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Aging and Health Status of Elderly in Latin America and the Caribbean

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Aging and health status of elderly in Latin America and the Caribbean: Preliminary findings

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Abstract

Aging in Latin America and the Caribbean will not proceed along known paths already followed by more developed countries. In particular, the health profile of the future elderly population is less predictable due to factors associated with their demographic past that may haunt them for a long time and make them more vulnerable, even if economic and institutional conditions turn out to be better than what they are likely to be. This paper answers a set of questions regarding the nature and determinants of health status among the elderly in Latin America and the Caribbean using SABE (Survey on Health and Well-Being of Elders), a cross-sectional representative sample of over 10,000 elderly aged 60 and above in private homes in seven major cities in Latin America and the Caribbean. We examine health outcomes such as self-reported health, functional limitations--Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs), obesity (ratio of weight in kilograms to the square of height in centimeters), and self reported chronic conditions (including diabetes). The findings include: (a) Countries differ in self-reported health but exhibit much less differences in terms of functional limitations. The number of chronic conditions increase with age and is higher among females than among males; (b) On average SABE countries display levels of self-reported diabetes (and obesity) that are as high if not higher than those found in the US; (c) There is evidence, albeit weaker than expected, suggesting deteriorated health and functional status in the region; (d) There is important evidence pointing toward rather strong inequalities (by education and income) in selected health outcomes. Preliminary findings from SABE confirm that Latin America and the Caribbean display peculiarities in the health profile of elderly, particularly with regard to diabetes and obesity. It is important that new policy initiatives begin to seriously target the region's elderly, especially with an emphasis on the prevention and treatment of diabetes and obesity.

Key words: Aging, diabetes, health outcomes, Latin America

Introduction

We use a new and rich data set on elderly people in seven countries of Latin America and the Caribbean to document salient properties of the health status profile of elderly in the region and to answer a set of three questions regarding its nature and determinants.

Health status of elderly is but one among a handful of characteristics that make the aging process of the region a distinct one. There are four features that set the aging processes in the region of Latin America and the Caribbean apart from others. These features are singularities in an otherwise standard landscape of aging. They are potentially important for, even if verified only partially, they may generate a unique mixture of problems requiring vastly different policies from those undertaken elsewhere. What follows is a succinct review of these features.[1]

Speed of aging

The speed of demographic aging in Latin America and the Caribbean will be unprecedented. The time it will take a typical country in Latin America and the Caribbean to attain a substantial fraction of people above age 60, say around 15 percent, from current levels of around 8 percent is less than two fifths the length of time it took the US, and between one fifth and two fifths of the time it took an average Western European country to attain similar levels (Palloni, Pinto & Pelaez 2002; Kinsella & Velkoff 2001). The annualized rate of increase of the population older than 60 is approaching values as high as .045 implying doubling times of the order of 5 years for the next three to five decades. Barring unexpected demographic upheavals we should expect that for the next three to five decades the speed of aging in the region will continue on a singularly fast course, a result of the momentum of demographic force set in motion long ago.

Dislocation between aging and standards of living

Fast and demographically premature aging takes place in countries that have not had the time, the fortune, or wherewithal to generate sustained high standards of living. Comparisons between the wealthiest countries in Latin America, on the one hand, and the US, Sweden or Japan, on the other, are revealing. First, even optimistic projections of growth in GNP per capita imply that when the fraction of elderly people begins to exceed 10 percent, countries of the region will attain no more than a small fraction (one tenth or thereabouts) of the levels of GNP per capita enjoyed *by developed countries when they were reaching similar levels of aging*.

Second, adopting an admittedly optimistic forecast with a fairly agile process of economic growth, driven by annual rates of increase in GNP per capita of about .030 (about 15 percent higher than the average in the region during the last fifty years!) does not help much. Indeed, even in this rosy scenario, no appreciable fraction of time during which the countries of the region are aging rapidly will be characterized by a GNP per capita exceeding $10,000, an admittedly modest amount. By comparison, Sweden spent about 77 percent of the time during which rapid aging was occurring enjoying higher standards of living; the US spent 95 percent of the time, and Japan 100 percent of the time. Barring unprecedented economic conjunctures, the fate of countries in Latin America and the Caribbean will be dominated by rapid aging paired with precarious standards of living. The comparisons are, of course, even more disheartening had we chosen as reference not the wealthiest but the poorest countries in the region.

Socio-political context and aging: institutional volatility

An even more startling and generalized reality in the Latin American and Caribbean region has to do with the relation between speed and magnitude of aging, on the one hand, and the social and political contexts within which the process is taking place, on the other. First, a traditional order whereby elderly well-being rests on the shoulders of the younger generation is

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[1] A more thorough examination of the aforementioned features can be found in Palloni et al. 2002.

being gradually subverted by shifts in norms regulating living arrangements and by rapid fertility declines (DeVos 1990; DeVos & Palloni 2002; Palloni 2001). Admittedly, traditional living arrangements crumbled in North America and Western Europe as well, but the phenomenon occurred well before the onslaught of rapid aging (Palloni 2001; Ruggles 1996). In countries in the Latin American and Caribbean region the safety net articulated around families and kin relations is being dismantled **concurrently** with rapid aging. This leaves little room for error and no time to seek adequate substitutes.

Second, aging is occurring in a fragile institutional environment, one where the bulk of sources guaranteeing minimum levels of social and economic support for the elderly are being reformulated, reformed, and in most cases, eliminated. A good example of this is the sustained and widespread drive toward reform of social security systems (Mesa-Lago 1994; Barrientos 1997; Klinsberg 2000). In all cases the reforms are designed to replace pay-as-you go systems that operated uninterruptedly in many of these countries since World War I, with privatization schemes. New plans will supplant a system which, though flawed, was successful in reducing inequalities and protecting the most vulnerable segments of the elderly population. Income receipts of those retiring from the labor force during the first ten years of the XXIst century will depend on clauses to stop-gap a prolonged transition to the instauration of the new system. An important fraction of these cohorts, but especially older women, received minimal earnings throughout their occupational careers and could not possibly accumulate sufficient wealth to secure safe standards of living. The combination of sheer growth of the elderly population and even an expected burden of disease among the elderly (see below) will result in an increase in the demand for health services precisely during a time when access to health care shrinks and becomes more expensive under the onslaught of privatization schemes.

In summary: no country in the Latin American and Caribbean region is blessed with institutional contexts designed to cope with changed demands from a growing elderly population. In almost all cases a highly compressed aging process will take place in the midst of weak economic performance, tense intergenerational relations, fragile institutional contexts, and shrinking access to medical and health care services.

Health status

Birth cohorts who reach age 60 and above after 1990 in this region are unique in that they are largely the product of medical interventions that increased childhood survival largely in the absence of significant improvements in standards of living. It is estimated that between 50 to 70 percent of the mortality decline that took place after 1945 was associated with medical interventions (Preston 1976; Palloni & Wyrick 1981). The remaining decline was probably associated with better standards of living, increased knowledge about exposure and resistance to illnesses, and assorted other factors. Furthermore, a large fraction of these gains were concentrated early in the life of individuals, between birth and age 5 or 10.

A potential consequence of this pattern of mortality decline is that average levels of frailty among members of cohorts blessed by new medical technology could be higher (and so will its variance) than if mortality had remained constant or had declined due to improved standards of living. This is so for two reasons. **First**, the lives saved by the mortality decline were certainly not random relative to conditions affecting health status (Vaupel, Manton & Stallard 1979). Indeed, they are more likely to have been drawn from populations exposed to higher risks, those whose morbidity and mortality experiences were dominated by exposure to infectious diseases and lack of adequate early nutrition.

Second, since most childhood morbid conditions responsible for higher mortality before the interventions continued to affect children, albeit with reduced lethality, their influence and aftermath must have been felt by a growing number of survivors, all drawn from high mortality subpopulations. This has important implications *if early childhood conditions exert an impact on adult health and mortality*. Although evidence that early childhood conditions affect adult health is far from water-tight, it is clearly mounting fast and cannot be ignored. The literature on the subject focuses on **three types of factors** that have frequently been examined in this literature. This literature is split in several strands and we attempt to do justice to each of them (Elo & Preston 1992; Schaffer 2000; Barker 1998; Kuh & Ben-Shlomo 1999, 2004; Hertzman 1994; Cynader 1994). The first is most closely associated with the work of Barker and concentrates on the sequelae of processes that may start *in utero* or develop shortly before and/or around birth ("fetal origin hypothesis"). In general, these effects develop as a result of either fixed traits that individuals are born with or, most interestingly, of stresses and uneven development of physiological systems that follow periods of moderate and severe deprivation and that remain latent until late in life. Thus, unless one has markers of early deprivation, there is little that can be done to falsify the conjecture. Some of these markers have already been used (birth weight, placental weight, length of gestation, length of recently born etc…). None of these markers is available to us in the data we will use in this paper. Instead we rely on indirect measures of early nutritional status, including height (adjusted for age), knee height (a proxy for leg length), and the ratio of hip to waist circumference. These measures have already been used with some success by nutritionists as surrogate measures among adults. A second strand in the literature identifies episodes of illnesses in early childhood as the cornerstone responsible for the late onset of some chronic diseases. The best known example of this is the relation between rheumatic heart fever—a common infectious disease in developing countries at least prior to the massive mortality decline that took place after World War II, —and the onset of heart disease. Because all the data from SABE and MHAS contain information on retrospectively recalled childhood diseases, we can at least attempt to assess the size of the effects. The strategy is by no means optimal since not only we must deal with faulty recall but there is a serious selection problem we cannot address (for example, individuals with the most serious cases of rheumatic fever may not have survived to be in our sample). A third strand is more general and attempts to find broad associations between socioeconomic conditions experienced in early childhood and adult health status. This type of work is a roundabout way to find some of the connections identified by the other two strands. Thus, finding an association between SES early in life and health status among the elderly may simply reflect the relation between current or recent SES and health. For the most part this kind of work aims at finding *net effects of early SES on adult health, that is, those that remain after appropriately controlling for current or recent SES*. The interpretation of the net effects conventionally invokes either the existence of Barker-effects or the influence of early illnesses. All the data sources we will use enable us to do tests for this as they contain retrospective evaluation of markers of early childhood poverty, deprivation and SES.

