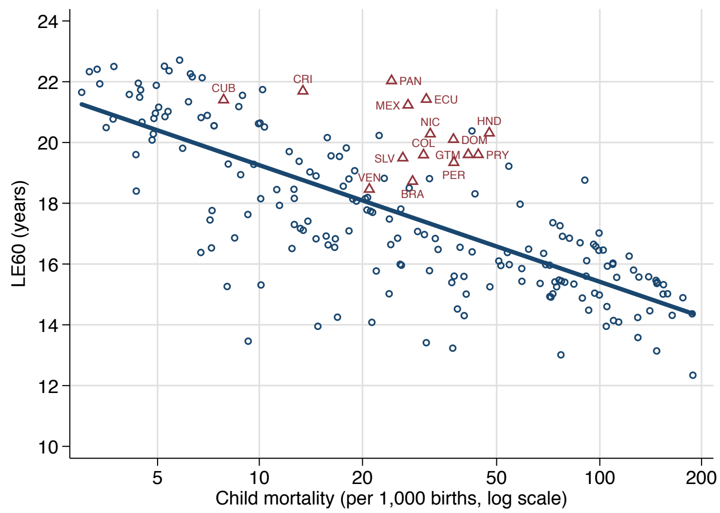
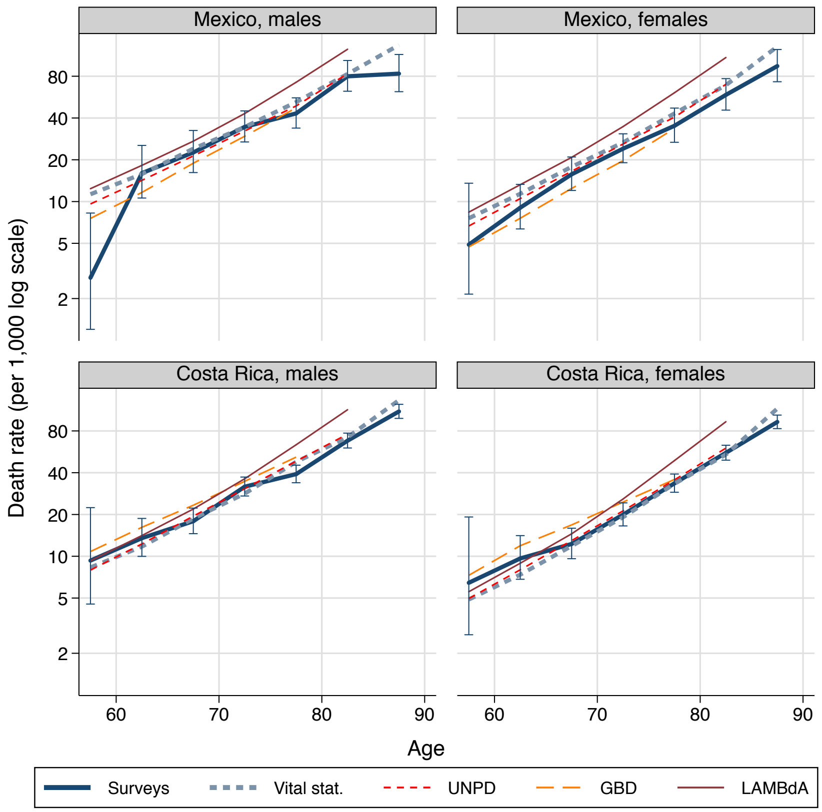
Figure S1. Life expectancy of males at age 60 by child mortality $_5q_0$. World's countries 2005-2010



BRA=Brazil, COL=Colombia, CRI=Costa Rica, CUB=Cuba, DOM=Dominican Republic, ECU=Ecuador, SLV=El Salvador, GTM=Guatemala, HND=Honduras, MEX=Mexico, NIC=Nicaragua, PAN=Panama, PRY=Paraguay, PER=Peru, VEN=Venezuela.

