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**DISPARITIES IN SELF-REPORTED ADL AND IADL DISABILITY AMONG  
ASIAN AMERICAN SUBGROUPS IN THE USA: RESULTS FROM THE  
NATIONAL HEALTH INTERVIEW SURVEY 2001-2003**

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## ABSTRACT

**Objectives:** The purpose of this study was to compare disability and functional limitations among elderly Asian American subgroups using datasets from the National Health Interview Survey 2001-2003. **Design:** This retrospective cross sectional study analyzed whether ADL and IADL disabilities were different among Asian American subgroups in the U.S. using data retrieved from the 2001-2003 National Health Interview Survey (NHIS). **Method:** For comparing all Asian American subgroups, chi-square analysis was applied for the bivariate comparisons. **Results:** Rates of 7.1% and 12.2% for ADL and IADL disability, respectively, within Asian American group were found. The elder Chinese subgroup accounted for the highest ADL and IADL disability (11.6% and 17.3 %, respectively,  $p < 0.05$ ). Being female, not married, and older was associated with higher ADL and IADL disability ( $p < 0.05$ ). **Conclusions:** The findings of the study highlight the inter-group variability among the elder Asian American subpopulations.

**Key Words:** Elders; Asian subpopulations; ADL and IADL disability; health disparity; National Health Interview Survey.

**DISPARITIES IN SELF-REPORTED ADL AND IADL DISABILITY AMONG  
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**INTRODUCTION**

Since 1900, the United States ( U.S.) population has tripled, and the number of older adults has increased 11-fold, growing from 3.1 million in 1900 to 36.3 million in 2004. According to the Administration on Aging (AoA), in 2004, elderly minorities aged 65 years and above constituted 18.1% of the population and were projected to compose 25% of the total population by 2030. By that year, all of the baby boomers have reached age 65. Additionally, by 2050, the number of older Americans is expected to reach 86.7 million, and individuals in this age group will comprise 21% of the U.S. population.<sup>1-3</sup> Between 2004 and 2030, the non Hispanic white population aged 65 and above is projected to increase by 74%, while this rate is projected to increase 183% for older minorities, such as Hispanics (254%); non Hispanic blacks (147%) and Asians and Pacific Islanders (208%).<sup>1,4</sup>

The total Asian American population has been reported as about 11.9 million, or 4.2%, of the total U.S. population in 2000.<sup>5</sup> The U.S. population of self-identified as single race Asian American residents in 2050 is projected to be 34 million, and these Asian Americans are expected to represent 8% of the total U.S. population in 2050, compared to 4.2% in 2000.<sup>6</sup> Asian Americans include Chinese, Filipinos, Asian Indians, Vietnamese, Korean, Japanese, Pakistanis, Cambodians, Thais, and over another 50 different Asian subgroups speaking over 100 different languages and dialects.<sup>7,8</sup> Following a 1997 Office of Management and Budget (OMB) directive, the “Asian or Pacific Islander” category was separated into the two different racial categories of “Asian” and “Native Hawaiian or Other

Pacific Islander.”<sup>9</sup> For the 2000 U.S. Census, five Asian American subgroups represented one-million or more U.S. residents. These five subgroups were Asian Indian, Chinese, Filipino, Korean, and Vietnamese. Together these groups with the Japanese made up about 88% of the Asian population in the U.S in 2000.<sup>6</sup> The Chinese subgroup was the largest group, representing about 24% of the Asian population.<sup>6</sup> The Filipino, Asian Indian, Vietnamese, Korean and Japanese subgroups represented the next largest Asian American subgroups populating the U.S., respectively.<sup>6</sup>

Each subgroup has demonstrated variations in diversity of economic origin, acculturation levels, socioeconomics, refugee status, citizenship, circumstances of immigration, culture, language, and access to health care.<sup>7,10-12</sup> After the Spanish language, Chinese is the next most widely spoken non-English language in the U.S.<sup>8,12</sup> In 2000, 96% of the Asian American population lived in metropolitan areas, and most were concentrated in the three states of Hawaii (at 42% of the state population), California (at 12.4% of the state population), and New Jersey (at 7.3% of the state population).<sup>6</sup>

