

IIASA-RANEPA Online Symposium

Demographic Consequences of COVID-19

Human costs of the first wave of the COVID-19 pandemic in the major epicenters in Italy

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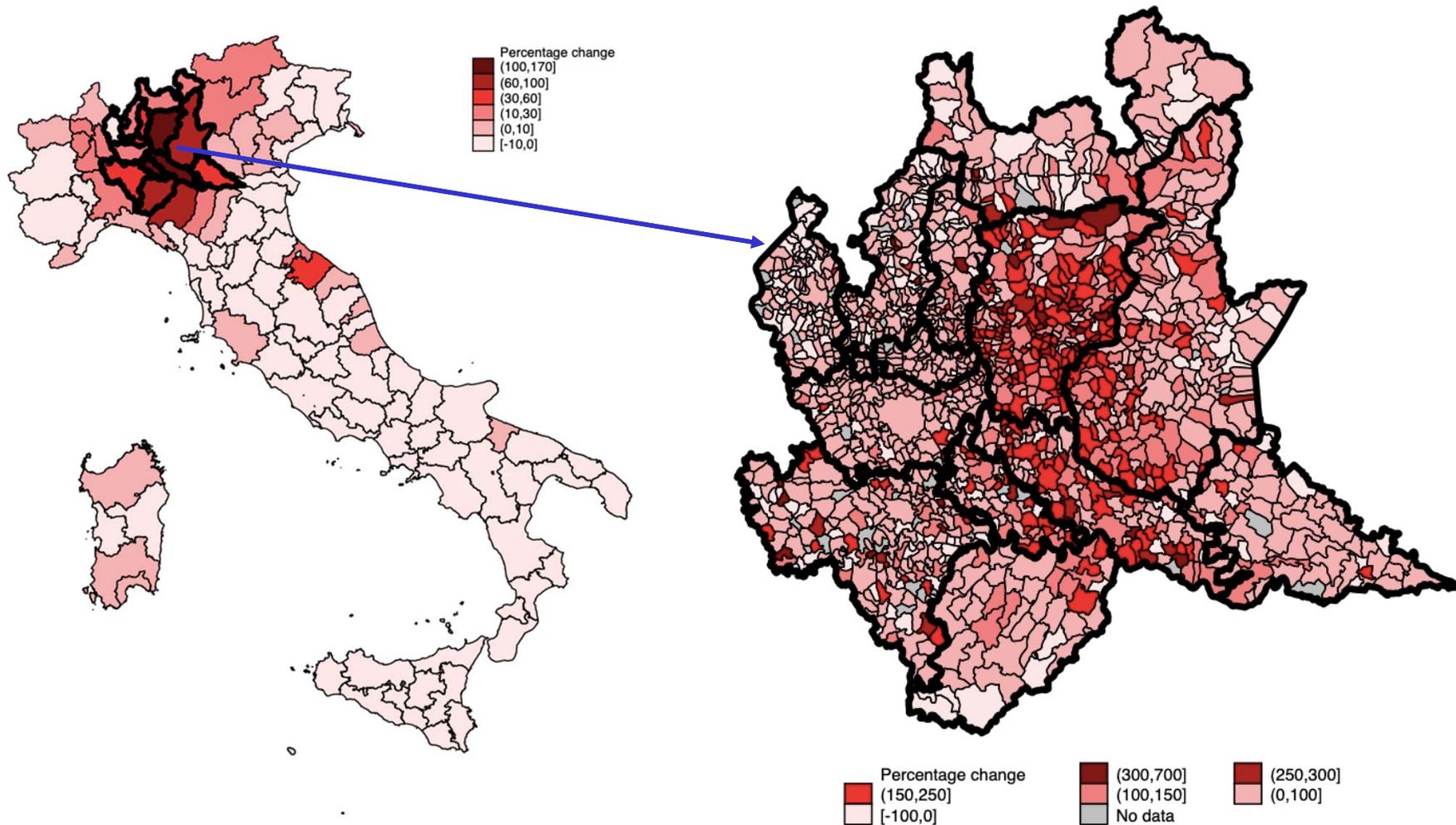
The Human cost of the pandemic

- COVID-19 is an ongoing pandemic.
- An assessment of the first wave human costs (life lost) is important:
 - The human life lost is a relevant part of the overall costs of the crisis
 - Informing health and economic policies.
- Here we measure the human costs in terms of loss of life expectancy. In Italy
 - Italy was the first heavily affected country outside Asia.
 - Mortality wave ended by 30 April 2020.