Data from the United Nations Population Division 2016, web site: http://www.un.org/en/development/desa/population/publications/mortality/world-mortality-cdrom-2015.shtml. Downloaded on December 16, 2016.

Figure S2. Age-specific death rates from MHAS/CRELES surveys, compared to other estimates.



Note: The data sources are explained in the text.

Table S1. Gompertz parameters a and g describing mortality of people in ages 55 to 99 years in Mexico and Costa Rica SES groups and estimated life expectancy at ages 55 (LE55), 60 (LE60), and 65 (LE65).

Country and SES groups	α constant (SE)		γ slope (SE)		LE55 (95% CI)		LE60 (95% CI)		LE65 (95% CI)	
Mexico males										
Total	-4.924	(.1639)	0.084	(.0062)	25.1	(24.4-25.7)	21.2	(20.5-21.8)	17.5	(16.8-18.2)
<100k inhabitants	-5.182	(.2230)	0.093	(.0078)	25.8	(25.0-26.6)	21.7	(20.9-22.5)	17.8	(17.0-18.7)
City 100k+ inhabitants	-4.544	(.2383)	0.070	(.0103)	23.6	(22.5-24.5)	20.0	(19.0-21.0)	16.7	(15.7-17.7)
Low wealth tercile	-5.081	(.2747)	0.090	(.0092)	25.3	(24.3-26.2)	21.2	(20.2-22.2)	17.4	(16.4-18.4)
Medium wealth tercile	-4.652	(.2869)	0.073	(.0114)	24.0	(22.8-25.2)	20.3	(19.1-21.5)	16.9	(15.7-18.1)
High wealth tercile	-4.972	(.3205)	0.086	(.0149)	24.6	(23.4-25.9)	20.6	(19.3-22.0)	16.9	(15.6-18.3)
No education	-5.372	(.3063)	0.094	(.0104)	27.1	(25.9-28.1)	22.9	(21.7-23.9)	18.9	(17.6-19.9)
Primary education	-4.950	(.2273)	0.090	(.0093)	24.1	(23.3-25.0)	20.2	(19.3-21.0)	16.5	(15.6-17.4)
Secondary education	-4.900	(.6575)	0.085	(.0325)	21.7	(18.9-24.3)	17.8	(15.1-20.4)	14.3	(11.3-17.0)
Postsecondary education	-4.347	(.5972)	0.072	(.0259)	19.4	(17.0-21.9)	16.0	(13.6-18.5)	13.0	(10.4-15.5)
Mexico females										
Total	-5.427	(.1464)	0.096	(.0060)	27.7	(27.1-28.2)	23.4	(22.8-24.0)	19.4	(18.8-20.0)
<100k inhabitants	-5.381	(.2129)	0.090	(.0087)	28.2	(27.3-29.0)	23.9	(23.0-24.8)	19.9	(19.0-20.8)
City 100k+ inhabitants	-5.532	(.1918)	0.105	(.0076)	26.9	(26.1-27.6)	22.5	(21.8-23.2)	18.4	(17.7-19.2)
Low wealth tercile	-5.521	(.2580)	0.094	(.0103)	28.5	(27.5-29.6)	24.2	(23.1-25.3)	20.2	(19.0-21.2)
Medium wealth tercile	-5.173	(.2265)	0.095	(.0091)	25.4	(24.5-26.2)	21.2	(20.4-22.1)	17.4	(16.5-18.3)
High wealth tercile	-5.675	(.2598)	0.104	(.0106)	28.0	(26.9-29.0)	23.5	(22.5-24.6)	19.4	(18.4-20.4)
No education	-5.132	(.2480)	0.082	(.0098)	27.4	(26.4-28.4)	23.4	(22.3-24.4)	19.6	(18.5-20.5)
Primary education	-5.641	(.1971)	0.109	(.0080)	27.1	(26.3-27.8)	22.7	(21.9-23.4)	18.5	(17.7-19.3)
Secondary education	-5.573	(.3962)	0.101	(.0165)	26.9	(25.3-28.5)	22.5	(20.9-24.1)	18.4	(16.8-20.1)
Postsecondary education	-5.814	(.9502)	0.086	(.0411)	26.5	(22.0-30.8)	22.3	(17.6-26.6)	18.2	(13.4-22.7)

Cont…

Table S1-cont.

