`UK assessments: **Impact assessment of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand**

Neil Ferguson's team at Imperial College, London, modelled the impact of COVID-19, interventions to reduce spread and their effects on case fatality.

The assumptions they made include:

- COVID have an incubation period of 5.1 days
- Infectiousness occur 12 hours prior to the onset of symptoms for symptomatic and 4.6 days in asymptomatic
- Based on Wuhan data they estimated R_0=2.4 and examined values between 2.0 and 2.6.
- Estimated symptomatic individuals are 50% more infectious than asymptomatic individuals.
- Individual infectiousness is variable (gamma distribution mean of 1 and shape parameter α=0.25.
- Growth rate (with a doubling time of 5 days) from early January 2020
- Estimated 40% to 50% of infections in China were not identified.
- 30% of hospitalised cases require critical care, for an overall mean duration of hospitalisation of 10.4 days.
- They also acknowledge there are very large uncertainties around the transmission of this virus

The Infection Fatality Rate estimates were based on from Verity et al
And adjusted to account for a non-uniform attack rate giving an overall IFR of 0.9% (95% credible interval 0.4%-1.4%).

Age-group (years)	% symptomatic cases requiring hospitalisation	% hospitalised cases requiring critical care	Infection Fatality Ratio
0 to 9	0.1%	5.0%	0.002%
10 to 19	0.3%	5.0%	0.006%
20 to 29	1.2%	5.0%	0.03%
30 to 39	3.2%	5.0%	0.08%
40 to 49	4.9%	6.3%	0.15%
50 to 59	10.2%	12.2%	0.60%
60 to 69	16.6%	27.4%	2.2%
70 to 79	24.3%	43.2%	5.1%
80+	27.3%	70.9%	9.3%

Published in MedRxiv (**preprint and not been peer-reviewed)** Verity obtained age-stratified CFR estimates from cumulative death data in China, and from individual data on 1,334 cases identified outside of mainland China.

Verity estimated:

- Mean duration from onset-of-symptoms to death 17.8 days (95% credible interval, crI 16.9,19.2 days);
- onset-of-symptoms to hospital discharge 22.6 days (95% crI 21.1,24.4 days).
- Estimate a crude CFR of 3.67% (95% crI 3.56%,3.80%) in cases from mainland China.
- Adjustment for under-ascertainment of milder cases in Wuhan relative to the rest of China, they obtained a best estimate of the CFR in China of 1.38% (95% crI 1.23%,1.53%)
- Overall IFR estimate for China of 0.66% (0.39%,1.33%), increasing with age.

- Early estimates give an indication of the CFR and demonstrate an age-gradient in risk.
- Their estimates suggest there is substantial under-ascertainment of cases. This under-ascertainment led to lower estimates of the crude CFR from China (3.67%) and their estimate of the overall CFR (1.4%).
- They report the CFR is likely to be strongly influenced by the availability of healthcare.
- We expect higher CFRs in those that are more severely ill. Many case reports note that the presence of other underlying conditions result in poorer prognosis.

In the absence of control measures Ferguson et al estimated the peak mortality would occur after approximately 3 months (estimated R_0 of 2.4) with an 81% of the GB and US populations infected over the course of the epidemic. In an unmitigated epidemic they predict approximately 510,000 deaths in GB and 2.2 million in the US. Would occur.