

Direct and Indirect Impacts of COVID-19 on Excess Deaths and Morbidity: December 2020 Update – Executive Summary

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Overview

This paper presents the estimated mortality and morbidity impacts of the COVID-19 pandemic, both directly due to the virus and indirect effects of government intervention, during the first peak of the pandemic and the possible additional health impacts as a result of a second peak. The paper includes a comparison with a counterfactual which reflects the potential health impacts if there was little or no government intervention to control the transmission of the virus.

This paper builds upon previous work, including a [paper](#) that was presented to SAGE in July 2020, and provides an update on previous work, based on new scenarios, assumptions and more recent evidence where available. This update was first discussed at SAGE on 19/11/2020 and has been updated to include a comparison with a counterfactual.

The paper estimates the morbidity and mortality impacts of COVID-19, split into **three time periods**:

- The impacts of the pandemic which have **already occurred**, between March 2020 and September 2020.
- The **possible additional impacts** which may occur between October 2020 and the end of February 2021 under specific scenarios, as well as the longer-term impacts (up to 50 years).
- Impacts between December 2020 and March 2021, when **compared to a possible counterfactual** where little or no government intervention was in place.

We consider both the **direct and indirect mortality and morbidity impacts of the pandemic** in the following categories of harm:

Category A: Direct health impacts from contracting COVID-19

Category B: Health outcomes from COVID-19 worsened in the event of lack of NHS critical care capacity

Category C: Health impacts from changes to health and social care made in order to respond to COVID-19, including changes to emergency care (C1), adult social care (C2), elective care (C3) and primary and community care (C4)

Category D: Health impacts from factors affecting the wider population, due to the pandemic (D1) and from economic impacts, such as increased deprivation (D2).

Our analysis is based on a series of scenarios and assumptions. In the event the trajectory of the pandemic resembles the scenarios assumed in our analysis, we can expect further deaths and health impacts over the next few months directly from contracting the virus (Category A), and indirectly as a result of changes to health and social care responding to the pandemic (Category C). However, the amount of harm in these areas in our main scenarios is expected to be markedly lower than in a counterfactual where there is little or no government intervention over the same period.

There may also be health impacts for the wider population living through the pandemic, due to COVID-19-related restrictions or voluntary behaviour changes. In the short term, this may result in fewer deaths (for example due to lower prevalence of infectious diseases or road injuries) but

greater morbidity impacts (for example due to impacts on mental health). Similarly impacts from the recession may result in more health impacts both in terms of mortality and morbidity in the longer term. However, we are unable to quantify the extent to which these health impacts would differ under a counterfactual; it is difficult to determine the degree of voluntary social distancing in the absence of government intervention and the impact of this on the economy, though we do expect the degree of voluntary social distancing to be related to the pandemic dynamics.

It is important to note that the analysis presented in this paper does not explicitly account for the [new variant 'B.1.1.7'](#) which was identified in December 2020 to have increased transmissibility compared to other variants of COVID-19. This paper was written prior to evidence of increased transmissibility being provided to NERVTAG on 18th December 2020 and uses scenarios which do not explicitly account for this. In light of variant B.1.1.7, the health impacts of both scenarios (which inform our main and counterfactual estimates) estimated in this paper could be worse, both in terms of direct and indirect health impacts if the new variant leads to increased infections, hospitalisations and deaths, and as a result greater levels of disruption to health and social care and tighter restrictions.

Main findings

Under the specific scenarios considered, in most areas of harm our estimates have increased compared to our previous paper. This is largely due to updating the scenarios modelled, which are described below, rather than due to updating the assumptions and methodologies for the categories of harm we have estimated.