Country and SES groups	α constant (SE)		γ slope (SE)		LE55 (95% CI)		LE60 (95% CI)		LE65 (95% CI)	
Costa Rica males										
Total	-5.125	(.0980)	0.091	(.0034)	26.0	(25.6-26.3)	21.9	(21.5-22.2)	18.0	(17.7-18.4)
<100k inhabitants	-5.396	(.1414)	0.098	(.0047)	27.0	(26.5-27.5)	22.7	(22.2-23.2)	18.7	(18.2-19.2)
City 100k+ inhabitants	-4.900	(.1354)	0.085	(.0049)	24.9	(24.4-25.4)	21.0	(20.4-21.5)	17.3	(16.8-17.8)
Low wealth tercile	-5.035	(.1552)	0.086	(.0053)	25.9	(25.3-26.5)	21.9	(21.2-22.4)	18.1	(17.5-18.7)
Medium wealth tercile	-5.224	(.1919)	0.097	(.0068)	25.6	(24.8-26.3)	21.4	(20.6-22.1)	17.5	(16.7-18.2)
High wealth tercile	-5.171	(.1705)	0.092	(.0061)	26.0	(25.3-26.6)	21.8	(21.1-22.5)	18.0	(17.3-18.6)
No education	-5.395	(.2379)	0.096	(.0076)	27.1	(26.3-28.0)	22.9	(22.0-23.7)	18.9	(18.0-19.7)
Primary education	-5.291	(.1271)	0.097	(.0044)	26.2	(25.8-26.7)	22.0	(21.6-22.5)	18.1	(17.6-18.5)
Secondary education	-4.892	(.2668)	0.087	(.0107)	24.1	(23.0-25.0)	20.1	(19.0-21.1)	16.5	(15.5-17.5)
Postsecondary education	-4.184	(.3007)	0.053	(.0131)	22.6	(21.3-24.0)	19.5	(18.1-20.9)	16.7	(15.2-18.1)
Costa Rica females										
Total	-5.581	(.1080)	0.099	(.0036)	28.6	(28.3-29.0)	24.3	(23.9-24.8)	20.2	(19.8-20.6)
<100k inhabitants	-5.604	(.1604)	0.099	(.0054)	28.6	(28.0-29.2)	24.2	(23.6-24.8)	20.1	(19.5-20.7)
City 100k+ inhabitants	-5.565	(.1460)	0.098	(.0048)	28.5	(28.0-29.0)	24.2	(23.6-24.7)	20.1	(19.5-20.6)
Low wealth tercile	-5.356	(.1772)	0.091	(.0059)	27.9	(27.2-28.6)	23.7	(23.0-24.4)	19.7	(19.0-20.4)
Medium wealth tercile	-5.628	(.1999)	0.100	(.0067)	28.6	(27.9-29.4)	24.2	(23.5-25.0)	20.1	(19.3-20.8)
High wealth tercile	-5.779	(.1868)	0.105	(.0061)	28.9	(28.2-29.5)	24.4	(23.8-25.1)	20.2	(19.5-20.9)
No education	-5.264	(.2589)	0.091	(.0086)	26.9	(25.9-27.9)	22.8	(21.8-23.7)	18.8	(17.9-19.8)
Primary education	-5.654	(.1344)	0.101	(.0044)	28.8	(28.4-29.3)	24.4	(24.0-24.9)	20.3	(19.8-20.8)
Secondary education	-5.542	(.3198)	0.097	(.0111)	28.0	(26.8-29.2)	23.7	(22.5-24.9)	19.7	(18.4-20.8)
Postsecondary education	-5.656	(.4269)	0.095	(.0148)	28.9	(27.3-30.5)	24.6	(22.9-26.1)	20.4	(18.7-22.0)

Gompertz function on age specific death rates mx:

$$m_x = e^{\alpha+\gamma x}$$

Where x is years of age minus 55, e^{α} is an estimate of mortality at age 55, and the slope γ is an indicator of senescence—the proportional growth in the mortality hazard with each year of age.

