A sensible COVID-19 exit strategy for the UK

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The current approach

A study by the COVID-19 Response Team from Imperial College (Ferguson et al. 2020[1]) appears to be largely responsible for driving UK government policy actions. The lockdown imposed in the UK appears, unsurprisingly, to have slowed the growth of COVID-19 infections, and may well soon lead to total active cases declining. However, it comes at huge economic and social costs, and substantial COVID-19-unrelated health costs.

Worse, the lockdown is merely a holding strategy, which offers no long term solution to the COVID-19 problem. The eventual total number of deaths for COVID-19 are not reduced relative to any less restrictive policy that likewise avoided the health system being overwhelmed. Deaths are merely spread over a longer period, assuming that eventually restrictions are lifted and people's lives return to normal.

Vaccinating the population against COVID-19 is unlikely to be achieved for 15-18 months at best. A repurposed existing drug might be found to work on a shorter timescale, but a sensible strategy cannot rely on that hope. Developing and testing a successful new drug would likely take longer. Worse, there is no guarantee that a vaccine or drug effective against COVID-19 will be found in the foreseeable future.

Ferguson et al. illustrates an adaptive cyclical on-off triggering of suppression strategies – involving lockdown approximately two-thirds of the time – extending to the end of 2021. But by that time their model implies that under 2% of the population has been infected and acquired immunity, whereas 80+% of the population needs to have been infected in order to achieve herd immunity in the absence of any restrictions. It would take of the order of 70 years living under an on-off lockdown regime to achieve that level.

A sensible approach

Clearly, the Ferguson et al. illustrated on-off lockdown strategy is not appropriate. A more intelligent approach is needed. Fortunately, there is an obvious solution. The key is to remove restrictions from those segments of the population that are at low risk of death from COVID-19 infection. Age is a key factor here. However, another key factor is whether a person suffers from various chronic health conditions, the most prevalent of which are hypertension, diabetes, cardiovascular disease, atrial fibrillation, obstructive pulmonary disease, and renal failure ("relevant health conditions").

Over half the population are under 70 years old and do not suffer from any chronic health conditions that are associated with a much elevated infection fatality rate (IFR). The IFR that I estimate for that segment of the population is only 0.03%. So is the estimated IFR for people under 30 years old who have one or more relevant health conditions.

I estimate that there are over 41 million people who are under 70 with no relevant health conditions, or have such conditions but are under 30. Allowing them to resume normal life, subject to some precautions, should lead to around 87% of them being exposed to COVID-19 and, if susceptible to it, infected, over the next few months. Because the IFR for these groups is very low, the resulting likely number of deaths would be relatively modest – slightly over 10,000. That would represent under 2%

of the expected total deaths in the UK during 2020. And if the IFR estimates that Ferguson et al. are using turn out to be too high, as looks increasingly likely, there could be substantially fewer deaths.

Assuming that these 10,000 deaths were spread over six months, on average slightly over 2,000 ICU beds would be occupied. The extent of precautions taken could be varied over time to achieve an even ICU bed occupancy level. If it turned out that a significant proportion of the population was already not susceptible to COVID-19 infection, the number of deaths could be substantially lower.

During the period of about six months during which the non-vulnerable population was exposed to COVID-19 infection, vulnerable groups (people over 30 year olds with any relevant health condition, and all over 70 year olds) would need to remain fairly isolated from other people who remained susceptible to COVID-19. By the end of that period approximately 54% of the population would no longer be susceptible to COVID-19. That is sufficient to provide herd immunity if the reproduction ratio is below 1.5.

The fact that daily new cases of COVID-19 have not been increasing in Sweden since the end of March 2020 strongly suggests that the relatively limited measures taken there have reduced the reproduction ratio to well below 1.5, despite that being totally at variance with the much smaller reduction that the Imperial College Response Team's modelling in another study (Flaxman et al 2020)[2] implies. Therefore, weaker measures than those in force in Sweden at that time should be adequate to prevent any resurgence of COVID-19 infections in the UK if 54% herd immunity is achieved.

My proposed exit strategy would enable over 60% of the UK population to immediately resume something close to normal life, with the other, more vulnerable, groups being able to do so, subject to some precautions (which could be on an advisory rather than mandatory basis) within six months.

In contrast, the current policy in the UK, which aims for all parts of the population to avoid exposure to COVID-19, will – until and unless an effective vaccine is available – take multiple years to achieve a sufficient level of herd immunity for relatively limited measures to be effective in preventing a resurgence of infections.

The IFR estimates that I use are based on those given in another paper by the same team at Imperial (Verity et al.2020 [3]), on which the Ferguson et al. assumptions were based, and on other published findings. The ICU bed occupation estimates that I use are based on the assumptions in Ferguson et al. Further details of my results and the data and assumptions involved are available here.

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References and Notes

[1] Neil M Ferguson et al., Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand, Imperial College COVID-19 Response Team Report 9, 16 March 2020, https://spiral.imperial.ac.uk:8443/handle/10044/1/77482

[2] Flaxman, Seth, et al. "Report 13: Estimating the number of infections and the impact of non-pharmaceutical interventions on COVID-19 in 11 European countries." (2020). https://spiral.imperial.ac.uk/bitstream/10044/1/77731/9/2020-03-30-COVID19-Report-13.pdf

[3] Verity R, Okell LC, Dorigatti I, et al. Estimates of the severity of COVID-19 disease. medRxiv 13 March 2020; https://www.medrxiv.org/content/10.1101/2020.03.09.20033357v1.