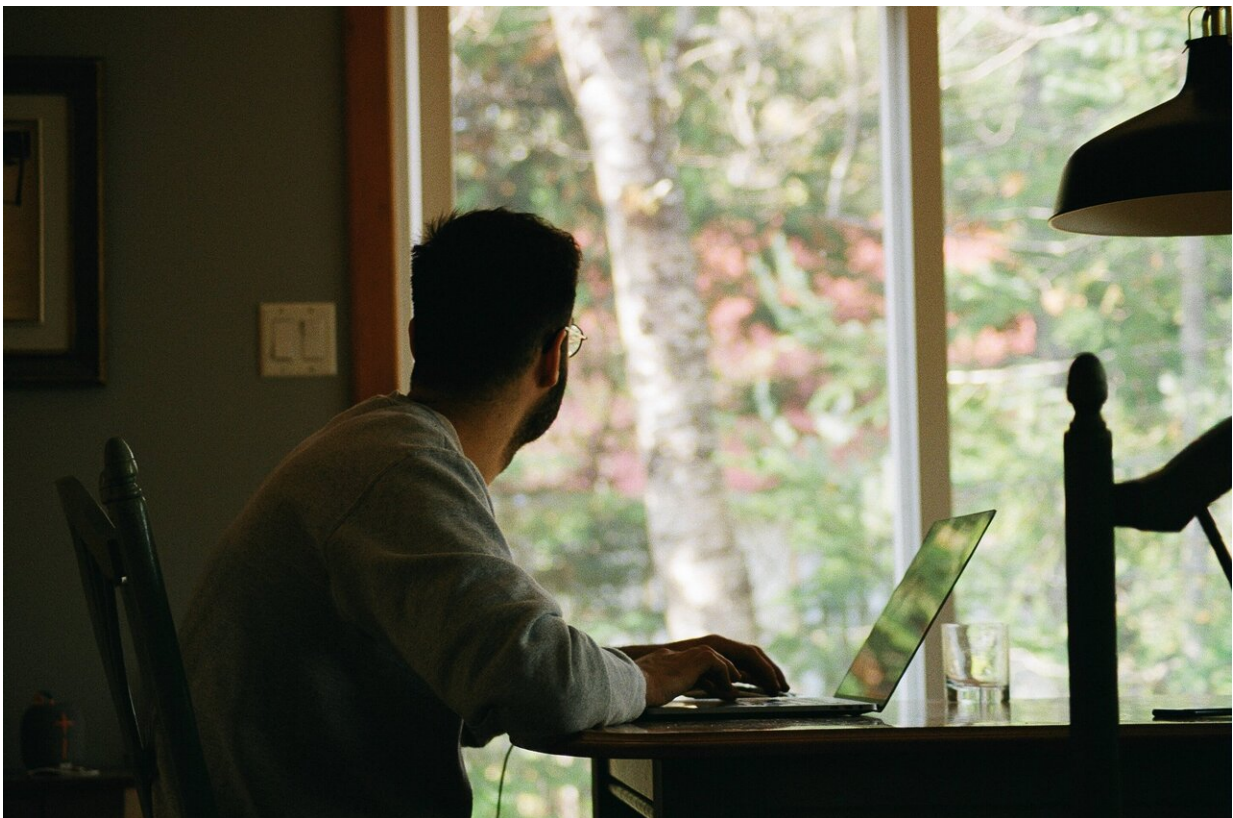


Alternating lockdown strategy can help defeat COVID-19 and sustain socio-economic activity

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Social distancing—from mobility restrictions to complete lockdowns—can take many weeks, possibly even months, a potentially

devastating outcome for social and economic stability. One of the challenges is that the sick cannot be selectively isolated, since many of the spreaders remain pre-symptomatic for a period ranging from several days to as much as two weeks—invisible spreaders who continue to be socially active. Hence, it seems that without a population-wide lockdown isolating the carriers cannot be achieved effectively.

To bypass this challenge, researchers from Israel's Bar-Ilan University, led by Prof. Baruch Barzel, devised a strategy based on alternating lockdowns: first splitting the population into two groups, then alternating these groups between lockdown and routine activity in weekly succession. Together with isolation of the symptomatic spreaders and the adoption of everyday prophylactic behaviors, this strategy can help defeat the virus, while sustaining socio-economic activity at a 50% level. This strategy was recently published in the journal *Nature Communications*.

In the alternating lockdown routine, society is partitioned into two groups, with little interaction between them—one half active this week, and the other active only the next. This will already slow the spread, but its main advantage is that it helps isolate the invisible spreaders, such as those who are pre-symptomatic carriers still in the [incubation period](#). "Consider an individual who became infected during their active week. They are now in their pre-symptomatic period—the most dangerous stage, in which they are invisible spreaders. The crucial point is that, according to the alternating lock-down routine they are now scheduled to enter their lockdown phase," explains Prof. Barzel, of Bar-Ilan's Department of Mathematics. "Staying at home for another week, they will most likely begin to exhibit symptoms, and therefore remain in isolation until full recovery. Indeed, if following a week of lockdown they show no symptoms, they are most likely uninfected and can partake in social and professional activities during their active week. Therefore, alternating lockdown with full isolation of symptomatic spreaders

ensures that at all times, the majority of invisible spreaders are inactive, as their incubation period is naturally directed towards their lockdown phase."

Most people are extremely cautious, and will refrain from any contact with someone showing symptoms. "Therefore, we believe that it is the invisible spreaders that are the main contributors to the proliferating case count. Our strategy is precisely directed at this challenge—placing each person on weekly lockdown after they were potentially exposed during their active week. Hence, we effectively isolate not just the sick, but also the majority of the pre-symptomatic carriers," says Barzel.

To examine this Barzel and team simulated the spread of COVID-19 using a detailed epidemiological model. This model tracks the number of individuals as they transition between the different stages of the disease, from the pre-symptomatic phase to the onset of symptoms and, down the disease cycle, to potential hospitalization, ventilation or even mortality. They found that employing their strategy significantly reduces the spread and helps flatten the curve, with effectiveness comparable to that of an 80% lockdown, all the while sustaining continuous socioeconomic activity at 50% capacity.

"We can achieve more if we also adopt responsible behavior. Specifically, we expect that even during their active week, people will continue to interact with caution: avoid physical contact, increase personal space and practice hygienic behavior. These additional measures, when coupled with our alternating lockdown strategy, can help inhibit the spread, allowing us to overcome COVID-19 with reasonable economic consequences," he says.

Sustaining restrictive measures such as lockdowns is always a challenge, since some percentage of the population may not cooperate, especially in democratic and individualistic societies. The researchers therefore

allowed for a fraction of defectors who continue to be active even during their lockdown phase in their simulation. This can also represent exempt individuals who hold essential positions and cannot be under lockdown. They found that even under 20% of non-cooperators their [strategy](#) would still overcome the viral spread.

The proposed weekly succession is aimed to sustain a functional economy in these challenging times. The researchers believe that, providing an outlet for people to continue their social and professional activity, at least at 50% capacity, will, in and of itself encourage cooperation, as it relaxes some of the individual stress endured under [lockdown](#).

More information: Dror Meidan et al, Alternating quarantine for sustainable epidemic mitigation, *Nature Communications* (2021). [DOI: 10.1038/s41467-020-20324-8](https://doi.org/10.1038/s41467-020-20324-8)

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