Supplementary sensitivity analysis:

Assessing the effect of attrition and age-misreport on LE60 estimates

Attrition

The potential effect of attrition is assessed by simulation of three scenarios of mortality of dropouts:

1. High mortality: 2.0 death odds ratio (OR) of dropouts compared to individuals in the same country, gender, and age who stayed in the panel.
2. Low mortality: 0.5 death OR of dropouts compared to individuals in the same country, gender, and age who stayed in the panel.
3. Extreme: zero mortality of dropouts.

The imputation of mortality of dropouts in scenarios 1 and 2 is made in two steps. First, the death ORs are predicted for each dropout individual using logistic regression parameters estimated with the information of individuals who stayed in the panels. The binary condition of death is then imputed to each dropout with stochastic simulation. Second, the date of death is randomly imputed to each dropout-death.

Life expectancy at age 60 (LE60) and its confidence intervals are estimated as described in the main text. Table S2 shows the results.

The scenario of high mortality of dropouts reduces LE60 by half year in Mexico. Changes in Costa Rican estimates are nil--an expected result given the low attrition rate of CRELES. The conclusion that old-age life expectancy is exceptionally high in these populations is unlikely to be an artifact of attrition of high-mortality individuals.

In turn, the scenario of low mortality of dropouts increases LE60 estimates, especially among groups with higher attrition rates—Mexicans with high education or living in large cities. This simulation thus attenuates the sharp LE60 gradient by education found among Mexican Males: the contrast of 6.7 years between males with no education and those with post-secondary education (22.9 vs. 16.0 years of LE60) diminishes to 5.2 years (22.6 vs. 17.5). SES gradients changed little in the simulations for Mexican females and for Costa Rica (Table S2).

Under the extreme (and unrealistic) zero-mortality scenario, LE60 increases by 1 year in Mexico and by 0.1 year in Costa Rica. The sharp educational reverse gradient in LE60 of Mexican males shrinks to less than half: the contrast between the lowest and highest education groups of 6.8 years falls to 3.1 years (23.4 vs. 20.2 LE60).

Age-misreport

Age-misreport, especially age exaggeration, of older individuals, is a well known problem in demographic data that results in down-biased estimates of mortality at older ages (Preston, Elo, & Stewart, 1999).

Age in the CRELES database was determined with the information of date of birth (DoB) in the national birth registry (which exists in Costa Rica since 1883). Therefore, by definition, there is no age-misreports in the Costa Rican data.

Age in the MHAS database was determined with the information of DoB reported by participants at baseline in the 2001 wave. This report of DoB is expected to be more accurate that typical reports of age in a census given that MHAS interviewers are better trained and supervised than census-takers, information in a census is not always self-reported but provided by a single informant per household, and asking about the DoB, as in MHAS, forces a more thoughtful response than asking just age. However, the DoB report is not error-free. In the 2012 wave, MHAS participants were asked to confirm if the baseline DoB in files was right. If it was not right, they were asked to provide the correct DoB. This information allows to assess the importance and implications of age-misreport in MHAS. To simplify the assessment, it is assumed that the wave-2012 responses are the gold-rule.

As shown in Table S3, the baseline year of birth was confirmed as correct by 87% of participants. Age exaggeration would had occurred in 6.6% of baseline interviews, whereas 6.4% would had under-reported their age.

The proportion of age-misreport in MHAS is substantially lower than the levels modeled in early literature (Dechter & Preston, 1991; Preston et al., 1999) to estimate that this census data error up-biases by one year the life expectancy by age 60. For example, the proportion of people classified in the correct 5-year age bracket at ages 70-74 and 75-79 in those studies is 81%, compared to 92% in MHAS.