If any of these mechanisms turns out to have more than modest effects, increases in frailty among elderly whose earlier experiences fit the description provided above, are likely to be pronounced.[2] This means that the health status composition of elderly in Latin America and the Caribbean in general, should be worse relative to what would have been had the growth of the more recent and forthcoming cohorts of elderly been associated, as was the case in more developed countries, with improving standards of living. Our understanding of the relations between early childhood exposures and adult health status is still too primitive to enable us to

[2] The argument holds, of course, if we assume that the effects of mortality selection are only mild and if the effects of changes in behavioral profiles and medical technology (exogenous or not) are only weak.

establish precise predictions or conjectures regarding the nature of expected health impairments. But this conjecture can at least be used as a guiding torch to explore the evidence available to us.

Finally, it is neither a mystery nor a novelty that the regimes of morbidity and mortality experienced by elderly people in developing countries are unusual. First, as one would expect (Omran 1982) there is an expansion of chronic conditions, such as heart and lung disease, cancers, diabetes, and arthritis, and elderly people continue to be assaulted by significant levels of infectious diseases (Frenk et al. 1991). We simply do not know what the health effects of exposure to highly interactive environments like these are. What should one expect, for example, under conditions where elderly people are simultaneously weakened by malaria and exposed to higher risks of congestive heart disease? Or, where increases in diabetes due to the adoption of a westernized diet (Popkin 1993; Albala, Kain, Burrows & Diaz 2000) are combined with recurrent intestinal infections and high prevalence of respiratory TB? What are the implications of a mixed mode of exposure for comorbidities, disability and impairments among the elderly? What are the implications for treatment? What effects does it have on demands for health care?

The strength of evidence supporting the existence of the aforementioned features of the aging process in the Latin American and Caribbean region is heterogeneous. There is considerably more data sustaining hypotheses about the first and second features than there is for the third but especially for the fourth. It is precisely this fourth feature that constitutes the focus of this paper. We do this by turning our focus to self-reported health, functional limitations and chronic conditions, especially diabetes.

Up to now very little was known about adult health in the region and, therefore, virtually no conjecture or hypothesis could be thoroughly investigated. We can now use a unique, newly released data set on elderly people living in seven major cities in countries of Latin America and the Caribbean to answer the following three questions: (a) what is the characteristic health profile of the elderly in the region? (b) How does this profile compare with other known profiles, such as the one in the US? (c) Is there any evidence of deteriorated health and functional status, as expected if some of the conjectures proposed before are on the mark?

Subjects and Methods

SABE

SABE (SABE 2003) is a data collection project anchored in seven major cities (six of them capital cities) of the region: Buenos Aires (Argentina), Bridgetown (Barbados), San Paulo (Brazil), Santiago (Chile), Havana (Cuba), Mexico City (Mexico) and Montevideo (Uruguay). All seven surveys were administered to representative samples of populations aged 60 and above in each city and were strictly comparable though translated to three different languages (Spanish, Portuguese and English). In some cases, interviewers selected a target older person and his/her surviving spouse. All sample frames were drawn either from recent population censuses or from nationally representative surveys carried out periodically in the capital cities of the region.[3] The fieldwork took place between June 1999 and June 2000 and a preliminary final report was completed in December of 2002. An important feature of the survey is that, with one exception (Buenos Aires), the rates of response were significantly higher than those in similar surveys in other countries. Table 1 displays basic information on sample sizes, rates of response, as well selected dimensions of the demographic profile (composition by age, sex, marital status, race) and of the socioeconomic composition of the samples (by education). As shown elsewhere the

[3] See more information on the nature of the samples (Palloni and Pelaez 2002).

basic demographic profile accords well with national figures.[4,5] Table 2 displays information on a few health-related characteristics that will be the object of study in this paper, namely, self reported health status, Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), chronic conditions, and anthropometric measures.[6]

[Insert Tables 1 and 2 about here]

HRS

The University of Michigan Health and Retirement Study (HRS) (2000) surveys more than 22,000 Americans over the age of 50 every two years. The study paints an emerging portrait of an aging America's physical and mental health, insurance coverage, financial status, family support systems, labor market status, and retirement planning. The sample we used in this paper included 12,527 target respondents (no spouses) aged 60 and above.

Analysis

For self-reported health we use individuals within countries as units of observations and the logit of the probability of self reporting in bad health as a dependent variable. As predictors we use dummy variables to represent cities, age groups and sex (see definitions in Table 1). Patterns for functional limitations can be studied better with the same tools deployed for the study of self reported health. We focus on a logit transformation of the individual probabilities of reporting at least one ADL (IADL) and dummy variables for sex, age categories and countries as

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[4] Because all samples are urban samples, our ability to generalize to the total population is impaired. However, readers should bear in mind that the proportion of the total population living in urban areas in these countries is substantial, varying from close to 100 percent in Barbados to about 74 or 75 percent in Mexico and Cuba respectively. This suggests that our results should not be too different from what we would have obtained had SABE been based on national samples. And, indeed, it has been shown that the demographic profile at least of the samples is quite close to national averages.

[5] In the rest of the paper we refer use the words "country" or "city" to refer to the **city samples**. By using the word country we are in no way assuming that the SABE data are exactly representative of elderly populations in each of the countries who participated in the project.

predictors. To examine the effects of education and income we use logit models while controlling for age, sex and country of origin.

Results

Self reported health

We begin with an assessment of self-reported health status. There is good evidence suggesting that self-reported health is an indicator of general health with good construct validity (Smith 1994; Manton, Stallard & Cordel 1997; Wallace 1995; Soldo & Hill 1995), and is a respectably powerful predictor of mortality risks (Idler & Benyamini 1997; Idler & Kasl 1991), disability (Idler & Kasl 1995) and morbidity (Schechter, Beatty & Willis 1998; Beckett, Weinstein, Goldman & Yu-Hsuan 2000), though these properties vary somewhat with national or cultural contexts (Idler 1997). Less is known, however, about whether and to what degree self-reported health status is contaminated by cultural idiosyncrasies, heterogeneous conceptualization of disease and ill health, and differential assessment of gradations of ill health. Even less is known about the impact of these distortions on the validity of direct cross-cultural comparisons of self reports (Sen 2002).

Robustness of comparisons: necessary conditions

The questionnaires used in SABE were strictly comparable. In particular, the questions eliciting self-reported health status were the same across countries. By the same token, with the exception of Barbados, all countries represented in the study belong to closely related cultural pools which makes it more likely that, if any, the influence of cultural idiosyncrasies will be attenuated. However, these conditions offer only weak assurances for the validity of the cross-country comparability we are about to undertake. In order to verify its robustness we first assess

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[6] The definition of ADL, IADL, and self-reported conditions selected for study in this paper appears in the Appendix. They are strictly comparable to those used in other surveys of elderly, particularly the Health and

the degree of concordance of self-reported health and self reported conditions. In particular, we demonstrate that there is a moderate degree of consistency between self-reported health, ADL, IADL and chronic conditions. Figure 1a displays the proportion of respondents with at least one ADL and with at least one IADL by self reported health status. Figure 1b displays the mean number of self reported chronic conditions by self reported health status. Finally, Figure 1c shows the relation between self-reported health status and self reported diabetes. The relations portrayed in these graphs are by no means perfect but reveal a high degree of concordance which is satisfying for our purposes.[7] This is overwhelmingly confirmed by simple descriptive models relating selected health outcomes to self reported health (Palloni & McEniry 2004). Regardless of country, the proportion of individuals declaring themselves in bad health is the first or second best predictor of the proportion with at least one ADL, at least one IADL, the mean number of chronic conditions and self reported diabetes when age, sex and country are controlled for. Exactly the same results hold for the US population in the HRS sample.

