Dear Editors and reviewers,

The authors thank you the reviews, suggestions and comments, which will improve the manuscript. The authors also thank you the short period in review. In fact, our prompt response is in alignment with the short time window for online publication that we all wish for this rapid communication.

As suggested, herein we number and detail ALL the manuscript changes, according to EACH comment of our two reviewers.

For convenience, we have grossly translated the Reviewer A comments from Portuguese to English, and all our replies are in the English language.

**Reviewer A:**

**General amendments**

1. In the article, the sections relating to statistical analysis and results should be well identified.

**Authors reply:**

The authors thank the Reviewer’s indication. The sections were introduced as requested.

**Changes in the manuscript - original:**

(section and subsection additions)

**Changes in the manuscript - final:**

[Manuscript, line 48, added subsection] Material and Methods

[Manuscript, line 64, added section] Results

1. The main findings of the research should be poured into the results section, preferably in understandable language, and not only in the supplementary section of the article, where more technical details can and well be found there.

**Authors reply:**

We agree with the reviewer and clearly highlighted the main finding in the result section by adding subsections in a clear and informative manner.

**Changes in the manuscript - original:**

(subtitles added in the results section)

**Changes in the manuscript - final:**

(subtitles added in the results section)

[Manuscript, line 65, results section, added subtitle] Total excess mortality estimation during March and beginning of April 2020

[Manuscript, line 79, results section, added subtitle] Excess mortality is concentrated on the 65+ years old age group

[Manuscript, line 84, results section, added subtitle] Excess mortality is geographically relatively homogeneous, but higher in districts with older patients and less dense population

[Manuscript, line 91, results section, added subtitle] Diminished emergency department (ED) visits in March/April can account for a significant part, but not all, of the observed excess mortality

1. One of the most relevant data is Exc1 > 0, compared to all baselines, except for the maximum, in the defined period, for individuals ≥ 65 years.

**Authors reply:**

The authors thank the Reviewer’s indication. The data received a highlight with a specific subsection on the Results section and with the inclusion of Table 1, in support of the already introduced highlight in the Discussion section and Figure 1c.

**Changes in the manuscript - original:**

(none)

**Changes in the manuscript - final:**

[Manuscript, Results section, line 79, added subtitle] Excess mortality is concentrated on the 65+ years old age group

[Manuscript, Results section, line 78, added Table 1]

1. Another interesting data is that the opposite happens in the age groups under 65 years, except in the comparison with the baseline that has the minimum as a reference.

**Authors reply:**

The reviewer raised an important issue. The authors thank the reviewer for this point and included a short discussion on the subject.

**Changes in the manuscript - original:**

(added to the discussion section on the manuscript)

**Changes in the manuscript - final:**

[Manuscript, line 138, added paragraph] It is of interest to note that no excess mortality was observed in the <55 y.o. group. In fact, this group remained around the minimum daily number of deaths observed in the past twelve years, and below the average number of deaths towards summer months (Figure 1c).

**Proposals for changes concerning data analysis**

1. Table 1 is extremely informative. It may be interesting to convert it into a chart, mainly due to the trend associated with age groups.

**Authors reply:**

The authors respect the Reviewer’s suggestion. However, the conversion of Table 1 would imply 8 charts, making it even more informative and risking dispersing the message. The authors consider Table 1 to be paramount for illustrating the age group results and propose moving it to the main manuscript while removing the baselines “Mean + 2 months” and “Mean + 4 months”, indicating also the COVID-19 associated mortality within the table. Typos existing in the table were also corrected.

**Changes in the manuscript - original:**

(Supplemental document, Table S1 moved to the Manuscript)

**Changes in the manuscript - final:**

[Manuscript, Table 1, line 78].

1. Figures S1a and S1b become imperceptible due to the absence of subtitles.

**Authors reply:**

The authors thank the Reviewer’s indication. Figure legends were introduced for clarity.