As expected, age report accuracy declines with age and in lower SES groups in MHAs data (Table S3). However, the magnitude of net error increases among high-educated people. In particular, the proportion that exaggerated their age is substantially larger than the proportion with the contrary error among the high-educated. An OLS regression model explaining the number of years of age error shows significantly higher age-exaggeration of 1.07 years after age 80 years (compared to age 55-59) and 0.36 years among participants with post-secondary education (last column of Table S3).

New LE60 estimates were obtained for MHAS using corrected ages, with the corrections derived from the 2012-wave reports (for dropouts and death individuals, age corrections were imputed using the regression model shown in Table S3). The new LE60 diminished just 0.2 years for males and females after age correction. Figure S3 compares the new estimates with the original LE60 by education. The reverse education gradients in LE60 change little with the age correction: the LE60 curves shift down a couple of decimal points with the age correction but the slope stays about the same.

The joint effects of age correction and adjustment for attrition of healthier individuals attenuates a bit the original gradients in LE60 by education but do not modify it meaningfully (Figure S3).

Table S2. Life expectancy at age 60 under three assumptions of mortality of dropouts

Country and SES groups	Scenarios of dropouts' mortality					
	High (95% CI)		Low (95% CI)		Extreme (95% CI)	
Mexico males						
Total	20.8	(20.2-21.4)	21.4	(20.7-22.0)	22.0	(21.3-22.6)
<100k inhabitants	21.5	(20.8-22.3)	21.8	(21.1-22.6)	22.1	(21.3-23.0)
City 100k+ inhabitants	19.4	(18.4-20.3)	20.5	(19.5-21.5)	21.8	(20.7-23.0)
Low wealth tercile	20.8	(19.9-21.8)	21.3	(20.3-22.3)	21.8	(20.8-22.8)
Medium wealth tercile	19.9	(18.8-21.1)	20.5	(19.3-21.6)	21.0	(19.7-22.1)
High wealth tercile	20.3	(19.2-21.5)	21.2	(19.9-22.5)	22.3	(21.0-23.6)
No education	22.8	(21.7-23.8)	22.6	(21.6-23.7)	23.4	(22.1-24.5)
Primary education	19.9	(19.1-20.7)	20.5	(19.6-21.3)	20.8	(19.9-21.6)
Secondary education	18.5	(15.9-20.8)	18.4	(15.7-21.2)	19.2	(16.4-21.8)
Postsecondary education	14.7	(13.0-16.3)	17.5	(14.9-19.8)	20.2	(17.4-23.2)
Mexico females						
Total	22.7	(22.2-23.3)	23.9	(23.3-24.4)	24.5	(23.9-25.1)
<100k inhabitants	23.5	(22.6-24.3)	24.0	(23.1-24.9)	24.6	(23.7-25.5)
City 100k+ inhabitants	21.7	(20.9-22.4)	23.3	(22.5-24.1)	24.0	(23.2-24.8)
Low wealth tercile	23.6	(22.6-24.6)	24.5	(23.4-25.5)	24.9	(24.0-26.0)
Medium wealth tercile	21.1	(20.1-22.0)	21.7	(20.8-22.6)	22.2	(21.3-23.2)
High wealth tercile	22.4	(21.5-23.4)	24.1	(23.1-25.1)	24.9	(23.9-26.1)
No education	23.0	(22.0-24.1)	23.7	(22.6-24.7)	24.3	(23.1-25.3)
Primary education	21.9	(21.1-22.6)	23.1	(22.4-23.8)	23.6	(22.8-24.3)
Secondary education	21.8	(20.4-23.2)	23.1	(21.6-24.7)	24.3	(22.5-26.0)
Postsecondary education	20.9	(17.6-24.2)	22.5	(18.0-26.6)	22.4	(16.6-27.5)
Costa Rica males						
Total	21.8	(21.4-22.1)	21.9	(21.5-22.2)	21.9	(21.5-22.3)
<100k inhabitants	22.5	(22.0-23.0)	22.8	(22.3-23.3)	22.8	(22.2-23.2)
City 100k+ inhabitants	20.9	(20.4-21.4)	20.9	(20.4-21.5)	21.0	(20.5-21.6)
Low wealth tercile	21.7	(21.1-22.3)	21.9	(21.3-22.5)	21.9	(21.3-22.5)
Medium wealth tercile	21.2	(20.5-22.0)	21.4	(20.7-22.1)	21.5	(20.7-22.2)
High wealth tercile	21.8	(21.2-22.4)	21.8	(21.2-22.5)	21.9	(21.3-22.6)
No education	22.5	(21.7-23.4)	22.9	(22.1-23.7)	23.0	(22.1-23.9)
Primary education	22.0	(21.5-22.4)	22.0	(21.6-22.5)	22.1	(21.6-22.5)
Secondary education	20.1	(19.1-21.1)	20.1	(19.1-21.2)	20.2	(19.1-21.2)
Postsecondary education	19.4	(18.1-20.8)	19.4	(18.1-20.8)	19.7	(18.2-21.1)
Costa Rica females						
Total	24.1	(23.7-24.5)	24.3	(23.9-24.6)	24.4	(24.0-24.8)
<100k inhabitants	24.1	(23.5-24.6)	24.2	(23.6-24.8)	24.3	(23.8-24.9)
City 100k+ inhabitants	24.0	(23.5-24.5)	24.2	(23.6-24.7)	24.4	(23.8-24.9)
Low wealth tercile	23.5	(22.9-24.2)	23.6	(23.0-24.3)	23.8	(23.1-24.5)
Medium wealth tercile	24.1	(23.4-24.9)	24.2	(23.6-25.0)	24.4	(23.7-25.1)
High wealth tercile	24.2	(23.6-24.9)	24.5	(23.9-25.1)	24.6	(23.9-25.3)
No education	22.6	(21.8-23.6)	22.8	(21.8-23.7)	22.8	(21.9-23.8)
Primary education	24.3	(23.8-24.7)	24.4	(23.9-24.9)	24.6	(24.1-25.0)
Secondary education	23.6	(22.3-24.7)	23.8	(22.5-25.0)	23.8	(22.5-25.0)
Postsecondary education	24.2	(22.6-25.8)	24.5	(22.8-26.2)	24.7	(23.0-26.4)

