Burden of Aging in Developing Countries: Disability Transitions in Mexico Compared to the United States

Rebeca Wong, PhD
Kerstin Gerst, PhD
Alejandra Michaels-Obregon, MSc

Corresponding author:
Rebeca Wong
University of Texas Medical Branch
Jennie Sealy, Room 3.232
301 University Boulevard
Galveston, Texas 77555-0460
rewong@utmb.edu

Extended Abstract: for consideration to be presented at the Population Association of America Meetings, Washington, D.C., March 2011.

DRAFT: September 2010

SHORT ABSTRACT

This paper examines the burden of aging in developing countries by contrasting patterns of disability transitions among older adults in a developing country (Mexico) with similar transitions in a developed society (the U.S. non-Hispanic White population). The driving hypothesis of this work is that current elderly in Mexico are survivors of infectious epidemiological and poor economic environments during their childhood and youth, while they are experiencing a mixed epidemiological environment of chronic and degenerative diseases combined with communicable diseases in their old age. This unique combination of conditions during their life cycle may imply more severe consequences regarding physical disability than current elderly in the United States, who have not been exposed to such disadvantaged conditions. The paper presents an assessment of this burden of disability in old age using data from the Mexican Health and Aging Study (MHAS) and the U.S. Health and Retirement Study (HRS), two highly comparable longitudinal studies on aging. Estimated probabilities of two-year transitions among disability states and mortality are presented for current older adults aged 50 and older. Overall, the findings reject the initial hypothesis and support the view that the current burden of disability in old age is lighter for a developing country compared to a developed society. The paper discusses the implications of these findings, possible explanations, likely scenarios for the future, limitations, and directions for further research.

Introduction

Over the 20th century, the pace of decline in mortality rates was quite remarkable in many countries of the Latin America region. By the beginning of the 21st century, aging of the population started in the region, representing simultaneously the success of the population and health policies established in the previous half a century and a new challenge to meet the needs of the rising number of older adults (Kinsella & Phillips, 2005). Aging in the region is also characterized by a relatively fast pace compared to the aging speed experienced by developed countries that aged before (Palloni, Pinto-Aguirre, & Pelaez, 2002), and this is a natural consequence of the rapid mortality and fertility declines that ensued in the region. The case of Mexico illustrates this rapid pace. The percent of population aged 60 and older is expected to grow steadily, from 6% in 2000, to 15% in 2027 (CONAPO, 2005). This 27-year pace is relatively fast. By comparison, it will have taken the United States 70 years to close this gap and reach similar percentage (in 2013); it took Japan about 40 years (from 1947 to 1985).

Another important feature of this aging process is that it is 'premature,' given the low level of economic development and institutional infrastructure to support this aging process (Palloni et al., 2002; Wong & Palloni, 2009). Developed countries that aged before, such as the United States or Japan, enjoyed high standards of living at the time that their aging process started. An additional remarkable feature of the aging process in Latin America has to do with the mixed epidemiological regime experienced currently by older adults. On the one hand, the prevalence of chronic conditions such as diabetes, arthritis, heart and lung disease are rising, while infectious diseases continue to prevail in certain groups (Samper-Ternent, Michaels-Obregon, Wong, & Palloni, 2010). Furthermore, current older adults are survivors of infectious diseases regimes during their early life, and we know little about how a disadvantaged childhood

combined with a mixed epidemiological regime could impact their health, disability, and mortality in old age. The burden of aging could be greater for developing countries that age under these circumstances compared to developed countries.

The hypothesis is that these cohorts may experience more severe consequences compared to those experienced by societies that aged under less-infectious conditions over their life course. One way to assess these consequences is to focus on the extent of physical limitations or disability, and the progression to more severe disability or death in populations that have aged under the two vastly different regimes (one developed- and one developing-country), and this is the approach we adopt. Compared to populations in developed countries, we should observe populations in developing countries to have higher disability rates, and moving faster towards disabled states or death over time. We use two countries as case studies: 1) Mexico, which fits the pattern of rapid aging under premature conditions, and experiencing a mixed epidemiological regime. 2) United States non-Hispanic White population, which fits the pattern of developed-country aging and can be used as benchmark or comparison group for Mexico.