[Figures 1a, 1b, 1c about here]

This evidence suggests that in each country the proportion self reporting in bad health reflects underlying medical conditions and functional limitations identified by respondents. Although it is certainly not sufficient for an unbiased cross-national comparison, it signals that we have a relatively robust basis for interpretation of intercountry heterogeneity of self reports.

Retirement Survey (HRS) (2000).

[7] To simplify analyses we focus on a single indicator for the presence of ADL and IADL, namely, whether or not individuals declare at least one of them. We could have used the entire frequency distribution and worked instead with the "number of ADL" or the "number of IADL". But this complicates the analyses unnecessarily since these are discrete, bounded variables and their distribution can only be mimicked by a handful of discrete distributions. Treating them as categories leads to unwieldly results. Finally, because the number of possible ADL (6) and IADL(6) is relatively few, the proportion of individuals declaring 0 turns out to be an excellent predictor of the shape of the entire distribution. Inferences drawn with the simplified indicator chosen here do not change if the dependent variables are fine-tuned (Palloni and McEniry 2004). The same applies for self reported health status.

Heterogeneity of self reported health

Figure 2a displays the proportions reporting their health as “bad “(“mala”) by age groups for all seven cities separately by gender. As a contrast we have included quantities for elderly aged 60 and over who are participants in the Health and Retirement Survey (HRS). The **first** feature of the graph is the massive intercountry heterogeneity which completely overwhelms the effects of gender and age. The cities with the highest proportions of individuals in bad health are found in Santiago (21 percent), Mexico City (20 percent) and Havana (13 percent) whereas those with the lowest are Buenos Aires, Bridgetown, and Monetevideo (5 to 7 percent). The latter three cities are located in countries that, perhaps not coincidentally, are those which until the beginning of the XXIst century enjoyed the highest standards of living (as measured by GNP per capita). They are also those with the most modern demographic regime, with near replacement fertility and life expectancies at birth exceeding 75 years.

[Figure 2a about here]

The **second** feature is the age and sex patterns of self reports. By and large we observe increasing proportions in bad health with age. The only exception to this regularity is in Mexico City, where the age pattern is flat. The sharpest increase always occurs after age 70 and is particularly pronounced except perhaps in Chile and Mexico. Females do worse than males everywhere, a recurrent finding with data of this type. The Latin American and Caribbean region is no different than others in this respect.

A **third** feature is that elderly living in the cities with the best standing (Buenos Aires, Bridgetown and Montevideo) are equally or less prone than those in the US to report their health as bad, while elderly living in Santiago, Havana and Mexico City are considerable more likely to do so. Elderly in the US are in an intermediate position between these two extremes.

Some of these visual regularities are confirmed by straightforward multivariate analyses of the proportion self reporting in bad health. The results are presented in Table 3a (Panel a) showing estimates from the most complete model. The results from Model II (Panel b, country effects are constrained to be equal to each other for all countries except the residual category represented by Uruguay) indicate that there is substantial intercountry heterogeneity (effect of .15 is significant). Also Model I (Panel a, unconstrained country effects) adds significantly to the fit of Model II, showing that the inclusion of the contrast of Uruguay versus all other countries adds significantly to the fit of the model (log likelihood ratio test between models leads to a chi-square statistic equal to 116.1 with 6 degrees of freedom). Gender differentials exert a respectable influence whereas those of age are more irregular. In Model I only the effects of age groups 75-79 and 85+ are significantly different from 0 but they are not significantly different from each other.[8] This indicates that there is no firm basis to infer the existence of an age gradient in the proportion of individuals reporting in bad health. Not unlike the pattern found in HRS, where age effects are significantly different from zero but not from each other.

Model III (Panel c) seeks to verify whether or not there are relevant differences between the US and the seven cities in Latin America and the Caribbean. In order to do this we treat the data from the seven cities in Latin America and the Caribbean as if they belonged to the same population and contrast it with the data from HRS. We first estimate a model including age and sex as variables to establish an average age-sex pattern. We then introduce a dummy variable to distinguish the HRS data from the rest. The results suggest that visual impressions can be misleading as elderly people in the US report themselves in somewhat better health status than the *average* of the seven cities in Latin America and the Caribbean. The odds of reporting in bad health among elderly in the US is only about .73 as large as among the pooled sample and the

[8] This statement is established by estimating a model where the age effects are constrained to be the same.

implied effect on the log odds of self reporting in bad health (-.31) is significantly different from 0 (t = -.6.82; p>.000).[9]

[Insert Table 3a about here]

Functional limitations

Self reported limitations in Activities of Daily Living (ADLs) or Instrumental Activities of Daily Living (IADLs) are a mainstay of population-based information on disability. They are arguably better gauges to assess the extent of physical impairment in population-based studies and are widely used in national surveys such as the HRS, NHANES, NHIS and LSOA as well as in a number of surveys in countries other than the US. ADLs reflect impairments associated with underlying conditions that induce physiological limitations and deterioration and provide a useful benchmark to calibrate demand for care, assistance, and support. IADLs are less tied to morbidity *per se* as they are sensitive to more generalized impairments and limitations in unassisted and independent living. ADLs are good probes of physical functioning, particularly lower body functionality (Smith, Branch & Scherr 1990), and reflect impairment created by chronic conditions as well as cognitive and affective functioning (Stump, Clark, Johnson & Wolinsky 1977; Wray, Herzog & Park 1996; Wray & Lynch 1998). As before, we focus only on the proportion of elderly with at least one ADL, or at least one IADL, and examine patterns of relations with the aid of straightforward and parsimonious models.[10]

The age patterns of the proportions with at least one ADL and at least one IADL are displayed in Figures 2b and 2c. There are strong age gradients, important gender differences, but virtually no intercity heterogeneity. The HRS sample stands out: individuals in this sample experience higher proportions with at least one ADL but much lower proportions with at least

[9] Simple analyses of variance (Palloni & McEniry 2004), reveal that the residual variance explained by country heterogeneity is significant whereas the residual variance explained by age and sex is not.

one IADL.

[Insert Figures 2b and 2c about here]

Table 3b (panels a, b and c) displays results for ADL and Table 3c (panels a, b and c) does so for IADL. For ADL age and sex patterns are very salient, more so than intercountry heterogeneity.[11] In this case intercountry differences are confined to the contrast between one country with low levels of prevalence of ADL (Barbados) and three with relatively higher levels (Brazil, Chile and Mexico). But, as revealed by Model II (panel b, constrained model), intercountry heterogeneity is trivial as the effects associated with all SABE countries (except Uruguay which is the residual category) are not significantly different from 0. Also note that Model I does not add significantly to the fit (relative to Model II). Instead for IADL, intercountry differences are powerful and generalized. A curious feature is that the city with one of the lowest proportions of elderly reporting themselves in poor health has one of the highest proportions with at least one ADL or IADL (Montevideo).[12]

[Insert Tables 3b and 3c about here]

The contrasts between ADL and IADL patterns in SABE cities and HRS (see Panels c in Tables 3b and 3c) are quite strong. An individual in the HRS population is about 1.11 times as likely to experience at least one ADL as an individual in the pooled SABE sample. In fact, the estimated effect on the log odds is equal to .10 and is significantly different form zero (t=2.93, p>.01). By contrast, the HRS population is less than a third as likely (log odds equal to .29) to declare at least one IADL as they are in the pooled sample. The associated effects on the log

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[10] See footnote 5.

[11] Analyses of variance (Palloni & McEniry 2004) suggest that the fraction of total variance explained by country variability is statistically insignificant.

[12] Montevideo is also the only city in the SABE sample where institutionalization of the elderly is more than trivial. The peculiar relation between self reported health and ADL and IADL in Montevideo might be a result of heavy selection among elderly who remain independent instead of becoming institutionalized.

odds (-1.25) is again significantly different from 0 (-1.25; t=-33.30; p>.000). This is an interesting pattern which could result from heavier mortality selection among elderly with compromising morbid conditions in the SABE cities.

Chronic conditions: The salience of diabetes

Figure 3 displays the mean number of chronic conditions by age and gender and shows that, as was the case for ADL and IADL, the age patterns slope upwards and females exhibit a more unfavorable profile than males. By the same token, a simple regression analysis reveals that intercountry heterogeneity is quite low and that the strongest effects are those of age and sex. A comparison with HRS shows that the elderly population of HRS exhibits a higher average number of chronic conditions than *any* of the countries in the SABE sample (except perhaps Cuban females). This again is a pattern that could be expected under heavier mortality selection in SABE countries.[13]

[Insert Figure 3 about here]

Of all chronic conditions highlighted in Table 2 and those included in the mean number of chronic conditions in Figure 3, arthritis, heart disease, obesity and diabetes are the most salient.[14] Of these, the latter three are of particular interest to us. First, other research reports that developing countries, particularly Latin America and the Caribbean, are in the midst of a diabetes (and obesity) epidemic, in part the result of a unfavorable shift toward a "Western" diet, rich in saturated fats, simple carbohydrates and sugar and a marked trend toward sedentarism (Popkin 1993; and Albala, Kain, Burrows and Diaz 2000). But never before has this been documented on a large scale for countries of the region and for elderly populations. Second, diabetes and coronary heart disease have been linked to unfavorable early childhood conditions

[13] See Appendix for definition of chronic conditions.

that express themselves either in unfavorable nutritional status or as a result of contraction of infectious diseases (Barker 1998; Kuh & Ben-Shlomo 2004). The case of diabetes is of special interest for it, but not heart disease, appears to be strongly related to indicators of early childhood malnutrition (Palloni & McEniry 2004).