According to the 2000 U.S. Census, when compared to the general population, median earnings were higher for Asians; the highest Asian American earnings were demonstrated by the subgroups of Asian Indian, Japanese, and Chinese.<sup>6</sup> Asian Indian and Japanese families earned median incomes more than \$10,000 higher than all other Asian American families.<sup>6</sup> Frisbie, Cho, and Hammer reported that even though Japanese family incomes exceeded the incomes of all other Asian groups, the Asian Indian and Chinese subgroups superseded the Japanese and non Hispanic white groups for college degree attainment.<sup>4</sup> Because Asian Americans have reached high average educational attainment,

occupational status, and house hold income, some authors have negated the idea of them representing a disadvantaged minority.<sup>13,14</sup>

The need of Medicaid or other sources of public and private health care coverage is similar for Asian Americans and non Hispanic whites; however, Asian Americans vary widely in their health coverage. Job-based health insurance coverage ranges from a low of 48% among Korean Americans to 77% among Japanese Americans.<sup>11</sup> Health insurance coverage rates were similar in 2000 for the Filipino, Chinese, and other Asian American subgroups with 13% being uninsured and 6% using public insurance.<sup>6</sup> Only the Vietnamese subgroup has demonstrated a higher uninsurance level (21%) and public insurance rate (20%).<sup>15</sup>

The *Healthy People 2010* definition of health disparities becomes critical to the present study. Health disparities are defined as differences in morbidity and mortality, occurring by gender, race, or ethnicity, income level, education level, disability, geographic location, or sexual orientation.<sup>16</sup> Many of the same disparities and barriers present in younger populations will continue into old age, when access to health care can be even more vital and critical.<sup>17</sup>

There are several components to a comprehensive assessment of an older adult's physical functioning. One way to measure it is using the ability to accomplish basic Activity of Daily Living (ADL) and limitations to Instrumental Activity of Daily Living (IADL). The six ADLs measured are bathing, dressing, getting in or out of bed, getting around inside, toileting, and eating. The eight IADLs measured are light housework, laundry, grocery shopping, getting around outside, managing money, taking medications, and telephoning.<sup>18</sup>

A recent study using the National Health Interview Survey (NHIS) data has shown the declining prevalence of any self-reported disability from 1982 to 2002 among all socioeconomic and ethnic groups.<sup>20</sup> The proportion of the population over 70 years of age reporting any disability declined from 22.7% to 15.5% during this time. The apparent reduction in elders reporting any disability was due to a reduction in IADL disability with a decrease from 14.5% to 8.1%. However, the increase in ADL disability during the same period of time, particularly among the least educated, who tended to be minorities, was considered disturbing for Schoeni et al.<sup>20</sup> Because Schoeni et al did not report disability among Asian subgroups of the U.S. population, such examination has grown in importance if U.S. policy makers and health care professionals intend to achieve the goals of *Health People 2010*.

The purpose of this study was to compare rates of self-reported disability and functional limitation among Asian American subgroups using data of older adults aged 65 years and above from the sample drawn from NHIS survey 2001-2003.

## **METHODS**

Data from National Health Interview Survey (NHIS), a cross sectional survey of the community dwelling population of U.S., were used. The NHIS is an annual, continuous, multipurpose, and multistage probability survey of the US civilian non institutionalized population and is conducted by the National Center for Health Statistics<sup>21, 22</sup>. A probability sample of households is selected with family members interviewed by trained personnel; one adult from each household is selected at random and administered a health oriented questionnaire (i.e., "the adult core"), which includes questions about ADL and IADL. Annual

response rates to the 2001 to 2003 adult core ranged from 73.8% (in 2001) to 74.4% (in 2002).<sup>23-25</sup> For this study, individuals aged 65 years and above were pooled from the 2001-2003 NHIS data. The resulting sample included 31,875 men and women. Self-reported disability and functional limitation among 738 Asian subjects and their characteristics were further explored.