- For several areas of harm, we use a central epidemiologically derived 'Winter Scenario' which aligns with observed growth in the pandemic in October but assumes impacts were felt two weeks earlier than seen in reality. This scenario contains a significant winter peak, whereas the previous paper's Central Static Scenario presented stable infections and deaths over time. Again, it is important to note throughout this paper that the Winter Scenario, or the other scenarios used to estimate health impacts, does not explicitly account for the newly identified variant B.1.1.7; health impacts could be worse than those estimated here given the increased transmissibility of the variant and the impacts this has on indirect health impacts.
- While all estimates presented are our best estimates of impacts, they are based on **scenarios** and **assumption-based analysis**. The scenarios are **not projections, predictions or forecasts** and represent one example of the potential impact of the pandemic. The pandemic could look very different to the scenarios presented in this paper, depending on a range of factors including but not limited to introduction of government interventions, public adherence to guidance or the impact of a vaccine roll-out. It is also important to note that they do not explicitly account for the increased transmissibility identified in the new variant, as noted above.
- Results presented are central estimates around which there is significant **uncertainty**, so we present upper and lower bounds in summary tables where these could be calculated; these are not available for all categories of harm. This uncertainty means comparisons between different impacts should be treated with caution, as the different methodologies for each category mean the uncertainty of each estimate is different.

Mortality impacts:

- In total, we estimate there could be approximately 1.5 million lost quality-adjusted life years (QALYs) due to mortality **across all categories and time periods in the main Winter Scenario**.
- In the short term across all categories of harm, we estimate 61,000 excess deaths may have occurred between March and September 2020, and 100,000 additional excess deaths may occur under the 'Winter Scenario' between October 2020 and the end of February 2021.
- The greatest number of excess deaths in the short-term (until March 2021) is likely to be seen in direct COVID-19 deaths (Category A) – approximately 120,000 excess deaths.
- Additionally, approximately 40,000 excess deaths may occur in the longer term (up to 50 years) as a result of economic impacts from the recession (Category D2).

Morbidity impacts:

- In total, we estimate approximately 2.9 million lost QALYs due to morbidity **across all categories of harm and time periods in the main Winter Scenario**.
- The most significant morbidity impacts may occur not directly due to COVID-19 itself, but for the wider population living through a pandemic, as a result of restrictions introduced to control COVID-19, voluntary behaviour changes related to the presence of COVID-19, or the economic impacts of a recession (Category D).
- A new addition to our analysis is an estimated total 174,000 lost QALYs that could occur for people who contract COVID-19 and develop lasting health impacts (e.g. fatigue), in order to provide an estimate for the impact of the condition or conditions termed as 'long COVID' (Category A).

[Counterfactual comparison \(three-month period\)](#)

It is important to note that the estimates above refer to a mitigated scenario where measures are put in place to control the transmission of the virus. We have also explored how these impacts would compare to one possible counterfactual where little or no government intervention is introduced, over a three-month period between the end of December 2020 and the end of March 2021.

- The counterfactual in this paper considers a scenario where there is little or no government intervention, and infections and hospitalisations increase until secondary healthcare is overwhelmed at which point it is assumed there is voluntary behaviour change in the population. Hospitals would face more pressures than in the main scenario and health and social care would be more impacted as a result (e.g. the need to cancel more urgent / non-urgent care).
- For the purposes of this paper, SPI-M-O have developed a modelled counterfactual, which covers a limited time period; we compare estimates of health impacts in our Winter Scenario and under a counterfactual over a **three-month period between the end of December 2020 and the end of March 2021 only**.
- This counterfactual results in greater negative impacts on mortality and morbidity of direct health impacts from contracting COVID-19, from a lack of NHS capacity to treat COVID-19 patients, and from pressures on other areas of health and social care, compared to the estimated impacts in our main scenario over the same period.
- Only a short period has been modelled due to the great uncertainty involved in producing a counterfactual scenario.
- This is just one possible counterfactual that could be used for this purpose; others could be worse or better depending on unknown behavioural responses. While epidemiologically

possible, this counterfactual does not represent a plausible scenario for the future as having no COVID-19 intervention is not Government policy. This counterfactual is **not** a reasonable worst-case.

