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INTERNATIONAAL

Covid-19 and its impact on Italian mortality

Numerous analyses have been carried out in Italy since the beginning of the pandemic, to study its behaviour and try to predict its progress. One of the central themes of the analyses is certainly the impact that this virus can have on mortality respect to the situation in absence of Covid-19 considering also the "indirect effect" of Pandemic. Think, for example, of people who die from other diseases, because they could not find a hospital bed or because they did not go there for fear of contagion, or the reduction of road fatalities or accidents at work due to the lockdown in Italy.

In a study of the **INPS (the National Social Security Institute)**, carried out by the Institute's "General Statistical – Actuarial Coordination", it was tried to determine a number of expected deaths in the first 4 months "baseline" based on the daily deaths observed in the last 5 years and comparing it with the number of deaths recorded in 2020; **the conclusions of this study would indicate that 2020 over-mortality, in the hypothesis that it is attributable to Covid-19, would show an underestimate of Covid-19 deaths compared to the data of "Protezione Civile" of about 19,000 units in the period March – April.**

Mortality detected and mortality reported by Covid-19 for the period 01/03/2020 – 30/04/2020

- Baseline
- Covid Recorded
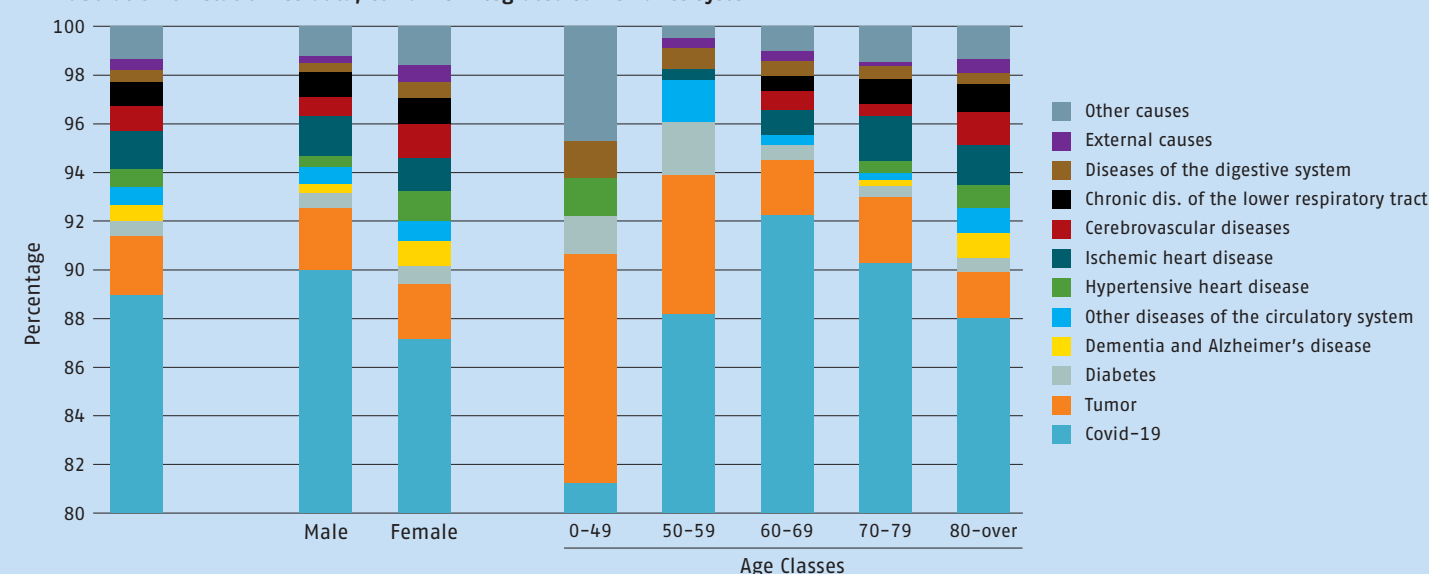- Underestimation of recorded Covid
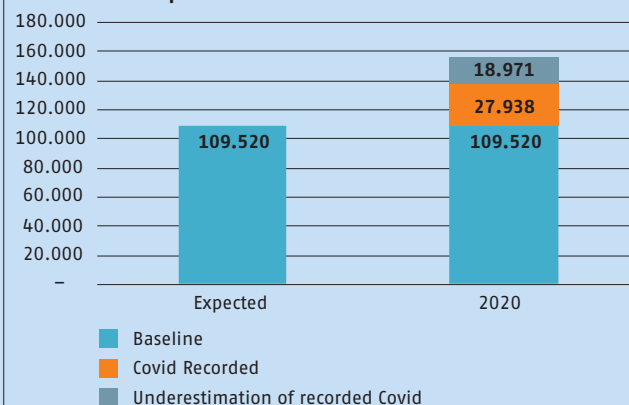
Studying the over-mortality, it is also important to understand in how many cases Covid-19 was actually the main cause, directly responsible for death and what was the role of other diseases/contributing causes pre-existent or subsequent. This is what the **National Statistical Institute (Istat) and the "Istituto Superiore di Sanità" (ISS)** did together in a report in which the main results of the analyses carried out on 4,942 death cards of the 31,573 reported on May 25, 2020 are discussed. The report basically reveals these results:

– About **11%** of the statistics' deceased Covid-19 was not the "initial cause of death[1]"; they would presumably have died in the year regardless of Covid-19, therefore, should **not contribute to over-mortality**;

– For about 89% Covid-19 is the "initial cause of death".