The paper is organized as follows: We first provide an overview of aging trends and disability patterns in Latin America, turning to a focus on Mexico and the United States. Second, we expand on physical disability as a measure of burden of aging for different societies and provide our working definition. Third, we describe the data sources used for the analyses and the methods used to test the project hypothesis. We provide a list of comparable measures across the two countries. We provide descriptive results comparing Mexico with the United States, as well as multivariate methods. We expand on our most relevant results: two-year transitions in physical disability across the two countries and among sub-groups in the two countries.

Our data comes from panel surveys from two waves of the U.S. Health and Retirement Study (HRS) and the Mexican Health and Aging Study (MHAS). These two studies are highly comparable and ideal for cross-national comparisons (see Box 2 and Box 3). We use two waves of data from the HRS and MHAS, each two years apart, in order to examine the two-year transitions in disability.

A multinomial logistic model was used to determine transition rates across categories of physical limitations and death at time 2. Covariates at time 1 included in the model were: age, sex, marital status, education, wealth, area of residence (urban/rural), and insurance coverage[1]. We also included ADLs at time 1 using a three categories variable in order to determine transition rates between the two times. We estimated the general probabilities of each outcome at time 2, controlling for the number of ADLs (0, 1, 2 or more) at time1. Finally, we also summarized the estimated probabilities by additional covariates, including sex, age, and education.

[1] In a separate analysis we included in the model the interaction of age and marriage. The interaction term was not significant and did not improve the model. We also considered age squared as a covariate in the model. Results of these analyses are available upon request.

Box 2. MHAS and HRS General Information

	HRS	MHAS
General Description	Large-scale longitudinal study of adults 51 years and older. Started in 1992, conducted every two years, and is ongoing.	Prospective panel study, of adults 51 years and older in 2001, with a follow-up in 2003.
Representativeness	Nationally representative of the United States community dwelling population. Includes an oversample of Blacks, Hispanics and persons living in the state of Florida.	Nationally representative of non-institutionalized individuals in Mexico, in both urban and rural areas. Includes an oversample of high migration states at a rate 1.7:1.
Survey Protocol	Direct interview with each individual when possible, and proxy interviews when poor health or temporary absence An exit interview is conducted with a proxy informant for deceased respondents	Direct interview with each individual when possible, and proxy interviews when poor health or temporary absence At the follow-up, next-of-kin interviews were conducted on deceased respondents
Weights	Weights were post-stratified to the March Current Population Survey (CPS), based on the birth cohort as well as the gender and race/ethnicity	Weights were stratified, based on the birth cohort, household composition, and place of residence by urban/rural areas and geography
Survey Content	Health and cognitive conditions Demographic background Employment status and job history Retirement plans and perspectives Family structure and transfers Housing Anthropometric measures	Health measures Background (childhood health and living conditions, education, migration and marital history etc) Family Financial transfers and help Economic measures Housing Environment Anthropometric measures
Samples Used in the Analyses	2000 and 2002 waves Including 51 years and older in 2000, and 53 years and older in 2002 Selected only US-born Non-Hispanic Whites Sample size (age eligible)=13,404 in 2000 and 13,229 for longitudinal analysis	2001 and 2003 waves Including 52 years and older in 2001, and 54 years and older in 2003 Sample size (age eligible)=11,837 in 2001 and 11,766 for longitudinal analysis

Box 3. Variables Definition: Similarities and Differences Across Studies

Variables	HRS	MHAS
Similarities		
Age	Continuous	
Sex	Categorical (Two categories): Female=1, Male=0	
Marital Status	Categorical (Three categories): Married & Union=1 Single, Separated, and Divorced=2 Widowed=3	
Wealth	Categorical: Tertiles of the distribution of wealth at the individual level	
ADLs (For both time 1 and 2)	Categorical (Three categories): Non Disabled=0 One physical disability=1 (Among bathing, toileting, transferring Two physical disabilities or more=2 (Among bathing, toileting, transferring into/out of bed, walking, and eating)	
Differences		
Education	Categorical (Three categories): Less than High School=1 High School=2 More than High School=3	Categorical (Four categories): 0 years=0 1 to 5 years=1 6 years=2 7 years or more=3
Residence Area	Categorical (Two categories): Urban (Populations of 1 million or more)=1	Categorical (Two categories): Urban (Populations of 100,000 or more)=1
Insurance	Categorical (Two categories): Insured=1 (Covered by any health insurance plan)	Categorical (Two categories): Insured=1 (Health insurance coverage, private or public)