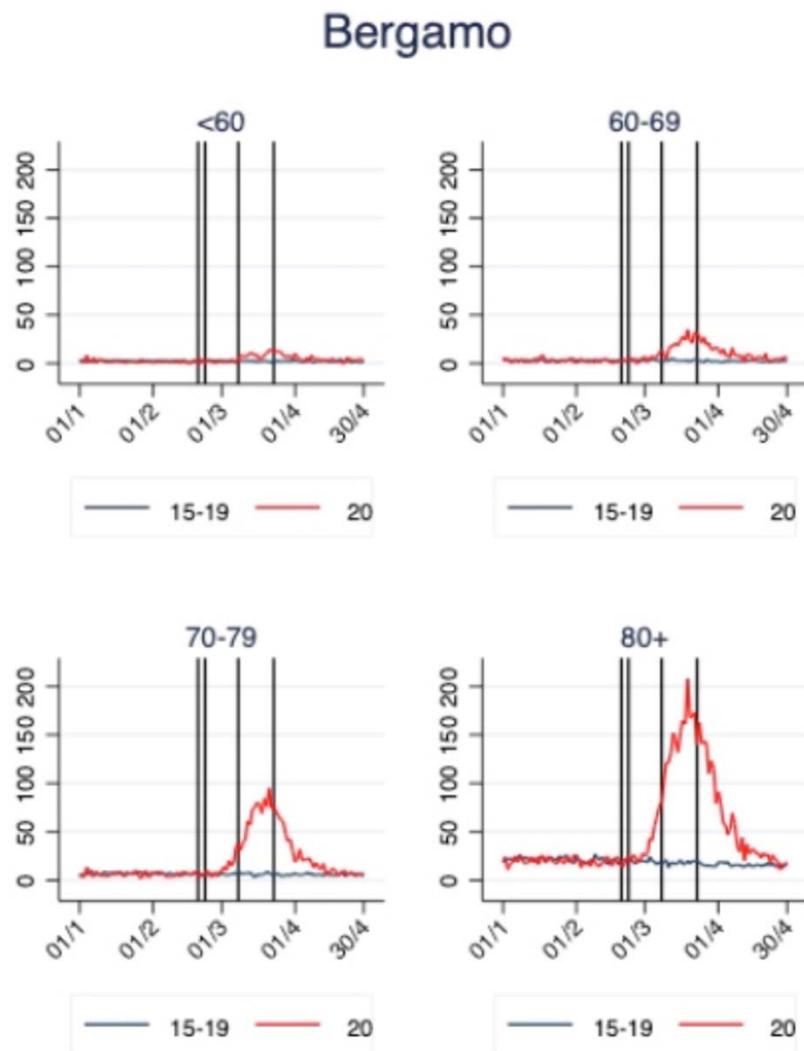
Our study

- Measuring life expectancy losses means that we rely on all cause mortality rather than COVID-19 related mortality. Official numbers of COVID-19 deaths are an underestimation
 - Not all deaths are tested. Post-mortem tests are rare.
 - Heterogeneity in the measurement of a COVID-19 related death.
- Here we focus on one Region (Lombardy) and 5 hard hit Provinces. Geography is key, because the infection wave did not hit uniformly the whole country. Hence, national statistics underestimate the impact of the pandemic.
- We use ISTAT data: daily number of deaths by municipalities 2015-30April2020. Merged with data on population and births.

The hardest hit areas in Italy



All causes mortality in Bergamo



- Excess mortality at all ages, but the impact on the 70+ is very strong.
- The lockdown (8 March) was imposed when the mortality wave was already mounting
- The wave lasted 8 weeks, with the peak after three weeks.