**Changes in the manuscript - original:**

(Figure legend adapted in main manuscript for figure 1; figure legends introduced in Figures S1a and S1B)

**Changes in the manuscript - final:**

[Supplement, Figures S1a and S1b, lines 16 and 22] Graphical comparison depicts observed mortality (magenta line), minimum baseline (red line), maximum baseline (orange line), mean baseline (yellow dashed line), median baseline (grey dashed line), mean + 1 month baseline (light blue dashed line), mean + 3 months baseline (dark blue dashed line) and mean + 5 months baseline (rose dashed line).

1. It is understood that the pink line is the variation of mortality and the remaining are baselines, namely the orange that represents the maximum and the red that represents the minimum. The rest are difficult to understand. A caption will suffice for the entire picture to resolve the issue.

**Authors reply:**

The authors thank the Reviewer’s indication. A legend to Figure 1 was introduced inside the picture itself and a caption was adapted.

“Evolution between March 1 and April 10. a) All-causes mortality with indication of the main non-pharmaceutical interventions by the Portuguese Government in chronological order. All baselines were smoothed. Note the excess mortality from the second half of March onwards. b) Cumulative excess mortality estimation compared with COVID-19 official mortality: Exc1 – Excess mortality: (∑ observed – ∑ defined baseline) on the left-hand side; Exc2 – Sum of Positive Excess Mortality: (∑ [observed – defined baseline] when this difference is positive) on the right-hand side. c) Age-specific evolution of all-causes mortality. All baselines were smoothed. Note the excess mortality estimated for the 65+ age group.”

**Changes in the manuscript - original:**

(Manuscript, Figure 1 legend)

**Changes in the manuscript - final:**

[Manuscript, Figure 1 legend, line 205]

1. Figures S2 and S3 are not clear how they used 3 baselines, identified by i), ii) and iii), and how they connect to each MS.

**Authors reply:**

The author thank the Reviewer’s query. The figures captions were updated including the information requested by the Reviewer. Added caption: “Vertical blue lines

represent the distance between minimum and the maximum of estimated excess

mortality calculated using 3 different baselines (median, mean + 1 month and mean + 3 months)”.

**Changes in the manuscript - original:**

(Supplement, Figures S2 and S3)

**Changes in the manuscript - final:**

[Supplement; (Figure S2, line 27), (Figure S3, line 40)]

1. Attention is also drawn to what may be a typo: below Figure S3 is the expression "Notes for Figure S2".

**Authors reply:**

Corrected.

**Changes in the manuscript - original:**

[Supplementary material, line 43] Notes for Figure S2::

**Changes in the manuscript - final:**

[Supplementary material, line 43] Notes for Figure S3:

1. It is not clear what was done in "step 2"; should be explained in greater detail

**Authors reply:**

We agree with the reviewer and have included a paragraph with the explanation, as described below. Changes were also performed to Figure S4 and Table S2 for clarity.

**Changes in the manuscript - original:**

(paragraph added)

**Changes in the manuscript - final:**

[Supplementary material, paragraph added, line 65] We calculated the drop on the number of ED visits, according to the Manchester System Triage color in the following manner: for each triage color, we calculate the 3-day average in the beginning of march (1st to 3rd of march) (Step 1, Figure S4). From day 3 forward, within each color, we calculated the difference between the number of each day visits (3-day centered averages) and the 3-day average in the beginning of march (reference). The total number of visits presented in Table S1 (‘Difference between daily averages’) correspond to the sum of these daily differences, according to the triagem color.

[Supplementary material, Figure S4, line 59]

[Supplementary material, Table S1, line 74]

1. The results of "Step 3" are important and should be highlighted in the body of the article.

**Authors reply:**

The authors thank the Reviewer’s suggestion. The results of “Step 3” were highlighted on the body of the article.

**Changes in the manuscript - original:**

(added to the body of the article)

**Changes in the manuscript - final:**

[Manuscript, Results section, line 93] A considerable reduction of daily-rate hospital ED visits occurred between March 1 - April 7 (cumulative daily average difference of - 128,255 visits for patients with red, orange and yellow colors according to the Manchester Triage System). Taking into account that despite the lockdown patients need access to emergency care, and assuming the proportions of short-term mortality occurring within the ED 24 - 48 hours after admission, we estimated a potential of, at least, 835 deaths could have occurred during march 2020 because of the reduction in ED visits. (see Supplement).