Table 5a. HRS Estimated Transition Rates, by Disabilities in time 1

	HRS					
	Time 2					
Time 1	**No ADLs**	**One ADL**	**2+ ADLs**	**Death**	**LTF**	**Total**
None	0.845	0.044	0.020	0.044	0.046	1.000
	(0.844 ,0.847)	(0.044 ,0.045)	(0.020 ,0.021)	(0.043 ,0.045)	(0.046 ,0.046)	
1 Disability	0.412	0.247	0.165	0.142	0.034	1.000
	(0.402 ,0.422)	(0.243 ,0.251)	(0.161 ,0.169)	(0.136 ,0.148)	(0.033 ,0.035)	
≥ 2 Disabilities	0.132	0.163	0.415	0.250	0.040	1.000
	(0.126 ,0.139)	(0.161 ,0.166)	(0.410 ,0.420)	(0.241 ,0.259)	(0.038 ,0.041)	

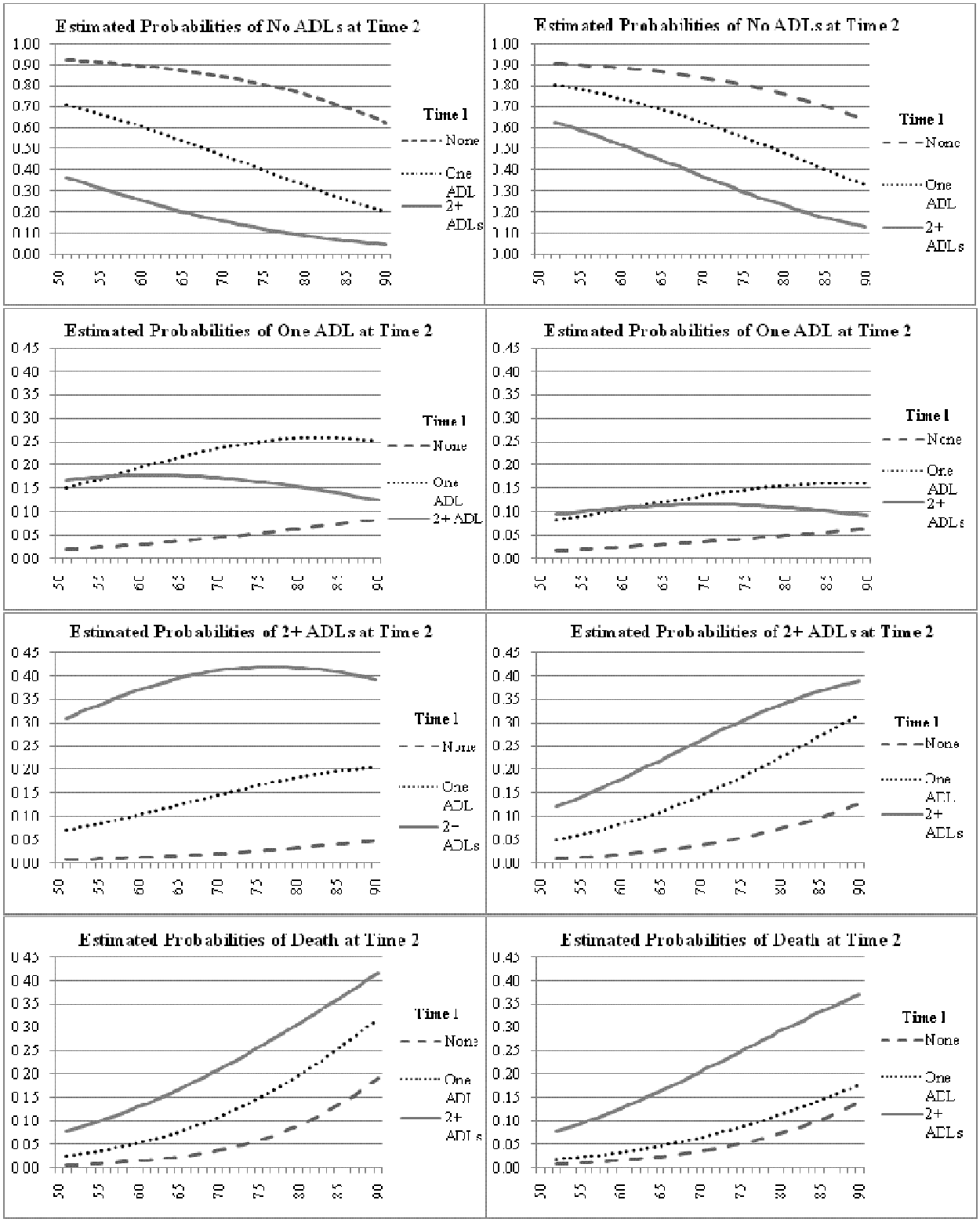
Table 5b. MHAS Estimated Transition Rates, by Disabilities in time 1