### **Dependent and Independent Variables**

The two dependent variables identified were ADL and IADL. Disability among elderly aged 65 years and above was measured by two questions which were “Because of any impairment or health problem, {do/does} {person} need the help of other persons with personal care needs, such as eating, bathing, dressing or getting around this home?” and “Because of any impairment or health problem {do/does} {person} need the help of others in handling household chores, doing necessary business, shopping, or getting around for other purposes?”<sup>5</sup> Finally, the estimates of disability prevalence were reported for the specific IADL and ADL disabilities and for “any disability,” which was defined as reporting either ADL or IADL disability.

### **Independent Variables**

In this study, race and ethnicity were restructured with the four major groups of Non Hispanic Whites (NHW), Non Hispanic Blacks (NHB), Hispanics, and Asians. Additionally, individuals reporting Asian American ethnicity were classified into four major subgroups of Chinese, Filipino, Asian Indian, and other Asians, due to the small sample sizes of any other potential subgroups. Age was dichotomized into 65-74 versus 75 years and above. We used educational attainment and income as markers of Socio-Economic Status (SES) and are important, as it is well established that lower SES individuals suffer higher rates of disease,

disability and mortality<sup>26, 27</sup>. Educational accomplishment was classified into less than or equal to 9-12<sup>th</sup> grade versus high school graduate and above. The annual household income was categorized as \$20,000 or greater versus less than \$20,000. The three health insurance types included Medicare, Medicaid, and no health insurance. Marital status was categorized into two types, namely married or not married. Not married included the statuses of divorced, widowed, separated, and never married. As part of the study protocol, appropriate approvals related to the protection of human subjects were obtained from the Institutional Review Board of the University of North Texas Health Science Center.

### **Analysis**

Rates of disability were calculated by restricting the analysis to the subgroup of interest and then computing the percent of respondents reporting disability out of all respondents. Chi-square analysis was applied for bivariate comparisons of ADL and IADL disability among the Asian American subgroups. Statistical significance was assessed at the 0.05 level. The SAS 9.12 and the STATA 8.0 computer programs were used for data analysis. STATA was used to calculate the correct standard errors for the complex survey design of the NHIS using Taylor Series linearization method. Data from the NHIS from 2001 to 2003 were pooled to conduct the analysis and the sampling weights for pooled data were adjusted. Due to small sample size, pair wise comparison was not considered for this study.

## **RESULTS**

Data presented in Table 1 illustrate the overall rates of self-reported ADL and IADL disabilities among older adults in 2001-2003. The ADL disability self-report rate was 6.4%,

while the IADL disability self-report rate was 12.5%. The frequency of the third disability category, any disability, was 13.5%. For both the ADL and IADL disabilities, respondents from the non Hispanic black and Chinese categories showed higher disability self-report rates than their non Hispanic white counterparts. The Chinese elders reported the highest rates of ADL disability at 11.6%, and their rate was twice the rate of the non Hispanic whites. Additionally, this rate was the highest among the Asian subgroups ( $p < 0.05$ ), and even higher than the non Hispanic black respondents' rate (10.2 %). Non Hispanic blacks reported the highest IADL and any disability rates when compared with other racial/ethnic subgroups ( $p < 0.05$ ), Table 1). Within the Asian American subgroups, Filipino elders reported the highest any disability rate at 17.9% ( $p < 0.05$ ). On the other hand, when the other Asian subgroup was excluded from the analysis, the Asian Indian subgroup showed the lowest rates for ADL, IADL, and any disabilities at 4.6%, 9.1%, and 9.1%, respectively ( $p < 0.05$ ), (Table 1). This group's rate was even lower than the non Hispanic white group's disability rate at 5.8% and 11.9%, respectively.