Figure 4 displays the proportion of individuals by age groups who self-report diabetes for all SABE samples and HRS, separately by gender.[15] The pattern by age is very distinct and quite similar across countries, concave downward with a peak around 70-74.[16] Males are less likely to report diabetes than females. For the most part, the population in HRS is as likely as the average individual in the pooled SABE sample to report diabetes. In regression models not shown here we find several regularities. First, within the SABE sample there is important heterogeneity. Cuba, closely followed by Argentina and Uruguay, exhibits the lowest levels of self-reported diabetes (almost 17 percent at the peak age group for women), whereas Barbados, Mexico and Brazil, experience the highest levels (about 29 percent at the peak age for women). Second, in the HRS sample prevalence of self reported diabetes is slightly higher than the weighted average in SABE: the predicted probability at the peak age for women is .22. But the difference between this level and the prevalence in the SABE sample is statistically insignificant, as the effect of being in the HRS sample on the log odds of self-reporting diabetes is only .10 (with t=.73, p>.470).

[Insert Figure 4 about here]

The fact that Cuba exhibits very low levels of self-reported diabetes specially among

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[14] In this paper we reserve the term diabetes to refer to a mixture of diabetes 1 and diabetes mellitus or type 2. However, for the most part those individuals self reporting diabetes are afflicted by diabetes type 2.

[15] Self-reports of diabetes are not perfect. We know that it underestimates true prevalence. But it is quite accurate as it has very high specificity but lower sensitivity in very different cultural contexts (Palloni, Soldo & Wong 2003; Goldman, Weinstein & Y-Hsung 2002).

[16] The declining pattern with age is probably a result of the heavier attrition of diabetics as age increases.

males, is undoubtedly due, in part at least, to the fact that the adoption of a Western life style has simply not been an option in this country and, therefore, the risk factors associated with a new diet and sedentary life styles are simply absent. But to explain the very high levels in Barbados, Brazil and Mexico one probably needs to explore the role of population composition by early nutritional status and/or the influence of ethnic composition. In fact, Barbados and Brazil have a hefty component of population with African descent whereas Mexico has the highest percentage of indigenous and mestizo population. Whether the fetal origin explanation or the one resting on ethnic-related genetic endowment or a combination of both explain the distinctive patterns in these countries must remain conjectures until we are able to test directly the influence exerted by each factor.[17]

Health inequalities

The most important conjecture we put forward at the outset is that the evolution of mortality in countries of the region may have important implications for the health status of those entering older age brackets now and in the next twenty to thirty years. In particular, if deleterious early childhood conditions do indeed affect health status during adulthood, we would expect that individuals who belong to more privileged social groups would be less affected by the peculiar evolution of mortality trends early during the century, and should experience a more favorable profile than those in less privileged social positions. Thus, one possible, albeit indirect, test of the conjecture should rely on contrasts of health status by socioeconomic standing. However, comparisons of health status across social groups are far from an ideal test for at least two reasons. First, similar contrasts in health status by social classes can also be the result of other mechanisms, such as better access to health care or more favorable behavior. For example, one

[17] See Palloni & McEniry 2004. Since most of the Barbados population is of African descent, a similar test cannot be applied there.

would expect inequalities to be more muted in Cuba than elsewhere. This does not mean that the conjecture is incorrect; only that other mechanisms help to conceal its effects. Second, since average frailty of those in better socioeconomic standing is likely to be higher than those in lower socioeconomic positions, health differentials at older ages will be considerably attenuated and will make less visible the contrasts associated with early experiences. Thus, for example, social classes who experienced higher mortality during childhood may have lost a larger fraction of individuals who would be in worse health had they survived, as happened among better off social classes. This mechanism alone can produce weaker contrasts and be more powerful in countries where social contrasts in morbidity and mortality were stronger early in the life of the cohorts of elderly. These factors with offsetting effects may blur distinctions and make it difficult to identify the presence of any particular mechanisms.

The SABE data set includes a number of variables that can be used to assess socioeconomic status. We will concentrate on two that are least controversial, levels of attained education and family income. Neither is an ideal measure of social class but both are strongly associated with mortality and morbidity in other social contexts and, in all likelihood, reflect a number of conditions with powerful effects on health status. Figure 5a and 5b graphically display the aggregate association between education (income) and selected health outcomes. These figures plot the proportion experiencing a particular outcome by quintiles of education (income). In both cases the relations seem to be in the right direction, and the slopes of gradients are in the expected direction. There is some intercountry heterogeneity, and Cuba exhibits the lowest levels of inequality across quintiles of income and education categories. But the differences are trifling. Inequality by income or education is more pronounced for self-reported health, ADL and IADL in that order and least pronounced for obesity. There are some observable social inequalities for diabetes but they probably betray much higher levels concealed by differential mortality of diabetics across social classes.

[Insert Figures 5a and 5b about here]

A summary of the effects for the SABE sample appears in Table 4 (panel a). The effects of both education and income are pervasive, powerful and statistically significant for almost all health outcomes except those of income on diabetes and obesity. When we contrast these inequalities with those in HRS (Table 4, panel b) we find a striking pattern: HRS inequalities by both education and income are larger in virtually all health outcomes than those found in SABE countries.

[Insert Table 4 about here]

Are these effects important? Although statistically significant effects are worth studying, they do not always translate into important influences. To illustrate the magnitude of the actual effects we calculate predicted probabilities of self reported diabetes for individuals with average attributes except in education and income. In the SABE cities the average probability of diabetes increases from about .14 to .18 when education level changes from high school and above to primary (complete or incomplete). In HRS the shift is from .16 to .23. Thus a change in educational level of this sort doubles the probabilities of diabetes in both the US and Latin American context. For income the contrasts are slightly more attenuated in SABE: the average chance of diabetes for those in the lowest quintile of the income distribution is about 1.20 as high as the chance for those in the highest quintile (.18 against .15). In HRS the ratio of one to the other is slightly higher than 2 (.23 to .11)

Discussion

This review of preliminary findings from SABE reveals well-known patterns and confirms routine expectations and, simultaneously, presents us with puzzling regularities that do not agree well either with *a priori* expectations nor with conjectures. At the outset we posed three questions. The first question had to do with the characteristic health profile of the elderly in the region. We now know a few things we did not know before. Self reported health status shows large intercountry variability and more muted heterogeneity due to gender and age. Women and the very old are more likely to declare themselves in bad health. On average, countries in the region display patterns by age and sex that are very similar to those found elsewhere. The proportion with at least one ADL or IADL is strongly related to age and gender and displays remarkable intercountry invariance. Self reported health, on the one hand, and ADL and IADL on the other are moderately related to each other. The mean number of self reported chronic conditions increases with age and is higher for females than it is for males. Of all the chronic conditions the one that stands for its high prevalence is (self reported) diabetes. Females are especially affected by this condition. Obesity, a risk factor of diabetes, is also high among elderly in the region, particularly among females. There is large intercountry variance in both diabetes and obesity. In some countries (such as Argentina) which are highly modernized and westernized, the prevalence of diabetes is fairly low and in others, such as Mexico and Barbados, with high percentages of population of African descent or mestizo, the prevalence is very high.

The second and third questions had to do with the relative standing of health status in the region relative to other countries. In this paper we chose the US as a benchmark not because it is uniquely suited to be so, but because the data were available to us. We find that the health profile of elderly in the Latin America and Caribbean is better than that of US elderly in some respects and worse in others. Patterns of self-reported health are comparable whereas the prevalence of at least one ADL is much higher in the US than in SABE. The opposite occurs with IADLs.

Similarly, the US population exhibits a much larger mean number of chronic conditions at all ages and particularly among males. The most interesting feature is that, on the whole, SABE countries, on average, display levels of self-reported diabetes (and obesity) that are as high if not higher than those found in the US.

In the end, do these findings lead to straightforward policy implications? The answer is a resounding yes. Of all the features we discovered, the high prevalence of diabetes and obesity is perhaps the most worrisome. It is known that the health costs implications of diabetes are staggering even if the disease presents itself with a normal, expected profile of associated co-morbidities. If lack of compliance with treatment or the mixture of diseases to which the population is exposed complicates the clinical status of individual with diabetes, the costs could escalate even more. Regardless of whether or not the origin of the large prevalence is in the adoption of a Westernized life style or, as we argued here, in the type of early exposure, a continued increase on diabetes prevalence will pose severe constrains in the health system. What seems most obvious is that educational campaigns are cost-effective means to both reduce incidence and keep the disease's negative spillovers at bay. In the next fifty years, perhaps the most important health policy initiatives regarding the elderly will have to be related to prevention of obesity and diabetes.