Bergamo registered increases in mortality up to 340%.

| BERGAMO | | | | | | | |
|---------|------------|------------|---------------|---------------|-------------|-------------|----------|
| Age | Population | Population | Excess deaths | Excess deaths | Increase MR | Increase MR | RR (M/F) |
| | Males | Females | Males | Females | Males | Females | |
| 40-49 | 89495 | 84520 | 18 | 10 | 1.245 | 1.407 | 1.700 |
| 50-59 | 88223 | 85678 | 125 | 39 | 2.441 | 1.536 | 3.113 |
| 60-69 | 64750 | 66463 | 442 | 121 | 3.169 | 2.059 | 3.750 |
| 70-79 | 47704 | 54499 | 1100 | 471 | 3.368 | 2.709 | 2.668 |
| 80-89 | 21758 | 34725 | 1374 | 1070 | 3.046 | 2.514 | 2.049 |
| 90+ | 2673 | 8578 | 384 | 826 | 2.340 | 2.188 | 1.492 |

Mortality among males consistently higher than among females

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Drop in life expectancy

We provide two measures:

1. Quadrimester life expectancy by Province: mortality rates 1Jan 2020-30 Apr 2020 vs same period previous years.

2. Annual life expectancy by Province: mortality rates for the entire year.

Two scenarios:

- No Harvesting: Mortality goes back to normal (Business as usual)
 - Full Harvesting: Annual mortality does not change (Optimistic)
- We do not provide estimation in the hypothesis of a second wave.

Drop in life expectancy

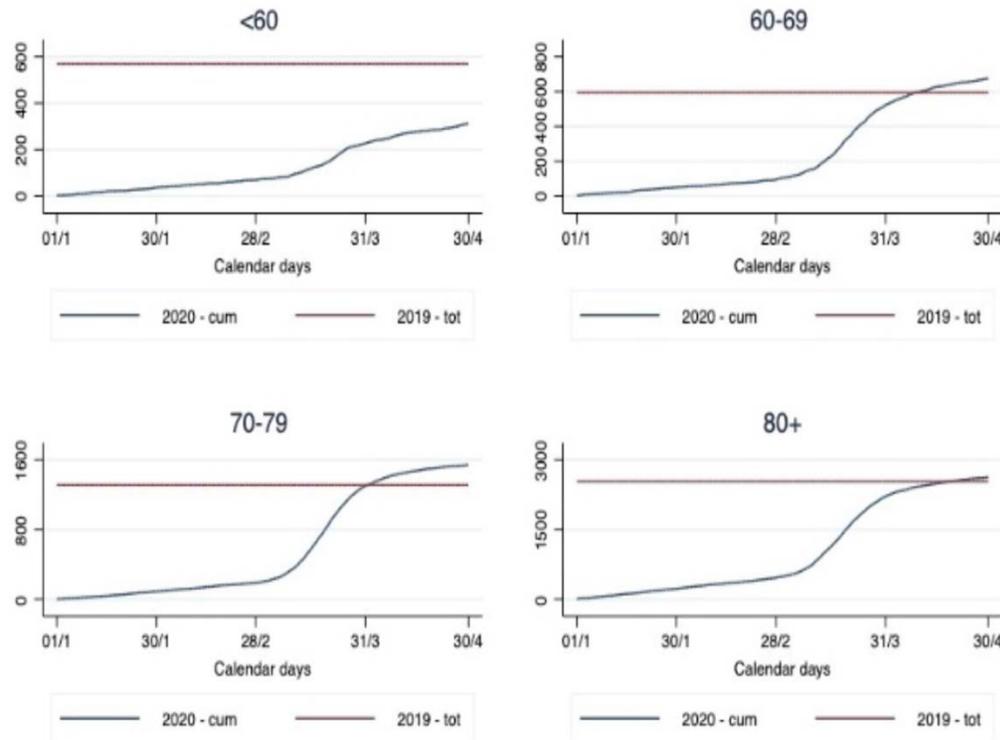
- «When compared to the average quadrimester life expectancy of the 2015-2019 period, the years of life lost for men range from 6.2 years in Piacenza to 8 years in Bergamo and for women from 3.6 years in Piacenza to the 5.8 years in Bergamo.»
- «In BAU in Bergamo, annual life expectancy will drop by 4.1 and 2.6 years for men and women respectively. In the other provinces, the years of life lost for men are between 2.5 in Brescia and 3.5 in Lodi and for women between 1.7 in Piacenza to 2.2 in Cremona. As expected, Lombardy shows a smaller reduction in life expectancy of 1.6. and 1.2 years for males and females, respectively.»

Discussion

- **Demographic variables are good predictors of mortality**
 - Age is the main risk factor of mortality. Discussions on comorbidities are somehow redundant, since 80+ are rarely free of conditions.
 - Sex is also, to a lesser extent, important. Lombardy had a high life expectancy to start with. Women were overrepresented among the 80+. Hence, overall number of women that died is high (42%)
- **Deepest drop in life expectancy since WWII**
 - Consider data at Province level rather than at national level
 - Further checks needed in order to compare with the influenza epidemics
- **Lombardy can not afford another wave.**
 - Much discussion about lockdowns. However, if annual life expectancy nears the quadrimester life expectancy, the human costs would be too high.