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Table 1 about here

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Table 2 presents the characteristics of only Asian Elderly reporting any ADL or IADL disability. The disability rates increased with subjects above 75 years and above reporting ADL, IADL, and any disability of 14.5%, 23.3% and 25.3%, respectively, as compared to those who were below 75 years old (Table 2). Asian females reported statistically significantly higher ADL and IADL disability rates compared to males ( $p < 0.05$ ).

The disability rates were related to education status. Individuals in the lower education category reported higher ADL disability rates (9.8%) as compared to individuals within the higher education category ( $p < 0.05$ ), (Table 2).

Asian elders who were not married reported significantly higher ADL and IADL disability levels (12.5% and 18.6%, respectively) compared to subjects who were married (as seen in Table 2). Elders who held Medicaid insurance described significantly higher rates of ADL and IADL disability (12.3% and 22.8%, respectively,  $p < 0.05$ ). Asian individuals who did not have health insurance presented significantly higher rates of ADL and IADL (9.8% and 16% respectively,  $p < 0.05$ ) compared to those who carried health insurance, (Table 2).

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Table 2 about here

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## **DISCUSSION**

The results of our study revealed for the overall population, a 13.5% disability of any type (including any disability, ADL, and IADL). This rate was slightly slower than the rate provided by Schoeni et al who found an overall disability of 15.5%.<sup>20</sup> The difference between these results has confirmed the declining prevalence of any self reported disability reported by these scholars.<sup>20</sup> Asians elders as overall race category, showed almost a similar rate at 13%; however, when analyzed by subgroups Chinese elders presented the highest ADL rate of all racial/ethnic groups. The Chinese elders' rate of disability was even higher than the rate for non Hispanic blacks. This group reported the highest IADL and any disability rates. The Chinese subgroup reported the highest ADL and IADL disability rate when compared to all other Asian American subgroups.

On the other hand Asian Indian subgroup (excluding the other Asian subgroup) reported the lowest ADL and IADL disability rates. In the present study, disability levels were lower among elderly Asian Indians, who are predominantly recent immigrants as compared to Chinese and Filipinos who have been in the U.S. for more generations, a finding consistent with those of Cho and Hummer and Frisbie et al.<sup>4, 28</sup>

Furthermore, the findings highlight the inter-group variability among the elder Asian American subpopulations. In our study females reported disability of any type more often compared to males (21.4 % vs. 12.1 %). This result is supported by Strauss et al who have reported while women live longer than men, they have experienced higher levels of ADL, IADL and any disability.<sup>29</sup> Our study has revealed that as elders of both genders age, they become more likely to report more disabilities.

The finding of lower rates of ADL, IADL, and disability of any type between married Asian Americans and unmarried Asian Americans (8.2% versus 20.6%) is consistent with the fact that marriage may serve as a protective factor against disability. Married individuals may participate in more health promoting behaviors and may tend to be integrated socially. According to some scholars, marriage provides a number of important and substantial benefits, including a healthier life style, increased income and wealth, and a major source of emotional and instrumental support.<sup>30,31</sup> In particular, married individuals are better able to cope with poor health and to maintain independent living arrangements than those without a spouse. Our study has presented additional evidence in support of the importance of marriage in preventing or prolonging the appearance of any disability.

Immigration status was not measured in this study; however, the low ADL, IADL and any disability rates from older Asian Indians concurs with Cho and Hummer's observation about disabilities being especially low among the most recent foreign born Asian immigrants as compared to native born counterparts.<sup>28</sup> A similar trend among recent Hispanic immigrants as compared to the native Hispanic born population was originally suggested initially by Markides and Coreil.<sup>32</sup> These observations have led to some scholars to hypothesize that a protection factor can be associated with being an immigrant. Migration

selection, which has been reported as a factor by those studying other immigrant groups, may serve to insulate recent Asian immigrants from debilitating health conditions which could lead to them reporting any disability.<sup>33,34</sup> An exception to this trend of Asians achieving higher education has been the Vietnamese population. The Vietnamese represent part of the wide range of diversity among Asians in the U.S. They been more likely to have entered the U.S. as refugees with less education and with greater likelihood of earning less income.<sup>35</sup>