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Table 1: Basic Sample Information

Condition/ Variable	Overall (n=10,902)	Argentina (n=1043)	Barbados (n=1808)	Brazil (n=2143)	Chile (n=1306)	Cuba (n=1905)	Mexico (n=1247)	Uruguay (n=1450)
Response Rate		0.60	0.85	0.85	0.84	0.95	0.85	0.66
Age	72 (8)	71 (7)	72 (8)	73 (8)	72 (8)	72 (9)	70 (8)	71 (7)
60-64	23%	23%	19%	20%	22%	25%	31%	22%
65-69	23%	24%	23%	18%	25%	21%	25%	25%
70-74	19%	24%	21%	16%	19%	18%	18%	23%
75-79	17%	15%	17%	22%	16%	13%	13%	17%
80-84	11%	8%	11%	14%	10%	11%	8%	9%
85+	8%	5%	9%	10%	8%	11%	6%	5%
Gender								
Females	62%	63%	60%	59%	66%	63%	59%	63%
Education								
Primary	71%	71%	77%	85%	68%	57%	74%	65%
Secondary	20%	23%	18%	5%	24%	37%	11%	21%
Higher	9%	6%	5%	10%	9%	7%	15%	14%
Race								
White	55%	---	5%	71%	43%	63%	---	90%
Black	34%	---	93%	16%	1%	36%	---	4%
Mestizo	6%	---	0.84%	8%	30%		---	6%
Other	4%	---	1%	5%	26%	0.58%	---	0.07%
Marital Status								
Never married	7%	6%	18%	5%	7%	3%	4%	4%
Married/union	46%	43%	45%	52%	44%	37%	54%	49%
Separated	9%	9%	9%	6%	13%	13%	9%	6%
Widowed	34%	42%	24%	35%	36%	35%	32%	37%
Divorced	4%	0.96%	5%	1%	0.39%	11%	1%	5%

Source: SABE data, respondents ages 60 and above. Numbers in parentheses are standard deviations where appropriate. Numbers rounded to nearest whole number. For race: the category Black includes blacks and mulattos and the category Other includes indigenous, Asian and all other. Information on race is not available for Mexico or Argentina.

Table 2: Health and Other Attributes of Sample

Condition/ Variable	Overall (n=10,902)	Argentina (n=1043)	Barbados (n=1808)	Brazil (n=2143)	Chile (n=1306)	Cuba (n=1905)	Mexico (n=1247)	Uruguay (n=1450)
Diabetes	17%	13%	22%	18%	14%	15%	22%	13%
Medicine	68%	64%	78%	64%	70%	60%	82%	52%
Insulin	12%	10%	15%	14%	6%	15%	9%	11%
Cancer	4%	5%	4%	4%	5%	3%	2%	6%
Respiratory	10%	8%	4%	13%	13%	13%	10%	9%
Heart	21%	20%	12%	21%	34%	24%	10%	23%
Stroke	7%	5%	6%	8%	7%	10%	5%	4%
Arthritis	42%	53%	47%	33%	32%	58%	25%	47%
Obesity	24%	------	24%	20%	30%	14%	30%	34%
Poor health	11%	5%	5%	9%	21%	13%	20%	7%
ADL	20%	19%	14%	24%	26%	21%	19%	17%
IADL	29%	29%	23%	40%	32%	28%	29%	17%
Height (cm)	158 (10)	------	163 (10)	157 (9)	155 (10)	158(10)	154 (9)	160 (9)
Knee height (cm)	50 (5)	------	53 (5)	50 (3)	48 (3.3)	50 (5)	49 (4)	48 (6)
Weight (kg)	67 (16)	------	72 (20)	64 (13)	67 (14)	61 (14)	66 (12)	72 (15)
BMI (w/h^2)	27 (6)	------	27 (8)	26 (5)	28 (5)	25 (5)	28 (5)	28 (7)

Source: SABE data. Numbers rounded to nearest whole number. Poor health 1=Poor, 0=All other. ADL=at least 1 ADL. IADL=at least 1 IADL. No height and weight measurements were taken in Argentina.

Table 3a: Relation between Self Reported Health and Age, Gender and Country

	Panel A		Panel B		Panel C	
	Effect	**SE**	**Effect**	**SE**	**Effect**	SE
Constant	-3.00	(0.13) ***	-2.95	(0.13) ***	-2.41	(0.06) ***
Female	0.35	(0.07) ***	0.37	(0.07) ***	0.33	(0.05) ***
65-69 years	0.07	(0.09)	0.04	(0.09)	0.05	(0.06)
70-74 years	0.03	(0.10)	-0.06	(0.10)	-0.04	(0.07)
75-79 years	0.29	(0.10) **	0.18	(0.10)	0.30	(0.07) ***
80-84 years	0.20	(0.12)	0.10	(0.11)	0.25	(0.08) **
85+	0.34	(0.13) **	0.24	(0.12) *	0.42	(0.09) ***
Argentina	-0.25	(0.18)				
Barbados	-0.22	(0.15)				
Brazil	0.36	(0.13) **				
Chile	1.35	(0.13) ***				
Cuba	0.77	(0.13) ***				
Mexico	1.28	(0.13) ***				
HRS					-0.31	(0.04) ***
SABE			0.65	(0.11) ***		
n	10,679		10,679		23,200	
Log likelihood	-3533		-3691		-7290	
LR chi square	399		82		155	
Degrees of freedom	12		7		7	

Numbers in parentheses are standard errors. Significance: * p<.05 ** p<.01 ***p<.001.

Table 3b: Relation between ADLs and Age, Gender and Country

	Panel A		Panel B		Panel C	
	Effect	**SE**	**Effect**	**SE**	**Effect**	SE
Constant	-2.37	(0.10) ***	-2.37	(0.10) ***	-2.17	(0.05) ***
Female	0.45	(0.05) ***	0.45	(0.05)***	0.44	(0.04) ***
65-69 years	0.16	(0.08)	0.15	(0.08)	0.11	(0.06)
70-74 years	0.28	(0.09) ***	0.26	(0.09)**	0.30	(0.06) ***
75-79 years	0.76	(0.08) ***	0.75	(0.08)***	0.63	(0.06) ***
80-84 years	1.15	(0.09) ***	1.14	(0.08)***	1.04	(0.06) ***
85+	1.74	(0.09) ***	1.71	(0.09)***	1.59	(0.06) ***
Argentina	0.14	(0.11)				
Barbados	-0.36	(0.10) ***				
Brazil	0.27	(0.09) **				
Chile	0.48	(0.10) ***				
Cuba	0.13	(0.09)				
Mexico	0.23	(0.10) *				
HRS					0.10	(0.03) **
SABE			0.15	(.08)		
n	10,824		10,824		21,322	
Log likelihood	-5041		-5086		-10,272	
LR chi square (12 d f.)	706		617		1082	
Degress of freedom	12		7		7	

Numbers in parentheses are standard errors. Significance: * p<.05 ** p<.01 ***p<.001.

Table 3c: Relation between IADLs and Age, Gender and Country

	Panel A		Panel B		Panel C	
	Effect	**SE**	**Effect**	**SD**	**Effect**	**SE**
Constant	-3.04	(0.10) ***	-3.01	(0.10)***	-1.97	(0.05) ***
Female	0.88	(0.05) ***	0.86	(0.05)***	0.62	(0.04) ***
65-69 years	0.31	(0.08) ***	0.29	(0.08)***	0.18	(0.06) **
70-74 years	0.65	(0.08) ***	0.62	(0.08)***	0.41	(0.06) ***
75-79 years	1.18	(0.08) ***	1.19	(0.08)***	0.93	(0.06) ***
80-84 years	1.69	(0.08) ***	1.68	(0.08)***	1.40	(0.06) ***
85+	2.60	(0.10) ***	2.56	(0.09)***	2.07	(0.07) ***
Argentina	0.77	(0.10) ***				
Barbados	0.33	(0.10) ***				
Brazil	1.14	(0.09) ***				
Chile	0.82	(0.10) ***				
Cuba	0.55	(0.09) ***				
Mexico	0.86	(0.10) ***				
HRS					-1.25	(0.04) ***
SABE			0.76	(0.08) ***		
n	10,778		10,778		23,283	
Log likelihood	-5572		-5638		-9903	
LR chi square	1789		1655		2975	
Degrees of freedom	12		7		7	

Numbers in parentheses are standard errors. Significance: * p<.05 ** p<.01 ***p<.001.