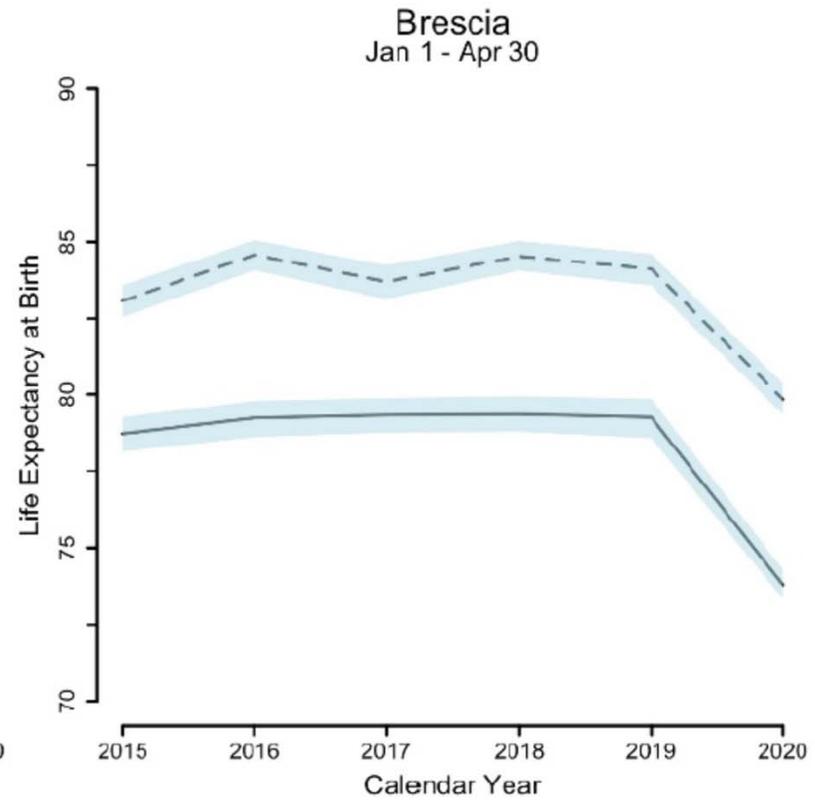
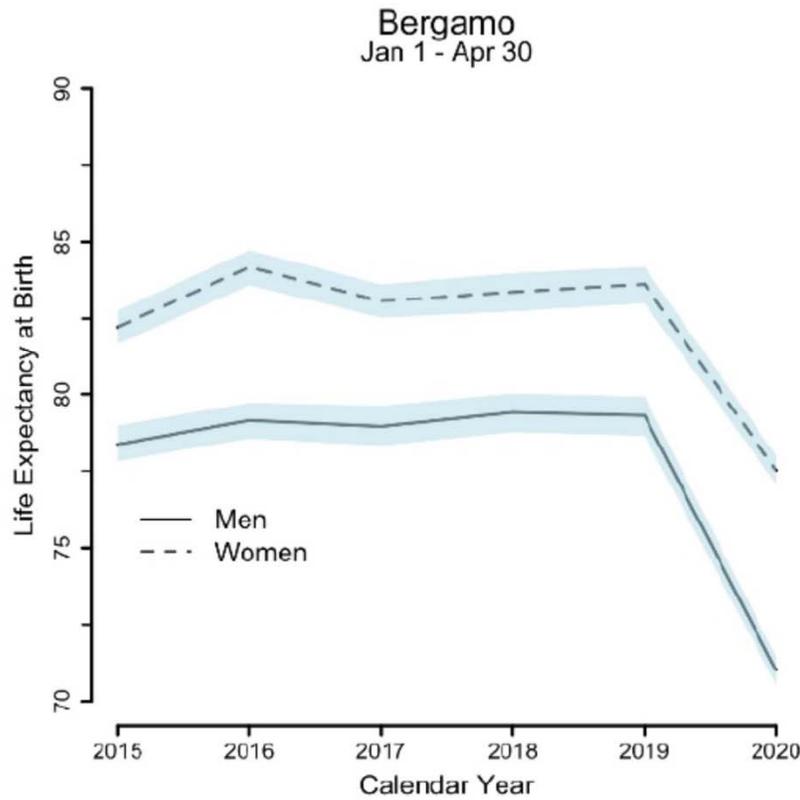
Harvesting or not harvesting?