Even though substantial variation exists for the circumstances of Asian American subgroups, we found elder Asians with any disability who reported not having health insurance rates (17.4%) to be equivalent to number of Asian single-race people living without health insurance (17.9%) reported by the US Census coverage in 2005 for all ages.<sup>36</sup> Medicaid, an important safety net for most low-income populations in the U.S., served 24.4% of the older Asian population with any disability in our study, while those who were Medicare beneficiaries represented 14.3%. This differs from previous research where 41% of Asian American seniors received Medicaid benefits, which is about twice as great as what our population reported obtaining.<sup>37</sup> Our results representing 75.7% of the elderly Asian Americans as having Medicare did not support a study conducted in New York where half the elderly Asian Americans were reported to have health insurance through Medicare.<sup>37</sup> Further research is needed to explain these differences.

Several limitations of the current study should be noted before conclusions are drawn. The NHIS data have restrictions. The health measures employed in the survey have not been clinically confirmed. Secondly, the language used during the interview effects self-reported health status. Another limitation to this study is the potential for selection bias; the Asian Americans included in the data are not fully representative of the general Asian American

population. The sample size for Asian American elders with high school or more education was too small for adequate comparisons to be made. This is a particular concern because of the number of Asians, including the Vietnamese, who might have entered the U.S. as refugees. Lastly, many potential Asian American subgroups did not report any disability. Consequently, we could report only for the three major Asian American subgroups. The rest of the Asian Americans were categorized in one very heterogeneous group (Other Asian).

Disability which is the result of chronic disease, is an indicator of long term health, and is associated with higher demand for medical services and medication use. As such, rates of disability and the profiles of disability may mirror aspects of well-being especially pertinent to national old-age policy and institution-based long-term care. The fact is that since disabilities increase with age and the overall U.S. population is living longer, the number of individuals with activity, work, or functional limitations will increase as the elderly population increases and has the potential to constitute a real significant public health problem. Older Americans spent 12.8% of their total expenditures on health, more than twice the proportion spent by all consumers (5.7%).<sup>22</sup> Within the total health costs in 2004 incurred on average by older Americans, these seniors spend \$2,307 (55%) for insurance, \$977 (23%) for drugs, \$769 (18%) for medical services, and \$140 (3%) for medical supplies.<sup>1</sup> Cutler has reported each ADL and IADL impairment increases health care spending by \$650 and \$1200 per person, respectively.<sup>22</sup> The projected medical spending per person with an ADL as the elderly population percentage grows involves an increase from \$650 to \$1000 by 2050.<sup>22</sup> Furthermore, Chernew et al has calculated that the per capita spending for people with five or more limitations in ADLs is nearly five times the amount incurred by those with limitations in only IADL.<sup>38</sup>

ADL and IADL disability scales are widely used in health services research, not only as an outcome measures for treatment but also in general health surveys and in measures of population health such as Disability-Adjusted Life Years (DALYs). Although well established in clinical settings, these scales are often found to be less useful as measures of disability in the general population, in part due to a small fraction of respondent report any disability<sup>39</sup>. Despite the frequent use of the ADL and IADL disability scale (Katz' index), evidence on its reliability and validity is limited<sup>40-43</sup>. The World health organization adopted in 2001 the International Classification of Functioning, Disability and Health (ICF) to provide a framework for describing health and health-related states and is considered an international standard in describing and measuring health and disability. The ICF classifies the person's state of performance, in his or her environment, in a list of life situations and the capacity to execute a task in a standard environment.<sup>44</sup>

Lack of adequate data has prevented policy makers from thoroughly planning the delivery of health services and public health programs for the Asian American population.<sup>45</sup> As the health care needs as well as the access to care for immigrant Asian American subgroups may differ from the needs of people born in the United States, it is important to keep track the health of elderly Asian Americans subpopulations.