  • Covid-19 is a disease that can be fatal even in the absence of causes. In fact, there are no pre-existing causes of death to Covid-19 in 28.2% of these deaths analysed (only in the age group 0-49 years the percentage is lower, 18%). This is an important fact: since Covid-19 was the only initial cause of death, without

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Elaboration of Istat on ISS data, Covid-19 Integrated Surveillance System

Legend:
- Other causes
- External causes
- Diseases of the digestive system
- Chronic dis. of the lower respiratory tract
- Cerebrovascular diseases
- Ischemic heart disease
- Hypertensive heart disease
- Other diseases of the circulatory system
- Dementia and Alzheimer's disease
- Diabetes
- Tumor
- Covid-19

contributing causes, it can reasonably be expected that within the year without Covid-19 the 28.2% of 89%, therefore about **25% of the people counted as Covid-19 deaths in the statistics would not have died and should bring to a first part of over-mortality of the year** – of course there are then to be considered all the deaths that have not been tested with a swab and so do not fall within the statistics on total Covid-19 deaths.

• For the remaining **64%** of the deceased of the statistics, Covid-19 was defined as a "contributing cause of death". For these deceased, **the contributing causes and their rates should be analysed in detail to understand how many would however die in the year with reasonable certainty and therefore would not have an impact on the over-mortality**.

For a coherent and more robust estimate of the over-mortality it is however necessary to have at least the data referring to whole 2020 and so we think that the only way to have interesting starting point on the "over-mortality" linked to Covid-19 is to define (substantially in line with the INPS approach) a "reference" q_x for single age to reconstruct the expected deaths 2020 "without Covid-19" and to obtain, using the Italian population at the beginning of the year (exposed to death risk) and taking into account the population movements, the overall expected number of deaths "without Covid-19". The comparison between the effective overall number of deaths recorded for 2020 and this overall expected number of deaths "without Covid-19" represents the better approach to give conclusion of overall effect of Covid-19 on 2020 Italian mortality.

The choice of the approach is a very difficult question: what is the hypothesis that characterizes in a better way the 2020 mortality "without Covid-19" of the Italian Population for the single age? An average of the last 3 or 5 years in the hypothesis that the previous three/five-year period represents on average a situation that would have been repeated in 2020? A model that considers trend of reduction of the mortality in 2020 (how seems to show the January and February data)? We hope that the Actuarial Profession will continue to contribute to analyse and to provide solution for the question.

The main threat from the virus has always been the impact on healthcare, specifically the volume of hospitalisations. For this reason, in addition to studies that try to analyse trends and statistics on the progression of the pandemic, there are Italian scientific studies that also try to improve the treatment (in term of cure) of the virus itself,

waiting for a vaccine. Worthy of mention is in this case a study conducted by the University of Florence, Careggi Hospital and Poliambulanza Foundation of Brescia, published on BMJ-Open. The aim of the work was to generate a tool to calculate the probabilities of death using variables obtainable within two hours of access to the Emergency Room. This allows healthcare professionals to optimize patient accommodation in low intensity areas or at home, intermediate intensity or high intensity areas.

The variables examined in the framework are six among which age (participants were divided into three groups), number of chronic pathologies present, respiratory rate, Horowitz index, creatinine, platelet count. Among the results of the study one appears particularly relevant: the mortality rate in patients over 75 years age appears 8 times higher than in under-62s, net of adjustment for the other conditions examined, such as the presence of previous pathologies. The "COVID-19MRS" risk calculator, the result of this study, is a rapid clinical tool, at no cost and independent of the subjective judgment of an operator, which allows patients to be assigned to the most appropriate treatment path, from home isolation to intensive care. With an optimization of the care and health resources used and having very accurate results, with a level of accuracy of at least 90%.

All the analysis mentioned need to data that are exhaustive, homogeneous, coherent and "clean".

We cannot manage a pandemic, try to understand its causes, try to reduce its effects, try to save as many lives as possible if there is, at each international level, no convergence that these are the priority objectives when faced with a situation of this kind and that to this scope, timely, clean, standardized and detailed data and information are needed.

This must come first of all, because as we know if the data are non-homogeneous, "selected at source in an uncleaned way" and /or hidden, our analyses will always be characterized by errors of "data construction" that will affect the analyses themselves and will not allow us to achieve the set objectives.

Covid-19 has shown the limit of the actual setting of the world in this context. We think that it is necessary to define/redefine a supranational body/organism, robust, without conflict of interest and, mainly, with the power to make specific controls and to impose penalties to manage situation with strong impact on global health. ∎

1 –OMS definition "Disease that started the events that lead directly to death"