Bergamo

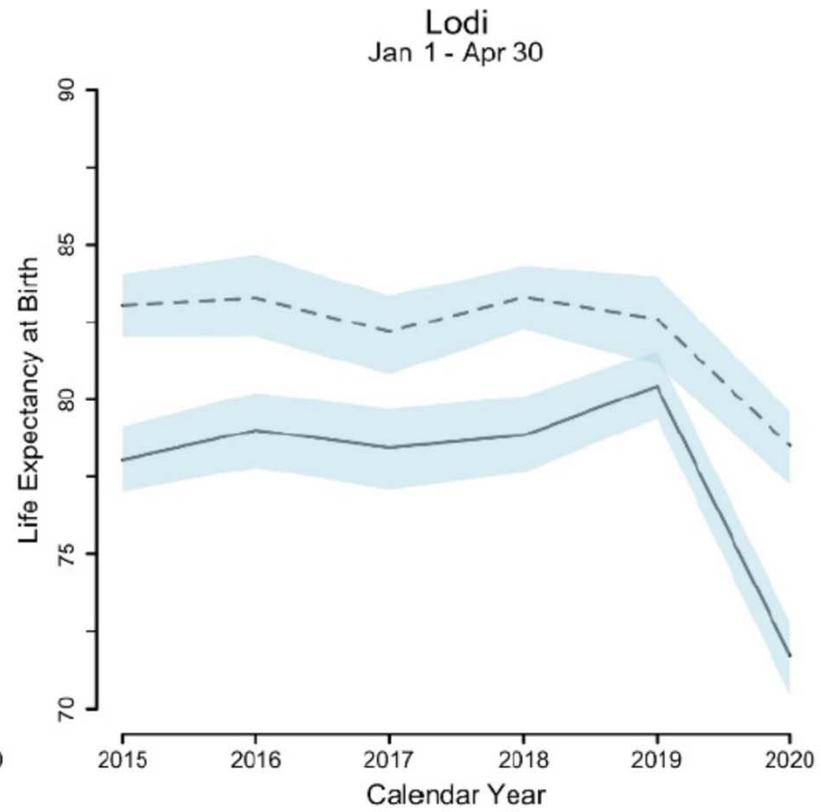
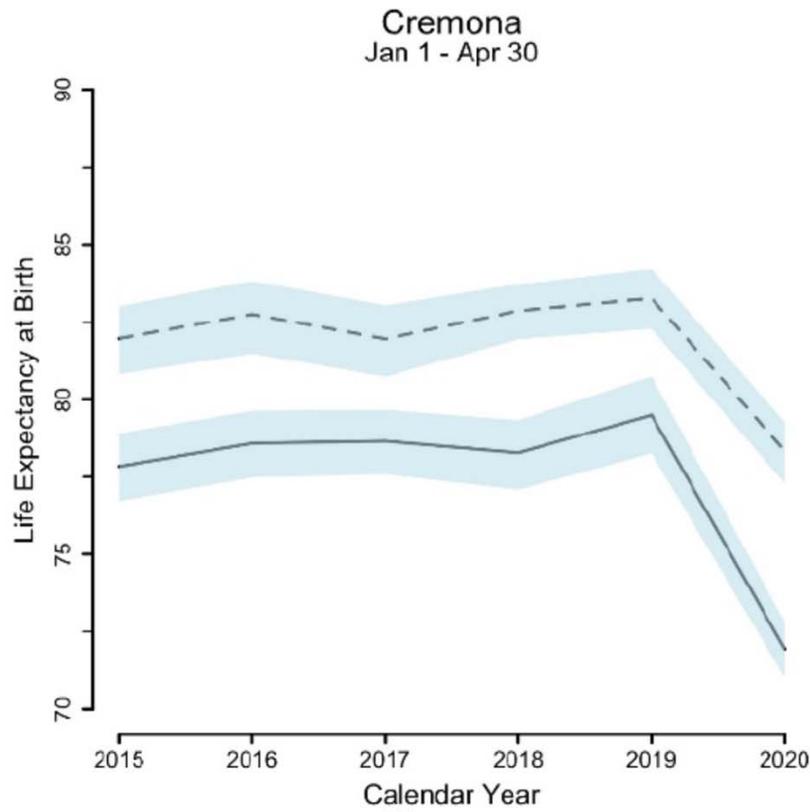


The number of deaths in first quadrimester is higher than the total number of deaths in 2019!!