Too few publications on the disabilities of Asian American elderly have been produced. The findings of this study highlight inter-group variability among Asian Americans. The driving force behind present day research involves the data provided through federal programs and services that serve Asian Americans. Without specific, timely, and accurate data about Asian American elders communities' needs and challenges, federal programs and services may be less inclusive of or responsive to this population. Therefore,

data need to be meaningful, disaggregated by subgroups, and sensitive to Asian Americans' language needs. The myth of the model of a healthy, wealthy, and wise Asian American minority is not valid.

Even after living in the U.S. for most of their lives, many Chinese, Korean and Filipino elders do not understand the nuances of publicly funded programs. Furthermore lack of formal education, minimal English proficiency, poverty of some subgroups and differences in culture, preclude access to many health care services funded over the years by their own tax dollars. Health policies that arise from this study are the use of Chinese speaking providers in public healthcare settings in particular in California and New Jersey, translation of chronic disease disability related pamphlets to the main Asian sub groups' languages and the understanding of the heterogeneity of the Asian race category for the next Census 2010, in terms for hiring a work force of interviewers with different Asian backgrounds.

Finally, the aggregation of more than 50 different Asian nationalities into one homogeneous group establishes noteworthy barriers which prevent the health needs of this population from being uncovered. We emphasize that aging in the 21st century is more than just a matter of numbers. The growing elderly population presents an urgent need to face a growing societal problem of racial and ethnic health disparities among older adults.

## REFERENCES

1. Administration on Aging (AoA), U.S. Department of Health and Human Services. *A Profile of Older Americans: 2006*. 2006. Available at: <http://www.aoa.gov/PROF/Statistics/profile/2006/2006profile.pdf>. Accessed September 1, 2007.
2. Centers for Disease Control. *The State of Aging and Health in America 2004*. 2004. Available at: [http://www.cdc.gov/aging/pdf/State\\_of\\_Aging\\_and\\_Health\\_in\\_America\\_2004.pdf](http://www.cdc.gov/aging/pdf/State_of_Aging_and_Health_in_America_2004.pdf). Accessed August 30, 2007.
3. AGS Foundation for Health in Aging. *Trends in the Elderly Population*. March 15, 2005. Available at: [http://www.healthinaging.org/agingintheknow/chapters\\_ch\\_trial.asp?ch=2](http://www.healthinaging.org/agingintheknow/chapters_ch_trial.asp?ch=2). Accessed on August 10, 2006.
4. Frisbie W, Cho Y, Hummer RA. Immigration and the Health of Asian and Pacific Islander Adults in the United States. *American Journal of Epidemiology*. 2001; 153:372-380.
5. U.S. Census Bureau. The Foreign Born Population: 2000, Census 2000 Brief. December 2003. Available at: <http://www.census.gov/prod/2002pubs/c2kbr01-16.pdf>. Accessed February 28, 2008.
6. U.S. Census Bureau. *We the People: Asians in the United States, Census 2000 special reports*. 2000. Available at: [www.census.gov/prod/2004pubs/censr-17.pdf](http://www.census.gov/prod/2004pubs/censr-17.pdf). Accessed April 1, 2007.
7. Kagawa MS, Hikoyeda N, Park-Tanjasiri S. *Aging, Chronic Conditions, and Physical Disabilities in Asian and Pacific Islanders*. In: Miranda RM, Markides KS, eds. *Minorities Aging and Health*: Thousand Oaks, CA: Sage; 1997:149-180.
8. American and Pacific Islander American Health Forum (APIAHF). Health Insurance Coverage: Asian Americans and Pacific Islanders. 2006. Available at:

[http://www.apiahf.org/resources/pdf/AAPI\\_Insurance\\_coverage\\_Fact\\_Sheet.pdf](http://www.apiahf.org/resources/pdf/AAPI_Insurance_coverage_Fact_Sheet.pdf).

Accessed on September 4, 2007.