**Jays identified in Supplementary material**

1. - Below Figure S3 is the expression "Notes for Figure S2".

**Authors reply:**

Thank you. Proofread and corrected.

**Changes in the manuscript - original:**

(Supplementary material, Notes for Figure S3]

**Changes in the manuscript - final:**

[Supplementary material, line 43] Notes for Figure S3

1. - Below Figure 4 in Step 2 a "r" is missing

in "for"

**Authors reply:**

Corrected.

**Changes in the manuscript - original:**

[Supplementary material, line 63] Step 2- The difference between those daily averages estimated in Step 1 was calculated fo the same period for each Manchester System Triage color as demonstrated in Table S2;

**Changes in the manuscript - final:**

[Supplementary material, line 63] Step 2- The difference between those daily averages estimated in Step 1 was calculated for the same period for each Manchester System Triage color as demonstrated in Table S2;

**Reviewer B:**

1. It was with pleasure that I read your proposal. In order to speed up the publication, let me cut to the chase and address the main points at stake.

**Authors reply:**

Thank you for the kind words.

1. The summer scenario as comparison needs to be further discussed as a possible hypothesis. Lockdown measures do not drive the same behavior as summer months, despite understanding some of the rational. This could be addressed, if you wish, considering a maximum difference hypothesis, stating why it is considered as such.

**Authors reply:**

We agree with the reviewers, as this hypothesis is central to our study approach, analysis and interpretation. We anticipated the presentation of these arguments, moving them to the 2nd paragraph and stated a clear rationale for them by introducing a new two-sentences paragraph (3rd paragraph).

**Changes in the manuscript - original:**

In the secion ‘Epidemiological Investigation’, the following part was moved to the second and third paragraph, and adapted.

[Manuscript, ‘Epidemiological Investigation’ section, starting line 47]

*We calculated the increase in all-cause mortality during the second half of March 2020 (Figure 1) according to several criteria.*

*Using previous year’s historical data for the same period (either mean or median), in the absence of the given event of interest, is considered a standard approach for the expected number of deaths.5 In the current pandemic situation several studies and newspaper articles are using this approach. However, the current lockdown situation is not comparable with any historical mortality reported so far, and therefore this approach does not reflect the expected mortality in the current situation. In fact, the lockdown can be thought as a summer holiday period, implying a reduction in expected mortality at least to the level of one summer holidays’ month*

**Changes in the manuscript - final:**

Two paragraphs were added in the introductory section (2nd and 3rd paragraphs)

[Manuscript, Introductory section, starting line 33]

The standard approach for the expected number of deaths, in the absence of a given event of interest, uses the previous year’s historical data for the same period (either mean or median) as baseline reference.5 In the current pandemic situation several studies and newspaper articles are using this approach. However, the current lockdown situation is not comparable with any historical mortality reported so far, and therefore this approach does not reflect the expected mortality in the current situation.

In fact, the current lockdown situation can be thought as having some similarities to a summer holiday period, given the lower population working, lower risk of infectious disease (due to weather in the summer and due to quarantine during the lockdown), less urban traffic and traffic accidents, and lower number and postponed health care appointments. Therefore, the current situation may not be comparable to the same periods in previous years, implying a reduction in expected mortality towards the level of one summer holidays’ month. If the lockdown had some protective effect on overall mortality, like summer holiday months seem to have, these effects may be observed in all age groups.

We calculated the increase in all-cause mortality during the month of March and first week of April 2020 (Figure 1) according to several criteria.

1. This is critical for the whole paper and it needs to be addressed, specially taking into account the unavoidable effect uncertainty. Discussion should follow that need as well.

**Authors reply:**

The author are in complete agreement with the reviewer and added, in accordance, a sentence in the discussion section, addressing the possible similarities between the lockdown and the summer holiday period, and how the fundamental difference between the lockdown and the summer holiday period is unlikely to explain what is observed.

**Changes in the manuscript - original:**

(sentence added in the discussion section).