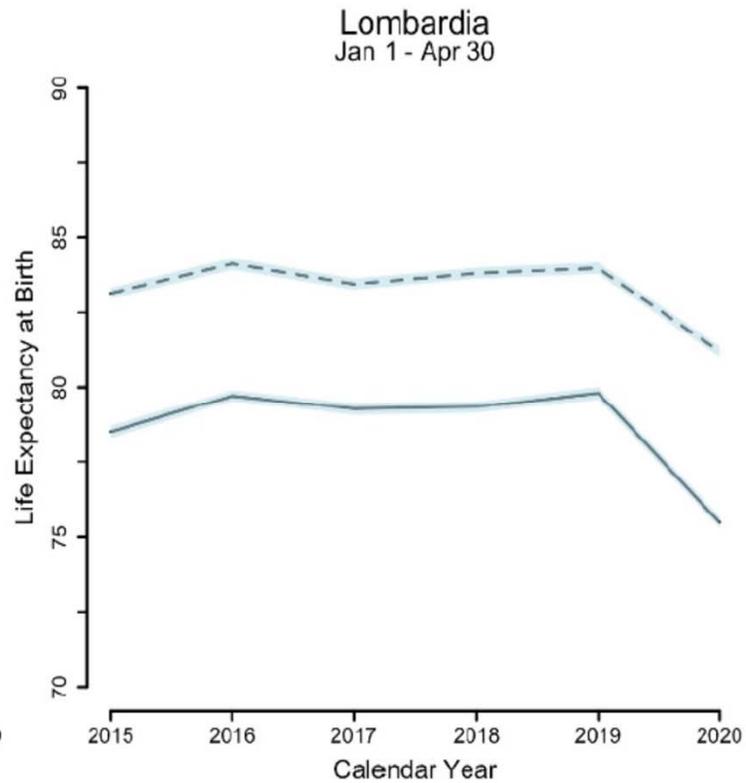
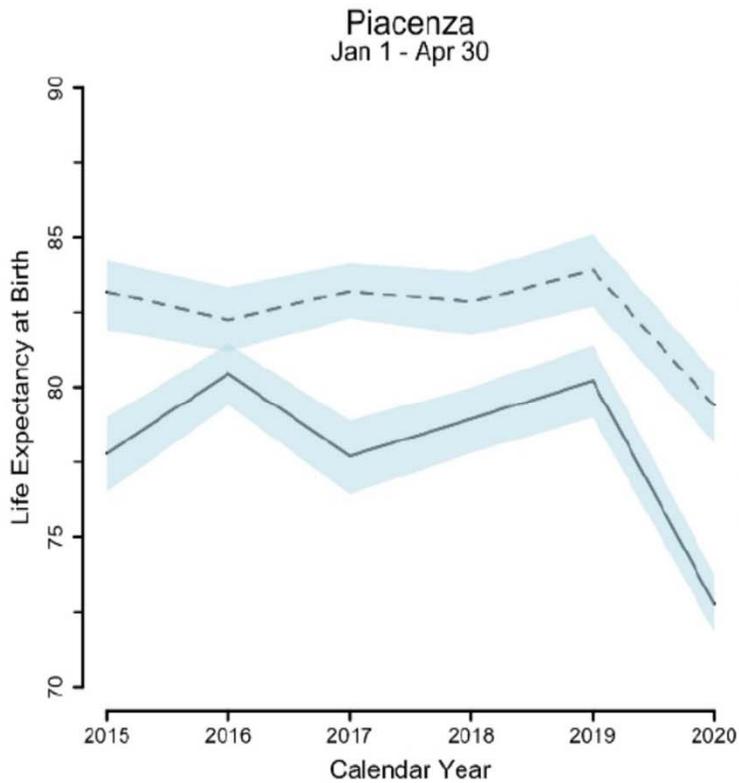
Quadrimester Life Expectancy