9. Office of Management and Budget (OMB). Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity. *Federal Register*. Notice October 30, 1997. Available at: <http://www.whitehouse.gov/omb/fedreg/1997standards.html>. Accessed on September 4, 2007.
10. Jang M, Lee E, Woo K. Income, language, and citizenship status: Factors affecting the health care access and utilization of Chinese Americans. *Health & Social Work*, 1998; 23:136-145.
11. The Kaiser Family Foundation. *Health Insurance Coverage and Access to Care among Asian Americans and Pacific Islanders*. 2000. Available at: <http://www.healthpolicy.ucla.edu/pubs/files/HealthInsuranceCoverageandAccessToCareAmongAsian%20AmericansandPacificIslanders.pdf>. Accessed on August 30, 2007.
12. Bean FD, Stevens G. *America's New comers and the Dynamics of Diversity*. New York: Russell Sage, 2003.
13. Lee SM. Asian Americans: Diverse and Growing. *Population Bulletin*, 1998; 53(2):1-40.
14. Heron M, Schoeni RF, Morales L. *Health Status Among Older Immigrants in the United States*. Population Studies Center Research Report No. 03-548. Population Studies Center, University of Michigan, 2003.
15. Alegria M, Cao Z, McGuire TG, Ojeda VD, Sribney B, Woo M, Takeuchi D. Health insurance coverage for vulnerable populations: Contrasting Asian Americans and Latinos in the United States. *Inquiry*, 2006; 43:231-254.
16. U.S. Department of Health and Human Services. *Healthy People 2010. With*

*Understanding and Improving Health and Objectives for Improving Health*. 2 vols. 2nd ed. Washington, DC: U.S. Government Printing Office, 2000. Available at: [http://www.healthypeople.gov/Document/html/uih/uih\\_bw/uih\\_1.htm](http://www.healthypeople.gov/Document/html/uih/uih_bw/uih_1.htm). Accessed on August 22, 2005.

17. Trevino FM, Coustasse A. In: Angel JL, Whitfield KE, eds. *The Health of Aging Hispanics: The Mexican-origin Population*. New York, NY, Springer Publishing Co, 2007: 167-181.
18. Katz, S. Ford, A.B. Moskowitz, R.W. Jackson B.A. and M.W. Jaffe. Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function, *JAMA* 1963; 185:914–919.
19. Lubitz J, Cai L, Kramarow E, Lentzner H. Health, Life Expectancy and Health Care Among the Elderly. *New England Journal of Medicine*. 2003; 349(11):1048-1055.
20. Schoeni RF, Martin LM, Andreski PM, Freedman VA. Persistent and Growing Socioeconomic Disparities in Disability among the Elderly: 1982-2002. *American Journal of Public Health*. 2005; 95:2065-2070.
21. Fowler FJ, Jr. The redesign of the National Health Interview Survey. *Public Health Rep*. 1996; 111: 508-511.
22. Botman SL, Moore TF, Moriarty CL, Parsons VL. Design and estimation for the National Health Interview Survey, 1995-2004. *Vital Health Stat 2*. 2000;130:1-31.
23. Lethbridge-Çejku M, Schiller JS, Bernadel L. Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2002. National Center for Health Statistics. *Vital Health Stat*, 2004:10(222).
24. Lethbridge-Çejku M, Vickerie J. Summary Health Statistics for U.S. Adults: National