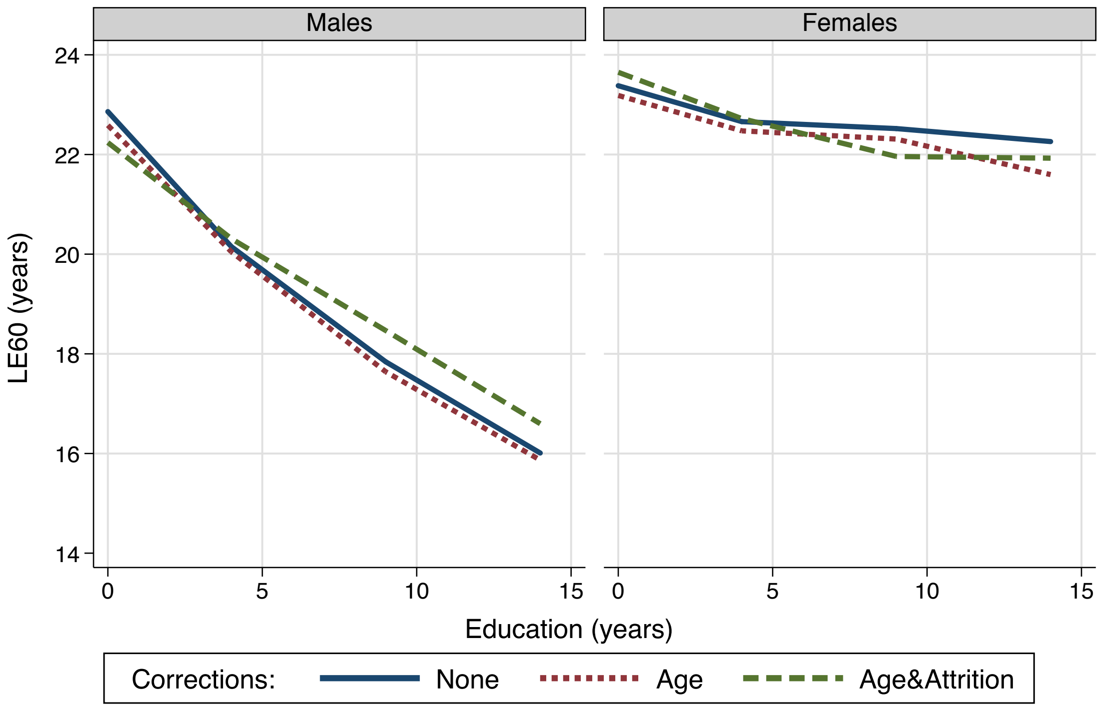
High = 2.0 mortality odds ratio (OR). Low = 0.5 OR. Extreme = zero mortality of dropouts.