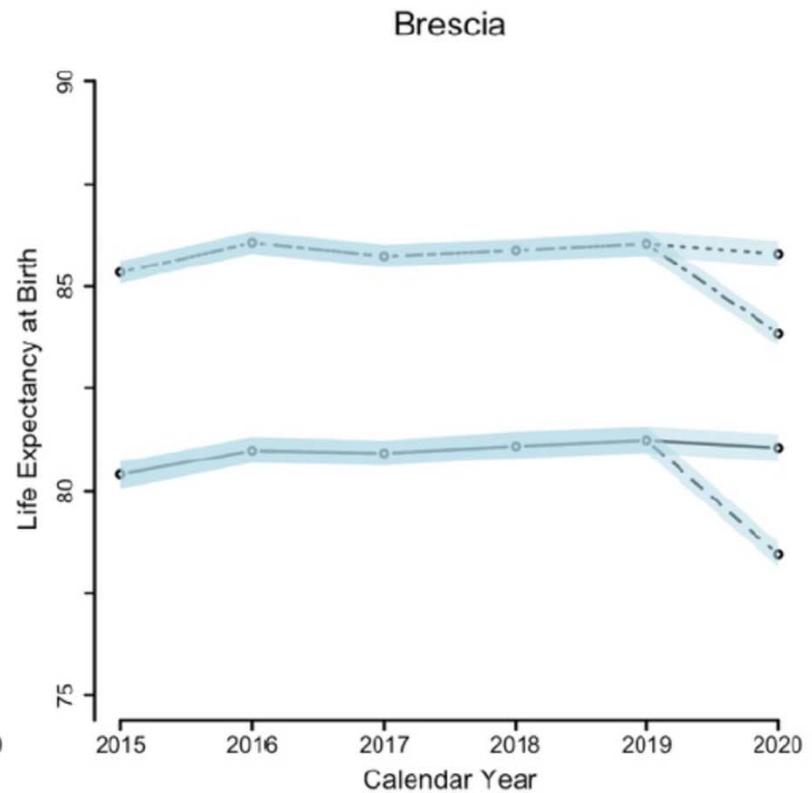
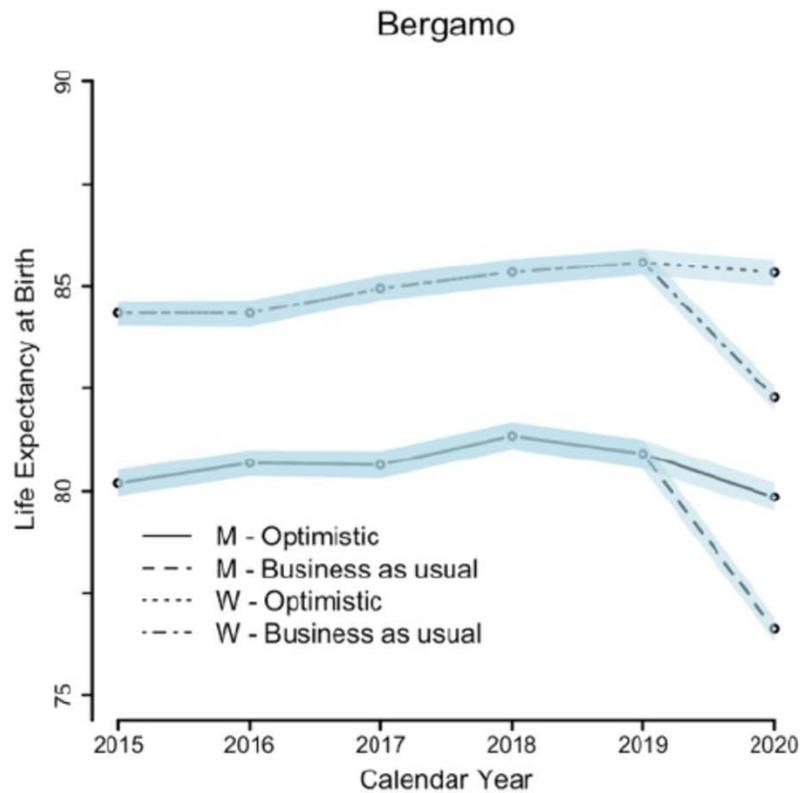
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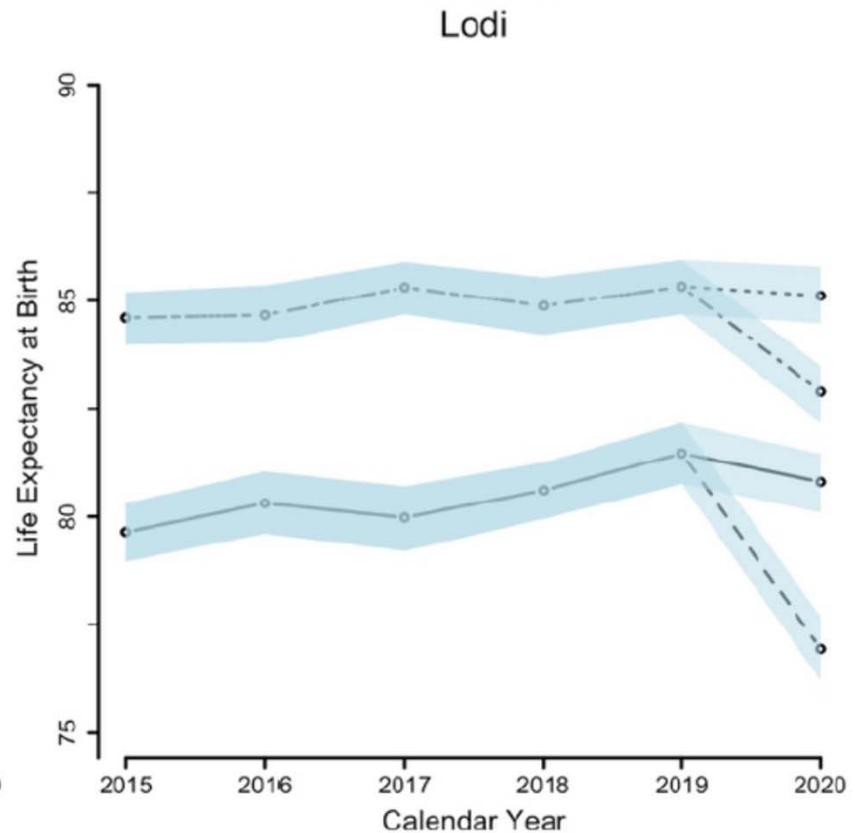