- Health Interview Survey, 2003. National Center for Health Statistics. *Vital Health Stat*, 2005; 10(225).
25. Lucas JW, Schiller JS, Benson V. Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2001. National Center for Health Statistics. *Vital Health Stat*. 2004; 10(218).
26. Antonovsky, A. Social class, life expectancy and overall mortality. *Milbank Memorial Fund Quarterly*. 1967; 45(2):31–73.
27. House, J. S., Lantz, P. M., & Herd, P. (2005). Continuity and change in the social stratification of aging and health over the life course: Evidence from a nationally representative longitudinal study from 1986 to 2001/ 2002 (Americans Changing Lives Study). 2005; 60B(Special Issue II): 15-26.
28. Cho Y, Hummer RA. Disability Status Differentials across Fifteen Asian and Pacific Islander Groups and the Effect of Nativity and Duration of Residence in the U.S. *Social Biology*. 2001; 48:171-195.
29. Strauss EV, Aguero-Torres H, Kareholt I, Winblad B, Fratiglioni L. Women Are More Disabled in Basic Activities of Daily Living Than Men Only in Very Advanced Ages: A Study on Disability, Morbidity, and Mortality from the Kungsholmen Project. *Journal of Clinical Epidemiology*. 2003; 56(7):669-677.
30. Waite LJ. Does Marriage Matter? *Demography*. 1995; 32:483-507.
31. Lilard LA, Panis CW. Marital Status and Mortality: The Role of Health. *Center for Study and Aging Demography*. 1996; 33(3):313-27.
32. Markides KS, Coreil J. The Health of Hispanics in the Southwestern United States: An Epidemiologic Paradox. *Public Health Report*. 1986; 101(3):253–265.

33. Palloni A, Morenoff J. In: Weinstein A, Hermalin, Soto M, eds. *Population Health and Aging*. New York: Academy of Sciences, 2001:140-174.
34. Markides KS, Eschbach K. Aging, Migration, and Mortality: Current Status of Research on the Hispanic Paradox. *Journal of Gerontology: Social Sciences*. 2005; 60B:68-75.
35. Mutchler JE, Prakash A, Burr JA. The Demography of Disability and the Effects of Immigrant History: Older Asians in the United States. *Demography*. 2007; 44(2):251-63.
36. U.S. Census Bureau. *Facts for features: Asian/Pacific Heritage Month May 2007*. 2007. Available at: [http://www.census.gov/PressRelease/www/releases/archives/facts\\_for\\_features\\_special\\_editions/009714.html](http://www.census.gov/PressRelease/www/releases/archives/facts_for_features_special_editions/009714.html). Accessed September 5, 2007.
37. Asian American Federation. Elderly Asian American New Yorkers Face Higher Levels of Poverty and Depression. *Asian American Federation Reports*, 2003. Available at: <http://www.aafny.org/proom/pr/pr20030219.asp>. Accessed September 5, 2007.
38. Chernew ME, Goldman DP, Pan F, Shang B. Health Care Spending Among Medicare Beneficiaries. *Health Affairs (Millwood)*. 2005; 24Suppl 2:W5R42-52.
39. McDowell I, Newell C. *Measuring health: A guide to rating scales and questionnaires*. 2nd ed) New York: Oxford University Press, 1996.
40. Spector WD, Katz S, Murphy JB, Fulton JP. The hierarchical relationship between activities of daily living and instrumental activities of daily living. *J Chronic Dis*. 1987; 40(6):481e9.
41. Reuben DB, Valle LA, Hays RD, Siu AL. Measuring physical function in community-dwelling older persons: a comparison of self administered, interviewer-administered, and performance-based measures. *J Am Geriatric Soc*. 1995; 43(1):17e23.

42. Sonn U. Longitudinal studies of dependence in daily life activities among elderly persons. *Scand J Rehabil Med Suppl.* 1996; 34:1e35.
43. Rodgers W, Miller B. A comparative analysis of ADL questions in surveys of older people. *J Gerontol B Psychol Sci Soc Sci.* 1997; 52(Spec No):21e36.
44. CDC, 2008. *National Center for Health Statistic. International Classification of Functioning, Disability and Health (ICF)*. Available at:  
<http://www.cdc.gov/nchs/about/otheract/icd9/icfhome.htm>. Accessed on February 29, 2008
45. Kuo J, Porter K. *Health Status of Asian Americans: United States, 1992-94 Advance Data (Number 298)*. Vital and Health Statistics of the Centers for Disease Control and Prevention. National Center for Health Statistics, 1998.