Mexico!

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1 Background

What is the question we are asking? Has anyone asked it before? What did they do and find? What are we going to do that's different and what will we find?

2 Data & Methods

Cause of death classification and age reporting are considered to be inaccurate in death registration in older ages. For this reason, we truncate analysis at age 75. This is also a reasonable decision because most changes in life expectancy are likely due to changes in mortality patterns below the age of 75. There are different ways to summarize mortality conditions in specified age ranges, and we choose to focus on temporary life expectancy between the ages of 0 and 75 (Arriaga, 1982), at times breaking this quantity into large age groups.

Exposures came from

Death counts were tabulated by the authors based on official microdata available from

2.1 Classification of causes of death

The period of years covered in this study spans both ICD 9 and ICD 10, . . . find language. . . based on XXX (2013) Causes were grouped into X categories based

Data quality and limitation (appendix?) In the case of Mexico, data for old ages are not sufficiently reliable at the state level to perform calculations as specified in the above equations, and so we truncate anayses at age 75 using the formulas recommended by Arriaga (1982).

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2.2 Best practices lifetable

This method was first proposed by Vallin & Mesle (2008), and we summarize it briefly here. The imaginary best practices lifetable for Mexico is a composite of the lowest observed mortality rates by age, cause, and state for a given sex and year. In continous terms, we define life expecancy, $e(0)$, as:

$$\int_0^\infty l(x)\ \mathrm{d}x \qquad , \tag{1}$$

where $l(x)$ is the survivorship function defined with radix of one, or as a function of the force of mortality, $\mu(x)$ as:

$$l(x) = e^{-\int_0^x \mu(a)\ \mathrm{d}a} \tag{2}$$

In general, $\mu(x)$ can be treated as the sum of C cause-specific mortality rates at age x:

$$\mu(x) = \sum_1^C \mu_c(x) \tag{3}$$

In the case of best practices mortality, and assuming that causes of death are independent of one another VCR (XXXX), we treat $\mu(x)$ as a composite of the lowest observed cause-specific mortality rates our of all 32 Mexican states in the given age x.

$$\mu(x)^\star = \sum_1^C min(\mu_c(x)) \tag{4}$$

This best practices $\mu^\star$ has a unique age profile, and it uniquely determines a pattern of $l(x)^\star$, per (2), that corresponds with a best practices life expectancy, $e(0)^\star$. $e(0)^\star$ can be treated as a sort of maximum presently acheivable life expectancy given the best available practices and technologies within a given set of populations and assuming perfect diffussion. It is an imaginary quantity because no particular population ever acheives this mortality pattern, and none may ever. However, this value is a real referent not based on a projection of improvements into the future, and so it bounds our optimism in a practical way.

2.3 temporary life expectancy

Given the data, we require an estimate of temporary life expectancy between ages 0 and 75, or the average years of life lived between the ages of 0 and 75 according to a given set of period mortality rates. We denote this quantity as ${}_{75}e_0$, and its best practices minimum as ${}_{75}e_0^\star$. Defined in terms of $l(x)^\star$

$${}_{75}e_0^\star = \int_0^{75} l(x)^\star\ \mathrm{d}x \qquad , \tag{5}$$

or in general for bounded ages, with a lower bound lb and upper bound, ub

$$
{}_{ub}e^{\star}_{lb} = \frac{\int_{lb}^{ub} l(x)^{\star}\,\mathrm{d}x}{l(lb)^{\star}} \qquad , \tag{6}
$$

2.4 decomposing differences in temp life expectancy

3 Trends in best practices life expectancy

The spaghetti plots. . .

4 State trends in departures from best practices temp e(0)

Small multiples maps (time series of maps)

5 Age and cause contributions to differences

This will show a few small multiples figures, tbd

6 Discussion

Talk about the role of homicide and other major causes. How many years of life were lost? (not just expectancy). maybe..

7 Conclusions

Homicide is a public health concern..