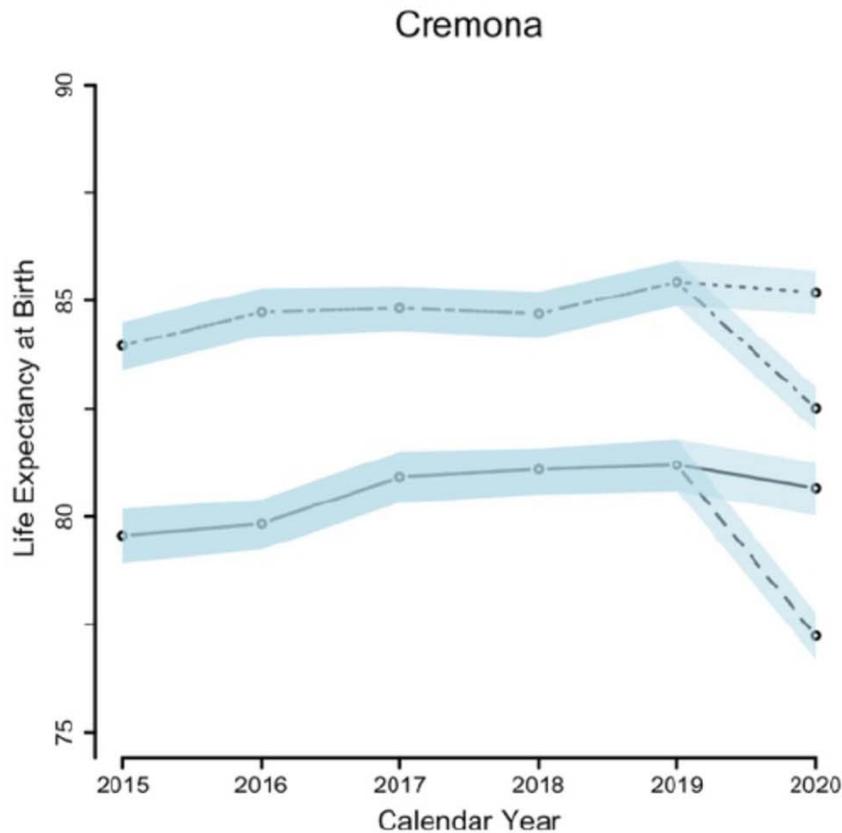
Quadrimester Life Expectancy



Annual Life Expectancy



Annual Life Expectancy



Annual Life Expectancy