Over a three-month period between the end of December 2020 and the end of March 2021:

- **Category A:** In terms of direct COVID-19 deaths, we estimate there could be an additional 97,000 excess deaths in a counterfactual compared to the Winter Scenario.
- **Category B:** In our main scenario, some excess deaths may be expected but have not been quantified due to the unpredictable and uncertain nature of the dynamics as the NHS nears full capacity. In a counterfactual, modelling is less sensitive to this issue of nearing capacity, because in the counterfactual it is more clearly breached. It suggests there may be an additional 76,000 excess deaths due to a lack of NHS critical care capacity leading to worsened outcomes for COVID-19 patients.
- **Category C:** Under a counterfactual there may be 12,000 additional excess deaths from changes to emergency care and 43,000 additional excess deaths from changes to adult social care. We are unable to quantify the impact on elective and primary and community care, but it seems likely there would be more significant health impacts under a counterfactual.
- **Category D:** For health impacts affecting the wider population, it has not been possible to quantify the impact relative to a counterfactual where there is little or no government intervention. This is as a result of no established way in government of determining the degree of voluntary social distancing in the absence of government intervention and the impact of this on the economy. We expect the degree of voluntary social distancing to be related to the dynamic of the pandemic (when transmission is high, individuals are more likely to self-regulate their behaviour, relative to when transmission is lower). Therefore, our main estimates cannot be used to evaluate the impact of measures put in place to control the transmission of COVID-19. In Annex E, we present a discussion of how our estimates relate to a counterfactual with little or no government intervention over the three months between December and the end of February.

Table 1. Summary of changes to methodology and QALY estimates

The table below summarises the changes to methodology and QALY estimates the previous paper (July 2020). These figures are central estimates and relate to our main scenario – they do not refer to the counterfactual.

Category of Harm	Summary of Changes	Mortality (QALYs)			Morbidity (QALYs)			
		Direction of Change	Previous	Updated	Direction of Change	Previous	Updated	
A	Directly from COVID-19	New mortality estimates include impacts to date and estimated impacts under a Winter Scenario. Changes to morbidity methods to estimate long COVID impacts.	↑	530,000	910,000	↑	40,000	174,000
B	From COVID-19 as a result of lack of NHS critical care capacity	Updated modelling approach to estimate impact on mortality if beds are breached. Definition extended to cover general beds as well as critical care beds.	Unquantified ¹			No estimate has been provided.		
C1	From changes to emergency care, to respond to COVID-19	New mortality estimates include impacts to date and estimated impacts under a Winter Scenario. Morbidity impacts increased due to changes in scenario. No changes to estimates of impacts for healthcare staff.	↓	41,000	37,000	↑	157,000	309,000
C2	From changes to adult social care, to respond to COVID-19	New mortality estimates include impacts to date and estimated impacts until February 2021. No changes to estimates of morbidity impacts for social care staff.	↑	73,000	88,000	→	21,000	21,000
C3	From changes to elective care, to respond to COVID-19	Updated assumptions on disruption to elective care to date; now includes estimates from second wave and impacts of infection control measures.	↑	45,000	64,000	↑	254,000	403,000
C4	From changes to primary & community care, to respond to COVID-19 ²	No changes; methodology and estimates have not been updated on this occasion.	→	3,500	3,500	→	300	300
D1	For the wider population due to the pandemic	Previous methodology only accounted for two-month lockdown; new estimates are based on potential harm under varying levels of restrictions until end of February 2021.	↓	-30,000	-48,000	↑	134,000	<1,100,000
D2	Impacts from recession	We have updated the methodology to exclude short-term impacts and introduce longer-term economic forecasts relative to a pre-Covid-19 baseline to identify the impact of Covid-19 on unemployment.	↓	421,000	400,000	↑	421,000	900,000

¹ Some excess deaths may be expected but have not been quantified due to the dynamic, unpredictable and uncertain nature of the dynamics as the NHS nears full capacity. New modelling suggests if COVID-19 patients requiring ICU ward care do not receive it, their mortality rate will increase by 55 percentage points (from 60% to 94% mortality rate). See Annex B for further discussion.

² It has not been possible to update these estimates on this occasion.