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Impact of the COVID-19 pandemic on life expectancy in Madrid (Spain)

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Letter to the editor

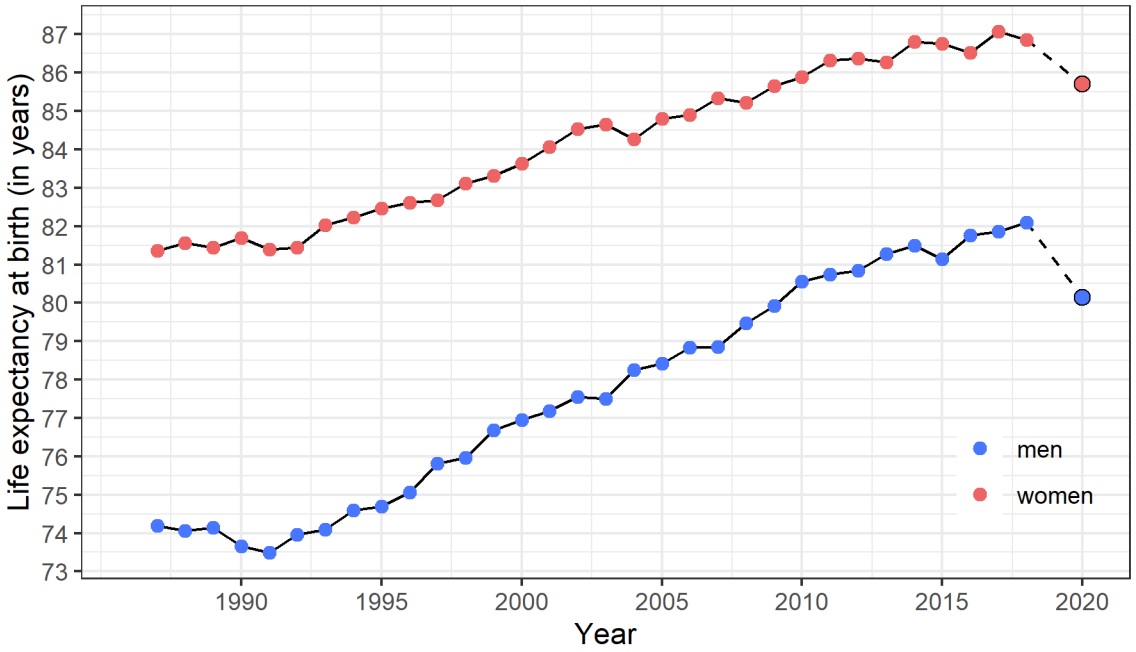
The COVID-19 pandemic is causing substantial increases in mortality across populations worldwide. According to the WHO, by May 22nd more than 325,000 confirmed COVID-19 deaths have occurred worldwide (1). The pandemic has overwhelmed health systems in many countries, potentially leading to increases in morbidity and mortality beyond the direct impact of COVID-19 infection. These increases in mortality, both direct and indirect, have the potential to cause stagnations or declines in life expectancy.

We examined the role of COVID-19 crisis on potential annual life expectancy levels in the region of Madrid, the most affected region in Spain (2,3). We do so by estimating expected changes in annual life expectancy accounting for the excess mortality for the weeks 11th to 19th in 2020 (from March 9nd to May 10th, 2020) using data from the Spanish *Sistema de vigilancia de la mortalidad diaria* (Daily Mortality Surveillance System, MoMo, updated April 29st) (4). We calculated excess mortality (death counts) during the analized period by subtracting observed minus expected mortality by age group (<65, 65-74 and 75+) and sex. During weeks 11th through 19th, 2020, there were 18,958 observed deaths in Madrid, resulting in an excess of 11,815 deaths (4). For age below 65, excess mortality was distributed according to the distribution of COVID-19 deaths for Spain (3). The expected annual increase in age- and sex-specific mortality was estimated by using the estimated excess mortality and assuming no other changes in mortality in the other weeks of the year. Estimates of the counterfactual life expectancy in 2020 were derived using the life tables for Madrid in 2018 from the *Instituto de Estadística de la Comunidad de Madrid* (Statistics Institute of the region of Madrid) (5).

Our results suggest a decline in life expectancy at birth of 1.9 years among men and 1.6 years among women, which corresponds to the levels of 2009 (Figure 1). These estimates can be considered conservative, as we have assumed that mortality for the rest of the year

would follow the expected mortality for previous years. There are reasons to believe that there will be excess mortality, at least in the following weeks, as the COVID-19 epidemic is still on-going in the region. Moreover, the significant medium-term impact of the disruption of the healthcare system could result in a higher death toll in the following months due to chronic conditions that have not been controlled during the peak of the pandemic. On the other side, a decline mortality due to a harvesting effect is also possible, as observed after severe flu seasons. The relative strength of both phenomena will determine whether the life expectancy decline we have estimated will be more or less intense by the end of the year.

Figure 1. Life expectancy at birth in Madrid (Spain) in 1987-2018 and counterfactual in 2020 assuming observed excessed mortality on weeks 11-19 (from March 9nd to May 10th, 2020).



In conclusion, we have shown that the COVID-19 pandemic has the potential to severely affect annual life expectancy in Madrid. Continuing to monitor trends in life expectancy in Madrid and worldwide will provide valuable evidence on the total impact of the pandemic on mortality.

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