**Changes in the manuscript - final:**

[Manuscript, Discussion section, line 130]

While lockdown measures do not promote the same behaviour as summer vacation months, both situations resulting in lower mortality risk: In fact, the lowest mortality rates are observed during the summer months, and the lockdown intends to reduce the citizen’s health risks. It should be noted that the number of excess deaths observed has a much higher magnitude than the number of deaths in subjects infected with COVID-19. Of these deaths, only a yet to be clearly defined proportion will have died because of the infection. Therefore, at least in this early phase of the epidemic, it is unlikely that deaths due to known or unknown COVID-19 infections would account for the total observed excess mortality.

1. The chosen figures are confusing because of the option of presenting so many scenarios. It would vastly benefit the paper presenting less in figures.

**Authors reply:**

The authors thank the Reviewer’s suggestion. The figures were adjusted as requested, removing scenarios “Mean + 2 months”, “Mean + 4 months”.

**Changes in the manuscript - original:**

(Manuscript, Figure 1; Supplement, Table S1, Figure S1)

**Changes in the manuscript - final:**

[Manuscript, Figure 1, line 205]

[Manuscript, Table 1, line 78]

[Supplement, Figure S1, lines 15 and 20]

1. Even one of the figures presented in the supplement (emergency episodes) seems to be underappreciated by the authors when going for the option of presenting other figures.

**Authors reply:**

The authors agree with the Reviewer. We included a reference to the results of the analysis of the decline in ED visits in the manuscript. However, due to the journal limitations for the number of figures, we have kept the ED visits analysis and figure as a supplementary material.

**Changes in the manuscript - original:**

(no changes in the original)

**Changes in the manuscript - final:**

[Manuscript, Results section, line 91, added subsection]

### Diminished emergency department (ED) visits in March/April can account for a significant part, but not all, of the observed excess mortality

A considerable reduction of daily-rate hospital ED visits occurred between March 1 - April 7 (cumulative daily average difference of - 128,255 visits for patients with red, orange, and yellow colors according to the Manchester Triage System). Taking into account that despite the lockdown patients need access to emergency care, and assuming the proportions of short-term mortality occurring within the ED 24 - 48 hours after admission, we estimated a potential of, at least, 835 deaths could have occurred during march 2020 because of the reduction in ED visits (see Supplement).

1. Once again, going for a single scenario of comparison (+5 months, p.ex.) would simplify a lot the reading. More complex scenarios could be kept in the Supplement.

**Authors reply:**

The authors thank the Reviewer’s suggestion and agree. The number of scenarios was reduced as requested, removing scenarios “Mean + 2 months”, “Mean + 4 months” and simplifying the reading and interpretation of the manuscript.

**Changes in the manuscript - original:**

(Manuscript, Figure 1; Supplement, Table S1, Figure S1)

**Changes in the manuscript - final:**

[Manuscript, Figure 1, line 205]

[Manuscript, Table 1, line 78]

[Supplement, Figure S1, lines 15 and 20]

1. I have also included some corrections in the main draft doc. In the supplement you have repeated the word "figure" in one instance but all of these corrections are minor and not important taking into the account the two important issues to be addressed in points 1 and 2.

**Authors reply:**

The authors thank the Reviewer for the detailed revision of our manuscript. However, we did not find any revised documents attached to the email or in the journal link to the reviews page in the reserved journal platform. This is unfortunate, but we hope that our new revision and version of the manuscript has accounted for some of these corrections. If we are given access to this document, we may account for these corrections in the proof review.

**Changes in the manuscript - original:**

(not applicable)

**Changes in the manuscript - final:**

(not applicable)

1. As a reviewer, I am committed to speeding up the following review process to maximize the work done so far.

**Authors reply:**

The authors are aligned with speeding up the online publication process and have submitted this careful review hours after it’s receptance. We thank you very much all for their efforts!

**Further minor changes by the authors:**

1. Minor typos and language adjustments

**Changes in the manuscript - original:**

“urgency service”

**Changes in the manuscript - final:**

“emergency service (ED)”