Table 4 (panel a): Education and Income Effects on Morbidity Controlling for Age, Gender and Country (SABE only)

	n	Effect	SE	Log Likelihood	Chi-square with (df)
Education					
Self Report					
-secondary	9584	-0.55	(0.10) ***	-2981	369 (df=14)
-higher education		-0.89	(0.16) ***		
ADL					
-secondary	9732	-0.46	(0.08) ***	-4365	661 (df=14)
-higher education		-0.60	(0.11) ***		
IADL					
-secondary	9688	-0.36	(0.07) ***	-4838	1484 (df=14)
-higher education		-0.59	(0.20) ***		
Diabetes					
-secondary	9751	-0.17	(0.07) *	-4301	164 (df=14)
-higher education		-0.52	(0.11) ***		
Obesity					
-secondary	7862	-0.18	(0.07) **	-4002	677 (df=13)
-higher education		-0.41	(0.10) ***		
Income					
Self Report					
-middle	8864	-0.19	(0.08) *	-2893	382 (df=14)
-richest		-0.78	(0.12) ***		
ADL					
-middle	9002	-0.05	(0.07)	-4193	625 (df=14)
-richest		-0.34	(0.09) ***		
IADL					

-middle	8972	-0.18	(0.06) **	-4555	1604 (df=14)
-richest		-0.63	(0.08) ***		
Diabetes					
-middle	9009	-0.05	(0.07)	-3950	145 (df=14)
-richest		-0.13	(0.09)		
Obesity					
-middle	7331	0.11	(0.07)	-3712	579 (df=13)
-richest		0.01	(0.09)		

Significance: * p<.05 ** p<.01 ***p<.001.

Table 4 (panel b): Education and Income Effects on Morbidity Controlling for Age and Gender (HRS only)

	n	Effect	SE	Log Likelihood	Chi-square (with df)
Education					
Self Report					
-secondary	12,500	-1.18	(0.09) ***	-3424	368 (df=8)
-higher education		-1.95	(0.11) ***		
ADL					
-secondary	10,480	-0.80	(0.08) ***	-5104	613 (df=8)
-higher education		-1.09	(0.09) ***		
IADL					
-secondary	12,484	-0.78	(0.09) ***	-4076	495 (df=8)
-higher education		-1.24	(0.10) ***		
Diabetes					
-secondary	12,504	-0.32	(0.09)	-5520	130 (df=8)
-higher education		-0.76	(0.09) ***		
Obesity					
-secondary	12,358	-0.34	(0.09) ***	-6249	453 (df=8)
-higher education		-0.73	(0.09) ***		
Income					
Self Report					
-middle	12,473	-1.11	(0.07) ***	-3339	499 (df=8)
-richest		-2.46	(0.16) ***		
ADL					
-middle	10,461	-0.76	(0.06) ***	-5015	771 (df=8)
-richest		-1.38	(0.09) ***		

IADL					
-middle	12,458	-0.93	(0.07) ***	-4002	624 (df=8)
-richest		-1.43	(0.11) ***		
Diabetes					
-middle	12,477	-0.55	(0.06)***	-5475	204 (df=8)
-richest		-1.03	(0.08)***		
Obesity					
-middle	12,331	-0.33	(0.06) ***	-6232	449 (df=8)
-richest		-0.68	(0.07) ***		

Significance: * p<.05 ** p<.01 ***p<.001.