	MHAS					
	Time 2					
Time 1	**No ADLs**	**One ADL**	**2+ ADLs**	**Death**	**LTF**	**Total**
None	0.855	0.032	0.031	0.029	0.054	1.000
	(0.854 ,0.856)	(0.032 ,0.032)	(0.031 ,0.032)	(0.028 ,0.029)	(0.053 ,0.054)	
1 Disability	0.612	0.132	0.152	0.073	0.031	1.000
	(0.598 ,0.626)	(0.129 ,0.136)	(0.144 ,0.160)	(0.067 ,0.078)	(0.029 ,0.033)	
≥ 2 Disabilities	0.324	0.112	0.290	0.238	0.037	1.000
	(0.312 ,0.336)	(0.110 ,0.114)	(0.282 ,0.297)	(0.229 ,0.247)	(0.035 ,0.040)	

Estimated Probabilities of Disability at Time 2, by Number of Disabilities and Age at Time 1

Figures 1a and 1b graph the predicted probabilities of transition to no ADLs, 1 ADL, 2 or more ADLs or death at time 2, by time-1 disability status and by age. In general terms, the predicted probabilities of transitioning to no ADLS at time-2 decrease with age across both countries. However, the probability curve for persons with two or more ADL limitations at time-1 is much lower in the U.S. than in Mexico.

1a) United States **1b) Mexico**



Summary of Conclusions

Our estimates of how populations of older adults in a developing country (Mexico) transition across disability states or death compared to a developed country (non-Hispanic Whites born in the United States) yield results that reject our initial hypothesis. The levels of disability prevalence and the two-year transitions are consistent with a heavier burden of aging for the U.S. than for Mexico, at least in terms of disability measured by limitations with activities of daily living (ADL). This generalized finding holds even after controlling for age, sex, marital status, educational achievement, urban-rural residence, wealth, and availability of health insurance.

We find many features of the disability patterns that are remarkably similar across the two countries. In univariate analyses, older persons are more likely to report disabilities than younger adults, women more than men, those with low socioeconomic status more than those in the high end of the scale, and those living in rural areas more than urban residents. Women are more likely to transition to or stay in disabled states, while men are more likely to transition to death than women.

In two-year transitions, among older adults aged 50 or older, the U.S. population is more likely to transition to a disabled state or increase the number of disabilities than the Mexican counterparts, while Mexicans are more likely to move out of disability or reduce the number of disabilities reported. The transition to mortality is also higher for the U.S. compared to Mexico.

The two studies that we used for our analysis are highly comparable in study protocols and contents, and our analyses were carefully harmonized across the two databases, thus we rule out differences in the surveys, measures, or methods as possible explanations for these results.

Rather, we speculate that these results could be explained by several other factors. The paper provides further discussion on four other possible explanations.