739	1.9141	-0.7313	-0.0095	0.4794	0.7146
D_x^M	0.0739	0.0144	0.2002	1.9551	0.3246	0.1270	0.3283	0.2790
65-89 years								
D_x^1	-1.4997	-0.5237	-0.9225	-0.4518	-0.1587	-0.3950	-0.4131	-0.0511
D_x^2	-1.5462	-0.3374	-0.8478	-0.4443	0.5353	0.0393	-0.3433	-0.1720
D_x^{12}	-1.2794	-0.2266	-0.7350	-0.3376	0.5891	0.0690	-0.3674	-0.1697
D_x	4.0748	0.3205	2.7746	1.6610	-1.0267	0.3042	1.2576	1.2539
D_x^M	-0.2504	-0.7672	0.2694	0.4273	-0.0610	0.0175	0.1338	0.8611

APPENDIX 3
ADULT PARTIAL LIFE EXPECTANCY DIFFERENTIALS BY HEALTH STATUS
WHITE AMERICANS AS REFERENCE GROUP, UNITED STATES 1990

Age	Indices	Females			Males		
		AmerInd	Asian	Black	AmerInd	Asian	Black
15	Dx1	-0.256	-0.098	-0.221	-0.147	-0.081	-0.240
	Dx2	-0.075	0.054	-0.012	-0.046	0.054	-0.026
	Dx12	-0.011	0.000	-0.006	-0.006	0.000	-0.008
	Dx	0.346	0.041	0.240	0.204	0.021	0.285
20	Dx1	-0.193	-0.104	-0.221	-0.107	-0.091	-0.261
	Dx2	-0.131	0.066	-0.038	-0.175	0.100	-0.084
	Dx12	-0.014	-0.001	-0.010	-0.013	0.001	-0.018
	Dx	0.341	0.036	0.274	0.309	-0.019	0.385
25	Dx1	-0.160	-0.114	-0.271	-0.161	-0.142	-0.289
	Dx2	-0.162	0.064	-0.063	-0.148	0.133	-0.123
	Dx12	-0.015	-0.002	-0.016	-0.017	0.000	-0.025
	Dx	0.340	0.049	0.359	0.339	-0.001	0.465
30	Dx1	-0.192	-0.136	-0.312	-0.172	-0.168	-0.317
	Dx2	-0.207	0.073	-0.119	-0.332	0.147	-0.181
	Dx12	-0.023	-0.003	-0.026	-0.032	-0.001	-0.037
	Dx	0.427	0.062	0.471	0.546	0.007	0.570
35	Dx1	-0.259	-0.141	-0.318	-0.303	-0.135	-0.309
	Dx2	-0.274	0.110	-0.158	-0.492	0.209	-0.226
	Dx12	-0.038	-0.002	-0.034	-0.068	0.002	-0.045
	Dx	0.578	0.029	0.531	0.873	-0.092	0.629
40	Dx1	-0.222	-0.156	-0.355	-0.247	-0.151	-0.315
	Dx2	-0.424	0.148	-0.218	-0.666	0.201	-0.230
	Dx12	-0.049	-0.001	-0.048	-0.079	-0.004	-0.052
	Dx	0.697	0.001	0.648	1.000	-0.069	0.654
45	Dx1	-0.242	-0.101	-0.427	-0.191	-0.124	-0.372
	Dx2	-0.527	0.147	-0.333	-0.662	0.296	-0.370
	Dx12	-0.071	0.000	-0.083	-0.072	0.007	-0.082
	Dx	0.841	-0.059	0.877	0.932	-0.205	0.901
50	Dx1	-0.519	-0.212	-0.451	-0.257	-0.134	-0.362
	Dx2	-0.818	0.178	-0.447	-0.650	0.299	-0.296
	Dx12	-0.191	-0.007	-0.119	-0.099	0.007	-0.085
	Dx	1.534	0.023	1.061	1.008	-0.211	0.832
55	Dx1	-0.608	-0.119	-0.496	-0.477	-0.135	-0.449
	Dx2	-0.735	0.219	-0.595	-0.994	0.397	-0.355
	Dx12	-0.238	0.003	-0.183	-0.250	0.014	-0.142
	Dx	1.580	-0.132	1.334	1.718	-0.335	1.073
60	Dx1	-0.355	-0.162	-0.569	-0.402	-0.310	-0.485
	Dx2	-0.789	0.284	-0.690	-0.967	0.400	-0.384
	Dx12	-0.198	0.006	-0.259	-0.257	-0.013	-0.196
	Dx	1.342	-0.184	1.606	1.607	-0.164	1.199
65	Dx1	-0.143	-0.153	-0.537	-0.210	-0.217	-0.488
	Dx2	-0.736	0.240	-0.688	-0.736	0.543	-0.375
	Dx12	-0.140	0.003	-0.287	-0.164	0.023	-0.230
	Dx	1.010	-0.158	1.618	1.030	-0.465	1.265
70	Dx1	-0.510	-0.244	-0.549	-1.018	-0.150	-0.512
	Dx2	-0.731	0.165	-0.681	-1.153	0.410	-0.380
	Dx12	-0.343	-0.026	-0.366	-0.719	0.028	-0.273
	Dx	1.536	0.002	1.710	2.789	-0.465	1.316
75	Dx1	-0.563	-0.250	-0.553	-0.103	-0.336	-0.493
	Dx2	-0.335	0.200	-0.553	-0.864	0.335	-0.377
	Dx12	-0.315	-0.015	-0.435	-0.206	-0.015	-0.317
	Dx	1.098	-0.066	1.654	0.975	-0.185	1.315
80	Dx1	-0.491	-0.285	-0.411	-0.014	-0.203	-0.272
	Dx2	-0.720	0.191	-0.375	-0.078	0.119	-0.242
	Dx12	-0.525	-0.011	-0.396	0.009	-0.002	-0.226
	Dx	1.485	-0.086	1.236	-0.217	-0.251	0.840
85	Dx1	0.186	0.368	-0.211	-1.235	-0.326	-0.269
	Dx2	-0.161	0.551	-0.265	-1.595	-0.078	-0.255
	Dx12	0.186	0.556	-0.290	-1.618	-0.123	-0.250
	Dx	-0.724	-1.768	0.750	4.079	0.187	0.715

Center for Demography and Ecology
University of Wisconsin
1180 Observatory Drive Rm. 4412
Madison, WI 53706-1393
U.S.A.
608/262-2182
FAX 608/262-8400
comments to: aguend@ssc.wisc.edu
requests to: cdepubs@ssc.wisc.edu