Figure 1A: Relation Self-Report and ADL/IADL

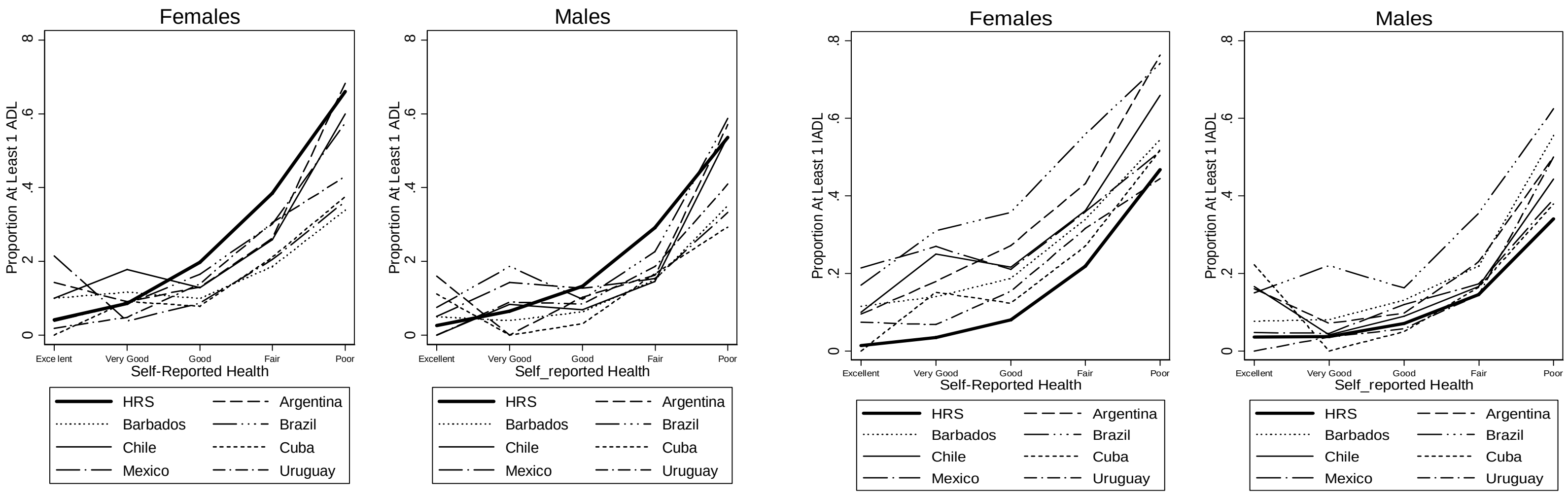


Figure 1B: Relation Self-Report and # Chronic Conditions

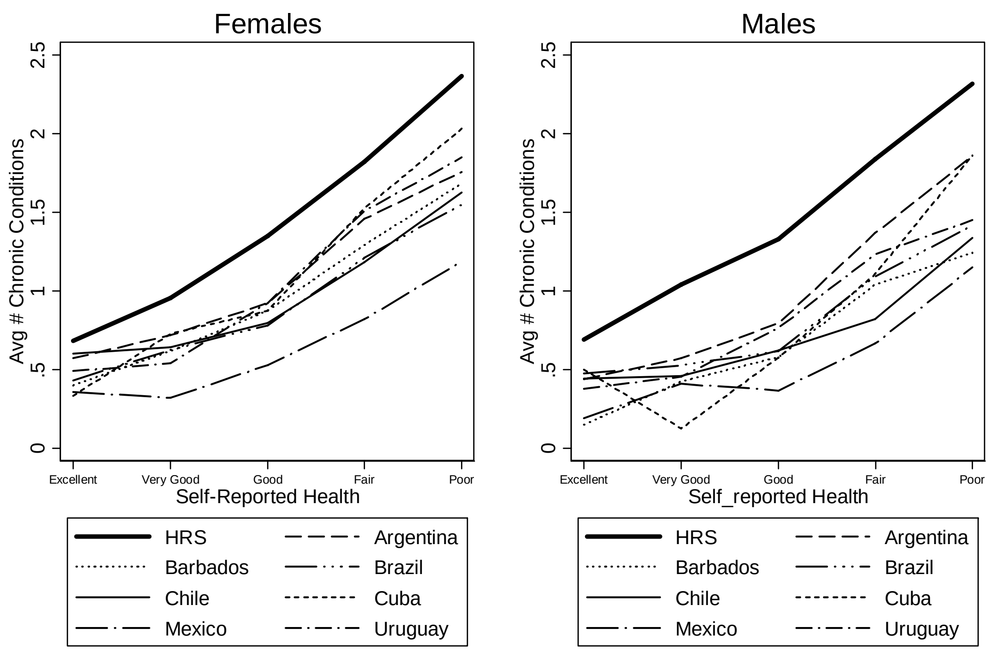


Figure 1C: Relation Self-Report and Diabetes

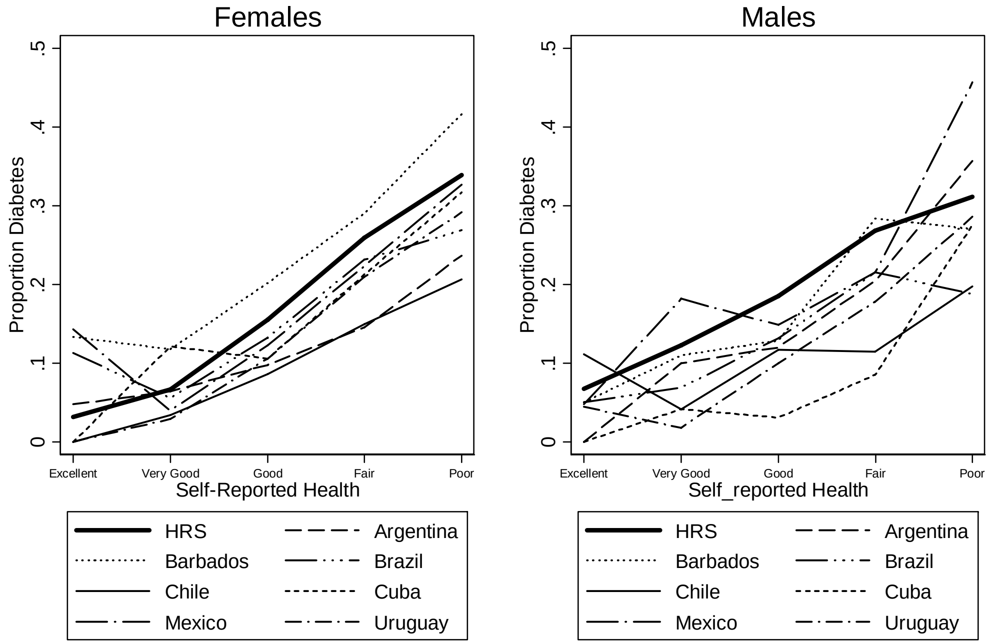


Figure 2A: Proportion Bad Health by Age/Sex

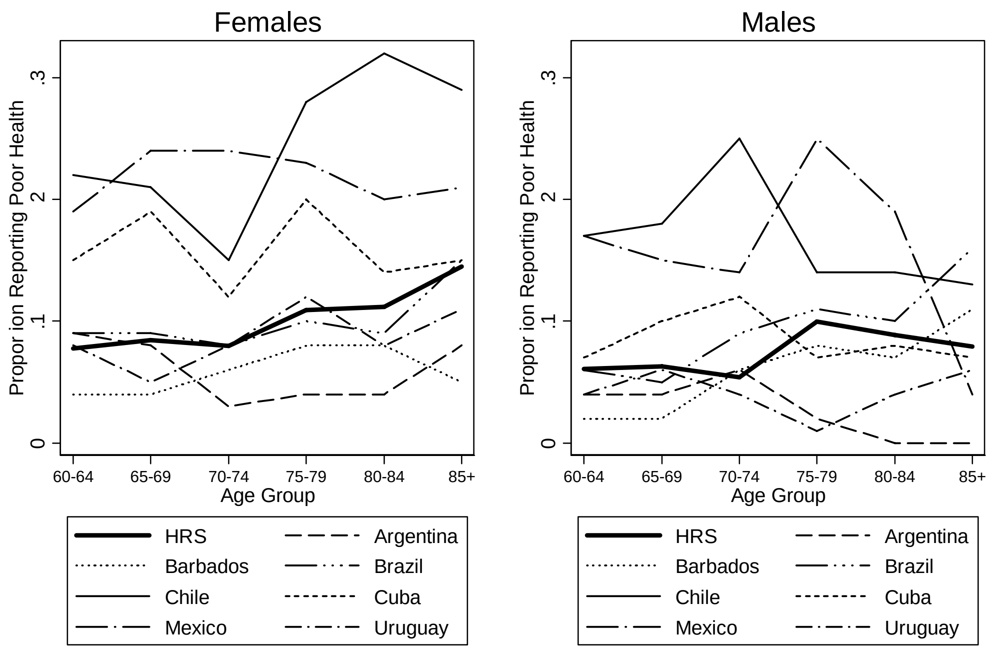


Figure 2B: Proportion ADL by Age/Sex

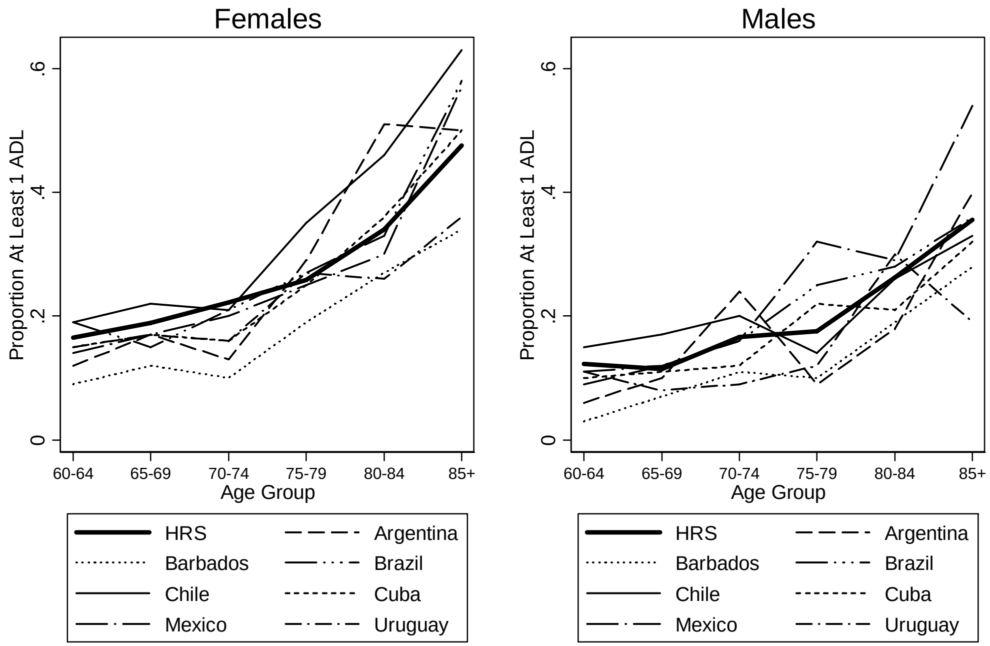


Figure 2C: Proportion IADL by Age/Sex

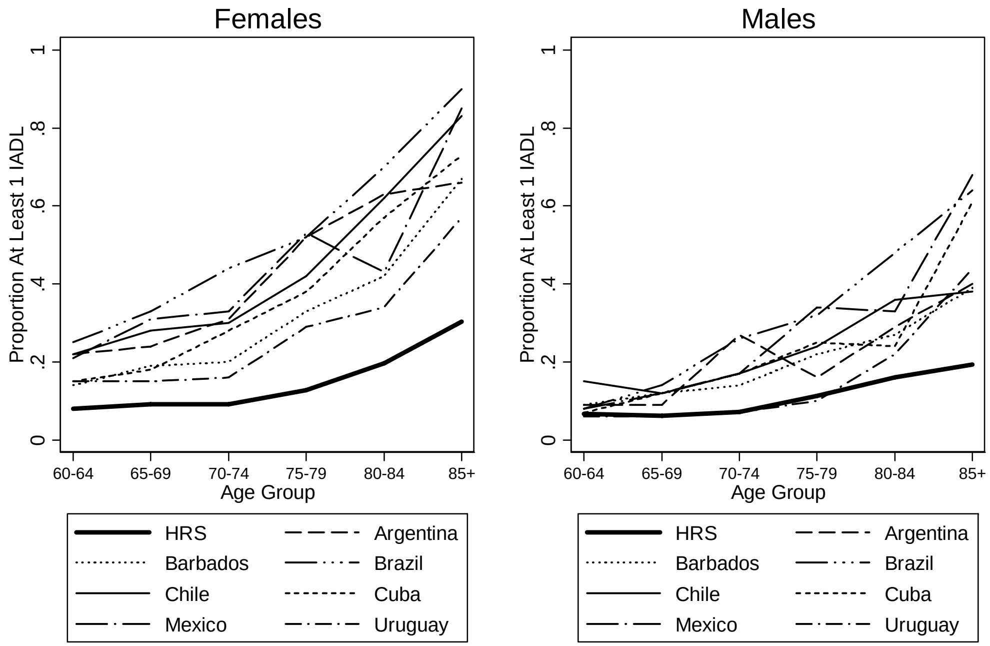


Figure 3: # Chronic Conditions by Age/Sex

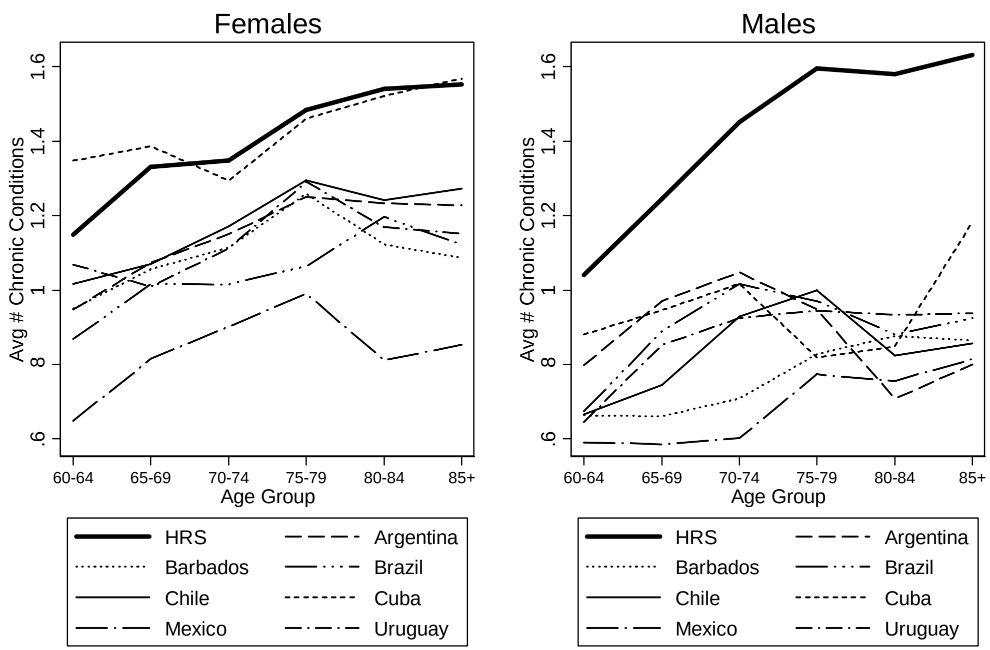


Figure 4: Proportion Diabetes by Age/Sex

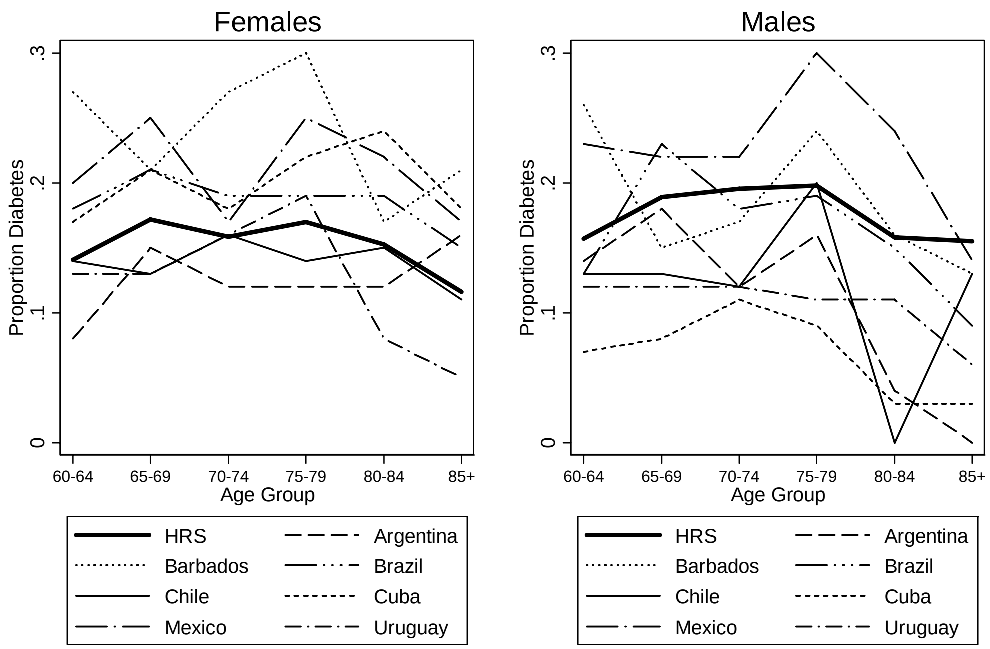


Figure 5A: Association Between Education & Health Outcomes

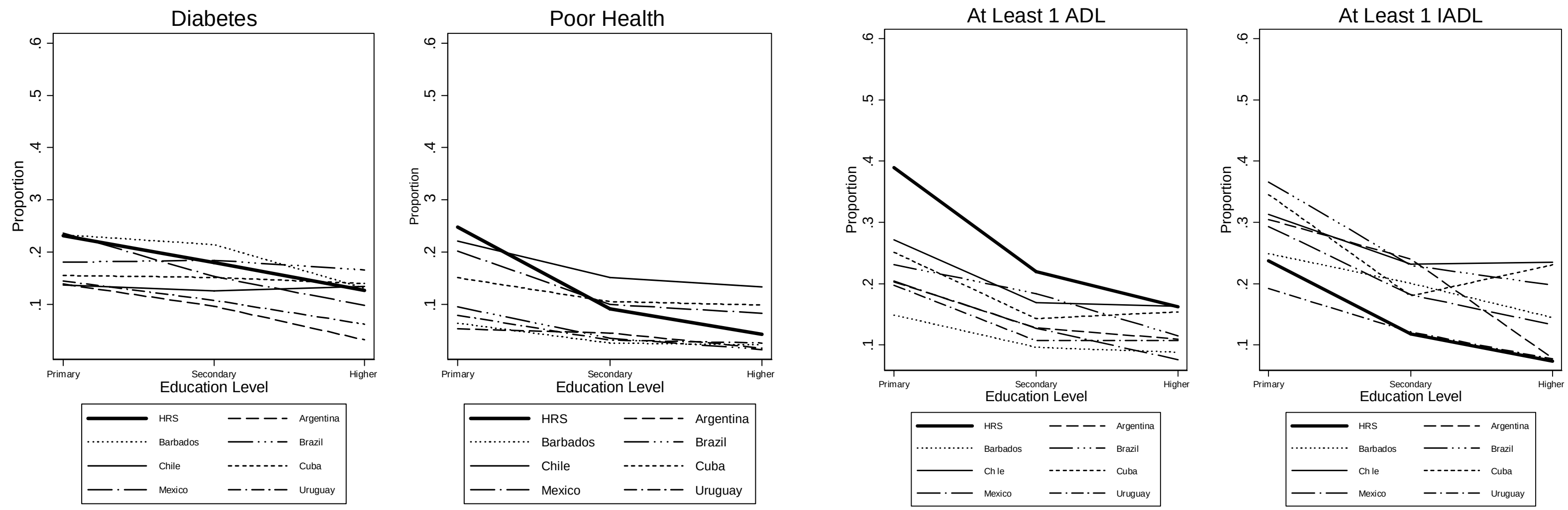
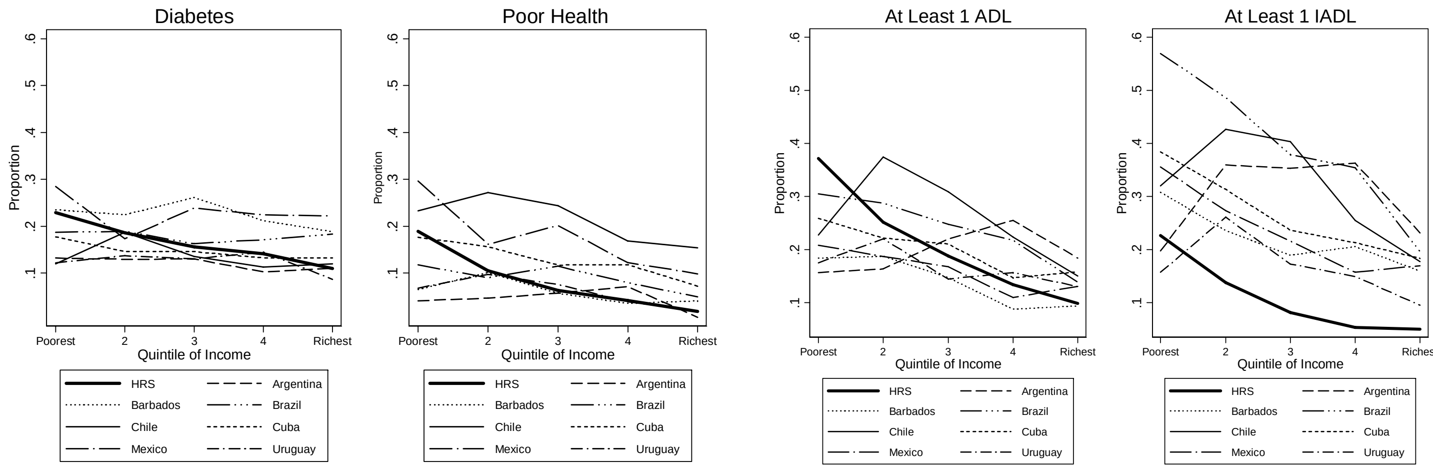


Figure 5B: Association Between Income & Health Outcomes



Appendix: definitions and operationalization of variables in SABE

1. ADL and IADL

1.1. ADLs:

-Walking across the room

-Dressing

-Bathing

-Eating

-Getting in and out of bed

-Using bathroom

1.2 . IADLs

-Preparing meals

-Managing money

-Difficulty with getting to places (only in SABE)

-Buying food or clothing

-Using the phone (in SABE only for those with a phone)

-Doing heavy housework

-Taking medicine(s)

2. Chronic conditions

Arthritis

Cancer

Diabetes

Respiratory Illness

Heart Disease

Stroke

3. Targets, spouses and proxies

In three countries (Argentina, Chile, and Uruguay) only one individual per household was interviewed. In two countries, Brazil and Mexico, interviewers proceeded to interview all individuals 60 and older found in selected household. In virtually all these cases, the additional interviews corresponded to spouses (one per household). In Cuba interviewers selected a target individual and a spouse.

In our analyses we include all individuals interviewed. This has the advantage of maximizing observation at the expenses of introducing dependence of observations in the countries where more than one individual per household was interviewed. In order to protect our inferences we repeated some of the analyses using clustering procedures to adjust for lack of independence but since the inferences remain unchanged we have chosen to present results based on the larger samples.

4. Sampling weights

Only the sample from Santiago is self-weighted. All others require weights to expand the sample population to the city population. Since in two countries no sample weights have been calculated we chose to ignore them in all the others. However, to ensure that none of our conclusions was sensitive to this choice, we proceeded to re-estimate models using sampling weights for those countries that had them available. None of the inferences changed, and it is highly unlikely that they will even in the countries where there were no weights available yet.

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