Table S3. Age misreport in MHAS wave-2001 when compared to report in wave 2012

	N	Percentage error			Years age difference	Regression coefficient &	
		No error	Lower age	Higher age			
Total	4,037	87.0	6.4	6.6	0.04		
Gender							
Male	1,668	87.8	5.8	6.4	0.02	-0.041	
Female	2,369	86.4	6.8	6.8	0.05	Ref.=0	
Baseline age							
55-59	1,410	88.7	5.9	5.5	-0.04	Ref.=0	
60-69	1,834	86.6	7.0	6.4	-0.01	0.051	
70-79	687	85.6	6.0	8.4	0.19	0.273	*
80 +	106	81.1	3.8	15.1	0.99	1.074	*
Baseline residence							
<100k inhabitants	1,793	86.1	6.1	7.8	0.07	Ref.=0	
City100k+ inhabitant	2,244	87.7	6.6	5.7	0.02	-0.100	
Wealth tercile							
Low	1,155	81.5	9.6	8.9	0.02	Ref.=0	
Medium	1,427	87.7	5.9	6.4	0.03	0.024	
High	1,455	90.7	4.3	5.1	0.06	0.018	
Education							
None	1,143	80.9	9.9	9.2	-0.02	Ref.=0	
Primary	2,203	89.2	5.3	5.5	0.02	0.108	
Secondary	500	89.4	4.4	6.2	0.17	0.285	*
Post-secondary	191	91.6	3.1	5.2	0.21	0.363	*
Constant						-0.113	

& OLS regression on the difference in reported years as dependent variable.
* Significant at P <0.05

Figure S3. Effect of age and attrition corrections in estimates of Life expectancy at age 60 (LE60) by gender and education in Mexico.



References

Dechter, A. R., & Preston, S. H. (1991). Age misreporting and its effects on adult mortality estimates in Latin America. *Population Bulletin of the United Nations, 31/32*, 1-16.

Preston, S. H., Elo, I. T., & Stewart, Q. (1999). Effects of age misreporting on mortality estimates at older ages. *Population studies, 53*(2), 165-177.

```
*Program code to compute age-specific death rates and the national Gompertz regressions:

use "MHAS_CRELES_morta_short2.dta",clear

*Setting the data as survival-time
stset damoexit [pw=wt], id(record) failure(death) ///
      origin(time damo55) entry(time damoentry) scale(12)
   * splitting into one-year age segments
      stsplit a,every(1)    /* one segment per year of age */
      lab var a "Age starting at 55=0"
      sort record _t0
      gen age = 55+a
      gen age5= int(age/5) *5
drop if age >=100

* Death rates by 5-year age groups
   strate mhas male age5 if age5>=55,per(1000) out("mx-MEXyCR.dta", replace)

*Gompertz regression by sex (national totals)
  streg if male==1 & mhas==1,dist(gompertz) nohr
  streg if male==0 & mhas==1,dist(gompertz) nohr
  streg if male==1 & mhas==0,dist(gompertz) nohr
  streg if male==0 & mhas==0,dist(gompertz) nohr
```